

	EPR Compliance Assessment Report	Report ID: BU2110IS/0242621			
This form will report compliance with your permit as determined by an NRW officer					
Site	Barry Silicon Based Manufacturing Installation EA/EPR/BU2110IS/V006		Permit Ref	BU2110IS	
Operator/ Permit holder	Cabot Carbon Ltd				
Date	24/06/2015	Time in	10:00	Out	16:00
What parts of the permit were assessed	Site Inspection June 2014; IP24 & 27; Fugitives Emissions Review				
Assessment	Site Inspection	EPR Activity:	Installation	X	Waste Op
Recipient's name/position	Paula Lloyd, Plant Environmental Manager				
Officer's name	Andi Kemp	Date issued	24/06/2015		

Section 1 - Compliance Assessment Summary					
This is based on the requirements of the permit under the Environmental Permitting Regulations. A detailed explanation and any action you may need to take are given in the "Detailed Assessment of Compliance" (section 3). 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					Condition(s) breached
a) Permitted activities	1. Specified by permit	A			
b) Infrastructure	1. Engineering for prevention & control of pollution	N			
	2. Closure & decommissioning	N			
	3. Site drainage engineering (clean & foul)	N			
	4. Containment of stored materials	N			
	5. Plant and equipment	N			
c) General management	1. Staff competency/ training	N			
	2. Management system & operating procedures	A			
	3. Materials acceptance	N			
	4. Storage handling, labelling, segregation	N			
d) Incident management	1. Site security	N			
	2. Accident, emergency & incident planning	N			
e) Emissions	1. Air	N			
	2. Land & Groundwater	N			
	3. Surface water	N			
	4. Sewer	N			
	5. Waste	N			
f) Amenity	1. Odour	A			
	2. Noise	A			
	3. Dust/fibres/particulates	A			
	4. Pests, birds & scavengers	NA			
	5. Deposits on road	A			
g) Monitoring and records, maintenance and reporting	1. Monitoring of emissions & environment	A			
	2. Records of activity, site diary, journal & events	A			
	3. Maintenance records	N			
	4. Reporting & notification	A			
h) Resource efficiency	1. Efficient use of raw materials	N			
	2. Energy	N			
KEY: C1, C2, C3, C4 = CCS breach category (* suspended scores are marked with an asterisk), A = Assessed (no evidence of non-compliance), N = Not assessed, NA = Not Applicable, O = Ongoing non-compliance – not scored					

Number of breaches recorded	0	Total compliance score (see section 5 for scoring scheme)	0
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If the Total No Breaches is greater than zero, then please see Section 3 for details of 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 (e.g. 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 suspended or consolidated scores.
- details of advice given
- any other areas of concern
- all actions requested
- any examples of good practice.
- a reference to photos taken

This report should be clear, comprehensive, unambiguous and normally completed within 14 days of an assessment.

Compliance Assessment: Cabot Carbon (BU21110IS)

The following items have been assessed and discussed with the site operator. Documents and conversations have been between Andi Kemp, NRW Regulatory Officer and Paula Lloyd, Cabot Carbon, Barry, Plant Environmental Manager.

IP24, IP27

Comments from June 2014 visit

Opra review for permit variation

Annual fugitive emissions review

Annual EMS update

Accident management plan review

Closure plan review

SPMP query

Routine quarterly and annual reporting submissions

The first four points are covered in this CAR1, with Annual EMS update onwards, covered in subsequent CAR1s.

IP24

IP24 was brought about by varying permit condition 1.4.1 and Table 1.4.1 (variation: EPR/BU2110IS/V005) and concerns the site reverting to an ELV of 10mg/m³ (hourly average) for gaseous chlorine at emission point A1 (36m scrubber stack). Up until now the site had a temporary derogation to 20mg/m³. 10mg/m³ is the ELV set in the BRef for Large Volume Inorganic Chemicals.

Key documents forming part of the operators response are presentation 5th June 2014, update 5th July 2014 and update 22nd April 2015.

The key elements within these latter submissions are that the method used to sample chlorine at A1 has been assessed and US EPA Method 26A (isokinetic halides in gas phase and aerosols) was determined as more suitable, key process variables have been examined (covering inputs, abatement, gas feeds, scrubber operation) and the results have been looked at on a statistical basis. There was no identified relationship between key process variables and peaks of Cl₂ emissions at A1. Method 26A is the most suitable extractive wet chemistry method.

Research conducted, literature reviewed and monitoring carried out by Cabot have led to the discovery of the unreliability of US EPA Method 26A for target concentrations below around 15mg/m³. This is believed to be due to possible droplet entrainment and interferences in more complex gas mixtures – and this is believed to be the case

with Cabots pyrogenic silica process. There are no other comparable plants with whom to share experience.

Results from monitoring from 2013 show that the large majority of data falls under the 10mg/m³ ELV, but occasional within process variations showing peaks above 10mg/m³, but below 20mg/m³. Therefore assessing data and the potential for statistical manipulation has been investigated and is the main subject of submissions to close out IP24.

Ongoing dialogue between NRW and Cabot led to proposals and further monitoring using 26A. A rolling mean proposal by Cabot was discounted by NRW and the latest monitoring was conducted on recommendations from NRW of conducting several consecutive 30 minute extractive samples. The option of conducting one longer sampling run (say 8 hours) was rejected by Cabot on the basis that this would restrict the process run changes during the sampling period.

This has led to a data pool of 47 sampling results. Cabot, after discussion with NRW have applied a statistical assessment of this data pool, applying the methodology of rejecting data above three standard deviations from the mean as outliers. Cabot most recently submitted a response following feedback of the June 2014 submissions and meeting and feedback off NRW in November 2014, on April 22nd 2015. The response included adding to the data set (to make the 47 point pool) a round of sampling in February 2015 of 5 consecutive 30 minute samples, using US EPA Method 26A. Then outliers identified using the described above 3 Sigma from the mean approach. The November 2014 NRW feedback recommended the consecutive sampling, removing outliers and averaging the results, with no single result above 150% of the ELV, i.e. 15mg/m³. Cabot sought clarification on interpretation of the 15mg/m³ compliance ceiling.

Cabots latest data reveals a mean of 5.37mg/m³, a SD of 3.06, with 3 Sigma being 9.18 and the UCL therefore being 14.6. This is interpreted as meaning any result above 14.6 is regarded as an outlier, with a confidence level of 99.73%. On 6th May 2015 AK and Paula Lloyd discussed the statistical validity of using this UCL from the data gathered to monitoring data to be gathered. AK accepted Cabots assertion that this 47 point data pool is representative of typical process conditions and therefore emissions and only the outliers inherent from using Method 26A at these concentrations needed to be removed in order to use the remaining data averages for compliance purposes.

The absolute single result limit of 15mg/m³ was seen by Cabot as too close to the outlier UCL of 14.6, however this is academic if removing data above 14.6 – a single result of 15 won't be valid. There is also the assumption, borne out by the data, that no single sampling run should contain more than one outlier in reality. *All this only applies to typical conditions – so Cabot must be able, using sampling data and process operation parameters, to identify when the process is atypical (either abatement component failure or raw material inputs out of spec or process reaction conditions non normal) and therefore data above the UCL could be real values.*

Therefore, what has been agreed is the following:

- Cabot to sample for chlorine at A1 using US EPA Method 26A.
- Sampling runs are to be 5 consecutive 30 minute samples per quarter.
- Values above 14.6 (under normal plant operating conditions) to be recorded, but removed as outliers.
- Average the remaining results and declare this as the submission for this parameter at A1 for that quarter. Submit that data quarterly.
- Repeat this to derive a result for every quarter and average the 4 results.
- Submit this as an annual average – this will be treated as the value for compliance assessment purposes.
- Any other results recorded are not counted for compliance, unless they represent atypical plant conditions or abatement failure, for a 12 month period commencing Q3 2015 (Jul – Sep).
- At the end of the 12 month period (after Apr – June Q 2016), an overall compliance assessment will be made on the quarterly average derived as above and other results recorded looked at to reach any conclusion about higher values, discounted, but possibly representing real results.

- At some point after the 12 month assessment of the above, a decision to vary the permit should be made.
- Variations for IED purposes may still be a few years away as BAT Conclusions have not been issued yet for LV Inorganic Chemicals sector.

This response formally signs off as complete IP24

IP27

Paula Lloyd made a submission in May 2014 for IP27, which required a BAT assessment (including replacement of A burner train) of the facility. Below are comments made by Tony Leakey.

IP27 – Interim BAT assessment

The conclusions of the interim assessment dated 23 May 2014 are acknowledged. The limitations of current plant configuration and heat sink availability appear to preclude further heat recovery in the absence of the need to upgrade the A train. However, more detailed assessment of costs and benefits of all potential options for electricity generation are considered to be possible, e.g. use of recovered low grade steam as feed to a conventional super-heater and steam turbine.

In view of the current status of the relevant BRef further assessment of BAT for the installation is deferred until publication of BAT conclusions following the BRef and permit review for the Large Volume Inorganic Chemicals (Solids & Others Industry) chemical sector.

This improvement condition is therefore considered to be complete.

5th June 2014 Inspection Comments

The comments below were made by TL.

Hydrogen plant overhaul

ABB are to undertake a review of the hydrogen plant design and performance by September 2014. The review should take account of likely BRef BAT conclusion requirements for such plant and proposals to improve performance should ensure that future IED requirements will be achieved.

ACTION: Cabot Carbon to provide written update upon completion of hydrogen plant review.

Cooling water concentration factor increase

The project has now been completed and CF has increased from around 1 to 1.4. This is the upper limit of CF for the system at Barry and the water savings are limited because CW blow down is used for vacuum pump seal flushing.

ACTION: Cabot Carbon to confirm any annual water use saving arising from the increase in CF.

Tanker loading review update

Several improvements have been made to minimise fugitive releases during product loading. Improved checks to ensure that top hatches are properly secured before loading commences have been introduced. Also, ABS loading pipe work and associated relief valve has been replaced with aluminium pipe work and pressure hose.

Critical pipe work and pump replacement programme

The aging lined pipe work and pump replacement programme was reviewed. Pipe work replacement was in progress during the site visit as the plant was on shut down. Pump replacement with magnetic drive and inverter speed control is 75% complete. This was not verified during the visit.

Treated plant capacity increase

A variation application is now likely to be submitted mid-July 2014 for modifications to increase production from the existing treated fumed silica plant. Cabot Carbon is advised that the following specific issues should be addressed by the application, in addition to relevant BAT demonstrations required by sector guidance:

- Justification of electrical heating of hot oil system in terms of accurate temperature control and paraformaldehyde formation and economics of gas-fired system replacement.
- Justification of commercial and industrial confidentiality claims.
- Review of formaldehyde scrubbing system including unabated streams, potential for water recirculation and recovery of waste streams.
- Review of milled product pneumatic conveying system design in order to establish if unabated (for formaldehyde) vent stream can be eliminated.

OPRA Scheme Guidance

The following advice was given to Paula Lloyd in Dec 2014 in respect of preparing a revised OPRA profile for a permit variation application. It also serves as a reviewed and accepted profile going forward.

With regard to the OPRA query, below are some points to note:

- 1) NRW doesn't have an OPRA scheme yet, so we are still referring to the EA one. So for variations etc. at this point in the year, refer to v3.9 Apr 2014 – Mar 2015.
- 2) The Charging Scheme is linked to OPRA, but they're independent documents so they can be changed independently. The Charging Scheme to refer to is EA 2014 – 2015.
- 3) NRW will be developing its own charges – out to consultation at the moment; may go live Apr 2015? OPRA for NRW is also being looked at, but not developed yet.
- 4) Once you have worked out the points for each part of each attribute (Complexity, Emissions, Location, Operator Performance), these are turned into lettered bands, e.g. 1000 points for emissions to air corresponds to a band D etc. Complexity is simply a look up table to get the band for whatever the plant does, e.g. Inorganic Chemicals = band C.
- 5) Each band appears at the end of the OPRA spreadsheet and is converted to points, e.g. the band D for air emissions above = 35 OPRA points. You then get a total OPRA score.
- 6) The OPRA score is multiplied by the relevant multiplier to work out charges for various activities, e.g. x OPRA score by 58 to equal normal variation charge. These multipliers appear on the Calculation tab of the OPRA spreadsheet and in the Charging Scheme, page 43, Table 23.
- 7) What values the OPRA lettered bands correspond to are in Table 22 of the Charging Scheme, along with the multipliers (Table 23) and the compliance adjustment (Table 24).
- 8) When doing your variation, use the CURRENT OPRA score as it stands now before you've amended it, x the relevant multiplier to work out the charge for this variation.
- 9) The revised OPRA spreadsheet score, that needs to be submitted with the variation, is used for subsistence and other variations going forward.
- 10) In terms of emissions, these are the key steps:
 - a. Use emission limits x volumetric flow rate (air, water, sewer).
 - b. The volumetric flow rate should be based on the plant annual operating hours.
 - c. Multiply the above two to get annual mass released.
 - d. Convert to the mass unit used in the OPRA spreadsheet.
 - e. Divide this figure by the Emission Threshold for each substance to get an Emission Index. If the annual mass is less than the ET, there's no need to input that substance on the spreadsheet.

- f. If you release any substance not listed on the spreadsheet, speak to me.
 - g. Each emission index gets added to get a total emission index for each media released to (air, water, sewer). The spreadsheet automatically turns these points into a lettered band for each media and then into a numerical score on the calculation tab of the OPRA spreadsheet. You can see what each range of emission indices corresponds to which letter band by referring to the table on page 33 of the Installations OPRA Guidance, e.g. 1000 – 9999 EI = Band D.
- 11) The apparent double counting of working out the numerical points for emissions, location, operator performance etc., turning them into a letter, then turning that letter in another numerical value, e.g. 1000 emission index to air, is band D, which is 35 OPRA points, is required so that the Charging Scheme and / or the OPRA scheme can be changed independently. So in the Charging Scheme Band C for Inorganic Chemical activity = 45 points, so either the Charging Scheme and OPRA could be altered to make a Band C activity worth more or less points, or OPRA could be changed on its own to make an Inorganic Chemical Activity a Band D and therefore 82 points for example. This could be done either to increase charging revenue and / or to reflect the revised risk associated with an activity or emissions or location attributes etc.

AK also queried the waste off site figures and Cabot stated they were below the Emission Thresholds in the scheme.

Annual Fugitive Emissions Review – 2014

A comprehensive document was received covering the year 2014 on 19th Mar 2015. The report highlights a number of incidents involving non point source potential releases, covering a range of substances in various physical forms. Root cause investigation is also evident and an evaluation system “Standard Reporting Index” or “Spillage and Release Index” – *are these terms synonymous and referring to the same system of assessing reportability?* – for decision making around reporting incidents is used to categorise events.

The stand out point is that more incidents or “near misses” have been reported, but account for a total release figure of 572kg, which is the lowest since 2009. Transparency in reporting is obviously working and potentially more significant issues are more likely to be identified early on and appropriate action taken.

Potentially worrying is the number of events (14) during tanker loading, however these only accounted for 57kg of lost silica powder. Having said that tanker offloading improvements were discussed in June 2014 and it is anticipated that along with lessons learned through 2014 and a change in haulier for some duties, the number of events will decrease. Cabot need to be confident that the amounts lost per event will remain low and that the tertiary containment can prevent releases to land or surface water. These basic layers of protection should also be built upon (and not solely relied upon as the main means to prevent pollution) by further upstream measures such as improved coupling / decoupling, controlled conveying / transport systems, closing manlids, detailed work instructions, monitoring and alarms etc. The 2015 fugitive emissions review should include details of how successful the 2014 and post 2014 actions have been in reducing the number of events.

The caustic soda (47%) leak is interesting, especially given the known potential stress relief issues with this substance and the nature of how it is stored given the varying f.p. temperature profile above concentrations of 20%, i.e. 20% = -26 deg C, 30% = 1 deg, 40% 15 deg, 50% 12 deg.

Action 1 Cabot Barry June 2015: *On next inspection Cabot to show incident area and equipment configuration of new orifice plate and discussion of how this was detected and in what time frame.* **Due:** Next inspection.

The summary report for 2014 covers the events detected. If Cabot haven’t already done this, as part of the permit application documentation or previous work, to supplement the fugitive emissions report the following recommendation is made.

Recommendation 1 Cabot Barry June 2015: *Draw up an inventory (from existing records) of all substances stored, what volume, location and how / what they are stored in. Take the bulk stored substances from this master inventory (Cabot to use their own judgment, but 100lts or less could be discounted with reason), and describe how they’re used from the point of view of how they could be lost. For example, “diesel fuel, stored in above ground*

tank at ambient conditions in one 10,000lt steel tank, refilling and dispense on site in bunded compound and / or conveyed through above ground steel pipework to boiler....". This secondary list of the bulk stored substances can be tabulated and include details in additional columns describing how potential loss is monitored (e.g. level gauge alarm or gauge checked twice a shift, stock reconciliation etc.) and controlled (e.g. using appropriate venting systems, knockout pots, vapour balancing, filters on silos, low solar absorbing tank paint, appropriately rated pressure relief valves, control of volatile substances etc.). This information could be supplemented by a separate list of what activities (that could give rise to significant fugitive emissions) take place on site. That way there is a cross reference between substances stored and activities carried out at site. This core information should form part of the fugitive review and once compiled need only be amended when there are changes on site.

END

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Site	Barry Silicon Based Manufacturing Installation EA/EPR/BU2110IS/V006	Permit	BU2110IS
Operator/ Permit	Cabot Carbon Ltd	Date	24/06/2015

Section 3- Enforcement Response		Only one of the boxes below should be ticked	
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.			X
In respect of the above non-compliance you have been issued with a warning. At present we do not intend to take further enforcement action. This does not preclude us from taking additional enforcement action if further relevant information comes to light or offences continue.			
We will now consider what enforcement action is appropriate and notify you, referencing this form.			

Section 4- Action(s)			
Where non-compliance has been detected and an enforcement response has been selected above, this section summarises the steps you need to take to return to compliance and also provides timescales for this to be done.			
Criteria Ref.	CCS Category	Action Required/Advised	Due Date
See Section 1 above			

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 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 which 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 fulfill 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 (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 and taking any resulting action
- preventing breaches of environmental law
- assessing customer service satisfaction and improving its service
- Freedom of Information Act/Environmental Information 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 twenty 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 the officer's line managers. 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.