Cyfoeth Naturiol Cymru Natural Resources Wales

Compliance Assessment Report

Report ID: CAR_NRW0032494

This form will report compliance with your permit as determined by an NRW officer					
Site	Barry Silicon Plant	Permit Ref	BR9685IX		
Operator/Permit holder	Dow Corning Ltd				
Regime	Installations				
Date of assessment	18/10/2017	Time in	10:00	Out	17:00
Assessment type	Report/Data Review				
Parts of the permit assessed	Emissions, Amenity, Waste				
Lead officer's name	Leakey, Antony				
Accompanied by	Harvey, Caitriona				
Recipient's name/position	Judith Sartor/ Environmental Specialist	Date issued	23/11/2017		

Section 1 – Compliance Assessment Summary

This is based on the requirements of the permit under the Environmental Permitting Regulations or the licence under the Water Resources Act 1991 as amended by the Water Act 2003. A detailed explanation is captured in "Compliance Assessment Report Detail" (Section 2) and any actions you may need to take are given in the "Action(s)" (section 4). This summary details where we believe any non-compliance with the permit has occurred, the relevant condition and how the non-compliance has been categorised using our Compliance Classification Scheme (CCS). CCS Scores can be consolidated or suspended where appropriate, to reflect the impact of some non-compliances more accurately. For more details of our CCS scheme, contact your local office.

Permit conditions and compliance summary	CCS Category	Condition(s) breached
B1 - Infrastructure - Engineering for prevention and control of emissions	A	
B3 - Infrastructure - Site drainage engineering (clean and foul)	A	
C2 - General Management - Management system and operating procedures	C3	1.1.1
E1 - Emissions - Air	A	
E2 - Emissions - Land and groundwater	A	
E3 - Emissions - Surface water	A	
F2 - Amenity - Noise	A	
G4 - Monitoring and Records, Maintenance and Reporting - Reporting and notification to Natural Resources Wales	A	

KEY: See Section 5 for breach categories, suspended scores will be indicated as such.
A = Assessed or assessed in part (no evidence of non-compliance), **X** = Action only,
O = Ongoing non-compliance, not scored.

Number of breaches recorded	1	Total compliance score (see section 5 for scoring scheme)	4

If the Number of breaches recorded is greater than zero, please see Section 3 for our proposed enforcement response

Section 2 – Compliance Assessment Report Detail

This section contains a report of our findings and will usually include information on:

- The part(s) of the permit that were assessed (eg. Maintenance, training, combustion plant, etc)
- Where the type of assessment was 'Data Review' details of the report/results triggering the assessment
- Any non-compliances identified
- Any non-compliances with directly applicable legislation
- Details of any multiple non-compliances
- Information on the compliance score accrued inc.
- Details of advice given
- Any other areas of concern
- Any actions requested
- Any examples of good practice
- A reference to photos taken

Dow Corning Limited Site Visit Report - 18/10/17

W931 release point A34 methanol mass flow limit

Calculations based on control valve characteristics have been used to demonstrate the vent flow split between the MEVA route and other vent routes.

ACTION: Dow Corning to provide calculation spreadsheet.

An investigation in to whether it is possible to reduce routine vent losses by introducing a recirculation flow from the accumulator to improve the mass transfer capability of the MEVA column has not yet been carried out.

ACTION: Dow Corning to review the MEVA column wetting rate and provide an update at next site meeting.

Effluent loss from W952 sump

The effluent loss occurred as a result of effluent backing up in the sump due to incorrect calibration of the sump level instrument. The underlying reasons for this are unclear.

ACTION: Dow Corning to review the level instrument set up issues in case there are wider implications for C&I procedures.

Failure of the sump top connection blinding caps allowed acidic effluent to spill into surrounding chippings and made ground. The failure mode of the caps is unclear.

ACTION: Dow Corning to review the sump blinding cap failure mode issues in case there are wider implications for the site effluent handling system.

The low pH effluent is expected to have been fully neutralised by the limestone chippings and there is currently no evidence of depressed pH in the nearest downgradient borehole monitoring data. This will be kept under review. The presence of persistent trace chemical species (e.g. metals, chlorinated hydrocarbons) in the effluent needs to be confirmed.

ACTION: Dow Corning to provide details of any persistent trace species in the W952 effluent.

Damage co-incidentally found in the CHP drainage system is now thought to be due to acidic effluent from W952 sump backing up in the linked CHP drainage system rather than a separate issue relating to CHP operation.

Inspection of photographs and the sump location indicated that the repairs and remediation have been completed. A review of permit condition non-compliance will be carried out upon completion of the above actions.

W806 Scrubber

The new water scrubber and release point A121 were visited. Blockage problems have been experienced during commissioning and investigation into the cause has not yet completed.

It was noted that one of the older redundant vent points was poorly supported and posed a potential hazard to personnel and plant.

River Cadoxton Abstraction

The screening cost estimates have been reviewed and cost-benefit assessment (CBA) screening using the spreadsheet tool shows that best practice or alternative screening is unlikely to be viable.

As best practice and alternative measures do not appear to be cost effective the final stage of compliance is adoption of measures by other means. This could involve a one-off investment in catchment-based habitat improvements to the value of £30,000, achieved through projects implemented by the Rivers Trust and agreed with NRW. An updated Eel Regulation exemption notice would be issued specifying the details of the projects to be undertaken once they were sufficiently well developed.

Further discussion on this matter will be required to agree a way forward and in the meantime, the existing exemption notice is extended further until 30 June 2018.

Silanol fate

Work has continued with identification of sources, potential control measures and impacts of DMSD and MST in the waste water discharge to the Cadoxton River. There is thought to be up to 100-200 mg/l DMSD from chlorosilane hydrolysis and MeCl/MeOH recovery and 150-200 mg/l MST from DPR hydrolysis in the final effluent.

So far testing has established that DMSD is not acutely toxic, not bio-accumulative, but is very persistent. The outcome of the chronic toxicity testing is awaited. It is noted that chronic toxicity using Tisbe only is being tested. This is not thought to be a problem.

The Water Framework Directive defines a hazardous substance as one which is toxic, persistent and liable to bioaccumulate, so a substance must meet all three criteria to be determined as hazardous. Alternatively, a substance must be very persistent and very bio-accumulative to be considered hazardous in groundwater.

On this basis DMSD is considered to be a non-hazardous pollutant.

The presence of traces of ethyl and propyl silanols in the effluent will need consideration and further assessment if these chemical species might meet the hazardous substances criteria.

W410 vent

The greater proportion of xylene emissions are from A78 vent and consideration is being given to use of chilled water. The potential to eliminate xylene from the resin raw material as supplied was discussed, as this is the source of the xylene and is not a process requirement.

ACTION: Dow Corning to review the possibility of eliminating xylene from the resin raw material.

Chloromethane daily mass release measurement

Investigation has indicated that excess MeCl was not released to atmosphere, but that an unmeasured stream was directed to a recovery route. Improvements are planned to ensure that

all vent routes are measured and visible to operators.

W941 Distillation secondary containment

The concrete apron on the vapor connection side of the "top" column section finishes very close to the edge of the plant structure. While the vapour line is the nearest potential source of chlorosilane release, there is also pumped liquid chlorosilane pipework and a higher-level accumulator that might result in liquid jetting or cascading out of the plant structure and onto uncontained areas.

Initially this issue will be followed up under COMAH, but if the potential for a MATTE is not present consideration will need to be given to groundwater and air quality protection requirements during an incident under EPR.

W941 Distillation reboiler corrosion

Excessive corrosion of the main column reboiler was noted during the recent shutdown after only 2 years of service. Change out is usually required after 7 years. Details of the corrosion mechanism are not yet known.

ACTION: Dow Corning to provide details of reboiler corrosion at future update.

Noise assessments

Two reports have been received relating to the complaints from residents of elevated noise levels over the summer and autumn period:

Hunter Acoustics Letter 22nd September 2017, Re: Continuous Noise Monitoring

Letter received detailing monitoring of 17-18th September 2017.

It is unclear whether Position 1 (on site) is the most appropriate location for comparison with Castleland Street due to it being further away and on the northern boundary. By comparison, positions 2 or 3 may be more appropriate being on the western boundary of the Dow site. The report partly acknowledges this, stating that sounds from other parts of the site may have been shielded. However, Position 1 will have been suitable for Gwenllian Street which is close by.

The report notes that Castleland Street is close to / overlooking the Docks and associated new developments. It is possible that some of the complaints are related to these activities. The report suggests that a further survey may be appropriate at Docks View road which has a view over a wider area. This may help to determine the source of complaints more accurately. This seems to be a reasonable suggestion, since the report is unable to identify the cause of complaints.

Dow Corning, Barry Environmental Noise Survey #0256/ENS1-Rev 1, 30th September 2017

The first point to note is that the report is not a true BS4142:2014 assessment, in that measurements are not at the location of complaints. Therefore, no comments are made on the significance or impact of the sound levels recorded, since they are close to the sources of sound, rather than the receptors.

However, the report does attempt to link site activities with reports of noise during the period. The general ambient sound level is relatively high, with L_{A90} values exceeding 50dB at night at many of the on-site locations. This can be expected on a large operational industrial site. As such, there is relatively little difference between the day and night time L_{A90} values (~ 2 – 4dB).

There were some loud intermittent events giving high LAF max levels of ~70 – 80 dB, at night. Plant noise was generally described as broadband rather than tonal, although there were some high frequency episodes noted, some of which could be investigated further. To this end, it would have been useful to have more frequency analysis to fingerprint sources of concern.

The report, though not a BS4142 survey, makes some useful points, including the likely sources of some of the complaints:

- "Helicopter noise" probably jetting work, although further work needed to determine source.
- Impact noise – materials being put into skip
- Plant alarms
- High frequency noises, including regular 5 minute periods each hour
- Loading/unloading of plant and vehicles
- HGV operations
- Safety valve discharges – regular intermittent
- Silicon grinder

Further work is needed to identify the remaining sources, particularly if further complaints are received. New sources at Barry Docks and near Barry Power Station are also of note. The impact noise from loading/unloading could be related to poor practice and be improved. A review of site operations in relation to BAT for noise control should be considered in the form of a noise management plan.

ACTION: Dow Corning to review the need for further noise control measures and a dedicated noise management plan.

Leak detection and rectification

There is currently no programme of rotating machinery and valve seal checking for VOC leakage rates, instead the plant gas alarms are relied upon to provide detection of gross leakage. A review of best practice for LDAR on large volume organic chemical plants (i.e. for the MeCl plants) should be considered.

ACTION: Dow Corning to review the benefits of LDAR.

W949 ERU A41 Release

High levels of inert venting following the site shut down appears to have resulted in higher than normal levels of HCl and chlorine in A41.

It is thought that this is due to there not being a dedicated temporary vent abatement "tanker" provided on the plant on this occasion.

Further details will be reviewed following completion of the RCI.

W806 low pH reading at W1 discharge

The incorrect calibration of SWWT pH instruments resulted in incorrect control of additive dosing system. The permit ELV is not considered to have been breached due to the uncertainty associated with the measurements. However, the failure to correctly calibrate the environmentally critical instruments with the potential for discharge of low pH effluent into the river is considered to be a minor (category 3) breach of the management permit condition 1.1.1. The correct calibration of WWT pH instruments is now controlled by Dow Corning analyser technicians.

Waste reduction

DPR recovery in the Phoenix plant has improved significantly and TFS outlets are easily ensuring that on site stocks are minimised and the old landfill area is not required for temporary storage.

A project to recover copper from DPR by nitric/hydrochloric acid leaching is entering the pilot stage following successful lab scale feasibility studies. The need for nitrate removal from the process effluent has been identified.

Non-compliance and incident rate review

A review of non-compliance with permit conditions and related incidents was undertaken. Current annual rates are no different to historic levels and there is a trend towards lower levels than in earlier years.

Dow management processes support non-compliance and incident reporting and no cultural changes relating to reporting are apparent.

NRW is content with the level and detail of reporting.

Operator Monitoring Assessment

OMAs are due for review in March 2018. It is proposed to carry these out as separate activities on different dates.

OMA for emissions to air is proposed in May 2018 and for water in September 2018.

The assessments will focus on aspects identified for improvement at the last OMA and any emerging key topics associated with Bref implementation.

Monitoring returns and notification review

Monitoring data has been reviewed and no breach of permit conditions was identified.

END

Cyfoeth Naturiol Cymru Natural Resources Wales	**EPR Compliance Assessment Report**	**Report ID: CAR_NRW0032494**

This form will report compliance with your permit as determined by an NRW officer

Site	Barry Silicon Plant	Permit Ref	BR9685IX
Operator/Permit holder	Dow Corning Ltd	Date	18/10/2017

Section 3 – Enforcement Response

You must take immediate action to rectify any non-compliance and prevent repetition.
Non-compliance with your permit conditions constitutes an offence and can result in criminal prosecutions and/or suspension or revocation of a permit. Please read the detailed assessment in Section 2 and the steps you need to take in Section 4 below.

Other than the provision of advice and guidance, at present we do not intend to take further enforcement action in respect of the non-compliance identified above. This does not preclude us from taking enforcement action if further relevant information comes to light or advice isn't followed.

Section 4 – Action(s)

This section summarises the actions identified during the assessment along with the timescales for when they will need to be completed.

Criteria Ref.	**CCS Category**	**Action required/advised**	**Due Date**
See Section 1 above			
C2	C3	Calibration of instruments undertaken by Dow Corning technicians.	31/12/2017

Section 5 – Compliance notes for the Operator

To ensure you correct actual or potential non-compliance we may

- Advise on corrective actions verbally or in writing
- Require you to take specific actions verbally or in writing
- Issue a notice
- Require you to review your procedures or management system
- Change some of the conditions of your permit
- Decide to undertake a full review of your permit

Any breach of a permit condition is an offence and we may take legal action against you

- We will normally provide advice and guidance to assist you to come back into compliance either after an offence is committed or where we consider that an offence is likely to be committed. This is without prejudice to any other enforcement response that we consider may be required.
- Enforcement action can include the issue of a formal caution, prosecution, the service of a notice and/or suspension or revocation of the permit.

See our Enforcement and Civil Sanctions guidance for further information

This report does not relieve the site operator of the responsibility to

- Ensure you comply with the conditions of the permit at all times and prevent pollution of the environment
- Ensure you comply with other legislative provisions which may apply

Non-compliance scores and categories

CCS category	Description	Score
C1	A non-compliance that could have a major environmental effect	60
C2	A non-compliance which could have a significant environmental effect	31
C3	A non-compliance which could have a minor environmental effect	4
C4	A non-compliance which has no potential environmental effect	0.1

Operational Risk Appraisal (Opra) - Compliance assessment findings may affect your Opra score and/or your charges. This score influences the resource we use to assess permit compliance.

Section 6 – General information

Data protection notice

The information on this form will be processed by the Natural Resources Wales (NRW) to fulfil its regulatory and monitoring functions and to maintain the relevant public register(s). The NRW may also use and/or disclose it in connection with:

- Offering/providing you with its literature/services relating to environmental matters
- Consulting with the public, public bodies and other organisations (eg. 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 its service
- Freedom of Information Act/Environmental Regulations request

The NRW may pass it on to its agents/representatives to do these things on its behalf. You should ensure that any persons named on this form are informed of the contents of this data protection notice.

Disclosure of information

The NRW will provide a copy of this report to the public register(s). However, if you consider that any information contained in this report should not be released to the public register(s) on the grounds of commercial confidentiality, you must write to your local area office within fifteen working days of receipt of this form indicating which information it concerns and why it should not be released, giving your reasons in full.

Customer charter

What can I do if I disagree with this compliance assessment report?

If you are unable to resolve the issue with your site officer, you should firstly discuss the matter with officer's line managers using the informal appeals procedure. If you wish to raise your dispute further through our official Complaints and Commendations procedure, phone our general enquiry number 0300 065 3000 (Mon to Fri 08.00 – 18.00) and ask for the Customer Contact team or send an email to enquiries@naturalresourceswales.gov.uk. If you are still dissatisfied you can make a complaint to the Public Services Ombudsman for Wales. For advice on how to complain to the Ombudsman phone their helpline on 0845 607 0987.

Welsh Language
If you would like this form in Welsh please contact your Regulatory Officer.