

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/BR7607IP
The Operator is: EPC United Kingdom Plc
The Installation is: Great Oakley Works
This Variation Notice number is: EPR/BR7607IP/V005

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. It also provides a justification for the inclusion of any specific

conditions in the permit that are in addition to those included in our generic permit template.

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.

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 proposed 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

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:

- deleted table S3.3 (Point source emissions to sewer, effluent treatment plant or other transfers off site) and references to it as there are no such discharges from the installation.
- Amalgamated emissions points A30 and A31 (as A30) because these are actually the same point that had been duplicated in the permit in error.
- moved the bespoke monitoring conditions 3.5.5 and 3.5.6 regarding the location of discharge monitoring to become Note 4 to Table S3.2.
- deleted the Product Efficiency and Total Volatile Organic Compounds Performance parameters from Table S4.3 as they are no longer relevant to regulating the installation operations.
- confirmed with the operator that nitrobenzyl acetate is no longer produced and this has been removed from the S4.1A(1)(a)(iv) description in Table S1.1. This has been recorded in the status log for consideration at a future permit surrender.
- updated the site plan to reflect only the current point source emission sampling points (including the mothballed plant).
- marked the Improvement Condition IC30 as complete but retained it in the permit for reference as it is recent and relates to matters addressed by other Improvement Conditions. The A30 monitoring frequency in Table S3.1 for Oxides of nitrogen and Sulphuric acid has been changed from monthly to quarterly as a result. The 75mg/m³ emission limit value for sulphuric acid has not been changed.

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 09/08/18.

Although we considered that the response did contain sufficient information for us to commence determination of the permit review the additional review of continuing applicability of existing permit conditions requested with the Reg61 notice had not been submitted . We therefore issued a further information request to the operator by e-mail dated 29/09/18. Suitable further information was provided by the operator on 24/01/19.

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 have no reason to consider that the operator will not be able to comply with the techniques and standards described in the BAT Conclusions.

For some BAT conclusions the operator has stated they are not currently compliant but will be before the target date and we agree. In relation to some of these BAT Conclusions we have therefore included Improvement Condition 32-39 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 request on 16/09/19. Copies of the further information request and the responses received on 18/10/19, 20/01/20 and 13/02/20 were 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.

There is limited information on the current status of the soil and groundwater at the site. To address the Regulation 61 notice requirement the operator performed, and submitted to the Environment Agency, an Environmental Risk Assessment that concluded that the potential for contamination of the soil and groundwater, both historical and current, is sufficient that a quantitative survey of the soil and groundwater conditions at the site is justified.

A follow-up Improvement Condition (IC34) has also been included which requires the operator to submit a baseline report compliant with Article 22 of the IED, containing information necessary to determine the current state of soil and groundwater contamination. This shall enable a quantified comparison to be made with the state of soil and groundwater contamination upon definitive cessation of activity.

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 EQSD¹ (priority hazardous substances, priority substances and "other pollutants"). It also applies to the specific pollutants listed in the 2015 Directions², 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 operator assessed the impact of the W2 discharge (W1 is not currently used) for Cadmium and Mercury for which Emission Limit Values are set in the current permit. The assessment used the Environment Agency's H1 screening methodology and tool. Neither Cd nor Hg screened out at the first test of whether the discharge is more than Environmental Quality Standard (EQS) limits but both screened out at the Test 5 step for whether the Effective Volume Flux (EVF) is within allowable limits. So detailed modelling is not required. Monitoring against Emission Limit Values has been retained in the permit.

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

The operator also assessed the Cd and Hg discharge annual load against the “significant load” for these priority hazardous substances and concluded that the calculated annual load in each case is much less than the Significant Load.

We reviewed these assessments and the assumptions supporting them and noted some points for further consideration:

- The average actual discharge flow rate was correctly calculated as 0.00367m³/s on p8 of the submitted assessment from the 2017 measured average of 132.7m³/day allowing for 10hrs of discharge time per day. The value used in the calculation tool was 0.0015m³/s spread over 24 hours but we used the 0.00367m³/s value with a 41.7% of year operating mode. This did not significantly change the conclusions.
- In order to use Test 5 for TRaC waters the discharge was assumed to be positively buoyant because of its temperature (~30degC) and the salt content of the receiving sea water. But at >16% sulphuric acid the discharge is still likely to be denser than the receiving water and therefore negatively buoyant.

However, the differential density between the two is not excessive and the velocity of the W2 discharge at the point of discharge will also lead to improved dispersion within the initial mixing zone. Hence due to the combination of temperature and the momentum associated with the discharge velocity, it is expected that the density differential between the seawater and the effluent plume will be minimised within the initial mixing zone, and a dense effluent plume is not expected.

So the Test 5 will provide an indicative assessment of potential impacts.

- The submitted assessment did not consider, as required by the Reg 61 notice, the relevance of the range of hazardous pollutants under the Water Framework Directive.

However, the variation application BR7607IP_V004, determined in parallel with this permit review, did include an analytical screening for inorganic elements in the W2 discharge. This included all the likely relevant specific pollutants and priority hazardous substances from the discharge to estuaries and coastal waters guidance on our gov.uk website <https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit> .

We used our H1 tool to screen these additional substances in the same manner as the Cd and Hg.

Arsenic and Boron screened out at Test 1. The results from the indicative Test 5 (assuming zero background concentration) for the remainder were as follows:

Annual Average effluent flow 0.0037 m³/s (41.7% of year)

Peak effluent flow 0.0060 m³/s

Allowable Effective Volume Flux 1.9 (from minimum release depth below chart datum (m))

	Annual Average EQS	Maximum Allowable Concentration
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Substance					EQS			
	Conc µg/l	EQS µg/l	EVF x10 ⁻³	EVF as % of allowable	Conc µg/l	EQ S µg/l	EVF	EVF as % of allowable
Cd and compounds	0.35	0.2	6.48	0.34	10	0.44	0.136	7.2
Cr III ^{Note 1}	204.1	n/a			970			
Co	11.8	3	14.6	0.77	20	100	0.0012	0.1
Cu	20.1	3.6	20.7	1.1	87			
Fe (dissolved)	2136	1000	7.9	0.42	5700			
Pb and compounds	3.27	1.3	9.31	0.49	6	14	0.0026	0.1
Hg and compounds	6.82	n/a			8	0.07	0.686	36.1
Ni and compounds	172.8	8.6	74.3	3.9	720	34	0.127	6.7
Sn (Inorganic)	45.9	10	17.0	0.89	110			
V	1854	100	68.6	3.6	5100			

Note 1: There are no existing EQSs specifically for Cr(III). Because of the low solubility and hence reduced bioavailability of Cr(III) species risks from Cr(III) are small.

All the substances are well below the allowable effective flux and therefore we accept that they can be screened out without further modelling.

The operator also submitted an assessment of the discharge of Total Organic Carbon, sulphate and Total Nitrogen against Environmental Assessment Levels (EAL) using 2017 monitoring data.

Assumptions:

The TOC is all a result of residual 2-EthylHexylNitrate in the effluent. The 2-EHN values are derived from 2017 COD monitoring. Compared to aquatic toxicity data no observed effect concentration.

All the sulphate is a result of sulphuric acid in the effluent neutralised on initial dilution. Compared to typical seawater sulphate levels.

The Total Nitrogen is all a result of nitric acid in the effluent. Compared to coastal waters standards for range from good quality to high quality waters.

The initial mass dilution of the effluent at discharge is 1:1195

	2-Ethyl hexylNitrate	Dissolved Available Inorganic Nitrogen (High Quality)	Dissolved Available Inorganic Nitrogen (Good Quality)	Sulphate
Conc in Effluent (AA mg/l)	854	884		189060
Initial Post Discharge Dilution Conc (AA µg/l)	715	740		158210

EAL (AA µg/l)	1520	250	972	2649000
Diluted Conc as % of EAL	47	296	76	6.0
Conc in Effluent (MAC mg/l)	1152	1120		197380
Initial Post Discharge Dilution Conc (MAC µg/l)	964	937		165175
EAL (MAC µg/l)	1520	250	972	2649000
Diluted Conc as % of EAL	63	375	96	6.2

The contributions are <100% of EAL for all criteria at the anticipated initial dilution close to the discharge. Although the contribution exceeds the EAL in the High Quality DAIN case it is expected that greater dilution will be achieved further afield by the tide.

Ammonia and Phosphorus are not present in the discharge and the expected level of Total suspended solids in this discharge will not represent a significant impact to a tidal estuary. Therefore we have not imposed an Improvement Condition to assess sanitary determinands against the requirements of the Water Framework Directive as part of this review.

However, a confirmatory analysis of phosphorus and metals (to address CWW BATc4) has been included in Improvement Condition 37.

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 (ELVs) 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) 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	Not applicable as the steam generating boiler (with stack emission point) was removed as part of the variation V002. The main manufacturing process is exothermic.
2	Monitor channelled emissions to air other than from process furnaces/heaters in accordance with the described standards and minimum frequencies	CC CC	<p>The permit now contains 4 point source emissions to air.</p> <ul style="list-style-type: none"> • A1 Combined dust extraction and drier stack for Metals Recovery Plant (MRP). • A30 Acid Recovery Plant/Direct dilution tank scrubber • A32 and A33 Recovered Sulphuric Acid Plant Scrubbers <p>A1 is currently monitored (when it operates) continuously for dust, a greater frequency than the monthly required by BAT2 for an 'other process'. Dust is not relevant for vents A30, A32 and A33.</p> <p>A30 is monitored for NO_x but is not a thermal oxidiser. It is also monitored for sulphuric acid monthly, a more relevant parameter than the BAT2 'other processes' monthly requirement for SO₂. This frequency</p>

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
		<p>NA</p> <p>CC</p>	<p>was amended on completion of Improvement Condition 30.</p> <p>The process reactor has an integral scrubber on its vent but this is not used. Instead the reactor ‘breathes’ naturally. The reactor is situated in a roofed but open to air structure. This is therefore a diffuse source that does not need to be included in Table S3.1.</p> <p>In the permit before review there was a potential emission of Volatile Organic Compounds (VOCs), mostly from the reactor but also 2EH and 2EHN storage tanks, that was reported annually as a performance parameter.</p> <p>Data has been submitted to show that the organic components of the raw materials and product have high boiling points and low vapour pressures leading to insignificant emissions so monitoring is not required at BAT 2 TVOC ‘other processes’ monthly frequency.</p> <p>Based on data, the performance parameter reporting requirement has been removed from Table S4.3. However, a confirmatory sampling and analysis check is required under Improvement Condition IC33</p>
3	Ensure optimised combustion from process furnaces/heaters to reduce emissions to air of CO	NA	No process heaters. The main manufacturing process is exothermic.

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
4	Reduce NO _x emissions from process furnace/heaters by using one or a combination of the described techniques	NA	No process heaters. The main manufacturing process is exothermic.
5	Prevent or reduce dust emissions from process furnace/heaters by using one or a combination of the described techniques	NA	No process heaters. The main manufacturing process is exothermic.
6	Prevent or reduce SO ₂ emissions from process furnace/heaters by using one or a combination of the described techniques	NA	No process heaters. The main manufacturing process is exothermic.
7	To reduce emission of ammonia optimise design/operation of SCR/SNCR	NA	No SCR or SNCR employed on the installation. Only source of NO _x is a small domestic boiler.

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
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)	NA CC CC NA NA CC	a) Hydrogen is not used or generated by the installation processes b) Organic solvents are not used in the installation processes. Reaction conversion is >99%. Unconverted raw material remains in the product, it is not viable to recover this. c) Compressed air is used to degas recovered sulphuric acid. Quantities are too small for viable recovery. d) No HCl is used or produced in the installation processes. e) No H ₂ S is used or produced in the installation processes. f) Wet scrubber and demister pads are used, where appropriate, to eliminate liquid entrainment in air flows.
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	NA	The installation does not generate off-gas streams of sufficient calorific value for combustion.

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
10	Reduce channelled emissions of organic compounds to air by using one or a combination of the described techniques.	CC	<p>The potential for emission of Volatile Organic Compounds (VOCs), mostly from the reactor but also 2EH and 2EHN storage tanks was assessed.</p> <p>Data has been submitted to show that the organic components of the raw materials and product have high boiling points and low vapour pressures leading to insignificant emissions (i.e. not appreciably volatile) so use of the described techniques is not applicable and monitoring is not required at BAT 2 Total VOC 'other processes' monthly frequency. The performance parameter reporting requirement for VOCs has been removed from Table S4.3. However, a confirmatory sampling and analysis check is required under Improvement Condition IC33.</p>
11	Reduce channelled dust emissions to air, by using one or a combination of the described techniques.	CC	<p>The permit now contains 4 point source emissions to air.</p> <ul style="list-style-type: none"> • A1 Combined dust extraction and drier stack for Metals Recovery Plant (MRP). • A30 Acid Recovery Plant/Direct dilution tank scrubber • A32 and A33 Recovered Sulphuric Acid Plant Scrubbers <p>A1 is currently monitored (when it operates) continuously for dust, a greater frequency than the monthly required by BAT2 for an 'other</p>

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
			process'. Dust is not relevant for vents A30, A32 and A33. A requirement to assess the applicability of the techniques for reducing channelled dust emissions to air has been included in Pre-operational condition PO2 that must be completed before restarting the Metals Recovery Plant that is currently shutdown.
12	Reduce emissions to air of sulphur dioxide and other acid gases (e.g. HCl), by using wet scrubbing.	CC	A water scrubber is installed on each of the two compressed air sparged degassing tanks (A32 and A33). A water scrubber is installed on the acid dilution tank vent (A30).
13	Reduce NO _x , CO and SO ₂ emissions from thermal oxidisers by using a combination of the described techniques	NA	Thermal oxidisers are not used on site.
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	FC	The acid recycle/recovery plant was planned to be running before Dec 2021. A re-commissioning report was to be submitted under Improvement Condition IC31 by 31/03/20 but this has been extended to 31/12/21. An additional Improvement Condition IC32 has been added to report on plans and progress for the re-commissioning by 31/12/20. Both dates may be altered by written agreement from the Environment Agency. The plant is capable of recovering 72% of the spent process acid (and

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.		associated dissolved 2-EHN product) as a 77% sulphuric acid stream for recycle to the process and export. Sulphuric acid (containing some nitric acid) that cannot be reused on site/exported is diluted in the direct dilution plant to stabilise it and eventually discharged to a tidal estuary from W2 (see CWW BATc).
15	Increase resource efficiency when using catalysts by using a combination of the described techniques.	CC	In the Fuel Additives Plant (FAP) process, the sulphuric acid used in the process is considered a catalyst as its function is to protonate the nitric acid that then reacts with the 2-ethylhexanol liberating the sulphuric acid again. All the techniques have been considered. Sulphuric acid is selected as the catalyst largely on safety and commercial cost grounds. However, it does meet the requirements for activity and selectivity and is not particular toxic or prone to poisoning (some can be recycled via the recovery plant).
16	Increase resource efficiency by recovery and reuse of organic solvents.	NA	Organic solvents are not used on the installation. Organic raw materials are used without solvents but the conversion to product is >99%.
17	Prevent, or where not practicable reduce, waste for disposal by using a combination of the described techniques.	CC	The processes do not use distillation or generate tars so techniques a), b) and e) are not applicable. c) Recovery of the small amount of unreacted raw material is not

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
			<p>considered viable (BAT8).</p> <p>d) Catalyst regeneration is via the Sulphuric Acid recovery plant (BAT14).</p> <p>The only other wastes are a few consumables such as spent filters used to remove solids contamination from the product and effluent discharge and some maintenance wastes.</p>
18	Prevent or reduce emissions from equipment malfunctions, by using all the described techniques.	<p>CC</p> <p>CC</p> <p>NA</p> <p>FC</p>	<p>The operator has considered the described techniques:</p> <p>a) Safety Critical equipment is identified. Many of these items are also critical for environmental protection.</p> <p>b) The site operates a planned preventative maintenance programme. This includes root cause analysis methods and reviews of work quality.</p> <p>c) There are no back-up systems for abatement as the risk is adequately covered by shutting down affected units and keeping critical spares on site.</p> <p>An Environmental Risk Assessment has been performed and submitted as part of this permit review. This identified critical factors and made recommendations for improvements in procedures and containment. Progress to implement these recommendations will be monitored under</p>

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
			Improvement Condition IC35
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 for: i) Start up and shutdown operations ii) Other circumstances	CC	Potential emissions to air of acid gasses are abated using wet scrubbers. These are connected to the DCS control system to be first on and last off and to alarm and/or shutdown the operation if they fail. Unintended emissions to water in start up/shutdown or emergency conditions are prevented using the capacity of the effluent storage tanks that have to be manually discharged to the estuary at the correct point in the tide.

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.	CC	Site is certificated to ISO14001:2015 environmental management standard (and ISO9001 Quality and ISO18001 Occupational H&S) with an EMS addressing all the points 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.	CC	The operator has established (and maintains under ISO14001) a set of mass balances and chemical equations for the site processes (manufacturing and recycles) including the characteristics of the waste streams to air and water.
3	For relevant emissions to water monitor key process parameters at key locations.	CC	W1 and W2 emissions to tidal estuary have MCERTS continuous flow metering. W1 has continuous pH and temperature monitoring. For W2 the temperature of streams entering the effluent collection tanks is alarmed at the direct dilution interceptor tank. pH monitoring is not practical/appropriate for W2 that is strongly acidic but other key parameters (including acid content) are checked monthly in a flow proportional sample.

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4	Monitor emissions to water in accordance with the described standards and minimum frequencies.	<p>FC</p> <p>FC</p> <p>CC</p> <p>CC</p>	<p>Monitoring of Total Phosphorus and Adsorbable Organically bound Halogens (AOX), Cr, Cu, Pb and Zn, is not currently relevant for this installation.</p> <p>Ni, V, Cd and Hg are monitored in relevant discharges.</p> <p>The sampling points are on the final line to discharge (Note 2)</p> <p>COD is monitored in preference to TOC (Note 3).</p> <p>Total N is monitored in preference to Total N Inorg (Note 4).</p> <p>The current monitoring data demonstrates sufficient stability to support the operator proposed weekly analysis of composite sample for COD, TSS, Total N (as well as Total Acidity) rather than the default daily frequency (Note 1). Weekly monitoring in Table S3.2 will be required from 07/12/21.</p> <p>Monitoring of COD, TSS, Total Nitrogen and relevant metals uses agreed operator methods rather than EN or other standards. A review of the applicability of methods will be monitored under Improvement Condition 36.</p> <p>A benthic survey has been conducted in 2019 to support variation V004. A confirmatory benthic survey after the recommissioning of the RSA plant has been required in Improvement Condition 37.</p> <p>An analysis of metals in the discharged effluent was conducted to</p>

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		FC	support variation V004 and showed there to be no need to monitor metals other than those already in the permit. Confirmatory analysis after the recommissioning of the RSA plant has been required (with phosphorus) in Improvement Condition 37. It is intended to conduct a Direct Toxicity Assessment of the acidic discharge to W2 once the Acid Recovery Plant is re-commissioned (IC32/31). This will be monitored under Improvement Condition 37.
5	Periodically monitor diffuse VOC emissions to air from relevant sources using a combination (or for large amounts – all) of the described techniques.	NA	The processes are not operated at elevated temperatures or reduced pressures. The primary organic compounds present, 2-Ethylhexanol raw material (bp184 degC) and 2-Ethylhexylnitrate product (bp ~193deg C but decomposes above 130degC) are not readily volatile.
6	Periodically monitor odour emissions from relevant sources using the described standards.	NA	The raw material and product are of mild odour. There are no residences within 1.5km and there have been no odour complaints. Therefore odour nuisance is neither expected nor substantiated.
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	FC	The volume of emissions to water will be significantly reduced when the Sulphuric Acid Recovery Plant is re-commissioned (IC32). This will also recover most of the unreacted nitric acid and dissolved product, hence reducing the pollutant load. Some recovered sulphuric acid can be reused in the process or exported off-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
	recovery and reuse of raw materials.		
8	Prevent the contamination of uncontaminated water and reduce emissions to water, by segregating uncontaminated waste water streams from waste water streams that require treatment.	CC	Process derived waste water streams are segregated from the surface water drainage system. Primary and secondary containment systems protect the surface water system from spillages etc.
9	Prevent uncontrolled emissions to water by providing an appropriate buffer storage capacity for waste water incurred during other than normal operating conditions based on a risk assessment, and taking appropriate further measures.	CC	There is sufficient buffer capacity in the process and effluent holding tanks to accommodate waste water arising from abnormal operating conditions before the process can be halted.
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 primary technique to reduce emissions to water by recovering pollutants at source is the Acid Recovery Plant re-commissioning (IC32). The operator is also proposing to consider options to minimise and/or recover a dilute acid stream from product washing. Progress to be monitored under Improvement Condition 38.

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
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 integrated waste water management and treatment strategy.	NA	The final waste water treatment is only mixing. The acid content of the effluent make biological treatment unfeasible. Pretreatment is not required as there is only one significant source per discharge point.
12	Reduce emissions to water, by using an appropriate combination of the described final waste water treatment techniques.	FC	Phosphorus removal is not applicable for this installation. The assessment that identified acid recovery/recycle via an Acid Recovery Plant as BAT concluded acid neutralisation was cost prohibitive for potential benefits. Biological treatment is not practicable for the unneutralised effluent. Methods of achieving BAT-AEL limits for TOC will be researched further. Nitrogen removal and final solids removal are not required to meet the current permit limits.
	For discussion of the BAT Associated Emissions Levels for emissions to water see the Key Issues Section below		
13	Prevent or, where this is not practicable,	CC	The process yield exceeds 99%. The only wastes other than aqueous

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
	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.		effluent are used product filters (low levels of solid contamination) and maintenance waste. Ongoing minimisation of waste is addressed under the ISO14001 certification.
14	Reduce the volume of waste water sludge requiring further treatment or disposal, and reduce its potential environmental impact, by using one or a combination of the described techniques.	NA	There is currently no biological treatment of effluent and no waste sludge is generated for treatment.
15	Facilitate the recovery of compounds and the reduction of emissions to air, by enclosing the emission sources and treating the emissions, where possible.	CC	<p>The permit contains 4 point source emissions to air, all with some form of abatement.</p> <ul style="list-style-type: none"> • A1 Combined dust extraction and drier stack for Metals Recovery Plant (MRP). • A30 Acid Recovery Plant/Direct dilution tank scrubber • A32 and A33 Recovered Sulphuric Acid Plant Scrubbers

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			<p>The process reactor has an integral scrubber on its vent but this is not used. Instead the reactor 'breathes' naturally. The vent is not routed outside the building.</p> <p>There is a potential emission of Volatile Organic Compounds (VOCs). Data has been submitted to show that the organic components of the raw materials and product have high boiling points and low vapour pressures leading to insignificant emissions so abatement is not required.</p> <p>The reactor is therefore a diffuse rather than point source emission with insignificant emissions.</p> <p>The Metals Recovery Plant is not currently operational.</p> <p>There are no significant combustion sources.</p> <p>Storage tanks for organic materials and sulphuric and nitric acids are naturally aspirated but are at ambient temperature and emissions will be intermittent and not significant.</p>
16	Reduce emissions to air, by using an integrated waste gas management and	CC	The identified potentially not insignificant emissions have appropriate abatement systems in place (A1, A30, A32 and A33).

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
	treatment strategy that includes process-integrated and waste gas treatment techniques.		
17	Prevent emissions to air from flares, by using flaring only for safety reasons or non-routine operational conditions (e.g. start-ups, shutdowns) using one or both of the described techniques.	NA	There is no flaring on site.
18	Reduce emissions to air from flares when flaring is unavoidable, by using one or both of the described techniques.	NA	There is 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.	CC	The organic raw materials and product are not readily volatile (see BAT5) and the processes are not operated at elevated temperature or pressure. Therefore the potential for diffuse emissions of VOCs to air is low. Nevertheless, the installation design standards and operational techniques address the listed techniques a) to g).
20	Prevent or, where that is not practicable, reduce odour emissions, by setting up,	NA	The raw material and product are of mild odour. There are no residences within 1.5km and there have been no odour complaints.

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
	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.		Therefore odour nuisance is neither expected nor substantiated. An odour management plan is therefore not applicable.
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.	NA	No biological treatment effluent is currently undertaken. There is no sludge treatment.
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:	NA	Noise assessments have been undertaken and no areas of the site are defined as requiring mandatory hearing protection. The operations have relatively low noise potential. There are no residences within 1.5km and there have been no noise complaints. Therefore noise nuisance is neither expected nor substantiated. A noise management plan is therefore not applicable.
23	Prevent or, where that is not practicable, reduce noise emissions, by using one or a	CC	The operations have relatively low noise potential. Furthermore, noise propagation is minimised by siting noise sources within buildings and not

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 of the described techniques.		at elevated heights.

Key Issues

BAT-AEL Table 1 - Direct Emissions of TOC, COD and TSS to a receiving water body

The installation currently monitors Chemical Oxygen Demand (COD) rather than Total Organic Carbon (TOC) (Note 2) against an Emission Limit Value from W2 of 10,000 mg/l.

In 2017 the installation discharged 64.2 tonne of COD, greater than 10 tonne/year so the BAT-AEL will apply.

No abatement of COD is currently performed. Notes 4-6 do not apply.

The primary component of the COD is believed to be dissolved 2-Ethylhexyl nitrate product present in the main effluent stream that is not readily biodegradable. Under Note 3 the upper end of the BAT-AEL range can therefore be applied at 100mg/l.

A COD limit of 100mg/l will therefore apply from 07/12/21. Progress to identify and implement measures to achieve the COD limit will be monitored under Improvement Condition 39.

The installation currently monitors Total Suspended Solids (TSS) (Note 2) against an Emission Limit Value from W2 of 100 mg/l.

In 2017 the installation discharged 0.155 tonne of TSS, much less than 3.5 tonne/year so the BAT-AEL will not apply.

The TSS ELV from W2 will remain unchanged at 100mg/l.

BAT-AEL Table 2 - Direct Emissions of nutrients to a receiving water body

The installation currently monitors Total Nitrogen rather than Total Inorganic Nitrogen (Note 1) against an Emission Limit Value from W2 of 2,200 mg/l.

In 2017 the installation discharged 43.1 tonne of Total Nitrogen, greater than 2.5 tonne/year so the BAT-AEL would apply.

However, the installation does not currently have a biological waste water treatment plant so the BAT-AEL for Total Nitrogen does not apply (Note 2). If the post Acid Recovery Plant re-commissioning reassessment of treatment options (Improvement Condition 38) results in the implementation of biological treatment then the poor biodegradability of the 2-Ethylhexylnitrate product would lead the 25mg/l upper end of the BAT-AEL range being applied if the Total Nitrogen emission still exceeded the threshold. See also Section 2.5.

The site processes do not involve phosphorus so the emission will definitely not exceed the threshold of 300kg/yr for applying a BAT-AEL.

BAT-AEL Table 3 - Direct Emissions of AOX and Metals to a receiving water body

No halogens are used on site so the AOX emissions will definitely not exceed the 100kg/yr threshold for applying a BAT-AEL.

Several screening analyses for metals were undertaken to support variation application V004. These included Cr, Cu, Ni and Zn as well as the Cd and Hg already monitored against Emission Limit Values in the permit.

The installation discharges (from W2) approximately 50,000 m³ of effluent a year.

Using the submitted average analytical values this corresponds to an emission of 10.2kg Cr; 1.0kg Cu; 8.6kg Ni; 2.3kg Zn.

The thresholds are 2.5; 5; 5 and 30 kg/yr respectively so a BAT-AEL must be applied for Cr and Ni.

Notes 4-8 do not apply so under Note 3 the lower end of the BAT-AEL range should be applied.

BAT-AELs of 5mg/l for Cr and Ni will therefore apply to W2 from 07/12/21 with associated monitoring and reporting requirements.

Discharge point W1 is not currently used. If the Metals Recovery Plant is re-commissioned a similar screening analysis must be performed to determine whether BAT-AELs for metals (and other parameters) would be needed. Pre-operational condition PO2 has been applied to require this.

Discharge point W3 only concerns indirect cooling water from the Fuel Additives Plant. This will not contain above threshold emissions of any of the substances in Tables 1-3.

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 or during subsequent discussions concerning requests for clarifications and further information .

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.

The completion date for IC31 has been extended to 07/12/21.

Reference	Requirement	Date
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Reference	Requirement	Date
IC31	<p>The operator shall submit a post re-commissioning report to the Environment Agency for the acid recovery plant which shall include, but not be limited to:</p> <ul style="list-style-type: none"> • a review of effect of performance of the facility against any relevant conditions of this permit. • details of procedures developed during commissioning for achieving and demonstrating satisfactory process control. • An energy use baseline of the optimised process. <p>On receipt of the report the Environment Agency shall confirm in writing any change to the W2 emission to water flow volume and discharge rate and suspended solids content in table S3.2.</p>	07/12/21 or otherwise as agreed in writing with the Environment Agency
IC32	<p>The operator shall submit a report to the Environment Agency of plans for re-commissioning of the acid recovery plant which shall include, but not be limited to:</p> <ul style="list-style-type: none"> • A summary of the hazard assessment studies. • Controls required to address potential significant safety and environmental impacts. • Identification of, and dates for, critical points in the project implementation. • An assessment of the expected performance of the re-commissioned plant. <p>On written approval from the Environment Agency the re-commissioning shall be implemented in accordance with the plans.</p>	31/12/20 or otherwise as agreed in writing with the Environment Agency
IC33	<p>The operator shall submit a report to the Environment Agency detailing the results of sampling and analysis of the outlet to air of the 2-EHN reactor to support the conclusion that running with the reactor naturally breathing directly to atmosphere is equivalent to the BAT of using the original design with abatement equipment. (LVOC BATc 2 and 10)</p>	31/12/20
IC34	<p>The operator shall submit a baseline report compliant with Article 22 of the IED to the Environment Agency, containing information necessary to determine the current state of soil and groundwater contamination. This shall enable a quantified comparison to be made with the state of soil and groundwater contamination upon definitive cessation of activity.</p> <p>In accordance with the submitted Environmental Risk Assessment 60580927-003 Dated 8 August 2018 Section 7 Recommendations (first bullet section) the report should include, but not be limited to:</p> <ul style="list-style-type: none"> • A review of historic and current potential sources of contamination. • Definition of a Sampling and Monitoring plan for soil and groundwater. • Implementation of the Sampling and Monitoring plan so as to generate a baseline. 	07/12/21
IC35	<p>The operator shall submit a report to the Environment Agency detailing progress towards implementation of the recommendations in Section 7 of the submitted Environmental Risk Assessment 60580927-003 Dated 8 August 2018 (other than the first bullet section). (LVOC BATc 18)</p>	30/09/20
IC36	<p>The operator shall submit a report to the Environment Agency for approval reviewing the suitability of analytical methods in the permit tables S3.1 and S3.2 (as active after 07/12/21) against</p>	31/12/20

Reference	Requirement	Date
	<p>(where relevant)</p> <p>a) The standards in BAT 4 of Best Available Techniques Conclusions For Common Waste Water/Waste Gas Treatment/Management Systems In The Chemical Sector</p> <p>b) The monitoring standards and methods in our guidance TGN M18 Monitoring of Discharges to Water and Sewer</p> <p>c) The monitoring standards and methods in our guidance M2 Monitoring Of Stack Emissions To Air</p> <p>Where an alternative method has been previously agreed in writing with the Environment Agency justification must be provided for why this equivalent or more appropriate choice is still valid.</p> <p>(CWW BATc 4)</p>	
IC37	<p>Following the re-commissioning of the acid recovery plant (or otherwise as agreed with the Environment Agency) the operator shall carry out relevant investigations and analyses and submit to the Environment Agency a report (or reports) of results addressing:</p> <p>a) the composition of the effluent discharged from release point W2.</p> <p>This should include, but not be limited to, Phosphorus, Chromium, Copper, Nickel, Zinc and Lead concentrations.</p> <p>b) a Direct Toxicity Assessment of the materials present in the residual effluent discharged from Release Point W2.</p> <p>c) a benthic survey at and around the discharge point W2.</p> <p>The report should include an explanation of how the effect of the acidity of the effluent has been addressed.</p> <p>If the assessment concludes that any component is other than not significantly toxic, the report should include recommendations and timescales for improvements.</p> <p>On receipt of the report the Environment Agency shall confirm in writing any monitoring requirement based on the assessed risk.</p> <p>(CWW BATc 4)</p>	6 months after the completion of IC31 (or otherwise as agreed in writing with the Environment Agency)
IC38	<p>Following the re-commissioning of the acid recovery plant (or otherwise as agreed with the Environment Agency) the operator shall submit to the Environment Agency for approval a report on options for minimisation and/or recovery of the dilute acid stream from 2-EHN product washing.</p> <p>If feasible options are identified, the report shall include recommendations and timescales for improvements.</p> <p>On receipt of approval in writing from the Environment Agency the operator shall implement the improvements.</p> <p>(CWW BATc10)</p>	6 months after the completion of IC31 (or otherwise as agreed in writing with the Environment Agency)
IC39	<p>The operator shall submit to the Environment Agency for approval a report on options for preliminary and final treatment and control of effluent discharges addressing the relevant techniques in BAT12 of Best Available Techniques Conclusions For Common Waste Water/Waste Gas Treatment/Management Systems In The Chemical Sector (CWW)</p> <p>The report should include, but not be limited to:</p> <ul style="list-style-type: none"> • Measures to minimise the discharge of acids • Measures to achieve the CWW Table 1 limit for Chemical Oxygen Demand included in Permit Table S3.2 from 07/12/21 • Measures to achieve the CWW Table 3 limits for Cr and Ni included in Permit Table S3.2 from 07/12/21 <p>Where measures are identified, the report shall include</p>	31/12/20 (or otherwise as agreed in writing with the Environment Agency)

Reference	Requirement	Date
	recommendations and timescales for improvements. On receipt of approval in writing from the Environment Agency the operator shall implement the improvements in accordance with the agreed timescales	