

PERMIT NUMBER BR9685IX

DOW CORNING LTD

SCHEDULE 5 INCIDENT NOTIFICATION

To:	Process Industry Inspector
FAO: Mr Tony Leahey	Natural Resources Wales Rivers House St Mellons Business Park Fortran Road St Mellons Cardiff CF3 0EY
Phone	03000 65 3000
Email	icc@cyfoethnaturiolcymru.gov.uk
From:	Mike Squire
Name Of Operator	Dow Silicones UK Ltd
Location of Process:	Cardiff Road, Barry, Vale of Glamorgan
FAX No:	
Telephone No:	+44 1446 723156
Email	Michael.squire@dow.com
Date Information Provided:	17 th March 2021 part A. 25 th May 2021 part B

Part A

Permit Number	EPR/BR9685IX
Name of Operator	Dow Silicones UK Ltd
Location of Facility	Barry, South Glamorgan, Wales
Time and Date of Detection	Q1 2021

a) Notification requirements for any activity that gives rise to an incident or accident which significantly affects or may significantly affect the environment	
To be notified immediately	
Date and time of event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substance(s) potentially released	
Best estimate of quantities or rate of release	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident	

b) Notification requirements for the breach of a permit condition	
To be notified immediately	
Emission point reference source	W1
Parameter(s)	Copper
Limit	95th % 0.1 mg/l
Measured value and uncertainty	95th % 0.1- 0.15 mg/l (exact figure to reported at end of Q1).
Date and time of monitoring	Q1 2021
Measures taken, or intended to be taken, to stop the emission	High Cu in W1 effluent were measured in the W1 composite sampler as follows: Jan 1 2021 = 0.37mg/l (spare sample result was 0.19mg/l) Jan 2 2021 = 0.347mg/l (spare sample result was 0.043mg/l) Jan 11 2021 = 0.104mg/l Jan 19 2021 = 0.168mg/l (3 out of 4 grab sample results tested <0.1mg/l afterwards) Mar 10 2021 = 0.109mg/l Mar 12 2021 = 0.104mg/l Mar 13 2021 = 0.129mg/l Mar 14 2021 = 0.149mg/l

Mar 15 2021 = 0.145mg/l
Mar 16 2021 = 0.18mg/l

Elevated Cu levels for Jan 1 and 2nd were thought to be due to contaminated/dirty samples as all plant conditions appeared normal and repeat test on the 2nd was 0.043mg/l.

High results later in January were due to an upset in the waste water treatment plant (bioreactor mixer failure) and high solids (containing copper) in the effluent. This issue was reviewed with NRW at the time and a full RCI undertaken, the actions from which will be documented in the Part B form and discussed with NRW.

Elevated Cu results in March have resulted from a low pH in the bioreactor (~pH6) compared to normal pH of ~7.5. This has been due to blockages and equipment failures associated with the Magnesium Hydroxide dosing system. Manual dosing of sodium hydroxide is currently being undertaken to return pH levels to normal, which should bring dissolved copper levels in W1 back to normal. Cu levels in primary waste water treatment and feed to secondary waste water treatment are normal. The latest elevated results were discussed with NRW on March 16th. W1 was diverted to containment mid afternoon on March 15th but then resumed back to river discharge mid afternoon on March 16th following review with NRW and following results of a Cu bioavailability impact study. Resuming discharge to the river has enabled critical site processes to remain operational. This includes W931 process which takes approximately 5 days to restart following shutdown. Air emissions associated with W931 restart are normally in the range 1-3 Tonnes of chloromethane. When considering the overall environmental impact of continued operation of slightly elevated levels of Cu in W1 effluent (after Cu bioavailability results showed low impact) versus increased air emissions the site deemed the best option was to continue discharge which also helps us to continue to work on optimising the bioreactor to return back to normal operation as soon as possible. NRW will receive daily updates until the compliance issue is resolved.

Cu bioavailability study:

The study used the following data and assumptions:

- W1 discharge flow = 250m³/hr (average during March dates above)
- Cadoxton River Flow = 140m³/hr (this is the 5th percentile flow so assumes low dilution). In reality the flow is higher at this time of year.
- Using the following guidance:
<https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit>
 - BC = Background concentration in river = 5.23 ug/l (upstream Cu concentration from NRW data)
 - The predicted environmental concentration (PEC) = PC + BC = 13.55 ug/l
 - If the river flow rate is less than 10 times the effluent discharge flow rate (it's not) use:
 - Calc PEC = (EFR*RC)+(RFR*BC)/(EFR+RFR) = 10.2 ug/l
 - Measured NRW downstream concentration = 11 ug/l
 - Dissolved Cu = 30-40% of Total Cu so normally ~ 4ug/l
 - Based on the above we used 24 ug/l to represent a worst case dissolved Cu level in the river (6x normal)
- Then using the following guidance: copper bioavailability assessment tool (Draft) 4 Tier 2
 - Dissolved Cu conc = 24 ug/l
 - DOC = 10ug/l (July 2020 measurement)
 - Ca = 100ug/l
 - pH of river = 7.7

	Using these parameters gives a result of 0.59ug/l bioavailable copper concentration (which is <1 and therefore acceptable from an EQS emission perspective). Further assessments on the Cu bioavailability, including sensitivity analysis will be carried out in the coming days using as much actual data as possible. This will be shared with NRW. 4 Hourly grab samples of W1 effluent are ongoing. Results are showing a decreasing copper trend in W1 today (from 0.17mg/l to 0.11mg/l).
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Time periods for notification following detection of a breach of a limit	
Parameter	Notification period

c) In the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment:	
To be notified immediately	
Description of where the effect on the environment was detected	
Substance(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B- to be submitted as soon as practicable

Any more information on the matters for notification under Part A	
Measure taken, or intended to be taken, to prevent a recurrence of the incident	The reported Q1 2021 W1 95th percentile copper discharge result was 0.148 mg/l, which breached the 0.1 mg/l permit limit. A full RCI has now been completed – a copy of which will be attached to the part B form submitted. The main root causes were as follows: - pH in bioreactor was too low due to blockages and hence lack of magmex dosing feed to the bioreactor (magnesium hydroxide). Backup dosing of caustic (sodium hydroxide) did not prove to be very effective. The magmex dosing system has been resolved and pH is control is now normal with copper levels in effluent also now very low. - High copper containing solids reaching secondary waste water treatment (spill of spent bed from a failed pump seal, containment systems fouled with solids entrained in effluent over time and e-tank level taken to a low level dragging solids into SWWT plus failure of bioreactor mixer). The RCI contains multiple actions to address all these issues. Temporary mixers have been installed in the bioreactor (as discussed with NRW). Additional resources have been assigned to the area to work towards making the waste water facility more robust, reliable and resilient. This included a dedicated new Operational Leader (Mike Kisby) put into post December 2020 and more recently a focused Operational Excellence Team was formed. The team will work complete an Operational Excellence Project for maintenance & operation excellence in PWWT & SWWT.

Measure taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment, which has been or may be caused by the emission.	Further copper bioavailability assessments were carried out using actual discharge and river sample data during the period of elevated copper in W1 and downstream in the river. The results were e-mailed to NRW on 20th April 2021 and concluded that the Water Framework Directive EQS for copper was not exceeded so environmental impact is not thought to have been significant.
The dates of any unauthorised emissions from the facility in the preceding 24 months.	23 May 2019 methanol in W1 BOD permit breach 3 Dec 2019 MeCl to air permit limit breach from W931 (A34) Q2 2020 95 th percentile suspended solids & cu in W1 breach. Q4 2020 95 th percentile cu in W1 breach

Name	Mike Squire
Post	Environmental Specialist
Signature	Mike Squire
Date	25th May 2021