

# **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 (as amended)**

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

The Permit number is:                   EPR/BX2094IJ  
The Operator is:                         British Sugar PLC  
The Installation is:                     Bury St Edmunds Sugar Factory  
This Variation Notice number is:   EPR/BX2094IJ/V011

### **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 by the European Commission of updated decisions on best available techniques (BAT) Conclusions.

We have reviewed the permit for this installation against the BAT Conclusions for the Food, Drink and Milk Industries published on 4<sup>th</sup> December 2019 in the Official Journal of the European Union. In this decision document, we set out the reasoning for the consolidated variation notice that we have issued.

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

As well as 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 issue. Where this has not already been done, 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 with other permits issued to Installations in this sector. Although the wording of some conditions has changed, while others have been deleted because of the new regulatory approach, it does not reduce the level of environmental protection achieved by the Permit in any way. In this document, we therefore address only our determination of substantive issues relating to the new BAT Conclusions and any changes to the operation of the installation.

We try to explain our decision as accurately, comprehensively and plainly as possible. Achieving all three objectives is not always easy, and we would welcome any feedback as to how we might improve our decision documents in future.

## **How this document is structured**

1. Our decision
2. How we reached our decision
3. The legal framework
4. Annex 1 – Review of operating techniques within the Installation against any relevant BAT Conclusions.
5. Annex 2 – Review and assessment of changes that are not part of the BAT Conclusions derived permit review
6. Annex 3 – Improvement Conditions

# 1 Our decision

We have decided to issue the Variation Notice to the Operator. This will allow the Operator to continue to operate the Installation, subject to the conditions in the Consolidated Variation Notice that updates the whole permit.

We consider that, in reaching our 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 Conclusion techniques

We issued a Notice under Regulation 61(1) of the Environmental Permitting (England and Wales) Regulations 2016 (a Regulation 61 Notice) on 08/06/2022 requiring the Operator to provide information to demonstrate where the operation of their installation currently meets, or how it will subsequently meet, the revised standards described in the relevant BAT Conclusions documents.

The Notice required that where the revised standards are not currently met, the operator should provide information that:

- describes the techniques that will be implemented before 4 December 2023, which will then ensure that operations meet the revised standards, or
- justifies why standards will not be met by 4 December 2023, and confirmation of the date when the operation of those processes will cease within the Installation or an explanation of why the revised BAT standards are not applicable to those processes, or
- justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised BAT standards 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 required that the Operator make a formal request for derogation from compliance with that BAT-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 07/10/2022.

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

The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 61 Notice response that appears to be confidential in relation to any party.

## 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 experience in the regulation of the installation we have no reason to consider that the Operator will not be able to comply with the techniques and standards described in the BAT Conclusions.

## 2.3 Other considerations

We have addressed any other key issues for the sector as part of this review process.

### Variation EPR/BX2094IJ/V010

Concurrently with the review process, we have also decided to grant an applied for variation for Bury St Edmunds Sugar Factory operated by British Sugar.

The variation number is EPR/BX2094IJ/V010.

The operator has applied to convert the Animal Feed Dryer No.1 (emission point A51) from coal fired to natural gas fired.

We consider that in reaching our decision to vary the permit we have taken into account all relevant considerations and legal requirements. We are satisfied that the permit will ensure that a high level of protection is provided for the environment and human health and that the activities will not give rise to any significant pollution of the environment or harm to human health.

### 3 The legal framework

The Consolidated Variation Notice will be issued under Regulations 18 and 20 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- an *installation* as described by the IED;
- subject to aspects of other relevant legislation which also have to be addressed.

We consider that, in issuing the Consolidated Variation Notice, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

## Annex 1: decision checklist regarding relevant BAT Conclusions

BAT Conclusions for the Food, Drink and Milk Industries, were published by the European Commission on 4 December 2019.

There are 37 BAT Conclusions.

BAT 1 – 15 are General BAT Conclusions (Narrative BAT) applicable to all relevant Food, Drink and Milk Installations in scope.

BAT 16 – 37 are sector-specific BAT Conclusions, including Best Available Techniques Associated Emissions Levels (BAT-AELs) and Associated Environmental Performance Levels (BAT-AEPLs):

BAT 16 & 17	BAT Conclusions for Animal Feed
BAT 18 – 20	BAT Conclusions for Brewing
BAT 21 – 23	BAT Conclusions for Dairies
BAT 24	BAT Conclusions for Ethanol Production
BAT 25 & 26	BAT Conclusions for Fish and Shellfish Processing
BAT 27	BAT Conclusions for Fruit and Vegetable Processing
BAT 28	BAT Conclusions for Grain Milling
BAT 29	BAT Conclusions for Meat Processing
BAT 30 – 32	BAT Conclusions for Oilseed Processing and Vegetable Oil Refining
BAT 33	BAT Conclusions for Soft Drinks and Nectar/Fruit Juice Processed from Fruit and Vegetables
BAT 34	BAT Conclusions for Starch Production
BAT 35 – 37	BAT Conclusions for Sugar Manufacturing

In addition to the BAT Conclusions for the Food, Drink and Milk Industries; the following BAT Conclusions also apply (as “secondary” BREF BAT Conclusions) due to the site activities:

- Large Combustion Plant (LCP) BAT Conclusions, published 17 August 2017 (relevant to FDM sites operating LCP):

BAT 1 – 17 (General BAT Conclusions), BAT 28 – 30 and BAT 40 – 45.

- Cement & Lime BAT Conclusions, published 9 April 2013 (relevant to FDM sites undertaking lime production):

BAT 1, 2, 30 – 54.

- Waste Treatment BAT Conclusions, published 10 August 2018 (relevant to FDM sites undertaking Anaerobic Digestion).

BAT 15, 16, 21 & 38.

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 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**

BATC No.	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
<b>GENERAL BAT CONCLUSIONS (BAT 1-15)</b>			
1	<p><b>Environmental Management System - Improve overall environmental performance.</b></p> <p>Implement an EMS that incorporates all the features as described within BATc 1.</p>	<b>CC</b>	<p>The operator has provided information to support compliance with BATc 1. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 1.</p> <p>The operator has an EMS externally accredited to the ISO14001 standard.</p>
2	<p><b>EMS Inventory of inputs &amp; outputs. Increase resource efficiency and reduce emissions.</b></p> <p>Establish, maintain and regularly review (including when a significant change occurs) an inventory of water, energy and raw materials consumption as well as of wastewater and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the features as detailed within the BATCs.</p>	<b>CC</b>	<p>The operator has provided information to support compliance with BATc 2. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 2.</p> <p>The operator has an EMS externally accredited to the ISO14001 standard</p>
3	<p><b>Monitoring key process parameters at key locations for emissions to water.</b></p> <p>For relevant emissions to water as identified by the inventory of wastewater streams (see BAT 2), BAT is to monitor key process parameters (e.g. continuous monitoring of waste water flow, pH and temperature) at key locations (e.g. at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation).</p>	<b>CC</b>	<p>The operator has provided information to support compliance with BATc 3. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 3.</p> <p>The operator ensures that key process parameters are monitored on the site's wastewater plant. This includes all incoming feeds, intermediate and outlets from the plant. These along with continuous dissolved oxygen levels are fed back to the sites distribution control system (DCS).</p>
4	<p><b>Monitoring emissions to water to the required frequencies and standards.</b></p> <p>BAT is to monitor emissions to water with at least the frequency given [refer to BAT 4 table in BATc] and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</p>	<b>FC</b>	<p>The operator proposed the following frequency for monitoring:</p>

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			<p><b>Table 1:</b> Wastewater monitoring schedule for Emission Point W1 (River Lark) – current as defined in permit and proposed</p> <table border="1" data-bbox="1447 293 1995 612"> <thead> <tr> <th>Parameter</th> <th>Current Sampling Schedule</th> <th>Proposed Sampling Schedule</th> </tr> </thead> <tbody> <tr><td>BOD</td><td>Weekly</td><td>Weekly</td></tr> <tr><td>COD <sup>(1&amp;2)</sup></td><td>None</td><td>3 times per week</td></tr> <tr><td>Temperature</td><td>Daily</td><td>Daily</td></tr> <tr><td>TSS</td><td>Weekly</td><td>Daily</td></tr> <tr><td>TN <sup>(2)</sup></td><td>None</td><td>3 times per week</td></tr> <tr><td>TP <sup>(2)</sup></td><td>None</td><td>3 times per week</td></tr> <tr><td>NH3</td><td>Weekly</td><td>Daily</td></tr> <tr><td>Iron</td><td>Weekly</td><td>Weekly</td></tr> <tr><td>Chloride</td><td>None</td><td>Monthly</td></tr> <tr><td>Phosphate</td><td>None</td><td>3 times per week</td></tr> <tr><td>Total Copper</td><td>Monthly</td><td>Monthly</td></tr> <tr><td>Total Nickel</td><td>Monthly</td><td>Monthly</td></tr> </tbody> </table> <p>British Sugar currently monitors COD and not TOC.</p> <p><b>Table 2:</b> Wastewater monitoring schedule for Emission Point E7 (to Soakaway) – current as defined in permit</p> <table border="1" data-bbox="1447 735 1812 1011"> <thead> <tr> <th>Parameter</th> <th>Current Sampling Schedule</th> </tr> </thead> <tbody> <tr><td>BOD</td><td>Weekly</td></tr> <tr><td>COD</td><td>None</td></tr> <tr><td>TN</td><td>None</td></tr> <tr><td>TON</td><td>Weekly</td></tr> <tr><td>TP</td><td>Weekly</td></tr> <tr><td>NH3</td><td>Daily</td></tr> <tr><td>Iron</td><td>Weekly</td></tr> <tr><td>pH</td><td>Daily</td></tr> <tr><td>Chloride</td><td>Weekly</td></tr> <tr><td>Phosphate</td><td>Weekly</td></tr> </tbody> </table> <p>British Sugar currently monitors COD and not TOC.</p> <p>A reduced frequency is only acceptable where an operator can demonstrate that their effluent is suitably stable.</p> <p>In this case, we have applied the requirements as per BATc4.</p>	Parameter	Current Sampling Schedule	Proposed Sampling Schedule	BOD	Weekly	Weekly	COD <sup>(1&amp;2)</sup>	None	3 times per week	Temperature	Daily	Daily	TSS	Weekly	Daily	TN <sup>(2)</sup>	None	3 times per week	TP <sup>(2)</sup>	None	3 times per week	NH3	Weekly	Daily	Iron	Weekly	Weekly	Chloride	None	Monthly	Phosphate	None	3 times per week	Total Copper	Monthly	Monthly	Total Nickel	Monthly	Monthly	Parameter	Current Sampling Schedule	BOD	Weekly	COD	None	TN	None	TON	Weekly	TP	Weekly	NH3	Daily	Iron	Weekly	pH	Daily	Chloride	Weekly	Phosphate	Weekly
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5	<p><b>Monitoring channelled emissions to air to the required frequencies and standards.</b></p> <p>BAT is to monitor channelled emissions to air with at least the frequency given and in accordance with EN standards.</p>	FC	<p>The operator proposed the following monitoring schedule:</p>																																																													



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			<p>Where required frequencies above are more than the existing permit we commit to increasing to the frequencies below:</p> <p><b>Table 3: Air emissions monitoring schedule – current as defined in permit and proposed</b></p> <table border="1" data-bbox="1462 323 2011 512"> <thead> <tr> <th colspan="3">Animal Feed Dryers (A52, A53, A54)</th> </tr> <tr> <th>Parameter</th> <th>Current Sampling requirements</th> <th>Proposed Sampling Requirements</th> </tr> </thead> <tbody> <tr> <td>Dust</td> <td>Annual</td> <td>Monthly</td> </tr> <tr> <td>PM2.5 and PM10</td> <td>None</td> <td>Annual</td> </tr> <tr> <td>TVOC</td> <td>None</td> <td>Annual</td> </tr> <tr> <td>NOx</td> <td>Annual</td> <td>Annual</td> </tr> <tr> <td>CO</td> <td>Annual</td> <td>Annual</td> </tr> <tr> <td>SOx</td> <td>Annual</td> <td>Not required when burning gas</td> </tr> <tr> <th colspan="3">Pellet Collers (A54 &amp; A55)</th> </tr> <tr> <td>Dust</td> <td>None</td> <td>Annual</td> </tr> </tbody> </table> <p>In this case, we have applied the requirements as per the BATc5.</p>	Animal Feed Dryers (A52, A53, A54)			Parameter	Current Sampling requirements	Proposed Sampling Requirements	Dust	Annual	Monthly	PM2.5 and PM10	None	Annual	TVOC	None	Annual	NOx	Annual	Annual	CO	Annual	Annual	SOx	Annual	Not required when burning gas	Pellet Collers (A54 & A55)			Dust	None	Annual
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6	<p><b>Energy Efficiency</b></p> <p>In order to increase energy efficiency, BAT is to use an energy efficiency plan (BAT 6a) and an appropriate combination of the common techniques listed in technique 6b within the table in the BATc.</p>	CC	<p>The operator has provided information to support compliance with BATc 6. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 6.</p> <p>The operator has an Energy Efficiency Plan which is externally accredited to the ISO150001 standard, and they closely monitor the energy usage throughout the manufacturing process.</p> <p>The operator also implements the following techniques at site:</p> <ul style="list-style-type: none"> <li>• Burner regulation and control – the sites gas turbine utilises combustion control computer to optimise the combustion process.</li> <li>• Co-generation – the site operates a CHP, natural gas is burned in the gas turbine, the exhaust gases from this heat a waste heat boiler and the steam generated goes through a steam turbine before being utilised in the manufacturing processes.</li> <li>• Heat recovery is used throughout the sugar manufacturing process.</li> </ul>																														

BATC No.	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
			<ul style="list-style-type: none"> <li>• Lighting – programme to implement LED lighting.</li> <li>• Boiler blowdown is minimised – the boiler is made up with ultra-pure water and boiler drum conductivity is monitored.</li> <li>• Steam distribution systems – the use of low-grade vapours within the multiple effect evaporator steam distribution system is prioritised to maximise energy efficiency.</li> <li>• Boiler feed water is preheated, and site boilers have economisers.</li> <li>• Process Control systems – the site uses a distributed control system to manage plant processes.</li> <li>• Reducing compressed air system leaks – the site actively looks for and address any compressed air leaks, regular audio-visual inspection (AVI) routes are carried out.</li> <li>• Reducing heat losses by insulation – pipes and vessel are lagged to reduce heat loss from the process.</li> <li>• Variable speed drives – the site uses inverter driven drives to reduced energy consumption.</li> <li>• Multiple-effect evaporation – the CHP produces steam, which is supplied to the first effects of a multiple effect evaporator chain. The thin juice supplied to the evaporators is preheated to ensure good thermal efficiency. The majority of the vapour generated in each of the initial 3 effects is passed to the next effect in the chain. A significant amount of the vapour from the 4th effects onwards is used for heating duties elsewhere in the sugar process.</li> </ul>
7	<p><b>Water and wastewater minimisation</b></p> <p>In order to reduce water consumption and the volume of waste water discharged, BAT is to use BAT 7a and one or a combination of the techniques b to k given below.</p> <p>(a) water recycling and/or reuse</p>	CC	<p>The operator has provided information to support compliance with BATc 7. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 7.</p>

BATC No	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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) Optimisation of water flow (c) Optimisation of water nozzles and hoses (d) Segregation of water streams Techniques related to cleaning operations: (e) Dry cleaning (f) Pigging system for pipes (g) High-pressure cleaning (h) Optimisation of chemical dosing and water use in cleaning-in-place (CIP) (i) Low-pressure foam and/or gel cleaning (j) Optimised design and construction of equipment and process areas (k) Cleaning of equipment as soon as possible		The operator implements a combination of techniques at site such as: (a) Sugar beet is 75% water, this water is stored and reused all over the site in multiple applications. (b) Control devices frequently employed in water circuits, and within the factory processes for flow & water optimisation. (c) Nozzles are used on many applications, including sugar beet cleaning/washing sprays, in the water circuit prior to the beet entering the factory and sugar crystal washing to remove traces of syrup in sugar extraction process. Hoses are utilised in many locations across the factory, and the water usage is monitored frequently. (d) Segregation of water streams is optimised in order to minimise treatment demand and is reviewed using water audits. (e) Dry cleaning is employed when the spillage/cleaning requirement is dry and can be cleaned without using water/liquid; e.g. final product areas (sugar, animal feed). (f) High-pressure cleaning is regularly used for heat exchange cleaning, removal of scale & blockages from pipework. (g) Optimisation of chemical dosing & water use in cleaning-in-place (CIP) – end of campaign beet-end chemical cleaning. (h) Optimised design and construction of equipment and process areas are applied through the stage & gate capital project development process. (k) Prioritised cleaning schedules are implemented across the site.
8	<b>Prevent or reduce the use of harmful substances</b> In order to prevent or reduce the use of harmful substances, e.g. in cleaning and disinfection, BAT is to use one or a combination of the techniques given below.	CC	The operator has provided information to support compliance with BATc 8. We have assessed the

BATC No	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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
	<p>(a) Proper selection of cleaning chemicals and/or disinfectants</p> <p>(b) Reuse of cleaning chemicals in cleaning-in-place (CIP)</p> <p>(c) Dry cleaning</p> <p>(d) Optimised design and construction of equipment and process areas [for detail of each technique, refer BAT 8 table in BATc]</p>		<p>information provided and we are satisfied that the operator has demonstrated compliance with BATc 8.</p> <p>Sugar manufacturing processes operate throughout the year in two distinct periods firstly beet processing and the second is sugar juice refining. Both processes employ very high temperatures and therefore the need to for cleaning and in particular Cleaning in Place (CIP) is minimal. The primary aim of the cleaning techniques employed is for descaling process plant.</p> <p>Where plant can safely be isolated from the process stream, e.g. heat exchangers, this will be carried out using high pressure water jetting. Where plant cannot be taken offline, cleaning is carried out at the end of operational periods using chemicals, namely sodium hydroxide or sodium carbonate and EDTA. EDTA is selected due to its effectiveness in cleaning the types of scale found in the sugar manufacturing process equipment, in particular calcium oxalate and is related to process chemistry. The amount of chemicals used is carefully monitored during the cleaning cycle and when the chemical levels reach constant concentration then the cleaning is considered to be finished. This activity tends to be carried out once per year at the end of the beet campaign.</p> <p>Halogenated biocides are used for biological control in water systems, generally for control of Legionella. Their use is carefully controlled based on targeted minimum residual levels of halogen and microbiological analysis to minimise health and safety risk. A number of chemicals used in sugar manufacturing historically, namely sulphuric acid, hydrochloric acid, caustic soda and sodium hypochlorite contained traces of cadmium and mercury by virtue of the manufacturing processes employed. These manufacturing techniques are now generally</p>

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			<p>phased out and as a result, these chemicals are produced using techniques that do not give rise to contamination with cadmium or mercury and only appropriately sourced chemicals are used. Supplier analysis is received on a quarterly basis and shows mercury and cadmium levels are below the limits of detection.</p> <p>Dry cleaning is utilised for process where appropriate such as cleaning of spillages of sugar and animal feed.</p>
9	<p><b>Refrigerants</b></p> <p>In order to prevent emissions of ozone-depleting substances and of substances with a high global warming potential from cooling and freezing, BAT is to use refrigerants without ozone depletion potential and with a low global warming potential.</p>	<b>CC</b>	<p>The operator has provided information to support compliance with BATc 9. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 9.</p> <p>The operator does not use large-scale cooling; and the majority of cooling across their operational sites is provided by evaporative cooling.</p> <p>However, the Operator has demonstrated a detailed understanding of the requirements of BAT 9 and has stated that all new refrigeration systems will use refrigerants with the lowest practical GWP. As with end of life system replacements, ultra-low GWP refrigerants would be used wherever possible.</p>
10	<p><b>Resource efficiency</b></p> <p>In order to increase resource efficiency, BAT is to use one or a combination of the techniques given below:</p> <ul style="list-style-type: none"> <li>(a) Anaerobic digestion</li> <li>(b) Use of residues</li> <li>(c) Separation of residues</li> <li>(d) Recovery and reuse of residues from the pasteuriser</li> <li>(e) Phosphorus recovery as struvite</li> <li>(f) Use of waste water for land spreading</li> </ul>	<b>CC</b>	<p>The operator has provided information to support compliance with BATc 10. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 10.</p> <p>The operator monitors and reports on the usage of all raw materials on a detailed basis. Monitoring of the main process raw materials and additives is reviewed at daily and weekly technical meetings. The majority of</p>

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			<p>raw materials are reported based on the quantity of sugar beet processed to form KPI's.</p> <ul style="list-style-type: none"> <li>• Anaerobic Digestion is not a technique employed in the sugar manufacturing process in order to manage the quantity of residues. From the sugar manufacturing process British Sugar produces a number of co-products. Anaerobic Digestion is a technique employed in the wastewater treatment process at the site.</li> <li>• Use of Residues is not applicable to British Sugar. The animal feed produced is declared as a product and is sold as such into the feed market.</li> <li>• Separation of Residues; British Sugar utilises drip trays as general good practice, which is generally applicable, although would not consider this to be significant.</li> <li>• Techniques d, and e are not applicable to British Sugar as none of these descriptions or applicability are related to British Sugar's manufacturing process or activities that are carried out.</li> <li>• Technique f is extensively used within beet sugar operations in mainland Europe. It is not used at the installation as all wastewater is treated and discharged to watercourse.</li> </ul> <p>Although the listed techniques are not used at the installation the operator ensures the processes are resource efficient in the following ways which we consider acceptable. Once the sugar is extracted from the sugar beet the residual beet pulp is either marketed as animal feed, either pressed (wet) or dried dependant on local markets or the pressed pulp can be used as an anaerobic digestion feedstock to produce methane. The sugar extracted from the beet is then purified by removal of impurities using lime and then crystallisation. The lime used for impurity removal</p>

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			is sold as an agricultural liming agent. The sugar will either be sold as crystal or low-grade sugar syrup e.g. molasses. The soil washed from the sugar beet is sold as topsoil for multipurpose use.
11	<p><b>Waste water buffer storage</b> In order to prevent uncontrolled emissions to water, BAT is to provide an appropriate buffer storage capacity for waste water.</p>	<b>CC</b>	<p>The operator has provided information to support compliance with BATc 11. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 11.</p> <p>The site has appropriate buffer storage capacity onsite in the form of water storage ponds which are designed to have the required area to allow for initial settlement of the soil from the raw materials (sugar beet), and subsequent mixing of wastewater streams from the manufacturing process to prevent variability in pollutant strength and pH prior to the wastewater being sent to the onsite wastewater treatment plant. In addition, the system capacity allows for surges in wastewater flows which may occur from time to time, due either to process changes or climatic conditions.</p> <p>The site storage ponds have a capacity of 350,000m<sup>3</sup>, the sites average total wastewater discharge per annum is 1,200,000m<sup>3</sup>. As the storage ponds have capacity for over a quarter of a years' worth of wastewater, we are confident the storage ponds should have sufficient buffer storage capacity for wastewater should they be required.</p>
12	<p><b>Emissions to water – treatment</b> In order to reduce emissions to water, BAT is to use an appropriate combination of the techniques given below. Preliminary, primary and general treatment (a) Equalisation</p>	<b>CC</b>	<p>The operator has provided information to support compliance with BATc 12. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 12.</p> <p>The operator employs the following techniques:</p>

BATC No	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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
	<p>(b) Neutralisation</p> <p>(c) Physical separate (eg screens, sieves, primary settlement tanks etc)</p> <p>Aerobic and/or anaerobic treatment (secondary treatment)</p> <p>(d) Aerobic and/or anaerobic treatment (eg activated sludge, aerobic lagoon etc)</p> <p>(e) Nitrification and/or denitrification</p> <p>(f) Partial nitrification - anaerobic ammonium oxidation</p> <p>Phosphorus recovery and/or removal</p> <p>(g) Phosphorus recovery as struvite</p> <p>(h) Precipitation</p> <p>(i) Enhanced biological phosphorus removal</p> <p>Final solids removal</p> <p>(j) Coagulation and flocculation</p> <p>(k) Sedimentation</p> <p>(l) Filtration (eg sand filtration, microfiltration, ultrafiltration)</p> <p>(m) Flotation</p>		<ul style="list-style-type: none"> <li>• Equalisation (different wastewater streams are mixed)</li> <li>• Physical separation (tails screens, ponds themselves, interceptors)</li> <li>• Aerobic treatment</li> <li>• Nitrification</li> <li>• Final Solids removal by sedimentation.</li> </ul> <p>Site wastewater treatment systems have developed over time to meet processing requirements and improvements required to meet legislative requirements for discharge to the relevant receiving waters.</p> <p>The majority of the carbon load (COD) is naturally treated within the ponds over long term storage, with a small amount of COD reduction being carried out using anaerobic digestion and aerobic treatment which in addition to COD removal provides ammoniacal nitrogen reduction via nitrification.</p> <p>Mixed liquor (water and biomass) from the aerobic treatment process. Wastewater from the sugar process typically contains small amounts of phosphorus therefore phosphorus removal is not required. Bury St Edmund has a final settlement pond prior to consented discharge, these effectively provide a final solids settlement.</p> <p>Fluming water passes over mechanical screens and is then sent to a large clarifier to separate any soil. The soil is settled further in a number of settling ponds. Settled water is returned back to the beet fluming system. Excess water from soil settlement ponds is transferred to long-term storage for use as required for mixing with the sugar process wastewater, i.e. equalisation.</p>



BATC No	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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										
12	<p><b>Emissions to water – treatment</b> <b>BAT-associated emission levels (BAT-AELs) for direct emissions to a receiving water body</b></p> <table border="1" data-bbox="282 416 1211 616"> <thead> <tr> <th>Parameter</th> <th>BAT-AEL (1) (2) (daily average)</th> </tr> </thead> <tbody> <tr> <td>Chemical oxygen demand (COD) (3) (4)</td> <td>25-100 mg/l (5)</td> </tr> <tr> <td>Total suspended solids (TSS)</td> <td>4-50 mg/l (6)</td> </tr> <tr> <td>Total nitrogen (TN)</td> <td>2-20 mg/l (7) (8)</td> </tr> <tr> <td>Total phosphorus (TP)</td> <td>0,2-2 mg/l (9)</td> </tr> </tbody> </table>	Parameter	BAT-AEL (1) (2) (daily average)	Chemical oxygen demand (COD) (3) (4)	25-100 mg/l (5)	Total suspended solids (TSS)	4-50 mg/l (6)	Total nitrogen (TN)	2-20 mg/l (7) (8)	Total phosphorus (TP)	0,2-2 mg/l (9)	FC	<p>British Sugar proposes that both abatement efficiencies are set on a yearly average basis with the year starting at the beginning of the annual beet campaign (generally September/October), once the effluent treatment plant has progressed through the start-up period and is fully operational Analytical data from periods of OTNOC will be excluded from the calculation of abatement efficiency, however should the final effluent quality fall outside permit limits discharge will be stopped and the effluent will be recycled until compliance with limits is achieved at which stage discharge will be resumed:</p> <p>COD &lt; 95% efficiency = 100 mg/l  COD ≥ 95% efficiency = 155 mg/l  TN &lt; 80% efficiency = 20 mg/l  TN ≥ 80% efficiency = 30 mg/l  TSS ≤ 50 mg/l  TP = ≤ 2 mg/l</p>
Parameter	BAT-AEL (1) (2) (daily average)												
Chemical oxygen demand (COD) (3) (4)	25-100 mg/l (5)												
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Total phosphorus (TP)	0,2-2 mg/l (9)												
13	<p><b>Noise management plan</b></p> <p>In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to set up, implement and regularly review a noise management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:</p> <ul style="list-style-type: none"> <li>- a protocol containing actions and timelines;</li> <li>- a protocol for conducting noise emissions monitoring;</li> <li>- a protocol for response to identified noise events, eg complaints;</li> <li>- a noise reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures.</li> </ul> <p><b>Note: BAT 13 is only applicable where a noise nuisance at sensitive receptors is expected and/or has been substantiated.</b></p>	NA	<p>We are satisfied that BATc 13 is not applicable to this Installation.</p> <p>Noise nuisance at sensitive receptors is not expected and has not been substantiated so we do not consider a noise management plan to be required.</p>										
14	<b>Noise management</b>	CC	The operator has provided information to support compliance with BATc 14. We have assessed the										

BATC No.	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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															
	<p>In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques given below.</p> <p>(a) Appropriate location of equipment and buildings            (b) Operational measures            (c) Low-noise equipment            (d) Noise control equipment            (e) Noise abatement</p>		<p>information provided and we are satisfied that the operator has demonstrated compliance with BATc 14.</p> <p>The operator employs the following techniques to minimise noise:</p> <ul style="list-style-type: none"> <li>• appropriate location of equipment &amp; buildings</li> <li>• operational measures</li> <li>• Low-noise equipment</li> <li>• Noise equipment control</li> </ul>															
15	<p><b>Odour Management</b></p> <p>In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:</p> <ul style="list-style-type: none"> <li>- a protocol containing actions and timelines;</li> <li>- a protocol for conducting odour monitoring.</li> <li>- a protocol for response to identified odour incidents eg complaints;</li> <li>- an odour prevention and reduction programme designed to identify the source(s); to measure/estimate odour exposure: to characterise the contributions of the sources; and to implement prevention and/or reduction measures.</li> </ul> <p><b>Note: BAT 15 is only applicable to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.</b></p>	CC	<p>The operator has provided information to support compliance with BATc 15. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 15.</p> <p>The Operator has an odour management plan as part of its environmental management system. Odour is monitored regularly and there is a procedure for managing complaints.</p>															
<b>ANIMAL FEED SECTOR BAT CONCLUSIONS (BAT 17)</b>																		
17	<p><b>Emissions to air – particulates</b></p> <p><b>In order to reduce channelled dust emissions to air, BAT is to use one of the techniques given; a. bag filter, b. cyclone.</b></p> <table border="1" data-bbox="275 1233 1227 1422"> <thead> <tr> <th rowspan="2">Parameter</th> <th rowspan="2">Specific process</th> <th rowspan="2">Unit</th> <th colspan="2">BAT-AEL (average over the sampling period)</th> </tr> <tr> <th>New plants</th> <th>Existing plants</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Dust</td> <td>Grinding</td> <td rowspan="2">mg/Nm<sup>3</sup></td> <td>&lt;2-5</td> <td>&lt;2-10</td> </tr> <tr> <td>Pellet cooling</td> <td colspan="2">&lt;2-20</td> </tr> </tbody> </table>	Parameter	Specific process	Unit	BAT-AEL (average over the sampling period)		New plants	Existing plants	Dust	Grinding	mg/Nm <sup>3</sup>	<2-5	<2-10	Pellet cooling	<2-20		CC	<p>The operator has provided information to support compliance with BATc 17. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 17.</p> <p>The site has six pellet coolers, each cooler has a cyclone abating the air emissions. The cyclones are discharged via two stacks. The operator has stated they can meet the BAT-AELs.</p>
Parameter	Specific process				Unit	BAT-AEL (average over the sampling period)												
		New plants	Existing plants															
Dust	Grinding	mg/Nm <sup>3</sup>	<2-5	<2-10														
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BATC No.	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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																							
			On that basis, we have included ELVs in the permit for the emission points A54 and A55 in line with the BAT-AELs. The new ELVs included in the permit are 20mg/m <sup>3</sup> .																							
<b>SUGAR SECTOR BAT CONCLUSIONS (BAT 35 – 37)</b>																										
35	<p><b>Energy efficiency</b></p> <p>In order to increase energy efficiency, BAT is to use an appropriate combination of the techniques specified in BAT 6 and of the techniques given below:</p> <table border="1" data-bbox="315 639 1182 1123"> <thead> <tr> <th data-bbox="315 639 367 683">Technique</th> <th data-bbox="367 639 640 683"></th> <th data-bbox="640 639 913 683">Description</th> <th data-bbox="913 639 1182 683">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="315 683 367 770">(a)</td> <td data-bbox="367 683 640 770">Pressing of beet pulp</td> <td data-bbox="640 683 913 770">The beet pulp is pressed to a dry matter content of typically 25-32 wt-%.</td> <td data-bbox="913 683 1182 770">Generally applicable.</td> </tr> <tr> <td data-bbox="315 770 367 882">(b)</td> <td data-bbox="367 770 640 882">Indirect drying (steam drying) of beet pulp</td> <td data-bbox="640 770 913 882">Drying of beet pulp by the use of superheated steam.</td> <td data-bbox="913 770 1182 882">May not be applicable to existing plants due to the need for a complete reconstruction of the energy facilities.</td> </tr> <tr> <td data-bbox="315 882 367 970">(c)</td> <td data-bbox="367 882 640 970">Solar drying of beet pulp</td> <td data-bbox="640 882 913 970">Use of solar energy to dry beet pulp.</td> <td data-bbox="913 882 1182 970">May not be applicable due to local climatic conditions and/or lack of space.</td> </tr> <tr> <td data-bbox="315 970 367 1058">(d)</td> <td data-bbox="367 970 640 1058">Recycling of hot gases</td> <td data-bbox="640 970 913 1058">Recycling of hot gases (e.g. waste gases from the dryer, boiler or combined heat and power plant).</td> <td data-bbox="913 970 1182 1058" rowspan="2">Generally applicable.</td> </tr> <tr> <td data-bbox="315 1058 367 1123">(e)</td> <td data-bbox="367 1058 640 1123">Low-temperature (pre)drying of beet pulp</td> <td data-bbox="640 1058 913 1123">Direct (pre)drying of beet pulp using drying gas, e.g. air or hot gas.</td> </tr> </tbody> </table>	Technique		Description	Applicability	(a)	Pressing of beet pulp	The beet pulp is pressed to a dry matter content of typically 25-32 wt-%.	Generally applicable.	(b)	Indirect drying (steam drying) of beet pulp	Drying of beet pulp by the use of superheated steam.	May not be applicable to existing plants due to the need for a complete reconstruction of the energy facilities.	(c)	Solar drying of beet pulp	Use of solar energy to dry beet pulp.	May not be applicable due to local climatic conditions and/or lack of space.	(d)	Recycling of hot gases	Recycling of hot gases (e.g. waste gases from the dryer, boiler or combined heat and power plant).	Generally applicable.	(e)	Low-temperature (pre)drying of beet pulp	Direct (pre)drying of beet pulp using drying gas, e.g. air or hot gas.	CC	<p>The operator has provided information to support compliance with BATc 35. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 35.</p> <p>The operator employs the following techniques to ensure maximum energy efficiency:</p> <ul style="list-style-type: none"> <li>• Pulp pressing – The site has a highly optimised pulp pressing station, comprised of seven pulp presses, which aims to achieve the best possible pressing and maximise the dry matter of the pressed pulp. The pressing station is maintained every year following the completion of the beet processing campaign. The average pressed pulp dry substance achieved at over the past 4 campaigns ranges from 29.74 – 31.96%</li> </ul> <p>Low temperature (pre-drying) of beet pulp - British Sugar has previously assessed the technical feasibility and economic viability of installing such technology. The opportunities to do so are somewhat limited by the already very good energy efficiency and utilisation of waste heat in the factories.</p> <p>The Operator states that steam drying is not applicable as it would need to be retrofitted. This would require a complete re-design of the current energy balance and configuration of the factory, and that solar drying is not feasible due to UK climatic conditions. However, steam drying would significantly</p>
Technique		Description	Applicability																							
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BATC No.	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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																									
			reduce the emissions of particulates. We would expect the operator to consider this as part of an overall review, as imposed by IC34.																									
36	<p>In order to prevent or reduce channelled dust emissions to air from beet pulp drying, BAT is to use one or a combination of the techniques given below:</p> <table border="1" data-bbox="309 472 1193 868"> <thead> <tr> <th data-bbox="309 472 360 507"></th> <th data-bbox="360 472 638 507">Technique</th> <th data-bbox="638 472 831 507">Description</th> <th data-bbox="831 472 1193 507">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="309 507 360 571">(a)</td> <td data-bbox="360 507 638 571">Use of gaseous fuels</td> <td data-bbox="638 507 831 571" rowspan="3">See Section 14.2.</td> <td data-bbox="831 507 1193 571">May not be applicable due to the constraints associated with the availability of gaseous fuels.</td> </tr> <tr> <td data-bbox="309 571 360 616">(b)</td> <td data-bbox="360 571 638 616">Cyclone</td> <td data-bbox="831 571 1193 616" rowspan="2">Generally applicable.</td> </tr> <tr> <td data-bbox="309 616 360 660">(c)</td> <td data-bbox="360 616 638 660">Wet scrubber</td> </tr> <tr> <td data-bbox="309 660 360 740">(d)</td> <td data-bbox="360 660 638 740">Indirect drying (steam drying) of beet pulp</td> <td data-bbox="638 660 831 740">See BAT 35b.</td> <td data-bbox="831 660 1193 740">May not be applicable to existing plants due to the need for a complete reconstruction of the energy facilities.</td> </tr> <tr> <td data-bbox="309 740 360 804">(e)</td> <td data-bbox="360 740 638 804">Solar drying of beet pulp</td> <td data-bbox="638 740 831 804">See BAT 35c.</td> <td data-bbox="831 740 1193 804">May not be applicable due to local climatic conditions and/or lack of space.</td> </tr> <tr> <td data-bbox="309 804 360 868">(f)</td> <td data-bbox="360 804 638 868">Low-temperature (pre)drying of beet pulp</td> <td data-bbox="638 804 831 868">See BAT 35e.</td> <td data-bbox="831 804 1193 868">Generally applicable.</td> </tr> </tbody> </table> <p data-bbox="275 906 804 938">The associated monitoring is given in BAT 5.</p>		Technique	Description	Applicability	(a)	Use of gaseous fuels	See Section 14.2.	May not be applicable due to the constraints associated with the availability of gaseous fuels.	(b)	Cyclone	Generally applicable.	(c)	Wet scrubber	(d)	Indirect drying (steam drying) of beet pulp	See BAT 35b.	May not be applicable to existing plants due to the need for a complete reconstruction of the energy facilities.	(e)	Solar drying of beet pulp	See BAT 35c.	May not be applicable due to local climatic conditions and/or lack of space.	(f)	Low-temperature (pre)drying of beet pulp	See BAT 35e.	Generally applicable.	CC	<p>The operator has provided information to support compliance with BATc 36. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with BATc 36.</p> <p>The Operator employs the following techniques:</p> <ul data-bbox="1473 533 2047 654" style="list-style-type: none"> <li>• Use of gaseous fuels: Bury St Edmund's dryers (A51 and A53) are run on natural gas</li> <li>• Cyclones: Bury St Edmund's dryers use cyclones to remove dust from the flue gas.</li> </ul>
	Technique	Description	Applicability																									
(a)	Use of gaseous fuels	See Section 14.2.	May not be applicable due to the constraints associated with the availability of gaseous fuels.																									
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36	<p>BAT-associated emission level (BAT-AEL) for channelled dust emissions to air from beet pulp drying in the case of high-temperature drying (above 500 °C)</p> <p style="text-align: center;"><i>Table 30</i></p> <p style="text-align: center;"><b>BAT-associated emission level (BAT-AEL) for channelled dust emissions to air from beet pulp drying in the case of high-temperature drying (above 500 °C)</b></p> <table border="1" data-bbox="315 331 1144 443"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>BAT-AEL (average over the sampling period)</th> <th>Reference oxygen level (O<sub>R</sub>)</th> <th>Reference gas condition</th> </tr> </thead> <tbody> <tr> <td>Dust</td> <td>mg/Nm<sup>3</sup></td> <td>5-100</td> <td>16 vol-%</td> <td>No correction for water content</td> </tr> </tbody> </table> <p>The associated monitoring is given in BAT 5.</p>	Parameter	Unit	BAT-AEL (average over the sampling period)	Reference oxygen level (O <sub>R</sub> )	Reference gas condition	Dust	mg/Nm <sup>3</sup>	5-100	16 vol-%	No correction for water content	<p><b>CC</b></p> <p>The operator has provided information to support compliance with the BAT-AEL. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BAT-AEL.</p> <p>The emissions from the natural gas fired dryers (A51 &amp; A53) are within the BAT-AEL range for high-temperature drying.</p> <p>The operator provided emissions data for particulate matter for the period of 2017 – 2021 for Dryer 3 emission point A53. This data demonstrates that emissions of dust from high temperature beet pulp drying is within the specified range at 16% O<sub>2</sub>:</p> <p>Average: 49.65 mg/m<sup>3</sup>  Max: 62.95 mg/m<sup>3</sup>  Min: 38.70 mg/m<sup>3</sup></p> <p>On that basis, we will impose an ELV of 70 mg/m<sup>3</sup> on emission points A53 (Dryer 3) from date of permit issue. The current site permit reference for particulate matter is 17% O<sub>2</sub>, we have updated the references in the permit to 16% O<sub>2</sub>.</p> <p>The operator changed the fuel in Dryer 1 emission point A51 from coal to natural gas in 2020 so the only data which is relevant to set an ELV in the permit is from 2021. This data demonstrates that emissions of dust from high temperature beet pulp drying is within the specified range at 16% O<sub>2</sub> at 45.98 mg/m<sup>3</sup>. With this limited data we have set the ELV for emission point A51 at 70mg/m<sup>3</sup>. The current site permit reference for particulate matter is 17% O<sub>2</sub>, we have updated the references in the permit to 16% O<sub>2</sub>.</p> <p>For emission point A52, Dryer 2 which is coal fuelled the operator provided emissions data for particulate matter for the period of 2017 – 2021. This data</p>
Parameter	Unit	BAT-AEL (average over the sampling period)	Reference oxygen level (O <sub>R</sub> )	Reference gas condition								
Dust	mg/Nm <sup>3</sup>	5-100	16 vol-%	No correction for water content								

BATC No.	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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																
			<p>demonstrates that emissions of dust from high temperature beet pulp drying is not within the specified range at 16% O<sub>2</sub>. The operator has stated in their response that the dryer will not operate this dryer post 03/12/2023. However, we have retained the dryer in the permit as the operator may switch the fuel used in the dryer. We have implemented limits in the permit for A52 in line with BAT36.</p> <p>We have included IC33 in order to ensure an appropriate ELV is derived for emission points A51 and A52 once an appropriate amount of data is available.</p>																
37	<p>In order to reduce channelled SOX emissions to air from high-temperature beet pulp drying (above 500 °C), BAT is to use one or a combination of the techniques given below:</p> <table border="1" data-bbox="286 900 1196 1134"> <thead> <tr> <th data-bbox="286 900 344 938"></th> <th data-bbox="344 900 629 938">Technique</th> <th data-bbox="629 900 853 938">Description</th> <th data-bbox="853 900 1196 938">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="286 938 344 1027">(a)</td> <td data-bbox="344 938 629 1027">Use of natural gas</td> <td data-bbox="629 938 853 1027">—</td> <td data-bbox="853 938 1196 1027">May not be applicable due to the constraints associated with the availability of natural gas.</td> </tr> <tr> <td data-bbox="286 1027 344 1066">(b)</td> <td data-bbox="344 1027 629 1066">Wet scrubber</td> <td data-bbox="629 1027 853 1066">See Section 14.2.</td> <td data-bbox="853 1027 1196 1066">Generally applicable.</td> </tr> <tr> <td data-bbox="286 1066 344 1134">(c)</td> <td data-bbox="344 1066 629 1134">Use of fuels with low sulphur content</td> <td data-bbox="629 1066 853 1134">—</td> <td data-bbox="853 1066 1196 1134">Only applicable when natural gas is not available.</td> </tr> </tbody> </table>		Technique	Description	Applicability	(a)	Use of natural gas	—	May not be applicable due to the constraints associated with the availability of natural gas.	(b)	Wet scrubber	See Section 14.2.	Generally applicable.	(c)	Use of fuels with low sulphur content	—	Only applicable when natural gas is not available.	CC	<p>The operator has provided information to support compliance with the BATc 37. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 37.</p> <p>The operator employs the use of natural gas.</p>
	Technique	Description	Applicability																
(a)	Use of natural gas	—	May not be applicable due to the constraints associated with the availability of natural gas.																
(b)	Wet scrubber	See Section 14.2.	Generally applicable.																
(c)	Use of fuels with low sulphur content	—	Only applicable when natural gas is not available.																
37	<p>BAT-associated emission level (BAT-AEL) for channelled SOX emissions to air from beet pulp drying in the case of high-temperature drying (above 500 °C) when natural gas is not used:</p>	NA	<p>We are satisfied that the requirements of the BAT-AELs for BATc 37 do not apply, as the operator uses natural gas in Dryer 1 and Dryer 3.</p> <p>The operator previously operated Dryer 2 which was fired on coal via emission point A52, the operator will either not operate the dryer or will switch the fuel to</p>																

BATC No.	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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										
	<p style="text-align: center;"><i>Table 31</i></p> <p style="text-align: center;"><b>BAT-associated emission level (BAT-AEL) for channelled SO<sub>x</sub> emissions to air from beet pulp drying in the case of high-temperature drying (above 500 °C) when natural gas is not used</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Parameter</th> <th style="width: 10%;">Unit</th> <th style="width: 20%;">BAT-AEL (average over the sampling period) (<sup>1</sup>)</th> <th style="width: 15%;">Reference oxygen level (O<sub>2</sub>)</th> <th style="width: 40%;">Reference gas condition</th> </tr> </thead> <tbody> <tr> <td>SO<sub>x</sub></td> <td>mg/Nm<sup>3</sup></td> <td>30-100</td> <td>16 vol-%</td> <td>No correction for water content</td> </tr> </tbody> </table> <p>(<sup>1</sup>) When using exclusively biomass as a fuel, emission levels are expected to be at the lower end of the range.</p> <p>The associated monitoring is given in BAT 5.</p>	Parameter	Unit	BAT-AEL (average over the sampling period) ( <sup>1</sup> )	Reference oxygen level (O <sub>2</sub> )	Reference gas condition	SO <sub>x</sub>	mg/Nm <sup>3</sup>	30-100	16 vol-%	No correction for water content		<p>natural gas. We have included this limitation in the permit.</p>
Parameter	Unit	BAT-AEL (average over the sampling period) ( <sup>1</sup> )	Reference oxygen level (O <sub>2</sub> )	Reference gas condition									
SO <sub>x</sub>	mg/Nm <sup>3</sup>	30-100	16 vol-%	No correction for water content									
	<b>Sugar Manufacturing Environmental Performance Levels</b>												
E P L	<p style="text-align: center;"><i>Table 28</i></p> <p style="text-align: center;"><b>Indicative environmental performance level for specific energy consumption</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Specific process</th> <th style="width: 20%;">Unit</th> <th style="width: 50%;">Specific energy consumption (yearly average)</th> </tr> </thead> <tbody> <tr> <td>Sugar beet processing</td> <td>MWh/tonne of beets</td> <td>0,15-0,40 (<sup>1</sup>)</td> </tr> </tbody> </table> <p>(<sup>1</sup>) The upper end of the range may include the energy consumption of the lime kilns and dryers.</p>	Specific process	Unit	Specific energy consumption (yearly average)	Sugar beet processing	MWh/tonne of beets	0,15-0,40 ( <sup>1</sup> )	<b>CC</b>	<p>The operator has provided information to support compliance with the specific energy consumption – environmental performance level (EPL) for sugar manufacturing.</p> <p>The operator provided data for three years which confirms they are currently compliant. The performance maximum was 0.38 MWh/ tonnes of beets. This is within the EPL range.</p> <p>The operator has confirmed this data includes heat and electricity utilised in the sugar process, animal feed and lime kilns.</p>				
Specific process	Unit	Specific energy consumption (yearly average)											
Sugar beet processing	MWh/tonne of beets	0,15-0,40 ( <sup>1</sup> )											

BATC No.	Summary of BAT Conclusion requirement for Food, Drink and Milk Industries	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						
E P L	<p>13.2. <b>Water consumption and waste water discharge</b></p> <p>General techniques to reduce water consumption and the volume of waste water discharged are given in Section 1.4 of these BAT conclusions. The indicative environmental performance level is presented in the table below.</p> <p style="text-align: center;"><i>Table 29</i></p> <p style="text-align: center;"><b>Indicative environmental performance level for specific waste water discharge</b></p> <table border="1" data-bbox="342 502 1173 608"> <thead> <tr> <th data-bbox="342 502 613 563">Specific process</th> <th data-bbox="613 502 884 563">Unit</th> <th data-bbox="884 502 1173 563">Specific waste water discharge (yearly average)</th> </tr> </thead> <tbody> <tr> <td data-bbox="342 563 613 608">Sugar beet processing</td> <td data-bbox="613 563 884 608">m<sup>3</sup>/tonne of beets</td> <td data-bbox="884 563 1173 608">0,5-1,0</td> </tr> </tbody> </table>	Specific process	Unit	Specific waste water discharge (yearly average)	Sugar beet processing	m <sup>3</sup> /tonne of beets	0,5-1,0	CC	<p>The operator has provided information to support compliance with the specific wastewater discharge – environmental performance level (EPL) for sugar manufacturing.</p> <p>The operator provided data for the three years which confirms they are currently compliant. The performance maximum was 0.66 m<sup>3</sup>/ tonnes of beets, which is within the EPL range.</p>
Specific process	Unit	Specific waste water discharge (yearly average)							
Sugar beet processing	m <sup>3</sup> /tonne of beets	0,5-1,0							



BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement													
<b>General</b>																
1	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 features listed in the BATc document.	CC	The operator has a EMS externally accredited to the ISO14001 standard which takes into account all relevant requirements to improve overall environmental performance.													
2	BAT is to determine the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the gasification, IGCC and/or combustion units by carrying out a performance test at full load (1), according to EN standards, after the commissioning of the unit and after each modification that could significantly affect the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the unit. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	CC	The operator has provided a calculation of the efficiency of the plant that demonstrates compliance with the requirements.													
3	<p><b>BAT is to monitor key process parameters relevant for emissions to air and water including those given below.</b></p> <table border="1" data-bbox="338 954 1234 1254"> <thead> <tr> <th data-bbox="338 954 618 1002">Stream</th> <th data-bbox="618 954 949 1002">Parameter(s)</th> <th data-bbox="949 954 1234 1002">Monitoring</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 1002 618 1182" rowspan="3">Flue-gas</td> <td data-bbox="618 1002 949 1070">Flow</td> <td data-bbox="949 1002 1234 1070">Periodic or continuous determination</td> </tr> <tr> <td data-bbox="618 1070 949 1139">Oxygen content, temperature, and pressure</td> <td data-bbox="949 1070 1234 1139">Periodic or continuous measurement</td> </tr> <tr> <td data-bbox="618 1139 949 1182">Water vapour content <sup>(3)</sup></td> <td data-bbox="949 1139 1234 1182"></td> </tr> <tr> <td data-bbox="338 1182 618 1254">Wastewater from flue-gas treatment</td> <td data-bbox="618 1182 949 1254">Flow, pH, and temperature</td> <td data-bbox="949 1182 1234 1254">Continuous measurement</td> </tr> </tbody> </table>	Stream	Parameter(s)	Monitoring	Flue-gas	Flow	Periodic or continuous determination	Oxygen content, temperature, and pressure	Periodic or continuous measurement	Water vapour content <sup>(3)</sup>		Wastewater from flue-gas treatment	Flow, pH, and temperature	Continuous measurement	CC	The operator monitors key flue-gas parameters using a continuous emissions monitor. Flue gas oxygen, temperature, pressure and water vapour are monitored to enable the required correction of emissions to the reporting conditions. Flue-gas flow is calculated from the fuel input for mass emission reporting. The site does not carry out any flue-gas treatment.
Stream	Parameter(s)	Monitoring														
Flue-gas	Flow	Periodic or continuous determination														
	Oxygen content, temperature, and pressure	Periodic or continuous measurement														
	Water vapour content <sup>(3)</sup>															
Wastewater from flue-gas treatment	Flow, pH, and temperature	Continuous measurement														
4	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.	CC	The operator monitors the required parameters (NOx and CO) continuously in accordance with EN14181													

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	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															
5	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.	NA	<p>We are satisfied that the requirements of the BATc5 are not applicable.</p> <p>The Operator does not undertake flue gas treatment.</p>															
6	<p>In order to improve the general environmental performance of combustion plants and to reduce emissions to air of CO and unburnt substances, BAT is to ensure optimised combustion and to use an appropriate combination of the techniques given below.</p> <table border="1" data-bbox="349 715 1227 1410"> <thead> <tr> <th data-bbox="349 715 555 753">Technique</th> <th data-bbox="555 715 891 753">Description</th> <th data-bbox="891 715 1227 753">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="349 753 398 919">a.</td> <td data-bbox="398 753 555 919">Fuel blending and mixing</td> <td data-bbox="555 753 891 919">Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type</td> </tr> <tr> <td data-bbox="349 919 398 1050">b.</td> <td data-bbox="398 919 555 1050">Maintenance of the combustion system</td> <td data-bbox="555 919 891 1050">Regular planned maintenance according to suppliers' recommendations</td> </tr> <tr> <td data-bbox="349 1050 398 1248">c.</td> <td data-bbox="398 1050 555 1248">Advanced control system</td> <td data-bbox="555 1050 891 1248">See description in Section 8.1</td> </tr> <tr> <td data-bbox="349 1248 398 1410">d.</td> <td data-bbox="398 1248 555 1410">Good design of the combustion equipment</td> <td data-bbox="555 1248 891 1410">Good design of furnace, combustion chambers, burners and associated devices</td> </tr> </tbody> </table>	Technique	Description	Applicability	a.	Fuel blending and mixing	Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type	b.	Maintenance of the combustion system	Regular planned maintenance according to suppliers' recommendations	c.	Advanced control system	See description in Section 8.1	d.	Good design of the combustion equipment	Good design of furnace, combustion chambers, burners and associated devices	CC	<p>The operator has provided information to support compliance with the BATc 6. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 6.</p> <p>The operator employs the techniques below to improve the general environmental performance of its combustion plant and to reduce emissions to air of CO:</p> <p>Planned regular maintenance is carried out of the plant as per the supplier's recommendations.</p> <p>Gas turbine utilises a combustion control computer to optimise the combustion process.</p> <p>Supplementary burners are designed to ensure that CO generation is kept to a minimum by controlling exhaust temperatures.</p> <p>The site gas turbine and waste heat boiler both use natural gas, back up fuel to the heat recovery boiler is low sulphur DFO.</p>
Technique	Description	Applicability																
a.	Fuel blending and mixing	Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type																
b.	Maintenance of the combustion system	Regular planned maintenance according to suppliers' recommendations																
c.	Advanced control system	See description in Section 8.1																
d.	Good design of the combustion equipment	Good design of furnace, combustion chambers, burners and associated devices																

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant				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
	e.	Fuel choice	Select or switch totally or partially to another fuel(s) with a better environmental profile (e.g. with low sulphur and/or mercury content) amongst the available fuels, including in start-up situations or when back-up fuels are used	Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the design of the plant		
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 <sub>x</sub> emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NO <sub>x</sub> ratio, homogeneous reagent distribution and optimum size of the reagent drops)				<b>NA</b>	We are satisfied that the requirements of the BATc7 are not applicable.  As the site does not use selective catalytic/non-catalytic reduction for abatement.
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.				<b>NA</b>	We are satisfied that the requirements of the BATc8 are not applicable.  As the site does not use any emission abatement systems.
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,				<b>CC</b>	The operator has provided information to support compliance with the BATc 9. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 9.  The Operator quality assurance/controls:

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	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				
	<p>national or other international standards may be used provided they ensure the provision of data of an equivalent scientific quality;</p> <p>(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);</p> <p>(iii) Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system (see description in Section 8.1)).</p> <p><b>Description</b> Initial characterisation and regular testing of the fuel can be performed by the operator and/or the fuel supplier. If performed by the supplier, the full results are provided to the operator in the form of a product (fuel) supplier specification and/or guarantee.</p> <table border="1" data-bbox="338 821 1229 991"> <thead> <tr> <th data-bbox="338 821 638 892">Fuel(s)</th> <th data-bbox="638 821 1229 892">Substances/Parameters subject to characterisation</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 892 638 991">Natural gas</td> <td data-bbox="638 892 1229 991"> <ul style="list-style-type: none"> <li>— LHV</li> <li>— CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>3</sub>, C<sub>4</sub>+, CO<sub>2</sub>, N<sub>2</sub>, Wobbe index</li> </ul> </td> </tr> </tbody> </table>	Fuel(s)	Substances/Parameters subject to characterisation	Natural gas	<ul style="list-style-type: none"> <li>— LHV</li> <li>— CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>3</sub>, C<sub>4</sub>+, CO<sub>2</sub>, N<sub>2</sub>, Wobbe index</li> </ul>		<ul style="list-style-type: none"> <li>• Natural gas fuel quality is stable within the UK and is prescribed by the Gas Safety (Management) Regulations (GS(M)R), with regards to Wobbe Index (47.2 – 51.4 MJ/m<sup>3</sup> at 15°C, 101.3 kPa, based on the Gross Calorific Value). Most gas turbines and boilers can tolerate this Wobbe Index variation, about the midrange point, but actual variations are currently smaller than this in practice. Natural Gas composition is not prescribed by the GS(M)R and there is some variation in the concentrations of methane, other hydrocarbons, and inert gas components. However, the methane concentration is always above 80%, in compliance with the IED definition of natural gas. The BAT 9 requirement is therefore satisfied by reference to the GS(M)R requirements, for Wobbe Index and typical NCV and compositional variations.</li> <li>• Regular testing. This is undertaken using a gas chromatograph, based on continuous/discontinuous natural gas sampling. The gas chromatograph is installed on site or by a third-party laboratory when sampling discontinuously. The Net Calorific Value (NCV) and the carbon content of the fuel are calculated from the natural gas composition for EU ETS reporting purposes. Records of NCV and the detailed fuel composition are held on site for additional regulatory inspection as required. The detailed data simply confirms that the natural gas is within UK specifications and no further characterisation is required. The Wobbe Index can also be calculated from the fuel composition, as required, where not already undertaken.</li> </ul>
Fuel(s)	Substances/Parameters subject to characterisation						
Natural gas	<ul style="list-style-type: none"> <li>— LHV</li> <li>— CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>3</sub>, C<sub>4</sub>+, CO<sub>2</sub>, N<sub>2</sub>, Wobbe index</li> </ul>						

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
			<ul style="list-style-type: none"> <li>Subsequent adjustment of plant settings. Gas turbine plants have highly automated control systems and finely tuned combustion systems which are regularly checked and re-tuned to maintain NOx performance. In relation to NCV, the control system adjusts the fuel flow rate until the required firing temperature and power output are achieved, without reference to fuel quality data/ based on measurement of the NCV using a local gas chromatograph/fast response calorimeter.</li> </ul>
10	<p>In order to reduce emissions to air and/or to water during other than normal operating conditions (OTNOC), BAT is to set up and implement a management plan as part of the environmental management system (see BAT 1), commensurate with the relevance of potential pollutant releases, that includes the following elements:</p> <ul style="list-style-type: none"> <li>— appropriate design of the systems considered relevant in causing OTNOC that may have an impact on emissions to air, water and/or soil (e.g. low-load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines),</li> <li>— set-up and implementation of a specific preventive maintenance plan for these relevant systems,</li> <li>— review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary,</li> <li>— periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary.</li> </ul>	CC	<p>The operator has provided information to support compliance with the BATc 10. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 10.</p> <p>The Operator has a procedure in the sites EMS that considers relevant OTNOC situations:</p> <ul style="list-style-type: none"> <li>• Training</li> <li>• Changing of fuel types</li> <li>• Periods of combustion failure</li> <li>• Continuous emissions monitoring</li> <li>• Fuel quality monitoring</li> </ul>
11	<p>BAT is to appropriately monitor emissions to air and/or to water during OTNOC.</p> <p><b>Description</b> 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</p>	CC	<p>The operator has provided information to support compliance with the BATc 11. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 11.</p>

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	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												
	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.		Emissions to air are monitored on a continuous basis with the sites CEMs unit through OTNOC. Issues with the sites CEM are covered in an EMS procedure.												
12	<p>In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated <math>\geq 1\,500</math> h/yr, BAT is to use an appropriate combination of the techniques given below.</p> <table border="1" data-bbox="338 539 1229 1425"> <thead> <tr> <th data-bbox="338 539 539 580">Technique</th> <th data-bbox="539 539 902 580">Description</th> <th data-bbox="902 539 1229 580">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 580 539 831">a. Combustion optimisation</td> <td data-bbox="539 580 902 831">See description in Section 8.2. Optimising the combustion minimises the content of unburnt substances in the flue-gases and in solid combustion residues</td> <td data-bbox="902 580 1229 1425" rowspan="4">Generally applicable</td> </tr> <tr> <td data-bbox="338 831 539 1134">b. Optimisation of the working medium conditions</td> <td data-bbox="539 831 902 1134">Operate at the highest possible pressure and temperature of the working medium gas or steam, within the constraints associated with, for example, the control of NO<sub>x</sub> emissions or the characteristics of energy demanded</td> </tr> <tr> <td data-bbox="338 1134 539 1350">c. Optimisation of the steam cycle</td> <td data-bbox="539 1134 902 1350">Operate with lower turbine exhaust pressure by utilisation of the lowest possible temperature of the condenser cooling water, within the design conditions</td> </tr> <tr> <td data-bbox="338 1350 539 1425">d. Minimisation of energy</td> <td data-bbox="539 1350 902 1425">Minimising the internal energy consumption (e.g.</td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Combustion optimisation	See description in Section 8.2. Optimising the combustion minimises the content of unburnt substances in the flue-gases and in solid combustion residues	Generally applicable	b. Optimisation of the working medium conditions	Operate at the highest possible pressure and temperature of the working medium gas or steam, within the constraints associated with, for example, the control of NO <sub>x</sub> emissions or the characteristics of energy demanded	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	Minimising the internal energy consumption (e.g.	CC	<p>The operator has provided information to support compliance with the BATc 12. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 12.</p> <p>The Operator employs the following techniques:</p> <ul style="list-style-type: none"> <li>• Pumps are on inverter drives, planned preventative maintenance is carried out to ensure plant items are run to optimal performance levels.</li> <li>• Gas turbine plants have highly automated control systems and finely tuned combustion systems which are regularly checked and re-tuned to maintain performance.</li> <li>• Feed water is preheated before going to the boiler drum.</li> <li>• Heat is recovered from the steam system and used in the sugar manufacturing process. Heat is also recovered from the flue-gas</li> </ul>
Technique	Description	Applicability													
a. Combustion optimisation	See description in Section 8.2. Optimising the combustion minimises the content of unburnt substances in the flue-gases and in solid combustion residues	Generally applicable													
b. Optimisation of the working medium conditions	Operate at the highest possible pressure and temperature of the working medium gas or steam, within the constraints associated with, for example, the control of NO <sub>x</sub> emissions or the characteristics of energy demanded														
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														
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BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant			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
		consumption 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 <sub>x</sub> 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 <sub>x</sub> 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	Applicable within the constraints associated with the local heat and power demand.		

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant			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
		public network for district heating. Additional heat recovery is possible from: <ul style="list-style-type: none"> <li>— flue-gas</li> <li>— grate cooling</li> <li>— circulating fluidised bed</li> </ul>	The applicability may be limited in the case of gas compressors with an unpredictable operational heat profile		
	j. CHP readiness	See description in Section 8.2.	Only applicable to new units where there is a realistic potential for the future use of heat in the vicinity of the unit		
	k. Flue-gas condenser	See description in Section 8.2.	Generally applicable to CHP units provided there is enough demand for low-temperature heat		
	l. Heat accumulation	Heat accumulation storage in CHP mode	Only applicable to CHP plants. The applicability may be limited in the case of low heat load demand		
	m. Wet stack	See description in Section 8.2.	Generally applicable to new and existing units fitted with wet FGD		
	n. Cooling tower discharge	The release of emissions to air through a cooling tower and not via a dedicated stack	Only applicable to units fitted with wet FGD where reheating of the flue-gas is necessary before release, and where the unit cooling system is a cooling tower		



BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant			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
	o.	Fuel pre-drying	The reduction of fuel moisture content before combustion to improve combustion conditions	<p>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).</p> <p>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>	
	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,	The applicability may be restricted by demand, steam conditions and/or limited plant lifetime	

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant			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
		addition of a low-pressure turbine, and modifications to the geometry of the turbine rotor blades			
	s. Supercritical and ultra-supercritical steam conditions	Use of a steam circuit, including steam reheating systems, in which steam can reach pressures above 220,6 bar and temperatures above 374 °C in the case of supercritical conditions, and above 250 – 300 bar and temperatures above 580 – 600 °C in the case of ultra-supercritical conditions	Only applicable to new units of $\geq 600 \text{ MW}_{\text{th}}$ operated $> 4\,000 \text{ h/yr}$ . Not applicable when the purpose of the unit is to produce low steam temperatures and/or pressures in process industries. Not applicable to gas turbines and engines generating steam in CHP mode. For units combusting biomass, the applicability may be constrained by high-temperature corrosion in the case of certain biomasses		
13	In order to reduce water usage and the volume of contaminated waste water discharged, BAT is to use one or both of the techniques given below.			<b>CC</b>	The operator has provided information to support compliance with the BATc 13. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 13.  Bury St Edmunds plant uses ultra-pure water, the conductivity of the system is monitored continuously using cation columns and blow down rates are then optimised to minimise water losses. Water is also recovered and reused from steam traps. All blow down water from the system goes
	<b>Technique</b>	<b>Description</b>	<b>Applicability</b>		
a	Water recycling	Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream and the water balance of the plant	Not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present		

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant		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 . Dry bottom ash handling	Dry, hot bottom ash falls from the furnace onto a mechanical conveyor system and is cooled down by ambient air. No water is used in the process.	Only applicable to plants combusting solid fuels. There may be technical restrictions that prevent retrofitting to existing combustion plants	to the sites centralised wastewater treatment plant before being treated and then discharged to a local river.  Dry bottom ash handling is not applicable as the site does not use solid fuels.
14	<p>In order to prevent the contamination of uncontaminated waste water and to reduce emissions to water, BAT is to segregate waste water streams and to treat them separately, depending on the pollutant content.</p> <p><b>Description</b> Waste water streams that are typically segregated and treated include surface run-off water, cooling water, and waste water from flue-gas treatment.</p> <p><b>Applicability</b> The applicability may be restricted in the case of existing plants due to the configuration of the drainage systems.</p>		<b>CC</b>	<p>The operator has provided information to support compliance with the BATc 14. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 14.</p> <p>The operates a centralised wastewater treatment plant. All wastewater streams generated on site are mixed in large buffering lagoons before being treated and then discharged to either the River Lark or to a Large open Soakaway. This means there is no need to separate water streams dependant on their pollutant content. A full description of the wastewater treatment plant is given in the responses to BATC 11 and 12 for FDM.</p>
15	<p>In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given, and to use secondary techniques as close as possible to the source in order to avoid dilution.</p>		<b>NA</b>	<p>We are satisfied that the requirements of the BATc15 are not applicable.</p> <p>The site does not carry out any flue-gas treatment</p>
16	<p>In order to reduce the quantity of waste sent for disposal from the combustion and/or gasification process and abatement techniques, BAT is to organise operations so as to maximise, in order of priority and taking into account life-cycle thinking:</p> <p>(a waste prevention, e.g. maximise the proportion of residues which arise ) as by-products;</p>		<b>NA</b>	<p>We are satisfied that the requirements of the BATc16 are not applicable.</p> <p>The site does not carry out any flue-gas treatment</p>

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	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) 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.														
17	<p>In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below.</p> <table border="1" data-bbox="338 560 1229 1401"> <thead> <tr> <th data-bbox="338 560 539 603">Technique</th> <th data-bbox="539 560 931 603">Description</th> <th data-bbox="931 560 1229 603">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 603 539 1102">a . Operational measures</td> <td data-bbox="539 603 931 1102">           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            — provisions for noise control during maintenance activities         </td> <td data-bbox="931 603 1229 1102">Generally applicable</td> </tr> <tr> <td data-bbox="338 1102 539 1206">b . Low-noise equipment</td> <td data-bbox="539 1102 931 1206">This potentially includes compressors, pumps and disks</td> <td data-bbox="931 1102 1229 1206">Generally applicable when the equipment is new or replaced</td> </tr> <tr> <td data-bbox="338 1206 539 1401">c . Noise attenuation</td> <td data-bbox="539 1206 931 1401">Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. Appropriate obstacles include protection walls, embankments and buildings</td> <td data-bbox="931 1206 1229 1401">Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of space</td> </tr> </tbody> </table>	Technique	Description	Applicability	a . Operational measures	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 — provisions for noise control during maintenance activities	Generally applicable	b . Low-noise equipment	This potentially includes compressors, pumps and disks	Generally applicable when the equipment is new or replaced	c . Noise attenuation	Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. 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	CC	<p>The operator has provided information to support compliance with the BATc 17. We have assessed the information provided and we are satisfied that the operator has demonstrated compliance with the BATc 17.</p> <p>a) The plant has twice daily audio-visual inspection routes carried out by experienced trained staff to highlight any issues that arise. Conditional based monitoring is used to identify issues early and rectify them.</p> <p>c) The main LCP is located in a building, the gas turbine is its own enclosure.</p> <p>d) The main LCP is located in a building, the gas turbine is its own soundproof enclosure.</p>
Technique	Description	Applicability													
a . Operational measures	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 — provisions for noise control during maintenance activities	Generally applicable													
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BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant				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	
	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				
<b>Combustion of liquid fuels</b>							
Table 13	<b>BAT-associated energy efficiency levels (BAT-AEELs) for HFO and/or gas oil combustion in boilers</b>				<b>NA</b>	The units do not operate > 1,500 hours/year with these fuels.	
<b>Type of combustion unit</b>		<b>BAT-AEELs <sup>(99)</sup> <sup>(100)</sup></b>					
		<b>Net electrical efficiency (%)</b>		<b>Net total fuel utilisation (%) <sup>(101)</sup></b>			
		<b>New unit</b>	<b>Existing unit</b>	<b>New unit</b>	<b>Existing unit</b>		
HFO- and/or gas-oil-fired boiler		> 36,4	35,6–37,4	80–96	80–96		
28	In order to prevent or reduce NO <sub>x</sub> emissions to air while limiting CO emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given below.				<b>NA</b>	The Operator employs the techniques below: The site uses Low-NO <sub>x</sub> burners in its supplementary firing of the heat recovery steam generator. The site uses an advanced distributed control system to operate its combustion process in the heat recovery steam generator. The site uses Gas oil class A2 with a low Nitrogen component, typically between 0.01-0.05 % (m/m)	
<b>Technique</b>		<b>Description</b>	<b>Applicability</b>				
a.	Air staging	See descriptions in Section 8.3	Generally applicable				
b.	Fuel staging						
c.	Flue-gas recirculation						

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant			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
	d. Low-NO <sub>x</sub> burners (LNB)				The ELVs do not apply as the units do not operate > 1,500 hours/year with these fuels.
e. Water/steam addition		Applicable within the constraints of water availability			
f. Selective non-catalytic reduction (SNCR)		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			
g. Selective catalytic reduction (SCR)	See descriptions in Section 8.3	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. Not generally applicable to combustion plants of < 100 MW <sub>th</sub>			
h. Advanced control system		Generally applicable to new combustion plants. The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system			
i. Fuel choice		Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State			
<b>BAT-associated emission levels (BAT-AELs) for NO<sub>x</sub> emissions to air from the combustion of HFO and/or gas oil in boilers</b>					
<b>Combustion plant total rated thermal input</b>		<b>BAT-AELs (mg/Nm<sup>3</sup>)</b>			
		<b>Yearly average</b>	<b>Daily average or average over the sampling period</b>		

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	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 border="1" data-bbox="338 292 1229 478"> <thead> <tr> <th>(MW<sub>th</sub>)</th> <th>New plant</th> <th>Existing plant <sup>(102)</sup></th> <th>New plant</th> <th>Existing plant <sup>(103)</sup></th> </tr> </thead> <tbody> <tr> <td>&lt; 100</td> <td>75–200</td> <td>150–270</td> <td>100–215</td> <td>210–330 <sup>(104)</sup></td> </tr> <tr> <td>≥ 100</td> <td>45–75</td> <td>45–100 <sup>(105)</sup></td> <td>85–100</td> <td>85–110 <sup>(106)</sup> <sup>(107)</sup></td> </tr> </tbody> </table> <p data-bbox="338 483 1229 655">As an indication, the yearly average CO emission levels will generally be:</p> <ul data-bbox="338 517 1229 655" style="list-style-type: none"> <li>— 10-30 mg/Nm<sup>3</sup> for existing combustion plants of &lt; 100 MW<sub>th</sub> operated ≥ 1 500 h/yr, or new combustion plants of &lt;100 MW<sub>th</sub>,</li> <li>— 10–20mg/Nm<sup>3</sup> for existing combustion plants of ≥ 100 MW<sub>th</sub> operated ≥ 1 500 h/yr, or new combustion plants of ≥ 100 MW<sub>th</sub>.</li> </ul>	(MW <sub>th</sub> )	New plant	Existing plant <sup>(102)</sup>	New plant	Existing plant <sup>(103)</sup>	< 100	75–200	150–270	100–215	210–330 <sup>(104)</sup>	≥ 100	45–75	45–100 <sup>(105)</sup>	85–100	85–110 <sup>(106)</sup> <sup>(107)</sup>		
(MW <sub>th</sub> )	New plant	Existing plant <sup>(102)</sup>	New plant	Existing plant <sup>(103)</sup>														
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≥ 100	45–75	45–100 <sup>(105)</sup>	85–100	85–110 <sup>(106)</sup> <sup>(107)</sup>														
29	<p data-bbox="338 675 1229 762">In order to prevent or reduce SO<sub>x</sub>, HCl and HF emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given below.</p> <table border="1" data-bbox="338 767 1229 1436"> <thead> <tr> <th>Technique</th> <th>Description</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 810 589 874">a. Duct sorbent injection (DSI)</td> <td data-bbox="589 810 792 874" rowspan="3">See description in Section 8.4</td> <td data-bbox="792 810 1229 1023" rowspan="3">Generally applicable</td> </tr> <tr> <td data-bbox="338 879 589 943">b. Spray dry absorber (SDA)</td> </tr> <tr> <td data-bbox="338 948 589 1011">c. Flue-gas condenser</td> </tr> <tr> <td data-bbox="338 1016 589 1150">d. Wet flue-gas desulphurisation (wet FGD)</td> <td data-bbox="589 1016 792 1150"></td> <td data-bbox="792 1016 1229 1369">There may be technical and economic restrictions for applying the technique to combustion plants of &lt; 300 MW<sub>th</sub>. Not applicable to combustion plants operated &lt; 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr</td> </tr> <tr> <td data-bbox="338 1369 589 1433">e. Seawater FGD</td> <td data-bbox="589 1369 792 1433"></td> <td data-bbox="792 1369 1229 1433">There may be technical and economic restrictions for applying</td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Duct sorbent injection (DSI)	See description in Section 8.4	Generally applicable	b. Spray dry absorber (SDA)	c. Flue-gas condenser	d. Wet flue-gas desulphurisation (wet FGD)		There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW <sub>th</sub> . 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	e. Seawater FGD		There may be technical and economic restrictions for applying	CC	<p data-bbox="1431 675 2013 762">The site uses Gas oil class A2 with a low Sulphur and Halogen components, typically &lt;0.0015 % (m/m) for Sulphur.</p> <p data-bbox="1431 799 2013 919">Due to this the site does not analysis for these components in its flue-gas. The use of gas oil is as a backup fuel, and it can only be used if conditions are met and for a limited time period.</p>	
Technique	Description	Applicability																
a. Duct sorbent injection (DSI)	See description in Section 8.4	Generally applicable																
b. Spray dry absorber (SDA)																		
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e. Seawater FGD		There may be technical and economic restrictions for applying																

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	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																															
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			<p>the technique to combustion plants of &lt; 300 MW<sub>th</sub>. Not applicable to combustion plants operated &lt; 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr</p>																															
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30	<p>In order to reduce dust and particulate-bound metal emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Technique</th> <th style="text-align: center;">Description</th> <th style="text-align: center;">Applicability</th> </tr> </thead> <tbody> <tr> <td>a. Electrostatic precipitator (ESP)</td> <td>See description in Section 8.5</td> <td>Generally applicable</td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Electrostatic precipitator (ESP)	See description in Section 8.5	Generally applicable	<b>CC</b>	<p>Bury St Edmunds employs the following techniques:</p> <p>f) The site uses Gas oil class A2 with a low ash content, typically between &lt;0.01 % (m/m).</p>																									
Technique	Description	Applicability																																
a. Electrostatic precipitator (ESP)	See description in Section 8.5	Generally applicable																																



BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant			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	Bag filter			Due to this the site does not analysis for the components in its flue-gas. Bury St Edmund uses gas oil as a back up fuel.			
c	Multicyclones	See description in Section 8.5. Multicyclones can be used in combination with other dedusting techniques	d			Dry or semi-dry FGD system	See descriptions in Section 8.5. The technique is mainly used for SO <sub>x</sub> , HCl and/or HF control	
e	Wet flue-gas desulphurisation (wet FGD)	See description in Section 8.5. The technique is mainly used for SO <sub>x</sub> , HCl and/or HF control	f.			Fuel choice	See description in Section 8.5	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
<b>BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of HFO and/or gas oil in boilers</b>								
<b>Combustion plant total rated thermal input (MW<sub>th</sub>)</b>		<b>BAT-AELs for dust (mg/Nm<sup>3</sup>)</b>						
		<b>Yearly average</b>				<b>Daily average or average over the sampling period</b>		
		<b>New plant</b>	<b>Existing plant <sup>(113)</sup></b>	<b>New plant</b>	<b>Existing plant <sup>(114)</sup></b>			

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BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	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																		
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40	<p>In order to increase the energy efficiency of natural gas combustion, BAT is to use an appropriate combination of the techniques given in BAT 12 and below.</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Description</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td>a. Combined cycle</td> <td>See description in Section 8.2</td> <td>Generally applicable to new gas turbines and engines except when operated &lt; 1 500 h/yr. Applicable to existing gas turbines and engines within the constraints associated with the steam cycle design and the space availability. Not applicable to existing gas turbines and engines operated &lt; 1 500 h/yr. Not applicable to mechanical drive gas turbines operated in discontinuous mode with extended load variations and frequent start-ups and shutdowns. Not applicable to boilers</td> </tr> </tbody> </table> <p><b>BAT-associated energy efficiency levels (BAT-AEELs) for the combustion of natural gas</b></p>	Technique	Description	Applicability	a. Combined cycle	See description in Section 8.2	Generally applicable to new gas turbines and engines except when operated < 1 500 h/yr. Applicable to existing gas turbines and engines within the constraints associated with the steam cycle design and the space availability. Not applicable to existing gas turbines and engines operated < 1 500 h/yr. Not applicable to mechanical drive gas turbines operated in discontinuous mode with extended load variations and frequent start-ups and shutdowns. Not applicable to boilers	CC	<p>The operator operates a combined cycle gas turbine CHP Type of combustion unit: CHP CCGT 50-600 MWth. The net total fuel utilisation data is presented in the table below:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Net total fuel utilisation (%) *</th> </tr> </thead> <tbody> <tr> <td>2021</td> <td>79.22</td> </tr> <tr> <td>2020</td> <td>74.18</td> </tr> <tr> <td>2019</td> <td>73.06</td> </tr> </tbody> </table> <p>*based on submitted CHPQA returns</p>	Year	Net total fuel utilisation (%) *	2021	79.22	2020	74.18	2019	73.06				
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BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant			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
	c. Low-NO <sub>x</sub> burners (LNB)				
	d. Advanced control system	See description in Section 8.3. This technique is often used in combination with other techniques or may be used alone for combustion plants operated < 500 h/yr	The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system		
	e. Reduction of the combustion air temperature	See description in Section 8.3	Generally applicable within the constraints associated with the process needs		
	f. Selective non-catalytic reduction (SNCR)		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		
	g. Selective catalytic reduction (SCR)		Not applicable to combustion plants operated < 500 h/yr.  Not generally applicable to combustion plants of < 100 MW <sub>th</sub> .		

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Technique	Description	Applicability															
a. Advanced control system	See description in Section 8.3. This technique is often used in combination with other techniques or may be used alone for combustion plants operated < 500 h/yr	The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system															
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BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant			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
		the demand in energy varies, e.g. by improving the inlet airflow control capability or by splitting the combustion process into decoupled combustion stages			
	e. Low-NO <sub>x</sub> burners (LNB)	See description in Section 8.3	Generally applicable to supplementary firing for heat recovery steam generators (HRSGs) in the case of combined-cycle gas turbine (CCGT) combustion plants		
	f. Selective catalytic reduction (SCR)		<p>Not applicable in the case of combustion plants operated &lt; 500 h/yr.</p> <p>Not generally applicable to existing combustion plants of &lt; 100 MW<sub>th</sub>.</p> <p>Retrofitting existing combustion plants may be constrained by the availability of sufficient space.</p> <p>There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr</p>		

BAT C. No.	Summary of BAT Conclusion requirements for Large Combustion Plant	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
43	In order to prevent or reduce NO <sub>x</sub> emissions to air from the combustion of natural gas in engines, BAT is to use one or a combination of the techniques given.	<b>NA</b>	Not applicable due to age and location
44	In order to prevent or reduce CO emissions to air from the combustion of natural gas, BAT is to ensure optimised combustion and/or to use oxidation catalysts.	<b>CC</b>	Bury St Edmunds control CO levels by optimising the combustion process, document BU-WI-EMS-001: Emissions Control on HRSG details the steps operators should take is CO levels are high.
45	In order to reduce non-methane volatile organic compounds (NMVOC) and methane (CH <sub>4</sub> ) emissions to air from the combustion of natural gas in spark-ignited lean-burn gas engines, BAT is to ensure optimised combustion and/or to use oxidation catalysts.	<b>NA</b>	Not applicable to the site.

BAT Conclusion No	Summary of BAT Conclusion requirement for production of Cement, Lime and Magnesium Oxide	Status NA/ C / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
3-29  55-69	BAT Conclusions that are not applicable to this installation	<b>NA</b>	BAT Conclusions 3 – 29 inclusive are not applicable as they apply to cement industry only. BAT Conclusions 55 – 69 inclusive are not applicable as they apply to the magnesium oxide industry only.
1	In order to improve the overall environmental performance of the plants/installations producing cement, lime and magnesium oxide, production BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the listed features.	<b>CC</b>	As per FDM BAT 1.
2	In order to reduce/minimise noise emissions during the manufacturing processes for cement, lime and magnesium oxide, BAT is to use a combination of the listed techniques.	<b>CC</b>	As per FDM BAT 13 and 14.
30	In order to reduce all kiln emissions and use energy efficiently, BAT is to achieve a smooth and stable kiln process, operating close to the process parameter set points by using the listed techniques.	<b>CC</b>	The operator employs the following techniques: a) Process control optimisation, including computer-based automatic control. The lime kiln is run using the sites DCS system, process parameters such as temperatures and air flows are fed back to a centralised control room. b) Both the limestone and fuel feeds to the lime kiln is done via gravimetric measurement. Limestone to fuel ratios are adjusted to optimise energy efficiency i.e., to ensure no overburnt limestone, and to maximise burnt lime and kiln gas quality.
31	In order to prevent and/or reduce emissions, BAT is to carry out a careful selection and control of the raw materials entering the kiln.	<b>CC</b>	The operator employs the following techniques to reduce emissions: Raw materials, limestone and solid fuel are procured to a British Sugar specification to minimise to ensure that limestone and fuel impurity levels are minimised and both fuel and limestone breakage is minimised. The specifications define key parameters including the required physical properties.

BAT Conclusion No	Summary of BAT Conclusion requirement for production of Cement, Lime and Magnesium Oxide	Status NA/ C / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement																
32	<p>BAT is to carry out monitoring and measurements of process parameters and emissions on a regular basis and to monitor emissions in accordance with the relevant EN standards or, if EN standards are not available, ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</p> <table border="1" data-bbox="327 560 848 863"> <thead> <tr> <th>Technique</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td>a Continuous measurements of process parameters demonstrating the process stability, such as temperature, O<sub>2</sub> content, pressure, flow rate and CO emissions</td> <td>Applicable to kiln processes</td> </tr> <tr> <td>b Monitoring and stabilising of critical process parameters, e.g. fuel feed, regular dosage and excess oxygen</td> <td></td> </tr> <tr> <td>c Continuous or periodic measurements of dust, NO<sub>x</sub>, SO<sub>x</sub>, CO emissions and NH<sub>3</sub> emissions when SNCR is applied</td> <td>Applicable to kiln processes</td> </tr> <tr> <td>d Continuous or periodic measurements of HCl and HF emissions in case wastes are co-incinerated</td> <td>Applicable to kiln processes</td> </tr> <tr> <td>e Continuous or periodic measurements of TOC emissions or continuous measurements in case wastes are co-incinerated</td> <td>Applicable to kiln processes</td> </tr> <tr> <td>f Periodic measurements of PCDD/F and metal emissions</td> <td>Applicable to kiln processes Applicable to non-kiln processes</td> </tr> <tr> <td>g Continuous or periodic measurements of dust emissions</td> <td>For small sources (&lt;10 000 Nm<sup>3</sup>/h) the frequency of the measurements should be based on a maintenance management system</td> </tr> </tbody> </table>	Technique	Applicability	a Continuous measurements of process parameters demonstrating the process stability, such as temperature, O <sub>2</sub> content, pressure, flow rate and CO emissions	Applicable to kiln processes	b Monitoring and stabilising of critical process parameters, e.g. fuel feed, regular dosage and excess oxygen		c Continuous or periodic measurements of dust, NO <sub>x</sub> , SO <sub>x</sub> , CO emissions and NH <sub>3</sub> emissions when SNCR is applied	Applicable to kiln processes	d Continuous or periodic measurements of HCl and HF emissions in case wastes are co-incinerated	Applicable to kiln processes	e Continuous or periodic measurements of TOC emissions or continuous measurements in case wastes are co-incinerated	Applicable to kiln processes	f Periodic measurements of PCDD/F and metal emissions	Applicable to kiln processes Applicable to non-kiln processes	g Continuous or periodic measurements of dust emissions	For small sources (<10 000 Nm <sup>3</sup> /h) the frequency of the measurements should be based on a maintenance management system	CC	<p>The operator employs the following techniques:</p> <p>a) The sites kiln has continuous measurement on process parameters including, temperature, pressure, and air flows. These are fed back to the sites distributed control system (DCS)</p> <p>b) Fuel and limestone feed to the kiln is monitored and controlled by the sites DCS</p> <p>c) SNCR is not employed on the lime kiln.</p> <p>d) Waste fuels are not co-incinerated. The fuel is of a single type either coke or anthracite, both purchased to a specific specification.</p> <p>e) Waste fuels are not co-incinerated. The fuel is of a single type either coke or anthracite, both purchased to a specific specification.</p>
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33	<p>In order to reduce/minimise thermal energy consumption, BAT is to use a combination of the listed techniques.</p>	CC	<p>The operator employs a combination of the following techniques:</p> <p>a) I. The sites limekiln has continuous measurements on process parameters to ensure that kiln control is run to optimal values.  II. Not applicable to mixed feed shaft Kilns (MFSK)  III. Limestone and fuel feed to the kiln is by a gravimetric system  IV. The kiln is regularly maintained, the site operates a Planned Preventative Maintenance (PPM) program that ensures the integrity of the limekiln is maintained and air ingress is minimised. I Inspections and testing are undertaken at regular intervals by specially trained engineers to prevent the potential for breakdown, confirm safety and ensure it is efficient in operation.  V. Stone size is specified in the defined British Sugar specification.</p> <p>b) The fuel used in the kiln is chosen to a defined British Sugar specification which includes calorific value and moisture content.</p> <p>c) Not applicable to MFSK</p> <p>Bury St Edmunds specific energy consumption falls within the 2.33 – 2.82 GJ/tonne of product range.</p>																

BAT Conclusion No	Summary of BAT Conclusion requirement for production of Cement, Lime and Magnesium Oxide	Status NA/ C / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
34	In order to minimise electrical energy consumption, BAT is to use one or a combination of the listed techniques.	CC	Electrical consumption is restricted to raw materials and burnt lime conveying and gas pumps and the lime slaker drive. There is no grinding of limestone within the process. Energy efficient equipment is employed where possible.
35	In order to minimise limestone consumption, BAT is to use one or a combination of the listed techniques	CC	<p>The operator employs the following techniques:</p> <p>a) Limestone sizing is defined in in specification PCS-014. The sizing is specified to allow efficient burning of stone and good air flows through the limekiln to produce high quality burnt lime which will slake effectively to produce a milk of lime which has a high surface area of lime particles which maximises purification of the sugar juice. This will ensure that the minimum amount of lime is used for sugar juice purification. A high-quality limestone is specified to ensure a high quality burnt lime is produced.</p> <p>b) Unburnt limestone is recovered from the lime slaker and is recycled back to the kiln to minimise process losses and raw materials usage.</p>
36	In order to prevent/reduce emissions, BAT is to carry out a careful selection and control of fuels entering the kiln	CC	Bury St Edmunds operates a mixed feed shaft kiln, the solid fuels that are used in the kiln are procured to meet BS specification (PCS-014). The kiln gas is initially scrubbed to remove particulate matter before passing through the gas pumps to the sugar process where it is introduced into a sugar juice, milk of lime mixture in a two stage carbonatation process. This is effectively ensuring all kiln gas is scrubbed twice, firstly by water in the gas washer and then through a lime solution in the sugar process. SO <sub>2</sub> is absorbed by the re-precipitated calcium carbonate in the process. In addition, the lime will scrub other acid gases.
37	In order to guarantee the characteristics of waste to be used as fuel in a lime kiln, BAT is to apply the listed techniques:	NA	Not applicable – waste fuels are not used.
38	In order to prevent/reduce emissions occurring from the use of waste fuels into the kiln, BAT is to use the listed techniques	NA	Not applicable – waste fuels are not used.
39	In order to prevent accidental emissions, BAT is to use safety management for the storage, handling and feeding into the kiln of hazardous waste materials	NA	Not applicable – hazardous wastes are not used in the kiln.



BAT Conclusion No	Summary of BAT Conclusion requirement for production of Cement, Lime and Magnesium Oxide	Status NA/ C / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
40	In order to minimise/prevent diffuse dust emissions from dusty operations, BAT is to use one or a combination of the listed techniques	CC	<p>The operator employs a combination of the following techniques:</p> <p>a) Limestone and burnt lime conveyors are enclosed to minimise dust emissions. Limestone and fuel hoppers have high level indication to reduce the risk of overloading and spillage, these are fed back to the DCS.</p> <p>g) British sugar operates a planned preventative maintenance system to ensure the proper and complete maintenance of its equipment, plant item areas checked by regular audio-visual inspection routes.</p> <p>h) The whole kiln, slaking and carbonatation process is monitored and controlled by the site DCS.</p>
41	In order to minimise/prevent diffuse dust emissions from bulk storage areas, BAT is to use one or a combination of the listed techniques	CC	<p>The operator uses a combination of the following techniques:</p> <p>a) Limestone and anthracite stocks are stored in locations with artificial screening for wind protection.</p> <p>c) Floors are damped down to reduce diffuse dust emissions when required.</p> <p>g) Surfaces are damped down to reduce diffuse dust emissions. Outside areas are regularly cleaned by road sweepers to reduce material build up which may lead to diffuse dust emissions by site transport and in extremely dry conditions from wind blow.</p>
42	In order to reduce channelled dust emissions from dusty operations other than those from kiln firing processes, BAT is to use one of the listed techniques and to use a maintenance management system which specifically addresses the performance of filters	CC	<p>Milk of lime for sugar processing is produced by mixing the burnt lime from the kiln with a dilute sugar solution within the lime slaker, exhaust air from the slaker passes through a hydro cyclone to reduce particulate emissions. Annual planned preventative maintenance is scheduled and carried out and shiftily Audio-Visual Inspections are carried out to ensure the plant is running to design specification.</p> <p>The BAT-AEL has been applied to the slaker vent.</p>
43	In order to reduce dust emissions from the flue-gases of kiln firing processes, BAT is to use flue-gas cleaning with a filter. One or a combination of the listed techniques can be used	CC	<p>The operator uses the following techniques:</p> <p>c) The gas from the limekiln is pulled from the top of the limekiln through gas washers by a gas pump and is introduced into the sugar juice purification process (carbonatation). The gas washer removes any entrained particulate matter preventing damage to the gas pump. The gas washers are supplied with recycled water from the sugar process (condenser water). The sugar process carbonatation system essentially acts as a second stage wet scrubber.</p> <p>The BAT-AEL may not apply subject to IC32.</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for production of Cement, Lime and Magnesium Oxide	Status NA/ C / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
44	In order to reduce the emissions of gaseous compounds (i.e. NO <sub>x</sub> , SO <sub>x</sub> , HCl, CO, TOC/VOC, volatile metals) from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques	<b>CC</b>	<p>The operator employs the following techniques:</p> <ul style="list-style-type: none"> <li>a) Raw materials are purchased to a specification which minimises the amount of impurities in the limestone and fuel.</li> <li>b) Both coke and anthracite are used in the kiln as a fuel and these are sourced to British Sugar specifications which include a specification to minimise the sulphur content. British Sugar specifies only very high purity limestone to be used in the lime kiln this is to maximise the quality of the burnt lime used for carbonation. This ensures maximum juice purification.</li> <li>c) Process control optimisation, including computer-based automatic control. The lime kiln is run using the sites DCS system, process parameters such as temperatures and air flows are fed back to a centralised control room. The carbonation vessels are fitted with gas distributors which maximise the reprecipitation of calcium carbonate by ensuring maximum contact between the limed sugar juice and the carbon dioxide and subsequent removal by the lime of acid gases and impurities.</li> </ul> <p>The BAT-AEL may not apply, subject to IC32.</p>
45	In order to reduce the emissions of NO <sub>x</sub> from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques	<b>CC</b>	<p>The operator uses a combination of the following techniques:</p> <ul style="list-style-type: none"> <li>a) Primary techniques I. Bury St Edmunds operates a mixed feed shaft kiln and only anthracite, coke and limestone are used in the kiln. All gas from the limekiln passes through a gas washer (water scrubber) and through the sugar carbonation process which acts as a lime scrubber.</li> </ul> <p>The BAT-AEL may not apply, subject to IC32.</p>
46	When SNCR is used, BAT is to achieve efficient NO <sub>x</sub> reduction, while keeping the ammonia slip as low as possible, by using the listed technique	<b>NA</b>	SNCR is not used at the site and thus the BATC is not applicable.

BAT Conclusion No	Summary of BAT Conclusion requirement for production of Cement, Lime and Magnesium Oxide	Status NA/ C / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
47	In order to reduce the emissions of SO <sub>x</sub> from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques	<b>CC</b>	The operator uses a combination of the following techniques: a) Process control optimisation, including computer-based automatic control. The lime kiln is run using the sites DCS system, process parameters such as temperatures and air flows are fed back to a centralised control room. b) Both coke and anthracite used as fuel for the limekiln have maximum sulphur specifications. Gas from the kiln is passed through a gas washer and is then introduced into the sugar factory purification process. This acts as a lime scrubber and will remove sulphur dioxide readily.
48	In order to reduce the emissions of CO from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques	<b>CC</b>	The operator uses a combination of the following techniques: a) Fuel and limestone used in the kiln is bought to a British Sugar specification the organic content of the limestone is low. b) Process control optimisation, including computer-based automatic control. The lime kiln is run using the sites DCS system, process parameters such as temperatures and air flows are fed back to a centralised control room. The fuel to stone ratio is adjusted to ensure that the limestone is burnt efficiently to minimise over burning or under burning. This optimisation of combustion within the kiln will control carbon monoxide emissions.
49	In order to minimise the frequency of CO trips when using electrostatic precipitators, BAT is to use the listed techniques	<b>NA</b>	Not applicable as ESP's are not utilised.
50	In order to reduce the emissions of TOC from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques	<b>CC</b>	The operator employs the following techniques to reduce emissions: Raw materials, limestone and solid fuel are procured to a British Sugar specification to minimise to ensure that limestone and fuel impurity levels are minimised and both fuel and limestone breakage is minimised. The specifications define key parameters including the required physical properties.
51	In order to reduce the emissions of HCl and the emissions of HF from the flue-gas of kiln firing processes, when using waste, BAT is to use the following primary techniques	<b>NA</b>	Not applicable as the site does not use waste as fuels.
52	In order to prevent or reduce the emissions of PCDD/F from the flue-gas of kiln firing processes, BAT is to use one or a combination of the listed primary techniques	<b>NA</b>	British Sugar does not use waste or waste derived fuels within its limekilns. The limestone specification requires a minimum 98 % purity. All kiln gas is passed through a gas washer which quickly reduces the temperature to around 40C. The gas is then passed through the sugar factory carbonatation system which acts as a lime scrubber.

BAT Conclusion No	Summary of BAT Conclusion requirement for production of Cement, Lime and Magnesium Oxide	Status NA/ C / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
53	In order to minimise the emissions of metals from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques	CC	The kiln gas is passed through a gas washer and then through the sugar factory carbonatation system which effectively acts as a lime scrubber. All particulates will therefore be removed in this two-stage wet scrubbing process.
54	In order to reduce the solid wastes from the lime manufacturing processes and to save raw materials, BAT is to use the listed techniques	CC	The operator uses a combination of the following techniques: a) Limestone screenings are either sold or used in place of virgin aggregate to maintain site roadways. Unburnt limestone is recycled back into limestone feed to kiln where material is suitable. Inert material (dross) generated from limited impurities within the limestone raw material are used for internal site roads maintenance

BATC No.	Summary of BAT Conclusion requirement for Waste Treatment – Applicable for Food and Drink sites with Anaerobic Digestion.	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												
15	<p>BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below.</p> <table border="1" data-bbox="264 359 1205 678"> <thead> <tr> <th data-bbox="264 359 322 395"></th> <th data-bbox="322 359 568 395">Technique</th> <th data-bbox="568 359 954 395">Description</th> <th data-bbox="954 359 1205 395">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="264 395 322 568">a.</td> <td data-bbox="322 395 568 568">Correct plant design</td> <td data-bbox="568 395 954 568">This includes the provision of a gas recovery system with sufficient capacity and the use of high-integrity relief valves.</td> <td data-bbox="954 395 1205 568">Generally applicable to new plants. A gas recovery system may be retrofitted in existing plants.</td> </tr> <tr> <td data-bbox="264 568 322 678">b.</td> <td data-bbox="322 568 568 678">Plant management</td> <td data-bbox="568 568 954 678">This includes balancing the gas system and using advanced process control.</td> <td data-bbox="954 568 1205 678">Generally applicable.</td> </tr> </tbody> </table>		Technique	Description	Applicability	a.	Correct plant design	This includes the provision of a gas recovery system with sufficient capacity and the use of high-integrity relief valves.	Generally applicable to new plants. A gas recovery system may be retrofitted in existing plants.	b.	Plant management	This includes balancing the gas system and using advanced process control.	Generally applicable.	CC	<p>The operator did not indicate compliance against the Waste Treatment (WT)-BAT15 however, we are confidence in their compliance as we have limited the use of flaring to emergencies only.</p> <p>We have assured environmental protection by implementing appropriate process monitoring and reporting requirements relating to the Waste Treatment - Anaerobic Digestion BAT.</p>
	Technique	Description	Applicability												
a.	Correct plant design	This includes the provision of a gas recovery system with sufficient capacity and the use of high-integrity relief valves.	Generally applicable to new plants. A gas recovery system may be retrofitted in existing plants.												
b.	Plant management	This includes balancing the gas system and using advanced process control.	Generally applicable.												
16	<p>In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.</p> <table border="1" data-bbox="264 810 1205 1321"> <thead> <tr> <th data-bbox="264 810 322 847"></th> <th data-bbox="322 810 568 847">Technique</th> <th data-bbox="568 810 954 847">Description</th> <th data-bbox="954 810 1205 847">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="264 847 322 1010">a.</td> <td data-bbox="322 847 568 1010">Correct design of flaring devices</td> <td data-bbox="568 847 954 1010">Optimisation of height and pressure, assistance by steam, air or gas, type of flare tips, etc., to enable smokeless and reliable operation and to ensure the efficient combustion of excess gases.</td> <td data-bbox="954 847 1205 1010">Generally applicable to new flares. In existing plants, applicability may be restricted, e.g. due to maintenance time availability.</td> </tr> <tr> <td data-bbox="264 1010 322 1321">b.</td> <td data-bbox="322 1010 568 1321">Monitoring and recording as part of flare management</td> <td data-bbox="568 1010 954 1321">This includes continuous monitoring of the quantity of gas sent to flaring. It may include estimations of other parameters (e.g. composition of gas flow, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g. NO<sub>x</sub>, CO, hydrocarbons), noise). The recording of flaring events usually includes the duration and number of events and allows for the quantification of emissions and the potential prevention of future flaring events.</td> <td data-bbox="954 1010 1205 1321">Generally applicable.</td> </tr> </tbody> </table>		Technique	Description	Applicability	a.	Correct design of flaring devices	Optimisation of height and pressure, assistance by steam, air or gas, type of flare tips, etc., to enable smokeless and reliable operation and to ensure the efficient combustion of excess gases.	Generally applicable to new flares. In existing plants, applicability may be restricted, e.g. due to maintenance time availability.	b.	Monitoring and recording as part of flare management	This includes continuous monitoring of the quantity of gas sent to flaring. It may include estimations of other parameters (e.g. composition of gas flow, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g. NO <sub>x</sub> , CO, hydrocarbons), noise). The recording of flaring events usually includes the duration and number of events and allows for the quantification of emissions and the potential prevention of future flaring events.	Generally applicable.	CC	<p>The operator did not indicate compliance against the Waste Treatment (WT)-BAT16 however, we are confidence in their compliance as we have limited the use of flaring to emergencies only.</p> <p>We have assured environmental protection by implementing appropriate process monitoring and reporting requirements relating to the Waste Treatment - Anaerobic Digestion BAT.</p>
	Technique	Description	Applicability												
a.	Correct design of flaring devices	Optimisation of height and pressure, assistance by steam, air or gas, type of flare tips, etc., to enable smokeless and reliable operation and to ensure the efficient combustion of excess gases.	Generally applicable to new flares. In existing plants, applicability may be restricted, e.g. due to maintenance time availability.												
b.	Monitoring and recording as part of flare management	This includes continuous monitoring of the quantity of gas sent to flaring. It may include estimations of other parameters (e.g. composition of gas flow, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g. NO <sub>x</sub> , CO, hydrocarbons), noise). The recording of flaring events usually includes the duration and number of events and allows for the quantification of emissions and the potential prevention of future flaring events.	Generally applicable.												

BATC No.	Summary of BAT Conclusion requirement for Waste Treatment – Applicable for Food and Drink sites with Anaerobic Digestion.	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												
21	<p>In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1).</p> <table border="1" data-bbox="266 363 1238 919"> <thead> <tr> <th data-bbox="266 363 327 405"></th> <th data-bbox="327 363 607 405">Technique</th> <th data-bbox="607 363 1238 405">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="266 405 327 612">a.</td> <td data-bbox="327 405 607 612">Protection measures</td> <td data-bbox="607 405 1238 612">           These include measures such as:           <ul style="list-style-type: none"> <li>— protection of the plant against malevolent acts;</li> <li>— fire and explosion protection system, containing equipment for prevention, detection, and extinction;</li> <li>— accessibility and operability of relevant control equipment in emergency situations.</li> </ul> </td> </tr> <tr> <td data-bbox="266 612 327 743">b.</td> <td data-bbox="327 612 607 743">Management of incidental/accidental emissions</td> <td data-bbox="607 612 1238 743">Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves.</td> </tr> <tr> <td data-bbox="266 743 327 919">c.</td> <td data-bbox="327 743 607 919">Incident/accident registration and assessment system</td> <td data-bbox="607 743 1238 919">           This includes techniques such as:           <ul style="list-style-type: none"> <li>— a log/diary to record all accidents, incidents, changes to procedures and the findings of inspections;</li> <li>— procedures to identify, respond to and learn from such incidents and accidents.</li> </ul> </td> </tr> </tbody> </table>		Technique	Description	a.	Protection measures	These include measures such as: <ul style="list-style-type: none"> <li>— protection of the plant against malevolent acts;</li> <li>— fire and explosion protection system, containing equipment for prevention, detection, and extinction;</li> <li>— accessibility and operability of relevant control equipment in emergency situations.</li> </ul>	b.	Management of incidental/accidental emissions	Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves.	c.	Incident/accident registration and assessment system	This includes techniques such as: <ul style="list-style-type: none"> <li>— a log/diary to record all accidents, incidents, changes to procedures and the findings of inspections;</li> <li>— procedures to identify, respond to and learn from such incidents and accidents.</li> </ul>	<b>CC</b>	The operator did not indicate compliance against the Waste Treatment (WT)-BAT21 however, we are confident in their compliance as they have an existing Environmental Management System which is accredited to ISO14001.
	Technique	Description													
a.	Protection measures	These include measures such as: <ul style="list-style-type: none"> <li>— protection of the plant against malevolent acts;</li> <li>— fire and explosion protection system, containing equipment for prevention, detection, and extinction;</li> <li>— accessibility and operability of relevant control equipment in emergency situations.</li> </ul>													
b.	Management of incidental/accidental emissions	Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves.													
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BATC No.	Summary of BAT Conclusion requirement for Waste Treatment – Applicable for Food and Drink sites with Anaerobic Digestion.	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
38	<p>In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.</p> <p>Implementation of a manual and/or automatic monitoring system to:</p> <ul style="list-style-type: none"> <li>• ensure a stable digester operation;</li> <li>• minimise operational difficulties, such as foaming, which may lead to odour emissions;</li> <li>• provide sufficient early warning of system failures which may lead to a loss of containment and explosions.</li> </ul> <p>This includes monitoring and/or control of key waste and process parameters, e.g.:</p> <ul style="list-style-type: none"> <li>• pH and alkalinity of the digester feed;</li> <li>• digester operating temperature;</li> <li>• hydraulic and organic loading rates of the digester feed;</li> <li>• concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate;</li> <li>• biogas quantity, composition (e.g. H<sub>2</sub>S) and pressure;</li> <li>• liquid and foam levels in the digester.</li> </ul>	<b>CC</b>	<p>The operator did not indicate compliance against the Waste Treatment (WT)-BAT38 however, we are confident in their compliance by the controls we have put in place.</p> <p>We have assured the operator is compliant with the requirements of the WT-BAT38 by including appropriate process monitoring and reporting requirements in the permit.</p>

## **Annex 2: Review and assessment of changes that are not part of the BAT Conclusions derived permit review**

### **Updating permit during permit review consolidation**

- Activity name
- Introductory note
- Site plan
- Table S1.1 overhaul
  - Activity Reference (AR) renumbering
  - Updated listed activities
  - Addition of production capacity
  - Directly associated activities (DAAs) standardisation

We have updated permit conditions to those in the current generic permit template as a part of permit consolidation. The conditions will provide the same level of protection as those in the previous permit.

### **Production/Capacity Threshold**

The Environment Agency is looking to draw a “line in the sand” for permitted production capacity; a common understanding between the Operator and regulator for the emissions associated with a (maximum) level of production, whereby the maximum emissions have been demonstrated as causing no significant environmental impact.

The operator has provided the production capacities of relevant activities as per Table S1.1 of the permit.

We are satisfied that the most recent risk assessment for these capacities remains valid.

### **Emissions to Air**

We asked the operator to list all emission points to air from the installation in the Regulation 61 notice. And to provide a site plan indicating the locations of all air emission points.

The operator has provided an up to date air emission plan.

### **Implementing the requirements of the Medium Combustion Plant Directive**

There are no medium combustion plants (1 – 50 MW) on site.

### **Existing large combustion plant (>50MW)**

The site operates Large Combustion Plant - LCP037

A full BAT assessment against the LCP BAT conclusions has been undertaken as detailed in Annex 1.



### **National Emissions Ceiling Directive Substances**

The site gives rise to emissions of NECD substances, and we have undertaken an assessment of these to ensure that the appropriate permit controls are in place.

#### **Emissions of NO<sub>2</sub>**

The operator has undertaken an assessment of the emissions of NO<sub>2</sub> from the LCP and the animal feed dryers.

The assessment shows that the emissions of NO<sub>2</sub> were significant from these sources, however, the operator has switched the fuel for Dryer No.1 (A51) from coal to natural gas and is planning to switch the fuel for Dryer No.2 (A52). The operator has also stated that they have reduced, and process contributions have reduced through the modification to gas burners.

#### **Emissions of SO<sub>x</sub> – No assessment undertaken**

Based on the activities and that the Dryer fuels have been switched from coal to natural gas, this is unlikely to be a significant parameter.

#### **Emissions of Particulate matter**

The operator has undertaken an assessment of the emissions of PM10 and PM2.5 from the lime slaker vents (PM10 only) and the animal feed dryers.

The assessment shows that the emissions of are significant from these sources. However, the operator has switched the fuel for Dryer No.1 (A51) from coal to natural gas and is planning to switch the fuel for Dryer No.2 (A52). The operator has also stated that they have reduced, and process contributions have reduced through the modification to gas burners.

BAT-AELs are derived for those substances identified as key environmental issues during the BREF review process.

If the operator has identified current compliance against BAT-AELs we will implement the relevant emission limit value (ELV) from the date of permit issue.

#### **Emissions of ammonia**

The operator has undertaken an assessment of the emissions of ammonia from the sugar process, cooling towers and the animal feed dryers.

The assessment screened the applicant's emissions out as not significant, when the post review plans are applied. However, since the original R61 response the operator has determined that Dryer No.2 will be retained on site and switched from coal to natural gas. Therefore, this has not been accounted for in the assessment.

We have included IC28 for the operator to investigate further reductions in the emissions of ammonia.

### Emissions of Non-methane Volatile Organic Compounds

The operator has undertaken an assessment of the emissions of NMVOCs (as Benzene) from the animal feed dryers. This was assessed against the revised LT EAL standard.

The assessment shows that the long term and short-term emissions of NMVOCs are insignificant from these sources.

However, to further reduce emissions of CO, methane, formaldehyde etc, we have imposed improvement condition IC29.

### Emissions to Water and implementing the requirements of the Water Framework Directive

We asked the Operator to provide information on all emissions to water at the installation in the Regulation 61 Notice as follows;

- Identify any effluents which discharge directly to surface or groundwater;
- Provide an assessment of volume and quality, including results of any monitoring data available;
- and for any discharges to water / soakaway whether a recent assessment of the feasibility of connection to sewer has been carried out.

The operator has provided a revised risk assessment using the Environment Agency's H1 software tool for the following emissions: Chloride, Iron and EDTA.

The assessment shows that, applying the conservative criteria in our guidance on environmental risk assessment, all emissions may be screened out as environmentally insignificant.

However, the presence of EDTA in the waste water stream requires further investigation and we have added IC30, also having regard for the requirements of BATc 8.

To further protect water quality, we have imposed a monitoring requirement for neonicotinoids when these have been applied to the crop.

We have ensured that the operator demonstrates BAT and the requirements protect the WFD status of the receiving watercourse.

### Soil & groundwater risk assessment (baseline report)

The IED requires that the operator of any IED installation using, producing or releasing "relevant hazardous substances" (RHS) shall, having regarded the possibility that they might cause pollution of soil and groundwater, submit a "baseline report" with its permit application. The baseline report is an important reference document in the assessment of contamination that might arise during the operational lifetime of the regulated facility and at cessation of activities. It must enable a quantified comparison to be made between the baseline and the state of the site at surrender.

At the definitive cessation of activities, the Operator has to satisfy us that the necessary measures have been taken so that the site ceases to pose a risk to soil or groundwater, taking into account both the baseline conditions and the site's current or approved future use. To do this, the Operator has to submit a surrender application to us, which we will not grant unless and until we are satisfied that these requirements have been met.

The Operator submitted a site condition report during the original application. The site condition report included a report on the baseline conditions as required by Article 22. We reviewed that report and considered that it adequately described the condition of the soil and groundwater at that time.

### **Hazardous Substances**

Hazardous substances are those defined in Article 3 of Regulation (EC) No. 1272/2008 on classification, labelling and packaging of substances and mixtures.

The operator did not provide a hazardous substances risk assessment; however, the operator has a robust Site Protection and Monitoring Plan (SPMP) in place which provides sufficient environmental protection for the pollution of soil and/or ground water against hazardous substances on site.

### **Climate Change Adaptation**

The operator has considered if the site is at risk of impacts from adverse weather (flooding, unavailability of land for land spreading, prolonged dry weather / drought).

The operator has identified the installation as likely to be or has been affected by flooding and prolonged dry weather/drought, which we consider to be a severe weather event.

The operator has management plans in place, which considers, as a minimum the impact of severe weather on the operations within the installation.

We consider the management plans to be appropriate for the installation.

### **Containment**

We asked the Operator via the Regulation 61 Notice to provide details of the each above ground tanks which contain potentially polluting liquids at the site, including tanks associated with the effluent treatment process where applicable.

The Operator provided details of all tanks;

- Tank reference/name
- Contents
- Capacity (litres)
- Location
- Construction material(s) of each tank
- The bunding specification including

- Whether the tank is bunded
- If the bund is shared with other tanks
- The capacity of the bund
- The bund capacity as % of tank capacity
- Construction material of the bund
- Whether the bund has a drain point
- Whether any pipes penetrate the bund wall
- Details of overfill prevention
- Drainage arrangements outside of bunded areas
- Tank filling/emptying mitigation measures (drips/splashes)
- Leak detection measures
- Details of when last bund integrity test was carried out
- Maintenance measures in place for tank and bund (inspections)
- How the bund is emptied
- Details of tertiary containment

and whether the onsite tanks currently meet the relevant standard in the Ciria “Containment systems for the prevention of pollution (C736)” report or alternative appropriate measures.

We reviewed the information provided by the operator. We are broadly satisfied that the existing tanks and containment measures are appropriate.

## Annex 3: Improvement Conditions

Based on the information in the Operator's Regulation 61 Notice response and our own records of the capability and performance of the installation at this site, we consider that we need to set improvement conditions so that the outcome of the techniques detailed in the BAT Conclusions are achieved by the installation. These improvement conditions are set out below - justifications for them is provided at the relevant section of the decision document (Annex 1 or Annex 2).

The following improvement conditions have added to the permit as a result of the variation.

<b>Improvement programme requirements</b>		
<b>Reference</b>	<b>Reason for inclusion</b>	<b>Justification of deadline</b>
IC27	Particulates are a key issue for the sector.	To give the operator appropriate time to undertake monitoring
IC28	Ammonia is a key issue for the sector.	
IC29	Emissions of CO, methane, formaldehyde etc are elevated in this sector as demonstrated by PI returns.	
IC30	In line with FDM BAT 8.	Reasonable timeframe for completion
IC31	In line with LCP BAT 44 to establish a meaningful low NOx profile for the site.	Reasonable timeframe for completion
IC32	The operator does not directly discharge lime kiln gases to atmosphere, as it is utilised into the sugar production process. As such, the nature of the emissions may be such that the CLM BAT-AELs do not apply	To give the operator appropriate time to undertake monitoring
IC33	To ensure an appropriate ELV for particulates are established for A51 and A52 once more data is obtained after the dryer fuel switches.	To give the operator appropriate time to undertake monitoring
IC34	In relation to FDM BAT 35 to look at the feasibility of steam drying to significantly reduce particulate emissions and improve energy efficiency	Reasonable timeframe for completion
IC35	A routine requirement in line with animal feed production	Reasonable timeframe for completion