Cyfoeth Naturiol Cymru
Natural Resources Wales

Natural Resources Wales permitting decisions

Sherwin-Williams UK Limited: Deeside Packaging Coatings Decision Document

Application for a Bespoke Permit Variation

The application number is: PAN-015227

The Applicant / Operator is: Sherwin-Williams UK Limited

The Installation is located at: Deeside Packaging Coatings, Parkway, Deeside Industrial Park, Deeside, CH5 2NN

We have decided to issue the variation for Deeside Packaging Coatings operated by Sherwin-Williams UK Limited.

The variation number is BU7545IM/V004.

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

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Key issues of the decision

The operator produces coatings for use in the packaging industry at its Deeside plant, and has an environmental permit from Natural Resources Wales. The variation application is for a new manufacturing line to allow the production of a new coating product for the beverage can market, with new intermediate resin and associated final product. This will require the installation of the new manufacturing line, largely within the existing site buildings and containment, and within the existing site boundary. The detail of the changes are described in the application and key environmental aspects are identified in this document.

The key issues of the decision were:

- the assessment of potential environmental impacts of the new operations (air quality, odour, noise, containment of substances)
- Environmental management and application of Best Available Techniques (BAT)

1 Our decision

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

This Application is to vary operations (by installation of a new production line) at an installation which is subject principally to the Environmental Permitting Regulations 2016 (EPR) and is subject to the requirements of the Industrial Emissions Directive (IED).

The permit and variation notice contain 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 permit, we have considered the Application and accepted the details are sufficient and satisfactory to make the standard conditions appropriate.

This document should be read in conjunction with the application and supporting information and permit, as well as site permitting history.

2 How we reached our decision

2.1 Receipt of Application

The Application was accepted as duly made on 09/03/22. This means we considered it was in the correct form and contained sufficient information for us to begin our determination, but not that it necessarily contained all the information we would need to complete that determination.

The Applicant made no claim for commercial confidentiality. We have not received information that appears to be confidential in relation to any party.

Having sought pre-application advice from NRW on the matter, the applicant was unsure if the variation was Normal or Substantial, and submitted the variation with the Substantial variation fee, pending our assessment. As part of the Duly Making process we confirmed that the proposed changes would constitute a Normal Variation, and arranged for a refund of the over-paid fee.

2.2 Consultation on the Application

We have not carried out consultation on the Application. This is in accordance with the requirements of the Environment Permitting Regulations (EPR), our statutory Public Participation Statement (PPS) and our Regulatory Guidance Note RGN6 for Determinations involving Sites of High Public Interest. Furthermore we have also considered the Well-Being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016 during this assessment. We do not normally consult on Normal Variations and have not done so in this case. We do not consider the application or site to be of high public interest.

A copy of the Application and all other documents relevant to our determination (see below) are available for the public to view. Anyone wishing to see these documents could arrange for copies to be made.

2.3 Requests for Further Information

In order for us to be able to consider the Application duly made, we needed more information. We requested further information on 08/02/2022 relating to:

- Assessment of air quality impacts of emissions of volatile organic compounds (VOCs)
- Confirmation of the cooling tower specification in respect to noise (*two options were stated in the application, pending final selection*)
- Which BAT conclusions were applicable to the process
- Clarification of details of the proposed new manufacturing process and chemistry (comparability with existing line/chemistry, provision of all material safety data sheets (MSDS), cross-referencing of MSDS to Raw Material (RM) codes used in the application documentation, confirmation of containment standards for the storage of substances, clarification of air emission points).

Upon receipt of this information, we were able to consider the application Duly Made. In addition, at our request the operator clarified several minor points of detail which arose during our duly making assessment, which were not material to the duly making decision, but which were provided and placed on file to facilitate the subsequent determination.

The permit determination also coincided with a planned regulatory visit to the site, so the determining officer was able to join the site visit on 16th February 2022. The application and permitting decision are fully described in the written records, but the visit helped to provide context to the application, and was an opportunity for the operator to clarify what information was required to respond to the information request described above.

During permit determination, the applicant was served with a Schedule 5 notice on 17th May 2022, requiring information on the approach to compliance with Chapter V of IED (installations and activities using organic solvents). In the variation application it was unclear how these requirements (which predominantly apply to the Part B coating formulation activity) would be affected by the new Part A chemical manufacturing line. A comprehensive response was provided on 15th June 2022.

A copy of the letters, emails and notice requesting further information were placed on our public register as were the responses when received.

3 The Legal Framework

The variation will be issued, under Regulation 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 the Well-Being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016 which also have to be addressed.

We address the legal requirements directly where relevant in the body of this document. NRW is satisfied that this decision is consistent with its general purpose of pursuing the sustainable management of natural resources (SMNR) in relation to Wales, and applying the principles of SMNR. In particular, NRW acknowledges that it is a principle of sustainable management to take action to prevent significant damage to ecosystems. We consider that, in granting the Permit a high level of protection will be delivered for the environment and human health through the operation of the Installation in accordance with the permit conditions. NRW is satisfied that this decision is compatible with its general purpose of pursuing the sustainable management of natural resources in relation to Wales and applying the principles of sustainable management of natural resources.

4 The Installation

4.1 Description of the Installation and related issues

4.1.1 The permitted activities

The Installation is subject to the EPR because it carries out an activity listed in Part 1 of Schedule 1 of the EPR:

- Schedule 1, Part 2, Chapter 4, **Section 4.1 Part A(1) (a)** *Producing organic chemicals such as* **(ii)** *organic compounds containing oxygen (for example alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, peroxides, phenols, epoxy resins)* ***and;***
- Schedule 1 Part 2, Chapter 6, **Section 6.5 Part B (a)** *Unless falling within Part A(1) or Part A(2) of any other Section* **(i)** *manufacturing or formulating printing ink or any other coating material containing, or involving the use of, an organic solvent, where the carrying on of the*

activity is likely to involve the use of 100 or more tonnes of organic solvents in any 12-month period.

Furthermore, the Part B activity is subject to Chapter V of IED (Installations and activities using organic solvents) as it constitutes prescribed activity "*Manufacturing of coating mixtures, varnishes, inks and adhesives*". It is considered that the chemical manufacturing Part A activity is outside of the scope of the Chapter V requirements.

There are no changes to the permitted activities as a result of the variation, as the existing and new operations fall under the same activity descriptions. Therefore only the permitted capacity of the site and the production infrastructure are changed as a result of the variation

An installation may also comprise "directly associated activities", which at this Installation includes the following. Only one has been added as a result of the variation, and the scale of other operations has increased as indicated:

- Deionised water supply, deionised water using reverse osmosis (*new plant and increased production/usage*)
- Waste storage (*increased production/storage*)
- Process and building hot Water supply, gas-fired (Existing *1MW$_{th}$ input gas fired hot water boiler)*
- Other process heating (N*ew ~0.8MWth electric powered thermal oil heater*)
- Production cooling system, 2 cooling towers (*existing cooling tower plus new ~1MW cooling tower*)
- Coolant supply, chilled Glycol/water mix (increased usage/circulation)
- Nitrogen gas supply (*new plant and increased usage / production*)
- Compressed air supply (*increased usage / production*)
- Emergency backup generator, 0.899 MW$_{th}$ (*existing equipment [2011], but not previously listed in the permit, and identified as a DAA during the determination. Not subject to MCP or SG regs as <1MWth on IED Ch II installation*).

Together, these listed and directly associated activities comprise the Installation.

4.1.2 The Site

The facility is located within the Deeside Industrial Park, 7 km North West of Chester and comprises a factory, a laboratory and office accommodation. The site is bordered on all four sides by neighbouring industrial premises.

There are protected habitats in the vicinity of the site. The Dee Estuary is a Ramsar wetlands site, a Special Area of Conservation and a Special Protection Area, approximately 3.3 km west of the Site. The River Dee and Bala Lake is a Special Area of Conservation located approximately 8 km south east of the Site.

The nearest human receptors are adjacent industrial / commercial units which form a boundary with the installation. The nearest residential receptors are approximately 1 km north-east of the site, in the village of Shotwick.

The Applicant has provided plans which we consider are satisfactory, showing the extent of the site of the facility, and its location.

A plan is included in the permit and the Applicant is required to carry on the permitted activities within the site boundary. There are no changes to the site boundary as a result of the variation and so the permit main site plan has not been updated. A revised emission point plan was included in the application and is incorporated into the permit.

4.1.3 What the Installation does and what the variation is for

The operator produces coatings for use in the packaging industry at the installation. The variation application is to allow the production of a new coating product for the beverage can market, with new intermediate resin and associated final product. This requires the installation of a new manufacturing line, largely within the existing site buildings and structures, including for containment. To accommodate the new line, a number of old redundant vessels in the coating/paint plant are being removed, but their removal does not affect the environmental permit significantly as there are no direct emission points from these vessels. Changes are described in the application documents.

The process steps to making the new product are almost identical to those already taking place on site for the currently permitted activities and products, with substitution

of some raw materials. There is also separation of two production steps into separate vessels which in the current line are done in the same vessel. The overall process chemistry, reactions, reactivity, energy, chemical and environmental hazard are very similar between existing and new modified processes.

Resin production is a batch process which in the new line takes place in two main reaction vessels, with supporting raw material and product weighing and storage vessels. There are heating and cooling circuits as well as trace heating for process control, and nitrogen gas is used as an inert atmosphere for process vessels and reactions.

The new epoxy resin is reacted with other chemicals in organic solvent mixture in an exothermic catalysed reaction in heated/cooled “upgrade reactor” vessel. A condenser and scrubber are used for solvent retention and emissions control, and serve the whole interconnected production line. The intermediate resin product is then transferred to a second vessel for an acrylation polymerisation reaction with a monomer in the presence of an initiator, which is termed the “extension” reaction and forms and epoxy acrylate. This differs slightly from the original production line, where upgrade and extension were carried out in a single vessel. The epoxy acrylate is then transferred to a water based solvent and undergoes various finishing processes before transfer to storage vessels. If finishing processes are conducted in the main EPR Part A reaction system, they are considered as integral to the process for regulatory purposes. If they are transferred to separate Paint Plant vessels, then these are EPR Part B activities subject to Chapter V of IED. Further detail on the process chemistry is given in the application, the permit, and the permitting history for the first line.

Fugitive emissions are controlled e.g. by appropriate “vent” arrangements on tanks, and the principal route of emissions is of VOC via the reaction vessel, and condenser, which collects the majority of volatile organics from the process. The principal VOC of concern is Ethyl Acrylate, which has significant odour potential, and is a medium hazard VOC. Other Low and medium hazard VOCs are used in the reactions and emitted in small amounts, and their potential environmental impacts are discussed below. A wet, reactive scrubber is used to remove majority of remaining ethyl acrylate by reactive destruction and is located after the condenser. It will have some, but

potentially limited efficacy in removing other VOCs, largely dependent on their miscibility in water and ability to be broken down by alkali reaction in potassium hydroxide in the scrubber. New emission point A4 is associated with the scrubber leading from the condenser and main reaction vessel.

Direct emissions from vessel cleaning are minimised by use of "Cleaning in place" techniques. As per current procedure, cleaning chemicals (aqueous and organic) are taken for off-site management/disposal. Existing site-wide "services" such as nitrogen, heating and cooling, will be extended to the new line. These directly associated activities will have limited environmental impacts, as detailed elsewhere in this document.

Overall, the site will go from one production line to two, within the existing site footprint, and with an associated site expected production capacity increase from 16,500 tonnes per annum in 2018 to 28,200 tonnes per annum when the second line is fully operational. The theoretical site maximum production capacity is 35,000 tonnes per annum.

4.1.4 Principal Environmental Guidance for the permitted activities

Various regulatory guidance which applies to the facility is referred to within the application and this document. When we received the application, the operator had completed Best Available Techniques (BAT) assessments using the Large Volume Organic Chemicals (LVOC) and Common Waste Water and Waste Gas Treatment/Management systems in the chemical sector (CWW) BAT reference documents (BREFs). We have confirmed that the operator considers that the plant does not fall directly into the scope of either of these BREFs, or any other BREF and so considers these BREF to be indirectly applicable. We agree with this assessment and therefore consider these to be the main BREFs which are informative to our decision. This position has not changed as a result of the proposed variation.

As identified above and in the permit, the installation is subject to Chapter V of IED for processes using organic solvents. The operator confirmed during the determination that the Chapter primarily applies to the Part B coatings/paint plant. While some integrated finishing/coatings activity may take place within the new Part A chemical

production vessels, we are satisfied that Chapter V controls apply only to separate formulation activity conducted in the separate vessels of the coatings/paint plant according to the statutory guidance RGN2 “understanding the meaning of a regulated facility”.

4.1.5 Key Issues in the Determination

Our decision includes but is not limited to the following key issues:

- the assessment of potential environmental impacts of the new operations (air quality, odour, noise, containment of substances)
- Environmental management and application of Best Available Techniques (BAT)

4.2 The site and its protection

4.2.1 Site condition report

As part of the variation application, the facility’s existing original Application Site Condition Report (“baseline” report) has been reviewed by the operator and a separate operational phase section of a Site Condition Report has been produced specifically for the proposed changes, following relevant Regulatory Guidance H5. The information provided is considered consistent with the variation applied for and has been placed on file where it will inform the eventual site surrender process.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

The operator has a duty to ensure that soil and groundwater are protected in order to meet the requirements of Articles 14 (1)(b), 14(1)(e) and 16(2) of the IED. The operator has identified the use of existing and new potentially pollution substances and has measures in place to prevent pollution, principally by appropriate primary and secondary containment. The substances, risks, and controls are described in the application, including the site condition report (operational phase update) and environmental risk assessment (land and groundwater and accident sections).

Further description and assessment of the containment arrangements is given in section 5.4 of this document.

We are satisfied that ground, groundwater, surface water, and sewers are protected adequately from the release of potentially polluting substances.

4.2.3 Closure and decommissioning

Permit condition 1.1.1 requires the Operator to have a written management system in place which identifies and minimises risks of pollution including those arising from closure.

At the definitive cessation of activities, the Operator has to satisfy us that the necessary measures have been taken so that the site ceases to pose a risk to soil or groundwater, taking into account both the baseline conditions and the site's current or approved future use. To do this, the Operator has to apply to us for surrender, which we will not grant unless and until we are satisfied that these requirements have been met.

4.3 Operation of the Installation – general issues

4.3.1 Administrative issues

The Applicant is the sole Operator of the Installation. We are satisfied that the Operator has control over the operation of the permitted Installation; and that the Operator will be able to operate the Installation so as to comply with the conditions included in the varied Permit. We note that this variation (V004) was made by the new operator shortly after an application to transfer of the permit (T003) from Valspar to Sherwin-Williams UK Limited. Both company names may be found in our records from the time.

4.3.2 Management

The Applicant has stated in the Application that they will implement an Environmental Management System (EMS) that will meet the requirements for an EMS in our "*How to comply with your environmental permit guidance*". The Applicant submitted a summary of the EMS with their application.

The applicant has an EMS which is certified to ISO14001 and make the changes necessary to include the new production line in its scope.

We are satisfied that appropriate management systems and management structures will be in place for this Installation, and that sufficient resources are available to the Operator to ensure compliance with all the Permit conditions.

4.3.4 Accident management

In order to ensure that the management system proposed by the Applicant sufficiently manages the residual risk of accidents, permit condition 1.1.1a requires the implementation of a written management system which addresses the pollution risks associated with, amongst other things, accidents.

As part of the application, the operator has submitted a detailed environmental risk assessment, section 3.7 of which is a comprehensive accident risk assessment (3.3. land and groundwater assessment is also relevant, see “containment” section 5.3 below). The application also indicates that the EMS includes sufficient accident management provisions. Finally, it is noted that the installation is subject to the Control of Major Accident Hazards (COMAH) regulations and has in place a Major Accident Prevention Policy (MAPP). While detailed review of these is outside the scope of the permit determination, this regulation by the relevant competent authority provides a high degree of additional assurance that appropriate accident management provisions are in place. Overall we are satisfied with the accident management provisions in place.

4.3.7 Operating techniques

The operator has undertaken a comprehensive review of their proposed facility and operating techniques against the most relevant BATc (LVOC and CWW, as outlined in section 4.1.2 above). The assessment forms Appendix D to the application.

We have reviewed the techniques proposed by the operator for the new line and compared these with the relevant guidance notes. The proposed techniques/ emission levels for priorities for control are in line with the benchmark levels contained in the most applicable BREFs (LVOC and CWW) and we consider them to represent BAT for the facility. Key points of BAT compliance include, but are not limited to:

- Characterisation and monitoring of channelled emissions to air (including odour) and water for relevant substances, and with appropriate emission limit values (ELVs) where relevant

- Minimisation of pollutant loading to waste gas treatment and emissions to air by integrated waste gas management/treatment strategy including the use of condensers to retain materials and increase resource efficiency
- Use of reactive alkaline wet scrubber to capture and destroy residual pollutant (Ethyl acrylate)
- Fugitive emission assessment, minimisation and control including:
    - enclosure and minimisation of emitted dust with fabric filters;
    - Pressure/vacuum relief valves minimising tank “breathing” losses, with vapours routed to the;
    - Condenser and scrubber on main reaction vessel for organic chemicals as described above
- Use of catalysts, recovery of solvents, cleaning in place (CiP) and waste management plan to enhance resource efficiency and reduce waste
- Appropriate environmental management systems, including management and minimisation of “other than normal operating conditions” (OTNOC)
- Odour assessment and management plan
- Noise assessment and minimisation of emission (see below)

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.

These are specified in the Operating Techniques table in the permit.

4.3.7 Energy efficiency

We are satisfied that the Applicant will ensure that energy is used as efficiently as possible. The application details energy efficiency in section 4.2 of the main application supporting document

The Operator is required to use energy efficiently under permit condition 1.2 and to report energy usage under condition 4.2 and Schedule 4.

The permit reporting parameters are unchanged enable Natural Resources Wales to monitor energy efficiency at the Installation

4.3.8 Avoidance, recovery or disposal of wastes produced by the activities

This requirement addresses wastes produced at the facility. Section 4.2 of the main application supporting document describes how waste will be managed from the new activity.

Having considered the information submitted in the Application, we are satisfied that the waste hierarchy referred to in Article 4 of the WFD will be applied to the generation of waste and that any waste generated will be treated in accordance with this Article.

We are satisfied that waste from the Installation that cannot be recovered will be disposed of offsite using a method that minimises any impact on the environment. Permit condition 1.4.1 will ensure that this position is maintained. While it is expected that the generation of waste on site will increase proportionally to the capacity increase, there are no significant new waste types, and waste management techniques/routes will be unchanged as a result of the variation.

5 Minimising the Installation's environmental impact

Regulated activities can present different types of risk to the environment, these include odour, noise and vibration; accidents, fugitive emissions to air and water; as well as point source releases to air, water, sewer and discharges to ground or groundwater, global warming potential and generation of waste. All these factors are discussed as relevant in this and other sections of this document.

The principal emissions or possible impacts from the variation to the installation are:

- emissions to air of odorous VOCs (odour and air quality implications) (section 5.1 and 5.2)
- Noise and vibration (section 5.3)
- Possible unintended discharge of chemical substances and discharge to ground, groundwater, surface water or sewer (section 5.4 and 5.5)
- Potential impacts on protected ecological sites (section 5.6)

The next sections of this document explain how we have approached the critical issue of assessing the likely impact of emissions from the Installation on human health and the environment and what measures we are requiring to ensure a high level of protection.

We have reviewed the operator's assessment of the environmental risk from the facility and consider that the operator's risk assessment is satisfactory, with key issues being considered as outlined below.

5.1 Assessment of odour impact

The operator has identified that chemicals used on site, including those for the new line, have potential to cause odour impacts. The principal odorous materials are solvents used in the process. Ethyl acrylate is the most odorous, but methyl ethyl ketone and methyl isobutyl ketone also have potential odour impact.

Section 3.4 of the operators Environmental Risk Assessment provided with the application identifies possible routes of odour emission, and describes how risks will be minimised through application of BAT. Good practice such as back-venting of vapour from tanker deliveries to the resin storage tank will minimise fugitive emissions, while process-related emissions from the rection system will be minimised by the use of the condenser and wet scrubber on the main reaction vessel (described above, section 4). The scrubber is expected to remove odour with a 99.95% efficiency from the waste gas stream for ethyl acrylate. Vapour from other connected vessels (such as the raw material weigh tanks) will be routed to the condenser/scrubber by use of pressure/vacuum relief valves to prevent free-venting to atmosphere, thus minimising fugitive releases.

The operator has undertaken detailed odour dispersion modelling to assess the possible impacts at receptors of odour from manufacturing activity on site. The application report "odour assessment" (ref AQ-001, dated September 2021) summarises the modelling which was completed using ADMS 5, a commonly used computer model suitable for the purpose. Further technical detail of the modelling (such as treatment of terrain and buildings, selection of modelled grid and resolution, meteorological data etc) is contained within the report and are considered appropriate to meet the requirements of Environment Agency guidance H4 for odour assessment.

Modelling was based on emissions of ethyl acrylate from the whole site (new proposed emission point A4, plus existing stacks A1, A2, A3 and A5, with fugitive/diffuse

emissions being minimised as detailed above). The report modelled emissions of ethyl acrylate (most odorous emission), and made a quantitative assessment that impacts of methyl ethyl ketone, and methyl isobutyl ketone were insignificant by comparison. It is noted that this also appears to assume a removal by the scrubber of 99.95% for other substances, whereas we consider that the actual removal efficiency may be lower for other substances, as the scrubber is primarily for ethyl acrylate control. Nevertheless, the assessment that ethyl acrylate is the dominant odour contributor remains valid. Other potentially odorous chemicals were deemed insignificant. These decisions were justified, based on emission concentration (before and after scrubber) and chemical odour potential.

We are in agreement with this approach. The assumptions underpinning the model have been checked and are reasonably precautionary:

- Odour emissions are assumed to occur continuously throughout the production cycle at the maximum (peak) rate anticipated. In a batch process the peak emission will occur only for a relatively short time, with emissions being lower the rest of the time, meaning that the modelled impact will be an over-estimate.
- Odour emissions are assumed to be continuous through the year, when the plant would typically be operational for 43 weeks (83%) of the year.
- Emissions modelling is for the whole site (A1-5), when the impact of the new process (A4) is a small proportion of the total impact (<5%, see below)

The operator has classified the potential odour emissions as being of “moderately offensive” nature, according to the H4 guidance, meaning that a benchmark of 3 European Odour Units per cubic metre (OU_e/m^3) is used for assessment of potential off-site impact, with 1 OU_e/m^3 being the minimum level which can reliably be detected. Impacts are expressed in the standard way, as the 98^{th} percentile of hourly average concentrations over the year.

The maximum odour level on the modelled grid for the five modelled years was 2.68 - 2.99 OU_e/m^3, i.e. the maximum modelled concentration was effectively at or below the benchmark level. The location of the annual maxima are given in the report, and do

not occur at receptors, but are outside locations in the immediate vicinity of the installation, albeit in public areas close to potential receptors.

The maximum odour level at receptors for the modelled years was 2.42 OU_e/m^3 at receptor 3. Similar odour impacts were predicted for different years and different receptors (R1, R3), with further potential receptors being less impacted (0.68 – 2.07 OU_e/m^3).

We are satisfied that the modelling undertaken is reasonably robust, and agree with the applicant's conclusion that the proposed variation "is unlikely to cause odour impact at the nearby sensitive receptors and the risk of adverse odour effect is unlikely".

Although the application did not highlight the fact, we further note from the supporting data in the report (Appendix C, modelling results) that the contribution of the proposed new process stack (A4) is a very small proportion of the overall emission impact of the installation. A4 contributes less than 5% of the total site odour impact, which is dominated by existing stack A1. We therefore have further confidence that the proposed variation will have an insignificant effect on the odour impact of the site, which in any case is unlikely to cause adverse effect.

5.2 Assessment of Impact on Air Quality

While the application detailed the potential impact of emissions of chemicals - volatile organic compounds (VOC) on odour, it did not fully quantify potential impact on air quality standards. Therefore additional information was requested before the application was duly made. Section 1.7 of the main application document made an initial assessment of potential air quality impacts and screened them as insignificant. This was supplemented by the response (dated 8th March 2022) to our request for further information.

An Air quality Screening risk assessment was undertaken as described in the guidance "air emissions risk assessment for your environmental permit", following the calculation methodology described. All of the relevant emissions are chemical substances, which can collectively referred to as VOCs. Over 20 chemical substances

which may be present in emissions were individually assessed, against relevant Environmental Assessment Levels (EAL) where these existed, or otherwise against Derived No-Effect Levels (DNEL) where these could be calculated. As all chemical components likely to be present in the emissions were quantified, there was no need to use the procedure described in the guidance "*if you release volatile organic compounds into the air and do not know what all the substances in them are*".

This assessment was in accordance with the guidance above, and based on actual emissions measurements for the existing production line and Emission Point A1. Further information was provided for the proposed new emission point (A4) regarding the expected and maximum (worst case) emission flows, and as noted, the worst case constituted a significant overestimate of actual annual or hourly emissions from the batch process.

We are in agreement with this approach for screening, although normally emissions screening would be based on Emission Limit Values (ELV), not on actual emissions. Nevertheless, given other precautionary elements to the calculation, and low results, the use of emissions data is acceptable. Calculation results were presented in a spreadsheet for each of the main possible VOC emission points A1, A3 and A4.

The applicant stated that as none of the calculated process contributions exceeded EALs or DNELs, further assessment was not required, with the implication being that emissions were either insignificant, or were unlikely to cause significant pollution. However, steps 2 and 3 of the risk assessment screening process were not detailed.

Based on the information provided by the applicant, we have compared the process contribution from each stack as a percentage of the EAL/DNEL. For all but one of the substances identified, the process contribution (PC) was far less than 1% of the ES/DNEL, and can be considered insignificant. The only pollutant where the PC is over 1% of the EAL (either short term or long term) is ethyl acrylate, where the total PC for the 3 stacks (A1, A2 and A4) is 2.7% of the long term EAL, and 2.0% of the short term EAL, based on assumed emission rate for A4 derived from A1 measurements. Given the relatively restricted and specialist use of significant quantities of ethyl acrylate, it is reasonable to assume the background concentration

to be approximately zero. The PEC can therefore be considered to be <3% of either the short term or long term ES, and unlikely to cause significant pollution after simple screening assessment.

Further calculations were provided for the new stack, presenting theoretical worst case flows of key pollutants at higher peak release rates, but noting that these are over estimates of time-averaged emissions. These calculate the A4 maximum PC for ethyl acrylate of 25 % of the long term EAL, and 17 % of the short term EAL. Combined with the other stack emissions from the site, the figures are 26 % and 17 % respectively. Thus neither EAL is likely to be exceeded, even based on a worst-case assessment. Similar calculations have been provided for selected other chemicals, with PCs being lower still.

We agree with the applicant that no further assessment is required, as clear evidence has been provided that either process contributions are insignificant, or in the case of ethyl acrylate, the environmental standard is unlikely to be exceeded. This decision is taken in accordance with our guidance on air quality assessment.

The operator has indicated that the total solvent use on site may increase significantly with the new production line. However, they have clarified in their response to our Schedule 5 notice that expected solvent emissions subject to regulation under Chapter V of IED (A5 and A37) are not expected to increase significantly, certainly not by more than 10%. In fact, it is expected that fugitive emissions may decrease as a result of the removal of a number of vessels from the paint/coatings plant. No further assessment is considered necessary and the change in fugitive emissions will be documented in the required annual solvent management plan submission.

5.3 Prevention of pollution of surface water, ground water and sewer by containment of substances

The site has a comprehensive arrangement of primary and secondary/tertiary physical containment, which is managed to reduce risk via an ISO 14001 certified environmental management system. This includes, but is not limited to accident reporting, monitoring and measuring, management of change, which are relevant to containment integrity.

The entire site already has appropriate primary and secondary/tertiary containments in place. Primary containment measures include appropriate design and material selection, construction and inspection/testing of primary vessels. Secondary containment of three main categories is present on site:

- Bulk storage within dedicated containment bunding with capacity exceeding 110% of the largest tank and 25% of the total storage capacity. 3 bulk storage areas are used: bulk vessels ("tank farm") in the yard, on main yard in front of workshop (*mainly Intermediate bulk containers - IBC's and drums*), internal warehouse (*principally IBCs*).
- Buildings/production areas (*impermeable solid flooring which in the event of significant spill, would drain into the outside yard*)
- Impermeable hardstanding and kerbing in all other operational areas (*mainly the outside yard, draining to onsite interceptors described below*)

The application environmental risk assessment details further potential loss of containment risks, and measures which will be implemented to minimise risk, such as tank high level and overfill alarms and monitoring, visible above-ground pipework within contained areas, containment inspection and testing regime, rigorous tank fill/discharge standard operating procedures and lock-off.

The operator has identified that a new dedicated external bund will be constructed in the yard, adjacent to the coatings plant building. This is for the storage of the raw material epoxy resin (Ref RE1086B) and the fume scrubbing plant [*CP-301 associated with air emission point A4, serving Reactor Vessel R301 and connected via condenser C301*]. This new bund will be constructed to relevant standard BS 8007 and design detailing will be based on the requirements of CIRIA C736, including exceeding 110 % / 25% minimum containment volumes. Furthermore any loss from this bund would run to the yard/interceptors as secondary containment.

NRW has already undertaken assessment of existing containment procedural arrangements on site (infrastructure and procedural), and are satisfied that they are appropriate. For the variation, we have confirmed with the operator that all the other additional materials storage on site are within the secondary containment capacity

where it serves both existing and new production lines, and that at least equivalent standards will be applied e.g. to procedures and monitoring of new plant.

The extensive hardstanding and containment at the site (production buildings and yard as well as tank farm) mean that risks which are commonly overlooked in containment design (e.g. containment of leaks from interconnecting pipework, risks from jetting leaks) are managed in the overall design. All new production storage, reaction, and transfer (pipework/forklift) are within existing contained areas. Construction/alteration work for the new production line will be undertaken in a way which maintains and does not significantly affect the integrity of existing containment.

Thus there is no likely pathway for contamination of ground or groundwater by site operations, given the containment arrangements. No effluent or water from production areas is directly discharged to controlled waters so there is no significant pathway for surface water contamination. Water from yard containment areas drains via interceptor tanks, and is actively discharged by pumping to foul sewer after monitoring for contamination to levels set in a trade effluent consent. If the water in the interceptors were contaminated, it would be emptied into road tankers and taken off site for appropriate treatment/disposal. Given the interceptor and testing regime, there is no significant pathway for contamination of surface water via the sewer network, from the site operations.

Based upon the information in the application we are satisfied that the appropriate measures will be in place to prevent pollution of ground, ground water and surface water.

5.4 Emissions to surface water, ground water and sewer

There are no planned emissions to ground water, and measures described above minimise the risk of accidental discharge or contamination. No effluent or water from production areas is directly discharged to controlled waters. Uncontaminated surface water only from building roofs is permitted to be discharged directly to surface water (emission point S1) and is unaffected by the variation. Water from yard containment areas drains via interceptor tanks, and is actively discharged to foul sewer as

described above (emission point F1). Again, these arrangements are unaffected by the proposed variation, and arrangements remain appropriate.

5.6 Noise Assessment

In accordance with the guidance "Risk assessments for your environmental permit", the operator submitted a "Preliminary risk assessment for noise" (*dated September 2021, report # 70082662 RP AC 01*) with their variation application. Based on this report, the applicant has concluded that further noise investigation (i.e. Full noise and vibration impact assessment to BS 4142:214 and noise management plan) is not necessary. We agree with this conclusion.

The preliminary noise risk assessment considered what potentially significant noise sources would be added to the installation as a result of the variation. They measured existing noise at the site boundary, and made a simple calculation of the likely change to noise from the variation, and determined that there would be no adverse change in the noise level at 4 site boundary monitoring points, provided that the quieter of two candidate options for cooling tower was selected. Before duly making the application, we confirmed with the operator that the quieter tower would be used. It is expected that the noise at site boundary would remain around 53-60 dB $L_{Aeq, t}$, unchanged by the variation. The data provided indicates that the noise from the site after variation would likely be dominated by existing permitted sources, with new sources being insignificant as 15 dB $L_{Aeq, t}$ or more quieter than existing sources at the site boundary.

The nearest residential noise sensitive receptor is approximately 1 km from the site, and is considered unlikely to be affected by noise from the installation, either before or after the variation. Other commercial / industrial sites near the installation could constitute noise sensitive receptors, but are considered unlikely to be impacted from the noise emission from the site (before or after variation), in the context of the noise soundscape in the area. We are not aware of any current noise issues or complaints arising from the current operations.

Based upon the information in the application we are satisfied that the preliminary noise risk assessment is appropriate for the proposed variation, and that noise risk

from the site is unlikely to alter significantly as a result of the proposed variation. Existing appropriate measures will be in place to prevent or where that is not practicable to minimise the effects of noise. Vibration is not identified as a significant risk.

5.7 Impact on Habitats sites, SSSIs, non-statutory conservation sites etc

European Sites

There are 3 sites within 10 km screening distance of the installation that fall under the protection of the Habitats Regulations, with the closest being over 3 km away:

- Deeside and Buckley Newt Sites UK0030132
- Dee Estuary UK0030131
- Bala Lake UK0030252

Habitats Regulations Assessment (HRA) is not required because there is no credible impact pathway to any Natura 2000/Ramsar site. Further information is given in the Form 1 Habitats Regulation Assessment, which is on the public register. There are no significant changes to risks from the site as a result of the variation. The air emissions (speciated VOCs) are not subject to limits for the protection of habitats receptors, and owing to the comprehensive containment in place, the risk of other contamination and impact on the protected site is negligible. Other mechanisms of harm (e.g. noise disturbance, accident/fire) are not credible given the 3 km or more distance from the installation to the protected sites.

SSSI Assessment

There are no Sites of Special Scientific Interest within a 2 km screening distance of the installation. Therefore no assessment is required and no credible impact of the proposed variation on SSSIs.

Non Statutory Sites Assessment

The applicant did not identify any non-statutory sites within the 2 km screening distance that we use for assessment. Searches on our systems identified one local wildlife site within a 2 km screening distance of the installation, and also one area of ancient woodland:

- Shotton Steelworks Local Wildlife site
- Ancient woodland at Old Marsh Farm Cottages

It is not unusual for there to be differences in open-source information on protected sites, and the identification of different potential receptors makes no material difference to the conclusion of our assessment.

We are satisfied that there is no credible significant impact from the proposed variation on non-statutory ecological sites. There are no air emissions with an established Environmental Standard for habitats site (speciated VOCs and total VOCs are emitted but have no ecological ES); there are no changes to emissions to water/sewer, and extensive measures to prevent discharge of chemical substances by implementation of appropriate containment; there are no residual mechanisms of harm (e.g. disturbance, odour) which are considered capable of having a credible effect on sites which are over 1 km from the installation.

5.8 Other changes to the site

As described in section 4.1, various directly associated activities are increasing in production/scale to accommodate the increased production capacity of the facility, such as increased process heating and cooling capacity, and supply of deionised water, nitrogen and compressed air.

In some cases, existing infrastructure can provide the increased capacity. In other cases, such as the nitrogen gas supply and deionised water plant, this is an opportunity for replacement and upgrade of existing equipment. We are satisfied from the application that BAT is being applied (in relevant matters such as energy use and noise emission) in respect of these minor changes to activities which in any case have only modest environmental impact. We do not require further assessment for environmental permitting.

6 Setting ELVs and other Permit conditions

We have decided that emission limits should be set for the parameters listed in the permit. Monitoring and limits have been set for specific substances emitted (ethyl acrylate) and total VOCs in line with the operator's impact assessment, proposed ELVs and limits on the existing line. Further detail is given below.

6.1 Translating BAT into Permit conditions

Article 14(3) of IED states that BAT conclusions shall be the reference for permit conditions. Article 15(3) further requires that under normal operating conditions; emissions do not exceed the emission levels associated with the best available techniques as laid down in the decisions on BAT conclusions.

As explained above, there are no BAT conclusions which are directly relevant to the installation, but the operator has assessed conformance against the two most relevant BAT conclusions. We are satisfied that the permit (including specified operating techniques) ensure that the installation meets appropriate BAT.

There are no specific BAT-associated emission limit values (ELVs) from these BATc associated with the specific manufacturing activity. Nevertheless, the emission limits described in the air impact (H1) screening assessment sets the worst case scenario. If this shows the emissions from the site are low and that they will not cause a breach of air quality objectives in the area then we are satisfied that the emissions from the site will not adversely impact the surrounding environment or human health. As detailed in section 5.2, the environmental impact of the installation has been assessed against relevant EALs, at the level of performance required. The installation will not result in the breach of any EALs. We accept that the applicant's proposals including use of containment, condenser and scrubber to limit emissions of various speciated VOC including ethyl acrylate are indicative BAT. The scrubber will dictate emission performance for ethyl acrylate and may help reduce concentrations of other VOCS (depending on their water solubility and reactivity), but the condenser is the primary control for VOC emissions other than ethyl acrylate.

The limits set for A4 are equivalent to those already imposed for the existing manufacturing line, but specified in a different manner. The basis of measurement has been updated to modern approach, i.e. concentration in mg/m^3, rather than a mass efflux limit in g/h, and measurement as total VOC by standard EN 12619, rather than as the sum of individual VOCs by standard CEN 13649, as explained below. So for ethyl acrylate, the emission limit of 1.75 mg/m^3 is directly taken from the application. For TVOC, the limit of 1250 mg/m^3 is derived from the proposed (and existing line) ELV of 2000 g/h (2000 000 mg/h), divided by the A4 flow of 1600 mg/m^3.

The specific ELV for Ethyl acrylate gives greater scrutiny over the key emission which the abatement system is designed to control, while the updated total VOC monitoring sets at least equivalent limits for other organic compounds.

Furthermore, as the application indicates that proposed ELVs may be some way above actual performance, but there is some uncertainty as to actual emissions performance. Hence we have set Improvement Condition IC14 (See Annex 1) which requires the operator to report on emissions performance, and allows Natural Resources Wales to reduce the emissions limit value for VOC from A4, if the limit set is found to be considerably above achieved new plant performance.

6.2 Monitoring

We have decided that monitoring should be carried out for the parameters listed in Schedule 3 of the permit using the methods and to the frequencies specified in those tables. These monitoring requirements have been imposed in order to demonstrate compliance with the emissions limits in the permit.

As noted above, the way in which we require monitoring of total VOCs has been updated for the new line when compared to the existing one. This is because the standard approach for monitoring and reporting of VOCs has changed since the original permit was issued. For the new emission point A4 we have removed monitoring of speciated VOCs (with the exception of ethyl acrylate which is still monitored and subject now to specific ELV) and replaced with monitoring of Total Volatile Organic Carbon (TVOC). So for the new line, we require measurement and reporting of Total VOC (TVOC) only, not the “Group A” and “Group B” VOCs classifications used previously, which is based on measurement of individual speciated VOCs, and summation of the results. This is because the standard monitoring approach has changed and EN 12619, the reference standard for measurement of total VOC, is generally preferred over the reporting of total VOCs as the sum of speciated VOC measured to CEN 13649 (see guidance EA TGN M16 on monitoring volatile organic compounds in stack gas emissions). We generally consider that monitoring total VOC to EN12619 is more satisfactory, precautionary, and subject to lower uncertainty than extensive speciated VOC measurements, unless information is specifically required on a specific substance of interest, as is the case

for ethyl acrylate as explained. We consider this monitoring approach appropriate as it aligns with the guidance above, the regulatory guidance: 'Monitoring stack emissions: techniques and standards for periodic monitoring' and BAT 2 of the LVOC BREF, where TVOC monitoring is specified, not speciated VOCs (with some exceptions, implemented as required). This approach is consistent with other permits recently issued in the chemicals sector by Natural Resources Wales.

The monitoring frequency is quarterly, consistent with other permitted discharges.

Based on the information in the Application and the requirements set in the conditions of the permit we are satisfied that the monitoring techniques, personnel and equipment employed by the Operator will have either MCERTS certification or MCERTS accreditation as appropriate.

6.3 Reporting

We have specified the reporting requirements in Schedule 4 of the Permit to ensure data is reported to enable timely review by Natural Resources Wales to ensure compliance with permit conditions and to monitor the efficiency of material use and waste recovery at the installation. Permitting following the variation is comparable to the previous reporting arrangements for the site, but incorporating the new line.

OPRA

The agreed OPRA score at the installation is **131**. This will form the basis for ongoing subsistence fees.

ANNEX 1: Improvement Conditions

Improvement Condition IC14: The Operator shall carry out a programme of total volatile organic carbon (TVOC) monitoring on emission point to air A4 as a minimum with the frequency and duration specified in Table S3.1. The Operator shall submit a written report to Natural Resources Wales for written approval including all monitoring results for at least 4 quarterly monitoring campaigns (or as otherwise agreed in writing with Natural Resources Wales) with an analysis of whether the TVOC emissions can be considered stable and low. Emission limit values may be reduced following Natural Resources Wales' review of the monitoring results as communicated to the operator in writing.

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