

Natural Resources Wales permitting decisions

Dow Silicones UK Limited (Barry Silicon Based Manufacturing Installation) Decision Document

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Variation

The variation number is: EPR/BR9685IX/V010

The operator is: Dow Silicones UK Limited

The installation is located at: Barry Silicon Based Manufacturing Installation, Barry Plant, Cardiff Road, Barry, Glamorgan, CF63 2YL

We have decided to issue the variation for Barry Silicon Based Manufacturing Installation operated by Dow Silicones UK Limited.

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.

Dow Silicones UK Limited applied to vary their permit for the Barry Plant to expand their Very Low Viscosity Fluids (VLVF) and packaging stretch project to make a wider range of VLVF materials and install a new self-contained drum and Intermediate Bulk Container (IBC) filling machines. The change in products to be made on the VLVF process will increase the siloxane release rate from two existing vents (on the 5042 rework tank and the 5000 storage tank) to make them authorised release points on the permit (due to the minimum threshold for inclusion being exceeded). This is due to making lower viscosity products which have a lower boiling point, and being more volatile will have proportionally higher releases to air. The project will also install two new product storage tanks in the dedicated space available in the W404 tank farm for storage of the higher viscosity products. The local vent points on the two new tanks will not be considered authorised release points due to the nature of the materials contained within them and their operating conditions. Two new pumps will be installed to pump the final products from their respective storage tanks to the new packaging facility in W303 warehouses.

The current permit has an annual 'bubble' limit of 150,000kg for total non-methane volatile organic compounds (VOCs). This does not currently include siloxanes or silanes. This limit has never been exceeded or approached. Volatile siloxanes are

classified as VOCs in the upcoming European Waste Gas Best Available Techniques (BAT) Reference Document (BREF), and it is expected that releases above a set mass threshold will need to be abated. However, there is currently no standard or recognised abatement techniques available for mitigating volatile siloxane releases. As an interim protection measure (ahead of the EU Waste Gas BREF), the operator proposes that the 150,000kg VOC bubble limit remains but is expanded to also include volatile siloxanes. The vent changes involved in this variation will involve a total increase in siloxane air emissions of approximately 10%. In terms of total VOCs the increase is approximately 6%.

As part of the variation the operator also proposes to introduce a new permit limit for Total Organic Carbon (TOC) for existing emission point W1 - discharge from effluent treatment plant. The limit has previously been agreed between the operator and NRW. There are no other proposed changes to W1.

Other minor changes requested by the operator are:

- Removal of emission point A36 due to decommissioning of the 1307 quencher
- Extension to the W205 building and more equipment installed – no changes to the permit
- Update to wording in documents – remove HCFC fridge and replace with ammonia – no changes to the permit

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 operator's proposals.

Key issues of the decision

Receipt of application

The application was received at Natural Resources Wales (NRW) on 15th July 2020 and was accepted as duly made on 30th March 2021. 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.

Confidential information

A claim for commercial or industrial confidentiality has been made by the operator. The initial claim for confidentiality was not accepted by NRW due to it not being specific enough. A revised claim for confidentiality was later accepted. We consider that the inclusion of the relevant information on the public register would prejudice the operator's interests to an unreasonable degree. The reasons for this are given in the notice of determination for the claim. The decision was taken in accordance with our guidance on commercial confidentiality.

Consultation

Due to the nature of the application, there was no requirement to advertise it or consult on it externally. The decision was taken in accordance with RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements.

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

Operator

There are no changes to the operator as part of this variation. We are satisfied that the operator is the person who will have control over the operation of the facility after the variation has been issued. The decision was taken in accordance with EPR RGN 1 Understanding the meaning of operator.

The facility

The primary function of the Barry Plant is the manufacture of silicone and silicone intermediates. The installation incorporates a large number of chemical processes that are highly integrated.

There are no changes to the activities which take place at the installation as part of this variation. The regulated facility is an installation which comprises the following activities listed in Part 2 of Schedule 1 to the Environmental Permitting Regulations (EPR) and the following directly associated activities (DAAs):

Schedule 1 Activities

- Schedule 1, Part 2, Chapter 2, Section 4.2: Inorganic chemicals – Part A(1)(a) Producing inorganic chemicals such as – (i) gases (for example ammonia, hydrogen chloride, hydrogen fluoride, hydrogen cyanide, hydrogen sulphide, oxides of carbon, sulphur compounds, oxides of nitrogen, hydrogen, oxides of sulphur, phosgene).
- Schedule 1, Part 2, Chapter 2, Section 3.1: Production of cement and lime – Part B(c) Slaking lime for the purpose of making calcium hydroxide or calcium magnesium hydroxide.
- Schedule 1, Part 2, Chapter 2, Section 4.1: Organic chemicals – Part A(1)(a) Producing organic chemicals such as – (vi) organic compounds containing halogens (for example halocarbons, halogenated aromatic compounds and acid halides).
- Schedule 1, Part 2, Chapter 2, Section 4.2: Inorganic chemicals – Part A(1)(a) Producing inorganic chemicals such as – (iv) salts (for example ammonium chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate, cupric acetate, ammonium phosphomolybdate).
- Schedule 1, Part 2, Chapter 2, Section 4.2: Inorganic chemicals – Part A(1)(a) Producing inorganic chemicals such as – (v) non-metals, metal oxides, metal carbonyls or other inorganic compounds (for example calcium carbide, silicon, silicon carbide, titanium dioxide).
- Schedule 1, Part 2, Chapter 2, Section 4.7: Manufacturing activities involving carbon disulphide or ammonia – Part A(1)(a) Any activity for the manufacture of a chemical which may result in the release of ammonia into the air, other than an activity in which ammonia is only used as a refrigerant.

- Schedule 1, Part 2, Chapter 2, Section 5.1: Incineration and co-incineration of waste – Part A(1)(c) The incineration, other than incidentally in the course of burning landfill gas or solid or liquid waste, of any gaseous compound containing halogens.
- Schedule 1, Part 2, Chapter 2, Section 5.4: Disposal, recovery or a mix of disposal and recovery of non-hazardous waste – Part A(1)(a) Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day (or 100 tonnes per day if the only waste treatment facility is anaerobic digestion) involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC concerning urban waste-water treatment – (i) biological treatment.

DAAs:

- Silicon grinders
- Hot oiler heaters <20MW thermal input
- Tanks farms
- Cooling towers
- Storm water collection sump and river water filtration unit
- Quench and Medusa processes
- Chlorosilane recovery unit
- Absorber and fridge
- Basics refrigeration unit
- Distillation process

Legislation

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.

All applicable European directives have been considered in the determination of the application.

The site

A plan is included in the permit and the operator is required to carry on the permitted activities within the site boundary. There are no changes to the site boundary as part of this variation.

Site condition report

Due to the nature of the variation application (no addition of land), the operator was not required to provide a description of the condition of the site.

Biodiversity, Heritage, Landscape and Nature Conservation

The installation is within the relevant distance criteria of sites of nature conservation. A full assessment of the variation application and its potential to affect the sites has been carried out as part of the permitting process. We consider that the variation will not affect the features of any of the sites listed below.

The following sites were considered:

Special Areas of Conservation (SACs) within 10km of the installation:

Severn Estuary Wales SAC – Site code UK0013030 (nearest point is approximately 4.9km away from the installation)

Severn Estuary England SAC – Site code UK0013030 (nearest point is approximately 8.11km away from the installation)

Ramsar sites within 10km of the installation:

Severn Estuary Wales Ramsar – Site code UK11081 (nearest point is approximately 3km away from the installation)

Special Protection Areas (SPAs) within 10km of the installation:

Severn Estuary Wales SPA – Site code UK9015022 (nearest point is approximately 3km away from the installation)

Sites of Special Scientific Interest (SSSIs) within 2km of the installation:

Cog Moors SSSI – Site code 33WAL (approximately 1.94km away from the installation site)

Hayes Point to Bendrick Rock SSSI – Site code 33WDP (approximately 1km away from the installation site)

Local nature sites (ancient woodlands, local wildlife sites and national and local nature reserves) within 2km of the installation:

Four local wildlife sites (closest one is approximately 0.3km away from the installation site)

Two ancient woodlands (closest one is approximately 0.7km away from the installation site)

An OGN 200 Form 1 (Habitats Regulation Assessment) was completed to assess the potential effects of the permit variation on the Natura 2000 sites (SACs, Ramsars and SPAs), and an Appendix 4 Form (CRoW Assessment) was completed to assess the potential effects of the permit variation on Cog Moors and Hayes Point to Bendrick Rock SSSIs. Both forms were forwarded to the NRW environment team for statutory consultation and notification and are available on the public register. Form 1 was also forwarded to Natural England due to one of the SAC sites being in England.

The Form 1 assessment concluded that the variation is not likely to have a significant effect on any of the Natura 2000 sites; for the majority of hazards there is no impact pathway from the proposal to any of the site features. In terms of toxic contamination, safety data sheets provided by the operator for products stored in the four tanks associated with the VLVF project expansion show that products stored in three out of the four tanks are non-hazardous (apart from being flammable in some cases). The remaining tank (tank 5042) will store some products which are hazardous to the environment but releases of these will only amount to approximately 50kg/year and are small enough not to be considered hazardous to habitat features a significant distance away. This will also apply to the nearby local nature sites. The safety data sheet for the hazardous product shows that although the product is listed as toxic to the aquatic environment, only aquatic invertebrates would be affected (at 0.015mg/l). We are satisfied that such concentrations are very unlikely to be attained at distances of 1km and over given the very low release quantity.

The Appendix 4 Form assessment concluded that the variation is not likely to damage any of the features of the SSSI sites; the proposed changes to the operator's permit do not include any of the activities which NRW considers may damage the features of interest of the SSSIs. The only potential impact from the proposed development is toxic contamination from increased siloxane emissions from the VLVF expansion project. However, as mentioned above, hazardous releases will only amount to

approximately 50kg/year and are small enough not to be considered hazardous to habitat features over 1km away.

The Form 1 assessment was reviewed by an adviser at Natural England who confirmed agreement with the conclusions. Both assessments were forwarded to NRW's environment team for consultation but no response was received.

Environmental Risk Assessment

Air

This section of the decision document deals with emissions to air from the installation and its impact on local air quality.

The change in products to be made on the VLVF process will increase the siloxane release rate from two existing vents (on the 5042 rework tank and the 5000 storage tank) to make them authorised release points on the permit. These will be included as emission point references A123 and A124 in the updated permit. This is due to making lower viscosity products which have a lower boiling point.

The project will also install two new product storage tanks in the dedicated space available in the W404 tank farm for storage of the higher viscosity products. The local vent points on the two new tanks will not be considered authorised release points due to the nature of the materials contained within them and their operating conditions. Calculations have been carried out on each of these local vent points and both points are anticipated to release less than 25kg/year of siloxanes. 25kg/year is the cut-off point used by the operator for siloxanes when completing their permit application for whether a vent point should be considered authorised or not. We are satisfied that impact of releases below this threshold would not be significant. Two new pumps will be installed to pump the final products from their respective storage tanks to the new packaging facility in W303 warehouses.

The current permit has an annual 'bubble' limit of 150,000kg for total non-methane VOCs. This does not currently include siloxanes or silanes. This limit has never been exceeded or approached. Volatile siloxanes are classified as VOCs in the upcoming European Waste Gas BREF, and it is expected that releases above a set mass

threshold will need to be abated. However, there is currently no standard or recognised abatement techniques available for mitigating volatile siloxane releases. As an interim protection measure (ahead of the EU Waste Gas BREF), the 150,000kg VOC bubble limit will remain but will be expanded to also include volatile siloxanes. There are no changes to permitted air emission limits as a result of this variation.

The new volatile siloxanes being released from this variation are primarily linear siloxanes. These substances when released to air are known to undergo oxidative chemical degradation and should ultimately be converted to silica, carbon dioxide and water, all of which are naturally occurring. The vent changes involved in this variation will involve a total increase in siloxane air emissions of approximately 10%. In terms of total VOCs the increase is approximately 6%. However the actual impact of the releases can be considered insignificant due to their fate upon release.

Safety data sheets provided by the operator for products stored in the four tanks associated with the VLVF project expansion show that products stored in three out of the four tanks are non-hazardous (apart from being flammable in some cases). The remaining tank (tank 5042) will store some products which are hazardous but these will only amount to approximately 50kg/year.

The operator submitted a H1 screening assessment as part of their application to assess the effects of the new siloxane releases on local air quality. The assessment uses Toluene as the polluting substance rather than siloxanes as the screening tool doesn't include siloxanes (none of the siloxanes have their own environmental standards). Toluene is considered a suitable substitute for siloxanes as it is a VOC and has similar risks to the worst of the siloxane components to be released. The H1 assessment suggests that emissions of Toluene (siloxanes) to air from the four tanks can be screened as insignificant when compared against both the long term and short term environmental standards for Toluene.

Based on the above, we are satisfied that the increased siloxane releases from the VLVF expansion project are unlikely to have a significant effect on air quality.

There are no changes to permitted air emission limits as a result of this variation.

Water

This variation will not impact emissions to water.

Following a request by the operator in their application we have introduced a new permit limit for TOC for existing emission point W1 - discharge from effluent treatment plant, whereas there was previously no limit for TOC in the operator's permit.

The imposed limit is obtained from the BAT conclusions for common waste water and waste gas for direct emissions of TOC, COD and TSS to a receiving water body treatment/management systems in the chemical sector.

A higher TOC limit of up to 100mg/l as an annual average is justified due to Conditions A and B of footnote 13 of Table 1: BAT-AELs for direct emissions of TOC, COD and TSS to a receiving water body, being met. The limit has previously been agreed between the operator and NRW. There are no other changes to W1.

Soil

This variation will not impact emissions to soil. There are no direct emissions to soil from the installation.

Odour

We are satisfied that the changes brought by this variation will not cause an increase in odour from the installation. It was confirmed by the operator at the duly making stage of the application that there are no anticipated increases to odour as a result of this variation.

Condition 3.4.1 requires that emissions from the activities are free from odour at levels likely to cause pollution outside the site, as perceived by an officer of NRW. We are satisfied that this condition will be sufficiently protective.

Noise

We are satisfied that the changes brought by this variation will not cause an increase in noise from the installation. It was confirmed by the operator at the duly making stage of the application that there are no anticipated increases to noise as a result of this variation.

Condition 3.5.1 requires that emissions from the activities are free from noise at levels likely to cause pollution outside the site, as perceived by an officer of NRW. We are satisfied that this condition will be sufficiently protective.

Fugitive emissions

We are satisfied that the changes brought by this variation will not cause an increase in fugitive emissions from the installation. The variation will not impact fugitive emissions.

Monitoring

There will be no change in the monitoring equipment for stream W1 following the introduction of the new TOC limit. Currently there is an MCERTS refrigerated composite sampler, from which a 24 hour sample is taken and analysed in the on site laboratory. TOC will be monitored in accordance with the requirements of the BAT conclusions for common waste water and waste gas for direct emissions of TOC, COD and TSS to a receiving water body treatment/management systems in the chemical sector.

Monitoring requirements have been added for new emission points A123 and A124.

Reporting

Reporting requirements have been added for new emission points A123 and A124.

Operating techniques

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes.

The proposed techniques are in line with the benchmark levels contained in the relevant TGN and we consider them to represent appropriate techniques for the facility. We consider that the emission limits included in the permit reflect the BAT for the installation.

The permit conditions

Updating permit conditions during consolidation

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 permits. The operator has agreed that the new conditions are acceptable.

Use of conditions other than those from the template

Based on the information in the application, we do not consider that we need to impose conditions other than those in our permit template, which was developed in consultation with industry having regard to the relevant legislation.

Raw materials

This variation has no impact on the use of raw materials and fuels.

Pre-operational conditions

Based on the information in the application, we do not consider that we need to impose pre-operational conditions.

Improvement conditions

Based on the information on the application, we do not consider that we need to impose improvement conditions.

Conditions where the consent of another person is needed.

Based on the information submitted in the application, we do not consider that it is necessary to impose conditions where the consent of another person is needed.

Incorporating the application

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

Operator Competence

Environment management system

There are no significant changes to the environment management system as part of this variation. 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

Our 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.

OPRA

The OPRA score has not changed as a result of this variation. The OPRA score at permit issue is 366.

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