

Compliance Assessment Report CAR_NRW0039941

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: Site Inspection, Reason: Routine.

On 07/04/2022 between 09:00 and 16:00.

Parts of permit assessed: Operating Techniques

NRW Lead Officer: Geraint Harris.

Report sent to: Christopher Chadwick, Environment Manager on 23/05/2022.

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	permit condition 3.1.2
C2 - General Management - Management system and operating procedures	C3 Minor	condition 1.1.1
F2 - Amenity - Noise	Action only (X)	

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

Total number of non-compliances recorded	Total non-compliance score
2	8

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 to confirm if they have sealed up the manholes linked to W952 sewer.	30/06/2022
C2	please provide an update on the systems in place to prevent the build up of solids within the Chem sewer	30/06/2022
F2	create an action plan to target the higher-ranking areas	01/07/2022

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.

At this time, we do not intend to take any further action.

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

EPR-BR9685IX

High pH to River

On the 2nd and 7th of February, several high pH discharges entered the river Cadoxton from Dow's wastewater treatment plant (WWTP) outfall. Dow later reported, within their schedule 5, that: *"When waste-water treatment (WWT) was shut-down on 7th Feb (14.13-14.20 & 15.05-15.25), the final effluent flow stopped being sent to river. Soon after the pH on the two final effluent pH probes increased to between 10.5 and 11.9, for the periods indicated. When the flow from the plant was reinstated at 14.20 and 15.25 respectively, the pH returned to normal (pH7.5-7.7). It was observed by the operator, that after the WWT plant flow had stopped and the final effluent flume had emptied, an additional flow was seen, approx. 2 minutes after the sewer had emptied, from the storm water line from W952, which also connects into the final effluent flume, at a rate of 10m³/hr."*

This event occurred on the following occasions:

pH>9 = on February 2nd 2022, 13.41-14.16 & 16.06-16.12

pH>9 = on February 7th 2022, 14.13-14.20 & 15.05-15.25

Upon reviewing Dow's root cause investigation, the source of the high pH material was discovered to be a residual amount of lime-based material within the W952 storm water line, from a small lime spill within the W1205 area. Overfilling Spent bed lorries in the area, had caused excess solids to block the chem sewer around the catalyst quench bay. A catalyst quench was undertaken and drain down of the lime solution from the quench emptied into the chem sewer but due to it being blocked it overflowed. As a result, the lime solution pooled in several areas, with the most significant area being over a manhole cover over W952's unused storm sewer line. Consequently, this lime solution dripped through the holes within the manhole cover and mixed with the pooled rainwater inside the W952 storm sewer. As a result of the WWTP being switched off, this high pH solution was then able to flow out of the sewer into the river Cadoxton as mentioned above. The affected section of W952's storm sewer is currently unused and its connection to W952 storm sump purposefully blocked. As part of the investigation, Dow tested this sump and found it to be pH6 and discovered that the integrity of Vetter bag isolation at the storm sump to be working as required. Therefore, the release of high pH solution to river could only have occurred as a result of the blocked chem sewer. According to Dow, the impact to the river will have been minimal due to the river currently being at a relatively high level and flow being around the mean of 0.225m³/s or approximately equal to Q31 or Q32.

Table S3.2 - Point Source emissions to water, requires Dow to undertake continuous pH monitoring with an instantaneous reference period and a limit of pH 6-9. Consequently, the incidents on the 2nd and 7th of February constitutes a breach in this permit condition 3.1.2. **Non-compliance:** *A category 3 non-compliance is given due to the release of a substances with a pH in excess of the permit ELV's (pH9). This is a breach under condition 3.1.2. It is an offence under Regulation 38(2) of the Environmental Permitting Regulations (consolidated 2016) to breach a permit condition or emission limit. Non-compliance score CCS3.*

Upon visiting the site on the 7th April 2022, the spent beds solids could be seen discharging from tube press screws into an open top lorry below. The system was designed so that the solids would fall into a large lorry which would, when full, drive to the offsite disposal site with minimal deviation. However, such a system was never implemented, and instead smaller onsite lorries are used to capture the bed material and then transport it to other parts of the site. Due to the difference in height between the discharge point and the lorry, discharging solids are more prone to spilling onto the surrounding surfaces. Significant deposits of solids could be seen around a filling lorry during the site visit. Within this area are a number of linked Chem sewers. It was

these sewers that were blocked with these spent bed solids during the incident. Therefore, liquid from the periodic drain down of 424 catalyst tank was unable to pass along the Chem Sewer towards the ETP and subsequently overflowed and pooled over W952's un-used storm sewer line.

Upon reviewing the learning and corrective actions stated within Dow's root cause investigation it appears there are a number of management system failures. These include:

- No planned preventive maintenance cleaning of sewers
- No inspection regime for sewers either before or during the opening of the base valve
- No system to capture or prevent solids from entering the sewer system.

Had the above measures been in place the likelihood of this incident occurring would have been significantly reduced. Therefore, a noncompliance against the management system for failure to have a system in place to check and monitor the conditions of the sewer. This ultimately resulted in the spilling over of the lime solution into the storm sewer. **Non-compliance:** A category 3 non-compliance is given for not having an effective management system in place. This is a breach under condition 1.1.1 **It is an offence under Regulation 38(2) of the Environmental Permitting Regulations (consolidated 2016) to breach a permit condition or emission limit. Non-compliance score CCS3.**

Following the incident Dow employed the services of a specialist drain cleaning contractor to remove the blockage within the sewer. Dow have stated that they intend to implement a plan preventative maintenance cleaning regime for W1205 Chem Sewer. They have also introduced a visual check of the sewer to the site procedures prior to opening the base valve on tank 424. Dow also plan on evaluating the automation options for preventing lorries from over filling or spend beds solids from contaminating the sewer system. The introduction of the above, especially the modification of the lorry filling area should reduce the reoccurrence of this incident.

Action1: please provide an update on the systems in place to prevent the build up of solids within the Chem sewer by 30th June 2022.

Action2: Dow to confirm if they have sealed up the manholes linked to W952 sewer. Due 30th June 2022.

Wastewater treatment failure

As mentioned in the previous two CAR Forms (CAR_NRW0038379 and CAR_NRW0039200), high copper levels within the effluent discharge to river, in 2021, were attributed to several upsets within the wastewater treatment plant. Since the incident Dow have reviewed all aspects of the treatment plant to identify all the critical elements of the plant's operation. As a result of this they feel they have a better understanding of the system and have made some improvements and plans to make the system more robust. An update on the progress of the plant was provided during the site visit on the 7th April and within subsequent emails following the visit. During the visit it was quite clear that a significant amount of resource and dedicated management leadership is being deployed to the ETP. Two of the more pertinent updates provided by Dow are highlighted below.

Dow have employed the use of a third party to assist with the removal of solids from the E-Tanks. A novel approach using de-watering filter bags has been proposed. The plan is to extract the solid laden solution from the E-Tanks and pump them through these bespoke filter bags. The solids should remain within the bags while the liquid is able to escape and re-join the ETP. Dow already have a disposal outlet for the solids. It is expected that this new method will reduce the amount of solid material within the E-Tanks and therefore reduce the carryover into the remaining treatment process. Furthermore, it is anticipated that the removal of solids through this method will be faster than the existing filter press method.

Another area that has received attention is the Stranco polymer dosing system. The reliability has been

improved with the system undergoing both procedural and hardware improvements in Q4 2021 and Q1 2022. This improvement has been reflected within the quality of the effluent which has seen a reduction in some of the reportable emissions to river.

NRW are pleased to see that the plant has remained within compliance since the incident involving high copper discharges to river in early 2021. It is anticipated that resilience within the ETP will be further improved as Dow continue to implement the solutions stated within the root cause investigation.

Action 3: Dow to provide an update on the ETP at the next compliance meeting.

W413 Passing valves

Dow have tried on a few occasions to schedule maintenance on the passing W413 valves. W413 storm water sump is normally in continuous use with water collected transferred to the wastewater treatment plant. Therefore, it is proving difficult to safely enter this space. There is a project planned to understand causes of contamination of storm water into W413 storm sump and hopefully this can address issues at source so that water quality can meet permit W2 discharge requirements. Fixing the passing valves will be part of the improvements within this project. Until the project is complete there will be no discharge of water from W413 to river and Dow are currently treating all site storm water within the waste treatment facility. Dow aim to look at the source to find what is causing this issue with the possible aim of turning some storm water sewers into chem sewers if needed.

Action 3: Dow to provide an update at the next compliance meeting.

Chlorosilane waste

Dow have asked NRW about the possibility of being allowed to export their 'chlorosilane' waste (hazardous liquid) to a disposal facility, in the event that their only available UK waste facility (Veolia high temperature incinerator plant in the north of England) goes out of action for an extended period. Up until February 2021 they were mainly sending this same waste to a site (Currenta GmbH) in Germany for R1 recovery. However, in July 2021 there was a fire at the Currenta site which has put it out of action. Dow asked if they are they allowed to pursue a 'speculative' application (for an exemption to the UK Plan) to potentially allow exports under TFS for a disposal site in Germany or France. On the understanding it could only be used in the event that the current site (HTI by Veolia) could not take their waste for an extended period. Contact was made with DEFRA, by NRW, regarding this request in which they responded with the following: "we would need substantive reassurance and evidence that they have explored all options to recover this waste in the EU, and failing that, explored all options to dispose of this waste in the UK before considering an exemption (and the DRR that would also be required). If they provided such evidence, then we would then explore the possibility of exemptions and DRRs." Therefore, while Veolia HTI is a viable option it is very unlikely that DEFRA would grant an exemption for disposal of this waste outside of the UK.

Noise

Dow have completed several noise surveys conducted within and outside of their permitted boundary. The two most recent include a survey by Hunter Acoustics, commissioned by Dow to carry out night-time noise surveys around the perimeter of the Barry Chemical/Industrial complex site on Cardiff Road, Barry on 30th June to the 1st July 2021. The second being a three-day internal audit using Sound Camera hardware (21st to 23rd October). The latter survey generated an Environmental Impact Noise Ranking Report by measuring the noise levels with a Cirrus 161D noise meter. Dow need to review all the previous reports to identify if the noise sources recorded by the sound camera relate to the external noise recordings, i.e do any of the acoustic camera tonal sources match the off site ones? There appears to be too many monitoring locations being used for recordings. These could be rationalised to allow more detailed investigations at the most sensitive receptors. Furthermore, Dow should produce a plan on how they can make improvements on site to those areas highlighted in the Ranking report. Of note is the small compressor / pump on the edge of the W822

plant next to the fence line. The noise is tonal with no obstructions between it and the fence. This particular noise was very noticeable during the site visit in November. Therefore, using this report coupled with past work, a plan for tackling the dominant offsite noise sources should be produced.

ACTION3: Dow to create an action plan to target the higher-ranking areas. Due 1st July.

Eel Regulation Compliance

Dow are currently not abstracting water from the Cadoxton. Contact has been made by NRW at another site which has employed compliant infrastructure with the aim of inviting Dow to visit to get an appreciation of what is required. NRW have passed on Dow's contact details to the third party.

Returns

The monitoring returns for Q1 2022 were received in April 2022. The only exceedance of an emission limit value was for high pH of liquid entering the Cadoxton river via emission pint W1. This is addressed at the beginning of this CAR Form. The report is accepted.

Groundwater monitoring data review

A spreadsheet containing landfill borehole sampling results and a report of Copper and Trimethylsilanol trending for the period Q1 2022 was received. The trends show typical fluctuations for both parameters with no significant increases recorded.

OMA Audit

NRW intend to undertake an OMA audit for air for both Dow Silicones and DOW CHP later in the year. It was proposed to undertake this Audit in late November or December following Dow's planned maintenance shutdown period.

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.