

Compliance Assessment Report CAR_NRW0037549

Permit being assessed: BR9685IX.

For: Barry Silicone Plant, held by Dow Silicones UK Limited

At: Cardiff Road, Barry, Vale of Glamorgan, CF63 2YL.

Type of assessment carried out: Report/Data Review, Reason: Routine.
On 31/12/2020.

Parts of permit assessed: Emissions control, noise and emissions

NRW Lead Officer: Antony Leakey.

Report sent to: Judith Sartor, Environmental Specialist on 10/02/2021.

1. Summary of our findings (full details in section 4)

Part of permitted activity assessed (criteria)	Assessment result	Permit condition
B1 - Infrastructure - Engineering for prevention and control of emissions	Assessed (A)	
C2 - General Management - Management system and operating procedures	Assessed (A)	
E1 - Emissions - Air	Assessed (A)	
E2 - Emissions - Land and groundwater	Assessed (A)	
E3 - Emissions - Surface water	C3 Minor	3.1.2
F2 - Amenity - Noise	Assessed (A)	
G1 - Monitoring and Records, Maintenance and Reporting - Monitoring of emissions and environment	Assessed (A)	
G4 - Monitoring and Records, Maintenance and Reporting - Reporting and notification to Natural Resources Wales	Assessed (A)	

Result types are explained in more detail in the 'Important Information' section below.

Total number of non-compliances recorded	Total non-compliance score
1	4

How we use the non-compliance score to calculate your annual fee is explained in the 'Important Information' section below.

2. What action is required?

Criteria	Action needed	Complete by
E3	Dow Silicones to provide an update on RCI outcome at the next compliance meeting.	30/04/2021

Action criteria codes are listed in the 'Important information' section below.

3. What will happen next?

Any non-compliance we have identified and recorded on this form is an offence. It can result in criminal prosecution and/or suspension or revocation of your permit.

You are non-compliant with your permit.

At this time, we are issuing you with a warning for the non-compliance recorded above. Warnings may influence future enforcement response for continued or further non-compliance.

This statement does not stop us from taking additional enforcement action if further relevant information comes to light or offences continue.

4. Details of our assessment

Dow Silicones UK Ltd reporting and compliance assessment review - 31/12/20

CWW Bref and TOC BAT AEL

Effluent treatment performance against the CWW BREF limits was reviewed. The applicable TOC limit will be determined as part of the VLVF variation now under assessment. The copper BAT AEL required review to ensure compliance with the revised copper EQS (Environmental Quality Standard) driven by the Water Framework Directive. A detailed assessment taking bioavailability criteria into account has shown that Dow effluent will not cause non-compliance with the copper EQS in the river Cadoxton. The DPR brine filtration project is also expected to reduce copper in the effluent as well as reducing solids carry over to WWT which causes operational problems.

There are data gaps for levels of nitrogen and AOX (halogenated organics) compounds in the effluent and Dow have planned a 3-month sampling campaign to address this.

Implementation of continuous effluent TOC monitoring will be considered during the VLVF variation determination.

WGC Bref

When considering which volatile silicone vents require abatement a cost-benefit analysis using damage costs for particulate matter rather than conventional VOC may be more appropriate for siloxane releases due to the ultimate environmental fate. This may require consideration even if the vents are excluded due to emissions being below the waste gas BREF mass threshold trigger for abatement.

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

Cadoxton WFD failure

The low DO (dissolved oxygen) in the river close to the tidal outfall and potentially linked to the high chloride levels in the Dow effluent. Monthly river sampling analysis by the site QA lab has shown that DO is good immediately downstream of the effluent outfall. There is poor

DO upstream which should be unrelated to Dow activities. Sampling further downstream to see if high results are sustained was suggested.

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

W931 MeCl ELV exceedance

Modified procedure “W931-P-3514 – 3514 Column Start-up” was reviewed. The isolation and flow valve position requirements to prevent the pressure spike that occurred due to the line between the reactors and the HCl column being pressurised, leading to high venting rates, has been amended. The Dow engineer has decided not to implement setpoint/tuning parameter changes to prevent a control system overshoot as the amount vented was relatively small in comparison to the amount vented during the actual overpressure event.

Hazardous waste audit follow-up

Waste composition review records to be examined at next site inspection -carried forward.

ACTION: Dow Silicones to provide copies of waste composition review records.

ISO14001 certification

The installation EOPRA score may need to be reviewed as part of the current VLVF application.

ACTION: Dow Silicones to review the Barry EOPRA score including the EMS element when the certification lapses or during the VLVF application determination.

W941 Reboiler condition

The RCI team are satisfied that the process side (external) tube wall loss root cause has been identified and effective measures have been put in place to prevent recurrence.

More recently tube side (steam service) pitting has been identified and assessed. This was believed to be related to a steam quality issue, potentially during the period where the CHP deaerator was offline for 6 months during 2019 for a PSSR inspection.

Examination of boiler feedwater dissolved oxygen data now suggests that steam quality was not the root cause. Also, the CHP plant was designed to operate on a single deaerator.

Implications of the reboiler service-side corrosion have been considered for other heat exchangers at site using process steam. A separate team is looking at chlorosilane reboilers on the Low Boiler Train and older Dragon basics processes. Several reboilers have needed to be replaced prematurely. The inspection strategies for these assets identified the concerns and allowed them to be replaced with spare assets before any significant potential for failure became evident.

A further inspection of the reboiler tube side will be undertaken within the next 24 months to determine if there is any further deterioration.

ACTION: Dow Silicones to provide updates as necessary.Noise control

Dow and their noise consultants have reassessed the community monitoring locations and will undertake more measurements on Hayes Road. Approval for funding has been obtained but monitoring delayed due to plant issues.

ACTION: Dow Silicones to provide an update at the next compliance meeting.Air quality data investigation

Dow has investigated dust abatement issues in 2018 and 2019 that may be correlated with the local air monitoring carried out by the Local Authority where some higher PM10 levels were detected to the west of the site.

Operator logs were reviewed to check if there were any recorded emissions from routine operator inspections and none were observed or reported in 2018 or 2019.

All the maintenance activities for all units where dust abatement is installed were also reviewed. Dow then assessed when maintenance was carried out against the specific times when high particulate matter levels were observed in the local area. There are only a couple of overlapping dates but from different sources:

1. W930 FBR 28 Aug 2018 during a period when bag filters were replaced.
2. W115 mixers (157, 197, 277). There was overlap on 4 days but from separate mixers. These mixers are batch operated and relatively small. Filters are changed out routinely.

Based on this review it is concluded that there does not appear to be any consistent correlation with high dust emissions that would have resulted from site operations at Dow that would explain all the measured elevated PM10 levels offsite.

Quench process data was also reviewed with no consistent correlation and the possibility of volatile siloxane aerosol and small droplet formation registering as ambient PM10 in the timescale for emissions to reach the monitoring is considered highly unlikely.

It has subsequently been identified that the air quality monitoring station technology has potential for elevated PM readings to be affected by deliquescence in high humidity conditions. Fumed silica and acid gas aerosol could cause these deliquescence effects. However, the quality of the monitoring data is poor because the monitors have not been subject to regular maintenance or QA procedures. This limits the accuracy of any conclusions that can be drawn from the data, although there is still potential for elevated aerosol triggering deliquescence effects when the wind is from the East.

Bag filter performance drops off with particle size fractions less than 1 µm, so unless there are significant proportions of sub-micron particle size fractions in routine emissions, these will be unlikely to register as significant concentrations at the monitors. Abatement efficiency cut off for wet scrubbers is generally higher and there can be a 10% loss for particle sizes less between 1-0.5 µm.

Examination of fumed silica, sulphuric acid mist and hydrogen chloride source terms may be necessary to fully eliminate the chemical complex as a potential source.

ACTION: Dow Silicones to review the potential for hydrogen chloride or other acid aerosol releases to coincide with the elevated PM10 episodes.

Eel Regulation Compliance

A project review with fisheries colleagues has identified potential solutions that may be cost-beneficial at the Cadoxton location. Self-cleaning intake suction screens or filters may provide a reliable and compact means to provide eel protection that meets the screen size and approach velocity requirements of the regulations.

ACTION: Dow Silicones to review options and provide an update at the next compliance meeting.

Groundwater monitoring data review

The data were reviewed following completion of the closed landfill capping works in 2020. Interpretation of the data report would be aided by including a graphic showing location of the sample points and inferred groundwater flow directions.

It is noted that borehole A2D is reporting significant levels of copper, which may be driving lower levels of contamination detected periodically at other locations closer to sensitive receptors. It is unclear if investigations into the nature of this source term and consideration of its isolation or removal have been made.

ACTION: Dow Silicones to review options and provide an update at the next compliance meeting.

Monitoring returns and notification review

Monitoring data for Q3 and Q4 2020 has been reviewed. Non-compliance with permit conditions were identified for the copper discharge ELV from W1. This has been linked to elevated suspended solids in the effluent. Annual average discharges are close to half the current ELV, which has been shown to not compromise compliance with the copper EQS in the river. The result is therefore considered to be a minor Category 3 breach of permit condition 3.1.2. Root cause investigation is still underway and will be considered at next compliance review.

ACTION: Dow Silicones to provide an update at the next compliance meeting.

END

If you have any queries about this report, or to discuss completion of any actions, please contact the NRW Officer named above.

Important information

Legal status of this report

Your permit is issued to you under the Environmental Permitting Regulations. You have a responsibility to comply with the conditions of your permit and prevent pollution/harm of the environment. You must also ensure that you comply with any other relevant legislation that may apply to your site's operations.

This report explains the findings of our assessment and any action you are required to take. We categorise non-compliance using our guidance for assessing non-compliance at regulated sites.

When we find potential non-compliance/s we will normally give you advice on how to maintain compliance.

To correct non-compliance, we may:

- require you to take specific actions
- issue a notice
- review the conditions of your permit.

Any advice and guidance we give will be without prejudice to any other enforcement response that we consider may be required.

Assessment results and non-compliance categories (used in section 1):

Assessment result	Description
Assessed (A)	Assessed or assessed in part, no evidence of non-compliance found
Action only (X)	Action only relating to the activity assessment
Ongoing (O)	Ongoing non-compliance, not scored

Non-compliance category	Description	Score
C1 Major	Potential to have a major, serious, persistent and/or extensive impact or effect on the environment, people and/or property	60
C2 Significant	Potential to have a significant impact or effect on the environment, people and/or property	31
C3 Minor	Potential to have a minor or minimal impact or effect on the environment, people and/or property	4
C4 No environmental impact	Non-compliance at a regulated site that cannot foreseeably have any impact on the environment, people and/or property	0.1

How we use assessment scores

The number and severity of non-compliances recorded in a year will affect your annual subsistence fee the following year. A non-compliance factor is added to your site's Operator

Performance Risk Appraisal (OPRA) score when we calculate your fee to reflect the additional resource we use to assess permit compliance.

What are suspended scores?

In line with our guidance, we may suspend scores for up to six months to allow time for remedial action to be taken. Suspended scores will be re-instated if the action is not completed.

Full list of Industry and Waste action criteria (used in section 1 and 2):**A: Permitted activities**

- A1 Specified by permit

B: Infrastructure

- B1 Infrastructure – Engineering for prevention and control of emissions
- B2 Infrastructure – Closure and decommissioning
- B3 Infrastructure – Site drainage engineering (clean and foul)
- B4 Infrastructure – Containment of stored materials
- B5 Infrastructure – Plant and equipment

C: General management

- C1 General management – Staff competency/training
- C2 General management – Management system and operating procedures
- C3 General management – Materials acceptance
- C4 General management – Storage, handling, labelling and segregation

D: Incident management

- D1 Incident management – Site security
- D2 Incident management – Accidents, emergency and incident planning

E: Emissions

- E1 Emissions – Air
- E2 Emissions – Land and groundwater
- E3 Emissions – Surface water
- E4 Emissions – Sewer
- E5 Emissions – Waste

F: Amenity

- F1 Amenity – Odour
- F2 Amenity – Noise
- F3 Amenity – Dust/fibres/particulates and litter
- F4 Amenity – Pests/birds and scavengers
- F5 Amenity – Deposits on road

G: Monitoring and records, maintenance and reporting

- G1 Monitoring and records, maintenance and reporting – Monitoring of emissions and environment
- G2 Monitoring and records, maintenance and reporting – Records of activity, site diary/journal/events
- G3 Monitoring and records, maintenance and reporting – Maintenance records
- G4 Monitoring and records, maintenance and reporting – Reporting and notification to Natural Resources Wales

H: Resources efficiency

- H1 Resource efficiency – Efficient use of raw materials
- H2 Resource efficiency – Energy efficiency

Enforcement response

Any permit condition non-compliance is an offence and we may take legal action against you. Action we take can include prosecution, serving a notice on you and/or suspension or revocation of your permit. See our Enforcement and Sanctions Guidance for further information.

Data protection notice

You should make sure that anyone named in this report knows that the information it contains will be processed by Natural Resources Wales to fulfil its regulatory and monitoring functions and to maintain the relevant public register(s).

We may also use and/or disclose the report in connection with:

- offering or providing you with our literature or services relating to environmental matters
- consulting with the public, public bodies and other organisations (e.g. 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 our service
- Freedom of Information Act or Environmental Information Regulations requests.

We may also pass it on to our agents or representatives to do these things on our behalf.

Disclosure of information – this report will be available to view on-line

If you think this report contains commercially confidential information that should not be placed on our public register, you must contact your local Natural Resources Wales office within **fifteen working days** of receiving this report, using the contact details in the accompanying email or letter. You must give a full explanation of why it should not be added to our public register, including specifying which information is commercially confidential. We will assess your request and respond to you within 20 working days to let you know if we agree to your request.

What do I do if I disagree with the report or have a complaint?

If you disagree with this compliance assessment report, you should contact the lead officer without delay to discuss your concerns.

If you are unable to resolve the issue with the lead officer or their line manager you should contact our Customer Contact team on 0300 065 3000 (Monday to Friday 08:00 – 18:00), or email enquiries@naturalresourceswales.gov.uk for details of how to raise your dispute further through our Complaints and Commendations procedure.

If you are dissatisfied with our response, you can contact the Public Services Ombudsman for Wales by phone on 0300 7900203 or by email at ask@ombudsman.wales

Welsh Language Standards

We are committed to establishing Natural Resources Wales as a naturally bilingual organisation. We will provide compliance reports in your preferred language.