

## Compliance Assessment Report

Report ID:  
CAR\_NRW0035871

This form will report compliance with your permit as determined by an NRW officer

|                              |                                         |             |            |     |       |
|------------------------------|-----------------------------------------|-------------|------------|-----|-------|
| Site                         | Barry Silicone Plant                    | Permit Ref  | BR9685IX   |     |       |
| Operator/Permit holder       | Dow Silicones UK Limited                |             |            |     |       |
| Regime                       | Installations                           |             |            |     |       |
| Date of assessment           | 07/08/2019                              | Time in     | 10:00      | Out | 17:00 |
| Assessment type              | Audit                                   |             |            |     |       |
| Parts of the permit assessed | Management, emissions and abatement     |             |            |     |       |
| Lead officer's name          | Leakey, Antony                          |             |            |     |       |
| Accompanied by               |                                         |             |            |     |       |
| Recipient's name/position    | Judith Sartor/ Environmental Specialist | Date issued | 25/10/2019 |     |       |

### Section 1 – Compliance Assessment Summary

This is based on the requirements of the permit under the Environmental Permitting Regulations or the licence under the Water Resources Act 1991 as amended by the Water Act 2003. A detailed explanation is captured in "Compliance Assessment Report Detail" (Section 2) and any actions you may need to take are given in the "Action(s)" (section 4). This summary details where we believe any non-compliance with the permit has occurred, the relevant condition and how the non-compliance has been categorised using our Compliance Classification Scheme (CCS). CCS Scores can be consolidated or suspended where appropriate, to reflect the impact of some non-compliances more accurately. For more details of our CCS scheme, contact your local office.

| Permit conditions and compliance summary                             | CCS Category | Condition(s) breached |
|----------------------------------------------------------------------|--------------|-----------------------|
| B5 - Infrastructure - Plant and equipment                            | A            |                       |
| C2 - General Management - Management system and operating procedures | C3           | 1.1.1                 |
| E1 - Emissions - Air                                                 | A            |                       |
| E2 - Emissions - Land and groundwater                                | A            |                       |
| E3 - Emissions - Surface water                                       | C3           | 3.1.2                 |

**KEY:** See Section 5 for breach categories, suspended scores will be indicated as such.

**A** = Assessed or assessed in part (no evidence of non-compliance), **X** = Action only,

**O** = Ongoing non-compliance, not scored.

|                             |   |                                                              |   |
|-----------------------------|---|--------------------------------------------------------------|---|
| Number of breaches recorded | 2 | Total compliance score<br>(see section 5 for scoring scheme) | 8 |
|-----------------------------|---|--------------------------------------------------------------|---|

If the Number of breaches recorded is greater than zero, please see Section 3 for our proposed enforcement response

## Section 2 – Compliance Assessment Report Detail

This section contains a report of our findings and will usually include information on:

- The part(s) of the permit that were assessed (eg. Maintenance, training, combustion plant, etc)
- Where the type of assessment was 'Data Review' details of the report/results triggering the assessment
- Any non-compliances identified
- Any non-compliances with directly applicable legislation
- Details of any multiple non-compliances
- Information on the compliance score accrued inc.
- Details of advice given
- Any other areas of concern
- Any actions requested
- Any examples of good practice
- A reference to photos taken

### **Dow Silicones UK Ltd reporting review and Site Visit Report - 7/8/19**

#### Operator Monitoring Assessment follow up

A daily temperature check has been implemented on composite samplers and this critical monitoring element is now compliant.

#### Hazardous waste audit follow up

A brief procedure for classifying wastes for disposal to landfill was reviewed. The procedure does not describe how waste composition data are used for categorisation of the waste streams using WM3 procedures. This aspect will be followed up at the next site visit.

**ACTION: Dow Silicones to provide update on waste classification using WM3-based procedures at next site visit.**

#### DPR recovery

The potential for recovery in cement manufacture by use of a kiln chloride bypass is being progressed. Other on-site recovery options are not being pursued.

**ACTION: Dow Silicones to provide an update at next site meeting.**

#### ERU dioxin emission

Monthly monitoring of dioxin/furan results remain in compliance. Scrubber packing replacement with ADIOX absorption internals is now not considered necessary due to the cost and continuing low emissions levels. It is considered that the high emissions are likely to be associated with high methyl chloride feed rates and the correlation with process excursions will be checked.

**ACTION: Dow Silicones to provide an update as necessary.**

#### WWT plant

A review of WWT asset criticality has been started and plant risk categories allocated. A further update will be provided at next site meeting.

**ACTION: Dow Silicones to provide an update at next site meeting.**

#### CWW Bref and TOC BAT AEL

A discussion covering process TOC sources and options for achieving the TOC BAT AEL was undertaken. Only aggressive chemical treatment options appear to be viable and are costly. A

review of the latest (draft) regulators' version of the CWW Bref interpretation guidance suggests that a derogation request is the most likely outcome if costs are excessive and outweigh the benefits.

There are a couple of alternative approaches to eliminate:

- Allow the methanol recovery columns on the MeCl plants to be considered as pre-treatment – it will be necessary to show that this unit operation isn't process integrated or recovery at source. Mass balance data for the MRCs and any evidence that the waste water has entered the effluent system by the time it reaches the MRC might provide the necessary evidence. It is also necessary to demonstrate that nitrification is taking place in the WWTP as the loading criteria in the Bref footnotes are not met. The relevant Bref footnote also uses the term "may", which in the cross-cutting guidance has been taken to mean that a derogation is still required anyway as a result of clarification from the EU on a Dutch query relating to the Refinery Bref. Therefore, even if all criteria can be met a derogation case may still have to be made.
- If effluent chloride interference with COD test could be overcome, would COD/TOC ratio help with current compliance?

It seems unlikely to be viable to consider the silanols to be refractory (recalcitrant) TOC, even though they might be, as the Bref footnote criteria for effluent TOC loading are not met. It may be correct to state that there is no oxygen demand, or a very slow one, but the alternative decomposition mechanism involving surface water nitrate reduction to nitrite may cause environmental impacts associated with elevated nitrite levels. This aspect will require consideration if a derogation application is made.

There is also some historic monitoring evidence that shows DO depletion in the lower reaches of the Cadoxton downstream of the Dow discharge. However, the WFD failing reductions are correlated with increased saline conditions. Further examination of this data may be useful in determination of impacts associated with silanol discharges and the salinity of the effluent.

These aspects are to be taken forward as a separate discussion and site meeting.

#### W931 methanol heat exchanger failure

A carbon block heat interchanger failure due to thermal shock during start up resulted in the loss of approximately 2.8 tonnes of methanol to the effluent treatment plant in the process effluent over 6½ hours. This led to partial loss of control of waste water treatment and discharge of a peak of 176 mg/l of BOD to the local river.

The methanol leak rate across the interchanger is estimated to be 400-500 kg/h. In the event of total failure of the WWT biological activity this might result in discharge of around 1700 ppm methanol to the Cadoxton (if all mitigation measures failed and the event continued for a long duration), possibly higher if lower effluent flow rates were present.

The actual discharge level was 64 ppm methanol over the day presumably due to dilution and some removal activity in the biological treatment process. Exceeding the design loading of the WWT process is prevented by a feed BOD limit of 500 mg/l which trips the feeds and diverts to the EST, although the online BOD meter has been shown to be unreliable and so potentially cannot be relied upon. The feed during the incident was up to 275 mg BOD/l, which is within the design capability of the WWTP.

Methanol has relatively low toxicity to aquatic species, although oxygen depletion effects may cause impacts for gross discharges. Concentrations in the river are expected to have been around the PNEC level for freshwater (20.8 mg/l). In practice it seems unlikely that impact could have been

significantly greater than the low level predicted based upon the system failures identified and the inherent dilution in the process.

On this basis the exceeded BOD ELV is therefore considered to be a minor Category 3 breach of permit condition 3.1.2.

Similarly, the underlying procedural failures are considered to be a minor category 3 breach of permit condition 1.1.1 in relation to failure to manage isolations, follow procedures or have procedures in place to identify and prevent the impacts on the WWTP. A review of critical procedures for protection of carbon block heat exchangers and the WWTP should be undertaken to ensure that such issues are prevented or detected as soon as practicable. Consideration should also be given to use of carbon grades with greater resistance to thermal shock for any critical heat exchangers where failure could result in significant loss of containment with environmental or process safety implications.

The management system failures that might be relevant to major accident hazard control have been referred to the Health & Safety Executive for consideration for follow up under the COMAH regime.

**ACTION: Dow Silicones to undertake a review of critical procedures for protection of carbon block heat exchangers and the WWTP. A review of carbon block grade for critical heat exchangers should also be undertaken. Dow to provide an update by 31 March 2020.**

#### W911 Cooling tower replacement

The 6-cell tower is funded for replacement in 2021. A data sheet was provided for review. The main aspects to consider is to ensure optimum efficiency for water and energy use (e.g. best possible drift performance, variable speed drives for fans) and improved noise characteristics (low noise fans) to help reduce the background noise levels associated with the plant. The latter should be evaluated with reference to the current noise contribution from the tower.

**ACTION: Dow Silicones to provide an update as necessary.**

#### Monitoring returns and notification review

Monitoring data for Q2 and Q3 2019 has been reviewed and no breach of permit conditions was identified other than those already addressed in previous correspondence.

END

## EPR Compliance Assessment Report

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|                        |                          |            |            |
|------------------------|--------------------------|------------|------------|
| Site                   | Barry Silicone Plant     | Permit Ref | BR9685IX   |
| Operator/Permit holder | Dow Silicones UK Limited | Date       | 07/08/2019 |

### Section 3 – Enforcement Response

You must take immediate action to rectify any non-compliance and prevent repetition. Non-compliance with your permit conditions constitutes an offence and can result in criminal prosecutions and/or suspension or revocation of a permit. Please read the detailed assessment in Section 2 and the steps you need to take in Section 4 below.

In respect of the above non-compliance you have been issued with a warning. At present we do not intend to take further enforcement action. This does not preclude us from taking additional enforcement action if further relevant information comes to light or offences continue.

### Section 4 – Action(s)

This section summarises the actions identified during the assessment along with the timescales for when they will need to be completed.

| Criteria Ref.       | CCS Category | Action required/advised                                                                                                                                                                                                                                   | Due Date   |
|---------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| See Section 1 above |              |                                                                                                                                                                                                                                                           |            |
| E3                  | C3           | Dow Silicones to undertake a review of critical procedures for protection of carbon block heat exchangers and the WWTP. A review of carbon block grade for critical heat exchangers should also be undertaken. Dow to provide an update by 31 March 2020. | 31/03/2020 |
| C2                  | C3           | Dow Silicones to undertake a review of critical procedures for protection of carbon block heat exchangers and the WWTP. A review of carbon block grade for critical heat exchangers should also be undertaken. Dow to provide an update by 31 March 2020. | 31/03/2020 |

## Section 5 – Compliance notes for the Operator

To ensure you correct actual or potential non-compliance we may

- Advise on corrective actions verbally or in writing
- Require you to take specific actions verbally or in writing
- Issue a notice
- Require you to review your procedures or management system
- Change some of the conditions of your permit
- Decide to undertake a full review of your permit

Any breach of a permit condition is an offence and we may take legal action against you

- We will normally provide advice and guidance to assist you to come back into compliance either after an offence is committed or where we consider that an offence is likely to be committed. This is without prejudice to any other enforcement response that we consider may be required.
- Enforcement action can include the issue of a formal caution, prosecution, the service of a notice and/or suspension or revocation of the permit.

**See our Enforcement and Civil Sanctions guidance for further information**

This report does not relieve the site operator of the responsibility to

- Ensure you comply with the conditions of the permit at all times and prevent pollution of the environment
- Ensure you comply with other legislative provisions which may apply

### Non-compliance scores and categories

| CCS category | Description                                                          | Score |
|--------------|----------------------------------------------------------------------|-------|
| C1           | A non-compliance that could have a major environmental effect        | 60    |
| C2           | A non-compliance which could have a significant environmental effect | 31    |
| C3           | A non-compliance which could have a minor environmental effect       | 4     |
| C4           | A non-compliance which has no potential environmental effect         | 0.1   |

**Operational Risk Appraisal (Opra)** - Compliance assessment findings may affect your Opra score and/or your charges. This score influences the resource we use to assess permit compliance.

## Section 6 – General information

### Data protection notice

The information on this form will be processed by the Natural Resources Wales (NRW) to fulfil its regulatory and monitoring functions and to maintain the relevant public register(s). The NRW may also use and/or disclose it in connection with:

- Offering/providing you with its literature/services relating to environmental matters
- Consulting with the public, public bodies and other organisations (eg. Health and Safety Executive, local authorities) on environmental issues
- Carrying out statistical analysis, research and development on environmental issues
- Providing public register information to enquirers
- Investigating possible breaches of environmental law
- Assessing customer service satisfaction and improving its service
- Freedom of Information Act/Environmental Regulations request

The NRW may pass it on to its agents/representatives to do these things on its behalf. You should ensure that any persons named on this form are informed of the contents of this data protection notice.

### Disclosure of information

The NRW will provide a copy of this report to the public register(s). However, if you consider that any information contained in this report should not be released to the public register(s) on the grounds of commercial confidentiality, you must write to your local area office within fifteen working days of receipt of this form indicating which information it concerns and why it should not be released, giving your reasons in full.

### Customer charter

#### What can I do if I disagree with this compliance assessment report?

If you are unable to resolve the issue with your site officer, you should firstly discuss the matter with officer's line managers using the informal appeals procedure. If you wish to raise your dispute further through our official Complaints and Commendations procedure, phone our general enquiry number 0300 065 3000 (Mon to Fri 08.00 – 18.00) and ask for the Customer Contact team or send an email to [enquiries@naturalresourceswales.gov.uk](mailto:enquiries@naturalresourceswales.gov.uk). If you are still dissatisfied you can make a complaint to the Public Services Ombudsman for Wales. For advice on how to complain to the Ombudsman phone their helpline on 0845 607 0987.

#### Welsh Language

If you would like this form in Welsh please contact your Regulatory Officer.