

Compliance Assessment Report CAR_NRW0036927

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 15/09/2020.

Parts of permit assessed: Monitoring, emissions, abatement

NRW Lead Officer: Antony Leakey.

Report sent to: Judith Sartor, Environmental Specialist on 15/09/2020.

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

Part of permitted activity assessed (criteria)	Assessment result	Permit condition
E3 - Emissions - Surface water	C3 Minor	3.1.2
G1 - Monitoring and Records, Maintenance and Reporting - Monitoring of emissions and environment	C4 No impact (Suspended)	3.3.1
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)	
E5 - Emissions - Waste	Assessed (A)	
F2 - Amenity - Noise	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
2	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	Improved weekly cleaning regime implemented.	Already completed
G1	Resume testing when capacity/capability is available.	31/03/2021

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 - 15/9/20

CWW Bref and TOC BAT AEL

Further work on an outline case was reviewed, including data for the MRCs showing that methanol recovery is not primarily for economic reasons but is to reduce effluent treatment loading. Demonstration that the loading criteria in the Bref footnotes are being achieved was also provided. A formal determination, including a BAT case for a TOC ELV within the range specified in the Bref and continuous TOC monitoring proposals, will be undertaken as part of an application for VLVF plant changes.

Implementation of continuous effluent TOC monitoring is considered to be an important control measure to protect the River Cadoxton and progress with implementation will be reviewed regularly.

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

WGC Bref

Initial work suggests that siloxane releases could be abated using new scrubbing technology and significant vent streams would be combined for treatment. A thermal oxidiser may also be necessary. Dow Silicones should note that if derogation from any BAT AELs is under consideration that the damage costs for particulate matter rather than conventional VOC may be more appropriate for siloxane releases due to the ultimate environmental fate. This can be given further consideration if the situation arises.

W716 reaction column replacement

The proposed new reaction column installation on the hydrolysis process will not now go ahead.

Cadoxton WFD failure

Further work in assessing impacts associated with the salinity of the effluent and

bioavailability of the copper is underway. Salinity aspects may be particularly important if increased quenching of chlorosilanes is necessary.

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

W931 methanol heat exchanger failure

The actions arising from the incident investigation were reviewed. Procedures have been updated to include cold-side checks during start up and MRC control improvements using differential temperature to track methanol composition will minimise risk of future failures or detect them earlier. A table top exercise was also undertaken to ensure that learning from the incident is embedded.

Installation of continuous TOC analysers at WWT plant will also ensure any future failures are confirmed as early as possible. Progress with TOC monitoring will be reviewed as outlined above.

W931 MeCl ELV exceedance

Start-up procedure has been modified but manual compressor control can lead to pressure problems. Improved control and guidance are needed to prevent operator intervention. A passing nitrogen valve also contributed feed header pressure increase. More details are to be provided.

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

Hazardous waste audit follow-up

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

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 next tube wall thickness measurements are due during the turnaround in August 2020.

ACTION: Dow Silicones to provide updates as necessary.

Noise control

An apparent increase in noise complaints has arisen since March relating to different parts of the site (see separate report on potential CHP impacts).

The rise may be due to a combination of factors: reduced background noise levels due to COVID-19 restrictions on movement and the prolonged period of northerly and easterly winds between March and June, coupled with unusually warm temperatures.

The current noise abatement plan was reviewed. This includes regular site-wide noise mapping at ground level to detect changes in the noise profile. This is supported by fixed fence line noise monitoring with sound recording triggered by levels above 60dB. The LA_{eq} averaging period of the fence line monitoring may influence the types of sound that are picked up. Mapping of elevated sources may provide additional insight into potential dominant sources.

However, the 60dB trigger for fence line sound recording is likely to be too high to detect some events that could cause disturbance, noting that a lower threshold could result in a significant increase in data storage needs.

For example, during late April a passing steam blowdown valve on the hydrolysis plant main acid pre-heater gave rise to complaint of offsite noise due to the high-pitched/tonal nature of the pressure release. This was not detected by the fence line monitoring.

Of note was the decision to continue operation with the passing blow down valve until the turnaround.

Mitigation barriers were only implemented once a complaint had been received, so there are potential gaps in controls or identification of the need for controls.

An acoustics consultant is contracted to undertake night time community noise monitoring periodically and the data variability in the latest reports suggests that there may be elevated noise levels compared to background, depending upon weather conditions. However, it is noted that these are not full noise investigation surveys to BS 4142:2014 and it is unclear whether such surveys have been carried out during re-permitting under the Pollution Prevention and Control regime when noise became a regulated “pollutant”. Similarly, modelling of noise sources to determine potential for offsite impacts and to identify sources that might require attenuation has not been undertaken to improve understanding of the site contribution to the local soundscape.

The acoustic consultant reports include third octave spectra, although plots of the data would aid interpretation for identification of dominant tonal sounds. Inspection of the data suggests that there may be dominant tones (position 2 – 315 Hz, position 3 – 25 Hz and position 9 – 50 Hz), but this is not supported by observations during monitoring that broadband sound is experienced at all locations. The reports do not provide LA_{90} statistics to help infer typical background levels in the area and enable an impression of potential site impact to be gained.

Review and interpretation of the acoustics consultant reports is important to understand how the site operations impact varies with different weather conditions and changing background sound levels. The scope and value of the reports should also be reviewed to ensure that information to determine approach to control of offsite noise impacts is being obtained.

Dow’s maintenance processes for cooling tower fans were reviewed on the basis that large air movers with elevated open discharge locations will potentially dominate the site noise profile. Site noise source prioritisation and control measures may indicate that other sources

are dominant, but any deterioration through insufficient maintenance may exacerbate their contribution.

Operations staff undertake daily noise/vibration observations to supplement the planned inspection and maintenance checks. Monthly vibration readings are taken with balancing carried out as necessary. Lubrication, drive shaft and blade rigidity checks are also undertaken. Gearboxes are inspected every 2 years as few defects are found. Variable speed drives are utilised to vary fan speed with heat load and minimise power input, and hence noise generation. Recent guidance, EEMUA 215, on cooling system fan maintenance has not been reviewed to establish if other best practice measures could be adopted.

Further review of inspection and maintenance of other potentially significant noise sources is proposed by NRW, including distillation fin-fans and the silicon grinder plants.

The following recommendations are made for improvements to noise management and control:

- Review the noise mapping approach to ensure that it provides suitable information to aid control of offsite noise impacts. Consider mapping of sources at height focussing on potentially dominant sources such as fan or high-pressure vents, openings in buildings with high internal noise levels.
 - Presumably this mapping is done primarily for Noise at Work compliance requirements, hence only ground level sources are considered, but this approach can be useful in correlating data with more targeted monitoring of sources including those at height. This can then be used in the formulation of a monitoring plan in accordance with BAT22 of Common waste water and waste gas treatment Bref management systems in the chemical sector, outlined below.
- Review the 60dB trigger for fence line sound recording taking into account the LA_{eq} averaging period, wind direction/speed and locations where receptors may be more sensitive.
 - It would be beneficial to confirm why 60dB has been chosen as the boundary limit and what averaging period that covers. The consultant's report specifies that correlation is available with the onsite weather station so if these can be linked it would be another level of confidence in substantiating complaints. The 60dB level may ensure that levels at the nearest sensitive receptor would be within WHO daytime and night time internal sound levels using simple propagation calculations. Fence line measurements are generally used to avoid or detect abnormal sounds and provide confidence that loud operations are being conducted within the times and levels specified by the planning regime or noise management plan. For broadband sound such as the CHP normal operation there may be limited benefit in making changes.
- Review operational staff awareness of offsite sensitivity to noisy activities and consider training or briefing on action required, particularly for night time increases in noise levels due to abnormal operations, maintenance, malfunctions or breakdowns. Roll out refresher training where necessary.
 - This is a key part to managing sound from a regulated site and is a requirement of BAT 23.

- Review the need for a dominant source survey and frequency analysis study to aid quantification of the site impact and direct the need for investigation of further control measures.
 - CWW Bref BAT22 (iv) states - a noise prevention and reduction programme designed to identify the source(s), to measure/estimate noise exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures. A refocus of the consultancy reports to concentrate on onsite measurements would be more beneficial than subjective assessments at 10 locations around the plant. A suitably qualified acoustic engineer should be engaged for this type of assessment.
- Review the scope, presentation and interpretation of the acoustics consultant noise surveys to ensure that best value and information is being obtained in directing strategy and action for managing noise control.
 - See point above. Also, the data does not seem to be analysed in detail to see if any insights can be gained. As outlined above, examination of the 1/3 octave bands shows that there are dominant low frequency tones indicated at 25 Hz and 50 Hz at Positions 3 and 9 respectively. There is also a dominant 315 Hz tone at multiple locations, although it is marginal, but possibly of significance at Position 2 which may be representative of the residential location where night time/early morning complaints are arising. An examination of the historic data to see if the 315 Hz tone is always there and less marginal may provide more information. FFT frequency analysis at the residential location and on site may then enable a potential source to be identified.
- Review EEMUA Publication 215 “Industrial cooling tower fans and fin fans - Guide for design, maintenance and operation”.
 - This new guide may provide additional areas to consider when setting inspection and maintenance programmes for cooling system fans at the installation.

ACTION: Dow Silicones to review the recommendations above and propose any changes to the site noise management regime, including updating of the noise management plan for discussion at the next site meeting.

Air quality data investigation

NRW is undertaking a review of air quality data from the Docks View Road and Holton Road monitors that were installed by the local authority environmental health team in response to public concerns about the Biomass UK No.2 waste wood co-incinerator plant impact on local air quality.

A report will be published on the public register when the review is complete.

All data to date show that Air Quality Objectives are being complied with, however, there appeared to be PM_{2.5} and PM₁₀ daily and hourly average peak concentrations at certain times which NRW undertook to investigate.

Initial source term identification suggests night time sources to the north east or east of the

monitoring locations. There are several possible sources:

- Local residential solid fuel burning
- Shipping movements in the docks
- Local idling road vehicles
- Industrial point source and fugitive emissions

All potential sources will need to be examined before reaching conclusions regarding any further steps to take. Preliminary discussions with Dow Silicones to review potential releases of dust established:

- DPR, catalyst and spent bed quenching only take place during the day.
- Other potential sources are high molecular weight hydrocarbon or siloxane releases. Although it is not known if such releases into cold atmospheric conditions would form an aerosol with the right particle size to register as PM_{2.5/10} on the monitoring station. This requires further consideration if the monitoring stations would register siloxane or HC aerosol as PM.

ACTION: Dow Silicones to review the potential for hydrocarbon or siloxane releases to form an aerosol with particle size in the PM_{2.5/10} range under cold weather conditions.

Spent sulphuric acid recovery

Recovery of spent acid at a UK processing site is under consideration. Initial indications are that permitting would be simplified if the material could be designated as a by-product.

However, the general regulatory position and case law appears to suggest that materials that are “spent” and need to be discarded or removed from site are considered to remain wastes until recovered. A contractual specification for supply to the proposed recovery operation would assist the by-product case.

If classification as by-product remains a preferred route for permitting use at the potential UK processor, Dow will need to make a case based on the current guidance. Further details are available here:

<https://naturalresources.wales/guidance-and-advice/environmental-topics/waste-management/meeting-the-end-of-waste-test/?lang=en>

<https://www.gov.uk/government/publications/legal-definition-of-waste-guidance/decide-if-a-material-is-waste-or-not#when-a-material-is-a-by-product-and-not-waste>

ACTION: Dow Silicones to provide updates as necessary.

Monitoring returns and notification review

Monitoring data for Q1 and Q2 2020 has been reviewed and no breach of permit conditions was identified other than those already addressed in previous correspondence and the marginal copper discharge ELV non-compliance from W1. This has been identified as

potentially spurious due to an inadequate cleaning regime associated with the composite effluent sampler. The result is therefore considered to be a minor Category 3 breach of permit condition 3.1.2 and improved weekly cleaning will address the likely causes.

The need to investigate the increasing trend in methane and NMVOC releases to air from A12 identified in the 2019 annual report is noted and this will need to be followed up at the next review meeting. This may be related to increased recovery of solid wastes and the associated increased venting of VOC.

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

The inability to monitor BOD5 in the site effluent during Q2 due to COVID-19 restrictions as notified on 12 May 2020 will not result in any increase in environmental risk as process emissions are tracked using regular effluent methanol analysis. This omission has been recorded as a suspended category 4 non-compliance with permit condition 3.3.1. in accordance with the NRW Regulatory Decision on monitoring and reporting during the COVID-19 pandemic:

<https://naturalresources.wales/about-us/news-and-events/statements/regulatory-decisions-for-monitoring-and-reporting/?lang=en>

The “score and suspend” approach is intended to provide transparency where issues have arisen due to COVID-19 restrictions, while not penalising operators for circumstances beyond their control.

The suspended category 4 non-compliance with permit condition 3.3.1 also applies to the omission of monitoring release points A43, A79 and A85 during Q2 2020 as detailed in the Q2 monitoring return.

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.