

Natural Resources Wales permitting decisions

Variation and Consolidation of a bespoke Permit

We have decided to issue a Natural Resource Wales initiated variation for Connah's Quay Power Station in Deeside, Flintshire operated by Uniper UK Limited.

The variation number is EPR/NP3037AF/V005.

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 Documents (BREFs) for Large Combustion Plant (LCP) and the Refining of Mineral Oil and Gas. The associated BAT conclusions to these documents were published on the 28 October 2014 for Refining of Mineral Oil and Gas and 17 August 2017 for LCP 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 and the Refining of Mineral Oil and Gas sector. These include the amendment of the wording of several permit conditions relating to notifications, changes to emission limits and monitoring requirements.

We are satisfied that the operator will be compliant with the published BAT conclusions which will apply from 17 August 2021 for Large Combustion Plant and is compliant with the Refining of Mineral Oil and Gas BAT conclusions.

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 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 Connah's Quay Power Station against the published BAT conclusions for Large Combustion Plant and Refining of Mineral Oil and Gas.
- Annex 1 – Decision Checklist regarding relevant BAT Conclusions for Large Combustion Plant.
- Annex 2 – Decisions Checklist regarding relevant BAT Conclusions for Refining of Mineral Oil and Gas.

Assessment of Connah's Quay Power Station against the published BAT conclusions for large combustion plant.

1. Our decision

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

The variation does three 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 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 9 February 2007, 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 for Large Combustion Plant and 29 March 2019 for Refining of Mineral Oil and Gas, 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 documents.

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, Uniper

UK Limited 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. Uniper UK Limited have a copy of a consequent baseline report.

- Where the permitted activity involves the release of priority hazardous substances, as defined by the Water Framework Directive, Uniper UK Limited 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, Uniper UK Limited 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.

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(1) 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 Uniper UK Limited.

The Regulation 61(1) Notice responses from the operator were received on the 22 November 2018 for Large Combustion Plant and 22 May 2019 for Refining of Mineral Oil and Gas. Additional information was also received on 30 August 2019.

We considered that the responses 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) responses

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. Annex 1 provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation.

BAT Conclusions for the Refining of Mineral Oil and Gas were published as a Commission Implementing Decision (2014/738/EU) in the Official Journal of the EU on the 28 October 2014. There are 58 BAT Conclusions. Annex 2 provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation. Both Annexes should be read in conjunction with the permit/variation notice issued.

A detailed response was received from Uniper UK Limited. Following assessment of the Regulation 61(1) responses, further information was requested from Uniper UK Limited (request sent 10 June 2019). Where the operator has concluded that they have achieved BAT, and we are in agreement, no further information/justification was sought by Natural Resources Wales.

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. Therefore, it is not necessary to demonstrate compliance with Article 14, paragraph 5 of the EED.

The energy efficiency levels associated with the Best Available Techniques Conclusions

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

For a ≥ 600 MWth CCGT plant, the relevant BAT-AEEL is 50 – 60% for net electrical efficiency (%). Uniper UK Limited stated that the net electrical efficiency for Connah's Quay Power Station is 55%, which is within this range. There are no BAT-AEELs for net total fuel utilisation or net mechanical energy efficiency for CCGT ≥ 600 MWth.

5. Changes we have made

Improvement Conditions

Based on the information provided in the Regulation 61(1) responses, 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.

Reference	Requirement	Date
IC26	Black Start Operation The operator shall produce and submit a written Black Start Response Plan to Natural Resources Wales, for approval. The plan shall contain an impact assessment demonstrating that there is no significant environmental risk associated with black start operations and: - propose a methodology for minimisation of environmental impact during such a period of operation; and - include the procedure for the notification of black start operation and its duration. The methodology for operation and reporting set out in the report shall be implemented by the Operator from the date of approval by Natural Resources Wales.	01/01/2021

IC27	Following the trial of the Ambient Air Injection (AAI) system on Unit 4, the Operator shall submit a written report to Natural Resources Wales for approval. The report shall; • Verify that the exhaust gas characteristics observed during the operation of the AAI system are in accordance with those modelled in 'Scenario 4' (as detailed in Uniper Technologies' Air Quality Assessment (reference UTG/17/PMP/672/R) and that the implementation on Units 1- 4 will not lead to an adverse impact on human health and sensitive habitats. • Include an assessment to verify that the control measures in place to prevent and minimise noise emissions from AAI associated plant and equipment constitutes Best Available Technique.	Within 6 months of trial period ending
IC28	The operator shall carry out a review of the emissions of sulphur dioxide (SO₂) emitted from the thermal oxidiser (emission point A11) and submit a technical report for approval by Natural Resources Wales documenting the results of this review. The review shall be informed by the results of representative monitoring campaigns of SO₂ during normal operating procedures, consisting of a sufficient number of periodic samples of emissions of SO₂ for a representative period of time. As part of this improvement condition, the operator shall identify opportunities to reduce emissions of SO₂ below the hourly average emission limit for SO₂ from A11 set in table S3.1(b) and agree an emission reduction target in writing with Natural Resources Wales. Data provided by this condition may be used as a means of imposing or amending permit conditions, including emission limit values for sulphur dioxide (table S3.1(b)).	01/07/2021

IC26 – Black start operation

There may be circumstances where there may be significant partial or total failure of the electrical supply system across Great Britain (note that the system in Northern Ireland is separate). In this circumstance (a Black Start Event), National Grid ESO (electricity system operator) may issue instructions (Black Start Instructions) to those plant who are providers of black start services to operate in order to re-establish the

electrical grid system. More information on Black Start is available on the National Grid ESO website - <https://www.nationalgrideso.com/balancing-services/system-security-services/black-start>

During such an Event, it may be that plant called upon to operate may do so in a mode that is not optimised and may be operated in such a way that not all abatement equipment is operational or effective. It is therefore possible that such plant may exceed emission limit values included in the environmental permits.

To ensure that the impact of such operation is minimised as far as is practical, IC26 has been included in the permit. This improvement condition requires that the operator provides to NRW a Black Start Response Plan, which sets out what the operator will do during a Black Start Event.

This plan is expected to include:

1. An assessment of the potential impact from the operation of the plant during a Black Start Event. This can be demonstrated from a generic sector study and after event site specific assessment.
2. What actions (as far as is possible and practical) that the operator will undertake to minimise environmental impact during such a Black Start Instruction.
3. The procedure for the notification to NRW of the Black Start Instruction and how to provide information on the duration of the instruction.

Items 1 to 3 can also be addressed by inclusion of the above points in an updated version of the IED Compliance Protocol.

IC27 – Ambient Air Injection (AAI) system

Due to the evolving energy market and the need for faster response times by the National Grid, Uniper UK Limited have requested a trial period for the use of ambient

air injection (AAI) equipment on Unit 4. The operator has submitted a technical statement (09/19) detailing the installation and operation of the AAI system. The AAI trial may not commence until the start and end dates have been agreed in writing by Natural Resources Wales, as required by PO6 (see Pre-operational conditions section below).

Within 6 months of the AAI trial period ending the operator must submit a written report to Natural Resources Wales for approval as detailed by IC27.

IC28 – SO₂ emissions from thermal oxidiser

As the Liverpool Bay Gas field comes to the end of its life, the sour gas treated via the installations gas treatment plant (GTP) is reducing. IC28 requires the operator to review SO₂ hourly average limit from thermal oxidiser (emission point A11), the data provided to NRW may be used to amend current sulphur dioxide limits in table S3.1(b) of the permit.

Pre-operational conditions

PO6	Ambient Air Injection (AAI) system	The operation of the Ambient Air Injection (AAI) system on Unit 4 as described in 'Technical Statement Detailing the Intended Operation of Ambient Air Injection at Connah's Quay' dated September 2019, shall not commence until dates for the start and end of the trial have been agreed in writing with Natural Resources Wales.
-----	------------------------------------	--

As detailed above PO6 ensures the AAI trial on Unit 4 (IC27) does not commence until the start and end dates have been agreed in writing by Natural Resources Wales.

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”.

Uniper UK Limited produced an excel version of the H1 electronic screening tool to present the emissions data and to carry out the Phase 1 screening tests and a copy was provided as part of the response to the Regulation 61(1) Notice.

After H1 Test 2, all substances considered can be screened out as presenting no risk to the environment. Cadmium and mercury also meet the significant load test for priority hazardous substances. Therefore, there was no need to carry out Phase 2 modelling, as described in “Surface water pollution risk assessment for your environmental permit”, available on the gov.uk website.

We have taken the opportunity to reduce the existing permit ELVs for residual chlorine dioxide and residual chlorite ion from W1 and W2. The table below shows the existing and new limits.

Parameter	Existing limit	New limit
Residual chlorine dioxide		1 mg/l (absolute limit)
Residual chlorite ion	10 mg/l (absolute limit)	1 mg/l (absolute limit)
	5 mg/l (average value)	0.5 mg/l (average value)

The new limits reduce the existing headroom in the current permit limits. However, they still provide enough headroom to allow for unavoidable process fluctuations, so we are satisfied that the new tighter limits are achievable.

A typographical error has also been amended in table S3.2. The 95% allowance has now been given to the 20°C temperature difference limit instead of the 13°C

temperature difference limit for November - March. The error dates back to the initial IED permit produced in 2015 and was raised by the operator during the draft permit review.

Emissions to Water – Article 15(4) Derogations

No derogations.

Emissions to Air

There were changes to the ELV's for emissions to air taking into account the Transitional National Plan (TNP), IED Annex V and BAT conclusions from the Large Combustion Plant BREF.

The LCP on site consist of 4 x 651MWth input (LCP96, LCP97, LCP98 and LCP99) combined cycle gas turbines (CCGTs). The current ELVs and the new BAT-AELs are based on an operating regime burning natural gas with unlimited operating hours.

The tables below outline the existing and proposed limits that have been incorporated into the permit for LCP96, LCP97, LCP98 and LCP99 and the reference periods at which they apply. The LCP BAT-AELs set out for combustion of gaseous fuels (natural gas) are stated within the following BAT Conclusions: BAT 42, 43, 44 and 45. The emission limits and monitoring requirements have been incorporated into Schedule 3 of the permit and the reference conditions are in Schedule 6 of the permit.

By the end of the TNP on 30 June 2020, as a minimum plant must meet the limits set out in Annex V of the Industrial Emissions Directive subject to BAT assessment and the principle of no backsliding. From the implementation date of the BAT Conclusions in 2021 the relevant BAT-AELs will also apply.

Effective until 30th June 2020.

The table below outlines the parameters and limits set to implement the Transitional National Plan limits.

Release point	Parameter	Monthly mean	Daily mean	95 th ile of hourly means in a year	Effective until
A1 – A4	Oxides of nitrogen	75 mg/m ³	75 mg/m ³	110 mg/m ³	30/06/2020

	(NO and NO ₂ expressed as NO ₂)	70% to Base load	70% to Base load and MSUL/MSDL to base load	70% to Base load	
A1 – A4	Carbon monoxide	30 mg/m ³ 70% to Base load	30 mg/m ³ 70% to Base load 200 mg/m ³ MSUL/MSDL to base load	60 mg/m ³ 70% to Base load	30/06/2020

Effective 1st July 2020 to 16th August 2021

The table below outlines the parameters and limits set to implement the IED Annex V Limits.

Release point	Parameter	Monthly mean	Daily mean	95 th ile of hourly means in a year	Effective from
A1 – A4	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	50 mg/m ³ 70% to Base load	55 mg/m ³ 70% to Base load 75 mg/m ³ MSUL/MSDL to base load	100 mg/m ³ 70% to Base load	01/07/2020
A1 – A4	Carbon monoxide	30 mg/m ³ 70% to Base load	30 mg/m ³ 70% to Base load 200 mg/m ³ MSUL/MSDL to base load	60 mg/m ³ 70% to Base load	01/07/2020

Effective from 17th August 2021

The table below outlines the parameters and limits set to implement the BAT-AELs set out in the LCP BREF:

Release point	Parameter	Annual mean	Monthly mean	Daily mean	95 th ile of hourly means in a year	Effective from
A1 – A4	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	40 mg/m ³ Effective Dry Low NOx to Base load	50 mg/m ³ Effective Dry Low NOx to Base load	50 mg/m ³ Effective Dry Low NOx to Base load 75 mg/m ³ MSUL/MSDL to base load	100 mg/m ³ Effective Dry Low NOx to Base load	17/08/2021
A1 – A4	Carbon monoxide	30 mg/m ³ Effective Dry Low NOx to Base load	30 mg/m ³ Effective Dry Low NOx to Base load	30 mg/m ³ Effective Dry Low NOx to Base load 200 mg/m ³ MSUL/MSDL to base load	60 mg/m ³ Effective Dry Low NOx to Base load	17/08/2021

The principle of no backsliding was applied to emission limits, if existing limits in the permit were already tighter than those specified in the BREF, the existing permit limits were retained. Where a limit was specified in both IED Annex V and the BAT Conclusions for a particular reference period, the tighter limit was applied and in the majority of cases this was from the BAT Conclusions. Where associated emission levels (AEL) ranges were specified in the BAT Conclusions, the upper value was applied, unless use of the tighter limit was justified or already used in the permit.

Annual limits for oxides of nitrogen (NO and NO₂ expressed as NO₂)(NO_x) and carbon monoxide (CO) have been added from 17 August 2021 as required by the LCP BREF. As the annual BAT-AELs for CO are indicative in the BAT conclusions, these were applied unless adequate justification was demonstrated that an alternative limit was more appropriate. The existing IED Annex V limits for carbon monoxide (CO) were retained in the permit.

For gas turbines where the IED Annex V specified that limits applied over 70% load and the BAT Conclusions specified that BAT-AELs applied when dry low NOx is effective (E-DLN), we have used E-DLN as a default across all monitoring requirements for NOx and CO.

Eight additional air emission points (A5 – A9D) have also been added. A5 – A9D are existing emission points (e.g. emergency diesel generators) but have now been incorporated into table S3.1 of the permit. No limits or monitoring requirements have been set for these emission 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 - Thermal Oxidiser

An additional sulphur dioxide limit of 600mg/m³ monthly mean (of validated hourly averages) has been included in table S3.1(b) for the Thermal oxidiser emission point (A11). This new monthly limit coupled with IC28 will allow the operator to review SO₂ emissions from A11 whilst improving environmental standards. IC28 also allows NRW to amend the current hourly SO₂ limit if it is required.

Emissions to Air – Article 15(4) Derogations

No derogations.

Other IED BREFs relevant to the permit review

BATCs associated with the Refining of Mineral Oil and Gas BREF have been considered during this permit review. The key aspects addressed in the revised permit are described in Annex 2 of this document. 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 also relevant, however, the key aspects associated with the power station 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 and visible plume shading have 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 significant 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 17 August 2021.

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 (EU 2017/1442) 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 Uniper UK has an environmental management system (EMS) which is accredited to ISO 14001:2015. Uniper operational sites within the UK have a shared certificate and meet the requirements of the standard by working to central system procedures as well as site specific procedures. The central procedures ensure that there is consistency in the implementation of the system across all Uniper UK sites. The Uniper UK EMS incorporates all the features described in BAT1 (i to xiii). Uniper sites will have site specific procedures and systems in place to address relevant topics listed in BAT1 x to xvi, however in relation to xiv & xvi Uniper note the following: xiv - Gas fired powered stations do not have a dust management plan in place as this is not applicable due to the absence of fuels and materials of this nature. xvi - It is not considered necessary to have an odour management plan as none of the Uniper UK operations involve the combustion of malodorous substances, therefore this is not considered to be an environmental risk. However, there are procedures in place to review any complaints received which could include those related to odour. If there is a change to processes or materials used at site, then this would trigger a review of the site environmental aspects, risks and opportunities. If an environmental risk is identified because of a change to processes and / or materials then appropriate control measures would be implemented to manage, control and reduce this risk and this would be incorporated within the management system.
2.	Efficiency Determine net electrical efficiency and/or net total fuel utilisation and/or net mechanical efficiency Carry out a performance test at full load.	Currently Compliant Uniper UK report that a full performance test was carried out by the Original Equipment Manufacturer (OEM) in 1998, and corrected to ISO base load conditions, the report confirms the site has a overall efficiency of 55%, a total output of 1432MWe and thermal input of 2604 MWth.

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
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 Uniper UK monitors all the flue gas process parameters that are relevant to gas fired turbines as set out in BAT3. These requirements are set out in the current environmental permit for the site. Process parameters for emissions to air (Stack flow, oxygen, water vapour, stack gas temperature, and stack gas pressure) are all continuously monitored on each of the CCGTs. Flow determination is by continuous calculation based upon the measured plant thermal input in accordance with EN ISO 16911-1:2013 (Annex E). The plant thermal input is calculated from the measured fuel flow rate and the net calorific value. The fuel flow rate is measured using high quality Coriolis mass flow meters. The net calorific value is measured using a gas chromatograph as specified and verified for EU ETS reporting purposes. Process parameters for emissions to water – in the BREF, monitoring of process water is only applicable to waste water from flue gas treatment which is not in use at Connah's Quay Power Station.
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 Connah's Quay Power Station meets the monitoring requirements that are relevant to natural gas fired turbines, these being NO _x and CO. Oxygen is also monitored as it is required for correction of emissions to reference conditions. Emissions monitoring of these species is on a continuous basis and the continuous emission monitors meet the required EN standard this being EN14181.
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 This BAT Conclusion is not applicable to Connah's Quay Power Station as there is no flue gas treatment.
6.	Environmental performance Improve general environmental performance A variety of techniques	Currently Compliant Connah's Quay Power Station utilises several techniques: A+C) Fuel blending: Fuel is natural gas from the transmission system as the main, fuel blending of the ENI Point of Ayr Gas Terminal sour gas with mains transmission gas. This is monitored by a gas chromatograph linked to the DCS. This allows the optimisation of combustion and minimises emission. B) Uniper UK carry out regular planned maintenance in accordance with manufacturers requirements. D) Uniper UK has installed variable load path and DLN2.6+, latest management system for GE Frame 6 DLN2.6+ combustion equipment. E) Uniper UK uses natural gas from the National Transmission network combined with (up to 20%) sour gas (treated and sulphur removed prior to use in the GT), this mix is controlled as outlined above.
7.	Reduce emissions of ammonia to air	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
	Reduction of ammonia emissions where SCR or SNCR is used. BAT is to optimise the design and/or operation and to meet associated AELs.	This BAT Conclusion is not applicable to Connah's Quay Power Station as the site does not use SCR.
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.	Currently Compliant Uniper UK have installed the latest DLN2.6+ combustion package. The performance of the GT is monitored by GE in real time, Uniper UK is notified of any problems. In addition, routine maintenance is carried out on the combustion process in accordance with the manufacturer's recommendations. Engine mapping is also carried out as part of the Return to Service procedure after every outage and periodically as part of ongoing maintenance when this is required.
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 All the parameters for natural gas listed in the BREF are measured or calculated semi-continuously. Natural gas is used by Connahs Quay Power Station and must meet a nationally agreed specification for all the parameters listed. In addition, the sour gas that is provided to Connahs Quay Power Station passes through the onsite gas treatment plant to a set specification. Furthermore, all gas used by the site is passed through a gas chromatograph this forms part of the onsite advanced control system. The measurement of the fired natural gas composition and the optimisation of the fuel quality, including the combustion properties mentioned in BAT 9, is part of the site's control and management systems.
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.	Currently Compliant Connah's Quay Power Station does not have a specific OTNOC management plan, however the EMS incorporates many of the key aspects of BAT 10. The site operates a risk-based review with the EMS (Aspects and impacts) which includes a review of potential impacts of OTNOC. The power station was purpose designed to minimise environmental impact throughout during operational / non-operational conditions. e.g. primary, secondary and tertiary containment measures to prevent emissions to soil or water from incidents. Emissions to Air and Water are continually monitored with early warning alarms set on all notable parameters to bring instant notification of potential issue to plant operators. Start up and shut down times are minimised as much as possible to reduce emissions and inefficient use of fuel. Control systems are designed to ensure if the plant is operating in low load then emission limits are still met. Gas turbine starts are optimised based on plant condition (i.e. warmth category) to minimise emissions during start-up. The power station is maintained in accordance with a full and active preventative maintenance program operated via computer software known as SAP. All plant components are included within the site specific preventative maintenance programmes. The frequency of maintenance is dependent on component duty and manufacturers requirements. This programme is supported risk assessment to identify environmentally critical plant (ECP), and emergency procedures for plant failure. Emissions are recorded during periods of OTNOC and in the event of an accident or environmental incident, Uniper UK review the emissions, cause etc as part of our incident investigation process and ensure any relevant corrective and / or preventive action is implemented.

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
11.	Monitoring of emissions to air and/or to water Monitoring of emissions to air and/or to water during OTNOC. Appropriately monitor emissions to air and/or to water during OTNOC.	Currently Compliant Uniper UK carries out monitoring of emissions to air/water during periods of OTNOC. Water: All 3 discharges to water from the installation are continuously monitored regardless of station operation. This monitoring is used to assist the site in taking action in the event an incident outside normal operation. Air: NOx Emissions are monitored from start-up and shut down at 142MW, emissions are monitored at all times when out of start-up and shut down. Due to the issues with high CO levels at start up 'poisoning' the CEMS CO emissions are not monitored from start-up but from 142MW.
12.	Energy efficiency Increase the energy efficiency for units operated ≥ 1500 h/yr A variety of techniques	Currently Compliant The latest OEM operational software is utilised to maximise plant efficiency throughout. To increase the energy efficiency of the plant, the following techniques are used at Connahs Quay: Combustion optimisation and advanced control systems (a and g of BAT12 which are also covered in BAT 8 (optimising combustion)). In addition to this, Connah's Quay Power Station also operates using the following techniques to ensure efficient use of energy: optimisation of the steam cycle (c), minimisation of energy consumption (d), fuel preheating, (e) preheating of combustion air, (f), feed-water preheating using recovered heat (h), cooling tower discharge (n), advanced materials (p) are carried out. Due to the nature and age of the CCGT plant and the fuel used, the following techniques are not appropriate in terms of increasing energy efficiency: optimisation of the working medium conditions (b), preheating of combustion air (e), heat recovery by cogeneration (CHP) (l), CHP readiness (j), flue gas condenser (k), heat accumulation (l), wet stack (m), cooling tower discharge (n), fuel pre-drying (o), minimisation of heat losses (g), steam turbine upgrades (r), supercritical and ultra-supercritical steam conditions (s).
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 Water recycling is not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present. Connah's Quay Power Station abstracts saline water from the River Dee Estuary and uses water treatment chemicals. Connah's Quay Power Station employs a system whereby boiler blow down is captured then stored before being then passed back through the water treatment plant for reuse. This represents BAT for water usage.
14.	Prevent contaminated of uncontaminated waste water and to reduce emissions to water Prevent contaminated 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 Contaminated process water streams which could contain small amounts of oil are collected separately to uncontaminated surface run off and cooling waters. Once collected, potentially contaminated streams are passed through separators to remove any oily residues before being combined with purge pond waters and discharged to the River Dee via the authorised emission point. Surface waters are collected in a separate drainage system and discharged to the River Dee via continuous analysers at separate emission points. The site layout prevents the installation of any additional water segregation options and no further water treatment would be possible on site. Therefore,

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
		Uniper believe the current process to join most waste water streams for total discharge represents the Best Available Technology at the installation.
15.	Reduce emissions to water Reduce emissions to water from flue-gas treatment A variety of techniques	Not Applicable This BAT Conclusion is not applicable to Connah's Quay Power Station as the site does not use flue gas treatment.
16.	Reduce waste sent for disposal To reduce the quantity of waste sent for disposal A variety of techniques	Currently Compliant Although this BAT requirement is not specific to Gas plant the power station has worked through a comprehensive zero to landfill program to minimise waste disposal across site. Only domestic waste and those products which cannot be recycled (MMF and some plastics) are disposed to landfill. The 85% of all site produced wastes are recycled. Waste prevention and reuse is promoted across all areas of the site and waste disposal levels have reduced significantly in the last ten years.
17.	Reduce noise emissions To reduce noise emissions A variety of techniques	Currently Compliant The power station utilises several operational measures to minimise noise production including a preventative maintenance, the use of noise attenuation in cooling towers, gas turbine exhaust areas and other areas of high gas flow. Acoustic enclosures are maintained around equipment with high noise emission levels. The site undertakes a four yearly BS4142 regime to monitor noise emissions from the installation and there is no notable history of external noise complaints.
Combustion of solid fuels (coal and/or lignite)		
18.	Environmental performance Improve overall performance Techniques in associated table.	N/A
19.	Efficiency Increase efficiency Techniques in associated table.	N/A
20.	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 coal and/or lignite. A variety of techniques and associated AELs	N/A
21.	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 coal and/or lignite. A variety of techniques and associated AELs	N/A
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.	N/A

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 and associated AELs	
23.	Prevent or reduce emissions of mercury Prevent or reduce emissions of mercury emissions to air from the combustion of coal and/or lignite. A variety of techniques and associated AELs	N/A
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	N/A
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	N/A
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	N/A
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	N/A
Combustion of liquid fuels (HFO and/or gas-oil-fired boilers)		
28.	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 HFO and/or gas oil in boilers. A variety of techniques and associated AELs.	N/A
29.	Prevent or reduce emissions of SOx, HCl and HF Prevent or reduce emissions of SOx, HCl and HF emissions to air from the	N/A

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
	combustion of HFO and/or gas oil in boilers. A variety of techniques and associated AELs.	
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.	N/A
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.	N/A
32.	Prevent or reduce emissions of NOx Prevent or reduce emissions of NOx emissions to air from the combustion of HFO and/or gas oil in reciprocating engines. A variety of techniques and associated AELs	N/A
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	N/A
34.	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 HFO and/or gas oil in reciprocating engines. A variety of techniques and associated AELs	N/A
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	N/A
Combustion of liquid fuels (gas oil fired gas turbines)		

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
36.	Energy efficiency BAT-associated energy efficiency levels (BAT-AEELs) Specified techniques and associated AEELs.	N/A
37.	Prevent or reduce emissions of NOx Prevent or reduce emissions of NOx emissions to air from the combustion of gas oil in gas turbines. A variety of techniques	N/A
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 AEELs	N/A
39.	Prevent or reduce emissions of SOx and dust Prevent or reduce emissions of SOx and dust emissions to air from the combustion of gas oil in gas turbines. A variety of techniques and associated AEELs	N/A
Combustion of gaseous fuels (natural gas)		
40.	Energy efficiency BAT-associated energy efficiency levels (BAT-AEELs) Specified techniques and associated AEELs	Currently Compliant Connahs Quay Power Station operates in combined cycle mode. The BAT AEEL range for net electrical efficiency applicable to Connahs Quay Power Station is 50-60% (based on a thermal input >600 MWth) and plant efficiency is 55%. Information to support this has been provided under BAT 2 and within the IED application from June 2015.
41.	Prevent or reduce emissions of NOx Prevent or reduce emissions of NOx emissions to air from the combustion of natural gas in boilers A variety of techniques	Not Applicable This BAT Conclusion is not applicable to Connah's Quay Power Station as the site does not operate boilers that are subject to the BREF.
42.	Prevent or reduce emissions of NOx Prevent or reduce emissions of NOx emissions to air from the combustion of natural gas in gas turbines A variety of techniques. Please also define effective dry low NOx load where applicable.	Currently Compliant To prevent or reduce NOx emissions to air, Connah's Quay Power Station utilises the latest DLN2.6 burners. The following techniques are not utilised due to the nature of the plant: Water / steam addition (b), Low-load design concept (d) and selective catalytic reduction (SCR) (f).
43.	Prevent or reduce emissions of NOx Prevent or reduce emissions of NOx emissions to air from the combustion of natural gas in engines. A variety of techniques	Not Applicable This BAT Conclusion is not applicable to Connah's Quay Power Station as the site does not combust natural gas in engines.

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
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	Currently Compliant Optimised combustion is in operation, but catalysts are not used at Connah's Quay Power Station. The current permitted CO limits for CQ are 30mg/m ³ (monthly & Daily), 60mg/m ³ (95th %ile of hourly mean), for 70% to base load, 110mg/m ³ (daily for MSUL/MSDL to base load).
45.	Prevent or reduce emissions of non-methane volatile organic compounds (NMVOC) and methane emissions 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	Not Applicable This BAT Conclusion is not applicable to Connah's Quay Power Station as the site does not combust natural gas in engines.
Combustion of iron and steel process gases		
46.		N/A
47.		N/A
48.		N/A
49.		N/A
50.		N/A
51.		N/A
Combustion of gaseous and/or liquid fuels on offshore platforms		
52.		N/A
53.		N/A
54.		N/A
Combustion of process fuels from the chemical industry		
55.		N/A

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
56.		N/A
57.		N/A
58.		N/A
59.		N/A
Co-incineration of waste		
60.		N/A
61.		N/A
62.		N/A
63.		N/A
64.		N/A
65.		N/A
66.		N/A
67.		N/A
68.		N/A
69.		N/A
70.		N/A
71.		N/A
Gasification		
72.		N/A

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
73.		N/A
74.		N/A
75.		N/A

Annex 2: Decision checklist regarding relevant BAT Conclusions Refining of Mineral Oil and Gas

BAT Conclusions for the Refining of Mineral Oil and Gas were published as a Commission Implementing Decision (EU 2014/738) in the Official Journal of the EU on the 9 October 2014. There are 58 BAT Conclusions. Annex 2 provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation. Both Annexes should be read in conjunction with the permit/variation notice issued.

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 Uniper UK has a long established environmental management system (EMS) which is accredited to ISO 14001:2015. Uniper operational sites within the UK have a shared certificate and meet the requirements of the standard by working to central system procedures as well as site specific procedures. The central procedures ensure that there is consistency in the implementation of the system across all Uniper UK sites. The Uniper UK EMS incorporates all the features described in BAT1 (i to ix), Uniper sites have site specific procedures and systems in place to address relevant topics listed in BAT1. Both the Connahs Quay Power Station and Gas Treatment Plant are covered by this Uniper common ISO14001 system.
2.	Energy efficiency Use appropriate combination of techniques to use energy efficiently. Pinch analysis, Heat integration, heat and power recovery, process optimisation, management and reduction of steam consumption, use of energy benchmark, use of combined heat and power, integrated gasification combine cycle	Currently Compliant Energy Efficiency is integral to operation of both the power station and gas treatment plant at Connahs Quay. All relevant site processes have been optimised to maximise energy efficiency wherever possible. Computerised combustion management systems are utilised and power supplies for the Gas Treatment Plant (GTP) are taken from the main Combined Cycle Gas Turbine Power Station. The plant is fully insulated throughout to maximise efficiency in the treatment process. Maximum energy efficiency is vital to ensure effective operation of the GTP.
3.	Solid materials storage and handling Prevent or reduce dust emissions from the storage and handling of dusty materials	Not Applicable
4.	Monitoring of emissions to air Monitor emissions to air with at least the frequency in the corresponding	Currently Compliant CQ gas treatment plant meets the monitoring requirements that are relevant to natural

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
	table and in accordance with the EN standards	gas fired combustion units, these being NOx and CO. Oxygen is also monitored as it is required for correction of emissions to reference conditions. SO2 is also monitored, however this is not required by the BAT conclusion for gas fired units. Emissions monitoring of these species is on a continuous basis and the continuous emission monitors meet the required EN standard this being EN14181.
5.	Monitor the relevant process parameters linked to pollutant emissions e.g. monitor O2 content in stack emissions, N and S content in fuel or feed	Currently Compliant Covered by BAT 4
6.	Monitor diffuse VOC emissions to air from the entire site VOC monitoring from loading / unloading operations of volatile materials	Not Applicable CQ does not receive deliveries of volatile products such as crude oil. Rejected nitrogen from the Gas Treatment plant is passed through a thermal oxidiser to destruct any VOC's.
7.	Operation of waste gas treatment systems Optimal operation of acid gas removal units	Currently Compliant Rejected off gas is combusted via a thermal oxidiser to minimise emissions.
8.	Reduce NH3 emissions from SCR/SNCR plants Reduce NH3 emissions from SCR/SNCR plants	Not Applicable CQ do not have SCR / SNCR installed.
9.	Reduce SOx emissions Reduce SOx emissions from sour water steam stripping units	Not Applicable CQ do not use a sour water steam stripping unit.
10.	Monitoring of emissions to water Monitoring of emissions to water	Currently Compliant No process water produced for discharge by the gas treatment plant. The only waters arising from the installation are surface drainage water and waste waters arising from domestic facilities. Both sources are transferred to the main power station for treatment and disposal in line with the BAT requirements of the site's Environment Permit.
11.	Emissions to water Reduce water consumption and the volume of contaminated water	Currently Compliant All tanks of potentially polluting substances are bunded. The site surface water drainage is equipped with an Oil in water interceptor. Site operational and management instructions outline correct handling of any polluting materials to prevent aqueous pollution. All contaminated waters would be contained and handled to prevent the likelihood of potential pollution. All discharge points to water equipped with continuous monitoring.
12.	Reduce the emission load of pollutants in the waste water discharge to the receiving water body Removal of pollutants	Currently Compliant Surface waters are passed through an oil / water interceptor prior to discharge to the River Dee. No Other process waters arise from the process.
13.	Further removal of organic substances or nitrogen from waste water	Not Applicable No supply issues

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
	Additional treatment step if for water preservation	
14.	Reduce waste generation To reduce the quantity of waste sent for disposal	Currently Compliant CQ has worked through a comprehensive zero to landfill program to minimise waste disposal across site. Only domestic waste and those products which cannot be recycled (MMF and some plastics) are disposed to landfill. The 85% of all site produced wastes are recycled. Waste prevention and reuse is promoted across all areas of the site and waste disposal levels have reduced significantly in the last ten years.
15.	Reduce the amount of sludge to be treated or disposed of Reduce the amount of sludge to be treated or disposed of	Not Applicable
16.	Reduce the generation of spent solid catalyst waste Reduce the generation of spent solid catalyst waste	Not Applicable
17.	Reduce noise emissions To reduce noise emissions	Currently Compliant The site utilises a number of operational measures to minimise noise production including a preventative maintenance. Acoustic enclosures are maintained around equipment with high noise emission levels. The site undertakes a four yearly BS4142 regime to monitor noise emissions from the installation and there is no notable history of external noise complaints.
18.	Prevent or reduce diffuse VOC emissions Prevent or reduce diffuse VOC emissions	Not Applicable No storage of chemicals. Continuous preventative maintenance schedule applied to natural gas pipelines. Gas pipelines have pressure measurement systems to detect any potential losses.
Alkylation Process		
19.	Prevent hydrofluoric acid (HF) emissions to air from the hydrofluoric acid alkylation process	Not Applicable
20.	Reduce emissions to water from the hydrofluoric acid alkylation process	Not Applicable
21.	Reduce the emissions to water from the sulphuric acid alkylation process	Not Applicable
Base Oil Production Processes		
22.	Prevent and reduce the emissions of hazardous substances to air and water from base oil production processes	Not Applicable
Bitumen Production		

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
23.	Prevent and reduce emissions to air from the bitumen production process	Not Applicable
24.	Prevent or reduce NOX emissions to air from the catalytic cracking process (regenerator)	Not Applicable
25.	Reduce dust and metals emissions to air from the catalytic cracking process (regenerator)	Not Applicable
26.	Prevent or reduce SOX emissions to air from the catalytic cracking process (regenerator)	Not Applicable
27.	Reduce carbon monoxide (CO) emissions to air from the catalytic cracking process (regenerator)	Not Applicable
Catalytic Reforming Process		
28.	Reduce emissions of polychlorinated dibenzodioxins/furans (PCDD/F) to air from the catalytic reforming unit	Not Applicable
Coking Process		
29.	Reduce emissions to air from coking production processes	Not Applicable
30.	Reduce NOx emissions to air from the calcining of green coke process	Not Applicable
31.	reduce SOX emissions to air from the calcining of green coke process	Not Applicable
32.	Reduce dust emissions to air from the calcining of green coke process	Not Applicable
Desalting Process		
33.	Reduce water consumption and emissions to water from the desalting process	Not Applicable
Combustion Units		

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
34.	Prevent or reduce NOX emissions to air from the combustion units	Not Applicable Fired on natural gas. Emissions currently ~80mg/Nm3 monitored continuously. Combustion management systems in operation to maximise efficiency and minimise emissions.
35.	Prevent or reduce dust and metal emissions to air from the combustion units	Not Applicable Fired on natural gas
36.	Prevent or reduce SOX emissions to air from the combustion units	Not Applicable Fired on natural gas
37.	Reduce carbon monoxide (CO) emissions to air from the combustion units	Not Applicable Monitored continuously.
Etherification Process		
38.	Reduce emissions to air from the etherification process	Not Applicable
39.	Prevent upset of the biotreatment (etherification process)	Not Applicable
Isomerisation Process		
40.	Reduce emissions to air of chlorinated compounds (isomerisation process)	Not Applicable
Natural Gas Refinery		
41.	Reduce sulphur dioxide emissions to air from the natural gas plant	Currently Compliant Rejected off gas is combusted via a thermal oxidiser, only small amounts of SO2 (~10mg/Nm3) present in rejected nitrogen and monitored continuously.
42.	Reduce nitrogen oxides (NOX) emissions to air from the natural gas plant	Currently Compliant See BAT 34
43.	Prevent emissions of mercury when present in raw natural gas	Currently Compliant Mercury removal system installed at CQ GTP. Activated carbon abatement. Carbon was exchange after ten years of operation and no mercury found whatsoever within gas supply or filtration system.
Distillation Process		
44.	Prevent or reduce waste water flow generation from the distillation process	Not Applicable
45.	Prevent or reduce water pollution from the distillation process	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
46.	Prevent or reduce emissions to air from distillation units	Not Applicable
Product Treatment Process		
47.	Reduce emissions to air from the products treatment process	Currently Compliant Rejected off gas is combusted via a thermal oxidiser to minimise emissions.
48.	Reduce waste and waste water generation when a products treatment process using caustic is in place	Not Applicable
Storage and Handling Processes		
49.	Reduce VOC emissions to air from the storage of volatile liquid hydrocarbon compounds	Not Applicable
50.	Reduce VOC emissions to air from the storage of volatile liquid hydrocarbon compounds	Not Applicable
51.	Prevent or reduce emissions to soil and groundwater from the storage of liquid hydrocarbon compounds	Not Applicable
52.	Prevent or reduce VOC emissions to air from loading and unloading operations of volatile liquid hydrocarbon compounds	Not Applicable
Visbreaking		
53.	Reduce emissions to water from visbreaking and other thermal processes	Not Applicable
Waste Gas Sulphur Treatment		
54.	Reduce sulphur emissions to air from off-gases containing hydrogen sulphides (H₂S)	Not Applicable
Flares		
55.	Prevent emissions to air from flares	Currently Compliant Flaring is used start up and shut down but minimised during normal routine operation for commercial reasons.
56.	Reduce emissions to air from flares when flaring is unavoidable	Currently Compliant The flare equipment installed at Connahs Quay is considered best practice design. The Plant is managed to ensure smooth operation and minimise flare operation. Flare use =

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
		lost combustion gas which must be financially accounted for. Flare operation kept to an absolute minimum. Flaring events are reported to the site Environmental Advisor and a record kept. Visual inspections made of flare operation to ensure operational health of unit. Supply of support gas to flare minimised and measured to ensure best quality flame.
Integrated Emission Management		
57.	Achieve an overall reduction of NOX emissions to air from combustion units and fluid catalytic cracking (FCC) units Applies to complex interlinked units	Not Applicable Simple site with 2 release points & similar emission profiles.
58.	Achieve an overall reduction of SO2 emissions to air from combustion units, fluid catalytic cracking (FCC) units and waste gas sulphur recovery units Applies to complex interlinked units	Not Applicable