

## **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/BT8864IT

The Operator is: Procter & Gamble Product Supply (U.K.) Limited

The Installation is: Procter & Gamble Product Supply (U.K.) Limited - London Plant

This Variation Notice number is: EPR/BT8864IT/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 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 but not that it necessarily contained all the information we would need to complete that determination.

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

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

Based on our records and previous experience in the regulation of the installation we consider that the operator will be able to comply with the techniques and standards described in the BAT Conclusions other than for those techniques and requirements described in LVOC BAT Conclusion 10 and 14, and CWW BAT Conclusion 2 and 15. In relation to this/these BAT Conclusion(s), we do not fully agree with the operator in respect of their current stated capability as recorded in their regulation 61 Notice response. We have therefore included Improvement Condition 14 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 06/04/2020. A copy of the further information request was placed on our public register.

## 2.4 Condition of Soil and Groundwater

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

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

- prepare and submit a baseline report containing information necessary to determine the current state of soil and groundwater contamination; or

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

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

The site is a mature facility which has submitted an Application Site Report (ASR) to the Environment Agency as part of the Integrated Pollution Prevision and Control (IPPC) Permit Application in 2006. This was followed by a Site Protection and Monitoring Programme (SPMP) which has been reviewed every four (4) years, the last review being completed in October 2015. The site is also regulated as a Control of Major Accident Hazards (COMAH) Upper Tier Installation by the Competent Authority, consisting of the Health and Safety Executive (HSE) and the Environment Agency. The applicant has submitted an Environmental Risk Assessment (ERA) and its purpose was to identify the hazardous materials which could present potential source(s) of pollution along with primary, secondary and tertiary containment systems. The conclusions of the ERA were that there is a low potential for pollution to ground and groundwater to occur in all areas of the site.

All bulk storage tanks containing materials other than water are fully bunded and operational areas are covered in well maintained concrete hardstanding. Hardstanding covers the entire site apart from a small area created temporarily by removal of redundant equipment.

The contents of the site process drains are collected, stored in tankage, tested and released to trade sewer only if within the agreed consented specifications as defined by the Trade Effluent Discharge Consent with Anglian Water.

The surface water drains are connected to the River Thames (via discharge point W1, W3 and W4) all of which have isolation penstock valves. The penstock valves for discharges W1 to W3 have been closed since 2011 when the surface water runoff was routed to the effluent system. Reject water from the RO plant is discharged to the surface water drains and discharged to the River Thames (discharge point W4). This penstock value is left open so as to allow the RO plant reject water and clean surface waters to be discharged. The site is bounded along the River Thames by a flood defence wall. Emergency flood gates in the wall have been permanently sealed and are no longer operational.

As a result of this recent ERA, additional soil and groundwater sampling and analysis beyond the current SPMP provisions, was not considered necessary.

## 2.5 Surface Water Pollution Risk Assessment

As part of our delivery of the Water Framework Directive (WFD) requirements, we need to identify and assess the impact of all sources of hazardous pollutants to surface waters from regulated industry. We use the term 'hazardous pollutants' to collectively

describe substances covered by the EQSD<sup>1</sup> (priority hazardous substances, priority substances and “other pollutants”). It also applies to the specific pollutants listed in the 2015 Directions<sup>2</sup>, 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.

Process wastewater is via a foul drainage system, which flows into the public foul sewer to Tilbury Sewage Treatment Works, which then discharges into the River Thames. This is covered by a Trade Effluent Discharge Consent with Anglian Water (as discharge S1).

Surface water is via a surface drainage system, which passes through an interceptor prior to discharge to the River Thames (as discharge W4).

The applicant has submitted an H1 Impact Assessment for the principal emission points to controlled waters (S1 and W4). For both discharge points the type of receiving water is considered to be TRaC – estuary and coastal.

The initial test determines whether the level of pollutant in the discharge is more than the EQS limits.

If the concentration of the pollutant is less than the EQS then it can be screened out and considered not to be a risk to the environment.

### Summary of S1

A number of pollutants, as seen in the table below, failed to be screened out in the initial test, as the concentration is more than the EQS.

Substance	Annual Avg EQS			MACEQS		
	Release µg/l	EQS	Release conc < 100% EQS Test 1	Release µg/l	EQS	Release conc < 100% EQS Test 1
e.g.			Test 1			Test 1
[S1] Ammonia (≤ 50mg/l CaCO3 (90 %ile)) (River Thames at Tilbury Sewag	33		N/A	63.8		N/A
[S1] Chemical Oxygen Demand (River Thames at Tilbury Sewage Treatme	242556.9		N/A	1040000		N/A
[S1] Chloride (River Thames at Tilbury Sewage Treatment Works)	#####		N/A	1860000		N/A
[S1] Chromium III (95%ile) (dissolved) (River Thames at Tilbury Sewage Tr	9.4		N/A	21.9		N/A
[S1] Copper (River Thames at Tilbury Sewage Treatment Works)	21.5	3.6	Fail	119.5		N/A
[S1] Cyanide (River Thames at Tilbury Sewage Treatment Works)	23.5	1	Fail	24.3	5	Fail
[S1] Lead and it's compounds (River Thames at Tilbury Sewage Treatmen	4.7	1.3	Fail	7.1	14	Pass
[S1] Nickel and its compounds (River Thames at Tilbury Sewage Treatmen	81.7	8.6	Fail	83.6	34	Fail
[S1] Oil & Grease (River Thames at Tilbury Sewage Treatment Works)	5570		N/A	5570		N/A
[S1] S. Solids (River Thames at Tilbury Sewage Treatment Works)	64607.8		N/A	464000		N/A
[S1] Sulphate (River Thames at Tilbury Sewage Treatment Works)	186647.1		N/A	351000		N/A
[S1] Zinc (River Thames at Tilbury Sewage Treatment Works)	103.5	6.8	Fail	229.4		N/A

Test 2 requires a check on whether the effluent is discharged to the low water channel in the upper parts of the estuary where the water is mainly fresh.

<sup>1</sup> Environmental Quality Standards Directive (EQSD) (2008/105/EC, as amended by 2013/39/EU)

<sup>2</sup> The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015

Wastewater discharges at discharge point S1 are via the Tilbury Sewage Treatment Works before discharge to the Tidal River Thames, after treatment. It is assumed that the sewage treatment plant discharges into a low water channel and hence the screening tests for freshwater can be applied; relative to the EQS values for estuaries and coastal waters.

Test 2 for freshwater impact uses the river flow data and daily discharge volume (discharge S1) to compare the process contribution (PC) for each pollutant, (i.e. the concentration of each pollutant after being diluted in the receiving waters) against the EQS. Specifically, if the value of the PC is 4% or less than the EQS then the pollutant is screened out as unlikely to have a significant impact on the environment.

All priority hazardous substances are screened out at Test 2, as seen in the table below.

Release Point and Substance	Background Conc	Annual Avg EQS				MAC EQS				Allowable EVF	Test 5
		Release Conc	Effluent Flow	EQS AA	EVF (AA)	Release Conc	Effluent Flow	EQS MAC	EVF (MAC)		
[S1] Ammonia (≤ 50mg/l CaCO <sub>3</sub> (90 %ile))		33.00	0.00			63.80	0.02				N/A
[S1] Chemical Oxygen Demand	3,967.00	242,556.90	0.00			1,040,000.00	0.02				N/A
[S1] Chloride		1,192,136.40	0.00			1,860,000.00	0.02				N/A
[S1] Chromium III (95%ile) (dissolved)	0.53	9.40	0.00			21.90	0.02				N/A
[S1] Copper	3.83	21.50	0.00	3.60	-0.04	119.50	0.02				Pass
[S1] Cyanide	0.50	23.50	0.00	1.00	0.03	24.30	0.02	5.00	0.03		Pass
[S1] Lead and it's compounds	0.65	4.70	0.00	1.30	0.00	7.10	0.02	14.00	0.00		Pass
[S1] Nickel and its compounds	4.30	81.70	0.00	8.60	0.03	83.60	0.02	34.00	0.03		Pass
[S1] Oil & Grease		5,570.00	0.00			5,570.00	0.02				N/A
[S1] S. Solids		64,607.80	0.00			464,000.00	0.02				N/A
[S1] Sulphate		186,647.10	0.00			351,000.00	0.02				N/A
[S1] Zinc	3.40	103.50	0.00	6.80	0.02	229.40	0.02				Pass

### Summary of W4

The discharge of all parameters, which have EQS values, can be screened out at test one as the release concentration is less than the applicable EQS.

Substance	Annual Avg EQS			MAC EQS		
	Release µg/l	EQS	Release conc < 100% EQS Test 1	Release µg/l	EQS	Release conc < 100% EQS Test 1
e.g.						
[W4] Ammonia (≤ 50mg/l CaCO <sub>3</sub> (90 %ile)) (River Thames at Thurrock)	500		N/A	500		N/A
[W4] BOD5 (River Thames at Thurrock)	2900		N/A	2900		N/A
[W4] Chloride (River Thames at Thurrock)	340000		N/A	372000		N/A
[W4] Copper (River Thames at Thurrock)	0.806	3.6	Pass	1.67		N/A
[W4] Nitrogen Total (River Thames at Thurrock)	11280		N/A	17400		N/A
[W4] Oil & Grease (River Thames at Thurrock)	0		N/A	0		N/A
[W4] Orthophosphate (River Thames at Thurrock)	4760		N/A	5690		N/A
[W4] S. Solids (River Thames at Thurrock)	5100		N/A	5100		N/A
[W4] Zinc (River Thames at Thurrock)	2	6.8	Pass	3.2		N/A

## 3 The legal framework

The consolidated variation notice will be issued, under Regulations 18 and 20 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the



relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

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

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

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

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

- a) the existing ELVs and monitoring requirements which are effective from the date of issue of the notice; and
- b) amended ELVs where a BAT-AEL is specified in the BAT conclusions, and any associated monitoring requirements which will take effect from 7<sup>th</sup> 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

BATc 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	<b>NA</b>	<p>LVOC BAT Conclusion 7 is not applicable as there is no SCR or SNCR at this installation.</p> <p>LVOC BAT Conclusion 9 is not applicable as process off-gas streams are low calorific values.</p> <p>LVOC BAT Conclusion 12 is not applicable as sulphur dioxide and other acid gases emissions are minimal and wet scrubbing techniques are not applicable.</p> <p>LVOC BAT Conclusion 13 is not applicable as no thermal oxidisers are operated on site.</p> <p>LVOC BAT Conclusion 15 is not applicable as catalysts are not used in the LVOC processes at the site.</p> <p>LVOC BAT Conclusion 16 is not applicable as there are no opportunities to recover/reuse organic solvents (perfumes added to the product) have been identified to date.</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</p>

			<p>no production of ethylene oxide and ethylene glycols at this installation.  LVOC BAT Conclusions 56 to 60 inclusive are not applicable as there is no production of phenol at this installation.  LVOC BAT Conclusions 61 to 63 inclusive are not applicable as there is no production of ethanolamine at this installation.  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.  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.  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	<b>FC</b>	<p>A2 emission point is the stack for the main process. The Applicant provided justification that the other emission points will have lower emissions, hence if they monitor A2 and are compliant, the other emission points should also be compliant.</p> <p>Emission point A2 is currently monitored for the following parameters, in accordance with their current EP requirements:</p> <ul style="list-style-type: none"> <li>– Volatile Organic Compounds (VOCs): annually (to BS EN 13649 standard);</li> <li>– Oxides of Nitrogen (NO and NO2 expressed as NO2): annually (to ISO 10849 standard);</li> <li>– Particulate Matter (PM): monthly (to BS EN 13284-1 standard) and continuously to provide a monthly average (to BS EN 13284-2 standard)</li> </ul> <p>The operator proposed additional monitoring emission point A2 in order to comply with BATc 1:</p>

			<ul style="list-style-type: none"> <li>- Carbon dioxide and Sulphur dioxide – every 3 months</li> <li>- Nitrogen oxides – every 3 months, according to standard EN 14792.</li> </ul> <p>These additional monitoring requirements have been added in the permit in Table S3.1 - Point source emissions to air – emission limits and monitoring requirements.</p>
2	Monitor channelled emissions to air other than from process furnaces/heaters in accordance with the described standards and minimum frequencies	<b>FC</b>	<p>The applicant proposed additional monitoring for the following parameters:</p> <ul style="list-style-type: none"> <li>- Dust, once every month (to EN 12384-1);</li> <li>- SO<sub>2</sub>, once every month (to EN 14791);</li> <li>- Total Volatile Organic Compounds (TVOC), every month (to EN 12619).</li> </ul> <p>These parameters will be monitored monthly at the following emission points:</p> <ul style="list-style-type: none"> <li>- A2 (spray drier);</li> <li>- A3 (crutcher vent);</li> <li>- A4 (KM filter, STW Bag Filter and N<sub>2</sub> filter)</li> </ul> <p>These additional monitoring requirements have been added in the permit in Table S3.1 - Point source emissions to air – emission limits and monitoring requirements.</p>
3	Ensure optimised combustion from process furnaces/heaters to reduce emissions to air of CO	<b>CC</b>	<p>The site undertakes planned maintenance on the equipment to ensure that combustion is optimised, which includes regular service checks of combustion plant by the manufacturer.</p> <p>The overall operation of all processes is controlled through the automated process control systems, which calculate and optimise process efficiency through a wide suite of process monitoring.</p>

4	Reduce NO <sub>x</sub> emissions from process furnace/heaters by using one or a combination of the described techniques	<b>CC</b>	NO <sub>x</sub> emissions are reduced through the choice of fuel (natural gas) and the burner management system / controls.
5	Prevent or reduce dust emissions from process furnace/heaters by using one or a combination of the described techniques	<b>CC</b>	Dust emissions from the MSG duct burner are reduced through the choice of fuel (natural gas). In addition the duct burner directly heats a solid / particulate drying process and cyclones are used downstream for the recovery of product particles.
6	Prevent or reduce SO <sub>2</sub> emissions from process furnace/heaters by using one or a combination of the described techniques	<b>CC</b>	Sulphur dioxide (SO <sub>2</sub> ) emissions from the MSG duct burner are reduced through the choice of fuel (natural gas).
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)	<b>CC</b>	Techniques a to e cannot be applied as following: a) The recovery and reuse of hydrogen is not applicable to site operations. Hydrogen is not used or generated by the process. b) No opportunities to recover / reuse organic solvents (e.g. perfumes added to the product) have been identified. c) No opportunities available for the use of spent air. d) The recovery of HCl is not applicable to site operations as no HCl is used. e) The recovery of H <sub>2</sub> S is not applicable to site operations (none is used or generated in the process). f) The use of filters where appropriate reduces solids entrainment into air. In addition, cyclones are used up stream of the spray drier, emission point A2 which helps to reduce the particulate loading in the discharge.
10	Reduce channelled emissions of organic compounds to air by using one or a combination of the described techniques.	<b>NC</b>	None of the listed techniques are currently used to reduce emissions of organic compounds to air.

			<p>The operator is undertaking a high level review of abatement options for relevant channelled air emissions at the facility (i.e. those with the potential to contain organic compounds).</p> <p>Improvement condition (IC) 14 has been added to prompt the operator to apply relevant techniques to reduce channelled emissions of organic compounds to air, as concluded in the high level review or abatement options.</p>
11	Reduce channelled dust emissions to air, by using one or a combination of the described techniques.	<b>CC</b>	<p>Emission point A2 uses high efficiency cyclone technology in order to reduce the potential for particulate emissions to air.</p> <p>All other channelled emission points with the potential to release dust particles are fitted with appropriate filters.</p> <p>All filters are fitted with a magnahelic guage which measures the differential pressure across the filter bags and is used to determine the effectiveness of the filters.</p>
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.	<b>NC</b>	<p>An inventory of waste water streams is being prepared in order to meet the requirements of the CWW BAT Conclusions.</p> <p>The site discharges uncontaminated surface water run-off (rainwater) and Reverse Osmosis effluent water only to the adjacent River Thames.</p> <p>The site discharges wastewater from the manufacture of detergent and ancillary products site, along with domestic sewage, to Tilbury Sewage Treatment Works via the public foul sewer.</p>
17	Prevent, or where not practicable reduce, waste for disposal by using a combination of the described techniques.	<b>CC</b>	<p>The process is a high efficiency process with yields exceeding 99%.</p> <p>P&amp;G is committed to continuous improvement and waste reduction with a number of completed and ongoing waste volume reduction projects.</p>

18	Prevent or reduce emissions from equipment malfunctions, by using all the described techniques.	<b>CC</b>	The site has procedures and management systems in place to prevent emissions during equipment outages in accordance with BAT requirements.
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	<b>CC</b>	The overall operation of all processes, including start-up and shutdown operations, is controlled through the automated process control systems which are monitored in local control rooms to each part of the process. Emissions to controlled waters are limited to surface water run-off from uncontaminated areas of the site and RO effluent water, which is currently released from a single discharge point via an interceptor. RO water emissions are continuously monitored for pH in order to detect any abnormal releases.



BATc 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	<b>NA</b>	<p>CWW BAT Conclusions 11, 12 and 14 are not applicable as the process effluents are sent to trade sewer for treatment and no sludge is generated.</p> <p>CWW BAT Conclusions 16 to 18 inclusive are not applicable as the portfolio of emission sources does not lend itself to waste gas collection and shared abatement /processing systems and flaring is not used at the site.</p> <p>CWW BAT Conclusions 21 is not applicable as waste water collection at the site is minimal and no sludge is produced.</p> <p>CWW BAT Conclusions 22 is not applicable as noise nuisance is not expected.</p>
1	To improve overall environmental performance implement and adhere to an EMS incorporating all the described features.	<b>CC</b>	<p>The site holds both ISO14001 and OHSAS 18001 standards, accredited in 2006. The standards have been updated in 2015 and a review against the new standard has not been completed.</p> <p>The operator confirmed that the site's Environmental Management System satisfies the requirements of points (i) to (x) of BAT 1.</p> <p>A Waste Management Plan and an Odour Management Plan are in place. A Noise Management Plan, as this is not a requirement of the current Environmental Permit</p> <p>Inventories of wastewater and waste gas streams are being developed in order to meet the requirement of BAT 2.</p>

BATc 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
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.	<b>FC</b>	Even though the site holds a set of process flow charts, mass balances and chemical equations for the processes operated on the site, inventories of wastewater and waste gas streams are currently being developed. IC 14 has been added to prompt the applicant to develop and send the inventories of wastewater and waste gas streams for confirmation.
3	For relevant emissions to water monitor key process parameters at key locations.	<b>CC</b>	Wastewater streams comprise: <ul style="list-style-type: none"> <li>– S1 – discharge of process wastewater to sewer under a Trade Effluent Discharge Consent; and</li> <li>– W4 – discharge of surface water run-off (rain water) from non-process areas and RO effluent water to surface water (River Thames).</li> </ul> <p>The discharge from S1 is tested using the on-site laboratory prior to each batch released, for suspended solids, sulphate, pH, Chemical Oxygen Demand (COD) (even though the permit does not require these to be monitored), visible oil/grease, and the flow is calculated in accordance with the requirements of the Anglian trade effluent consent. The discharges are monitored at the point of discharge.</p>
4	Monitor emissions to water in accordance with the described standards and minimum frequencies.	<b>CC</b>	Discharges to W4 only comprise intermittent discharges of surface water and RO effluent water, for which continuous pH monitoring is currently undertaken. Anomalies identified as a result of the continuous pH

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			monitoring would allow for identification of any process upsets which may affect RO effluent discharge water quality.
5	Periodically monitor diffuse VOC emissions to air from relevant sources using a combination (or for large amounts – all) of the described techniques.	<b>CC</b>	Independent assessments of diffuse VOC emissions from storage tanks at the site have been assessed on two occasions: in 2008 and 2016. The assessments concluded that only a small level of fugitive VOC's emissions are estimated from storage tanks.
6	Periodically monitor odour emissions from relevant sources using the described standards.	<b>CC</b>	Odour has been periodically monitored at the facility and was assessed in more detail in 2016/ 2017 as part of the development of the site's Odour Management Plan (OMP). The OMP includes a clear commitment to undertake periodic odour monitoring.
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.	<b>CC</b>	P&G track monthly water usage by department and have established a Pillar Team to complete water use mapping, benchmarking and to identify specific projects to reduce water consumption.  There has been a reduction in actual and production-adjusted water used year on year at P&G since 2012.  There has been a reduction in overall raw material use due to re-blending waste product (out of specification) back into the process, where quality allows, as well as product compaction.
8	Prevent the contamination of uncontaminated water reduce emissions to water, by segregating uncontaminated	<b>CC</b>	Uncontaminated surface water run-off (rain water) and RO water is segregated from process wastewater.

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	waste water streams from waste water streams that require treatment.		Uncontaminated surface water run-off (rain water) is discharged to surface water via emission point W4, whilst process wastewater is discharged to foul sewer (emission point S1),
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.	<b>CC</b>	<p>The site is underlain by hard standing and the site process drainage system can be locked off to prevent discharges to the trade effluent sewer.</p> <p>Firewater can be retained on site within the surface water drainage system, bunds and hardstanding in order to prevent discharges to the river, the discharges to which are protected with the use of Penstock valves.</p>
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).	<b>CC</b>	<p>The operation of the processes is controlled through the automated process control systems, which calculate and optimise process efficiency through a wide suite of process monitoring.</p> <p>Waste minimisation (solid and liquid wastes) is one of their elements tracked as part of the plant's Sustainability Reduction Action Plan.</p> <p>They are committed on projects to minimise the volume of waste (including waste water) they produce and identify alternative routes for disposal.</p>
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	<b>CC</b>	A formal review of the Best Environmental Options for Waste Disposal at the plant was undertaken in July 2009 in response to EP Improvement Condition IC10. The review considered each waste stream in turn and identified potential opportunities to improve disposal routes, in

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	environmental management system (see BAT 1) that, in order of priority, ensures that waste is prevented, prepared for reuse, recycled or otherwise recovered.		accordance with the principles of the waste hierarchy. This was subsequently updated in 2015 as part of the 4 year permit review and will be subject to review again during the next 4 year permit review.
15	Facilitate the recovery of compounds and the reduction of emissions to air, by enclosing the emission sources and treating the emissions, where possible.	<b>FC</b>	<p>The site has a large number of channelled emissions, which are abated where required, e.g. filtered vent emissions from the process and naturally aspirated vents from storage tanks. The main process stack is emission point A2 (MSG spray drier vent) which has cyclone technology for particulate abatement.</p> <p>The applicant is reviewing if there is the potential to enclose and further abate the emissions from the emission points. We have included IC14 to monitor progress.</p>
19	Prevent or, where that is not practicable, reduce diffuse VOC emissions to air, by using a combination of the described techniques.	<b>CC</b>	<p>Independent assessments of diffuse VOC emissions from storage tanks at the site have been assessed on two occasions: in 2008 and 2016. The assessments concluded that only a small level of fugitive VOC's emissions are estimated from storage tanks.</p> <p>The latest review undertaken in 2016 concluded that P&amp;G are considered to be applying best available techniques through monitoring of fugitive releases, the application of engineering standards and the programme of leak detection and repair.</p>
20	Prevent or, where that is not practicable, reduce odour emissions, by setting up,	<b>CC</b>	Odour has been periodically monitored at the facility and was assessed in more detail in 2016/ 2017 as part of the development of the site's

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	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:		Odour Management Plan (OMP). The OMP includes a clear commitment to undertake periodic odour monitoring.
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.	<b>NA</b>	Waste water collection at the site is minimal and sludge collection is limited to sludge that builds up in effluent tanks/interceptors. Neither of these sources have been identified as potential odour sources in the OMP.
23	Prevent or, where that is not practicable, reduce noise emissions, by using one or a combination of the described techniques.	<b>CC</b>	Potential noise impacts are assessed as part of P&G's Management of Change procedures. The site currently has a purchasing policy for individual items of plant to ensure that all new equipment has a low sound power rating. The site is currently not allowed to purchase items with a sound power rating above 80dB.

**Annex 2: Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested.**

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

### Annex 3: Improvement Conditions

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

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

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC14	<p>The operator shall submit, for approval by Environment Agency, a report setting out progress to achieving the ‘Narrative’ BAT where BAT is currently not achieved, but will be achieved before 07/12/21. The report shall include, but not be limited to, the following:</p> <ul style="list-style-type: none"> <li>• Methodology for achieving BAT</li> <li>• Associated targets / timelines for reaching compliance by 07/12/21</li> <li>• Any alterations to the initial plan (in progress reports)..</li> </ul> <p>The report shall address the following BAT Conclusion:</p> <ul style="list-style-type: none"> <li>• Production of Large Volume Organic Chemicals <b>BAT 10</b> (Reduce channelled emissions of organic compounds to air for relevant point source emissions, other than emission point A2)</li> <li>• Production of Large Volume Organic Chemicals <b>BAT 14</b> (Reduce the waste water volume, pollutant, loads and emissions to water by assessing the potential to reuse Reverse Osmosis effluent water)</li> <li>• Common waste water and waste gas treatment/management systems in the chemical sector <b>BAT 2</b> (Inventory of waste water and waste gas streams incorporating all the described features).</li> <li>• Common waste water and waste gas treatment/management systems in the chemical sector <b>BAT 15</b> (Reduction of emissions to air by enclosing and treating waste gas sources)</li> </ul> <p>Refer to BAT Conclusions for a full description of the BAT requirement.</p>	<p>Progress reports by:</p> <p>07/12/20</p> <p>07/06/21</p> <p>07/12/21</p>