Natural Resources Wales permitting decisions

Variation and Consolidation of a bespoke Permit – Synthite Limited

We have decided to issue a Natural Resources Wales initiated variation and consolidated permit for Mold Chemicals (Alyn Works) in Mold operated by Synthite Limited.

The permit number is EPR/BU2349IL

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 (BREF) for the Production of Large Volume Organic Chemicals (LVOC). The associated BAT conclusions to this document were published on 7 December 2017 in the Official Journal of the European Union.

This variation incorporates the changes required by the Industrial Emissions Directive (IED) following a statutory review of permits in the Large Volume Organic Chemicals sector. These include the amendment of the wording of several permit conditions relating to notifications, changes to emissions limits and monitoring requirements if applicable.

We are satisfied that the operator will be compliant with the published BAT conclusions which will apply from 7 December 2021.

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 Mold Chemicals (Alyn Works) against the published BAT conclusions for the Production of Large Volume Organic Chemicals
- Annex 1 – Decision Checklist regarding relevant BAT Conclusions (LVOC)
- Annex 2 – Decision Checklist regarding relevant BAT Conclusions (Common waste water and waste gas treatment/management systems in the Chemical Sector)

Assessment of Mold Chemicals (Alyn Works) against the published BAT conclusions for the Production of Large Volume Organic Chemicals

1. Our decision

We have issued a variation, which will allow Synthite 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 Levels (BAT-AELs).

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 05/10/2004 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. Where the site is not currently compliant with BAT, Improvement Conditions have been included to bring the site up to standard by 7 December 2021.

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 (England and Wales) Regulations 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 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 06 July 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) Notice required the operator to:

- Describe the techniques that will be implemented before 7 December 2021, which will then ensure that operations meet the revised standard, or
- Justify why standards will not be met by 7 December 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 their permitted activity involves the use, production or release of a hazardous substance, as defined in Article 3(18) of the Industrial Emissions Directive, Synthite 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.
- Where their permitted activity involves the use, production, storage or release of priority hazardous substances and any other relevant substances, as defined by the Water Framework Directive, Synthite 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 modelling will be required to demonstrate that the effluent discharge will not have a significant impact to the receiving water.
- 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.

The Regulation 61(1) Notice response from the operator was received on the 22 February 2019 and additional information received on 26 March 2019, 27 March 2019, 13 September 2019, 17 December 2019. We considered that the response contained sufficient information for us to commence determination of the permit review. No further requests for information were completed, however a number of clarification were completed via e-mail with the Operator.

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 response

BAT Conclusions for the Production of Large Volume Organic Chemicals were published as Commission Implementing Decision EU 2017/2117 in the Official Journal of the EU on 7 December 2017. There are 90 BAT Conclusions. Annex 1 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 and the variation notice issued.

A detailed response was received from Synthite Limited. Following assessment of the Regulation 61(1) response, further information was requested from Synthite Limited via clarification e-mails. Where the operator has concluded that they have achieved BAT, and we are in agreement, no further information nor 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. The improvement conditions ensure compliance with the new BATc by 7 December 2021.

Table S1.3 Improvement programme requirements

Reference	Requirement	Date
1 – 21	Conditions 1 – 21 are complete	N/A
22	The Operator shall forward a full commissioning report of the new reactor R6, to include the monitoring detailed in response to question 2.10.1 of the Application (in BU2349_Var_SecC2.)	Complete
23	The Operator shall provide an updated drainage plan diagram showing the interconnection with Parry's Ditch and the position of the proposed filter and meter, technical specifications of the filter and meter and details of the revised MCERTS programme of certification	Complete

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC24	The Operator shall submit a written report to Natural Resources Wales for written approval on the baseline conditions of soil and groundwater at the installation. The report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for in Article 22(3) of the IED and provided in accordance with the European Commission Guidance concerning the baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions. The report shall contain information, supplementary to that already provided in the application Site Condition Report, needed to meet the information requirements of Article 22(2) of the IED.	6 December 2021 or otherwise agreed in writing with Natural Resources Wales
IC25	The operator shall submit a written report to Natural Resources Wales for written approval containing information on priority hazardous substances and any other relevant substances, for all discharges to surface waters. 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 the Operator is to carry 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 you will need to carry out modelling, as described in the risk assessment guidance "Surface water pollution risk assessment for your environmental permit". The report shall contain the results from the emissions monitoring, the results from the screening tests and the results from any modelling and any other information considered relevant.	6 December 2021 or otherwise agreed in writing with Natural Resources Wales
IC26	The operator shall submit to Natural Resources Wales for written approval (a) written procedure(s) describing how they intend to meet the following BAT requirements in accordance with requirements specified within BAT Conclusions of The Production of Large Volume Organic Chemicals BREF Document (EU 2017): • BAT 14 Emissions to water • BAT 18 & BAT 19 Equipment Malfunction and other than normal operating conditions	6 December 2021 or otherwise agreed in writing with Natural Resources Wales
IC27	The Operator shall carry out a programme of monitoring emissions to air as specified in Table S3.1 Note 2, the monitoring will be completed over a period agreed with Natural Resources Wales. The Operator shall submit a written report to Natural Resources Wales for written approval with an analysis of whether the emissions of certain parameters can be considered stable. Monitoring frequencies of certain parameters may be reviewed and reduced following Natural Resources Wales' review of the monitoring results as communicated to the operator in writing.	As agreed in writing with Natural Resources Wales

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC28	The Operator shall carry out a programme of total volatile organic carbon (TVOC) monitoring on certain emissions to air as specified in Table S3.1 Note 3. The monitoring will be completed over a period and frequency agreed with Natural Resources Wales to EN12619 standard. The Operator shall submit a written report to Natural Resources Wales for written approval including all monitoring results with an analysis of whether the TVOC emissions can be considered stable and low. Emission limit values may be reviewed and reduced following Natural Resources Wales' review of the monitoring results as communicated to the operator in writing.	As agreed in writing with Natural Resources Wales
IC29	The Operator shall carry out a programme of monitoring emissions to air as specified in Table S3.1 Note 5, the monitoring will be completed over a period agreed with Natural Resources Wales. The Operator shall submit a written report to Natural Resources Wales for written approval with an analysis of whether the emissions of certain parameters can be considered stable. Monitoring frequencies of certain parameters may be reviewed and reduced following Natural Resources Wales' review of the monitoring results as communicated to the operator in writing.	As agreed in writing with Natural Resources Wales
IC30	The operator shall submit to Natural Resources Wales for written approval a written procedure(s) describing how they intend to meet the following BAT requirements in accordance with requirements specified within BAT Conclusions of Common waste water and waste gas treatment / management systems in the chemical sector (EU 2016): • BAT 5 BAT is to periodically monitor diffuse VOC emissions to air from relevant sources by using an appropriate combination of the techniques I-III or, where large amounts of VOC are handled, all of the techniques I-III (i) Sniffing methods (e.g. with portable instruments according to EN 15446) associated with correlation curves for key equipment (ii) Optical gas imaging methods (iii) Calculation of emissions based on emissions factors, periodically validated (e.g. once every two years) by measurements	6 December 2021 or otherwise agreed in writing with Natural Resources Wales
IC31	The Operator shall submit a written report to Natural Resources Wales for written approval. The report shall address process monitoring for the emission abatement employed on emission points A10, A11 and A12. The report shall include; • a review of the current process monitoring techniques employed • a review of the requirement for process monitoring techniques in line with Best Available Techniques (BAT) including 'how to comply with your environmental permit' (2014) and industry best practice to ensure the ongoing efficacy of operation of the abatement plants • identification of any process monitoring improvements required to ensure BAT and a timetable for their implementation as necessary Any improvements required shall be implemented in accordance with an implementation timetable approved in writing by Natural Resources Wales.	31 March 2022 or otherwise agreed in writing with Natural Resources Wales

IC24 has been included as the Operator has not provided a report of the baseline conditions at the site, nor have they confirmed the current baseline report remains valid.

IC25 has been included as the Operator has not provided an assessment of priority hazardous substances or any other relevant priority hazardous substances discharged to sewer and surface water.

IC26 and IC30 has been included due to deficiencies in the response to the Regulation 61(1) Notice from the Operator. See Annex 1 for further details.

IC27 and IC29 has been included to enable the Operator to provide sufficient monitoring data to confirm whether the emissions are stable and therefore the monitoring frequency may be reduced, in line with Table S3.1 of the permit and notes.

IC28 has been included for the Operator to provide sufficient monitoring data of TVOC to confirm whether the BAT-AEL for TVOC is appropriate or if the ELV can be reduced by NRW – see below.

IC31 has been included for the Operator to review their process monitoring of abatement systems on emission points A10, A11 and A12. This is because the Operator stated there was no pressure monitoring on bag plant of emission point A12 and currently we do not consider this BAT. Therefore, we have taken this opportunity to request the Operator to review their process monitoring for dust abatement on the relevant emission points.

Operational changes & other changes to the permit

Ammonia surface water / groundwater monitoring

The site is currently permitted to discharge an abstraction of groundwater from two boreholes (boreholes A and B) and off-site surface water drainage via Parry's Ditch to the River Alyn, part of the Alyn Dolfechlas-Leadmill Waterbody (GB111067052171). Nutrient and field meter monitoring is undertaken at two statutory water quality sample points of the waterbody to produce a Phys-Chem waterbody classification for the Water Framework Directive (WFD). The installation and its discharge point are located between the two sample points, which are: 715 Rhyd y Goleu (upstream of site) and 717 Leadmill (downstream of site).

The Total Ammonia (as Nitrogen) WFD environmental quality standard (EQS) and respective class set for both sample points are shown below:

Total Ammonia as Nitrogen Environmental Quality standards (90 Percentile mg/L) class range				
High	**Good**	**Moderate**	**Poor**	**BAD**
≤0.2	>0.2 ≤0.3	>0.3 ≤ 0.75	>0.75 ≤ 1.1	>1.1

The current 2018 WFD site level classification for the two sample points are shown below:

WFD Sample point	Ammonia concentration (90%ile mg/L)	Class
715 Rhyd y Goleu	0.068	High
717 Leadmill	1.659	Bad

Statutory sampling data collected on Total Ammonia (as Nitrogen) concentrations between 2010 and 2019 show a clear increase in the Total Ammonia (as Nitrogen) concentration between the two sample points. Total Ammonia (as Nitrogen) levels are significantly higher during the spring and early summer months at the Leadmill sample point 717. The source of the ammonia is not fully understood by NRW and therefore we consider additional ammonia monitoring in this area is necessary.

As part of the permit review we have implemented additional ammonia monitoring in Table S3.4 of the permit, as follows. New monitoring is shown in Red, other monitoring requirements are unchanged:

Table S3.4 Surface water or groundwater monitoring requirements

Location or description of point of measurement	Parameter	Monitoring frequency	Monitoring standard or method	Other specifications
Groundwater reference points B/H1, B/H8, B/H9, B/H10, B/HA, B/HB, SP4	Groundwater level (m)	Monthly	Electronic Dip Tape	None
	Formaldehyde (mg/L)	Monthly	DNPH/HPLC	None
	Total ammonia (as Nitrogen) (mg/L)	Monthly	BS EN ISO 11732	None
Sample culvert at culvert pump as identified on MAP6 Drainage Diagram	Formaldehyde (mg/L)	Weekly	DNPH/HPLC	None
	Total ammonia (as Nitrogen) (mg/L)	Weekly	BS EN ISO 11732	None

Table S3.4 Surface water or groundwater monitoring requirements				
Location or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
River Alyn sampled downstream at NGR: SJ 2363 6487	Formaldehyde (mg/L)	Weekly	DNPH/HPLC	None
	Total ammonia (as Nitrogen) (mg/L)	Weekly	BS EN ISO 11732	None
	pH	Weekly	pH Meter	None

We consider this inclusion appropriate so as to address our duties under the Water Environment (Water Framework Directive) England and Wales Regulations 2017. The regulations require us to exercise our relevant functions so as to secure compliance with the requirements of the WFD.

The WFD regulations also require NRW to determine any authorisation, which includes imposing conditions on a permit, as necessary in order to:

(a) to prevent deterioration of the surface water status of a body of water and,

(b) to support the achievement of the environmental objectives set for a body of water

We have increased the monitoring frequency of monthly for the groundwater reference points so as to establish any seasonal variation.

Emulsions production

The Operator has confirmed the emulsions production process is no longer carried out at the site and hasn't done for at least seventeen years. The Operator confirmed we should remove the process from the permit, and we have therefore removed it from Table S1.1 authorised activities. We have also removed emission limit values for substances solely associated with the activity. The emissions point is retained as they are still used for other parts of the processes. The associated emissions are emissions to air of acrylic acid, acrylamide and sulphur dioxide from emission point A7. The Operator provided previous monitoring data spanning 2015 - 2019 to confirm there are no longer emissions to air of these three substances due to cessation of the emulsions production activity.

Effluent Treatment Plant

The installation currently has an effluent treatment plant (ETP) permitted as a directly associated activity (DAA). However, it has been confirmed by the Operator that the ETP is operating above the activity threshold for EPR Section 5.4 Part A(1)(a) installation activity. The ETP is operating at a capacity of 300 tonnes per day which exceeds the EPR activity threshold of 50 tonnes per day. Therefore the permitting of the ETP has been changed from a DAA to a listed activity. The ETP will be permitted as the following EPR activity as confirmed by the Operator:

- Section 5.4 Part A(1)(a)(i) – Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving (i) biological treatment

Operating Techniques

We have added two letters to the operating techniques table, the two letters detail the agreement between Synthite Limited and TS Resins Limited which allow TS Resins Limited to vent ammonia emissions through emission point A7 listed on the Synthite Limited permit with no change to emission limit values on A7. These letters were added into TS Resins Limited permit (EPR/UP3831ES) through a minor technical variation (EPR/UP3831ES/V002) therefore the Synthite Limited permit is updated to include the letters too for consistency. We have also added any operating techniques that have been approved via minor operational change requests or existing improvement conditions by the Operator with the regulatory compliance officer.

Medium Combustion Plant Directive

The installation has three natural gas fuelled standby boilers (5.2 MWth input each) and one foul gas boiler (5.2 MWth input) from the silver catalyst process exit gas. These combustion plant may be classed as Medium Combustion Plant (MCP) and Specified Generators (SG). Emission Limit Values (ELVs) and monitoring for existing MCPs & SGs is not required until 1st January 2025 at the earliest. We have decided to maintain any existing ELVs and monitoring requirements in the permit. The operator is required to assess relevance of MCP ahead of the 2025 deadline, and NRW assessment of compliance with the directive/regulation(s) will be managed separately.

Discharge to sewer

The installation has a Trade Effluent Consent (TEC) in place to discharge treated trade effluent to public sewer. Both the TEC and the current EPR permit set limits and monitoring requirements on the sewer discharge, see the table below for a comparison. This was standard permitting practice in the past. The Operator has requested the removal of limit and monitoring requirements of the sewer discharge within the EPR

permit. For parameters where the TEC limit is identical or tighter to the EPR permit limit we have removed the limit and monitoring requirement from the EPR permit. This is current standard permitting practice, as we do not replicate the requirements of other regulation, i.e. the TEC. For parameters where the EPR permit limit is tighter than the TEC limit, the limit and monitoring requirement has been retained in the permit to ensure environmental protection remains, this applies to ammonia (unionised as nitrogen) and temperature, as indicated in the table below with red text.

Parameter	Trade Effluent Consent Limit	EPR Permit Limit
pH	Minimum 5, Maximum 9	Minimum 5, Maximum 9
Total suspended solids	400 mg/L	400 mg/L
Formaldehyde	10 mg/L	40 mg/L
Methanol	10 mg/L	40 mg/L
Ammonia (unionised as nitrogen)	50 mg/L	25 mg/L
Chemical oxygen demand	800 mg/L	1500 mg/L
Grease and Oils	None present	10 mg/L
Volumetric flow rate	300 m^3/day and 3.5 L/sec	300 m^3/day
Temperature	43 °C	40 °C

Emission points to air

There have been several changes to the monitoring and parameters for the emission points to air at the installation, therefore these changes have been summarised below for clarity. There have been no changes to emission points A3, A4, A5 and A6, these are all tank vent emission points from storage of raw materials or products.

1. Monitoring of speciated VOCs and TVOC ELV

The Operator is currently monitoring various speciated VOCs on various different emission points to air. The current speciated VOCs monitored include n-Decane (measured as VOC toluene), dimethylamine, methanol and methanol (measured as VOC toluene) as well as formaldehyde. Following review of the permit we have removed monitoring of speciated VOCs (with the exception of formaldehyde) and replaced with monitoring of Total Volatile Organic Carbon (TVOC). We have retained formaldehyde monitoring in line with BAT 2 of the LVOC BREF. We consider this appropriate as it aligns with BAT 2 of the LVOC BREF, where TVOC monitoring is specified, not speciated VOCs (with some exceptions, implemented as required, e.g. formaldehyde). This is because using available EN monitoring standards and methods, TVOC measurement is more satisfactory, precautionary, and generally subject to

lower uncertainty than speciated VOC measurements, unless information is specifically required on a substance of interest, contained within a waste stream that contains this and other VOCs. Furthermore, current monitoring of speciated VOCs is conducted in house using various non-accredited methods including use of Gastec tubes, whereas monitoring of TVOC will be conducted externally and to MCERTS and EN accredited standards, improving data quality and reducing uncertainty. Therefore switching to TVOC monitoring will ensure an accurate and robust monitoring programme is in place at the site. We have decided to set the ELV of TVOC on all formaldehyde production emission points at the BAT-AEL contained within BAT 45 of the LVOC BREF. The Operator has no previous TVOC monitoring data and we have agreed a suitable approach to initially set the BAT-AEL and also set an Improvement Condition (IC28) for the Operator to provide MCERTS monitoring data so NRW can reduce the ELV if required. We do not consider setting the TVOC BAT-AEL 'backsliding' as the actual emissions from the processes are not changing and the current monitoring methods of speciated VOCs are not MCERTS therefore there is a need for the Operator to complete an MCERTS monitoring campaign so we can identify a suitable TVOC ELV.

2. Monitoring Methods and frequency

All monitoring methods on emission points A7, A8, A10, A11, A12, A15, A16, A17 and A18 have been updated in line with those contained within the LVOC BAT Conclusions and the following guidance: *'Monitoring stack emissions: techniques and standards for periodic monitoring' February 2021 :* Monitoring stack emissions: techniques and standards for periodic monitoring - GOV.UK (www.gov.uk) .

Monitoring frequency on all parameters from emission points A7, A8, A10, A11, A12, A15, A18 has been retained as quarterly with a note added to Table S3.1 enabling the monitoring frequency to be reduced to once every year if the emissions are proven to be sufficiently stable, subject to completion of an improvement condition (IC27). The monitoring frequency of dust on emission points A10 and A12 has been implemented as monthly as per LVOC BAT Conclusion 2 and because we have no previous monitoring data for dust from these emission points, again the note has been added as explained above potentially allowing the monitoring frequency to be reduced, if justified by monitoring data.

Monitoring frequencies for A16 and A17 are explained below.

3. Emission Point A1

The emission point A1 relates to a storage tank for formaldehyde derivatives products, it has a wet scrubber abatement system in place. The Operator initially requested the removal of current monitoring requirements and ELV on emission point A1, however later stated that they plan in the future to reroute the emissions from A1 to emission point A8, therefore, as this is a future plan we have retained the current monitoring arrangement and ELV on emission point A1, we have updated the method to remove the brand-specific name 'Gastec'. We do not consider the emission point a channelled emission to air as emissions are only displaced during refilling therefore BAT 2 of the LVOC BREF does not apply.

4. Emission Point A7

Emission point A7 relates to the ammonium salts, emulsions and formaldehyde derivatives production process emissions, ammonia venting emissions from bulk ammonia storage (TS Resins permit) and previously the emulsions production process. As noted above the emulsions production process has been removed from the permit during this variation. The parameters acrylamide, acrylic acid and sulphur dioxide have been removed from the emission point as these were only emissions from the emulsions production process as explained.

There is a scrubber and catalytic oxidiser abatement system in place. The current ammonia monitoring and ELV has been retained. The current formaldehyde monitoring and ELV has been retained as the current ELV is lower than the upper end of the BAT-AEL range. The current n-decane (measured as VOC toluene) monitoring has been changed to TVOC monitoring with the TVOC BAT-AEL set as explained above.

5. Emission Point A8

Emission point A8 relates to formaldehyde derivatives production process emissions, there is wet scrubber abatement. The current formaldehyde monitoring and ELV has been retained as the current ELV is the same as the upper end of the BAT-AEL range. The current methanol (measured as VOC toluene) and dimethylamine monitoring has been replaced by TVOC monitoring with the TVOC BAT-AEL set as explained above.

6. Emission Point A10

Emission point A10 relates to fine powder manufacture and has fabric filter abatement fitted. The current formaldehyde monitoring and ELV has been retained as the current

ELV is the same as the upper end of the BAT-AEL range. The current methanol monitoring has been replaced by TVOC monitoring with the TVOC BAT-AEL set as explained above. The Operator identified dust as potentially present in the waste gas based on the inventory of waste gas stream specified by the CWW BAT Conclusions. Therefore, dust monitoring applies as per LVOC BAT Conclusion 2. A monthly monitoring frequency for dust has been applied as there is no previous monitoring data. No ELV has been set in the absence of a BAT-AEL.

7. Emission Point A11

Emission point A11 relates to fine powder manufacture and has wet scrubber abatement fitted. The current formaldehyde monitoring and ELV has been retained as the current ELV is the same as the upper end of the BAT-AEL range and monitoring at least meats the LVOC BREF requirements. The current methanol monitoring has been replaced by TVOC monitoring with the TVOC BAT-AEL set as explained above. The current ammonia monitoring and ELV has been retained. The Operator has not identified dust as potentially present in the waste gas based on the inventory of waste gas stream specified by the CWW BAT Conclusions, however, we believe dust to be present within the waste gas stream. Therefore, dust monitoring applies as per LVOC BAT Conclusion 2. A monthly monitoring frequency for dust has been applied as there is no previous monitoring data of dust, no ELV has been set in the absence of a BAT-AEL.

8. Emission Point A12

Emission point A12 relates to paraformaldehyde production process emissions and has fabric filter abatement fitted. The current formaldehyde monitoring and ELV has been retained as the current ELV is the same as the upper end of the BAT-AEL range. The current methanol monitoring has been replaced by TVOC monitoring with the TVOC BAT-AEL set as explained above. The Operator identified dust as present in the waste gas based on the inventory of waste gas stream specified by the CWW BAT Conclusions. Therefore, dust monitoring applies as per LVOC BAT Conclusion 2. A monthly monitoring frequency for dust has been applied as there is no previous monitoring data of dust, no ELV has been set in the absence of a BAT-AEL.

9. Emission Points A13 and A14

The current permit required the Operator to monitor and report methanol emissions from both these emission points, which relate to methanol storage tanks with no abatement systems in place. The monitoring was based on an estimated value via

calculation and not physical monitoring methods. Following the review of the permit, we no longer feel it necessary nor justified for the Operator to monitor emissions from a storage tank that is passively venting where emissions are only displaced during refilling of the tank. We have removed the monitoring from both these emission points effective from variation issue.

10. Emission Point A15

Emission point A15 relates to tanker loading of formalin, a formaldehyde production process as confirmed by the Operator, it has wet scrubber abatement fitted. The current formaldehyde monitoring and ELV has been retained as the current ELV is the same as the upper end of the BAT-AEL range. The current methanol monitoring has been replaced by TVOC monitoring with the TVOC BAT-AEL set as explained above.

11. Emission Point A16

Emission point A16 relates to a combustion process fuelled by exit gas of the silver process. The process furnace/heater is 5.2 MWth input and therefore is not in scope of BAT 1 or BAT 2 of the LVOC BAT Conclusions. BAT 1 only applies to units with a total rated thermal input equal to or above 10 MW and BAT 2 only applies to channelled emissions to air other than from process furnaces/heaters. Following review of the current monitoring arrangements we have changed 'methanol (measured as VOC toluene)' to TVOC for reasons explained above. The current ELV (40 mg/m^3) for 'methanol (measured as VOC toluene)' has been retained and transferred to TVOC, the TVOC BAT-AEL in LVOC BAT 45 does not apply to combustion processes. Previous monitoring data of methanol (measured as VOC toluene) provides assurance the new ELV will be comfortably met. The current ELVs for formaldehyde and NOx have been retained. However, we have reduced the monitoring frequency on all parameters from quarterly to once every six months, the Operator has demonstrated the emissions from this emission point are stable using previous monitoring data spanning a period of five years.

12. Emission Point A17

Emission point A17 relates to an emission point from three combustion units fuelled on natural gas. The process furnace/heaters are each 5.2 MWth input, aggregated to 15.6 MWth through one stack and therefore in scope of BAT 1 of the LVOC BAT Conclusions. The boilers provide back-up to the main combustion unit (A16) and are operated on average less than 50 days per year. Carbon monoxide (CO) and sulphur dioxide (SO_2) monitoring to relevant EN standards have been added to permit

requirements reflecting LVOC BAT 1 monitoring requirements for combustion plant. For SO_2 a footnote has been added, noting that it is acceptable to monitor via calculation, reflecting BAT 1 as the Operator is combusting solely natural gas. No BAT-AELs or existing ELVs apply for CO or SO_2. The current ELV for NOx has been retained in the absence of a lower BAT-AEL in the LVOC BREF. The monitoring frequency has been reduced from quarterly to once every six months, the Operator has demonstrated the NOx emissions are stable using previous monitoring data spanning a period of five years. By setting a monitoring frequency of once every six months we hope to avoid the Operator turning on the units in order to carry out monitoring. We have also reviewed the current monitoring methods and updated these in line with those contained within either the LVOC BAT Conclusions or the following guidance: *'Monitoring stack emissions: techniques and standards for periodic monitoring' February 2021:* Monitoring stack emissions: techniques and standards for periodic monitoring - GOV.UK (www.gov.uk)

13. Emission Point A18

Emission point A18 relates to emissions from the mixed oxide plant, a formaldehyde production process. As confirmed by the Operator, it has catalytic oxidation abatement fitted. The current formaldehyde monitoring and ELV has been retained as the current ELV is the same as the upper end of the BAT-AEL range. The current methanol (measured as VOC toluene) monitoring has been replaced by TVOC monitoring with the TVOC BAT-AEL set as explained above.

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 installation for priority hazardous substances and any other relevant substances. The emissions monitoring for these substances must 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 was required to carry out the following assessments and report the results as part of their response to the Regulation 61(1) notice:

- 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”.

Under the existing (V006) permit the Operator was already permitted to discharge Formaldehyde to sewer (via emission point S1) and to surface water (via emission point W1). Formaldehyde is classed a specific pollutant as per the guidance referenced above, and therefore requires assessment by the Operator. The Operator has not provided any assessment of formaldehyde for either emission point as required by the Regulation 61(1) Notice and further requested by NRW. Therefore an improvement condition has been set in order for the Operator to provide an assessment of formaldehyde discharged to sewer and surface water.

The Operator discharges process effluent via their effluent treatment plant to sewer under a Trade Effluent Consent (TEC). The Operator also discharges recirculated borehole water to surface water, although this is not process effluent, this is done to avoid site flooding.

There are no relevant BAT-AELs for direct or indirect discharges to water in the LVOC BRef document or secondary BRefs. There are no monitoring requirements for direct or indirect discharges to water specified within the LVOC BRef document or secondary BRefs that are relevant to the operations carried out at the installation.

The current monitoring methods for emissions to surface water have been reviewed and where applicable have been updated to those as listed in the following guidance: ‘M18 Monitoring of discharges to water’ - Monitoring discharges to water: guidance on selecting a monitoring approach - GOV.UK (www.gov.uk).

Emissions to Water – Article 15(4) Derogations

There are no derogations, there are no relevant BAT-AELs that apply.

Emissions to Air

There were changes to the Emission Limit Values (ELVs) and monitoring requirements for emissions to air taking into account BAT conclusions for the Production of Large Volume Organic Chemicals. The tables below outline the parameters and limits set to

implement the BAT-AELs and the monitoring requirements, see the section above for more detail.

Emissions and monitoring effective until 6 December 2021

Table S3.1 Point source emissions to air – emission limits and monitoring requirements

Emission point ref. & location Note 1	Source	Parameter	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A1 NGR: SJ 2338 6498	Wet scrubber – Formaldehyde derivatives storage	Dimethylamine	5 mg/m^3	-	Quarterly	Gastec Tube
A3 NGR: SJ 2311 6501	Adsorption – Propionic acid storage	No parameters set	No limit set	-	-	-
A4 NGR: SJ 2312 6501	Adsorption – Formic acid storage	No parameters set	No limit set	-	-	-
A5 NGR: SJ 2311 6501	Adsorption – Agricultural product storage	No parameters set	No limit set	-	-	-
A6 NGR: SJ 2311 6501	Adsorption – Agricultural product storage	No parameters set	No limit set	-	-	-
A7 NGR: SJ 2337 6487	Scrubber vent from R1, R2, R3, R4, R5 reactors and catalytic oxidiser from R6 reactor – Ammonium salts and formaldehyde derivatives plus venting emissions from TS Resins	Formaldehyde	2 mg/m^3	-	Quarterly	DNPH/HPLC
		Ammonia	10 mg/m^3	-	Quarterly	Gastec Tube
		n-Decane (measured as VOC toluene)	20 mg/m^3	-	Quarterly	VOC Meter
A8 NGR: SJ 2337	Wet scrubber – RV10, AR2 and AR1 reactors –	Formaldehyde	5 mg/m^3	-	Quarterly	DNPH/HPLC
		Methanol (measured as VOC toluene)	40 mg/m^3	-	Quarterly	VOC Meter

6488	formaldehyde derivatives	Dimethylamine	5 mg/m^3	-	Quarterly	Gastec Tube
A10 NGR: SJ 2321 6500	Fabric filters – Fine powder manufacture	Formaldehyde	5 mg/m^3	-	Quarterly	DNPH/HPLC
		Methanol	1 mg/m^3	-	Quarterly	Gastec Tube
A11 NGR: SJ2322 6499	Wet scrubber – Fine powder manufacture	Ammonia	10 mg/m^3	-	Quarterly	Gastec Tube
		Formaldehyde	5 mg/m^3	-	Quarterly	DNPH/HPLC
		Methanol	1 mg/m^3	-	Quarterly	Gastec Tube
A12 NGR: SJ 2323 6494	Fabric filters – Paraformaldehyde production	Formaldehyde	5 mg/m^3	-	Quarterly	DNPH/HPLC
		Methanol	5 mg/m^3	-	Quarterly	Gastec Tube
A13 NGR: SJ 2332 6494	Methanol storage (no abatement)	No parameters set	No limit set	-	-	-
A14 NGR: SJ 2333 6494	Methanol storage (no abatement)	No parameters set	No limit set	-	-	-
A15 NGR: SJ 2336 6491	Wet scrubber – Tanker loading of formalin	Formaldehyde	5 mg/m^3	-	Quarterly	DNPH/HPLC
		Methanol	5 mg/m^3	-	Quarterly	Gastec Tube
A16 NGR: SJ 2318 6497	Combustion of silver process exit gas (no abatement)	Formaldehyde	5 mg/m^3	-	Quarterly	DNPH/HPLC
		Methanol (measured as VOC toluene)	40 mg/m^3	-	Quarterly	VOC Meter
		Nitrogen dioxide	50 mg/m^3	-	Quarterly	Gastec Tube
A17 NGR: SJ 2319 6496	Three natural gas fired boilers (no abatement)	Nitrogen dioxide	150 mg/m^3	-	Quarterly	Gastec Tube
A18 NGR: SJ 2321 6497	Catalytic oxidation – Mixed oxide plant emission control system vent	Formaldehyde	5 mg/m^3	-	Quarterly	DNPH/HPLC
		Methanol (measured as VOC toluene)	20 mg/m^3	-	Quarterly	VOC Meter

Note 1: Refer to Emission points plan: 'Synthite – MAP 5 – REV2 Emission Points October 2004' in Schedule 7 for location of emission points.

Emissions and monitoring effective from 7 December 2021

Table S3.1 Point source emissions to air – emission limits and monitoring requirements

Emission point ref. & location Note 1	Source	Parameter	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A1 NGR: SJ 2338 6498	Wet scrubber – Formaldehyde derivatives storage	Dimethylamine	5 mg/m^3	Periodic	Quarterly	Self-indicating detector tube
A3 NGR: SJ 2311 6501	Adsorption – Propionic acid storage	No parameters set	No limit set	-	-	-
A4 NGR: SJ 2312 6501	Adsorption – Formic acid storage	No parameters set	No limit set	-	-	-
A5 NGR: SJ 2311 6501	Adsorption – Agricultural product storage	No parameters set	No limit set	-	-	-
A6 NGR: SJ 2311 6501	Adsorption – Agricultural product storage	No parameters set	No limit set	-	-	-
A7 NGR: SJ 2337 6487	Scrubber vent from R1, R2, R3, R4, R5 reactors and catalytic oxidiser from R6 reactor – Ammonium salts and formaldehyde derivatives plus venting emissions from TS Resins	Formaldehyde	2 mg/m^3	Periodic	Quarterly Note 2	BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337
		Ammonia	10 mg/m^3	Periodic	Quarterly Note 2	EN ISO 21877 or CEN TS 17337
		Total volatile organic carbon (TVOC)	30 mg/m^3 Note 3	Periodic	Quarterly Note 2	EN 12619
A8 NGR: SJ 2337	Wet scrubber – RV10, AR2 and AR1 reactors – formaldehyde derivatives	Formaldehyde	5 mg/m^3	Periodic	Quarterly Note 2	BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337

6488		Total volatile organic carbon (TVOC)	30 mg/m^3 Note 3	Periodic	Quarterly Note 2	EN 12619
A10 NGR: SJ 2321 6500	Fabric filters – Fine powder manufacture	Formaldehyde	5 mg/m^3	Periodic	Quarterly Note 2	BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337
		Total volatile organic carbon (TVOC)	30 mg/m^3 Note 3	Periodic	Quarterly Note 2	EN 12619
		Dust	No limit set	Periodic	Monthly Note 5	EN 13284-1
A11 NGR: SJ2322 6499	Wet scrubber – Fine powder manufacture	Ammonia	10 mg/m^3	Periodic	Quarterly Note 2	EN ISO 21877 or CEN TS 17337
		Formaldehyde	5 mg/m^3	Periodic	Quarterly Note 2	BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337
		Total volatile organic carbon (TVOC)	30 mg/m^3 Note 3	Periodic	Quarterly Note 2	EN 12619
A12 NGR: SJ 2323 6494	Fabric filters – Paraformaldehyde production	Formaldehyde	5 mg/m^3	Periodic	Quarterly Note 2	BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337
		Total volatile organic carbon (TVOC)	30 mg/m^3 Note 3	Periodic	Quarterly Note 2	EN 12619
		Dust	No limit set	Periodic	Monthly Note 5	EN 13284-1
A13 NGR: SJ 2332 6494	Methanol storage (no abatement)	No parameters set	No limit set	-	-	-
A14 NGR: SJ 2333 6494	Methanol storage (no abatement)	No parameters set	No limit set	-	-	-
A15 NGR: SJ 2336 6491	Wet scrubber – Tanker loading of formalin	Formaldehyde	5 mg/m^3	Periodic	Quarterly Note 2	BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337
		Total volatile organic carbon (TVOC)	30 mg/m^3 Note 3	Periodic	Quarterly Note 2	EN 12619

A16 NGR: SJ 2318 6497	Combustion of silver process exit gas (no abatement)	Formaldehyde	5 mg/m^3	Periodic	Once every six months	BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337
		Total volatile organic carbon (TVOC)	40 mg/m^3	Periodic	Once every six months	EN 12619
		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	50 mg/m^3	Periodic	Once every six months	EN 14792
A17 NGR: SJ 2319 6496	Three natural gas fired boilers (no abatement)	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	150 mg/m^3	Periodic	Once every six months	EN 14792
		Carbon monoxide (CO)	No limit set	Periodic	Once every six months	EN 15058
		Sulphur dioxide (SO_2) Note 4	No limit set	Periodic	Once every six months	EN 14792
A18 NGR: SJ 2321 6497	Catalytic oxidation – Mixed oxide plant emission control system vent	Formaldehyde	5 mg/m^3	Periodic	Quarterly Note 2	BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337
		Total volatile organic carbon (TVOC)	30 mg/m^3 Note 3	Periodic	Quarterly Note 2	EN 12619

Note 1: Refer to Emission points plan: 'Synthite – MAP 5 – REV2 Emission Points October 2004' in Schedule 7

Note 2: The minimum monitoring frequency for periodic measurements may be reduced to once every year, if the emission levels are proven to be sufficiently stable. Subject to written approval by Natural Resources Wales and completion of Improvement Condition IC27.

Note 3: The ELV for TVOC may be reduced by written notice from Natural Resources Wales upon completion of Improvement Condition IC28.

Note 4: In the case of combustion of gaseous fuels and/or oil with a known sulphur content and where no flue-gas desulphurisation is carried out periodic monitoring can be replaced by calculation ensuring the provision of data of an equivalent scientific quantity.

Note 5: The minimum monitoring frequency for periodic measurements may be reduced to once every year, if the emission levels are proven to be sufficiently stable. Subject to written approval by Natural Resources Wales and completion of Improvement Condition IC29.

Where BAT associated emission levels are identified (BAT-AELs), limits may be prescribed at the top end of the range unless the proximity of sensitive receptors requires a tighter limit or if tighter limits have previously been permitted, this ensures no backsliding of emission limits, i.e. we will not relax emission limits via a BREF permit review. See Annex 1 for the detail and summary of changes for the emission points to air.

Emissions to Air – Article 15(4) Derogations

There are no derogations

Other IED BRefs relevant to the permit review

All the activities at the installation are also subject to the following IED BRef:

- Common waste water and waste gas treatment/management systems in the chemical sector

See Annex 2 for a summary of the review completed of the installation against these BAT conclusions. In addition the following processes were assessed against specific BREFs as determined relevant:

(i) Effluent treatment plant – CWW and other BREFs

- Section 5.4 Part A(1)(a)(i) – Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day by biological treatment

For reasons explained above the ETP has changed from a DAA to a listed activity in the permit, we have determined that the ETP activity is subject to the Common waste water and waste gas treatment/management systems in the chemical sector and site-specific BAT is informed by the Waste Treatment BRef also. The ETP discharges to foul sewer not to surface water. Therefore, BAT-AELs for indirect discharges to a receiving water body contained within the Waste Treatment BRef have been reviewed and none have been found to be relevant to either the treatment activity or the composition of the process effluent.

(ii) Ammonium salts production – Inorganic Chemicals BREFs.

There is the following activity listed in the permit:

- Section 4.2 Part A(1)(a)(iv) Production of inorganic ammonium salts

This activity is covered by the following technical guidance note: How to comply with your environmental permit additional guidance for: The Inorganic Chemicals Sector (EPR 4.03). This technical guidance note was published in 2009 and therefore incorporates the following IED BRefs all published in 2007: Large Volume Inorganic Chemicals – Solids and others industry; Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers and Production of Speciality Inorganic Chemicals.

The permitted inorganic chemicals activity is not operational at the site and hasn't been for some time (approximately ten years), nevertheless the Operator wants to retain the activity in the permit to allow future operation should it be required again.

As the plant is non-operational, it difficult at this time for the Operator to complete a BAT assessment against the relevant BAT conclusions for this activity. As the activity remains not operational and at this time there are no plans to restart the activity, we have included a pre-operational condition for the Operator to complete a BAT assessment and submit to NRW for approval if and when they restart the activity. We have also added a limitation in Table S1.1 for the activity. See below for the pre-operational measure and changes to Table S1.1:

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
PO1	At least 12 weeks before restarting operation of the inorganic ammonium salts production activity (activity reference A5 in Table S1.1), the Operator shall submit a written report to NRW for written approval that details how the relevant and latest BAT conclusions including both narrative BAT and BAT-AEL for that activity are achieved. NRW will only issue approval to the report when it is satisfied that all BAT requirements have been met.

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**

A5	S4.2 A(1)(a)(iv) Producing inorganic chemicals such as salts	Production of formaldehyde derivatives	From receipt of raw materials to despatch of finished product, subject to meeting the requirements of the MPP This activity has been mothballed and the activity shall not be operated until the completion of Pre-operational measure 1 (PO1) has been completed as confirmed in writing by Natural Resources Wales

6. Conclusion

We consider that the installation already employed BAT, as defined/understood at the time of the previous permit issue and that the operator has achieved significant improvements in performance since the permit was originally granted. Continually improving standards and technology mean that the revised BRef and its BAT-AELs provide the opportunity to consider further environmental improvements.

Coupled with the consolidation and modernisation of the permit, 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 7 December 2021.

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 the Production of Large Volume Organic Chemicals

BAT Conclusions for the Production of Large Volume Organic Chemicals were published as Commission Implementing Decision EU 2017/2117 in the Official Journal of the EU on 7 December 2017. There are 90 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;

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
MONITORING OF EMISSIONS TO AIR			
	BAT is to monitor channelled emissions to air from process furnaces/heaters in accordance with EN standards and with at least the minimum frequency given in the table below. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.		
1	CO	Total rated thermal input >50 MWth – continuous Total rated thermal input (2) 10 – 50 MWth – Once every 3 months (4) Generic EN standards or EN 15058	Compliant in the future A16 combustion unit is not subject to BAT 1 as is 5.2 MWth input, BAT 1 only applies to unit >10 MWth input. A17 combustion unit is subject to BAT 1 and CO monitoring will be implemented to EN 15058 standard through the permit requirements, currently there is no CO monitoring on

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
			the A17 combustion unit. We have implemented the monitoring frequency of once every 6 months due to the low operational time of the combustion units discharging through A17 as they are backup units.
	Dust [5]	Total rated thermal input >50 MWth – continuous Total rated thermal input [2] 10 – 50 MWth – Once every 3 months [4] Generic EN standards or EN 13284-1 or EN 13284-2	Not Applicable A16 combustion unit is not subject to BAT 1 as is 5.2 MWth input, BAT 1 only applies to unit >10 MWth input. A17 combustion units are fuelled solely on natural gas.
	NH3 [6]	Total rated thermal input >50 MWth – continuous Total rated thermal input [2] 10 – 50 MWth – Once every 3 months [4] Generic EN standards / no EN standard available	Not Applicable There is no SCR or SNCR abatement in use on either combustion units.
	NOx	Total rated thermal input >50 MWth – continuous Total rated thermal input [2] 10 – 50 MWth – Once every 3 months [4] Generic EN standards / EN 14792	Compliant in the future A16 combustion unit is not subject to BAT 1 as is 5.2 MWth input, BAT 1 only applies to unit >10 MWth input. There is current NOx monitoring with an NOx ELV on both A16 and A17 emission points which are relating to combustion units; however it is currently not to EN14792 standard. The current ELV on each A16 and A17 will be retained in the absence of a BAT-AEL for NOx in LVOC BREF. The EN14792 monitoring standard will be implemented through the permit requirements. We have reduced the

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
			monitoring frequency from quarterly to once every 6 months after receiving previous monitoring data from the Operator to demonstrate the NOx emissions are stable and due to the low operational time of combustion unit discharging through A17.
	SO2 (7)	Total rated thermal input >50 MWth – continuous Total rated thermal input (2) 10 – 50 MWth – Once every 3 months (4) Generic EN standards / EN 14791	Compliant in the future A16 combustion unit is not subject to BAT 1 as is 5.2 MWth input, BAT 1 only applies to unit >10 MWth input. A17 combustion unit is subject to BAT 1 and SO_2 monitoring to EN 14791 standard will be implemented through the permit requirements, currently there is no SO_2 monitoring on the permit for A17 combustion unit. We have implemented the monitoring frequency to once every 6 months due to the low operational time of the combustion unit discharging through A17 (backup unit). We will also include the Note (7) in the table in order to give the Operator the option to calculate the SO_2 emissions rather than monitor them physically as A17 combustion units are combusting solely natural gas.
	BATc Notes	*2 Refers to total rated thermal input of all process furnaces/heaters connected to the stack where emissions occur*	
		4 The minimum monitoring frequency for periodic measurements may be reduced to once every 6 months, if the emission levels are proven to be sufficiently stable	
		5 Monitoring of dust does not apply when combusting exclusively gaseous fuels	

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
		6 Monitoring of NH3 only applies with SCR of SNCR is used	
		7 In the case of process furnaces/heaters combusting gaseous fuels and/or oil with a known sulphur content and where no flue-gas desulphurisation is carried out, continuous monitoring can be replaced either by periodic monitoring with a minimum frequency of once every 3 months or by calculation ensuring the provision of data of an equivalent scientific quality.	
2	**BAT is to monitor channelled emissions to air other than from process furnaces/heaters in accordance with EN standards and with at least the minimum frequency given in the table below. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.**		
	See BAT 2 table: COMMISSION IMPLEMENTING DECISION (EU) 2017/ 2117 - of 21 November 2017 - establishing best available techniques (BAT) conclusions, under Directive 2010/ 75/ EU of the European Parliament and of the Council, for the production of large volume organic chemicals - (notified under document C (2017) 7469) (europa.eu)		
	Not applicable to following emission points A1, A3, A4, A5, A6, A13, A14 – these emission points all related to storage of either raw materials or products. We consider these emission point non-channelled and rather diffuse, fugitive emissions. The Operator has stated emissions are only displaced from these tanks during refilling this indicates there is only passive venting and no active pumped flow through the emission point. Therefore we consider BAT2 is not applicable to any of these emission points as we do not consider them 'channelled'.		
	Benzene		Not Applicable No benzene emissions identified in waste gas inventory supplied by the Operator.
	Cl_2		Not Applicable BAT2 only stipulates monitoring is required for TDI/MDI or EDC/VCM processes, neither of which are carried out at the site.

BATc number	Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	CO	Not Applicable BAT2 only stipulates CO monitoring is required for the following processes/sources: thermal oxidiser, lower olefins and EDC/VCM, none of which are carried out on site.
	Dust	Compliant in the future Dust emissions were identified as relevant in the waste gas inventory supplied by the Operator from the following emission points: A10 and A12. Therefore, monitoring of dust to EN 13284-1 standard will be implemented within the permit, the current V006 permit does not stipulate any dust monitoring on these two emission points. No stability data has been received for dust emissions from these two emission points therefore we cannot reduce the monitoring frequency as stipulated in BAT2, therefore once every month monitoring has been automatically applied. We have added a note to the permit (Table S3.1) stating the monitoring frequency may be reduced to once every year upon production of sufficient monitoring data that confirm the emissions are suitably stable.
	EDC	Not Applicable BAT2 only stipulates monitoring of EDC is required for EDC/VCM processes, neither of which are carried out at the site.

BATc number	Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	Ethylene oxide	Not Applicable BAT2 only stipulates monitoring of Ethylene oxide is required for Ethylene oxide and ethylene glycol production processes, neither of which are carried out at the site.
	Formaldehyde	Compliant in the future The following emission points have formaldehyde emissions as identified in the waste gas inventory: A7, A8, A10, A11, A12, A15 and A18, all the emission points relate to formaldehyde or formaldehyde derivative production processes therefore monitoring will apply as per BAT2. The BAT standard is to monitor formaldehyde once every month with no EN standard available, the current permit stipulates quarterly monitoring and not to an EN standard. The Operator has provided adequate monitoring data for emission points A7, A8, A10, A11, A12, A15 and A18 to demonstrate that the formaldehyde emissions are suitably stable and with ample headroom of current ELV and new BAT-AEL therefore we are satisfied with retaining a monitoring frequency of quarterly with monitoring method BS CEN TS 13649 or US EPA Method 316 or CEN TS 17337 in line with TGN (technical guidance note) M2 in the absence of a method in the BRef. We have added a note to the permit (Table S3.1) stating the monitoring frequency may be reduced to once every year upon production of sufficient

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
			monitoring data that confirm the emissions are suitably stable.
		Gaseous chlorides, expressed as HCl	Not Applicable No gaseous chloride emissions identified in waste gas inventory supplied by the Operator.
		NH_3	Not Applicable BAT2 only stipulates monitoring of NH_3 is required for SCR or SNCR abatement technologies, neither of which are employed at the site. The ammonia monitoring currently on any emissions points on the permit will remain at quarterly frequency. We have added a note to the permit (Table S3.1) stating the monitoring frequency may be reduced to once every year upon production of sufficient monitoring data that confirm the emissions are suitably stable. We have also updated the monitoring method to EN ISO 21877 or CEN TS 17337 in line with TGN M2 as there is no EN standard listed in BAT2 for ammonia monitoring.
		NOx	Not Applicable BAT2 only stipulates monitoring of NOx is required for thermal oxidiser abatement technologies, this is not employed at the site as confirmed by the Operator.
		PCDD/F	Not Applicable

BATc number	Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
		BAT2 only stipulates monitoring of PCDD/F is required for TDI/MDI and EDC/VCM production processes, neither of which are employed at the site.
	SO_2	Not Applicable No SO_2 emissions identified in waste gas inventory supplied by the Operator. Within the current permit there is monitoring of SO_2 on process emission point A7, however emissions of SO_2 only relate to the emulsions production process which has been removed from the permit at this review as explained above, therefore associated emission parameters are also removed..
	Tetrachloromethane	Not Applicable BAT2 only stipulates monitoring of tetrachloromethane is required for TDI/MDI production processes, neither of which are employed at the site.
	TVOC	Compliant in the future TVOC monitoring as per BAT2 will be required for all formaldehyde production or formaldehyde derivative production processes emissions, this includes emission points: A7, A8, A10, A11, A12, A15 and A18 There is no TVOC monitoring on the current permit, rather there is: A7 – n-Decane (measured as VOC toluene)

BATc number	Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
		A8 – methanol (measured as VOC toluene) and dimethylamine A10 – methanol A11 – methanol A12 – methanol A15 – methanol A18 – methanol (measured as VOC toluene) Due to the inconsistency with the monitoring parameters stipulated in the current permit, we have standardised the monitoring and implemented TVOC monitoring on A7, A8, A10, A11, A12, A15 and A18 emission points and removed any previous methanol, n-Decane and dimethylamine monitoring. The BAT standard is to monitor TVOC once every month to EN12619 standard, the current permit stipulates quarterly monitoring and not to EN12619 standard. The Operator has provided monitoring data for emission points A7, A8, A10, A11, A12, A15 and A18 to demonstrate that the speciated VOC emissions are stable and within ample headroom of TVOC BAT-AEL. Therefore, we are satisfied with retaining a quarterly monitoring frequency for TVOC to EN12619 standard. We have added a note to the permit (Table S3.1) stating the monitoring frequency may be reduced to once

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
			every year upon production of sufficient monitoring data that confirm the emissions are suitably stable.
	Emissions to air from process furnaces/heaters		
	In order to reduce emissions to air of CO and unburnt substances from process furnaces/heaters, BAT is to ensure an optimised combustion		
3	Optimised combustion is achieved by good design and operation of the equipment which includes optimisation of the temperature and residence time in the combustion zone, efficient mixing of the fuel and combustion air, and combustion control. Combustion control is based on the continuous monitoring and automated control of appropriate combustion parameters (e.g. O2, CO, fuel to air ratio, and unburnt substances)		Currently Compliant The Operator has stated servicing, monitoring and maintenance is carried out on the combustion units by an external contractor this ensures optimised combustion.
4	**In order to reduce NOx emissions to air from process furnaces/heaters, BAT is to use one or a combination of the techniques given below:**		
	a.	Choice of fuel	Currently Compliant The Operator uses natural gas or exit gas from silver process as the sole fuel for all process furnaces/heaters.
	b.	Staged combustion	
	c.	Flue-gas recirculation (external)	
	d.	Flue-gas recirculation (internal)	
	e.	Lox-NOx burner or ultra-low-NOx burner	
	f.	Use of inert diluents	
	g.	Selective Catalytic Reduction	
	h.	Selective Non-catalytic reduction	
5	**In order to prevent or reduce dust emissions to air from process furnaces/heaters, BAT is to use one or a combination of the techniques given below**		
	a.	Choice of fuel	Currently Compliant

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	b.	Atomisation of liquid fuels	The Operator uses natural gas or exit gas from silver process as the sole fuel for all process furnaces/heaters.
	c.	Fabric, ceramic or metal filter	
6	**In order to prevent or reduce SO2 emissions to air from process furnaces/heaters, BAT is to use one or both of the techniques given below**		
	a.	Choice of fuel	Currently Compliant The Operator uses natural gas or exit gas from silver process as the sole fuel for all process furnaces/heaters.
	b.	Caustic scrubbing	
7	**Emissions to air from the use of SCR or SNCR**		
	In order to reduce emissions to air of ammonia which is used in SCR or SNCR for the abatement of NOx emissions, BAT is to optimise the design and/or operation of SCR or SNCR		Not Applicable No SCR or SNCR used at the site.
8	**Techniques to reduce emissions from other processes/sources**		
	In order to reduce the load of pollutants sent to the final waste gas treatment, and to increase resource efficiency, BAT is to use an appropriate combination of the techniques given below for process off-gas streams		
	a.	Recovery and use of excess or generated hydrogen	Currently Compliant The Operator has stated that off-gas from silver process is sent to the combustion unit. They Operator has stated that the load of pollutants is not reduced by any other techniques listed in this BATc because the off-gas is combusted to release energy as per BAT9. The Operator has stated that the cost-benefit would be disproportionate and there could be further release of VOCs to atmosphere.
	b.	Recovery and use of organic solvents and unreacted organic raw materials	
	c.	Use of spent air	
	d.	Recovery of HCl by wet scrubbing for subsequent use	
	e.	Recovery of H2S by regenerative amine scrubbing for subsequent use	
	f.	Techniques to reduce solids and/or liquids entrainment	

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
9	In order to reduce the load of pollutants sent to the final waste gas treatment, and to increase energy efficiency, BAT is to send process off-gas streams with a sufficient calorific value to a combustion unit. Bat 8a and 8b have priority over sending process off-gas streams to a combustion unit.		Currently Compliant Process off-gas from silver process is sent to the combustion units.
10	**In order to reduce channelled emissions of organic compounds to air, BAT is to use one or a combination of the techniques given below**		
	a.	Condensation	Currently Compliant There are a wide variety of abatement options on emission points at the installation: A1 – wet scrubbing A3 – A6 – Adsorption A7 – Condensation & thermal oxidation A8 – Condensation & wet scrubbing A11 & A15 – Wet scrubbing A18 – Catalytic oxidation A16 and A17 are the emission points from combustion units and are not abated.
	b.	Adsorption	
	c.	Wet scrubbing	
	d.	Catalytic oxidiser	
	e.	Thermal oxidiser	
11	**In order to reduce channelled dust emissions to air, BAT is to use one or a combination of the techniques given below**		
	a.	Cyclone	Currently Compliant Emission points A10 and A12 have fabric filters fitted.
	b.	Electrostatic precipitator	
	c.	Fabric filter	
	d.	Two-stage dust filter	
	e.	Ceramic/metal filter	

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	f.	Wet dust scrubbing	
12	**In order to reduce emissions to air of sulphur dioxide and other acid gases (e.g. HCl), BAT is to use wet scrubbing**		Not applicable There are no emissions of acid gases and sulphur dioxide from process emission points. Nevertheless, emission points A1, A8, A11 and A15 have wet scrubber fitted and are appropriate abatement for the pollutants concerned.
13	**Techniques to reduce emissions from a thermal oxidiser**		
	a.	Removal of high levels of NOx precursors from the process off-gas streams	Not Applicable The Operator has confirmed there are no thermal oxidisers on site.
	b.	Choice of support fuel	
	c.	Low-NOx burner	
	d.	Regenerative thermal oxidiser	
	e.	Combustion optimisation	
	f.	Selective Catalytic Reduction	
	g.	Selective Non-catalytic reduction	
EMISSIONS TO WATER			
14	**In order to reduce the waste water volume, the pollutant loads discharged to suitable final treatment and emissions to water, BAT is to use an integrated waste water management and treatment strategy that includes an appropriate combination of process-integrated techniques, techniques to recover pollutants at source, and pre-treatment techniques, based on**		Compliant in the future The Operator has stated 'Not Applicable' to this BATc, we do not agree this is not applicable. Therefore an Improvement Condition has been set for the Operator to provide justification on how this BATc is achieved.

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	the information provided by the inventory of waste water streams specified in the CWW BAT conclusions.		
15	**RESOURCE EFFICIENCY**		
	In order to increase resource efficiency when using catalysts, BAT is to use a combination of the techniques given below		
	a.	Catalyst selection	Currently Compliant The Operator has stated that catalyst selection of the silver process is the industry standard as detailed in industry standard reference documents. The catalyst performance in the silver process is monitored by reaction conversions and deviations in methanol concentration and acidity. The Perstop catalyst change is done so under contract by Johnson Matthey. Formox AB and catalyst performance is monitored by Methanol breakthrough.
	b.	Catalyst protection	
	c.	Process optimisation	
	d.	Monitoring of catalyst performance	
16	**In order to increase resource efficiency, BAT is to recover and reuse organic solvents**		Currently Compliant The Operator has stated that distillation and liquid phase separation are used in specific reactions. Reduced pressure distillation is used to remove water from products and therefore increase the concentration of the product. The distillate is then fed back into other products as a diluent so that waste material is minimised.
17	**RESIDUES**		
	In order to prevent or, where that is not practicable, to reduce the amount of waste being sent for disposal, BAT is to use an appropriate combination of the techniques given below		
	a.	Addition of inhibitors to distillation systems	Currently Compliant

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	b.	Minimisation of high-boiling residue formation in distillation systems	The Operator has stated that distillation is carried out at reduced pressure rather than at atmospheric pressure to reduce the temperature required and therefore energy input. Distillate from products is used as a diluent in other products therefore reducing the amount of waste material produced. Catalysts in silver and Perstop plant processes are regenerated off-site. Off-gas from silver plant is combusted as a fuel in the combustion units.
	c.	Material recovery	
	d.	Catalyst and adsorbent regeneration	
	e.	Use of residues as a fuel	
18	**OTHER THAN NORMAL OPERATING CONDITIONS**		
	In order to prevent or reduce emissions from equipment malfunctions, BAT is to use all of the techniques given below		
	a.	Identification of critical equipment	Compliant in the future Limited information provided by the Operator; therefore improvement condition has been set in order for the Operator to provide sufficient detail on how this BATc is achieved.
	b.	Asset reliability programme for critical equipment	
	c.	Back-up systems for critical equipment	
19	**In order to prevent or reduce emissions to air and water occurring during other than normal operating conditions, BAT is to implement measures commensurate with the relevance of potential pollutant releases for:**		
	i.	Start-up and shut-down operations	Compliant in the future Limited information provided by the Operator; therefore improvement condition has been set in order for the Operator to provide sufficient detail on how this BATc is achieved.
	ii.	Other circumstances including those that could affect the proper functioning of the installation	
2 BAT CONCLUSIONS FOR LOWER OLEFINS PRODUCTION Not Applicable			
3 BAT CONCLUSIONS FOR AROMATICS PRODUCTION Not Applicable			

BATc number	Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
4 BAT CONCLUSIONS FOR ETHYLBENZENE AND STYRENE MONOMER PRODUCTION Not Applicable		
5 BAT CONCLUSIONS FOR FORMALDEHYDE PRODUCTION		
EMISSIONS TO AIR		
45	**In order to reduce emissions of organic compounds to air from formaldehyde production and to use energy efficiently, BAT is to use one of the techniques given below**	
	a. Send the waste gas stream to a combustion unit	Currently Compliant The Operator has stated that the silver process off-gas is sent to the combustion to be used as fuel. The metal oxide/perstop plant is fitted with a catalytic oxidiser with energy recovery.
	b. Catalytic oxidiser with energy recovery	
	c. Thermal oxidiser with energy recovery	
	BAT-AELs for emissions of TVOC and formaldehyde to air from formaldehyde production (daily average or average over the sampling period, mg/Nm3, no correction for oxygen content) – monitoring given in BAT2	
	TVOC: <5 – 30 mg/Nm3 (1)	Currently Compliant The Operator has provided monitoring data of speciated VOCs which shows ample headroom to achieve BAT-AEL. The TVOC BAT-AEL has been set on all relevant emission points as explained above. Improvement Condition set to gather TVOC monitoring data.
	Formaldehyde: 2 – 5 mg/Nm3	Currently Compliant The Operator has provided monitoring data which demonstrates they can achieve the upper end of this BAT-AEL. The BAT-AEL will be set in the permit, unless there is already a tighter limit in place which will remain.
	(1) The lower end of the range is achieved when using a thermal oxidiser in the silver process	

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
EMISSIONS TO WATER			
46	**In order to prevent or reduce waste water generation (e.g. from cleaning, spills and condensates) and the organic load discharged to further waste water treatment, BAT is to use one of both of the techniques given below**		
	a.	Reuse of water	Currently Compliant The Operator has stated that condensates are reused to adjust formaldehyde product concentration. Effluent is pre-treated in the ETP prior to discharge to sewer.
	b.	Chemical pre-treatment	
RESIDUES			
47	**In order to reduce the amount of paraformaldehyde-containing waste being sent for disposal, BAT is to use one or a combination of the techniques given below**		
	a.	Minimisation of paraformaldehyde generation	Currently Compliant The Operator has stated they recover formaldehyde by dissolution.
	b.	Material recovery	
	c.	Use of residues as a fuel	
6 BAT CONCLUSIONS FOR ETHYLENE OXIDE AND ETHYLENE GLYCOLS PRODUCTION Not Applicable			
7 BAT CONCLUSIONS FOR PHENOL PRODUCTION Not Applicable			
8 BAT CONCLUSIONS FOR ETHANOLAMINES PRODUCTION Not Applicable			
9 BAT CONCLUSIONS FOR TOLUENE DIISOCYANATE (TDI) AND METHYLENE DIPHENYL DIISOCYANATE (MDI) PRODUCTION Not Applicable			
10 BAT CONCLUSIONS FOR ETHYLENE DICHLORIDE AND VINYL CHLORIDE MONOMER PRODUCTION Not Applicable			
11 BAT CONCLUSIONS FOR HYDROGEN PEROXIDE PRODUCTION Not Applicable			

Annex 2: Decision checklist regarding relevant BAT Conclusions for the Common Waste Water and Waste Gas Treatment / management systems in the chemical sector

BAT Conclusions for the Common Waste Water and Waste Gas Treatment / management systems in the chemical sector were published as Commission Implementing Decision EU 2016/902 in the Official Journal of the EU on 9 June 2016. There are 23 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;

BATc number	Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	ENVIRONMENAL MANAGEMENT SYSTEM	
	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:	
1	See BAT 1: COMMISSION IMPLEMENTING DECISION (EU) 2016/ 902 - of 30 May 2016 - establishing best available techniques (BAT) conclusions, under Directive 2010/ 75/ EU of the European Parliament and of the Council, for common waste water and waste gas treatment/management systems in the chemical sector - (notified under document C(2016) 3127) (europa.eu)	Currently Compliant The Operator has an externally certified ISO14001:2015 EMS in place.
2	**In order to facilitate the reduction of emissions to water and air and the reduction of water usage, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the EMS that incorporates all of the following features:**	
	(i) Information about the chemical production processes including:	

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	a.	Chemical reaction equations, also showing side products	Currently Compliant The Operator maintains an inventory of waste gas and waste water via the EMS.
	b.	Simplified process flow sheets that show the origin of the emissions	
	c.	Descriptions of process-integrated techniques and waste water / waste gas treatment at source including their performance	
	(ii)	Information as comprehensive as is reasonably possible, about the characteristics of the waste water streams such as:	
	a.	Average values and variability of flow, pH, temperature and conductivity	
	b.	Average concentrations and load values of relevant pollutants/parameters and their variability	
	c.	Data on Bioeliminability	
	(iii)	Information as comprehensive as is reasonably possible, about the characteristics of the waste gas streams, such as:	
	a.	Average values and variability of flow and temperature	
	b.	Average concentration and load values of relevant pollutants/parameters and their variability	
	c.	Flammability, lower and higher explosive limits, reactivity	
	d.	Presence of other substances that may affect the waste gas treatment system or plant safety	

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	MONITORING		
3	For relevant emissions to water as identified by the inventory of waste water streams, BAT is to monitor key process parameters at key locations		Currently Compliant The Operator monitors direct and indirect emissions to water in line with the permit requirements and Trade Effluent Consent Requirements which we agree are suitable.
4	**BAT is to monitor emissions to water in accordance with EN standards with at least the minimum frequency given below. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.**		
	TOC	EN 1484 Daily	Not Applicable – no direct discharge to surface water of process effluent. The direct discharge to surface water is from abstracted borehole groundwater and collected surface water from old ditch that is capped above the site (Parry's ditch). The site discharges process effluent indirectly to sewer which we interpret the monitoring standards do not apply to. The Operator monitors the sewer discharge in line with their trade effluent consent. Retain all current limits and monitoring requirements as per the current permit.
	COD	No EN standard available Daily	
	TSS	EN 872 Daily	
	Total nitrogen	EN 12260 Daily	
	Total inorganic nitrogen	Various EN standards available Daily	
	Total phosphorus	Various EN standards available Daily	
	Absorbable organically bound halogens (AOX)	EN ISO 9562 Daily	
	Metals	Various EN standards available Daily	
	Toxicity	Risk based decision	
5	**BAT is to periodically monitor diffuse VOC emissions to air from relevant sources by using an appropriate combination of the techniques below, or, where large amounts of VOC are handles all of the techniques below**		

BATc number		Summary of BAT Conclusion requirement	Status/comment **One of the following:** Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	i.	Sniffing methods associated with correlation curves for key equipment	Compliant in the future The Operator has stated this is not applicable as diffuse VOCs are applicable to areas that are open to the atmosphere. However, we do not agree this is not applicable as there could be diffuse VOC emissions from leaking pipework and other areas. Improvement Condition set for the Operator to provide information on how they comply with this BATc.
	ii.	Optical gas imagine methods	
	iii.	Calculation of emissions based on emissions factors, periodically validated by measurements	
6	**Applicability: the applicability is restricted to cases where odour nuisance can be expected or has been substantiated**		
	BAT is to periodically monitor odour emissions from relevant sources in accordance with EN standards		Not Applicable Odour nuisance is not expected nor has it been substantiated.
	EMISSIONS TO WATER		
7	**In order to reduce the usage of water and the generation of waste water, BAT is to reduce the volume and/or pollutant load of waste water streams, to enhance the reuse of waste water within the production process and to recover and reuse raw materials**		Currently Compliant The Operator has stated that site water audits are undertaken and efficiencies are implemented. Water audit results are benchmarked against the chemical sector, the Operator reviews water use and implement measures were applicable.
8	**In order to prevent the contamination of uncontaminated water and to reduce emissions to water, BAT is to segregate uncontaminated waste water streams from waste water streams that require treatment**		Not Applicable The site drainage is already a combined system therefore it is unfeasible to separate these.
9	**In order to prevent uncontrolled emissions to water, BAT is to provide an appropriate buffer storage capacity for waste water incurred during other than normal operating conditions based on a risk assessment and to take appropriate further measures**		Currently Compliant The Operator has stated the use of existing lagoons and water can be recirculated if required. The Operator has bunding in place with collect water that is tested prior to approval for discharge. Waste liquors are collected from the site water

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
			collection system, held, testing and transferred to the ETP. The lagoons are tested for analytes frequently and the influent flowrate to the treatment plant is adjusted.
10	**In order to reduce emissions to water, BAT is to use an integrated waste water management and treatment strategy that includes an appropriate combination of the techniques in the priority order given below**		
	a.	Process integrated techniques	Currently Compliant There is an ETP on site that treats process effluent prior to discharge to sewer under a Trade Effluent Consent. Techniques to prevent or reduce the generation of waste water are considered during the water audit reviews.
	b.	Recovery of pollutants at source	
	c.	Waste water pre-treatment	
	d.	Final waste water treatment	
11	**In order to reduce emissions to water, BAT is to pre-treat waste water that contains pollutants that cannot be dealt with adequately during final waste water treatment by using appropriate techniques**		Currently Compliant See above
12	**In order to reduce emissions to water, BAT is to use an appropriate combination of final waste water treatment techniques** **Includes BAT-AELs for direct emissions to a receiving water body**		Currently Compliant The treatment techniques in the ETP are neutralisation, physical separation, activated sludge process and denitrification and sedimentation. The BAT-AELs are not applicable as there is no direct emissions to a receiving water body. All wastewater from ETP is discharged to sewer under a trade effluent consent.
WASTE			

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
13	**In order to prevent or, where that is not practicable, to reduce the quantity of waste being sent for disposal, BAT is to set up and implement a waste management plan as part of the EMS that, in order or priority, ensures that waste is prevented, prepared for reuse, recycled or otherwise recovered**		Currently Compliant The Operator has stated that a waste management plan is implemented as part of ISO14001 EMS. There are permit conditions to ensure this BAT requirement is achieved.
14	**In order to reduce the volume of waste water sludge requiring further treatment or disposal, and to reduce its potential environmental impact, BAT is to use one or a combination of the techniques given below**		
	a.	Conditioning	Currently Compliant The Operator has stated the volume of waste water sludge requiring disposal is reduced by dewatering carried out by sedimentation in the waste sludge tank.
	b.	Thickening/dewatering	
	c.	Stabilisation	
	d.	Drying	
EMISSIONS TO AIR			
15	**In order to facilitate the recovery of compounds and the reduction of emissions to air, BAT is to enclose the emission sources and to treat the emissions, where possible**		Currently Compliant The Operator has stated that air is recirculated in the paraformaldehyde process to recover formaldehyde gas, hence reduce aerial emissions. Other emissions to air are either combusted (silver process off-gas) or abated by catalytic oxidiser, wet scrubbers or activated carbon drums.
16	**In order to reduce emissions to air, BAT is to use an integrated waste gas management and treatment strategy that includes process-integrated and waste gas treatment techniques**		Currently Compliant The Operator has stated that they have waste gas treatment techniques in place including emissions control system on formaldehyde production plant. Chemicals production plant has catalytic oxidiser.
17	**In order to prevent emissions to air from flares, BAT is to use flaring only for safety reasons or non-routine operational conditions (e.g. start-ups, shutdowns) by using one or both of the techniques given below**		

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	a.	Correct plant design	Not Applicable No flaring activities on site
	b.	Plant management	
18	**In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use one or both of the techniques given below**		
	a.	Correct design of flaring devices	Not Applicable No flaring activities on site
	b.	Monitoring and recording as part of flare management	
DIFFUSE VOC EMISSIONS			
19	**In order to prevent or, where that is not practicable, to reduce diffuse VOC emissions to air, BAT is to use a combination of the techniques given below**		
	a.	Limit the number of potential emission sources	Currently Compliant The Operator has stated plant design and operational measures minimise the release of diffuse VOC emissions to air. Plant design pipework is made of corrosion resistant steel. There are standard operating procedures for plant and equipment construction, assembly and commissioning. The Operator has a dedicated team of maintenance engineers and a reliability engineer that use 'Operate' system as the planned preventative maintenance system, this ensures good maintenance and suitable replacement of equipment. Most sources of diffuse VOCs are contained and abated.
	b.	Maximise process-inherent containment features	
	c.	Select high-integrity equipment	
	d.	Facilitate maintenance activities by ensuring access to potentially leaky equipment	
	e.	Ensure well-defined and comprehensive procedures for plant/equipment construction and assembly. This includes using the designed gasket stress for flanged joint assembly	
	f.	Ensure robust plant/equipment commissioning and handover procedures in line with the design requirements	
	g.	Ensure good maintenance and timely replacement of equipment	

BATc number		Summary of BAT Conclusion requirement	Status/comment **One of the following:** Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	h.	Use a risk-based leak detection and repair programme (LDAR)	
	i.	As far as it is reasonable, prevent diffuse VOC emissions, collect them at source and treat them	
ODOUR EMISSIONS			
20	**In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plant, as part of the EMS, that includes all the following elements:**		
	i.	A protocol containing appropriate actions and timelines	Not Applicable Odour nuisance not expected nor been substantiated
	ii.	A protocol for conducting odour monitoring	
	iii.	A protocol for response to identified odour incidents	
	iv.	An odour prevention and reduction programme designed to identify the source(s); to measure/estimate odour exposure; to characterise the contributions of the sources; and to implement prevention and/or reduction measures	
	Applicability – applicability is restricted to cases where odour nuisance can be expected or has been substantiated		
21	**In order to prevent or, where that is not practicable, to reduce odour emissions from waste water collection and treatment and from sludge treatment, BAT is to use one or a combination of the techniques given below**		
	a.	Minimise residence times	Currently Compliant The Operator has stated that the residence times and aerobic treatment is optimised in the ETP to prevent odour. Waste sludge is stored in an enclosed tank.
	b.	Chemical treatment	
	c.	Optimise aerobic treatment	
	d.	Enclosure	

BATc number		Summary of BAT Conclusion requirement	Status/comment One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	e.	End-of-pipe treatment	
NOISE EMISSIONS			
22	**In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to set up and implement a noise management plan as part of the EMS, that includes all of the following elements:**		
	i.	A protocol containing appropriate actions and timelines	Not Applicable Noise nuisance not expected nor substantiated
	ii.	A protocol for conducting noise monitoring	
	iii.	A protocol for response to identified noise incidents	
	iv.	A noise prevention and reduction programme designed to identify the source(s), to measure/estimate noise exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures	
	Applicability: applicability is restricted to cases where noise nuisance can be expected or has been substantiated		
23	**In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques given below**		
	a.	Appropriate location of equipment and buildings	Currently Compliant The Operator has stated that on and off-site noise acoustic surveys are completed and abatement techniques are implemented. These includes operational measures of screening by closing doors and enclosure of motors in acoustic enclosures.
	b.	Operational measures	
	c.	Low-noise equipment	
	d.	Noise-control equipment	
	e.	Noise abatement	

Annex 3: Consultation on the draft decision where an Article 15(4) derogation has been applied

Not Applicable