

Natural Resources Wales permitting decisions

Variation and Consolidation of a bespoke permit

We have decided to issue a Natural Resources Wales initiated variation for the Dow CHP at Barry operated by Dow Silicones UK Ltd.

The variation number is EPR/JP3632ZH/V004.

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

The Permit has been varied following the publication of the revised Best Available Techniques (BAT) Reference Document (BREF) for Large Combustion Plant (LCP). The associated BAT conclusions to this document were published on 17 August 2017 in the Official Journal of the European Union.

This variation incorporates the changes required by the Industrial Emissions Directive following a statutory review of permits in the Large Combustion Plant sector. These include the amendment of the wording of several permit conditions relating to notifications, changes to emission limits and monitoring requirements.

Purpose of this document

This decision document:

- explains how we have carried out our statutory review of the Operator's Permit;
- why we have decided to vary the Permit as a result of that review; and
- why we have included the specific conditions in the revised Permit through the variation notice we are issuing.

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

Structure of this document

- Assessment of Dow CHP against the published BAT conclusions for Large Combustion Plant.
- Annex 1 – Decision Checklist regarding relevant BAT Conclusions for Large Combustion Plant

Assessment of Dow CHP against the published BAT conclusions for large combustion plant.

1. Our decision

We have issued a variation, which will allow Dow Silicones UK Ltd to operate the installation, subject to the conditions in the varied permit.

The variation does four things:

- it consolidates the original permit to reflect changes made through earlier variations;
- it brings the permit into line with our modern regulatory template; and
- it varies the permit to implement the Industrial Emissions Directive (IED) Annex V Emission Limit Values (ELVs) applicable to large combustion plants (LCP) at the end of Transitional National Plan (TNP) on 30 June 2020.
- it varies the permit where appropriate to reflect the outcome of our statutory review and incorporate Best Available Techniques (BAT) and associated Emission Limit Values (ELVs).

We consider that, in reaching this decision, we have taken into account all relevant considerations and legal requirements and that the permit will continue to ensure that a high level of protection is provided for the environment and human health.

The original permit, issued on the 30 June 2006, ensured that the installation, employed Best Available Techniques (BAT) and ensured a high level of protection for human health and the environment. We have altered the permit as a result of the statutory review, and we are confident that the new requirements will deliver a superior level of protection to that which was previously achieved.

2. The legal framework

The variation and consolidation notice (which includes the consolidated permit as Schedule 2) will be issued under Regulation 20 of the Environmental Permitting Regulations (England and Wales) 2016 (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 Industrial Emissions Directive (IED);
- subject to aspects of other relevant legislation which also have to be addressed.

We consider that, in issuing the variation notice and consolidated permit, 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.

3. How we reached our decision

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 on 9 May 2018 requiring the operator to provide information to demonstrate how the operation of their installation currently meets, or will subsequently meet, the revised standards described in the relevant BAT Conclusions document.

The Regulation 61(1) notices required the operator to:

- Describe the techniques that will be implemented before 17 August 2021, which will then ensure that operations meet the revised standard, or
- Justify why standards will not be met by 17 August 2021, and confirmation of the date when the operation of those processes will cease within the installation or an explanation of why the revised BAT standard is not applicable to those processes, or
- Justify why an alternative technique will achieve the same level of environmental protection equivalent to the revised standard described in the BAT Conclusions.
- Where the permitted activity involves the use, production or release of a hazardous substance, as defined in Article 3(18) of the Industrial Emissions Directive, Dow Silicones UK Ltd were required to carry out a risk assessment considering the possibility of soil and groundwater contamination at the permitted installation with such substances. Where risk of such contamination is established prepare a baseline report containing information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definite cessation of the activity. Dow Silicones UK Ltd have a copy of a consequent baseline report.

- Where their permitted activity involves the release of priority hazardous substances, as defined by the Water Framework Directive, Dow Silicones UK Ltd were required to carry out a risk screening assessment considering the presence of priority hazardous substances at the permitted installation. Where a risk of these substances is established the operator is to sample the effluent and screen for the priority hazardous substances. If these substances are found to be present in the effluent stream, then assessment using the H1 tool and potential detailed dispersion modelling will be required to demonstrate that the effluent discharge will not have a significant impact to the receiving water.
- Where the compliance with the BAT conclusions leads to the substantial refurbishment or installation of new combustion plant with an aggregate thermal input of greater than 20MWth, which generates more than 100kWth of heat, Dow Silicones UK Ltd must provide sufficient technical and commercial evidence to demonstrate compliance with Article 14, Paragraph 5 of Directive 2012/27/EU on Energy Efficiency. This must include an assessment of the technical feasibility and costs of installing a combined heat and power (CHP) system or providing district heating and, where this assessment shows that the costs are not disproportionate to the benefits, proposals to incorporate these measures into the plant. The plant already employs CHP as part of normal operations and no further demonstration of compliance with Article 14, Paragraph 5 of Directive 2012/27/EU is necessary.

Where the operator proposed that they were not intending to meet a BAT standard that also included a BAT Associated Emission Level (BAT-AEL) described in the BAT Conclusions Document, the Regulation 61 Notice requested that the operator make a formal request for derogation from compliance with that AEL (as provisioned by Article 15(4) of IED). In this circumstance, the Notice identified that any such request for derogation must be supported and justified by sufficient technical and commercial information that would enable us to determine acceptability of the derogation request. No derogations were requested by Dow Silicones UK Ltd.

The Regulation 61(1) Notice response from the operator was received on 9 September 2018 and additional information provided on 14 August 2019.

We considered that the response contained sufficient information for us to commence 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(1) Notice response that appears to be confidential in relation to any part.

4. Key issues/Regulation 61(1) response

BAT Conclusions for the large combustion plants were published as a Commission Implementing Decision (2017/1442/EU) in the Official Journal of the EU on 17 August 2017. There are 75 BAT Conclusions. This annex provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation. This should be read in conjunction with the permit/variation notice issued.

A detailed response was received from Dow Silicones UK Ltd. Where the operator has concluded that they have achieved or will achieve BAT, and we are in agreement, no further information/justification has been sought by Natural Resources Wales.

5. Changes we have made

Improvement Conditions

Based on the information provided in the Regulation 61(1) response, we consider that we need to set improvement conditions. These conditions are set out below. We are using these conditions to require the operator to provide Natural Resources Wales with details that need to be established or confirmed during operations.

An improvement condition (reference IC7) has been set requiring Dow Silicones UK Ltd to provide a commissioning report and confirmation that BAT Associated Emission Levels for NO_x and CO specified in the LCP BREF BAT Conclusions will be implemented following commissioning of dry low NO_x control for the CHP gas turbines. Upon approval of the improvement condition response by NRW the reduced emission limit values will take effect on the date agreed and in accordance with footnotes to Table S3.1 in Schedule 3 of the permit.

Improvement condition reference IC8 has been included requiring submission of a commissioning report and confirmation that BAT Associated Emission Levels for NO_x and CO specified in the LCP BREF BAT Conclusions will be implemented following commissioning of low NO_x burners and/or flue gas recirculation (FGR) for the CHP HP boiler and optimisation of the MP boilers. Upon approval of the improvement condition response by NRW the reduced emission limit values based upon BAT AELs and MP boilers operating constraint of <1500 hours/year will take effect on the date agreed and in accordance with footnotes to Table S3.1 in Schedule 3 of the permit.

Reference	Requirement	Date
IC7	Following the commissioning of dry low NO_x (DLN) conversion of the CHP gas turbines and a period of operation for optimisation, the Operator shall submit a written post-commissioning report to Natural Resources Wales for approval. The report shall confirm the commissioning completion date for each gas turbine conversion to DLN firing. The report shall also state the emission reductions achieved and relevant performance parameters under the full range of operating scenarios, including, but not limited to: • noise levels associated with commissioning activities and routine start up and operation • start up, shut down thresholds and effective DLN threshold. • thermal performance • CEMs performance • NO_x emissions, including NO:NO₂ ratio • CO emissions The report shall include confirmation of the Best Available Techniques Associated Emission Levels (BAT AELs) to be adopted upon full optimisation of the units, including a date from which the BAT AELs will be complied with.	31 August 2021
IC8	Following the commissioning of low NO_x burner/FGR conversion of the CHP HP boiler and optimisation of the MP boilers and a period of operation for optimisation of the HP boiler, the Operator shall submit a written post-commissioning report to Natural Resources Wales for approval. The report shall confirm the commissioning completion date for HP boiler conversion to low NO_x firing. The report shall also state the emission reductions achieved and relevant performance parameters under the full range of operating scenarios, including, but not limited to: • noise levels associated with commissioning activities and routine start up and operation • start up, shut down thresholds • thermal performance • CEMs performance • NO_x emissions, including NO:NO₂ ratio • CO emissions The report shall include confirmation of the Best Available Techniques Associated Emission Levels (BAT AELs) to be adopted upon full optimisation of the HP boiler, including a date from which the BAT AELs will be complied with and 1500 hours/year operating constraints will permanently apply to the MP boilers.	31 December 2022

Operational Changes

Use of gas oil standby fuel provisions, including ELVs, have been removed from the permit as the operator no longer requires this capability.

Start up and shut down thresholds have been updated to reflect the agreed completion of improvement condition IC4.

The total remaining life operating hours of the HP boiler, with an individual unit rating less than 100 MW_{th}, are expected to be limited to significantly less than 10,000 hours (IED ESI Compliance Protocol provisions for CHP auxiliary boilers) once the gas turbine DLN upgrades have been completed as it should only be required for short duration periods of gas turbine outage until it is taken out of service for low NOx burner/FGR installation to allow future unconstrained operation and compliance with the BAT AELs.

Upon return to service following upgrading the HP boiler will potentially operate for greater than 1500 hours/year and CEMs along with associated annual mean BAT AEL ELVs will be required. This transition in operational mode for the HP boiler is implemented using improvement condition IC8, which has a compliance date set so that any unconstrained operation of the HP boiler without meeting the annual mean NOx BAT AEL will not take place after the expected date of the main chemical installation permit review when the LCP BREF requirements will need to be implemented for the CHP.

The BREF allows periodic monitoring for LCPs rated less than 100 MW_{th}, and that operate less than 1500 hours/year. Therefore, periodic monitoring and the associated Annex V periodic ELV based upon the daily average value have been implemented from the end of the TNP for the MP boilers. However, the operating and monitoring regime for the MP boilers during and after the TNP until BREF requirements come into force will continue to be permitted using the 10,000-hour limited life monitoring derogation implemented by the IED ESI Compliance Protocol for auxiliary boilers at CHPs which anticipates significantly less than 500 hours/year of operation.

The annual operating hours of the MP boilers, with an individual unit ratings less than 100 MW_{th}, are expected to continue to be less than 1500 hours/year from BREF implementation and periodic monitoring or emissions factor-based reporting will continue as they already meet the BAT AEL for NOx. This transition will also be implemented using improvement condition IC8.

Emissions to Water

As part of our delivery of the Water Framework Directive requirements, we need to identify and assess the impact for all discharges to surface waters and/or sewer from the site for priority hazardous substances and any other relevant substances. The emissions monitoring

for these substances should be carried out using the methods and standards described in the M18 guidance on “Monitoring of discharges to water and sewer”.

With reference to the risk assessment guidance on the gov.uk website entitled “Surface water pollution risk assessment for your environmental permit” (accessible via: <https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit>) the company carried out the following assessments:

- Screening tests for priority hazardous pollutants and any other relevant priority hazardous substances.
- For any substance which is not screened out by the screening tests further modelling, as described in the risk assessment guidance “Surface water pollution risk assessment for your environmental permit”.

The CHP does not discharge waste water directly into surface water and discharges of boiler feed water treatment effluent, oily water drains and blowdown are passed into the Dow waste water treatment system. No priority hazardous substances are used, and no flue gas treatment is carried out that gives rise to effluent. Therefore, no BAT-AELs are applicable and no changes to the existing permit requirements for waste water are considered to be necessary.

Therefore, it can be concluded, for the purposes of this Notice, that the discharge of priority hazardous substances and any other relevant substances to surface waters and/or sewer from the site has been assessed and is deemed acceptable. Emissions meet the requirements of Water Framework Directive.

The specific BAT Conclusions for water emissions in the large combustion plant BREF were also reviewed and conditions are not applicable. No changes are made to the ELV's for emissions to water as a result of this variation.

Emissions to Water – Article 15(4) Derogations

No derogation from compliance with water discharge BAT-AELs has been requested.

Emissions to Air

There are changes to the ELV's for emissions to air taking into account the IED Annex V ELVs applicable at the end of the Transitional National Plan (TNP) and BAT conclusions from the Large Combustion Plant BREF.

The tables below outline the parameters and limits set to implement the Annex V ELVs and BAT-AELs set out in: BAT 41, 43 and 44 (for combustion of gaseous fuels – natural gas fired boilers and gas turbines).

Note that the NO_x ELVs that apply after 1 July 2020 and completion of the gas turbine upgrades are dependent upon maintaining a net total fuel utilisation of 75% or more.

Effective until 30th June 2020:

Release point	Parameter	Monthly mean	Daily mean	95% of hourly means in a year	Effective until
A1 & A3 (gas turbines at 15% oxygen)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	125 mg/m ³ 70% to base load	125 mg/m ³ 70% to base load and MSUL/MSDL to base load	125 mg/m ³ 70% to base load	30 th June 2020
	Carbon Monoxide	80 mg/m ³ 70% to base load	80 mg/m ³ 70% to base load and MSUL/MSDL to base load	80 mg/m ³ 70% to base load	
A2 (HP boiler at 3% oxygen)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	250 mg/m ³	250 mg/m ³	250 mg/m ³	
	Carbon Monoxide	100 mg/m ³	110 mg/m ³	200 mg/m ³	
	Sulphur dioxide	38.5 mg/m ³	6-monthly by calculation		
	Dust	5.5 mg/m ³	6-monthly by calculation		
A4 & A5 (MP boilers at	Oxides of nitrogen (NO and NO ₂	135 mg/m ³	6-monthly extractive or emissions factor		

3% oxygen)	expressed as NO ₂)			
	Carbon Monoxide	200 mg/m ³	6-monthly extractive or emissions factor	
	Sulphur dioxide	38.5 mg/m ³	6-monthly by calculation	
	Dust	5.5 mg/m ³	6-monthly by calculation	

Effective from 1st July 2020:

Release point	Parameter	Monthly mean	Daily mean	95% of hourly means in a year	Effective from
A1 & A3 (gas turbines at 15% oxygen)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	75 mg/m ³ 70% to base load	82.5 mg/m ³ 70% to base load and MSUL/MSDL to base load	125 mg/m ³ 70% to base load	1 st July 2020
	Carbon Monoxide	80 mg/m ³ 70% to base load	80 mg/m ³ 70% to base load and MSUL/MSDL to base load	80 mg/m ³ 70% to base load	
A2 (HP boiler at 3% oxygen)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	100 mg/m ³	110 mg/m ³	200 mg/m ³	
	Carbon Monoxide	100 mg/m ³	110 mg/m ³	200 mg/m ³	
	Sulphur dioxide	38.5 mg/m ³	6-monthly by calculation		
	Dust	5.5 mg/m ³	6-monthly by calculation		
A4 & A5 (MP boilers at	Oxides of nitrogen (NO and NO ₂	110 mg/m ³	6-monthly extractive or emissions factor		

3% oxygen)	expressed as NO ₂)			
	Carbon Monoxide	100 mg/m ³	6-monthly extractive or emissions factor	
	Sulphur dioxide	38.5 mg/m ³	6-monthly by calculation	
	Dust	5.5 mg/m ³	6-monthly by calculation	

Effective from the date approved by NRW upon completion of improvement conditions IC7 and IC8 respectively:

Release point	Parameter	Annual mean	Monthly mean	Daily mean	95% of hourly means in a year	Effective from
A1 & A3 (gas turbines at 15% oxygen) ¹	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	55 mg/m ³ Effective Dry Low NOx to Base load	75 mg/m ³ Effective Dry Low NOx to Base load	80 mg/m ³ Effective Dry Low NOx to Base load and MSUL/MSDL to base load	125 mg/m ³ Effective Dry Low NOx to Base load	As approved by NRW upon completion of IC7
	Carbon Monoxide	30 mg/m ³ Effective Dry Low NOx to Base load	80 mg/m ³ Effective Dry Low NOx to Base load	80 mg/m ³ Effective Dry Low NOx to Base load and MSUL/MSDL to base load	80 mg/m ³ Effective Dry Low NOx to Base load	
A2 (HP boiler at 3% oxygen)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	100 mg/m ³	100 mg/m ³	110 mg/m ³	200 mg/m ³	As approved by NRW upon completion of IC8
	Carbon Monoxide	40 mg/m ³	100 mg/m ³	110 mg/m ³	200 mg/m ³	

	Sulphur dioxide	38.5 mg/m ³	6-monthly by calculation	
	Dust	5.5 mg/m ³	6-monthly by calculation	
A4 & A5 (MP boilers at 3% oxygen)	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	110 mg/m ³	6-monthly extractive or emissions factor	As approved by NRW upon completion of IC8
	Carbon Monoxide ²	100 mg/m ³	6-monthly extractive or emissions factor	
	Sulphur dioxide	38.5 mg/m ³	6-monthly by calculation	
	Dust	5.5 mg/m ³	6-monthly by calculation	

¹Effective dry low NO_x threshold or parameters will be determined upon approval of the response to improvement condition IC7.

² CO BAT AEL is not applicable for plants operating <1500 hours/year. MP boilers will need more CO head room to allow combustion settings to achieve tighter NO_x BAT AEL so Annex V ELV is retained.

Where applicable, tighter limits than required by Annex V have remained in place to ensure no backsliding. The main change in emission limits and monitoring following the publication of the LCP BREF is the inclusion of annual limit values which were not previously required.

The operator has proposed limits in line with Annex V of the IED. Consequently, we have accepted the proposed limits and incorporated them into table S3.1 of the permit Emission limits. We have also added two annual limits as required by the BREF. One for NO_x and CO emissions as detailed in the table above.

Following the operator's review of the draft permit, two additional air emission points (A7 and A8) have been inserted into table S3.1(a). A7 and A8 are existing by-pass stack air emission points from the gas turbines. No limits or monitoring have been set for these points.

The reporting period will begin from the next full reporting period. Specifically, monthly reporting period begins the following completion of full month i.e. September 2021. Daily reporting period begins following completion of first full day i.e. 18 August 2021.

Emissions to Air – Article 15(4) Derogations

No derogation from compliance with air emissions BAT-AELs has been requested.

Directive 2012/27/EU on Energy Efficiency (EED)

Compliance with the BAT conclusions has not resulted in the substantial refurbishment or installation of new combustion plant with an aggregate thermal input of greater than 20MWth, which generates more than 100kWth of waste heat, and all combustion units already provide CHP capability. Therefore, it is not necessary to demonstrate compliance with Article 14, paragraph 5 of the EED.

Other IED BREFs relevant to the permit review

There are no other specific listed activities within Table S1.1 of the permit that are within scope of other published BREFs. Emissions from Storage, Energy Efficiency, Industrial Cooling Systems BREFs and Monitoring Emissions to Air and Water from IED Installations Reference Report on Monitoring are relevant, however, the key aspects associated with the installation are fixed by the existing infrastructure and no applicable changes or upgrades are appropriate for the remaining life of the station, subject to any requirements to amend conditions in the permit under Article 18 of the IED, or other relevant domestic legislation.

The LCP BATC and the emission monitoring requirements set out in Annex V of IED are in line with the Monitoring Emissions to Air and Water from IED Installations Reference Report on Monitoring. These requirements have been transposed into the Permit.

Condition 1.2 of the permit (Energy Efficiency) requires that the operator shall take appropriate measures to ensure that energy is used efficiently in the combustion activity and also to review on a minimum four yearly basis whether there are opportunities to improve the energy efficiency of the activities and take appropriate measures in line with what is identified. Appropriate measures would include those that are included in the Energy Efficiency BREF.

Similarly permit condition 3.2.1 requires that Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution and permit condition 3.2.3 requires that all liquids in containers, whose emission to water or land could cause pollution, shall be

provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container. Appropriate measures would include those that are included in the Emissions from Storage BREF.

These conditions are enforceable and we consider that they are sufficient to prevent unauthorised emissions from storage and deliver continuous improvements in energy efficiency at the installation.

Requirements set out in the Industrial Cooling Systems BREF that are relevant to power stations have been addressed through current compliance with existing legislation associated with European eel protection and fish passage, Habitats Directive risk assessments and other designated site protection, water abstraction control and the Water Framework Directive. Noise has also been assessed during previous determinations.

We recognise that the Emissions from Storage, Energy Efficiency and Industrial Cooling Systems BREFs are now over 10 years old and are due for revision. As such, we consider that the site's compliance with the relevant LCP BATCs, coupled with the permit conditions described above are sufficiently protective as an interim measure, pending the publication of the updated BREFs. Our guidance EPR RGN 12 "Statutory Periodic Permit Reviews" (October 2014) explains that "Permit reviews for installations will normally follow production of revised Best Available Techniques (BAT) standards in EU BAT Reference (BREF) documents for each sector". The permit review is triggered by the publication of the main activity BREF for the sector (LCP in this case) and when this happens, we are required to review the permit against all other relevant extant BREFs at the same time. This ensures that all reviews occur at the same time for a particular sector and that sites where multiple BREFs are applicable are not held in a continuous state of review.

IED paragraph (13) states that "The Commission should aim to update BAT Reference documents not later than 8 years after the publication of the previous version". On this basis, the current LCP BREF is due to be updated by 2025, when the next LCP permit review will be triggered. Any relevant secondary BREFs which have been updated in the meantime (e.g. Emissions from Storage, Energy Efficiency and Industrial Cooling Systems) will be considered as part of this next LCP Permit review, unless the installation undergoes a substantial change as set out in IED Article 20, in which case such a review may occur at an earlier time.

The UK left the EU on 31 January 2020 and entered a Transition Period, during which it will continue to apply EU law. The IED, BAT conclusions published prior to EU Exit and BAT conclusions published during the Transition Period apply in the UK. Arrangements are being put in place to determine BAT for the UK after the end of the Transition Period.

6. Conclusion

We consider that the installation already employed what used to be BAT, and that the operator has achieved improvements in performance since the permit was originally granted. The revised BREF and its BAT-AELs provide the opportunity to consider further environmental improvements.

We believe this variation provides a sound basis for ongoing regulation of the installation and we are satisfied that the operator is currently achieving or will be achieving all relevant BAT by the time of the primary activity (chemicals manufacture) permit review (expected during 2022-23).

We believe that we have ensured compliance with all relevant legal requirements in carrying out this review and making our determination on the variation.

Annex 1: Decision checklist regarding relevant BAT Conclusions for Large Combustion Plant

BAT Conclusions for the large combustion plants were published as a Commission Implementing Decision (2017/1442/EU) in the Official Journal of the EU on 17 August 2017. There are 75 BAT Conclusions. This checklist 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.

All BAT Conclusions arising are listed by number in order below;

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
General BAT conclusions		
1.	Environmental Management Systems Improve overall performance Implement and adhere to an EMS that incorporates key features identified.	Currently compliant. The operator has confirmed that the CHP environmental performance is managed using a system currently certified to ISO 14001. All relevant aspects associated with BAT 1 are addressed by the EMS, including those specifically applicable to the power generation sector. Emissions monitoring during OTNOC is to be undertaken to identify potential improvements.
2.	Efficiency Determine net electrical efficiency and/or net total fuel utilisation and/or net mechanical efficiency.	Currently compliant.

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	Carry out a performance test at full load.	The net total fuel utilisation of the CHP has been determined to appropriate test standards for accreditation under the BEIS CHP Quality Assurance Scheme. Overall operational efficiency is determined on a monthly basis using process measurements.
3.	Monitoring of process parameters Monitor key process parameters for emissions to air and water specified in the corresponding table. Monitoring of specified process parameters.	Currently compliant. All parameters are or will be measured continuously using instruments certified to appropriate standards or derived from surrogate measurements of suitable quality for units that operate >1500 hours/year. The exception is gas turbine exhaust flow which is assumed to be constant as the units only operate at full load. The same appears to apply for TEG (supplementary) firing when a fixed value is used (GT throughput). This aspect will require verification as part of compliance assessment.
4.	Monitoring of emissions to air Monitor emissions to air with at least the frequency in the corresponding table and in accordance with the EN standards. Monitor emissions to air with at least the frequency in the corresponding table and in accordance with the EN standards.	Currently compliant. NOx and CO emissions are currently measured continuously to appropriate standards on units operating >1500 h/y. SO ₂ and dust emissions monitoring are not required by the BREF and are estimated using emissions factors for Annex V reporting purposes.
5.	Monitoring of emissions to water from flue-gas treatment Monitor emissions to water with at least the frequency in the corresponding table and in accordance with the EN standards. Monitor emissions to water with at least the frequency in the corresponding table and in accordance with the EN standards.	Not applicable.
6.	Environmental performance Improve general environmental performance	Currently compliant.

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	A variety of techniques.	Regular burner and combustion tuning maintenance is under taken and associated control instrumentation is calibrated annually.
7.	Reduce emissions of ammonia to air Reduction of ammonia emissions where SCR or SNCR is used. BAT is to optimise the design and/or operation and to meet associated AELs.	Not applicable SNCR/SCR abatement is not installed or proposed.
8.	Prevent or reduce emissions to air Prevent or reduce emissions to air during normal operating conditions. Ensure, by appropriate design, operation and maintenance, that the emission abatement systems are used at optimal capacity and availability.	Compliant in the future. Improved combustion controls will be implemented as part of gas turbine and boiler NOx control upgrades. Automatic control of air-fuel ratio is currently used for all plant.
9.	Environmental performance and reduce emissions to air Inclusion of a number of elements in the quality assurance/quality control programmes for all the fuels used, as part of the EMS. Techniques (i), (ii) and (iii).	Currently compliant. Appropriate fuel characterisation is undertaken for all required parameters and plant adjustments are made automatically by the control systems. Combustion dynamics monitoring will be implemented as part of the gas turbine upgrades.
10.	Reduce emissions to air and/or water Prevent or reduce emissions to air during other than normal operating conditions (OTNOC). A variety of techniques.	Compliant in the future. Typical OTNOC scenarios, such as start-up and shut down, are not currently optimised to minimise emissions. Periodic review and assessment of OTNOC emissions is not specifically covered by the EMS currently. Changes to EMS are proposed upon completion of gas turbine upgrades. This aspect will require verification as part of compliance assessment.
11.	Monitoring of emissions to air and/or to water Monitoring of emissions to air and/or to water during OTNOC.	Currently compliant.

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	Appropriately monitor emissions to air and/or to water during OTNOC.	Continuous monitoring is carried out for most key parameters during OTNOC. However, specific monitoring may be required upon review to allow assessment of other relevant parameters. This aspect will require verification as part of compliance assessment.
12.	Energy efficiency Increase the energy efficiency for units operated ≥ 1500 h/yr A variety of techniques.	Currently compliant. CHP steam conditions and condenser pressure are optimised within the design constraints of the plant. Feed water pre-heating is used.
13.	Reduce water usage and the volume of contaminated waste water discharged Reduce water usage and the volume of contaminated waste water discharged. Use of one or both of the techniques specified in the associated table.	Currently compliant. Air cooling of condensers minimises freshwater use. Boiler feedwater treatment is managed to minimise steam cycle blowdown.
14.	Prevent contamination of uncontaminated waste water and to reduce emissions to water Prevent contamination of uncontaminated waste water and to reduce emissions to water. Segregate waste water streams and to treat them separately, depending on the pollutant content.	Currently compliant. Clean surface water is segregated from chemical sewer system before discharge to river. Dirty drains effluent is treated (oil and solids interceptor) before passing through secondary treatment with boiler feedwater effluent.
15.	Reduce emissions to water Reduce emissions to water from flue-gas treatment. A variety of techniques.	Not applicable.
16.	Reduce waste sent for disposal To reduce the quantity of waste sent for disposal. A variety of techniques.	Not applicable.

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
17.	Reduce noise emissions To reduce noise emissions. A variety of techniques.	Currently compliant. Appropriate attenuation, control and maintenance is used to reduce noise emissions. Perimeter noise monitoring is undertaken to identify issues.
Combustion of solid fuels (coal and/or lignite)		
18.	Environmental performance Improve overall performance. Techniques in associated table.	Not applicable.
19.	Efficiency Increase efficiency. Techniques in associated table.	Not applicable.
20.	Prevent or reduce emissions of NO_x Prevent or reduce emissions of NO _x emissions to air while limiting CO and N ₂ O emissions to air from the combustion of coal and/or lignite. A variety of techniques and associated AELs.	Not applicable.
21.	Prevent or reduce emissions of SO_x, HCl and HF Prevent or reduce emissions of SO _x , HCl and HF emissions to air from the combustion of coal and/or lignite. A variety of techniques and associated AELs	Not applicable.
22.	Reduce dust and particulate-bound metal emissions Reduce emissions of dust and particulate-bound metal emissions to air from the combustion of coal and/or lignite. A variety of techniques and associated AELs	Not applicable.
23.	Prevent or reduce emissions of mercury	Not applicable.

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	Prevent or reduce emissions of mercury emissions to air from the combustion of coal and/or lignite. A variety of techniques and associated AELs	
Combustion of solid fuels (solid biomass and/or peat)		
24.	Prevent or reduce emissions of NOx Prevent or reduce emissions of NOx emissions to air while limiting CO and N2O emissions to air from the combustion of solid biomass and/or peat. A variety of techniques and associated AELs	Not applicable.
25.	Prevent or reduce emissions of SOx, HCl and HF Prevent or reduce emissions of SOx, HCl and HF emissions to air from the combustion of solid biomass and/or peat. A variety of techniques and associated AELs	Not applicable.
26.	Reduce dust and particulate-bound metal emissions Reduce emissions of dust and particulate-bound metal emissions to air from the combustion of solid biomass and/or peat. A variety of techniques and associated AELs	Not applicable.
27.	Prevent or reduce emissions of mercury Prevent or reduce emissions of mercury emissions to air from the combustion of solid biomass and/or peat. A variety of techniques and associated AELs	Not applicable.
Combustion of liquid fuels (HFO and/or gas-oil-fired boilers)		
28.	Prevent or reduce emissions of NOx	Not applicable.

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	Prevent or reduce emissions of NO _x emissions to air while limiting CO and N ₂ O emissions to air from the combustion of HFO and/or gas oil in boilers. A variety of techniques and associated AELs.	
29.	Prevent or reduce emissions of SO_x, HCl and HF Prevent or reduce emissions of SO _x , HCl and HF emissions to air from the combustion of HFO and/or gas oil in boilers. A variety of techniques and associated AELs.	Not applicable.
30.	Reduce dust and particulate-bound metal emissions Reduce emissions of dust and particulate-bound metal emissions to air from the combustion of HFO and/or gas oil in boilers. A variety of techniques and associated AELs.	Not applicable.
Combustion of liquid fuels (HFO and/or gas-oil-fired engines)		
31.	Energy efficiency BAT-associated energy efficiency levels (BAT-AEELs) Specified techniques and associated AEELs.	Not applicable.
32.	Prevent or reduce emissions of NO_x Prevent or reduce emissions of NO _x emissions to air from the combustion of HFO and/or gas oil in reciprocating engines. A variety of techniques and associated AELs	Not applicable.
33.	Prevent or reduce emissions of CO Prevent or reduce emissions of CO and volatile organic compounds from the combustion of HFO and/or gas oil in reciprocating engines. A variety of techniques and associated AELs	Not applicable.
34.	Prevent or reduce emissions of SO_x, HCl and HF	Not applicable.

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	Prevent or reduce emissions of SO _x , HCl and HF emissions to air from the combustion of HFO and/or gas oil in reciprocating engines. A variety of techniques and associated AELs	
35.	Reduce dust and particulate-bound metal emissions Reduce emissions of dust and particulate-bound metal emissions to air from the combustion of HFO and/or gas oil in reciprocating engines. A variety of techniques and associated AELs	Not applicable.
Combustion of liquid fuels (gas oil fired gas turbines)		
36.	Energy efficiency BAT-associated energy efficiency levels (BAT-AEELs) Specified techniques and associated AEELs.	Not applicable.
37.	Prevent or reduce emissions of NO_x Prevent or reduce emissions of NO _x emissions to air from the combustion of gas oil in gas turbines. A variety of techniques.	Not applicable.
38.	Prevent or reduce emissions of CO Prevent or reduce emissions of CO from the combustion of gas oil in gas turbines. A variety of techniques and associated AELs.	Not applicable.
39.	Prevent or reduce emissions of SO_x and dust Prevent or reduce emissions of SO _x and dust emissions to air from the combustion of gas oil in gas turbines. A variety of techniques and associated AELs.	Not applicable.
Combustion of gaseous fuels (natural gas)		

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
40.	Energy efficiency BAT-associated energy efficiency levels (BAT-AEELs) Specified techniques and associated AEELs	Currently Compliant The Dow CHP net total fuel utilisation is typically 75-78% and within the BAT-AEEL range of 65-95% for CHP CCGT of 50-600 MW _{th} rating.
41.	Prevent or reduce emissions of NO_x Prevent or reduce emissions of NO _x emissions to air from the combustion of natural gas in boilers A variety of techniques	Compliant in the future. Flue gas recirculation and/or low NO _x burner technology will be installed on HP and MP boilers (if required) to ensure that BAT AELs for NO _x are met by the time the chemical installation permit review is implemented. (See IC8 description also).
42.	Prevent or reduce emissions of NO_x Prevent or reduce emissions of NO _x emissions to air from the combustion of natural gas in gas turbines A variety of techniques. Please also define effective dry low NO _x load where applicable.	Compliant in the future. Dry low NO _x emissions technology will be installed on both gas turbines to ensure that Annex V and BAT AELs for NO _x are met by the time the TNP ends and the chemical installation permit review is implemented. (See IC7 description also).
43.	Prevent or reduce emissions of NO_x Prevent or reduce emissions of NO _x emissions to air from the combustion of natural gas in engines. A variety of techniques	Not applicable.
44.	Prevent or reduce emissions of CO Prevent or reduce emissions of CO emissions to air from the combustion of natural gas. A variety of techniques and associated AELs	Compliant in the future. Boiler and gas turbine upgrades will ensure that relevant BAT AELs are met by the time the chemical installation permit review is implemented. (See IC7 and 8 descriptions also).
45.	Prevent or reduce emissions of non-methane volatile organic compounds (NMVOC) and methane emissions	Not applicable.

No	Summary of BAT Conclusion requirement	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	Prevent or reduce emissions of non-methane volatile organic compounds (NMVOC) and methane emissions to air from the combustion of natural gas in spark-ignited lean-burn gas engines A variety of techniques and associated AELs	
No further BAT Conclusions are applicable to the Dow CHP.		

Annex 2: Consultation on the draft decision where an Article 15(4) derogation has been applied

No Article 15(4) derogation has been applied.