

Environment Agency permitting decisions

Substantial Variation

We have decided to issue the variation for the Royal Brewery Manchester operated by Heineken UK Limited.

The variation number is EPR/BV7796IW/V008

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

Purpose of this document

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Structure of this document

- Key issues
- Annex 1 the decision checklist
- Annex 2 the consultation and web publicising responses

Key issues of the decision

Introduction

This application is the last in a series of applications submitted as part of Heineken's Project Cymbeline. The intention is to increase the site's production capacity from 3.2 million hectolitres to 5.5 million hectolitres per annum. Applications EPR/BV7796IW/V005 to EPR/BV7796IW/V007 have dealt with the preparatory works for the increase. This includes new fermentation vessels, new control panels and central control room, replacement of yeast vessels, new centralised cleaning in place (CIP) plant, packaging line replacement and the replacement of the roller mill with a new hammer mill. The biomass combined heat and power (CHP) plant and the biogas CHP plant have been removed from the permit.

The environmental impacts associated with these enabling actions have been addressed in the earlier permit variations. This application enables the actual capacity increase in the brewhouse with the replacement of the lauter tuns

(brewery vessels) with mash filters. This is the primary technical change described in the application, which considers the potential environmental impacts associated with the overall capacity increase. The primary impact is the increase in effluent that will be generated.

The mash filters

The installation of the mash filters allows the brewhouse capacity to be increased due to a higher efficiency of conversion of raw materials into product. This includes an improvement in turnaround time, an improvement in extract efficiency and a lower effluent loading. There will be pro-rata improvements in water and energy use efficiencies and a reduction in waste generation. As such, the use of mash filters is considered the best available technique (BAT) for this site.

The emissions to air from the mash filters will be similar in temperature and nature to the current emissions from the lauter tuns, with one point source replacing the two current emission points. The Reference Document on Best Available Techniques in the Food, Drink and Milk Industries August 2006 (BREF) notes that the largest source of odour emissions is the evaporation from wort boiling. However, the mash liquor is not boiled, so there is little entrainment of material or mist generated during the process. Therefore, the mash filters are not a principle odour source and no techniques are considered necessary to reduce emissions.

Acceptable containment is provided by the location of the mash filters within the main brewery building in a fully contained room which drains to the ETP. Maintenance and inspection procedures are in place and the new mash filters will be incorporated into the preventative maintenance plan. This meets the BAT requirement to operate regular maintenance programmes.

Effluent treatment

Process effluent from the Royal Brewery is treated at the on-site effluent treatment plant (ETP), which is operated under permit EPR/CP3531GM by Ondeo Industrial Solutions Limited. Some effluent bypasses the treatment processes and is discharged untreated. All effluent discharges to sewer for treatment at United Utilities' Davyhulme Wastewater Treatment Works (WwTW), prior to discharge to the Manchester Ship Canal (MSC).

The effluent predictions are as follows:

Parameter	Current average	Future average (post Project Cymbeline)	Discharge consent limit
COD load to sewer (kg/day)	1,598	5,097	18,000
Flows to sewer (m ³ /day)	1,535	3,002	5,130

The increase in flow represents a pro-rata increase in production of beer. The increase in Chemical Oxygen Demand (COD) loading is of a greater

proportion because a larger volume of untreated process effluent (with a higher COD load than the treated effluent) will bypass the ETP and discharge directly to sewer. However, it can be seen that both parameters are still well within the limits set in the discharge consent issued by United Utilities.

The BREF notes that for the treatment of waste water from food and drink installations, BAT is to use a suitable combination of the following:

- 1 apply an initial screening of solids (see Section 4.5.2.1) at the FDM installation
- 2 remove fat using a fat trap (see Section 4.5.2.2) at the FDM installation, if the waste water contains animal or vegetable FOG
- 3 apply flow and load equalisation (see Section 4.5.2.3)
- 4 apply neutralisation (see Section 4.5.2.4) to strongly acid or alkaline waste water
- 5 apply sedimentation (see Section 4.5.2.5) to waste water containing SS
- 6 apply dissolved air flotation (see Section 4.5.2.6)
- 7 apply biological treatment. Aerobic and anaerobic techniques applied in the FDM sector are described in Sections 4.5.3.1 to 4.5.3.3.2
- 8 use CH₄ gas produced during anaerobic treatment for the production of heat and/or power (see Section 4.5.3.2).

The effluent treatment consists of primary screening, flow and load equalisation, neutralisation, anaerobic reaction (and recovery of biogas), aerobic reaction, dissolved air flotation and sand filtration. Additional treatment will be provided at Davyhulme WwTW. Therefore, we are satisfied that partial treatment on site prior to discharge to sewer represents BAT for the disposal of process effluent from the brewery. United Utilities have replied to our consultation to confirm that adequate sewerage and sewage treatment facilities exist, no significant pollution is caused by acceptance of the trade effluent and treatment of the trade effluent in admixture with domestic sewage represents BAT.

The BREF states that brewery waste water normally has a COD/BOD ratio of 1.5 – 1.7 indicating that the wastewater is easily degradable. We are satisfied that the brewery effluent falls within or below this range and that no further assessment of the impacts of the sanitary determinands (BOD, COD, suspended solids, phosphate) is necessary. These are the parameters that Davyhulme WwTW is designed to treat and will perform this more efficiently than any on-site treatment process.

The BREF also notes that normally, the process waste water has a low content of non-biodegradable components and that heavy metals are normally present in very low concentrations. To check this assertion, the applicant has monitored a range of substances and included these in an assessment under our H1 methodology. We have undertaken an audit of this assessment, including checks of the input parameters and the validity of the conclusions.

As part of the data requirements for the H1 screening tool, the applicant refers to their use of 6m³/s as a mean flow for the MSC. However, the tool requires the input of a Q95 low flow estimate for the receiving watercourse. We hold the following data for the MSC, which shows the flow data to be higher than that used by the applicant, meaning more dilution is available to the effluent.

Therefore, we are satisfied with their use of the 6m³/s 'mean' flow as the Q95 figure.

Upstream flow data – Manchester Ship Canal			
Mean flow	1521 Ml/day (17.6m ³ /s)	Q95 flow	571 Ml/day (6.6m ³ /s)

The applicant has used a sewage treatment reduction factor (STRF) of 1 for mercury, implying that there is no removal of the substance during treatment. This is overly conservative – our guidance allows 76% removal for activated sludge treatment and 56% removal for water filter treatment. The same is true for cyanide, where the overly-conservative STRF of 1 has been used again in the application. Our guidance notes 68% removal for both activated sludge and water filter treatment processes. Therefore, we have amended the STRF for mercury to 0.44 and that for cyanide to 0.32 in the screening tool. The result of this is that the process contribution (PC) of both substances is lowered, meaning that mercury now passes the PC test at <4% of the EQS. Only cyanide is carried forwards for the predicted environmental concentration (PEC) test due to a PC of 7.51% of the EQS (AA).

Upon calculating the PEC, the applicant has had to estimate a background concentration for cyanide because no sampling data is available. Their use of their limit of detection (30 µg/l) immediately causes the PEC tests to be failed because it is already greater than the EQS of 1 µg/l (AA) and 5 µg/l (MAC), prior to the addition of the PC. In cases where there is no sampling data, the background quality should be assumed to be a percentage of the EQS, depending on whether or not the watercourse is considered to be clean of the substance in question. A sensitivity analysis testing both 'clean' (10% of EQS as background quality) and 'dirty' (50% of EQS as background quality) has been undertaken. This finds that under both scenarios, the screening tests are passed. There are no failures of the EQSs because the PC is very small. There are also no failures of significant loads. No further assessment is necessary.

Therefore, we can support the applicant's conclusion that the discharge of effluent from the installation does not have the potential to significantly impact on the water quality of the Manchester Ship Canal.

Noise

The applicant has identified that there may be some changes to the noise at the site and undertaken an assessment of the potential impacts at neighbouring receptors. The BREF notes that the main noise sources are transport within the brewery with lorries and forklifts. Following identification of which noise sources have the potential to impact, the noise assessment has focussed on increased HGV movements because these are related to the increase in production capacity. The mash filters themselves are not expected to alter noise emissions and earlier process modifications (e.g. the keggings line and hammer mill) have been addressed in the previous variation.

It is likely that there will be an increase in truck and tanker numbers – Heineken predicts this to be a maximum of 29%, equating to an estimated increase in existing noise levels of 1.1 dB(A) during the daytime and less than 1 dB(A) during the night. As such, the noise increase from HGV movements is likely to be barely perceptible and of negligible impact.

An assessment of activities such as product or chemical transfers (pumps and pipework) and other general operations has already been undertaken. This will have addressed the noise impacts from those operations, which already have the potential to operate 24 hours a day, seven days a week. In recognition that the frequency of these operations might change when the production capacity is increased, we will require that noise monitoring is carried out to assess and report on the actual impacts, including those from vehicle movements. If necessary, this must identify additional measures to ensure noise levels do not cause pollution outside the site boundary. The operator will also be required to submit a noise management plan, to include a traffic management plan.

The BREF notes that by controlling the times when vehicles enter and leave the installation and the location and times of on-site vehicle movements, noise emissions off-site can be reduced at sensitive times, e.g. at night during the hours when neighbours, in residential areas, normally wish to sleep. The improvement conditions described above will address these points and ensure that the site meets the following BAT:

- To minimise noise nuisance from vehicles.
- Control noise emissions at source by designing, selecting, operating and maintaining equipment, including vehicles to avoid or reduce exposure and, where further reductions in noise levels are required, enclosing noisy equipment.

We are satisfied that noise will be controlled, but the improvement conditions (IC18 and IC19) are designed to ensure that this remains the case. We consider it appropriate to require these improvement conditions to be undertaken following the increase in production capacity because this will build on the work undertaken to *predict* the impacts by providing an assessment of *actual* impacts. Regarding current operations, Manchester City Council have confirmed that there have been no noise complaints within the last three years.

Air emissions

The main source of emissions to air from the installation are from the steam raising boiler plant. This has previously been assessed at worst case operating levels. The application states that the steam demand associated with the production capacity increases will not increase point source emissions beyond those currently assessed and permitted. Therefore, no further assessment is required.

The response to the Schedule 5 Notice explains that the boilers are fuelled by natural gas or a mixture of natural gas and biogas. When dual fuelled, the NO_x emissions are lower than for the combustion of natural gas alone but the

SO₂ emissions are higher. However, these have already been assessed and screened out as insignificant. The burning of biogas is no longer a 1.1 A(1)(b)(iii) activity and this was removed from the permit in V006 when the biogas engine and CHP plant were surrendered. It remains appropriate for the biogas to be combusted in combination with natural gas in the brewery boilers.

The BREF notes that apart from the emissions to air from energy generation processes, the main potential emission sources are dust from material intake and transport of raw materials, i.e. grains, and filtration aids, i.e. kieselguhr. We are satisfied that all powder handling systems are contained in buildings.

Resource efficiency

It is BAT to implement a system for monitoring and reviewing consumption and emission levels for both individual production processes and at site level, to enable actual performance levels to be optimised. Heineken have introduced Total Productive Management (TPM) across the site whereby any losses can be tracked and recorded on a central database, promoting continual improvement. They have also described the individual process control system updates and enhancements in the previous variations. The new mash filters will result in a further enhancement to process efficiency. Therefore, it is anticipated that resource consumption (including raw materials, energy and water) and waste production will be below 'pro-rata' for the increased production volumes. The site already achieves zero waste to landfill.

Waste minimisation and water audits are undertaken at least every four years to identify ongoing improvements. Water efficiency is of great importance in the food and drink sector due to the high usage in order to achieve the required food safety and hygiene standards. The BREF notes that cleaning of equipment and installations consumes a major proportion of the water used in the sector. Reduced water consumption also leads to reduced volumes of waste water for treatment. Therefore, we encourage sites to reuse water wherever possible. The application describes the measures the site takes to ensure water is used efficiently, including the reuse of rinse waters in CIP. As a result, the site expects that they will maintain or even reduce their consumption of 3.1 litres water/litre product. We are satisfied that this is well within the BREF benchmark, which notes that water consumption for modern breweries generally ranges from 0.3 to 0.9 m³/hl of beer produced (3 to 9 litres/litre product). An area where further savings could be made is through the re-use of treated effluent within the process. The variation will include an improvement condition requiring the operator to consider this as part of their next water efficiency audit in 2015 (IC22).

Energy

The BREF explains that breweries need both electrical and heat energy and that the main heat consuming process steps are mashing, wort boiling, generation of hot liquor, CIP, sterilising, bottle/keg cleaning and pasteurising. It is BAT to apply and maintain a methodology for preventing and minimising the consumption of energy. The BREF goes on to note that the choice of

mash process influences the energy consumption in the brewhouse and hence in the brewery as a whole. The application cites the change to mash filters as an improvement in the energy use efficiency. Furthermore, changes proposed in this and the previous permit variations include the replacement of existing equipment and plant which could be considered outdated or becoming obsolete with new modern and more efficient equipment and plant. It is therefore expected that the energy use per hectolitre of product will be maintained or improved. The variation will include an improvement condition requiring the operator to assess the energy efficiency resulting from the increase in capacity as part of their next energy efficiency audit in 2015 (IC23 and IC24).

Accidents

To prevent accidents and minimise their harm to the environment as a whole, BAT is to identify potential sources of incidents/accidental releases that could harm the environment, carry out a risk assessment and identify and implement any additional controls that are necessary. The application includes an accident risk assessment for the mash filters, which does not expect will lead to any increases in the potential risks associated with the operation of the installation.

Groundwater

Following a number of submitted notifications for uncontrolled emissions to land where the root cause was linked to poor maintenance and inspection of drainage assets, we need to ensure that drainage management is addressed as an improvement condition (IC20). This is of particular importance because the site is partially on an SPZ1 (due to Heineken's own borehole, licence 2569007007).

Commissioning

As part of PO1, the operator is required to inform us when certain stages of the upgrading works are complete. This will help us to understand the operations on site and the implications for the deadlines of the improvement conditions that have timescales associated with completion of the upgrades.

Annex 1: decision checklist

This document should be read in conjunction with the application and supporting information and permit/ notice.

Aspect considered	Justification / Detail	Criteria met
		Yes
Consultation		
Scope of consultation	The consultation requirements were identified and implemented. The decision was taken in accordance with RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements.	✓
Responses to consultation and web publicising	The web publicising and consultation responses (Annex 2) were taken into account in the decision. The decision was taken in accordance with our guidance.	✓
Operator		
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will continue to have control over the operation of part of the facility after the issue of the variation. The decision was taken in accordance with EPR RGN 1 Understanding the meaning of operator.	✓
European Directives		
Applicable directives	All applicable European directives have been considered in the determination of the application. The variation incorporates the requirements of the Industrial Emissions Directive (IED), which includes the addition of the periodic monitoring condition and an update to the notification condition. The listed activity is still 6.8 Part A (1) (d) (ii) but the wording has changed slightly to note that this is for processing of ONLY vegetable raw materials.	✓
The site		
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility, including the location of the part of the installation to which this permit applies on that site. The boundary of the effluent treatment plant that operates within the wider brewery boundary has expanded slightly to accommodate the additional storage. The response to the Schedule 5 Notice confirms that the operator of the ETP will assume responsibility for the quality of this land. A plan is included in the permit and the operator is required to carry on the permitted activities within the site	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
	boundary. The amended site boundary around the ETP is shown with a blue line and excluded from the brewery permit.	
Site condition report	<p>The operator has provided a description of the condition of the site.</p> <p>We consider this description is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under IED–guidance and templates (H5).</p>	✓
Biodiversity, Heritage, Landscape and Nature Conservation	<p>The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat - Rochdale Canal SAC.</p> <p>A full assessment of the application and its potential to affect the site has been carried out as part of the permitting process. We consider that the application will not affect the features of the site.</p> <p>We have not formally consulted on the application and have sent our assessment to Natural England for information only. The decision was taken in accordance with our guidance.</p>	✓
Environmental Risk Assessment and operating techniques		
Environmental risk	<p>We have reviewed the operator's assessment of the environmental risk from the facility.</p> <p>The operator's risk assessment is satisfactory, although we note the following:</p> <ul style="list-style-type: none"> • Some overly conservative assumptions were made in the H1 assessment of the impact of the discharge on the Manchester Ship Canal. We agree with the overall conclusion of no significant impact. • We are satisfied that the applicant has shown that noise will not be significant but in order to ensure that this remains so under operation at the increased capacity we have set improvement conditions requiring a noise assessment, to validate the predictions and ensure that noise is not causing pollution off site. <p>See the Key Issues section for further detail on these matters.</p>	✓

Aspect considered	Justification / Detail	Criteria met Yes
	<p>The assessment shows that, applying the conservative criteria in our guidance on Environmental Risk Assessment, all emissions may be categorised as environmentally insignificant.</p>	
<p>Operating techniques</p>	<p>We have reviewed the techniques used by the operator and compared these with the relevant guidance notes:</p> <ul style="list-style-type: none"> • The Reference Document on Best Available Techniques in the Food, Drink and Milk Industries August 2006 (BREF). • How to comply with your environmental permit, Additional guidance for: The Food and Drink Sector (EPR 6.10) <p>The proposed techniques/ emission levels for priorities for control are in line with the benchmark levels contained in the guidance notes and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with the relevant BREF and guidance note.</p> <p>We consider that the emission limits (or appropriate measures) included in the installation permit reflect the BAT for the sector.</p> <p>The previous variation applications (V005 – V007) have assessed the BAT associated with those process modifications required to support the capacity increase at the installation. This includes:</p> <ul style="list-style-type: none"> • Installation of modern energy efficient plant (including CIP). • Upgrade to equipment with a higher product yield and less wastage (including reduced water consumption). • Improvements to materials storage resulting in reduced environmental risk. • Increased use of bulk materials storage and handling. • New emissions control measures including reverse jet filters. • Enhanced process automation, process monitoring and process controls. 	<p>✓</p>

Aspect considered	Justification / Detail	Criteria met Yes
	<p>In terms of the BAT applicable to the specific changes required under this variation (i.e. installation of the mash filters and a subsequent increase in effluent volume), the application has addressed the following BAT measures:</p> <ul style="list-style-type: none"> • Ensure that effluent treatment plant is adequately sized and maintained. • Identify the major risks associated with the effluent treatment plant (ETP) and have procedures in place to minimise them. • Use measures to detect variation in effluent composition. • Provide adequate effluent buffer storage so that you can stop spills reaching the ETP or controlled water, especially those spills with high organic strength. Use a balancing tank. • As a minimum, control all emissions to avoid a breach of water quality standards (These five points covered in Appendix 1: ETP risk assessment). • Assess the potential environmental impact of raw materials and make substitutions where appropriate. (Table 7 and response to Part C3, question 6d in Section III: Supporting Information). • Demonstrate that the chosen routes for recovery or disposal represent the best environmental option (Response to Part C3, question 6e in Section III: Supporting Information , including zero waste to landfill). • Wherever possible raw materials and product should be kept out of the wastewater system. (response to Part C3, question 6d in Section III: Supporting Information). 	
The permit conditions		
Updating permit conditions during consolidation.	<p>We have updated previous permit conditions to those in the new generic permit template as part of permit consolidation. The new conditions have the same meaning as those in the previous permit(s).</p> <p>The operator has agreed that the new conditions are acceptable.</p>	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Pre-operational conditions	<p>Based on the information in the application, we consider that we need to impose pre-operational conditions.</p> <p>The application includes a summary of the Interim Management and Commissioning Plan, in recognition that there may be some heightened risks presented by the upgrading works at the brewery. We will require a full copy of this for approval, prior to the commissioning of the brewery upgrades causing an increased flow or load to the ETP. This plan and its additional measures must then be implemented until full brewery production and enhanced ETP operation are achieved and the operator should inform us when this is complete. (PO1)</p> <p>We have also included a formal requirement for the operator to update their Environmental Management System and any associated documents, which should be made available to us for inspection. (PO2)</p> <p>To recognise that the operator is interested in utilising higher levels of biogas within the boilers, they are required to share their feasibility study of this with us beforehand. If anything of significance is identified then a variation application would be required. From the information provided in this application, this is unlikely to be necessary as the maximum impacts of emissions to air have already been assessed and found to be insignificant. (PO3)</p>	✓
Improvement conditions	<p>Based on the information in the application, we consider that we need to impose improvement conditions.</p> <p>We are satisfied that the assessments have found no significant impacts from the operations at the increased capacity and in order to confirm that this continues to be the case we have imposed improvement conditions to ensure that:</p> <ul style="list-style-type: none"> ➤ The BAT requirement to 'Identify and evaluate opportunities for the recycling or reuse of water, taking into consideration hygiene issues and practical constraints' is addressed within an appropriate timescale of the operation of production at the increased capacity. ➤ the appropriate measures are in place to prevent annoyance from noise and vibration. 	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
	<ul style="list-style-type: none"> ➤ the appropriate measures are in place to prevent fugitive emissions to surface water and groundwater. ➤ appropriate measures are in place to ensure the efficient use of water. ➤ appropriate measures are in place to ensure that energy is used efficiently ➤ appropriate measures are in place such that waste production will be avoided as far as possible, and where waste is produced it will be recovered unless technically and economically impossible. 	
Incorporating the application	<p>We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the determination process.</p> <p>These descriptions are specified in the Operating Techniques table in the permit. This includes reference to sections of the application detailing the proposed operational changes resulting from the installation of the mash filters.</p>	✓
Emission limits	<p>There are currently no emission limits in the permit, except for an annual limit on NOx. We have decided that no new emission limits should be set for the parameters listed in the permit.</p> <p>It is considered that the equivalent parameters or technical measures referenced from the permit will ensure that significant pollution of the environment is prevented and a high level of protection for the environment secured.</p>	✓
Monitoring	<p>We have previously decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified. The only changes we have made to these in this variation is to update some of the monitoring methods.</p> <p>Based on the information in the application we are satisfied that, where necessary, the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.</p>	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Reporting	We have specified reporting in the permit. No changes have been made to these requirements through this variation.	✓
Operator Competence		
Environment management system	There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence.	✓
Relevant convictions	The National Enforcement Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in RGN 5 on Operator Competence.	✓
Financial provision	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence.	✓

Annex 2: Consultation and web publicising responses

Summary of responses to consultation and web publication and the way in which we have taken these into account in the determination process. (Newspaper advertising is only carried out for certain application types, in line with our guidance.)

Response received from
Manchester City Council
Brief summary of issues raised
Nothing to report regarding noise complaints from the past three years. No other matters brought to our attention.
Summary of actions taken or show how this has been covered
None required

Response received from
United Utilities Water PLC
Brief summary of issues raised
No objection. Represents BAT.
Summary of actions taken or show how this has been covered
None required.