Environment Agency

Review of an Environmental Permit for an Installation subject to Chapter II of the Industrial Emissions Directive under the Environmental Permitting (England & Wales) Regulations 2016 (as amended)

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

The Permit number is:	EPR/BS3000ID
The Operator is:	Stepan UK Limited
The Installation is:	Stalybridge Organic Chemicals
This Variation Notice number is:	EPR/BS3000ID/V002

What this document is about

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

We have reviewed the permit for this installation against the revised BAT Conclusions for the Large Volume Organic Chemicals industry sector published on 07 December 2017 in the Official Journal of the European Union.
Where appropriate, we also considered other relevant BAT Conclusions published prior to this date but not previously included in a permit review for the Installation:
Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector. Published 09 June 2016

In this decision document, we set out the reasoning for the consolidated variation notice.

It explains how we have reviewed and considered the techniques used by the operator in the operation and control of the plant and activities of the installation. This review has been undertaken with reference to the decision made by the European Commission establishing best available techniques (BAT) conclusions (BATc) for Production of Large Volume Organic Chemicals, and Common Waste Water And Waste Gas Treatment/Management Systems in the Chemical Sector as detailed in documents reference C(2017) 7469, and C(2016) 3127 respectively. It is our

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

As well as considering the review of the operating techniques used by the operator for the operation of the plant and activities of the installation, the consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issue. Where this has not already been done, it also modernises the entire permit to reflect the conditions contained in our current generic permit template.

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

The operator has also applied to consolidate their permits EPR/BS3000ID and EPR/FP3034LK for the site. The assessment of this application is the subject of a separate decision document for EPR/FP3034LK/V002 but the permit changes have been included in the consolidated permit issued as a result of this permit review.

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

How this document is structured

1. Our decision
2. How we reached our decision
3. The legal framework
4. Annex 1– Annex 1: decision checklist regarding relevant BAT Conclusions.
5. Annex 2 – Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested..
6. Annex 3 – Improvement Conditions
7. Annex 4 – Review and assessment of changes that are not part of the BAT Conclusions derived permit review.

1 Our decision

We have decided to issue the variation notice to the operator. This will allow it to continue to operate the Installation, subject to the conditions in the consolidated variation notice that updates the whole permit.

As part of this update we have:

- Added further explanation to the description for Directly Associated Activity AR9 – Waste handling and storage, to clarify that this includes the collection and adjustment of aqueous effluent from the Continuous sulphonation, alkanolamide and esterquat processes for off-site disposal by tanker.
  The batch sulphonation effluent discharged to sewer remains a Directly Associated Activity as it is not of sufficient flow to be a scheduled activity.
- Reviewed the process description.
  Oleum used in the batch process is not produced on site. Trials are in progress to change from Oleum to 98% Sulphuric Acid. A scheduled activity for oleum production is not required.
  Although the continuous sulphonation process generates sulphur trioxide and uses it in a concerted process with low inventory the formation and reaction take place in separate reactors. To ensure consistency across the sulphonation sub-sector we have added a S4.2 A(1)(a)(i) Producing inorganic chemicals such as gases for the sulphur dioxide/trioxide production from sulphur.
- Updated the site plan after consolidation of permits BS3000ID and FP3034LK (see Annex 4) and included the location of current emission points.
- Reviewed, and updated where necessary; the permit introduction, operational techniques and improvement conditions status.

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

The consolidated variation notice contains many conditions taken from our standard environmental permit template including the relevant annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the notice, we have considered the techniques identified by the operator for the operation of their installation, and have accepted that the details are sufficient and satisfactory to make those standard conditions appropriate. This document does, however, provide an explanation of our use of “tailor-made” or installation-specific conditions, or where our permit template provides two or more options.

2 How we reached our decision

2.1 Requesting information to demonstrate compliance with BAT Conclusion techniques

We issued a notice under regulation 61(1) of the Environmental Permitting (England and Wales) Regulations 2016 (a Regulation 61 Notice) on 04/05/18 requiring the operator to provide information to demonstrate where the operation of their installation currently meets, or how it will subsequently meet, the revised standards described in the relevant BAT Conclusions document. The notice required that where the revised standards are not currently met, the operator should provide information that

- Describes the techniques that will be implemented before 07/12/21 which will then ensure that operations meet the revised standard, or
- justifies why standards will not be met by 07/12/21, and confirmation of the date when the operation of those processes will cease within the installation or an explanation of why the revised BAT standard is not applicable to those processes, or
- justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised standard described in the BAT Conclusions.

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

The Regulation 61 notice response from the Operator was received on 26/10/18.

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

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

2.2 Review of our own information in respect to the capability of the installation to meet revised standards included in the BAT Conclusions document

Based on our records and previous experience in the regulation of the installation we consider that the operator will be able to comply with the

techniques and standards described in the BAT Conclusions other than concerning some parts of techniques and requirements described in BAT Conclusion LVOC BATc2, 10, 17, 19 CWW BATc 1, 2, 5, 7, 10, 13, 15, 16 and 19 as well as details arising from some existing Improvement Conditions. We have therefore included new Improvement Condition IC10 – IC17 in the consolidated variation notice to ensure that the requirements of the BAT Conclusion are delivered before 07/12/21.

2.3 Requests for further information during determination

Although we were able to consider the Regulation 61 notice response generally satisfactory at receipt, we did in fact need more information in order to complete our permit review assessment, and issued a further information requests on 12/02/20. A copy of the further information request, and the response received on 18/03/20 was placed on our public register.

2.4 Condition of Soil and Groundwater

Articles 16 and 22 of the Industrial Emissions Directive (IED) require that a quantified baseline is established for the level of contamination of soil and groundwater with hazardous substances, in order that a comparison can be made on final cessation of activities.

We have used the Large Volume Organic Chemicals permit review to regulate against the above IED requirements. Our Regulation 61 notice required operators, where the activity of the installation involved the use, production or release of a relevant hazardous substance (as defined in Article 3(18) of the Industrial Emissions Directive), to carry out a risk assessment considering the possibility of soil and groundwater contamination at the installation with such substances. Where any risk of such contamination was established we requested that the operator either:

- prepare and submit a baseline report containing information necessary to determine the current state of soil and groundwater contamination; or
- provide a summary report referring to information previously submitted where they were satisfied that such information represented the current state of soil and groundwater contamination so as to enable a quantified comparison to be made with the state of soil and groundwater contamination upon definitive cessation the activity.

Where operators concluded that there were no risks of soil or groundwater contamination (due to there not being any release of hazardous substances), they were required to provide a copy of the risk assessment.

The operator stated in their Regulation 61 notice response that a report on the environmental baseline conditions at the site prior to issue of the permit in 2006 had been produced by Conestoga Rovers and Associates and that the nature of the processes and materials used on site has not changed

significantly. However, as this report (not resubmitted as part of this response) is dated December 2008 it is proposed to undertake further soil and groundwater sampling in order to produce an updated baseline.

The frequency of groundwater monitoring is set at yearly in condition 3.1.5 with a reporting requirement in Table S4.3 although this can be altered in future by written agreement from the Environment Agency.

2.5 Surface Water Pollution Risk Assessment

As part of our delivery of the Water Framework Directive (WFD) requirements, we need to identify and assess the impact of all sources of hazardous pollutants to surface waters from regulated industry. We use the term 'hazardous pollutants' to collectively describe substances covered by the EQSD[1] (priority hazardous substances, priority substances and "other pollutants"). It also applies to the specific pollutants listed in the 2015 Directions[2], and substances which have operational (non-statutory) Environmental Quality Standards (EQS).

For all installations with discharges to surface water and/or sewer we required the operator, via our Regulation 61 notice, to provide a summary report of the current hazardous pollutant releases referring to the series of screening tests, which are described in our H1 risk assessment guidance, which would allow us to assess whether the emissions of hazardous pollutants from the installation are significant.

The installation does not have any direct discharges to surface water.

However, the operator's response to the Regulation 61 notice made reference to a Controlled Site model and Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) produced by ERM in July 2013 (not resubmitted as part of this response) which assessed the potential risks to the River Tame (forming the northern boundary of the site) from groundwater beneath the site. The model and risk assessment concluded that, taking into consideration active retardation, degradation and dilution within the River Tame, the predicted concentrations of the contaminants of concern in the River Tame are less than the Environmental Quality Standards.

As this report was produced in 2013 and further groundwater and surface water monitoring has been undertaken since then (and more is proposed in response to this permit review), the operator stated an intention to update the CWDQRA to reflect the additional data and current site conditions.

A follow-up Improvement Condition (IC10) has also been included which requires the operator to submit the updated Controlled Waters Detailed Quantitative Risk Assessment ensuring that it considers:
i) potential risks to the River Tame but also to the Huddersfield Narrow Canal

[1] Environmental Quality Standards Directive (EQSD) (2008/105/EC, as amended by 2013/39/EU)
[2] The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015

(an SSSI) to the south of the site.
ii) the range of relevant hazardous pollutants from the Environmental Quality Standards Directive (EQSD) (2008/105/EC, as amended by 2013/39/EU).

3 The legal framework

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

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

We consider that in issuing the consolidated variation notice, it will ensure that the operation of the installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

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

We have set emission limit values (ELV's) in line with the BAT Conclusions, unless a tighter, i.e. more stringent, limit was previously imposed and these limits have been carried forward. For emissions to each relevant environmental receptor (i.e. air, or surface water), the emission limits and monitoring requirements have been incorporated into the consolidated variation notice via the tables in Schedule 3 – Emissions and Monitoring for

a) the existing ELVs and monitoring requirements which are effective from the date of issue of the notice; and
b) notes to the tables for amended ELVs where a BAT-AEL is specified in the BAT conclusions, and any associated monitoring requirements which will take effect from 7th December 2021.

Annex 1: decision checklist regarding relevant BAT Conclusions

BAT Conclusions for the Large Volume Organic Chemicals industry sector were published by the European Commission on 07 December 2017. There are 19 General BAT Conclusions and a further 71 BAT Conclusions in 10 subsector-specific sections. Where appropriate, we also considered other relevant BAT Conclusions published prior to this date but not previously included in a permit review for the Installation; 23 BAT Conclusions for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector. This annex provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation. This annex should be read in conjunction with the consolidated variation notice.

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

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

BAT Conclusion No	Summary of BAT Conclusion requirement for Production of Large Volume Organic Chemicals	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	BAT Conclusions that are not applicable to this installation	**NA**	BAT Conclusions (BATc) 20-90 for chemical sub-sectors.
1	Monitor channelled emissions to air from process furnaces/heaters in accordance with the described standards and minimum frequencies	**NA**	Under the definition of process furnaces/heaters in the BATc neither the steam raising boilers nor the sulphur burning process are process furnaces or heaters. During start up plant air is diverted through an electric heater to raise the sulphur burner and converter to operational temperature. This indirect heating is also not a process heater. After auto ignition the sulphur burning is self-sustaining.
2	Monitor channelled emissions to air other than from process furnaces/heaters in accordance with the described standards and minimum frequencies	**NA** **NA** **FC** **FC**	Ammonia is stored on site but not used in SCR/SNCR process sources listed in the BAT2 table. Formaldehyde has been eliminated from the site. Dust is currently monitored annually in the AA2 batch process spray drier vent (the only likely source of dust emissions) using the required EN 13284-1 method. To meet BAT2 this will change to monthly monitoring at 07/12/21 unless or until it may be reduced to minimum of annually if stable emissions are demonstrated after the completion of the approved actions under IC17. Sulphur dioxide is monitored continuously in the AA1 continuous

		FC	process vent. AA1, the batch process vent AA5, oleum tank vent AA11 and molten sulphur tank AA13 are all periodically monitored for Sulphur Dioxide without limits under the current permit, but with no method or frequency. These will need to be monitored monthly (or annually minimum if stable) to EN14791 in future. IC11 has been included to require confirmatory monitoring of the these emission points for Sulphur Dioxide, particularly to determine whether they are stable emissions justifying a reduction in monitoring frequency. Total VOC is listed as a monitoring parameter for vents AA3-AA10 and AA14 but with no method or frequencies. Currently results are reported annually based on calculations from previous monitoring results. These emission points will need to be monitored monthly (or annually minimum if stable) to EN 12619 in future. IC12 has been included to require a plan to be submitted for approval for the reverification monitoring proposed by the operator and IC13 has been included to require submission of the resulting monitoring results, particularly to determine whether they are stable emissions justifying a reduction in monitoring frequency.
3	Ensure optimised combustion from process furnaces/heaters to reduce emissions to air of CO	**NA**	See BAT1.
4	Reduce NO_x emissions from process furnace/heaters by using one or a combination of the described techniques	**NA**	See BAT1.
5	Prevent or reduce dust emissions from process furnace/heaters by using one or a combination of the described techniques	**NA**	See BAT1.

6	Prevent or reduce SO_2 emissions from process furnace/heaters by using one or a combination of the described techniques	**NA**	See BAT1.
7	To reduce emission of ammonia optimise design/operation of SCR/SNCR	**NA**	There is no SCR or SNCR on site.
8	Increase resource efficiency/reduce the pollutant load on final waste gas treatment by using one or a combination of the described techniques on process off-gas streams (8a/b take precedence over 9)	**CC**	Appropriate techniques are used: Organic solvents: Chilled condensation and reuse in process. Entrained liquids abated by electrostatic precipitator
9	Increase energy efficiency/reduce the pollutant load on final waste gas treatment by sending process off-gas streams of sufficient calorific value to a combustion unit	**CC**	No streams have sufficient calorific value. Recovery and reuse of organic solvents in BAT 8 takes precedence over BAT9.
10	Reduce channelled emissions of organic compounds to air by using one or a combination of the described techniques.	**CC** **FC**	VOC emissions are minimised by chilled condensation for reactor vents. Bulk storage vents are back-vented to delivery vehicles to minimise displacement VOC emissions during tank filling. The potential impact of VOC emissions from sources without chilled condensation will be assessed using the results from monitoring under IC13.
11	Reduce channelled dust emissions to air, by using one or a combination of the described techniques.	**CC**	Dust from sprayer abated by cyclones, filters and a final water wash. The first part of original IC4 to carry out monitoring of particulates from emission point AA2 was completed however, the second part to investigate options for improvement if the emissions were found to be greater than benchmark levels was not fully met. A new Improvement

			Condition IC17 has been set to require this. On completion of which an Emission Limit Value will be set.
12	Reduce emissions to air of sulphur dioxide and other acid gases (e.g. HCl), by using wet scrubbing.	**CC**	The exhaust gas from the sulphur burning, conversion of SO_2 to SO_3 and reaction with alcohols stages is treated through an SO_3 absorber and two stage SO_2 scrubber using sodium hydroxide solution. The 200mg/Nm^3 continuous monitoring limit has been reviewed (as intended after the completion of IC2), including against recent monitoring returns and reduced to the benchmark 50mg/m^3 in our guidance for abatement including wet scrubbing.
13	Reduce NO_x, CO and SO_2 emissions from thermal oxidisers by using a combination of the described techniques	**NA**	There is no thermal oxidiser at the installation
14	Reduce the waste water volume, the pollutant loads discharged to a suitable final treatment (typically biological treatment), and emissions to water, by using appropriate techniques based on the information provided by the inventory of waste water streams specified in the CWW BAT conclusions.	**FC**	See CWW BATc 7-12.
15	Increase resource efficiency when using catalysts by using a combination of the described techniques.	**CC**	The continuous Sulphonation process catalytic oxidation of SO_2 to SO_3 is optimised by catalyst grade choice and reaction temperatures to balance process efficiency and catalyst life. The catalyst performance is monitored and it is changed on a six yearly planned schedule.
16	Increase resource efficiency by recovery and reuse of organic solvents.	**CC**	Organic solvents used in processes and operations are recovered using e.g. distillation and liquid phase separation, purified if necessary using

			e.g. distillation, adsorption, stripping or filtration and returned to the process.
17	Prevent, or where not practicable reduce, waste for disposal by using a combination of the described techniques.	**FC**	The operator has stated that waste generation rates are monitored and processes are optimised to reduce waste. Successful reduction in waste generation is described and that hazardous waste is sent for incineration with energy recovery but approximately 50% of waste goes to landfill. The site reviews waste management options periodically. The batch sulphonation process uses distillative recovery of solvent for reuse (technique b) and the sulphone residue is sent for fuel use (technique e). The continuous sulphonation process generates waste 96% Sulphuric acid and sulphite liquors, both reused in other industries (technique b). Waste methanol from the alkalonamide process (in the consolidated other site permit) is also sent for fuel use. IC14 concerning the submission of details of a formal Environmental Management System includes the requirement for a formal Waste Management Plan.
18	Prevent or reduce emissions from equipment malfunctions, by using all the described techniques.	**CC**	The site a) has a procedure that identifies/reviews a list of critical equipment. b) operates a process and bulk storage asset integrity programme. c) carries critical spares including standby scrubber and adsorber pumps in the continuous sulphonation gas treatment plant. Interlocks prevent operation without abatement.
19	Prevent or reduce emissions to air and water occurring during other than normal operating conditions, by implementing measures commensurate with the relevance of potential pollutant releases	**CC**	There are temperature interlocks and start up procedures to minimise SO_2 emissions from the furnace during start up. The shutdown of the continuous sulphur burner/converter takes 2-3 minutes and involves halting the sulphur feed and purging the relatively low inventory of SO_2/SO_3 to the abatement system that is sized to absorb it.

	for: i) Start up and shutdown operations ii) Other circumstances	**FC**	IC14 concerning the submission of details of a formal Environmental Management System includes the requirement for formal consideration of the environmental impact from Other Than Normal Operating Conditions (such as from maintenance activities, other than the preparatory shutdown purging).

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
1	To improve overall environmental performance implement and adhere to an EMS incorporating all the described features.	**FC**	The operator has an in-house EMS but this is based on the environmental assessment in the site COMAH safety report. This incorporates some, but not all, of the requirements of BAT1. A wider EMS is under development based on a Stepan global EMS review. IC14 has been included for the submission of the scope and summary details of the EMS after development for approval to ensure it incorporates all the features in BAT1.
2	To facilitate reduction of emissions to water and air and water usage, establish and maintain an inventory of waste water and waste gas streams as part of BAT1 EMS incorporating the described features.	**FC**	The operator has an in-house EMS but this is based on the environmental assessment in the site COMAH safety report. This incorporates some, but not all, of the requirements of BAT1. A wider EMS is under development based on a Stepan global EMS review. IC14 has been included for the submission of the scope and summary details of the EMS after development for approval to ensure it incorporates all the relevant features in BAT2.
3	For relevant emissions to water monitor key process parameters at key locations.	**CC**	There are no direct emissions to surface water or river. There are no continuous emissions to sewer.

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
			Process effluents are stored in bulk on site and released batchwise to combined sewer under trade effluent discharge consents following testing (by the sewer undertaker) for pH, VOC and sulphate content. These are the appropriate parameters for this installation. The site has cooling tower blowdown discharge and surface water runoff also going to combined sewer.
4	Monitor emissions to water in accordance with the described standards and minimum frequencies.	**CC**	There are no direct emissions to surface water or river. There are no continuous emissions to sewer. United Utilities, the Sewerage Undertaker, has confirmed that the off-site secondary treatment is appropriate for Dukinfield Waste Water Treatment Works to meet its discharge consent for pH, VOC, sulphate as well as TOC, COD, TSS, Cr and Ni identified as relevant from the BAT4 list. We accept this will provide an equivalent level of protection to the environment as on-site treatment.
5	Periodically monitor diffuse VOC emissions to air from relevant sources using a	**FC**	The site operates using option III - calculations of emissions based on emissions factors periodically validated (e.g. once every two years) by

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	combination (or for large amounts – all) of the described techniques.	**CC** **FC**	measurements. TVOCs are reported annually based on calculations from previous monitoring results. The site is planning to re-verify emissions rates with a single additional round of monitoring. IC12 and IC13 have been included to report this VOC monitoring. However, the intended monitoring is from point sources rather than the non-channelled diffuse emissions from 'area' sources. The response to the request for further information explained that minimisation of diffuse VOC emissions is mainly be design but hand-held InfraRed detectors and product specific colorimetric tubes are used (technique i) to detect, quantify, and locate leaks. A requirement to submit a plan for periodic monitoring of diffuse VOC emissions has been included in IC16. Fixed flammability detection sensors have just been installed in the sulphonation building and will provide a continuous log of VOC concentrations in the area.
6	Periodically monitor odour emissions from relevant sources using the described standards.	**NA**	No odour nuisance is expected or has been substantiated

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
7	Reduce usage of water and the generation of waste water, by reducing the volume and/or pollutant load of waste water streams, enhancing the reuse of waste water within the production process and recovery and reuse of raw materials.	**FC**	The operator has submitted details of water usage by area and overall reduction over the life of the permit and some details about how this has been achieved in relation to the BAT direction to 'reduce the volume and/or pollutant load of waste water streams, to enhance the reuse of waste water within production process and to recover and reuse raw materials' are included in the response to BAT10. However, it stated that further investigatory work is in progress so IC15 has been included to submit a report on the methods used to achieve reductions in water usage and waste water generation water including options for future further reductions.
8	Prevent the contamination of uncontaminated water reduce emissions to water, by segregating uncontaminated waste water streams from waste water streams that require treatment.	**CC**	The site is designed to maintain separation between uncontaminated water and water from process areas.
9	Prevent uncontrolled emissions to water by providing an appropriate buffer storage	**CC**	The site has carried out a bulk storage bunding review including capacity for failure and firewater. The site primary, secondary and

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	capacity for waste water incurred during other than normal operating conditions based on a risk assessment, and taking appropriate further measures.		tertiary containment has been assessed against a worst case 4 hour fire. The conclusion is that the site meets the BAT requirement for appropriate buffer storage capacity for waste water incurred during other than normal operating conditions
10	Reduce emissions to water, by using an integrated waste water management and treatment strategy that includes an appropriate combination of the described techniques (in the priority order given).	**FC**	The operator's response includes details of waste water generation reduction in the Batch and Continuous Sulphonation processes. However, it is not clear whether the full inventory of waste water streams (BAT2) has been considered or how the stated initiatives are part of an integrated waste water management and treatment strategy using an appropriate combination of the described techniques in the priority order. Further details must be submitted under IC15.
11	Reduce emissions to water, by pre-treating waste water that contains pollutants that cannot be dealt with adequately during final waste water treatment using appropriate techniques as part of an	**CC**	The collected effluent is dosed when required to remain within consent pH and then discharged batchwise to sewer. No other effluent treatment is undertaken on site. In response to the request for further information the operator supplied confirmation from the sewerage undertaker United Utilities that they can

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	integrated waste water management and treatment strategy.		treat the typical worst case emissions to sewer of substances specific to the installation.
12	Reduce emissions to water, by using an appropriate combination of the described final waste water treatment techniques.	**CC**	Only pH adjustment is performed on site (neutralisation - technique b). See BAT11.
13	Prevent or, where this is not practicable, reduce the quantity of waste being sent for disposal by setting up and implementing a waste management plan as part of the environmental management system (see BAT 1) that, in order of priority, ensures that waste is prevented, prepared for reuse, recycled or otherwise recovered.	**FC**	Evidence has been submitted of the fate of some wastes and significant reduction in the total quantity during the life of the permit. There is insufficient detail about how this is managed. IC14 includes the requirement to set up and implement a waste management plan as part of the Environmental Management System.
14	Reduce the volume of waste water sludge requiring further treatment or disposal, and reduce its potential environmental impact,	**NA**	No wastewater treatment sludge is generated on site.

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	by using one or a combination of the described techniques.		
15	Facilitate the recovery of compounds and the reduction of emissions to air, by enclosing the emission sources and treating the emissions, where possible.	**FC**	The site processes are enclosed and discharge through abated point sources. See LVOC BAT2 & 10. IC12 and 13 require the design, implementation and reporting of a VOC monitoring investigation. IC16 has been included to require an options assessment as a part of an integrated waste gas management and treatment strategy.
16	Reduce emissions to air, by using an integrated waste gas management and treatment strategy that includes process-integrated and waste gas treatment techniques.	**FC**	IC16 has been included to require an options assessment as a part of an integrated waste gas management and treatment strategy.
17	Prevent emissions to air from flares, by using flaring only for safety reasons or non-routine operational conditions (e.g. start-	**NA**	No flaring on site.

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	ups, shutdowns) using one or both of the described techniques.		
18	Reduce emissions to air from flares when flaring is unavoidable, by using one or both of the described techniques.	**NA**	No flaring on site.
19	Prevent or, where that is not practicable, reduce diffuse VOC emissions to air, by using a combination of the described techniques.	**FC**	IC16 has been included to require consideration and monitoring of diffuse source VOC emissions.
20	Prevent or, where that is not practicable, reduce odour emissions, by setting up, implementing and regularly reviewing an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the described elements:	**CC**	A formal OMP is not required as no odour nuisance is expected or has been substantiated.

BAT Conclusion No	Summary of BAT Conclusion requirement for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
21	Prevent or, where that is not practicable, reduce odour emissions from waste water collection and treatment and from sludge treatment, by using one or a combination of the described techniques.	**CC**	No odour nuisance is expected or has been substantiated. Effluent is collected for pH pre-treatment if required before discharge to sewer. Residence time is minimised.
22	Prevent or, where that is not practicable, reduce noise emissions, by setting up and implementing a noise management plan, as part of the environmental management system (see BAT 1), that includes all of the described elements:	**CC**	A formal NMP is not required as no noise nuisance is expected or has been substantiated.
23	Prevent or, where that is not practicable, reduce noise emissions, by using one or a combination of the described techniques.	**CC**	Potentially noise generating equipment on site (e.g. compressors) is contained within noise insulation enclosures.

Key Issues

There are no direct discharges to a receiving water body. Only the waste water from the batch sulphonation is discharged to sewer to an urban waste water treatment works.

Therefore the BAT-AELs in
BAT-AEL Table 1 - Direct Emissions of TOC, COD and TSS to a receiving water body
BAT-AEL Table 2 - Direct Emissions of nutrients to a receiving water body
BAT-AEL Table 3 - Direct Emissions of AOX and Metals to a receiving water body
do not apply.

We have taken this decision in accordance with interpretive guidance on the BAT Conclusions for Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector.
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Annex 2: Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested.

The Operator did not request derogation from compliance with any AEL included within the BAT Conclusions as part of their Regulation 61 notice response.

Annex 3: Improvement Conditions

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

If the consolidated permit contains existing improvement conditions that are not yet complete or the opportunity has been taken to delete completed improvement conditions then the numbering in the table below will not be consecutive as these are only the improvement conditions arising from this permit variation.

Permit conditions IC1 to IC9 are complete and have been removed from the permit. The second part of IC4 that was not fully complete has been addressed under IC17.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC10	The operator shall review the updated Controlled Waters Detailed Quantitative Risk Assessment, which assesses the potential impact of groundwater beneath the site on nearby surface water bodies, to ensure that it includes, but is not limited to: i) A consideration of the relevance of each of the hazardous pollutants from the Environmental Quality Standards Directive (EQSD) (2008/105/EC, as amended by 2013/39/EU). ii) Where relevant, a quantitative assessment of the potential risk to the River Tame bordering the north of the site. iii) An assessment of the potential risk to the Huddersfield Narrow canal, an SSSI approximately 80m to the south. iv) Data and conclusions from the original 2013 CWDQRA and groundwater and surface water monitoring since 2013 to reflect current site conditions. If any point is not fully addressed the operator shall submit an update to the Environment Agency.	30/11/20
IC11	The operator shall submit a report to the Environment Agency on the results of monitoring vents AA1, AA5, AA11 and AA13 for sulphur dioxide using method EN14791. If a reduction in the LVOC BAT 2 frequency of monthly to a minimum of annually is sought after 07/12/21 then the quantity of monitoring data considered and duration of the monitoring programme must be sufficient to demonstrate stability of the	07/12/21

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	emission for which the reduction is sought during normal operation.	
IC12	The operator shall submit a written proposal to the Environment Agency to undertake monitoring to investigate Volatile Organic Compound emissions using method EN12619 (unless agreed in writing with the Environment Agency) from emission points AA3-AA10 and AA14. The objective of the monitoring is to establish or confirm the nature (including concentration and mass) of any VOC emissions to air via these emissions points. The quantity of monitoring data considered must be justified and be sufficient so as to demonstrate that the results are representative of emissions during normal operation.	31/10/20
IC13	On receipt of written approval from the Environment Agency to the proposal under IC12, the operator shall carry out the agreed VOC monitoring and submit to the Environment Agency a report including, but not limited to, the results and an interpretation of the environmental significance of the results. If a reduction in the LVOC BAT 2 frequency of monthly to a minimum of annually is sought after 07/12/21 then the quantity of monitoring data considered and duration of the monitoring programme must be sufficient to demonstrate stability of the emission for which the reduction is sought during normal operation.	31/01/21
IC14	The operator shall submit, for approval by the Environment Agency, in relation to condition 1.1.1 of this permit, the scope and summary of an Environmental Management System covering all operations relating to activities regulated by this permit. The EMS should include, but not be limited to, the relevant features of Common Waste Water and Waste Gas Treatment/ Management Systems in the Chemical Sector BAT Conclusion 1, particularly: a) the environmental impact of maintenance and cleaning activities (under (iv)g), b) waste management plan (under (x)). c) Inventories of waste water and waste gas streams (under (xii) to meet the requirements of BAT2. The summary should contain sufficient detail to demonstrate how all the BAT Conclusion 1 features have been considered. On receipt of written approval from the Environment Agency the operator shall implement the agreed Environmental Management System.	31/12/20 or other date as agreed in writing with the Environment Agency
IC15	The operator shall submit to the Environment Agency a report of methods to 'reduce the volume and/or pollutant load of waste water streams, to enhance the reuse of waste water within production process and to recover and reuse raw materials.' The report should include but not be limited to:-	31/01/21

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	i) details of methods used to meet the CWW BAT7 objectives during the life of the permit. ii) options for future improvement (e.g. feasibility of re-using waste water in the Batch Sulphonation process, reduction of COD in the Esterquats waste water) iii) consideration of the full inventory of waste water streams detailed in the response to IC14 (and CWW BAT2). iv) consideration of the priority order of techniques in CWW BAT10 as part of an integrated waste water management and treatment strategy.	
IC16	The operator shall submit to the Environment Agency the details of an integrated waste gas management and treatment strategy. This report should include but not be limited to:- i) consideration of options to further reduce emissions to air from both process optimisation and waste gas treatment techniques. ii) characterisation of emissions from bulk storage, both channelled and diffuse. iii) consideration of the full inventory of waste gas streams detailed in the response to IC14 (and CWW BAT2). iv) details of a plan for periodic monitoring of diffuse VOC emissions (CWW BAT5). v) consideration of the techniques for prevent or reduce diffuse VOC emissions described in CWW BAT19	31/01/21
IC17	The operator shall submit to the Environment Agency a report detailing options to reduce the particulate emissions from the spray drier (emission point AA2) to the range 5-20 mg/m3 – target 5mg/m3 for fabric filter based systems. The report should include, but not be limited to: • Expected concentrations achievable with each option • Estimated timescales for implementation for each option • The preferred option (which may include cost considerations) On receipt of approval from the Environment Agency the approved option shall be implanted in line with the submitted timescales.	31/10/20

Annex 4: Review and assessment of changes that are not part of the BAT Conclusions derived permit review.

The operator confirmed that ammonia solution is now only used in the continuous sulphonation process. Ammonia monitoring has therefore been removed from release point AA8.

The operator separately applied to consolidate their permit EPR/FP3034LK, to operate the Alkanolamide and Esterquat processes on other parts of the site, with this permit. There is a separate Decision Document relating to our determination of the consolidation under application EPR/FP3034LK/V002 but production of the consolidated permit has been included as part of this permit review.

Permit changes arising from this consolidation include:

- Updating of Permit Introduction to cover all site processes.
- Amalgamation of scheduled and directly associated activities in Table S1.1
- Alkanolamide and Esterquat description of process operating techniques and BAT review submitted as part of application EPR/FP3034LK/V002 incorporated into Table S1.2.
- Inclusion of Emission points AB1-AB9 into Table S3.1, with relevant updating of Reporting Form references.
- Inclusion of Emission Points AB1-AB9 on the emission point location site plan.

In permit FP3034LK emission points to air AB1, AB3-7 had monitoring parameters but no frequency or methods in Table S4.1 (of permit FP3034LK) and reporting for emission points AB1 and AB3 only. This has been updated in the consolidated permit to annual monitoring (it is accepted that no limits are required) and reporting where a parameter is specified. The Alkanolamide and Esterquat processes are assessed against the current Organic Fine Chemicals BRef rather than the LVOC BAT Conclusions.

The effluent from the Alkanolamide and Esterquat processes is not treated on site so the effluent treatment remains below 50m^3/ day as a Directly Associated Activity.