

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 1<sup>st</sup> January 2020 to 31<sup>st</sup> December 2020**

| Emission Point | Substance / Parameter                 | Emission Limit Value                  | Result <sup>[1]</sup> | Test Method <sup>[2]</sup> | Sample Date and Times <sup>[3]</sup>                                                             | Accreditation/ Certification <sup>[4]</sup> | Uncertainty <sup>[5]</sup> |
|----------------|---------------------------------------|---------------------------------------|-----------------------|----------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------|
| A1             | Oxides of nitrogen as NO <sub>2</sub> | 50mg/m <sup>3</sup> <sup>[6]</sup>    | 12.5                  | TGN M22                    | 13/11/20 09:27-10:27, 10:28-11:28, 11:29-12:29                                                   | MCERTS / UKAS                               | ±0.9 mg/m3                 |
| A2             | Oxides of nitrogen as NO <sub>2</sub> | 200mg/m <sup>3</sup> <sup>[7]</sup>   | 88.2                  | BS EN 14792                | 10/11/20 10:30-1:30                                                                              | MCERTS / UKAS                               | ±4.8 mg/m3                 |
| A2             | Carbon monoxide                       | 200mg/m <sup>3</sup> <sup>[7]</sup>   | 0.3                   | BS EN 15058                | 10/11/20 10:30-11:30                                                                             | MCERTS / UKAS                               | ±0.9 mg/m3                 |
| A3             | Oxides of nitrogen as NO <sub>2</sub> | None                                  | 139.6                 | BS EN 14792                | 09/11/20 16:50-00:00                                                                             | MCERTS / UKAS                               | ±74 mg/m3                  |
| A3             | Carbon monoxide                       | None                                  | 0.31                  | BS EN 15058                | 09/11/20 16:50-00:00                                                                             | MCERTS / UKAS                               | ±28 mg/m3                  |
| A13 & A24      | Formaldehyde                          | 100g/hr <sup>[6]</sup> <sup>[8]</sup> | 4.64                  | BS EN 13649                | 11/06/20 10:00-11:00, 11:15-12:15, 12:34-13:34<br>11/11/20 08:40-09:40, 09:45-10:45, 10:53-11:53 | MCERTS / UKAS                               | ±0.54 g/hr                 |

[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. (Sampling period was extended to capture more operational time, 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 A24 emission point corrected 273K, 101.3KPa.

Signed .....



(authorised to sign as representative of Operator)

Date: 29.01.2021

Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: A3 / Form Dated 1<sup>st</sup> February 2006

**Reporting of Emissions to Air for the period 1<sup>st</sup> October 2020 to 31<sup>st</sup> December 2020**

| Emission Point | Substance / Parameter                  | Emission Limit Value <sup>[6]</sup> | Result <sup>[1] [8]</sup> | Test Method <sup>[2]</sup> | Sample Date and Times <sup>[3]</sup>                                     | Accreditation/ Certification <sup>[4]</sup> | Uncertainty +/- <sup>[5]</sup> |
|----------------|----------------------------------------|-------------------------------------|---------------------------|----------------------------|--------------------------------------------------------------------------|---------------------------------------------|--------------------------------|
| A1             | Chlorine                               | 10 mg/m <sup>3</sup>                | 5.28 mg/m <sup>3</sup>    | US EPA Method 26A          | 13/11/20 09:27-09:57, 10:02-10:32, 10:57-11:07, 11:12-11:42, 11:47-12:17 | MCERTS / UKAS                               | ±1.60 mg/m <sup>3</sup>        |
| A1             | Chlorine                               | 10mg/m <sup>3</sup>                 | 3.9 mg/m <sup>3</sup>     | US EPA Method 26A          | Annual average of<br>CY20Q1(2.8) CY20Q2(3.7)<br>CY20Q3(3.6) CY20Q4(5.3)  | MCERTS / UKAS                               | ±0.64 mg/m <sup>3</sup>        |
| A1             | Chloromethanes<br>(as methyl chloride) | 50mg/m <sup>3</sup>                 | 2.44 mg/m <sup>3</sup>    | BS EN 13649                | 13/11/20 09:27-10:27, 10:28-11:28, 11:29-12:29                           | MCERTS / UKAS                               | ±0.49 mg/m <sup>3</sup>        |
| A1             | Hydrogen chloride                      | 10mg/m <sup>3</sup>                 | 1.2 mg/m <sup>3</sup>     | TGN M22 <sup>[2]</sup>     | 13/11/20 09:27-10:27, 10:28-11:28, 11:29-12:29                           | MCERTS / UKAS                               | ±0.12 mg/m <sup>3</sup>        |

[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.

[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.

[7] Annual Average reported CY20 Q1-Q4 inclusive

Signed .....



(authorised to sign as representative of Operator)

Date: 29.01.2021

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: W1 / Form Dated 1<sup>st</sup> February 2006

**Reporting of Emissions to Water (other than to Sewer) for the period from 1 October 2020 to 31 December 2020**

| Emission Point | Substance / Parameter | Emission Limit Value  | Result <sup>[1]</sup> | Test Method <sup>[2]</sup> | Sample Date and Times <sup>[3]</sup> | Accreditation/ Certification <sup>[4]</sup> | Uncertainty <sup>[5]</sup> |
|----------------|-----------------------|-----------------------|-----------------------|----------------------------|--------------------------------------|---------------------------------------------|----------------------------|
| W1             | Oil and grease        | 5mg/l <sup>[6]</sup>  | <0.6 mg/l             | IR Spectrometry - W-TEC-IR | 06/10/2020 08:10                     | UKAS                                        | +/- 20.0%                  |
|                | BOD <sub>5</sub>      | 20mg/l <sup>[6]</sup> | <1 mg/l               | ISBN 011 7522120           | 06/10/2020 08:10                     | UKAS                                        | +/- 23.6%                  |
|                | pH                    | >5, <9 <sup>[7]</sup> | 7.6                   | ISBN: 011 7514284          | 06/10/2020 08:10                     | UKAS                                        | +/- 20.3%                  |
| W2             | Oil and grease        | 5mg/l <sup>[6]</sup>  | <0.6 mg/l             | IR Spectrometry - W-TEC-IR | 06/10/2020 08:15                     | UKAS                                        | +/- 20.0%                  |
|                | BOD <sub>5</sub>      | 20mg/l <sup>[6]</sup> | <1 mg/l               | ISBN 011 7522120           | 06/10/2020 08:15                     | UKAS                                        | +/- 23.6%                  |
|                | pH                    | >5, <9 <sup>[7]</sup> | 7.8                   | ISBN: 011 7514284          | 06/10/2020 08:15                     | UKAS                                        | +/- 20.3%                  |
| W3             | Oil and grease        | 5mg/l <sup>[6]</sup>  | <0.6 mg/l             | IR Spectrometry - W-TEC-IR | 06/10/2020 08:20                     | UKAS                                        | +/- 20.0%                  |
|                | BOD <sub>5</sub>      | 20mg/l <sup>[6]</sup> | 2 mg/l                | ISBN 011 7522120           | 06/10/2020 08:20                     | UKAS                                        | +/- 23.6%                  |
|                | pH                    | >5, <9 <sup>[7]</sup> | 7.8                   | ISBN: 011 7514284          | 06/10/2020 08:20                     | UKAS                                        | +/- 20.3%                  |

[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 BOD<sub>5</sub>, is expressed as a maximum individual value.

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

[8] ALS Environmental has obtained UKAS accreditation for all test method.

Signed .....



(authorised to sign as representative of Operator)

Date: 29.01.2021

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 2020 (01/01/2020-31/12/2020)**

| Waste Description                                                                       | Disposal                     |        | Recovery |
|-----------------------------------------------------------------------------------------|------------------------------|--------|----------|
|                                                                                         | Route                        | Tonnes | Tonnes   |
| 1) Hazardous Wastes                                                                     |                              |        |          |
| Hazardous waste from production and maintenance activities                              | D09, D15, R09, R13           | 383.7  | 5.01     |
| Other hazardous wastes                                                                  | N/A                          |        |          |
| Total hazardous waste                                                                   |                              | 388.8  |          |
| 2) Non-Hazardous Wastes                                                                 |                              |        |          |
| Non-Hazardous silica waste to landfill from production activities (including packaging) | D01                          | 88.68  |          |
| Non-Hazardous waste from production and maintenance activities                          | D01, D15, R01, R03, R04, R13 | 8.06   | 122.8    |
| Non-Hazardous waste from construction activities (subsoil and hardcore)                 |                              |        | 1.5      |
| Total Non-Hazardous waste                                                               |                              | 96.7   | 122.8    |
| TOTAL WASTE                                                                             |                              | 480.4  | 127.9    |
|                                                                                         |                              |        |          |

| Trends in Waste Disposal and Recovery |             |             |                       |
|---------------------------------------|-------------|-------------|-----------------------|
| Year                                  | Parameter   |             |                       |
|                                       | Named Waste | Total Waste | Waste per unit output |
| 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         |
| 2016                                  | 430.6       | 430.6       | Report on PI1         |
| 2017                                  | 146.5       | 146.5       | Report on PI1         |
| 2018                                  | 174.9       | 174.9       | Report on PI1         |
| 2019                                  | 155.1       | 155.1       | Report on PI1         |
| 2020                                  | 480.4       | 480.4       | Report on PI1         |
|                                       |             |             |                       |

Operator comments: An equipment failure in 2020 meant we made a controlled discharge of 232MT of water contaminated with glycol, this disposal has elevated our waste amount for the year.

Signed



(authorised to sign as representative of the Operator)

Date: 29.01.20

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 2020 (01/01/2020 – 31/12/2020)**

| Water Source      | Usage<br>(m <sup>3</sup> ) | Specific Usage<br>(m <sup>3</sup> /t) |
|-------------------|----------------------------|---------------------------------------|
|                   |                            |                                       |
| Mains water       | 66,007                     | 7.28                                  |
| Dow Corning       | 49,363                     | 5.44                                  |
|                   |                            |                                       |
|                   |                            |                                       |
| TOTAL WATER USAGE | 115,370                    | 12.72                                 |
|                   |                            |                                       |
|                   |                            |                                       |
|                   |                            |                                       |
|                   |                            |                                       |
|                   |                            |                                       |
|                   |                            |                                       |
|                   |                            |                                       |
|                   |                            |                                       |
|                   |                            |                                       |
|                   |                            |                                       |

| 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         |
| 2016                  | 78,272      | 32,911      | 111,182           | Report on PI1         |
| 2017                  | 76,512      | 38,898      | 115,410           | Report on PI1         |
| 2018                  | 69,695      | 50,490      | 120,185           | Report on PI1         |
| 2019                  | 69,980      | 53,899      | 123,879           | Report on PI1         |
| 2020                  | 66,007      | 49,363      | 115,370           | Report on PI1         |

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Signed



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Date: 29.01.20

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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 2020 (01/01/2020-31/12/2020)**

| Energy Source | Energy Usage |                         | CO <sub>2</sub><br>Produced<br>(Tonnes) |
|---------------|--------------|-------------------------|-----------------------------------------|
|               | Quantity     | Primary Energy<br>(MWh) |                                         |
|               |              |                         |                                         |
| Electricity   | MWh          | 35,984                  | 5,973                                   |
| Natural Gas   | MWh          | 39,879                  | 7,573                                   |
|               |              |                         |                                         |
|               |              |                         |                                         |
| TOTAL         |              | 75,863                  | 13,546                                  |

\* Conversion factor for delivered electricity to primary energy = 2.4

\*\* Conversion factor for Electricity CO<sub>2</sub> equivalent metric tonnes = MWh x 0.166

\*\*\* Conversion factor for Gas CO<sub>2</sub> equivalent metric tonnes = MWh x 0.190

| Trends in Energy Usage |                         |                             |                                    |
|------------------------|-------------------------|-----------------------------|------------------------------------|
| Year                   | Parameter               |                             |                                    |
|                        | Primary Energy<br>usage | CO <sub>2</sub><br>produced | CO <sub>2</sub> per unit<br>output |
| 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                  | 15,480                      | Report on PI1                      |
| 2016                   | 85,907                  | 15,351                      | Report on PI1                      |
| 2017                   | 76,211                  | 13,531                      | Report on PI1                      |
| 2018                   | 83,219                  | 14,865                      | Report on PI1                      |
| 2019                   | 76,066                  | 13,567                      | Report on PI1                      |
| 2020                   | 75,863                  | 13,546                      | Report on PI1                      |

Operator comments:

Signed



(authorised to sign as representative of the Operator)

Date: 29.01.20

Permit Reference Number: BU2110IS

Operator: Cabot Carbon Limited

Installation: Barry Silicon-Based Manufacturing Installation

Form Number: PI1 / Form Dated 1<sup>st</sup> February 2006

**Reporting of Performance Indicators for the year 2020 (01/01/2020– 31/12/2020)**

| Annual Production/Treatment |                |
|-----------------------------|----------------|
| Production of fumed silica  | 9071.68 tonnes |

**Environmental Performance Indicators**

| Parameter                | Annual Average | Units                  |
|--------------------------|----------------|------------------------|
| Carbon monoxide          | 27.02          | kg/tonne               |
| Water use                | 12.72          | m <sup>3</sup> /tonne  |
| Energy use               | 8,363          | kWh/tonne              |
| Carbon dioxide           | 0.83           | tonne/tonne            |
| Waste silica to landfill | 9.8            | kg/tonne               |
| Chlorosilane             | 2.5            | tonne/tonne            |
| Hydrogen                 | 604.93         | Nm <sup>3</sup> /tonne |

| Trends in Environmental Performance |           |                   |        |                 |              |               |                    |
|-------------------------------------|-----------|-------------------|--------|-----------------|--------------|---------------|--------------------|
| Year                                | Parameter |                   |        |                 |              |               |                    |
|                                     | CO        | Water             | Energy | CO <sub>2</sub> | Waste silica | Chloro-silane | H <sub>2</sub>     |
|                                     | kg/t      | m <sup>3</sup> /t | kWh/t  | t/t             | kg/t         | t/t           | Nm <sup>3</sup> /t |
| 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             |
| 2016                                | 22.90     | 9.41              | 7,273  | 0.7309          | 27.5         | 2.50          | 583.30             |
| 2017                                | 21.30     | 9.58              | 6,324  | 0.5782          | 9.6          | 2.50          | 557.63             |
| 2018                                | 27.29     | 9.62              | 6,663  | 0.6926          | 11.3         | 2.50          | 585.94             |
| 2019                                | 24.48     | 11.40             | 7,002  | 0.69            | 10.2         | 2.82          | 583.14             |
| 2020                                | 27.02     | 12.72             | 8,363  | 0.83            | 9.8          | 2.5           | 604.93             |

Operator's comments. 2020 represents a low year for production volumes with nearly 2000MT shortfall over previous years. The requirement to keep the operations running on heatload when not producing means our PI/MT are higher than previously reported.

Signed



(authorised to sign as representative of the Operator)

Date: 29.01.20