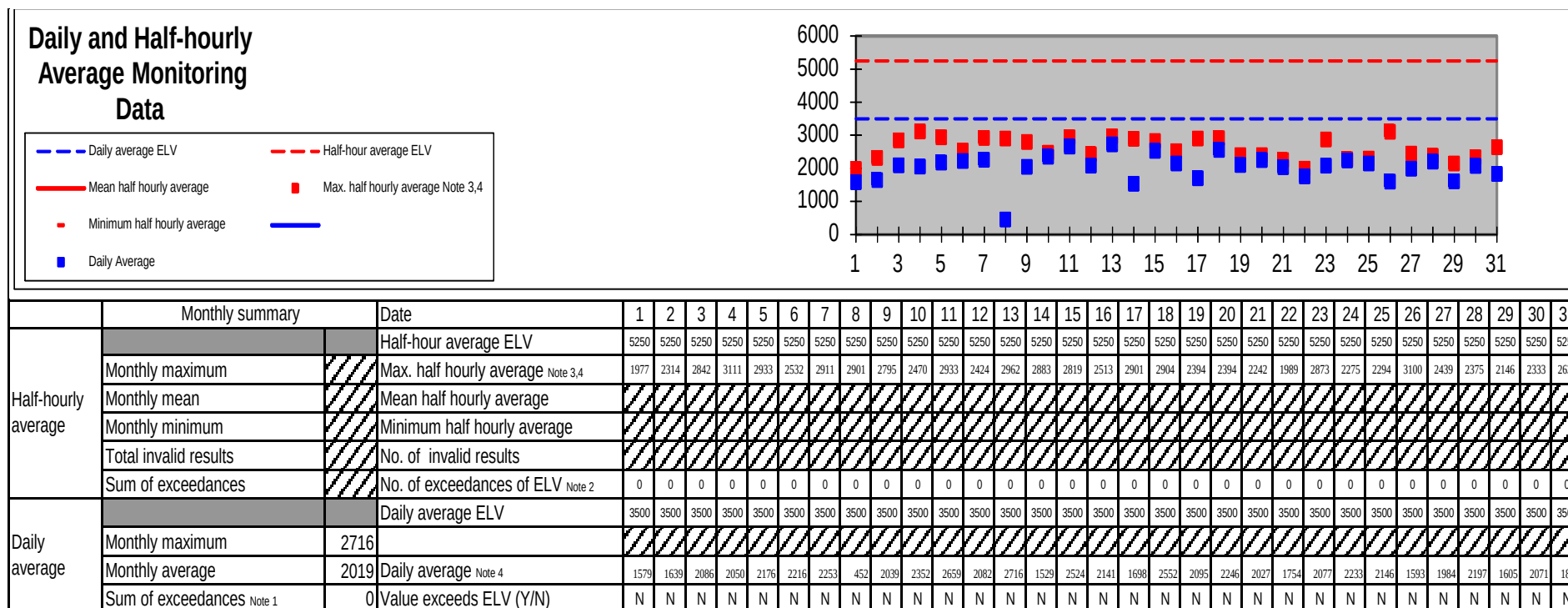


Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: A1 / Form Dated 1st February 2006**Reporting of Continuously Monitored Emissions to Air for Carbon Monoxide Emission Point A1 for the month of October 2015**

Note 1: Not more than one calendar monthly average during any rolling twelve month period shall exceed the limit value by more than 10%.

Note 2: Not more than one half hour period (commencing on the hour or half hour) during any 24 hour period shall exceed the daily average limit value of 3500mg/m³ by more than 50%.Note 3: Max. Half hourly averages to be reported in the event of an exceedance of 3500mg/m³.

Note 4: All results corrected to 273K, 101.3kPa.

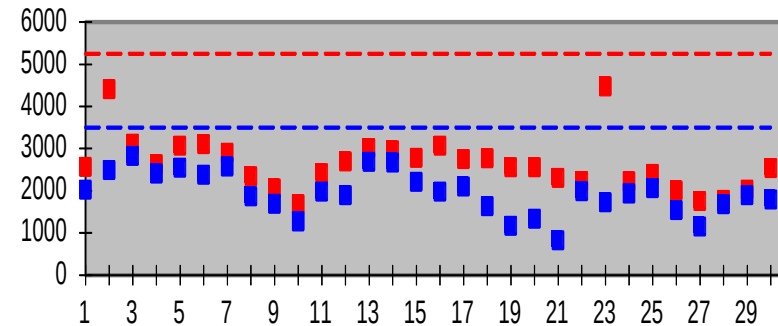
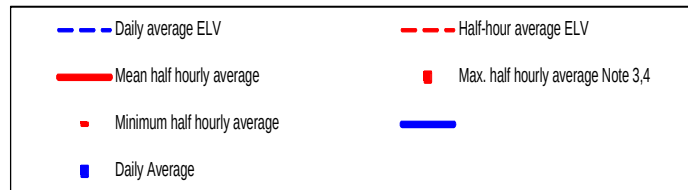
Note 5: 08.10.15 A unit offline 15 hrs HCL Blower change. 5hrs B unit offline: condensate line repairs. 14.10.15 11 hrs downtime A unit Maint. 17.10.15 A unit offline, B unit offline 12hrs: Burner change.

Signed

(authorised to sign as representative of Operator)

Date: 28th January 2016

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: A1 / Form Dated 1st February 2006**Reporting of Continuously Monitored Emissions to Air for Carbon Monoxide Emission Point A1 for the month of November 2015****Daily and Half-hourly
Average Monitoring
Data**

	Monthly summary		Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Half-hourly average			Half-hour average ELV	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	
	Monthly maximum		Max. half hourly average Note 3,4	2561	4403	3115	2628	3061	3103	2895	2342	2054	1678	2414	2690	3008	2948	2775	3063	2752	2769	2554	2554	2304	2224	4470	2216	2396	2004	1754	1779	2018	2533
	Monthly mean		Mean half hourly average																														
	Monthly minimum		Minimum half hourly average																														
	Total invalid results		No. of invalid results																														
	Sum of exceedances		No. of exceedances of ELV Note 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily average			Daily average ELV	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	
	Monthly maximum	2822																															
	Monthly average	1944	Daily average Note 4	2019	2490	2822	2403	2544	2376	2570	1860	1685	1268	1979	1894	2680	2666	2211	1977	2095	1635	1168	1337	824	1982	1720	1931	2061	1542	1144	1676	1889	1788
	Sum of exceedances Note 1		0 Value exceeds ELV (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Note 1: Not more than one calendar monthly average during any rolling twelve month period shall exceed the limit value by more than 10%.

Note 2: Not more than one half hour period (commencing on the hour or half hour) during any 24 hour period shall exceed the daily average limit value of 3500mg/m³ by more than 50%.Note 3: Max. Half hourly averages to be reported in the event of an exceedance of 3500mg/m³.

Note 4: All results corrected to 273K, 101.3kPa.

Note 5: 19th-21st Nov A Unit offline at varying times (B Unit down 16hrs on 21st Nov) to investigate B Muf higher dp. 23rd Nov B unit offline TCS Fridge Plant Trip at DC (lack of feedstock,

Signed

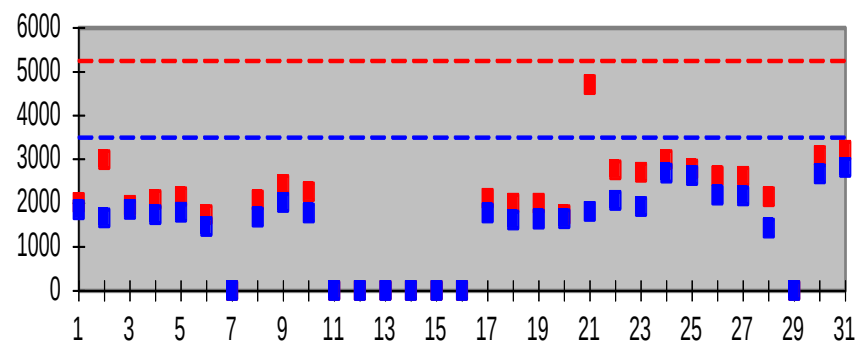
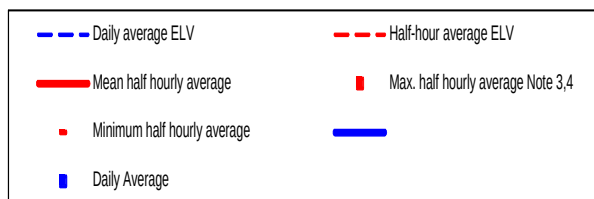
(authorised to sign as representative of Operator)

Date 28th January 2016

Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: A1 / Form Dated 1st February 2006**Reporting of Continuously Monitored Emissions to Air for Carbon Monoxide Emission Point A1 for the month of December 2015****Daily and Half-hourly
Average Monitoring
Data**

	Monthly summary		Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Half-hourly average			Half-hour average ELV	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250
	Monthly maximum	///	Max. half hourly average Note 3,4	2016	2990	1951	2078	2147	1735	0	2064	2424	2255	0	0	0	0	0	0	2109	1990	1990	1730	4706	2753	2702	2994	2776	2614	2608	2140	0
	Monthly mean	///	Mean half hourly average	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///
	Monthly minimum	///	Minimum half hourly average	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///
	Total invalid results	///	No. of invalid results	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///
	Sum of exceedances	///	No. of exceedances of ELV Note 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily average			Daily average ELV	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
	Monthly maximum	2811	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///
	Monthly average	1444	Daily average Note 4	1846	1655	1853	1733	1785	1468	0	1676	2016	1768	0	0	0	0	0	0	1769	1609	1627	1640	1812	2063	1922	2681	2623	2178	2157	1425	0
	Sum of exceedances Note 1	0	Value exceeds ELV (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Note 1: Not more than one calendar monthly average during any rolling twelve month period shall exceed the limit value by more than 10%.

Note 2: Not more than one half hour period (commencing on the hour or half hour) during any 24 hour period shall exceed the daily average limit value of 3500mg/m³ by more than 50%.Note 3: Max. Half hourly averages to be reported in the event of an exceedance of 3500mg/m³.

Note 4: All results corrected to 273K, 101.3kPa.

Note 5: 6th to 7th Dec A unit offline DC lack of feedstock. 10th-16th Dec Plant Down due to curtailment. 24th-28th Dec B unit curtailed. 29th Dec A&B Unit curtailed.

Signed

(authorised to sign as representative of Operator)

Date 28th January 2016

Permit Reference Number: BU2110IS

Operator : Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: A2 / Form Dated 1st February 2006

Reporting of Emissions to Air for the period from 1st January 2015 to 31st December 2015

Emission Point	Substance / Parameter	Emission Limit Value	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Accreditation/ Certification ^[4]	Uncertainty ^[5]
A1	Oxides of nitrogen as NO ₂	50mg/m ³ ^[6]	25.9	TGN M22	30/11/2015, 16:00-17:00	MCERTS / UKAS	±7.5 mg/m3
A2	Oxides of nitrogen as NO ₂	200mg/m ³ ^[7]	55.8	BS EN 14792	11/11/2015 12:05-13:05	MCERTS / UKAS	± 24 mg/m3
A2	Carbon monoxide	200mg/m ³ ^[7]	<1.8	BS EN 15058	11/11/2015 12:05-13:05	MCERTS / UKAS	± 29.1 mg/m3
A3	Oxides of nitrogen as NO ₂	None	148 (b)	BS EN 14792	11/11/2015 10:57-11:48	MCERTS / UKAS	± 24 mg/m3
A3	Carbon monoxide	None	73.4 (b)	BS EN 15058	11/11/2015 10:57-11:57	MCERTS / UKAS	± 12 mg/m3
A13	Formaldehyde	100g/hr ^{[6] [8]}	5.38	BS EN 13649	13/05/2015 10:18-11:18,11:28-12:28,12:36-13:36 (A13) 09/11/2015 09:50-10:50,10:55-11:55,12:00-13:00 (A13 & A24)	MCERTS / UKAS	± 36% mg/m3

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Note: Result [1] are average values of sample results (where indicated), being more representative, as agreed with NRW

[1b] Results of site's only operational boiler B (during the sampling period the boiler was only operating for 7 min as it is now typically only on standby but testing was referenced to 3% Oxygen as stated in the Permit).

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with the Agency is used, then the appropriate identifier is given.

[3] For non-continuous measurements the date and time of the sample that produced the result is given.

[4] The accreditation status of the equipment and/or the monitoring organisation, as appropriate, for the methods used for both sampling and analysis.

[5] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated. The basis of any other uncertainty figure needs to be stated. Where no figure is available NRW will need to agree an appropriate uncertainty value.

[6] Corrected to 273K, 101.3KPa.

[7] Corrected to 273K, 101.3KPa, 3% oxygen, dry.

[8] Combined mass emission from A13 and new emission point A24 corrected 273K, 101.3KPa. Revised ELV of 100g/hr as set in the new permit variation 05/08/2015.

Signed



(authorised to sign as representative of Operator)

Date: 28th January 2016

Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: A3 / Form Dated 1st February 2006

Reporting of Emissions to Air for the period 1 October 2015 to 31 December 2015

Emission Point	Substance / Parameter	Emission Limit Value ^[6]	Result ^[1] [Note A]	Test Method ^[2]	Sample Date and Times ^[3]	Accreditation/ Certification ^[4]	Uncertainty +/- ^[5]
A1	Chlorine	10 mg/m ³ ^[8]	5.9 mg/m ³	US EPA Method 26A	10.11.15 1245-1315,1320-1350,1355-1425,1430-1500,1505-1535	MCERTS / UKAS	+/- 0.8 mg/m3
A1	Chloromethanes (as methyl chloride)	50mg/m ³	1.7 mg/m ³	BS EN 13649	10.11.15 1245-1250, 1355-1400, 1500-1505hrs	MCERTS / UKAS	+/- 0.4 mg/m3
A1	Hydrogen chloride	10mg/m ³	3.5 mg/m ³	TGN M22 ^[2]	30.11.15 1500-1600,1605-1705-1710-1810hrs	MCERTS / UKAS	+/- 1.6 mg/m3

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value.

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with the Agency is used, then the appropriate identifier is given. Please note TGN M22 method replacing ASTM D6348-03 in accordance with EA (NRW) Monitoring Standard.

[3] For non-continuous measurements the date and time of the sample that produced the result is given.

[4] The accreditation status of the equipment and/or the monitoring organisation, as appropriate, for the methods used for both sampling and analysis.

[5] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated. The basis of any other uncertainty figure needs to be stated. Where no figure is available the Agency will need to agree an appropriate uncertainty value.

[6] Corrected to 273K, 101.3Kpa.

[8] Reversion to 10mg/m3 chlorine emission limit as documented in EPR/BU2110IS/V007. Calculated as the average of 5 consecutive 30 minute samples taken every quarter. Results above 14.6mg/m3 removed from these calculations and reported every 12 months as an average of the 4 quarterly averages for the calendar year beginning 05/08/15

[Note A]: Results are given as averages being more representative, as agreed with NRW.

Signed



(authorised to sign as representative of Operator)

Date 28th January 2016

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: W1 / Form Dated 1st February 2006

Reporting of Emissions to Water (other than to Sewer) for the period from 1 October 2015 to 31 December 2015

Emission Point	Substance / Parameter	Emission Limit Value	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Accreditation/ Certification ^[4]	Uncertainty ^[5]
W1	Oil and grease	5mg/l ^[6]	<0.2	IR Spectrometry - EA Test 362 ISBN 0117517283	10/12/2015@11:45	UKAS	±4.97%
	BOD ₅	20mg/l ^[6]	<1.00	ISBN 011 7522120	10/12/2015@11:45	UKAS	±11.53%
	pH	>5, <9 ^[7]	7.14	BS 6068-2.50:1995	10/12/2015@11:45	UKAS	± 1.04%
W2	Oil and grease	5mg/l ^[6]	No result ^[9]	IR Spectrometry - EA Test 362 ISBN 0117517283		UKAS	
	BOD ₅	20mg/l ^[6]	No result ^[9]	ISBN 011 7522120		UKAS	
	pH	>5, <9 ^[7]	No result ^[9]	BS 6068-2.50:1995		UKAS	
W3	Oil and grease	5mg/l ^[6]	0.2	IR Spectrometry - EA Test 362 ISBN 0117517283	10/12/2015@11:45	UKAS	±4.97%
	BOD ₅	20mg/l ^[6]	<1.00	ISBN 011 7522120	10/12/2015@11:45	UKAS	±11.53%
	pH	>5, <9 ^[7]	7.73	BS 6068-2.50:1995	10/12/2015@11:45	UKAS	± 1.04%

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Where the emission limit value is expressed as a range, the result is given as the 'minimum – maximum' measured values.

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with the Agency is used, then the appropriate identifier is given.

[3] For non-continuous measurements the date and time of the sample that produced the result is given.

[4] The accreditation status of the equipment and/or the monitoring organisation, as appropriate, for the methods used for both sampling and analysis.

[5] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated. The basis of any other uncertainty figure needs to be stated. Where no figure is available the Agency will need to agree an appropriate uncertainty value.

[6] The emission limit value for Oil and grease, and BOD₅, is expressed as a maximum individual value.

[7] The emission limit values for pH are expressed as minimum and maximum individual values.

[8] The Environment Agency National Testing Laboratory at Shawcross in Exeter has obtained UKAS accreditation for the oil and grease test method.

[9] Unable to obtain representative water samples from W2 outlet due to lack of flow during this period.

Signed

(authorised to sign as representative of Operator)

Date 28th January 2016

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: R1 / Form Dated 1st February 2006

Reporting of Waste Disposal and Recovery for the year 2015 (01/01/15 – 31/12/15)

Waste Description	Disposal		Recovery
	Route	Tonnes	Tonnes
1) Hazardous Wastes			
Hazardous waste from production and maintenance activities	D09, D15, R09,R13	40.12	1.72
Other hazardous wastes	N/A	N/A	
Total hazardous waste		40.12	
2) Non-Hazardous Wastes			
Non-Hazardous silica waste to landfill from production activities (including packaging)	D01	176.9	
Non-Hazardous waste from production and maintenance activities	D01, D14, D15, R03,R09, R13	41.7	129.7
Non-Hazardous waste from construction activities (subsoil and hardcore)			
Total Non-Hazardous waste		218.6	129.7
TOTAL WASTE		258.7	131.4

Trends in Waste Disposal and Recovery			
Year	Parameter		
	Named Waste	Total Waste	Waste per unit output
2006	134.7	317.5	Report on PI1
2007	249.0	293.2	Report on PI1
2008	456.2	464.7	Report on PI1
2009	154.8	162.8	Report on PI1
2010	199.5	199.5	Report on PI1
2011	245.4	245.4	Report on PI1
2012	165.65	165.65	Report on PI1
2013	214.31	214.31	Report on PI1
2014	242.50	242.50	Report on PI1
2015	258.72	258.72	Report on PI1

Operator's comments: More hazardous waste recycled compared to CY14 as a result of work on caustic storage tank in Shut Down 2015 which was emptied of NaOH (33.9MT)
New non hazardous waste streams introduced end of 2014: Dry Mixed Recycling and Food Waste on site resulting in 10.3MT directly diverted from Landfill in 2015.

Signed



(authorised to sign as representative of the Operator)

Date 28th January 2016

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: WU1 / Form Dated 1st February 2006

Reporting of Water Usage for the year 2015 (01/01/15 – 31/12/15)

Water Source	Usage (m ³)	Specific Usage (m ³ /t)
Mains water	74,320	5.94
Dow Corning	38,023	3.04
TOTAL WATER USAGE	112,343	8.98

Trends in Water Usage				
Year	Parameter			
	Mains water	Dow Corning	Total water usage	Water per unit output
2006	103,892	94,047	197,939	Report on PI1
2007	92,671	87,424	180,096	Report on PI1
2008	49,805	73,734	123,539	Report on PI1
2009	52,229	47,656	99,885	Report on PI1
2010	58,643	43,664	102,307	Report on PI1
2011	73,172	44,154	117,326	Report on PI1
2012	76,828	42,204	119,032	Report on PI1
2013	76,004	49,040	125,044	Report on PI1
2014	68,392	41,828	110,220	Report on PI1
2015	74,320	38,023	112,343	Report on PI1

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Signed 

(authorised to sign as representative of the Operator)

Date 28th January 2016

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: E1 / Form Dated 1st February 2006

Reporting of Energy Usage for the year 2015 (01/01/15 – 31/12/15)

Energy Source	Energy Usage		CO ₂ Produced (Tonnes)
	Quantity	Primary Energy (MWh)	
Electricity	MWh	39,417	6543
Natural Gas	MWh	47,037	8937
TOTAL		86,454	15480

* Conversion factor for delivered electricity to primary energy = 2.4

** Conversion factor for Electricity CO₂ equivalent metric tonnes = MWh x 0.166

*** Conversion factor for Gas CO₂ equivalent metric tonnes = MWh x 0.190

Trends in Energy Usage			
Year	Parameter		
	Primary Energy usage	CO ₂ produced	CO ₂ per unit output
2006	108,936	19,884	Report on PI1
2007	107,011	19,531	Report on PI1
2008	99,904	18,219	Report on PI1
2009	95,570	17,445	Report on PI1
2010	99,165	18,055	Report on PI1
2011	97,179	17,681	Report on PI1
2012	93,540	17,004	Report on PI1
2013	84,074	15,040	Report on PI1
2014	85,449	15,306	Report on PI1
2015	86,454	15480	Report on PI1

Operator's comments: Marginal increase on CY14 attributed to production volume increase.

Signed



(authorised to sign as representative of the Operator)

Date 28th January 2016

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: PI1 / Form Dated 1st February 2006

Reporting of Performance Indicators for the year 2015 (01/01/15 – 31/12/15)

Annual Production/Treatment	
Production of fumed silica	12512 tonnes

Environmental Performance Indicators

Parameter	Annual Average	Units
Carbon monoxide	20.63	kg/tonne
Water use	8.98	m ³ /tonne
Energy use	6,910	kWh/tonne
Carbon dioxide	0.71	tonne/tonne
Waste silica to landfill	14.1	kg/tonne
Chlorosilane	2.53	tonne/tonne
Hydrogen	579.4	Nm ³ /tonne

Trends in Environmental Performance							
Year	Parameter						
	CO	Water	Energy	CO ₂	Waste silica	Chloro-silane	H ₂
	kg/t	m ³ /t	kWh/t	t/t	kg/t	t/t	Nm ³ /t
2006	22.75	17.3	9,500	1.5523	4.16	2.65	580.14
2007	25.26	15.8	9,390	1.2285	8.31	2.57	571.87
2008	29.05	13.2	10,670	1.3855	8.30	2.73	694.81
2009	30.61	11.3	10,817	1.3790	4.87	2.60	766.64
2010	40.41	10.2	9,900	1.2640	7.56	2.59	604.20
2012	37.28	13.2	10,356	1.2990	8.63	2.83	628.90
2013	21.31	10.80	7,262	0.7401	11.89	2.41	575.30
2014	21.69	9.04	7,011	0.7282	17.06	2.51	503.51
2015	20.63	8.98	6,910	0.7143	14.13	2.53	579.39

Operator's comments: CO2 based on natural gas consumption only. There has been an increase in H₂ attributed to Chlorosilane blends and grades produced in CY15 requiring more H₂.

Signed



(authorised to sign as representative of the Operator)

Date 28th January 2016