

Compliance Assessment Report CAR_NRW0050087

Permit being assessed: JP3632ZH.

For: Barry CHP , **held by:** Dow Silicones UK Limited

At: Wimborne Road - Dock 2, Barry, Vale of Glamorgan, CF63 3DH.

Type of assessment: Site Inspection,

Reason: Routine.

On: 16/10/2025 between 09:00 and 16:00.

Parts of permit assessed: 1.1.1(a) 3.1.2.

NRW Lead Officer: Geraint Harris.

Report sent to: Environmental Manager , Environmental Manager , on 04/12/2025.

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

Part of permitted activity assessed (compliance criteria)	Assessment result	Permit condition
IR1A - Installations - Management - General Management	Action only (X)	
IR3A(2) - Installations - Emissions and monitoring - Emissions to air	C3 Minor	3.1.2

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

Total 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
IR1A	Action1: Dow must confirm whether a formal procedure exists to ensure manufacturer instructions are incorporated into operating procedures and MOC documentation, and provide a copy or reference. Due 5th January 2026. Action2: If not, Dow should explain how it ensures such instructions are consistently followed and embedded into operational procedures. Due 5th January 2026.	31/12/2025
IR3A(2)	Dow to provide a completed Schedule 5 Notice Part B form	31/12/2025

Criteria	Action needed	Complete by
	by the end of December for the exceedances that occurred on the following dates: <ul style="list-style-type: none"> • 21st February • 31st May • 21st August 	

Compliance 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.

We are currently considering taking enforcement action against you for the non-compliance recorded above. We will contact you in due course.

4. Details of our assessment

Continuation from CAR NRW0049276

Confirmation that O₂ trim procedures are embedded in EMS and MOC documentation.

During the recent site visit on 16th October 2025, it was noted that following a shutdown, burner O₂ sensors were likely calibrated “cold,” which is inconsistent with the manufacturer’s recommendation for “hot” calibration once sensors are online. This incorrect calibration resulted in CO emissions exceeding permit limits until Dow performed a hot calibration in line with the manufacturer’s guidance, successfully restoring compliance. Subsequently, Dow updated its start-up checklist to include the hot calibration requirement, indicating a procedural change.

This incident raises concerns about whether Dow’s Environmental Management System (EMS) and Management of Change (MOC) processes adequately integrate manufacturer instructions into operational procedures. While Dow stated that the sensors are standard consumables replaced from stock, the failure to follow OEM calibration guidance during installation suggests that even routine replacements can have significant compliance implications. It remains unclear whether manufacturer recommendations were considered during the replacement and calibration of these sensors.

MOC procedures generally do not apply to true “like-for-like” replacements or “replacement-in-kind,” as these are considered routine maintenance and do not introduce new hazards. However, OEM guidelines should be embedded into Planned Preventive Maintenance (PPM) to ensure consistency and compliance. There was ambiguity during the site visit regarding whether Dow’s maintenance notes and systems require personnel to check and implement OEM guidance when setting up new PPM or MOC procedures. Dow agreed to review its maintenance documentation and confirm this point. Therefore, two actions are required to address these concerns.

Action1: Dow must confirm whether a formal procedure exists to ensure manufacturer instructions are incorporated into operating procedures and MOC documentation, and provide

a copy or reference. Due 5th January 2026.

Action2: If not, Dow should explain how it ensures such instructions are consistently followed and embedded into operational procedures. Due 5th January 2026.

Following the 2024 shutdown, Dow Silicones experienced elevated CO emissions on Unit A when operating in Forced Draft (FD) mode without O₂ trim bias. Prior to this shutdown, O₂ trim was not required to maintain CO emissions within permitted limits. Post-shutdown, lower O₂ levels in FD mode resulted in increased CO emissions. At the time of the incident, there were no specific procedures for applying O₂ trim in FD mode, and operators were unaware that a Gas Turbine (GT) trip reset O₂ trim to zero. Alarm overload during the GT trip contributed to the nightshift missing high CO alarms.

The root cause was a combination of technical, procedural, and human factors. Technically, the O₂ trim reset to zero after a GT trip, and burner O₂ sensors were incorrectly calibrated using a “cold” method instead of the manufacturer-recommended “hot” calibration. Procedurally, there were no documented instructions for operating in FD mode. From a human factors perspective, alarm overload and the lack of refresher training contributed to operators missing high CO alarms.

On the 16th October, Dow demonstrated completion of several corrective measures. All operators received detailed refresher training on O₂ trim bias and CO mitigation, and new training manuals were developed to ensure consistent knowledge across shifts. Alarm management has been improved by removing redundant alarms and introducing a process safety trip linked to the O₂ stack sensor. The environmental compliance dashboard now flashes red when O₂ falls below 3%, and the plant will trip if O₂ drops below 0.5%. System enhancements include applying Qual 2 functions to DCS and Envirosoft data for live corrected readings, creating PI screens to consolidate permitted parameters into a single graphical view, and reconfiguring analyser data display on the DCS for clarity. Additionally, the O₂ trim reset value has been changed from zero to 1.8%, and procedures for FD mode operation have been updated and documented.

Dow has implemented robust improvements to strengthen operational resilience and ensure sustained compliance. These measures not only address the root causes of the incident but also enhance system reliability, operator competence, and real-time emissions control, significantly reducing the risk of recurrence.

CHP Inlet Blockages

With regards to the CHP inlet fan blockages, NRW acknowledges that the fans are fitted with protective mesh to prevent ingress of typical debris. In this instance, however, a large plastic sheet, likely dislodged during the storm from onsite scaffolding, fully covered one of the fans. While this type of material is not commonly present on site, its impact highlights the importance of considering extreme weather scenarios in risk assessments. Dow has since installed fencing around all three fans to prevent similar occurrences and incorporated a process safety trip linked to the O₂ stack sensor, enabling operators to respond to such events in real time. NRW welcomes these improvements and encourages Dow to review its Environmental Management System (EMS) to ensure that reasonably foreseeable risks, including those exacerbated by severe weather, are proactively identified and

managed.

Reporting Thresholds

Action 18 from CAR_NRW0049276 asked if Dow can operate stable steam and/or electricity supply to the site while operating under their current reporting threshold? Due 28th June 2025.

Action 19 from CAR_NRW0049276 asked If the answer to action 1 is yes. Then please report to NRW, how many hours you stably generated steam and/or electricity while operating under the current reporting thresholds in 2024. Due 30th June 2025.

During the onsite meeting on 16th October, Dow confirmed that they can operate a stable steam supply under their current reporting thresholds. However, their boilers must remain in a state of readiness for operational purposes. This involves sporadic firing of burners, a practice known as *banking*, to maintain steam quality. Banking is not generally considered normal operation for regulatory purposes and can be treated as part of the start-up process.

Dow did not provide specific hours of stable steam or electricity generation under current thresholds for 2024. However, they did present an overview of NO_x emissions versus steam production in both FD mode and GT mode. Emissions in GT mode were generally lower than when operating below the 32-tonne threshold, suggesting that the current threshold is appropriate, as there do not appear to be significant ELV exceedances within the non-reportable sub-32-tonne range. FD mode emissions were mostly lower and more stable below the 25-tonne threshold. Given Dow's recent permit variation request to remove three high-pressure boilers and associated equipment from their existing LCP permit, there is limited benefit in pursuing further assessment of threshold changes. Therefore, Actions 18 and 19 are considered complete and can be closed.

Q3 Monitoring Returns

All parameters, except for carbon monoxide (CO) from emission point A2 on 21st August 2025, were compliant. Dow reported via a Schedule 5 notice the following:

“At approximately midnight, Unit FB (A2) was ramped up to meet site steam demand. During this process, the air flow rate automatically increased; however, a reduction in burner oxygen caused significant fluctuations in CO levels, ultimately exceeding the ELV. At 09:00, the unit was ramped down, restoring burner oxygen and reducing CO concentrations to below the ELV. The unit then operated for approximately four hours with consistently low CO levels before being shut down to allow the maintenance team to investigate the air system.”

Dow has stated that findings from their root cause investigation will be reported in their Schedule 5 Notice Part B submission.

Carbon monoxide (CO) is a pollutant that contributes to poor air quality and poses risks to human health and the environment; its exceedance is taken seriously. However, considering the nature of the breach, its short duration, and the corrective actions implemented, the incident is not considered significant enough to warrant escalation to a Category 2 non-compliance. Therefore, a Category 3 non-compliance is being issued against permit condition 3.1.2 for exceeding the CO emission limit

value (ELV) specified in Schedule 3.

Action 3: Dow to provide a completed Schedule 5 Notice Part B form by the end of December for the exceedances that occurred on the following dates:

- **21st February**
- **31st May**
- **21st August**

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.

If your assessment result in Section 1 is suspended, what does this mean?

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 compliance criteria (used in section 1 and 2):

1. Management

- IR1A – General management
- IR1B – Finance (only applicable to Landfill)
- IR1C – Energy efficiency
- IR1D - Efficient use of raw materials
- IR1E - Avoidance, recovery and disposal of wastes produced by the activities
- IR1F - Multiple operator installations

2. Operations

- IR2A – Permitted activities
- IR2B – The site
- IR2C – Operating techniques
- IR2D – Technical requirements
- IR2E – Improvement programme
- IR2F – Pre-operational conditions
- IR2G – Landfill engineering (only applicable to Landfill)
- IR2H – Waste acceptance (only applicable to Landfill)
- IR2I – Leachate levels (only applicable to Landfill)
- IR2J – Closure and aftercare (only applicable to Landfill)
- IR2K – Landfill gas management (only applicable to Landfill)

3. Emission and Monitoring

- IR3A – Emissions to water, air or land
- IR3B – Emissions of substances not controlled by emission limits
- IR3C – Odour
- IR3D – Noise and vibration
- IR3E – Monitoring
- IR3F – Pests
- IR3G – Air quality management plans
- IR3H – Monitoring for the purposes of the Industrial Emissions Directive (this heading includes Large Combustion Plants)
- IR3I – Fire

4. Information

- IR4A – Records
- IR4B – Reporting
- IR4C – Notification

Enforcement response

Any non-compliance with a permit condition 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 twenty 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 to 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.