

# Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2010

---

Dow Corning Limited

Barry Silicon Based Manufacturing  
Installation  
Barry Plant  
Cardiff Road  
Barry  
Vale of Glamorgan  
CF63 2YL

Variation application number

EPR/BR9685IX/V006

Permit number

EPR/BR9685IX

# Barry Silicon Based Manufacturing Installation

Permit number **EPR/BR9685IX**

## Introductory note

**This introductory note does not form a part of the notice.**

The following notice gives notice of the variation and consolidation of an environmental permit.

The variation is for the following changes –

- a new process – W405, Very Low Viscosity Fluids Project. This process will utilise an existing air emission point – A68.
- Ethylene replacement project
- Maintenance vent for Methyl Chloride tankers

This variation also includes consolidation of the original permit and subsequent variations and to update the conditions.

The schedules specify the changes made to the permit.

The main features of the permit are as follows:

The installation consists of four sites that are linked technically. These are operated by Dow Corning Limited, Npower Cogen Limited, Vopak Terminal Windmill Limited and Cabot Carbon Limited. This permit relates to the Dow Corning site. The primary function of the Dow Corning site is the manufacture of silicones and silicone intermediates. Silicones are extremely versatile materials that can be manufactured in the form of fluids or elastomeric products for uses that include lubrication, sealing, bonding, releasing, defoaming and other varied industrial applications.

The site incorporates a large number of chemical processes that are highly integrated. The main process stages are described below.

Silicon metal is ground to a fine powder and fed to fluidised bed reactors where it is reacted with chloromethane to produce a mixture of chlorosilanes. These are then separated in to individual monomers by distillation and either used further on site, shipped to other sites for further processing, or sold. If necessary the mix of chlorosilanes monomers can be adjusted to meet specific requirements in a dedicated rearranger plant.

Two of the separated monomers, dimethyldichlorosilane and methylchlorosilane are hydrolysed to produce polydimethylsiloxane and methylhydrogen cyclic siloxanes respectively. These are either further processed on site or shipped off site. Hydrogen chloride, produced as a by-product from the hydrolysis reaction and also returned from the adjacent Cabot Carbon site, is used as a feedstock, together with methanol, for the chloromethane production process.

A mixture of trichlorosilane and silicon tetrachloride is produced from silicon powder and recovered anhydrous Hydrochloric acid. This is blended with methyltrichlorosilane before being piped to Cabot Carbon for use in their fumed silica production process. Cabot Carbon also receives a hydrogen supply from Dow Corning. This is produced as a by product of the trichlorosilane/silicon tetrachloride process. Dow Corning also receives fumed silica from Cabot Carbon for use as a principle ingredient in the manufacture of silicone rubber.

A variety of individual processes are used for the manufacture of a range of specialist products from the produced intermediate materials. These include processes for the manufacture of silicones gums and elastomeric products, siloxane fluids, speciality silicone based polymers, siloxanes and silanes. In addition a small multipurpose development plant of new silicone based products.

The site is served by dedicated utility plants that provide steam, nitrogen, process water, compressed air and hot oil (for heating the process plant). In addition a natural gas steam reforming plant provides hydrogen. A dedicated combined heat and power plant (CHP) operated by Npower Cogen on an adjacent site provides electrical power and additional steam. The adjacent vopak terminal windmill site provides bulk storage facilities for feedstock materials and product intermediates.

The process vents from the fluidised bed reactors and chloromethane plant are abated using compression and water/cryogenic condensation with the residual vent being sent to the energy recovery unit (ERU) which destroys the organic species and produces steam for the site. Vents containing silanes and chlorosilanes are abated using absorption units, a dedicated recovery unit and condensation, prior to final abatement in the ERU. Liquid process effluents are treated in the site waste water plant. Effluent streams from Cabot Carbon and Npower Cogen are also processed by this plant. The treatment process includes a primary water treatment stage that neutralises acidic materials and precipitates out dissolved metals, and a secondary biological treatment process to remove organic species. Final discharge is to the River Cadovton.

Spent sulphuric acid from the chloromethane process is currently sent off site for recovery. The operator has a waste management centre where all wastes are segregated according to hazard in preparation for shipment off site for recycling or disposal. The centre also has a waste activity permit.

Two Sites of special scientific interest (SSSI's) are within 2km of the site, these are Cog Moors and Hayes Point to Bendrick Rock. Five other SSSI's and a single Natura 2000 site, the Severn Estuary Ramsar, are within 10km of the site. Other local receptors include residential housing within 50m of the north – east site boundary.

The operator's Environmental Management System (EMS) is accredited to ISO14001 and there is a Climate Change Levy Agreement in place. The status log of a permit sets out the permitting history, including any changes to the permit reference number.

## Status log of the permit

Description	Date	Comments
Application BR9685IX	Received 17/08/05	
Response to request for information BR9685IX	Requests dated: 30/09/05 07/10/05 21/10/05 25/10/05 03/11/05, 9/11/05	Responses dated: 03/11/05, 12/10/05 25/10/05, 17/11/05 08/11/05 15/11/05, 17/11/05 Summary response 24/01/06, 21/02/06, 21/02/06
Request to extend determination BR9685IX	Request dated 14/12/05	Request accepted 09/01/06
Permit determined BR9685IX	06/06/06	
Application HP3138UU	Duly Made 01/05/07	
Additional information received HP3138UU		08/05/07
Response to request for additional information HP3138UU	15/05/07	30/05/07
Variation Notice HP3138UU Issued	27/06/07	
Application EPR/BR9685IX/V003	Duly Made 08/09/08	
Variation notice EPR/BR9685IX/V003 issued	19/11/08	
Application EPR/BR9685IX/V004 (PAS Ref LP3231KF)	Duly Made 07/12/09	
Additional information received EPR/BR9685IX/V004		05/02/10
Additional information received EPR/BR9685IX/V004		08/03/10
Variation notice EPR/BR9685IX/V004 issued	08/03/10	
Application EPR/BR9685IX/V005 (PAS Ref NP3836HK)	Duly Made 24/12/10	
Additional information received EPR/BR9685IX/V005		10/02/11
Variation notice EPR/BR9685IX/V005 issued	11/03/11	
Application EPR/BR9685IX/V006	Duly Made 22/12/11	Minor technical variation to include a very low viscosity fluids (VLVF) project and an ethylene replacement project. Also to vary and update the permit to modern conditions.
Additional information received EPR/BR9685IX/V006	21/02/12	Information regarding the maintenance vent for Methyl Chloride tankers to add to the variation.
Variation determined EPR/BR9685IX/V006	22/03/12	Varied and consolidated permit issued in modern condition format.

**Other Part A installation permits relating to this installation**

<b>Operator</b>	<b>Permit number</b>	<b>Date of issue</b>
Cabot Carbon Ltd.	BU2110IS	31/03/06
Npower Cogen Ltd.	BX4135IJ	30/06/06
Vopak Terminal Windmill Ltd.	KP3734SH	01/06/06

End of introductory note

## Notice of variation and consolidation

The Environmental Permitting (England and Wales) Regulations 2010

The Environment Agency in exercise of its powers under regulation 20 of the Environmental Permitting (England and Wales) Regulations 2010 varies and consolidates

**permit number**  
**EPR/BR9685IX**

**issued to**  
**Dow Corning Limited** (“the operator”)

whose registered office is

**Dow Corning UK**  
**Cardiff Road**  
**Barry**  
**Vale of Glamorgan**  
**CF63 2YL**

company registration number 486170

to operate a regulated facility at

**Dow Corning UK**  
**Cardiff Road**  
**Barry**  
**Vale of Glamorgan**  
**CF63 2YL**

to the extent set out in the schedules.

The notice shall take effect from 22/03/2012

Name	Date
<b>M Bischer</b>	22/03/2012

Authorised on behalf of the Environment Agency

**Schedule 1**

All conditions have been varied by the consolidated permit as a result of the application made by the operator.

**Schedule 2 – consolidated permit**

Consolidated permit issued as a separate document.

# Permit

The Environmental Permitting (England and Wales) Regulations 2010

**Permit number**  
**EPR/BR9685IX**

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/BR9685IX/V006 authorising,

**Dow Corning Limited** (“the operator”),  
whose registered office is

**Dow Corning UK**  
**Cardiff Road**  
**Barry**  
**Vale of Glamorgan**  
**CF63 2YL**

company registration number 486170

to operate an Installation at

**Dow Corning UK**  
**Cardiff Road**  
**Barry**  
**Vale of Glamorgan**  
**CF63 2YL**

to the extent authorised by and subject to the conditions of this permit.

Name	Date
<b>M Bischer</b>	22/03/2012

Authorised on behalf of the Environment Agency

# **1 Management**

## **1.1 General management**

1.1.1 The operator shall manage and operate the activities:

- (a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and
- (b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

## **1.2 Energy efficiency**

1.2.1 The operator shall:

- (a) take appropriate measures to ensure that energy is used efficiently in the activities;
- (b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and
- (c) take any further appropriate measures identified by a review.

## **1.3 Efficient use of raw materials**

1.3.1 The operator shall:

- (a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;
- (b) maintain records of raw materials and water used in the activities;
- (c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and
- (d) take any further appropriate measures identified by a review.

## **1.4 Avoidance, recovery and disposal of wastes produced by the activities**

1.4.1 The operator shall take appropriate measures to ensure that:

- (a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and
  - (b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and
  - (c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.
- 1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

## **1.5 Multiple operator installations**

- 1.5.1 Where the operator notifies the Environment Agency under condition 4.3.1 (a) or 4.3.1 (c), the operator shall also notify without delay the other operators of the installation of the same information.

## **2 Operations**

### **2.1 Permitted activities**

- 2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the “activities”).

### **2.2 The site**

- 2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

### **2.3 Operating techniques**

- 2.3.1 (a) The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.
- (b) If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan specified in schedule 1, table S1.2 or otherwise required under this permit, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.
- 2.3.2 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.

- 2.3.3 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:
- (a) the nature of the process producing the waste;
  - (b) the composition of the waste;
  - (c) the handling requirements of the waste;
  - (d) the hazardous property associated with the waste, if applicable; and
  - (e) the waste code of the waste.
- 2.3.4 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.

## **2.4 Improvement programme**

- 2.4.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency.
- 2.4.2 Except in the case of an improvement which consists only of a submission to the Environment Agency, the operator shall notify the Environment Agency within 14 days of completion of each improvement.

# **3 Emissions and monitoring**

## **3.1 Emissions to water, air or land**

- 3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1 and S3.2.
- 3.1.2 The limits given in schedule 3 shall not be exceeded.
- 3.1.3 Total annual emissions from the emission points set out in tables schedule 3 S3.1 and S3.2 of a substance listed in schedule 3 table S3.3 shall not exceed the relevant limit in table S3.3.

## **3.2 Emissions of substances not controlled by emission limits**

- 3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.
- 3.2.2 The operator shall:

- (a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan;
  - (b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.
- 3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

### **3.3 Monitoring**

- 3.3.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring specified in the following tables in schedule 3 to this permit:
  - (a) point source emissions specified in tables S3.1 and S3.2;
  - (b) process monitoring specified in table S3.4;
- 3.3.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.
- 3.3.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.3.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the Environment Agency.
- 3.3.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1 and S3.2 unless otherwise agreed in writing by the Environment Agency.

### **3.4 Odour**

- 3.4.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.
- 3.4.2 The operator shall:
  - (a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan;
  - (b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

### **3.5 Noise and vibration**

3.5.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.5.2 The operator shall:

- (a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan;
- (b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

## **4 Information**

### **4.1 Records**

4.1.1 All records required to be made by this permit shall:

- (a) be legible;
- (b) be made as soon as reasonably practicable;
- (c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and
- (d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:
  - (i) off-site environmental effects; and
  - (ii) matters which affect the condition of the land and groundwater.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

## 4.2 Reporting

- 4.2.1 The operator shall send all reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.
- 4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to the Environment Agency by 31 January (or other date agreed in writing by the Environment Agency) each year. The report(s) shall include as a minimum:
- (a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;
  - (b) the annual production /treatment data set out in schedule 4 table S4.2; and
  - (c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule.
- 4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:
- (a) in respect of the parameters and emission points specified in schedule 4 table S4.1;
  - (b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.4 ; and
  - (c) giving the information from such results and assessments as may be required by the forms specified in those tables.
- 4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.
- 4.2.5 The operator shall review fugitive emissions, having regard to the application of Best Available Techniques, on an annual basis, or such other period as shall be agreed in writing by the Environment Agency. A summary report on this review shall be sent to the Environment Agency detailing such releases and the measures taken to reduce them within 3 months of the end of such period.
- 4.2.6 The operator shall within two months of the date of this permit, submit a detailed Site Protection and Monitoring Programme (SPMP), in accordance with and using the appropriate template format given in the Land Protection Guidance. The operator shall implement and maintain the SPMP submitted under this condition, and shall carry out regular reviews of it at a minimum frequency of every two years. The results of such reviews and any changes made to the SPMP shall be reported to the Environment Agency within 1 month of the review or change.
- 4.2.7 Where the operator has a formal environmental management system applying to the permitted installation which encompasses annual improvement targets the operator shall, not later than 31<sup>st</sup> of March in each year, provide a summary report of the previous years progress against such targets.

## 4.3 Notifications

4.3.1 The Environment Agency shall be notified without delay following the detection of:

- (a) any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution;
- (b) the breach of a limit specified in the permit; or
- (c) any significant adverse environmental effects.

4.3.2 Any information provided under condition 4.3.1 shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

- (a) any change in the operator's trading name, registered name or registered office address; and
- (b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

4.3.4 In any other case:

- (a) the death of any of the named operators (where the operator consists of more than one named individual);
- (b) any change in the operator's name(s) or address(es); and
- (c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

- (a) the Environment Agency shall be notified at least 14 days before making the change; and
- (b) the notification shall contain a description of the proposed change in operation.

4.3.6 The Environment Agency shall be given at least 14 days notice before implementation of any part of the site closure plan.

4.3.7 Where the operator has entered into a climate change agreement with the Government, the Environment Agency shall be notified within one month of:

- (a) a decision by the Secretary of State not to re-certify the agreement;
- (b) a decision by either the operator or the Secretary of State to terminate the agreement; and
- (c) any subsequent decision by the Secretary of State to re-certify such an agreement.

## **4.4 Interpretation**

- 4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.
- 4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made “without delay”, in which case it may be provided by telephone.

## Schedule 1 - Operations

**Table S1.1 activities**

<b>Activity listed in Schedule 1 of the EP Regulations</b>	<b>Description of specified activity</b>	<b>Limits of specified activity</b>
S1.2 A(1)(b) – Reforming Natural Gas.	Natural Gas steam reformer for hydrogen production	Receipt of fuel to production and storage of hydrogen, associated cooling system and emission of combustion gases.
S3.1 B(c) – lime slaking	W806 and W1206 lime slakers.	Receipt of raw materials and storage, production of slaked lime, storage, associated emissions.
S4.1 A(1)(a)(vi) – Producing organic chemicals such as organic compounds containing halogens, such as halocarbons, halogenated aromatic compounds and acid halides.	W931 and W718 methyl chloride plant.	Receipt and storage of reactants, chemical processing and associated abatement plant, product storage, associated emissions.
S4.2 A(1)(a)(iv) – Producing inorganic chemicals such as salts, such as ammonium chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate, cupric acetate, ammonium phosphomolybdate.	W307/8 phosphonitrile chloride process.	Receipt and storage of reactants, chemical processing and associated abatement plant, product storage, associated emissions.
S4.2 A(1)(a)(v) – Producing inorganic chemicals such as non-metals, metal oxides, metal carbonyls or other inorganic compounds such as calcium carbide, silicon, silicon carbide, titanium dioxide.	W343 rearranger unit, W813 chlorocarbon reactor, W930/W714 fluidised bed reactors, W348 TCS/STC process, W930 DPR hydrogenolysis, W922 methylhydrogen cyclics, W410 continuous hydrolysis unit, W410/W407 vinyl polymer processes, W705/W716/W920 hydrolysis, W306/W406 silicone fluids plant, W309 silicone fluid process, W410 acetoxysilane process, W115 gum rig process, W422 polymerisation reactor process, W410 release modifier process and paper coating blenders, W410 amino polymer process, W307/W308 pilot plant, W115 catalyst unit.	

**Table S1.1 activities**

<b>Activity listed in Schedule 1 of the EP Regulations</b>	<b>Description of specified activity</b>	<b>Limits of specified activity</b>
S4.7 A(1)(b) – Any activity for the manufacture of a chemical which involves the use of ammonia or may result in the release of ammonia into the air other than an activity in which ammonia is only used as a refrigerant.	W115 mixing plant	Receipt and storage of reactants, chemical processing and abatement plant, product storage, associated emissions.
S5.1 A(1)(f) – Incineration other than incidentally in the course of burning solid or liquid waste, of any gaseous compounds containing halogens in a plant that is not an incinerator or co-incinerator.	W949 Energy Recovery Unit.	Receipt of waste gases, combustion, abatement plant, associated emissions.
S5.3 A(1)(c)(i) – any on site effluent treatment plant discharging more than 300m <sup>3</sup> in any one day	W806 effluent treatment process.	Receipt, storage and treatment of process effluent and contaminated surface water, discharge to River Cadoxton.

**Directly Associated Activity**

	W424/W940 silicon grinders	Receipt of raw materials, grinding, associated abatement and emissions.
	W948/W420/W322 hot oil heaters <20MW thermal input	Production of hot oil for site and emission of combustion gases.
	W404, W406, W408, W414, W708, W801, W802, W810 tank farms	Storage of raw materials, intermediates and products, associated emissions.
	W339, W715, W911 cooling towers	Site cooling towers and associated emissions.
	W413 storm water collection sump and W411 river water filtration unit	Uncontaminated storm water run off from site and discharge to River Cadoxton.
	W1205 and W1206 quench process, W805 Medusa process.	Receipt of material for quenching/encapsulation, treatment, product storage and associated emissions.
	W946 chlorosilane Recovery unit.	Receipt of silanes, treatment with HCL, despatch of chlorosilanes and associated emissions.
	W709 absorber and fridge.	Absorption of chlorosilanes.
	W945 basics refrigeration unit.	Refrigeration capacity for W930 and W941.

**Table S1.1 activities**

<b>Activity listed in Schedule 1 of the EP Regulations</b>	<b>Description of specified activity</b>	<b>Limits of specified activity</b>
	W707, W717, W941 distillation processes.	Receipt of crude feedstock, distillation and despatch of refined product.

**Table S1.2 Operating techniques**

<b>Description</b>	<b>Parts</b>	<b>Date Received</b>
Application	The response to questions 2.1 and 2.2 given in section B2.1, B2.2 and Appendix 4 and 7 of the application.	17/08/05
Further information	Two new separation processes.	24/01/06
Application for variation EA/EPRBR9685IX/V004	Amended Appendix 4, Section 9.	01/12/09
Application for variation EA/EPRBR9685IX/V005	An amended and consolidated appendix 4, containing modifications to Sections 2,5,6,9,10,11,and 15. Note section 7 still remains excluded.	10/02/11
Application for variation EA/EPRBR9685IX/V006	Appendix A – the main activities : Section 16 update, Section 14 update. Appendix D – Non Technical Summary, Appendix E Environmental Assessment, Appendix H New Raw Materials.	22/12/11
	Emails - Information regarding the maintenance vent for Methyl Chloride tankers to add to the variation.	21/02/12 & 07/03/12

**Table S1.3 Improvement programme requirements**

Reference	Requirement	Date
IP1	The operator shall characterise ammonia releases from A89 over the full duration of the batch based process using Environment Agency Technical Guidance Note M2 'Monitoring of Stack emissions to air', compliant methodology. An emission factor for ammonia shall be proposed that is appropriate for the calculation of the annual release inventory. A report shall be provided to the Agency.	Completed
IP2	The operator shall install and commission an enclosed Direct Process Residue quenching process that will enable optional venting to the ERU if trials confirm this is viable. Following commissioning a report shall be provided to the Agency that describes the process and its performance.	Completed
IP3	The operator shall: a) Undertake a comparison of the environmental risk assessments for silane and methylsilanes to determine the environmental significance of methylsilane releases to air; b) Where methylsilane releases are confirmed as environmentally significant on the basis of a), air dispersion modelling shall be carried out to assess the potential ground level concentration of methylsilanes at local receptors; c) If exceedences of the appropriate EAL are predicted from air dispersion modelling, strategies shall be proposed to reduce the releases of methylsilanes to appropriate levels. A report shall be submitted to the Agency in respect of the completed items and where necessary abatement, an appropriate ELV for methyl silanes and monitoring methodology.	Completed
IP4	The operator shall characterise the releases from A60 and A68. An appropriate abatement strategy, to be agreed with the Environment Agency shall be proposed and implemented. A report shall be submitted to the Environment Agency that includes an agreed timescale for completion of the work.	Completed
IP5	The operator shall implement a planned inspection procedure for all surfacing to minimise the risk of fugitive ground pollution. This shall define inspection frequencies and the procedures to be followed in the event of improvements being identified. A copy of the procedure shall be provided to the Environment Agency.	Completed
IP6	The operator shall undertake a noise survey to determine background noise levels during plant shutdown and ambient noise levels during normal operation at day and night. The survey shall satisfy the requirements of the Environment Agency's Horizontal Guidance note IPPC H3 and BS4142:1997. The scope of the survey and measurement locations shall be agreed with the Environment Agency beforehand. A report that details the findings, any necessary improvements and an agreed timetable to meet the Inorganic Chemicals Sector Guidance Note IPPC S4.03 standards, shall be submitted to the Environment Agency.	Completed
IP7	The operator shall identify all potential causes for the non-availability of the energy recovery unit (ERU). This shall include planned and un planned outages. Appropriate procedures shall be established to ensure that ERU availability is maximised through effective maintenance planning breakdown avoidance and rapid response to breakdowns. A report that details the procedures shall be submitted to the Environment Agency.	Completed
IP8	The operator shall demonstrate to the Environment Agency that the Danfoss Magflo 3100 continuous flow rate measurement equipment is fit for purpose by comparing the manufactures stated performance with the performance criteria for equivalent equipment having an MCERTS certificate as given in document 'Continuous water monitoring equipment part 3: Performance standards for water flow meters version 1, February 2003'. Where this comparison shows that the Danfoss Magflow 3100 does not meet the criteria in the above document, the operator shall propose a timescale whereby either the Danfoss Magflo 3100 will be able to meet the criteria or for the purchase and installation of suitable replacement equipment. Any timescales shall be approved by the Environment Agency.	Completed
IP9	The operator shall carry out a Direct Toxicity Assessment of the treated effluent discharges from W1. A report shall be submitted to the Environment Agency that details the findings and includes recommendations, approved by the Environment Agency, for any necessary improvements to the effluent discharge.	Completed

**Table S1.3 Improvement programme requirements**

Reference	Requirement	Date
IP10	The operator shall demonstrate to the Environment Agency that equipment used for continuous monitoring of pH on W1 and W2, is fit for purpose by comparing the manufactures stated performance of the equipment with the performance criteria for equivalent equipment having an MCERTS conformance certificate as given in document 'Continuous water monitoring equipment part 2: Performance Standards for on-line analysers, Turbidity and pH meters; ammonia, COD, TOC, dissolved O <sub>2</sub> , total phosphorus, nitrate and total oxidised nitrogen analysis version 1, February 2003'. Where this comparison shows that the equipment does not meet the criteria in the above document, the operator shall propose a timescale whereby either the equipment will be able to meet the criteria or for the purchase and installation of suitable replacement equipment. Any timescales shall be approved by the Environment Agency.	Completed
IP11	The operator shall demonstrate to the Environment Agency that the composite sampler is fit for purpose by comparing the manufactures stated performance with the performance criteria for equivalent equipment having an MCERTS certificate as given in document 'Continuous water monitoring equipment part 1: Performance standards and conformity testing procedures for automatic waste water sampling equipment version 1, February 2003'. Where this comparison shows that the composite sampler does not meet the criteria in the above document, the operator shall propose a timescale whereby either the composite sampler will be able to meet the criteria or for the purchase and installation of suitable replacement equipment. Any timescales shall be approved by the Environment Agency.	Completed
IP12	The operator shall develop and implement a risk based inspection programme for the chemical sewers. A report shall be submitted to the Environment Agency that details the programme including the inspection frequency and inspection methodology.	Completed
IP13	The Operator shall assess the feasibility of eliminating or substituting the use of cyclohexane in process W115 and substituting the use of toluene used for solvent cleaning with by-product xylene. Identified improvements shall be implemented and a report submitted to the Environment Agency	Completed
IP14	The operator shall complete a BAT assessment on siloxane abatement options for vent A26, A27, A65, A68, A79, A85. The assessment shall include sampling and analysis to determine representative annual release levels, the identification of options for release reductions and cost implications to complete improvements to meet agreed emission limits. An implementation programme for the identified improvements shall be agreed with the Environment Agency. A report shall be submitted to the Environment Agency.	Completed
IP15	The operator shall review the location of all waste patches. Where these are identified as not being on an impermeable surface necessary improvements shall be carried out to meet BAT standards. A report that details the review and necessary improvements shall be provided to the Environment Agency.	Completed
IP16	The operator shall quantify the releases of speciated VOC's from A78 during periods of normal operation. Where an exceedence of the VOC emission benchmark (Class A VOC's of 100g/h, Class B VOC's 2 Kg/h) is identified the potential for abatement efficiency improvements shall be identified. A report shall be submitted to the Environment Agency that details the releases to air, the proposed improvements, and agreed release limits and timetable for completion of the work.	Completed
IP17	The operator shall submit a written Site Closure Plan to be agreed with the Environment Agency. The plan shall have regard to the requirements set out in Section 2.11 of the Inorganic Chemicals Sector Guidance Note IPPC S4.03.	Completed
IP18	The operator shall investigate the feasibility of using an alternative heat transfer fluid in W322 that has an improved thermal stability compared with the existing Santotherm oil, thereby avoiding releases of VOC's from A70 and A71. A timetable for commencement of use of the new fluid shall be agreed with the Environment Agency that details the characteristics of the alternative fluid and the resultant releases to air.	Completed
IP19	The operator shall devise an appropriate HCL abatement Strategy for release point A44. Following installation of appropriate abatement confirmation shall be provided that BAT benchmark levels for HCL (10mg/m <sup>3</sup> ) are complied with.	Completed

**Table S1.3 Improvement programme requirements**

Reference	Requirement	Date
IP20	The operator shall either reposition or provide improved spill protection for the W406 fluids process drum re-work station. A report that details the improvements shall be provided to the Environment Agency.	Completed
IP21	All monitoring carried out by the site personnel for external reporting purposes shall be undertaken by staff with appropriate MCERTS accreditation. Written confirmation shall be provided to the Environment Agency.	Completed
IP22	The operator shall install dust abatement equipment on release point A108 to meet the BAT benchmark for dust releases. A report shall be provided to the Environment Agency upon completion of installation that includes details of the performance of the abatement equipment and the planned maintenance regime.	Completed
IP23	The operator shall upgrade the abatement system for release point A42 to provide a self cleaning filter to at least the standard of those used on other particulate vent abatement techniques on site . Written confirmation shall be provided to the Environment Agency upon completion of the work.	Completed
IP24	The operator shall provide written confirmation that the discharge to the River Cadoxton from the effluent treatment plant at W1 is able to comply with an ELV for copper of 0.1 mg/l (daily composite).	Completed
IP25	The Operator shall assess the outcome of Environmental Risk Assessments on siloxanes and identify the impact of these assessments upon the operation of the site. Where necessary consideration shall be given to; <ul style="list-style-type: none"> <li>• The need for detailed characterisation and quantification of siloxane releases to air from specified release points and fugitive release,</li> <li>• The requirement for improved abatement of such releases,</li> <li>• Dispersion modelling,</li> <li>• Timescales for the implementation of necessary improvements</li> </ul> <p>Any proposals for improvements shall be approved by the Environment Agency and a report submitted.</p>	Completed
IP26	The operator shall submit to the Environment Agency proposals for the improvement of the bulk basics plant waste storage area such that it meets the BAT standards for storage and containment. A report that details the proposed improvements and an agreed timetable for their implementation shall be provided to the Environment Agency.	Completed
IP27	The operator shall replace the existing lagoon (W804 E-Pond) with a BAT compliant bunded tank suitable for the storage of untreated effluent. During decommissioning of the existing E pond validation samples shall be taken and the results included in the SPMP.	Completed
IP28	The operator shall provide a report to the Agency that describes the proposed 'Medusa' process. This shall include a description of the process, the environmental benefits, the proposed use or disposal route for the produced materials, predicted releases to air from release points A109, A110 and any proposed other associated release points, and the proposed abatement for these release points. A plan shall also be proposed for the monitoring of the process performance and characterisation of releases to air during the first six months of operation. This shall be agreed with the Environment Agency.	Completed
IP29	Submit a written commissioning report to the Environment Agency for approval. The report shall compare the design parameters of the new scrubber with operating conditions, including hydrogen chloride removal efficiency. Where deficiencies arise, the report must contain dates for the implementation of individual improvement measures. The notification requirements of condition 1.4.1 will be deemed to have been complied with on submission of the report.	Completed

**Table S1.3 Improvement programme requirements**

<b>Reference</b>	<b>Requirement</b>	<b>Date</b>
IP30	Submit a written commissioning report to the Environment Agency for approval. The report shall compare the design parameters of the new scrubber with operating conditions, including hydrogen chloride removal efficiency. Where deficiencies arise, the report must contain dates for the implementation of individual improvement measure. The notification requirements of condition 1.4.1 will be deemed to have been complied with on submission of the report.	Completed
IP31	The operator shall carryout an assessment of the measures and procedures in place to prevent or reduce the environmental impact, including emissions to air of siloxanes, resulting from the Very Low Viscosity Fluids (VLVF) process. A summary of the assessment shall be submitted to the Environment Agency in writing, and if required, a timetable to implement any changes identified.	3 months following the commissioning of the VLVF process.
IP32	The operator shall carryout an assessment of the measures and procedures in place to prevent or reduce the environmental impact, of the change in process, resulting from the ethylene replacement project. A summary of the assessment shall be submitted to the Environment Agency in writing, and if required, a timetable to implement any changes identified.	3 months following the change in operation resulting in the ethylene replacement project.

# Schedule 2 - Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	Specification
-	-

## Schedule 3 – Emissions and monitoring

<b>Table S3.1 Point source emissions to air – emission limits and monitoring requirements</b>						
<b>Emission point ref. &amp; location</b>	<b>Parameter</b>	<b>Source</b>	<b>Limit (including unit)</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
A1 – Point A1 on site plan B2.2.2 in Application	-	W424 Grinding Plant bag filter vent	-	-	-	-
A2 – Point A2 on site plan B2.2.2 in Application						
A3 – Point A3 on site plan B2.2.2 in Application						
A4 – Point A4 on site plan B2.2.2 in Application						
A5 – Point A5 on site plan B2.2.2 in Application						
A6 – Point A6 on site plan B2.2.2 in Application						
A7 – Point A7 on site plan B2.2.2 in Application						
A8 – Point A8 on site plan B2.2.2 in Application	-	W714 Fluidised Bed Reactor bag filter vent , located on W709	-	-	-	-
A9 – Point A9 on site plan B2.2.2 in Application						
A10 – Point A10 on site plan B2.2.2 in Application	-	W714 Fluidised Bed Reactor bag filter vent	-	-	-	-
A11 – Point A11 on site plan B2.2.2 in Application						
A12 – Point A12 on site plan B2.2.2 in Application	Chloromethane	W714 Fluidised Bed Reactor vent via condenser	1000 kg/day, <sup>(2)</sup> 250 kg/h <sup>(2)</sup>	-	Continuous when ERU not available	US EPA Method 18

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

<b>Emission point ref. &amp; location</b>	<b>Parameter</b>	<b>Source</b>	<b>Limit (including unit)</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
A13 – Point A13 on site plan B2.2.2 in Application	-	W930 Fluidised Bed Reactor catalyst filter vent	-	-	-	-
A14 – Point A14 on site plan B2.2.2 in Application	-	W930 Fluidised Bed Reactor Bag filter vent	-	-	-	-
A15 – Point A15 on site plan B2.2.2 in Application	-					
A16 – Point A16 on site plan B2.2.2 in Application	-					
A17 – Point A17 on site plan B2.2.2 in Application	-					
A18 – Point A18 on site plan B2.2.2 in Application	-					
A19 – Point A19 on site plan B2.2.2 in Application	-	Not Assigned	-	-	-	-
A20 – Point A20 on site plan B2.2.2 in Application	-	W716 Hydrolysis Plant vent via condenser	-	-	-	-
A21 – Point A21 on site plan B2.2.2 in Application	-	Not Assigned	-	-	-	-
A22 – Point A22 on site plan B2.2.2 in Application	-	W716 Hydrolysis Plant vent via absorber	-	-	-	-
A23 – Point A23 on site plan B2.2.2 in Application	-	W705 Hydrolysis plant via scrubber	-	-	-	-
A24 – Point A24 on site plan B2.2.2 in Application	-	W716 Hydrolysis Plant vent via scrubber	-	-	-	-
A25 – Point A25 on site plan B2.2.2 in Application	-	W705/ W716 Hydrolysis Plant vent via scrubber	-	-	-	-
A26 – Point A26 on site plan B2.2.2 in Application	Siloxanes	W920 Hydrolysis Plant vent via scrubber	-	-	Quarterly	Method agreed With Environment Agency

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A27 – Point A27 on site plan B2.2.2 in Application	Siloxanes	W920 Hydrolysis Plant vent via condenser	-	-	Quarterly	Method agreed With Environment Agency
A28 – Point A28 on site plan B2.2.2 in Application	-	W920 Hydrolysis Plant tanker loading vent	-	-	-	-
A29 – Point A29 on site plan B2.2.2 in Application	-	W343 Rearranger Plant vent via scrubber	-	-	-	-
A30 – Point A30 on site plan B2.2.2 in Application	-	W718 Chloromethane Plant sulphuric acid tank vent	-	-	-	-
A31 – Point A31 on site plan B2.2.2 in Application	-	W802 Tank Farm tank vent	-	-	-	-
A32 – Point A32 on site plan B2.2.2 in Application	-	-	-	-	-	-
A33 – Point A33 on site plan B2.2.2 in Application	Chloromethane	W718 Chloromethane Plant vent via condenser and absorber	1000 kg/day, <sup>(2)</sup> 250 kg/h <sup>(2)</sup>	-	Continuous when ERU not available	US EPA Method 18
	Methanol		60 kg/h			
A34 – Point A34 on site plan B2.2.2 in Application	Chloromethane	W931 Chloromethane Plant vent via condenser and absorber	1000 kg/day, <sup>(2)</sup> 250 kg/h <sup>(2)</sup>	-	Continuous when ERU not available	US EPA Method 18
	Methanol		60 kg/h			
A35 – Point A35 on site plan B2.2.2 in Application	-	W1206 Quench treatment Area bag filter vent	-	-	-	-
A36 – Point A36 on site plan B2.2.2 in Application	-	W1206 Quench treatment Area vent via scrubber	-	-	-	-
A37 – Point A37 on site plan B2.2.2 in Application	-	-	-	-	-	-
A38 – Point A38 on site plan B2.2.2 in Application	-	-	-	-	-	-
A39 – Point A39 on site plan B2.2.2 in Application	-	-	-	-	-	-

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A40 – Point A40 on site plan B2.2.2 in Application	-	W946 Chlorosilane Recovery Unit vent via W806 scrubber	-	-	-	-
A41 – Point A41 on site plan B2.2.2 in Application	Particulates	W949 Energy recovery Unit via 30M stack	10 mg/m <sup>3</sup>	Hourly average	Annually	BS EN 13284-1
	Hydrogen chloride		10 mg/m <sup>3</sup> <sup>(9)</sup>	Annual average	Monthly	BS EN 1911:1998
	chlorine		10 mg/m <sup>3</sup>	Annual average	Monthly	US EPA Method 26
	Carbon monoxide		50 mg/m <sup>3</sup> <sup>(9)</sup>	Hourly average	Annually	BS EN 15058
	Oxides of nitrogen, as NO <sub>2</sub>		100 mg/m <sup>3</sup>	Hourly average	Annually	BS EN 14792
	Dioxins and furans		0.1ng/m <sup>3</sup>		Annually	BS EN1948: Parts 1, 2 and 3 MID
A42 – Point A42 on site plan B2.2.2 in Application	-	Waste water treatment plant bag filter vent	-	-	-	-
A43 – Point A43 on site plan B2.2.2 in Application	Hydrogen chloride	W922 Methylhydrogen Cyclics Process vent via scrubber	10 mg/m <sup>3</sup>	Hourly average	Monthly	BS EN 1911:1998
A44 – Point A44 on site plan B2.2.2 in Application	Hydrogen chloride	W922 Methylhydrogen Cyclics process tank vent	10 mg/m <sup>3</sup>	Hourly average	Monthly	BS EN 1911:1998
A45 – Point A45 on site plan B2.2.2 in Application	-		-	-	-	-
A46 – Point A46 on site plan B2.2.2 in Application	-	W922 Methylhydrogen Cyclics process tanker vent	-	-	-	-
A47 – Point A47 on site plan B2.2.2 in Application	-	W420 Hot oil unit vent via 18.3m stack	-	-	-	-
A48 – Point A48 on site plan B2.2.2 in Application	-	W948 Hot oil unit vent via 30m stack	-	-	-	-
A49 – Point A49 on site plan B2.2.2 in Application	-	W1206 Quench treatment area via scrubber	-	-	-	-
A50 – Point A50 on site plan B2.2.2 in Application	Oxides of nitrogen, as NO <sub>2</sub>	W957 Hydrogen plant vent via 19m Stack	200 mg/m <sup>3</sup>	Hourly average	Annually	BS EN 14792
	Carbon monoxide		200 mg/m <sup>3</sup>	Hourly average	Annually	BS EN 15058

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A51 – Point A51 on site plan B2.2.2 in Application	-	W940 Grinder Plant bag filter vent	-	-	-	-
A52 – Point A52 on site plan B2.2.2 in Application	-	W920 Hydrolysis vent via scrubber	-	-	-	-
A53 – Point A53 on site plan B2.2.2 in Application	-	W922 Methylhydrogen Cyclics Process separator vent	-	-	-	-
A54 – Point A54 on site plan B2.2.2 in Application	-	-	-	-	-	-
A55 – Point A55 on site plan B2.2.2 in Application	-	W348 TCS Process bag filter vent	-	-	-	-
A56 – Point A56 on site plan B2.2.2 in Application	-	-	-	-	-	-
A57 – Point A57 on site plan B2.2.2 in Application	Hydrogen chloride	W348 TCS Process vent via scrubber	10 mg/m <sup>3</sup>	Hourly average	Quarterly	BS EN 1911:1998
	Chloromethane		2 kg/h		During each spent bed transfer to W348	BS EN 13649
A58 – Point A58 on site plan B2.2.2 in Application	-	W306 fluids GIC Process vent	-	-	-	-
A59 – Point A59 on site plan B2.2.2 in Application	-	W306 fluids HVF Process vent	-	-	-	-
A60 – Point A60 on site plan B2.2.2 in Application	Class B VOC's	W306 fluids DC1107 process vent via condenser	-	-	Quarterly	BS EN 13649
A61 – Point A61 on site plan B2.2.2 in Application	-	W404 Tank Farm Vent	-	-	-	-
A62 – Point A62 on site plan B2.2.2 in Application	-	-	-	-	-	-
A63 – Point A63 on site plan B2.2.2 in Application	-	-	-	-	-	-

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

<b>Emission point ref. &amp; location</b>	<b>Parameter</b>	<b>Source</b>	<b>Limit (including unit)</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
A64 – Point A64 on site plan B2.2.2 in Application	-	W406 Fluids process vent	-	-	-	-
A65 – Point A65 on site plan B2.2.2 in Application	Siloxanes	W406 Fluids splitter process vent via condenser	-	-	Quarterly	Method agreed With Environment Agency
A66 – Point A66 on site plan B2.2.2 in Application	-	W406 Tank Farm Vent	-	-	-	-
A67 – Point A67 on site plan B2.2.2 in Application	-	-	-	-	-	-
A68 – Point A68 on site plan B2.2.2 in Application	Siloxanes	W422 polymerisation process vent via condenser, and	-	-	Quarterly	Method agreed With Environment Agency
	Class B VOC's	W405, Very Low Viscosity Fluids Process	-	-	Quarterly	BS EN 13649
A69 – Point A69 on site plan B2.2.2 in Application	-	W322 Hot oil unit vent via 15m stack	-	-	-	-
A70 – Point A70 on site plan B2.2.2 in Application	-	W322 Hot oil vent via condenser	-	-	-	-
A71 – Point A71 on site plan B2.2.2 in Application	-	W322 Hot oil unit tank vent	-	-	-	-
A72 – Point A72 on site plan B2.2.2 in Application	-	W410 Batch vinyl polymer process vent via condenser	-	-	-	-
A73 – Point A73 on site plan B2.2.2 in Application	-	-	-	-	-	-
A74 – Point A74 on site plan B2.2.2 in Application	-	W410 Amino Polymer Process (Textiles) vent via condenser	-	-	-	-
A75 – Point A75 on site plan B2.2.2 in Application	-	W410 Acetoxysilane/ CHU process vent via scrubber	-	-	-	-
A76 – Point A76 on site plan B2.2.2 in Application	-	W410 Acetoxysilane process bag filter vent	-	-	-	-

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A77 – Point A77 on site plan B2.2.2 in Application	-	W410 Release modifier process vent via condenser	-	-	-	-
A78 – Point A78 on site plan B2.2.2 in Application	Class A VOC's		-		Quarterly	Method agreed With Environment Agency
A79 – Point A79 on site plan B2.2.2 in Application	Siloxanes	W407 continuous vinyl polymer process vent via condenser	-	-	Quarterly	Method agreed With Environment Agency
A80 – Point A80 on site plan B2.2.2 in Application	-	W407 continuous vinyl polymer process vent via 25m stack	-	-	-	-
A81 – Point A81 on site plan B2.2.2 in Application	-	W408 Tank Farm vent	-	-	-	-
A82 – Point A82 on site plan B2.2.2 in Application	-	W414 Tank farm vent	-	-	-	-
A83 – Point A83 on site plan B2.2.2 in Application	-		-	-	-	-
A84 – Point A84 on site plan B2.2.2 in Application	-		-	-	-	-
A85 – Point A85 on site plan B2.2.2 in Application	Hydrogen chloride Siloxanes	W307 Multipurpose/development process vent via scrubber	10 mg/m3 <sup>(3)</sup> -	Hourly Average	Annually Quarterly	BS EN 1911:1998 Method agreed With Environment Agency
A86 – Point A86 on site plan B2.2.2 in Application	-	W309 Silicone Fluids Process vent	-	-	-	-
A87 – Point A87 on site plan B2.2.2 in Application	-		-	-	-	-
A88 – Point A88 on site plan B2.2.2 in Application	-		-	-	-	-

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

<b>Emission point ref. &amp; location</b>	<b>Parameter</b>	<b>Source</b>	<b>Limit (including unit)</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
A89 – Point A89 on site plan B2.2.2 in Application	-	W115 Elastomers Mixing Process vent via scrubber	-	-	-	-
A90 – Point A90 on site plan B2.2.2 in Application	-	W115 Elastomers Mixing Process vent via dust	-	-	-	-
A91 – Point A91 on site plan B2.2.2 in Application	-	cartridge	-	-	-	-
A92 – Point A92 on site plan B2.2.2 in Application	-		-	-	-	-
A93 – Point A93 on site plan B2.2.2 in Application	-	W115 Elastomers Catalyst unit vent	-	-	-	-
A94 – Point A94 on site plan B2.2.2 in Application	-	W115 Elastomers Gum unit vent via condenser	-	-	-	-
A95 – Point A95 on site plan B2.2.2 in Application	-	W115 Elastomers mixing plant bag filter vent	-	-	-	-
A96 – Point A96 on site plan B2.2.2 in Application	-		-	-	-	-
A97 – Point A97 on site plan B2.2.2 in Application	-		-	-	-	-
A98 – Point A98 on site plan B2.2.2 in Application	-		-	-	-	-
A99 – Point A99 on site plan B2.2.2 in Application	-		-	-	-	-
A100 – Point A100 on site plan B2.2.2 in Application	-		-	-	-	-
A101 – Point A101 on site plan B2.2.2 in Application	-		-	-	-	-
A102 – Point A102 on site plan B2.2.2 in Application	-		-	-	-	-

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

<b>Emission point ref. &amp; location</b>	<b>Parameter</b>	<b>Source</b>	<b>Limit (including unit)</b>	<b>Reference period</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>
A103 – Point A103 on site plan B2.2.2 in Application	-		-	-	-	-
A104 – Point A104 on site plan B2.2.2 in Application	-		-	-	-	-
A105 – Point A105 on site plan B2.2.2 in Application	-		-	-	-	-
A106 – Point A106 on site plan B2.2.2 in Application	-		-	-	-	-
A107 – Point A107 on site plan B2.2.2 in Application	-		-	-	-	-
A108 – Point A108 on site plan B2.2.2 in Application	-	W410 Amino Polymer Process vent	-	-	-	-
A109 – Point A109 on site plan B2.2.2 in Application	-	Removed	-	-	-	-
A110 – Point A110 on site plan B2.2.2 in Application	-	Removed	-	-	-	-
A111 – point A111 on revised Air vent drawing	-	W930 FBR Catalyst Powder unloading system vent	-	-	-	-
A112 – point A112 on revised Air vent drawing	-	W205 4401 tilt mixer vent	-	-	-	-
A113 – point A113 on revised Air vent drawing	-	W205 301 small tilt mixer vent	-	-	-	-
A114 – Point A114 on IPPC drawing B2.2.2 Emissions/ Discharge points to air/water	-	W1205 200 DPR Quench vent	-	-	-	-
A115 – point A115 on site map 17 11 01	-	W806 Tertiary water scrubber vent	-	-	-	-

**Table S3.1 Point source emissions to air – emission limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A116 – point A116 on site map 17 11 01	-	W922 Methylhydrogen cyclics process 2 <sup>nd</sup> separator vent	-	-	-	-
A117 – point A117 on site map 17 11 01	-	W810 HCL storage tank water scrubber vent	-	-	-	-

Note 1: See section 6 for reference conditions.

Note 2: Limit is cumulative for A12, A33, A34 and A40.

Note 3: During phosphonitrile production.

Note 4: No monthly value to exceed 150% (15 mg/m<sup>3</sup>) of annual average limit.

**Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements**

Emission point ref. & location	Parameter	Source	Limit (incl. unit)	Reference Period	Monitoring frequency	Monitoring standard or method <sup>(3)</sup>
W1 on site plan B2.2.2 in application	Flow	Discharge from effluent treatment plant	11,000 m <sup>3</sup> /day	-	Continuous	To an agreed relevant EN, BS, or ISO standard
			625 m <sup>3</sup> /hour	-		
	Temperature		40°C <sup>(1)</sup>	Instantaneous	Continuous	Method agreed With Environment Agency
	pH		≥6, ≤9	Instantaneous	Continuous	Method agreed With Environment Agency
	Suspended solids		30 mg/l <sup>(1)</sup>	daily composite	Daily	SCA Blue Book 105 ISBN 011751957X
	BOD <sub>5</sub>		20 mg/l <sup>(2)</sup>		Monthly	SCA Blue Book 130 ISBN 0117522120
	Copper		0.1 mg/l <sup>(1)</sup>	daily composite	Daily	BS ISO 17294-2:2004, BS 6068-2.89:2003
	Zinc		0.5 mg/l <sup>(1)</sup>	daily composite	Daily	
	Hydrocarbon oil		No visible sheen	-	Weekly	Method agreed With Environment Agency
	Halogenated organic compounds		1 mg/l <sup>(2)</sup>	-	Monthly	BS EN ISO 10301:1997, BS 6068-2.58:1997
W2 on site plan B2.2.2 in application	pH	Untreated discharge from 413 spill pond	≥6, ≤9	-	Weekly	BS 6068-2.50:1995, ISO 10523:1994
	Suspended solids		30 mg/l <sup>(2)</sup>	-	Weekly	SCA Blue Book 105 ISBN 011751957X
	BOD <sub>5</sub>		20 mg/l <sup>(2)</sup>	-	Monthly	SCA Blue Book 130 ISBN 0117522120
	COD		125 mg/l <sup>(2)</sup>	-	Monthly	BS ISO 15705:2002, BS 6068-2.34:1988, SCA blue book 215
	Copper		0.15 mg/l <sup>(2)</sup>	-	Following each transfer from W809 to W413	BS ISO 17294-2:2004
	Zinc		0.25 mg/l <sup>(2)</sup>	-		
	Hydrocarbon oil		No visible sheen	-	Monthly	Method agreed With Environment Agency

Note 1: Not more than 5% of samples shall exceed the emission limit value in the reporting period.

Note 2: No spot sample shall exceed the emission limit value by more than 50%.

Note 3: or to an EN, BS, ISO or SCA Blue book standard as agreed in writing with the Environment Agency.

**Table S3.3 Annual limits**

Substance	Medium	Limit (including unit)
Chloromethane	Air	60,000 kg
Total non methane volatile organic compounds <sup>(1)</sup>	Air	150,000 kg

Note 1: Not including siloxanes or silanes

**Table S3.4 Process monitoring requirements**

<b>Emission point reference or source or description of point of measurement</b>	<b>Parameter</b>	<b>Monitoring frequency</b>	<b>Monitoring standard or method</b>	<b>Other specifications</b>
A12	Methane	Continuous	US EPR Method 18	Only when ERU not available
A12	Non-methane hydrocarbons	Continuous	US EPR Method 18	Only when ERU not available
A26	Class B VOC's	Annually	BS EN 13649	
A48	Oxides of nitrogen as NO <sub>2</sub>	Annually	BS EN 14792	
A48	Carbon monoxide	Annually	BS EN 15058	
ERU	Process availability <sup>(1)</sup>	Continuous	Process monitoring	To be reported to the Environment Agency annually.
A114 <sup>(2)</sup>	Non methane hydrocarbons	Annually	BS EN 13649	
	Siloxanes		Method agreed With Environment Agency	
A1 – A11, A13 – A18, A29, A35, A38, A39, A42, A49, A51, A55, A56, A76, A90 92, A95 – A107, A111- A113.	Particulates	-	-	No visible releases of dust with no evidence of deposition in vicinity of stack discharge.
A47, A48, A69	Smoke	-	-	No visible smoke except for the first 15 minutes of start up from cold.
W1 - Storm water released via W1	Total Oxygen demand (TOD)	Continuous		Monitoring of TOD, flow is stopped on detection of contamination.
W806 – Tertiary scrubber	-	-	-	Record and maintain an electronic or written log of operating efficiency using a methodology agreed by the Environment Agency.

Note 1: Based on the availability to process 100% of W714 FBR vent.

Note 2: Sampling to be carried out during period when releases from the batch based process are greatest.

## Schedule 4 - Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

**Table S4.1 Reporting of monitoring data**

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Emissions to air Parameters as required by condition 3.5.1	A12, A26, A33, A34, A40, A41, A48, A50,A57 A85	Every 12 months	1 January
Emissions to air Parameters as required by condition 3.5.1	A26, A27, A43, A44, A57, A60, A65, A68, A78, A79, A85	Every 3months	1 January, 1 April, 1July, 1 October
Emissions to water Parameters as required by condition 3.5.1	W1, W2	Every 3months	1 January, 1 April, 1July, 1 October

**Table S4.2: Annual production/treatment**

Parameter	Units
Production of polydimethylsiloxane	tonnes

**Table S4.3 Performance parameters**

Parameter	Frequency of assessment	Units
Water usage	Annually	tonnes
Energy usage	Annually	MWh
Total raw material used	Annually	tonnes
Energy recovery unit availability	Annually	%
Waste disposal and/or recovery	Annually	tonnes

**Table S4.4 Reporting forms**

<b>Media/parameter</b>	<b>Reporting format</b>
Air – Annual reporting of emissions	Agency Form BR9685IX/A1 or other form as agreed in writing by the Environment Agency
Air – Quarterly reporting of emissions	Agency Form BR9685IX/A2 or other form as agreed in writing by the Environment Agency
Air A41 Annual reporting of Hydrogen chloride emissions	Agency Form BR9685IX/A3 or other form as agreed in writing by the Environment Agency
Air A41 Annual reporting of chlorine emissions	Agency Form BR9685IX/A4 or other form as agreed in writing by the Environment Agency
Air A41 Annual reporting of chloromethane emissions	Agency Form BR9685IX/A5 or other form as agreed in writing by the Environment Agency
Water – Quarterly reporting of emissions to water	Agency Form BR9685IX/W1 or other form as agreed in writing by the Environment Agency
Energy usage	Agency Form BR9685IX/E1 or other form as agreed in writing by the Environment Agency
Waste return	Agency Form BR9685IX/R1 or other form as agreed in writing by the Environment Agency
Water usage	Agency Form BR9685IX/WU1 or other form as agreed in writing by the Environment Agency
Performance indicators	Agency Form BR9685IX/PI1 or other form as agreed in writing by the Environment Agency
ERU Availability	Agency Form BR9685IX/ERU1 or other form as agreed in writing by the Environment Agency

# Schedule 5 - Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

**If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.**

## Part A

Permit Number	EPR/BR9685IX
Name of operator	Dow Corning Limited
Location of Facility	
Time and date of the detection	

<b>(a) Notification requirements for any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution</b>	
<b>To be notified within 24 hours of detection</b>	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

<b>(b) Notification requirements for the breach of a limit</b>	
<b>To be notified within 24 hours of detection unless otherwise specified below</b>	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

<b>(c) Notification requirements for the detection of any significant adverse environmental effect</b>	
<b>To be notified within 24 hours of detection</b>	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

**Part B - to be submitted as soon as practicable**

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

<b>Name*</b>	
<b>Post</b>	
<b>Signature</b>	
<b>Date</b>	

\* authorised to sign on behalf of Dow Corning Limited

## Schedule 6 - Interpretation

*“application”* means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

*“authorised officer”* means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

*“accident”* means an accident that may result in pollution.

*“background concentration”* means such concentration of that substance as is present in:

- for emissions to surface water, the surface water quality up-gradient of the site; or
- for emissions to sewer, the surface water quality up-gradient of the sewage treatment works discharge.

*“emissions to land”* includes emissions to groundwater.

*“emissions of substances not controlled by emission limits”* means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit.

*“EP Regulations”* means The Environmental Permitting (England and Wales) Regulations SI 2010 No.675 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

*“groundwater”* means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

*“hazardous property”* has the meaning given in Schedule 3 of the Hazardous Waste (England and Wales) Regulations 2005 No.894 and the Hazardous Waste (Wales) Regulations 2005 No. 1806 (W.138).

*“MCERTS”* means the Environment Agency’s Monitoring Certification Scheme.

*“quarter”* means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

*“WFD”* means Waste Framework Directive Directive 2008/98/EC of the European Parliament and of the Council on waste

*“year”* means calendar year ending 31 December.

Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

- (a) in relation to emissions from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid and gaseous fuels, 6% dry for solid fuels; and/or
- (b) in relation to emissions from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content

## Schedule 7 - Site plan

The site plan comprises one view as follows:

Figure 1 – Overview of complete installation showing the Dow Corning boundary edged in green and all sites that comprise the installation edged in red.

Figure 1 has been reproduced from the Ordnance Survey map with the permission of the Controller of Her Majesty's Stationery Office ©Crown Copyright 2000. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings.

