

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/ZP3839MG

The Operator is: ExxonMobil Chemical Limited

The Installation is: Fawley Refinery Installation

This Variation Notice number is: EPR/ZP3839MG/V007

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 that we have issued.

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.

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.

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 04/05/2018 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 10/08/2018.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review.

The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 61 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.

2.3 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.

A baseline report containing information necessary to determine the current state of soil and groundwater contamination has not been submitted as part of the current permit review. At the request of the applicant, we have assessed a part surrender in 2019,

which included baseline soil and groundwater data from 2010. Further investigations as part of the ongoing 'site protection and monitoring programme' in 2015 found that the previous identified contaminants were stable and there had been no deterioration when compared to the 2010 dataset. This was again confirmed with groundwater monitoring in 2017 and 2018 which showed that there was no deterioration. Soil sampling in 2018 also confirmed that there had been no deterioration. Considering the evidence provided, we did not request additional soil and groundwater investigations.

2.4 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.

Wastewater streams at emission points from the Fawley site are permitted under Esso Petroleum Company Limited (EPCo) Fawley Refinery Installation permit BR6996IC, and BAT is being considered as part of the permit update that has been triggered by publication of the Refining BAT conclusions on 28th October 2014. We have agreed that CWW BAT conclusions and associated BAT-AELs relating to water emission points will be considered at the existing permitted emission points under EPR/BR6996IC, and has been therefore implemented as part of the Refining BAT permit update process.

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.

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

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	<p>LVOC BAT Conclusion 2 is not applicable as there are no channelled emissions to air other than from process furnaces/heaters.</p> <p>LVOC BAT Conclusion 7 is not applicable as there is no SCR or SNCR at this installation.</p> <p>LVOC BAT Conclusion 10 to 13 inclusive is not applicable as there are no applicable organic emissions sources identified that can fall under BAT 10, no dust emissions, no sulphur dioxide and other acid gases emissions besides furnace emissions, no thermal oxidisers on site.</p> <p>LVOC BAT Conclusion 16 is not applicable as there are no applicable organic solvents identified within the facility.</p> <p>LVOC BAT Conclusions 20 to 23 inclusive are not applicable as there is no production of lower olefins at this installation.</p> <p>LVOC BAT Conclusions 24 to 30 inclusive are not applicable as there is no production of aromatics at this installation.</p> <p>LVOC BAT Conclusions 31 to 44 inclusive are not applicable as there is no production of ethylbenzene and styrene monomer at this installation.</p> <p>LVOC BAT Conclusions 45 to 47 inclusive are not applicable as there is no production of formaldehyde at this installation.</p>

			<p>LVOC BAT Conclusions 48 to 55 inclusive are not applicable as there is no production of ethylene oxide and ethylene glycols at this installation.</p> <p>LVOC BAT Conclusions 56 to 60 inclusive are not applicable as there is no production of phenol at this installation.</p> <p>LVOC BAT Conclusions 61 to 63 inclusive are not applicable as there is no production of ethanolamine at this installation.</p> <p>LVOC BAT Conclusions 64 to 74 inclusive are not applicable as there is no production of toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) at this installation.</p> <p>LVOC BAT Conclusions 76 to 85 inclusive are not applicable as there is no production of ethylene dichloride and vinyl chloride monomer at this installation.</p> <p>LVOC BAT Conclusions 86 to 90 inclusive are not applicable as there is no production of hydrogen peroxide at this installation.</p>
1	Monitor channelled emissions to air from process furnaces/heaters in accordance with the described standards and minimum frequencies	CC	<p>Furnace emissions of CO, NO_x and SO_x are currently monitored once every 6 months, in line with existing requirements and those of the Refining BREF. There is only one furnace within the facility with rated thermal input >10MW, emission data for which is submitted annually and is steady. Monitoring frequency for that furnace could be increased to once every 3 months however as emission levels are stable this is not seen to be justified. No dust monitoring is carried out as furnaces combust exclusively gaseous fuel. No NH₃ monitoring is carried out as no selective catalytic reduction or selective non-catalytic reduction is used.</p>
3	Ensure optimised combustion from process furnaces/heaters to reduce emissions to air of CO	CC	<p>Furnaces are designed to allow combustion to be efficiently controlled, using relevant parameters including O₂ analysers, firebox temperatures and fuel/air ratios. Control systems are in place to ensure ongoing</p>

			combustion efficiency and identify abnormal conditions. Burners are designed to ensure efficient fuel/air mixing.
4	Reduce NO _x emissions from process furnace/heaters by using one or a combination of the described techniques	CC	Furnaces combust exclusively gaseous fuel. The existing design doesn't permit flue gas recirculation, low- NO _x burner or Selective catalytic reduction. NO _x emissions have been rolled into permit EPR/BR6996IC from October 2018, as agreed during Refining BREF permit update process.
5	Prevent or reduce dust emissions from process furnace/heaters by using one or a combination of the described techniques	CC	Furnaces combust exclusively gaseous fuel.
6	Prevent or reduce SO ₂ emissions from process furnace/heaters by using one or a combination of the described techniques	CC	Furnaces combust exclusively gaseous fuel. SO _x emissions to be rolled into permit EPR/BR6996IC from October 2018, as agreed during Refining BREF permit update process.
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	The applicant used the following techniques: Hydrogen produced as a by-product in the production of methyl ethyl ketone (MEK) is recovered and used for hydrogenation of higher olefins to isoparaffins, as well as in hydrotreatment of refinery products. Other unreacted materials are recovered and routed to alternative product pools, for example butane. Liquids are removed prior to recovery of gas to combustion units by Knock-out drums present on flare system.
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	Off-gas streams produced within the applicable facilities are routed to process furnaces, for example routing of off-gas from the higher olefins and IB2 units back into the fuel gas system. These streams are low in sulphur and so would not be appropriate for routing to refinery amine scrubbing units.

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.	CC	<p>Integrated treatment strategy includes process integrated techniques (e.g. process additive addition control, process operating window control) recovery of pollutants at source (e.g. steam stripping), waste water pre-treatment (e.g. effluent holdup and quality management facilities) and final treatment (API separators).</p> <p>Wastewater streams routed to refinery, with emission points permitted under permit EPR/BR6996IC.</p>
15	Increase resource efficiency when using catalysts by using a combination of the described techniques.	CC	<p>A combination of techniques is used to ensure catalyst resource efficiency, as detailed below:</p> <p>Catalysts selected for use with support from global technology networks, for optimal performance.</p> <p>Raw materials pre-treated, where required, to remove potential catalyst inhibiting compounds.</p> <p>Reactor conditions controlled to achieve optimal conversion, selectivity and catalyst lifetime.</p> <p>Reactor performance parameters are monitored to identify any catalyst related issues and allow for further future optimisation.</p>
17	Prevent, or where not practicable reduce, waste for disposal by using a combination of the described techniques.	CC	<p>No significant residue generation outside of acid system. Acid system residue formation controlled through the monitoring and control of TOC levels in the acid pool, as well as control of process parameters including temperature. Minimisation of residue formation through temperature control not applicable to existing facilities. No use for recovered materials, linked to lack of significant residue generation. Catalysts are regenerated where possible and reused.</p>

18	Prevent or reduce emissions from equipment malfunctions, by using all the described techniques.	CC	<p>The following techniques are employed:</p> <p>Environmentally critical equipment identified and documented, including fuel gas flowmeters.</p> <p>Within ExxonMobil Operations Integrity Management System, "Operations and Maintenance" section ensures maintenance programmes are in place to ensure availability based on above defined criticality. Environmental performance indicators monitored to identify signs of equipment issues.</p> <p>Excess material vented to closed flare system in the event of operating conditions other than normal, from where it can be recovered for combustion.</p>
19	<p>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:</p> <p>i) Start up and shutdown operations</p> <p>ii) Other circumstances</p>	CC	<p>Start-up and shutdown procedures documented. Personnel training and competency assessments carried out in line with Operations Interface Management System "Training". Operations and maintenance procedures in place for regular and extraordinary maintenance activities, again as part of Operations Interface Management System.</p>

Key Issues

NO_x and SO_x monitoring

NO_x emissions have been rolled into permit EPR/BR69961C from October 2018, as agreed during Refining BREF permit update process. As part of the Refinery review, the operator proposed units deemed suitable to be managed through an Integrated Emissions Management Technique (IEMT). These include NO_x and SO_x emissions with the associated BAT AELs from furnaces firing Refiner Fuel Gas permitted under permit ZP3839MG.

Wastewater

Wastewater streams at emission points from the Fawley site are permitted under EPCo Fawley Refinery Installation permit BR6996IC, and BAT is being considered as part of the permit update that has been triggered by publication of the Refining BAT conclusions. We have agreed that CWW BAT conclusions and associated BAT-AELs relating to water emission points will be considered at the existing permitted emission points under EPR/BR6996IC, and are therefore implemented as part of the Refining BAT permit update process.

Treatment facilities are included prior to discharge at the outfalls as follows:

Outfall 1. Waste water is processed through a series of separators designed to remove insoluble substances by recovering oil. The Secondary Effluent Treatment plant provide a further treatment process to remove suspended solids and dispersed oil through dual-media filtration.

Outfall 2. Waste water is processed through a series of separators designed to remove insoluble substances by recovering oil. Process effluent from the integrated chemicals plant is the main effluent discharged through outfall 2. Due to the nature of the effluent, further processing, such as by biological treatment, is not viable due to the cohesive nature of components in specific effluent streams.

Outfall 3. Waste water is processed through a series of separators designed to remove insoluble substances by recovering oil.

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
	BAT Conclusions that are not applicable to this installation	NA	<p>LVOC BAT Conclusion 4 is not applicable. Further details in the key issue section below.</p> <p>LVOC BAT Conclusion 8 is not applicable as there is an existing waste water collection systems in place.</p> <p>LVOC BAT Conclusion 17 and 18 are not applicable. Further details in the key issue section below.</p> <p>LVOC BAT Conclusion 21 is not applicable as no odorous compounds from process operation are routed to sewer.</p>
1	To improve overall environmental performance implement and adhere to an EMS incorporating all the described features.	CC	ExxonMobil's Operations Integrity Management System meets the intent of ISO14001 and OHSAS18001 requirements (Review by Lloyd's Register Quality Assurance Oct 1st, 2013).
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	Waste water and waste gas streams are identified and monitored.

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
3	For relevant emissions to water monitor key process parameters at key locations.	CC	Wastewater streams at emission points from the Fawley Refinery Installation are permitted under permit EPR/BR69961C. Key parameters are monitored.
5	Periodically monitor diffuse VOC emissions to air from relevant sources using a combination (or for large amounts – all) of the described techniques.	CC	The site completes periodic Leak Detection and Repair (LDAR) surveys to identify and repair leak sources, and annual calculation of emissions is in place.
6	Periodically monitor odour emissions from relevant sources using the described standards.	CC	Odour Management Plan has been approved and implemented. The plan outlines methods used to monitor odour around the site, as well as protocols for how scenarios in which complaints of odour (either external or internal) are followed up. This includes the provision for air sampling and onsite testing to identify the source of an odour.
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.	CC	Freshwater is recovered and reused where possible, for example MEK condensate and IB2 condensate recovery. Periodic reviews of water and resource consumption are also carried out to verify good practices have been sustained and to identify any opportunities for improvement.

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
			Raw materials are also recycled where possible, for example separation and recycling of methanol on the IB2 unit, and re-concentration and recycling of sulphuric acid on the MEK unit.
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	Temporary hold up capacity is available as part of an effluent neutralisation and monitoring facility which treats streams most likely to be impacted by 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).	CC	<p>The existing permitted emission points are considered under EPR/BR6996IC, and will therefore be implemented as part of the Refining BAT permit update process. Therefore this BAT is not applicable to EPR/ZP3839MG as it has no permitted emission points to water.</p> <p>However the following techniques are employed as part of the integrated waste water management:</p> <p>Minimise the generation of water pollutants by controlling of process additive addition rates, and adherence to process operating windows</p>

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
			<p>that avoid regimes where excessive pollutants would be generated (e.g. feed quality and temperature control on MEK extraction).</p> <p>Techniques for recovery of pollutants at source includes steam stripping of some water on MEK unit prior to routing to the effluent neutralisation and monitoring facility. This also ensures molecules are recycled into the process to increase overall yield from raw materials. The Butyl unit also has facilities for initial fines recovery.</p> <p>Pre-treatment of some waste waters is carried out at an effluent neutralisation and monitoring facility, where pH can be corrected prior to release to the sewer system.</p> <p>All waste water from the facility passes through a series of separator bays for final solids and free phase hydrocarbon removal, before clean and process water streams are combined and routed with refinery wastewater, permitted under EPR/BR6996IC.</p>
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	As above

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.		
12	Reduce emissions to water, by using an appropriate combination of the described final waste water treatment techniques.	CC	Besides the techniques described at BAT 10 above, the waste stream is separated when passing through pre-settlement and screening of acid system washings, as well as Butyl fines recovery; and is filtrated using suction strainers on pumpout of acid system washings from pre-settlement tanks. All of these techniques are employed upstream of final effluent treatment.
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.	CC	The site has documents and procedures for waste handling with a priority on reuse or recycle where possible. Key performance indicators are tracked via a monthly review and improvement opportunities to reduce the volume of waste and to maximise the recycle and re-use of waste are sought.
14	Reduce the volume of waste water sludge requiring further treatment or disposal, and reduce its potential environmental impact,	CC	Volume of silt from separator bays that is required to be removed for further treatment is minimised through dewatering of the silt following removal from the bays.

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.	CC	No applicable emissions sources identified within the facilities covered by the LVOC BREF as only emission points are process furnace stacks. On the Butyl unit, hexane vapours evolved in the finishing process are collected by hoods and routed to a regenerative thermal oxidiser.
16	Reduce emissions to air, by using an integrated waste gas management and treatment strategy that includes process-integrated and waste gas treatment techniques.	CC	Emissions in waste gases from process furnaces, as identified in BAT 2, are managed through close control of furnace operation under Operations Interface Management System element "Operations and Maintenance". Fuel gases with elevated sulphur content are treated prior to being routed to the fuel gas main to remove sulphur prior to combustion. Emissions from the Butyl regenerative thermal oxidiser (RTO) are also managed through close control of RTO operation under Operations Interface Management System element "Operations and Maintenance". Operation of the rest of the Butyl process in line with the same element also ensures process conditions other than normal are minimised.

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
19	Prevent or, where that is not practicable, reduce diffuse VOC emissions to air, by using a combination of the described techniques.	CC	<p>Techniques for design, commissioning and maintenance of equipment are in place under "Facilities Design and Construction" management section of Operations Interface Management System.</p> <p>The company process design standards, will ensure emission sources are minimised, ensure the selection of high integrity equipment and ensure access to equipment for maintenance.</p> <p>Detailed project plans are developed which include leak testing in the field to ensure integrity of new equipment before commissioning, with documented actions and priority defined (e.g. pre/post-commissioning).</p> <p>Operations Interface Management System "Mechanical Integrity" and "Operations and Maintenance" ensure that process equipment integrity risks are understood and mitigated, including preventative maintenance and replacement where appropriate.</p> <p>Periodic surveys using optical gas imaging are in place to identify and repair leak sources.</p>
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	CC	The site has an Odour Management Plan in place.

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
	environmental management system (see BAT 1), that includes all of the described elements:		
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	The site has a Noise Management Plan in place. The plan outlines methods used to monitor noise emissions from the site, including quarterly attended and unattended monitoring at sensitive local receptors, and regular block perimeter noise monitoring.
23	Prevent or, where that is not practicable, reduce noise emissions, by using one or a combination of the described techniques.	CC	Various techniques are used to prevent and reduce noise emissions from the site. These are included in the Noise Management Plan.

Key Issues

BAT4 Monitor emissions to water in accordance with EN standards

It has been agreed with the Environment Agency that CWW BAT conclusions and associated BAT-AELs relating to water emission points will be considered at the existing permitted emission points under EPR/BR6996IC, and are therefore implemented as part of

the Refining BAT permit update process. Therefore this BAT is not applicable to EPR/ZP3839MG as it has no permitted emission points to water.

BAT5 Periodically monitor diffuse VOC emissions to air from relevant sources.

The site has a LDAR monitoring programme in place and it is updated under permit EPR/BR6996IC, as prompted by IC39.

BAT12 Reduce emissions to water, by using an appropriate combination of the described final waste water treatment techniques. Ultimately, water emissions are considered under permit EPR/BR6996IC. Under the refinery permit review, the operator was granted a derogation in regards to reducing the total oxygen consumption (TOC) emission point W2 from chemicals activities. IN the same EPR/BR6996IC permit, the operator is also required to submit a plan to review monitored TOC emissions from emission point W2, as prompted by IC40

BAT17 and 18 Prevent emissions to air from flares, by using flaring only for safety reasons or non-routine operational conditions Flare gas and fuel gas systems are owned and operated by the refinery facility, permitted under permit EPR/BR6996IC. This BAT was therefore assessed under the refinery permit review as BAT 55. The operator has confirmed that refinery streams are not routinely routed to flare. Flaring is utilised to manage events, non-routine and unplanned unit shutdowns and reformer regenerations.

Flare gas recovery rates and flaring is monitored and reviewed every shift. The flare check list for each operational area enables a systematic check on all potential routings and helps minimise flaring.

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 do not need to set improvement conditions. The outcome of the techniques detailed in the BAT Conclusions are achieved by the installation.