SELBY DISTRICT COUNCIL

ENVIRONMENTAL HEALTH

POLLUTION PREVENTION AND CONTROL ACT 1999

ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS 2016 AS AMENDED

PERMIT TO OPERATE A GLASS MANUFACTURING INSTALLATION

PERMIT REF NO:A(2)51PV5

OPERATOR INSTALLATION **ADDRESS**	Saint-Gobain Glass (United Kingdom) Ltd Eggborough Plant Weeland Road Goole DN14 0FD Company registration number 2442570
REGSITERED OFFICE	Saint-Gobain House Binley Business Park Coventry CV3 2TT

Selby District Council hereby permits Saint-Gobain Glass (United Kingdom) Ltd to carry on the Glass Manufacturing Activity with Melting Capacity More than 20 Tonnes per Day as described in the installation description under 3.3 of Part 1 of Schedule 1 of The Environmental Permitting (England and Wales) Regulations 2016 Statutory Instrument 1154 (as amended), within the installation boundary as shown outlined in red plans referenced Figure 1B forming part of this permit, and in accordance with the following conditions.

The conditions within this permit shall come into effect from the date of issue of the permit, unless otherwise stated in a specific condition.

Provenance	Date
Date First Permit Issued	10th May 2004
Date of Variations	2nd May 2007 27 November 2012 18 April 2013e 7 March 2016e 20 December 2019
Date of Latest Version	19 June 2020
Current PG Note	Best Available Techniques (BAT) Reference Document for the Manufacture of Glass Commission Implementing Decision of 28 February 2012 establishing the best available techniques (BAT) conclusions under Directive 2010/075/EU on Industrial Emissions for the Manufacture of Glass Industrial Emissions Directive Directive 2010/75/EU

Signed on behalf of Selby District Council by

[redacted]

Diana Adamson
Senior Environmental Health Officer

Date: 19 June 2020

A 2 51 P/V5

CONTENTS **Page**

Schedules

1. Description of Installation

1.1 Saint-Gobain's Eggborough plant is a float glass manufacturing facility for the production of a basic flat soda lime silica glass, for applications in the construction industry.

The installation includes the storage and handling of sand (silicon dioxide), soda ash (sodium oxide), limestone (calcium carbonate), dolomite (calcium-magnesium oxide), and cullet to produce the glass by the application of heat in a furnace followed by a float bath, lehr, glass cutting, and subsequent warehousing.

The flue gas from the furnace is treated to reduce harmful SO_x, particulates and NO_x components. The reagents for these processes, hydrated lime and aqueous ammonia solution (<25% concentration) are stored in a silo and double wall tank respectively for automatic dosing into the flue ducts via local pipework.

The process has an output of up to 230,000 tonnes of float glass per annum, and operates continuously. The float tank is operational 24 hours per day without stopping until it is refurbished approximately every 20 years.

The plant also operates a Physical Vapour Deposition (PVD) process which applies extremely thin coatings to glass sheets to enhance the thermal emissivity properties of the glass. The coating plant is housed in a purpose built extension to the existing finished product warehouse. The glass to be coated can be sourced from within the production line or from external sources. The production capacity of the coater is up to approximately 130,000 tonnes, and will operate across all shifts on a continuous basis.

The plant also operates a Laminating process which produces laminate and laminate safety glass by creating a sealed laminate sandwich consisting of glass/PVB/glass. The laminating plant is housed in a further purpose built extension to the existing warehouse. The glass to be laminated can be sourced from within the production line or from external sources. The production capacity of the laminator is up to approximately 2.2 million m^2 per annum.

A more detailed process description is appended in Schedule 1 to this Permit.

Conditions

2. General

2.1 It is a Condition for the validity of this Permit that no information provided by The Operator in connection with the obtaining of this Permit is false or misleading and that any change affecting the accuracy of such information is notified immediately in writing by the Operator to the Regulator.

2.2 The Permitted Installation shall, subject to the provisions of this Permit, operate using the techniques and in the manner described in the Application and in the description of the Installation forming part of this Permit.

2.3 The Permitted installation shall be managed and operated by sufficient persons who are suitably qualified, experienced, trained and supervised in respect of the duties to be undertaken in connection with the Installation.

2.4 The Operator shall provide all such persons described in Condition 2.3 above, with appropriate written operating instructions for their duties in relation to the operation of the Permitted Installation.

2.5 Any persons having duties which are or may be affected by the matters set out in this Permit shall have convenient access to a copy of this document kept at or near the place where such duties are carried out.

2.6 Safe and permanent means of access shall be provided by the Operator to any sampling or monitoring point which is required to demonstrate compliance with an emission limit specified in Schedule 3.

Safe means of access shall be provided to any other sampling or monitoring points when required by the Regulator.

2.7 A written log or other traceable record approved by the Regulator shall be kept by the Operator of the Installation containing a record of all inspections, assessments and monitoring required by the Conditions of this Permit.

The record shall include the time and date of the assessment, inspection or monitoring, the result and the name of the person carrying out the task.

The log or traceable record shall be kept available for inspection at the Installation by an the Regulator and shall be retained by the Operator for a minimum of 2 years.

2.8 If the Operator proposes to make a change in operation of the installation, he must, at least 14 days before making the change, notify the Regulator in writing. The notification must contain a description of the proposed change in operation. It is not necessary to make such a notification if an application to vary this permit has been made and the application contains a description of the proposed change. In this condition 'change in operation' means a change in the nature and functioning, or an extension, of the installation, which may have consequences for the environment.

2.9 The best available techniques shall be used to prevent or, where that is not practicable, reduce emissions from the installation in relation to any aspect of the operation of the installation which is not regulated by any other conditions of this permit.

2.10 The operations on site shall be subject to constant monitoring of operations parameters by the DCS system which shall alarm when critical parameters for emissions to air and energy efficiency are exceeded. This shall include continuous monitoring of temperature, fuel feed and air flow.

2.11 The operations on site shall be subject to a comprehensive inspection and maintenance plan which shall from part of the Environmental Management Plan required by Condition 6.1. The inspection and maintenance plan shall cover all plant whose failure could lead to impact on the environment, including tanks, pipework, retaining walls, bunds, ducts and filters.

2.12 The Regulator shall be notified within 14 days of the occurrence of the following matters except where such disclosure is prohibited by Stock Exchange rules:

(3) Where the Operator is a registered company:

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

(b) Where the Operator is a corporate body other than a registered company:

(3) any change in the Operator's name or address; and
(ii) any steps taken with a view to the dissolution of the Operator

2.13 The Operator shall identify and list all environmentally critical process and abatement equipment whose failure could impact on the environment. For all such items identified:
• Alarms or other warning systems shall be provided, which indicate equipment malfunction or breakdown ;
• Such warning systems shall be maintained and checked to ensure continued correct operation, in accordance with manufacturer's recommendations ; and
• Essential spares and consumables for such equipment shall be held on site or be available at short notice from suppliers, so that breakdowns can be rectified rapidly.

Records of breakdowns shall be kept and analysed by the Operator in order to eliminate common failure modes.

3. Control of Atmospheric Emissions

3.1 General Conditions Controlling Emissions to Atmosphere

3.1.1 All emissions from the Installation shall be free from offensive odours when assessed by the Regulator at any point on the site boundary as identified in blue on the attached plan ref: figure 1b in Schedule 2.

3.1.2 All emission point sources are identified on the attached plan ref: Figure 1c in Schedule 3. All emissions to air from a release point specified in Schedule 3 to this Permit shall arise only from the source for that release as specified in the Schedule.

3.1.3 An emission to air from a release point specified in Schedule 3 shall not exceed any limit for that release point specified in that Schedule. For continuous monitoring the limit is a daily average value.

3.1.4 All emissions to air, other than steam or water vapour, shall be free from visible and persistent mist, persistent fume and droplets.

3.2 General Conditions controlling the Monitoring of Emissions

3.2.1 All pollutant concentrations shall be expressed at standard Conditions of 273K and 101kPa without correction for water vapour content. The concentrations of pollutants from the release point serving the glass melting furnace specified in Schedule 1 shall be normalised to 8% oxygen content measured dry.

3.2.2 The introduction of dilution air to achieve an emission limit specified in Table 1a in Schedule 3 shall not be permitted.

3.2.3 Emissions from the release point A1 serving the glass-melting furnace specified in Plan ref: Figure 1c in Schedule 3 shall be continuously monitored for Particulate Matter, Nitric Oxide, Ammonia and Oxides of Sulphur.

3.2.4 No monthly mean emissions concentrations shall exceed an emission limit specified in Schedule 3. No individual daily mean emissions concentration shall exceed 110% of an emission limit specified in Schedule 3. The number of hourly average values that exceed 200% of an emission limit specified in Schedule 3, shall be less than 5% of the total hourly averages in any year. In the event of such exceedance(s) monitoring results shall be forwarded to the Regulator within 7 working days.

3.2.5 The instantaneous emission concentrations monitored in Condition 3.2.3 above shall be on immediate display to operating staff responsible for the control of the glass-melting furnace.

3.2.6 An audio visual alarm shall be fitted to instruments in 3.2.3 above to alert operating staff of any arrestment plant failure.

3.2.7 On each occasion that the alarm required by Condition 3.2.6 above is activated, this shall be automatically recorded and an investigation carried out

into the cause of the cause of the alarm and process operations adjusted accordingly. Details of alarms shall also be notified to the Regulator every 6 months or immediately if there is a significant pollution risk.

3.2.8 Where any individual 1-hour mean concentration is twice the emission limit specified in Schedule 3 the Regulator shall be advised as soon as reasonably possible and in any case within 24 hours, by means identified in the Explanatory Notes attached to this Permit. Details of the exceedance, the subsequent investigation and any remedial actions undertaken shall be confirmed in writing within 7 days.

3.2.9 Emissions of particulates, Nitorgen Oxides, Ammonia, Chlorides (expressed as HCL), Fluorides (expressed as HF), Sulphur Dioxide and metals (groups 1 & 2) from the release point A1 serving the glass melting furnace identified in Schedule 3 shall be monitored annually in order to demonstrate compliance with the emission limits specified in that Schedule.

3.2.10 The monitoring carried out in relation to Condition 3.2.7 shall include at least three stop samples of at least 30 minutes each and cover a minimum of two firing reversals of the regenerator chambers.

3.2.11 Adequate facilities for sampling shall be provided on vents and ducts in order to obtain representative samples.

3.2.12 At least 7 days before any periodic monitoring exercise is undertaken, the Regulator shall be notified in writing, giving details of the times when monitoring will take place, the pollutants to be monitored and the sampling techniques to be employed.

3.2.13 The results of all non-continuous emission testing shall be forwarded to an The Regulator within 8 weeks of completion of the sampling.

3.2.14 Visual assessments of emissions from all sources within the installation shall be carried out at least once a day and the details entered in the log required by Condition 2.7 in order to demonstrate compliance with the requirements of Conditions 3.1.4, 3.3.1 and 3.3.2. The entry shall contain the date, time and result of the assessment and the name of the person carrying out the assessment. Any adverse result shall be investigated immediately and the details of the investigation and any remedial action entered in the log.

3.2.15 A waste gas analysis shall be carried out every 2 weeks for each port and the results used to optimise the combustion. The analysis shall include CO. Copies of the analysis shall be made available to the Regulator on request.

3.2.16 The EP system shall be subject to continuous monitoring of surrogate parameters to demonstrate its correct functioning. The parameters shall include temperature, pressures and dust level.

3.2.17 When special operations are being undertaken, including regular and extraordinary maintenance work and cleaning operations relating to the furnace or EP the critical parameters of production shall be closely monitored and corrective actions taken where emission limits in Schedule 3 down in this

permit or agreed the Regulator prior to the work being undertaken.

3.3 Control of Emissions of Particulate Matter.

3.3.1 All emissions to air shall be free from visible particulate matter, subject to the allowances in Condition 3.3.2 below.

3.3.2 All emissions to air from combustion processes shall be free from visible smoke in normal operation, with the exception of the periods allowed for under the Dark Smoke (Permitted Periods) Regulations 1958 and in any case shall not exceed at any time the equivalent of Ringlemann Shade 1 as described in British Standard 2742: 1969.

3.3.3 Exhaust gases from the glass melting furnace shall be vented through an Electrostatic Precipitator with associated sorbent injection as necessary, prior to final discharge to atmosphere via the release point specified in Schedule 3 and marked on Plan ref: Figure 1c, in order to meet the emission limit for particulate matter for that release point specified in Schedule 3. Exemption to this requirement shall be made during periods of maintenance allowed by Conditions 3.3.4 and 3.3.5 below and under exceptional circumstances, when the requirements of Condition 3.3.7 below shall be observed.

3.3.4 Essential planned periodic maintenance of the Electrostatic Precipitator shall, where practicable, be arranged to coincide with such times that the furnace throughput is likely to be minimal in order to minimise the emission of particulate matter.

3.3.5 Exemption from the requirements of Condition 3.3.3 above shall be requested from and approved in writing by the Regulator at least 7 days before any planned periodic maintenance of the Electrostatic Precipitator is carried out.

3.3.6 The details of all periodic maintenance of the Electrostatic Precipitator shall be recorded in the log required by Condition 2.7.

3.3.7 The bypass for the Electrostatic Precipitator shall be kept closed during normal operation. Every opening of the bypass shall be recorded and all reasons for and the duration of opening of the bypass shall be recorded in the log required by Condition 2.7 and a report submitted in writing to the Regulator within 7 days.

3.3.8 Stocks of powdered, granular or dusty materials, excluding cullet, shall be stored in purpose build silos or undercover. Procedures for loading to and from such storage locations shall be specified in the Environmental Management System required by Condition 6.1 and shall be designed so as to minimise the emission of particulate matter to the air. These procedures shall be communicated to all drivers and site personnel involved in such operations.

3.3.9 All storage silos shall be vented to air through reverse jet fabric filters.

3.3.10 All storage silos shall be fitted with audible and visual high-level alarms to warn of impending overfilling. The alarm shall be interlocked to interrupt the

delivery should the silo capacity be approached. The correct operation of such alarms shall be tested monthly and the results recorded in the logbook required by Condition 2.7.

3.3.11 All filter bags shall be inspected at least once every 6 months and the details recorded in the logbook required by Condition 2.7. If defects or significant binding are detected, corrective action shall be taken prior to the next delivery and the details of this action recorded in the log book.

3.3.12 All vehicular, mechanical, gravity dependent and pneumatic methods for the transportation and handling of powdered, granular or dusty materials shall be specified in the Environmental Management System required by Condition 6.1 and shall be so designed as to minimise the emission of particulate matter to the air and in particular the pneumatic system shall be a sealed system equipped with a filter to clean the transport air before release.

3.3.13 External above ground conveyors and bucket elevators for the movement of powdered, granular or dusty materials shall be totally enclosed so as to prevent wind whipping. Dust extraction equipped with reverse jet fabric filters shall be maintained on such conveyors.

3.3.14 Raw materials and cullet shall be stored and handled in accordance with Schedule 4 appended to this Permit. Procedures for loading to and from such storage locations shall be specified in the Environmental Management System required in Condition 6.1 and shall be so designed as to minimise the emission of particulate matter to the air. These procedures shall be communicated to all drivers and site personnel involved in such operations.

3.3.15 The cullet shall be stored in enclosed bays in the storage compound and the area shall be dampened during periods of windy weather by the Mist Spray System.

3.3.16 Prior to periods of dry windy weather steps shall be taken to dampen the cullet and other external raw materials stockpiles and to clean access roads in the vicinity of these storage areas. This shall be carried out in line with the procedure forming part of the Environmental Management System required by Condition 6.1.

3.3.17 The batch material shall be moistened to reduce the dust emissions.

3.4 Control of Emissions of Oxides of Nitrogen.

3.4.1 External examination and maintenance of the furnace shall be carried out at least once a day in order to check for and seal leaks and gaps allowing the ingress of air into the furnace and the subsequent formation of Oxides of Nitrogen. The result of the examination and any remedial action shall be recorded in the log required by Condition 2.7.

3.4.2 All furnace inspection holes shall be designed to close and seal.

3.4.3 The glass melting furnace shall be operated at a slight positive pressure respective to ambient external atmospheric pressure, to prevent the rogue ingress of air to the combustion chamber.

3.4.4 The emission of Nox shall not exceed the levels given in the table below. The levels given in the table below will be subject to an annual review and may be revised after consideration has been given to the current emission level, on-going trials, maintenance completed and planned maintenance.

Date	Emission level	Averaging period	Monitoring required
1 January 2020 to 28 February 2021	1500 mg/Nm^3	Daily average values. Where failures/maintenance work lead to temporary increases in level the averaging period may be extended at the regulator's discretion.	Continuous indicative and annual
1 March 2021	700 mg/Nm^3	Daily average values	

Emissions due to regenerator failure:
Where regenerator failure leads to a sudden increase (over 300mg/Nm^3) in levels immediate actions in line with the examination, maintenance and reporting parts of this condition shall be carried out.

If the emission levels have exceeded the appropriate limit given above and cannot be reduced to the appropriate level within the timeframe agreed with the regulator under this condition; then the operator will produce a plan of action detailing either how the emission limit will be met and the associated time frame for consideration by the regulator. This plan may include the bringing forward the planned rebuild of the furnace.

Examination and Maintenance:
A programme of examination and maintenance shall be submitted and agreed in writing with the regulator within 1 month of the date of this permit. The programme shall detail the examination programme in regards to the furnace area and timescales, and the regular maintenance programme.

Where a sudden increase (over 300mg/Nm^3) in No_x levels is detected by the continuous monitor the operator shall take immediate steps to determine the cause of the increase, identify remedial action and determine a timescale for restoration.

Reporting:
A report on the daily average results of continuous monitoring of Nitrogen oxides shall be forwarded to the regulator once every three months. The report shall include a graph trending the average monthly emissions for the furnace, year on year.

Every six months the operator shall submit to the Regulator a report detailing the examinations and maintenance carried out in respect to the agreed programme.

The Regulator shall be notified within one working day of a sudden increase in NO_x emission levels. A report detailing the reason for the increase, remedial actions identified and timescales for restoration shall be submitted to the Regulator within 1 month of the notification. The report shall be agreed with the Regulator and completion of the restorative actions shall be notified on a monthly basis until completion.

Where Saint-Gobain Glass (United Kingdom) Ltd intend to carry out maintenance work which will cause a temporary increase in Nox levels prior notice shall be sent to the Regulator and agreed in writing prior to work commencing.

3.5 Control of Emissions of Oxides of Sulphur

3.5.1 Exhaust gases from the glass melting furnace shall be vented through an Electrostatic Precipitator with associated sorbent injection as necessary, prior to final discharge to atmosphere via the release point specified in Plan ref: Figure 1c in Schedule 3, in order to meet the emission limit for oxides of sulphur for that release point specified in Table 1a in Schedule 3.

3.5.2 Gas shall be used as the primary fuel for the furnaces.

3.5.3 Heavy Fuel Oil may be used to provide fuel flexibility and shall comply with the Sulphur Content of Liquid Fuels (England & Wales) Regulations 2007 in that the heavy fuel oil shall have a sulphur content of no greater than 1 percent by mass. A statement from the fuel supplier demonstrating the sulphur content of Heavy Fuel Oil shall be made available to the Regulator upon request.

3.5.4 The burning of waste oil is not permitted at any time.

3.6 Control of Emissions of Chlorides and Fluorides

3.6.1 The process Operator will seek to identify, as necessary, appropriate modification of the type of reactant substances used in the ESP and for the reduction of chlorides and fluorides to ensure compliance with the emission limit specified in Table 1a in Schedule 3.

3.6.2 The process Operator will seek to identify and implement systems to reduce ESP downtime and improve reliability to order to ensure consistently low levels of hydrogen chloride.

3.7 Control of Metal Emissions

3.7.1 Exhaust gases from the glass melting furnace shall be vented through an Electrostatic Precipitator with associated sorbent injection of lime as necessary, prior to the final discharge to atmosphere via the release point specified in Plan ref: Figure 1c in Schedule 3, in order to meet the emission

limit for metals for that release point specified in Table 1a in Schedule 3.

3.8 Control of Emission of Ammonia

3.8.1 Exhaust gases from the glass melting furnace and SCR shall be vented through the release point specified in Plan ref: Figure 1c in Schedule 3, in order to meet the emission limit for ammonia for that release point specified in Table 1a in Schedule 3.

3.9 Control of Emission from the Coating Plant

3.9.1 Stocks of coating materials and gases shall be stored in purpose made containers and/or cylinders the locations of which shall be clearly identified and referenced on the site plan 1F: in Schedule 2.

3.10 Control of Emissions from the Laminating Plant

3.10.1 Stocks of laminating materials shall be stored in purpose made containers and/or cylinders the locations of which shall be clearly identified and referenced on the site plan 1G: in Schedule 2.

4. Noise and Vibration

4.1. The Noise Management Plan for the installation shall be maintained by the Operator, in accordance with the Environmental Management System required under Condition 6.1.

The plan identifies the noise levels at the boundary of the site in a format and at positions agreed with the Regulator, identifies key plant and equipment with the potential to give rise to significant noise and include any mitigation or maintenance measures to be undertaken.

The Plan shall be reviewed whenever changes are proposed to the installation which might have an impact on the Plan and, in any case, not less frequently than once in every period of two years.

The plan shall be revised following the installation of SCR and be completed and submitted to the Regulator by the 31 December 2020. During the revision an environmental noise assessment shall be carried out, and consideration given to the enclosure of noisy equipment and operations, use of embankments and screens and the time of day when noisy activities are carried out.

The Plan shall establish the noise levels at the boundary of the site in a format and at positions agreed with the Regulator, identify key plant and equipment with the potential to give rise to significant noise and include any mitigation or maintenance measures to be undertaken.

4.2 During the discharge of raw materials from vehicles, the discharge mechanism of any such vehicle shall only be operated (opened and closed) whilst the vehicle is inside the loading/unloading area.

4.3 Deliveries and discharge of raw materials shall only take place between the hours of 07:00 and 19:00 Monday to Friday and 07:00 and 13:00 on Saturday. The loading/unloading of vehicles shall not be permitted on Sundays. Any deviation from this requirement shall first of all be approved in writing by The Regulator.

4.4 The discharge of raw materials to silo by pneumatic means shall be achieved by connection to the on-site pneumatic system of the use of vehicle mounted pumps and compressors. Where this requirement cannot be met the details of the exceptional circumstances involved shall be recorded in the log required by Condition 2.7 and the details forwarded in writing to an The Regulator within 7 days.

4.5 External above ground conveyors for the movement of cullet and raw materials shall be totally enclosed.

4.6 All goods vehicle drivers entering the site shall be directed to park up in a holding area with the vehicle engine switched off until such time that the vehicle can be unloaded in the case of delivery vehicles, or loaded in the case

of dispatch vehicles.

4.7 Any emergency diesel generators on site shall only be tested between the hours of 09:00 and 19:00 Monday to Friday and not on any public holiday. An exception to this requirement shall be allowed for testing after emergency repair, where the repair work is completed outside of the specified times.

4.8 The testing of audible alarms required by condition 3.2.5 shall only be carried out between the hours of 09:00 and 18:00 Monday to Friday and not on any public holiday.

5. Emissions to Water and Sewer

5.1 All liquid storage tanks containing liquids that could be harmful to the environment, including liquid discharges from the battery charging room and laboratories, as shown on plan Figure 1D (Schedule 3) shall be impermeable and resistant to the stored materials and located wither underground or within an impervious bund with a capacity not less than 110% of the largest tank or largest combined volume of connected tanks or 25% of the total tank capacity, whichever is the greater. All associated pipe work, fill points, vents, gauges, overflow outlets and sight glasses shall be located within the bunded area. Bunded areas shall have no outlet (i.e. drains of taps) and shall not discharge to any watercourse, land or underground strata.

5.2 The secondary containment system for the liquid storage tanks referred to in Condition 5.1 and shown on plan number Figure 1D(Schedule 3) shall be protected from the risk of damage by impact or collision.

5.3 The pipework carrying materials from the tanks shown on Figure 1D (Schedule 3) shall be positioned or protected to prevent damage by impact or collision.

5.4 The tanks and pipework referred to in Condition 5.1.1 and 5.1.3 shall be subject to an inspection and testing programme to be agreed in writing with the Regulator within 6 months of the date of this permit.

5.5 Domestic effluent only shall be discharged to the existing public sewerage system in accordance with the assessments and proposals detailed in Schedule 6 attached to this Permit.

5.6 There shall be no discharge to foul sewer of surface water. All surface water from the installation shall be discharged in accordance with the proposals detailed in Schedule 6 attached to this Permit.

5.7 Surface water discharge shall be free from visible oil and grease. Surface water from vehicle parking and hard standing areas shall be passed though an oil interceptor of adequate capacity prior to discharge.

5.8 The interceptors required by condition 2.2.9 shall be:
- impermeable ; and
- subject to regular inspection, as part of the preventative maintenance programme required by condition 2.11, and contamination removed as necessary to ensure continuous function. The results of all inspections to be recorded.

5.9 There shall be no direct or indirect emission to groundwater from the installation of any Hazardous Substance or Non-Hazardous Pollutants as set out in Schedule 22 of the Environmental Permitting (England & Wales) Regulations 2016.

5.10 Liquid waste containing process effluent shall not be discharged to foul sewer or to any surface water drainage system subject to the agreement of the

relevant water and sewerage Regulator.

5.11 Emissions to water from the installation shall be monitored according to a scheme to be agreed in writing with the Regulator within 12 months of the date of this permit.

5.12 The Operator shall ensure that all emissions are controlled, as a minimum, to avoid a breach of water quality standards and where required by an officer of Selby District Council shall carry out monitoring and provide calculations and/or modelling to demonstrate this.

5.13 When requested by the Regulator, the Operator shall monitor any or all of the following parameters in effluent streams from activities at the installation:

- The volumetric flow rate
- pH
- Temperature
- Total organic carbon (TOC)
- Chemical oxygen demand (COD)
- Biological oxygen demand (BOD)
- Turbidity and
- Dissolved oxygen content
- Metals
- Sulphates, expressed as SO_4^{2-}
- Fluorides, expressed as F^-
- Total hydrocarbons

6. Environmental Management System and Proposed Improvement Programme for the Installation

6.1 An Environmental Management System for the installation shall be implemented and adhered to and incorporate the following features:

i) commitment of the management, including senior management:

ii) definition of an environmental policy that includes the continuous improvement of the installation:

iii) planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment:

iv) implementation of the procedures paying particular attention to:
(a) structure and responsibility
(b) training, awareness and competence
(c) communication
(d) employee involvement
(e) documentation
(f) efficient process control
(g) maintenance programmes
(h) emergency preparedness and response.
(i) safeguarding compliance and environmental legislation

v) checking performance and taking corrective action, paying particular attention to:
(a) monitoring and measurement
(b) corrective and preventive action
(c) maintenance of records
(d) independent (where practicable) internal and external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained:

vi) review of the EMS and its continuing suitability, adequacy and effectiveness by senior management:

vii) requirement to follow the development of cleaners technologies:

viii) Consideration of the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant and throughout its operating life.

ix) Application for sectoral bench marking on a regular basis.

6.2 A copy of the Environmental Management System required by condition 6.1 shall be forwarded to the Regulator within 9 months of the date of this permit. Any amendments made to the system documents shall be notified in writing to the Regulator within 1 week of the documents being issued.

6.3 The standards of competence and management systems required by

Condition 6.1.1 above shall be maintained and., whenever possible, improved throughout the life of the installation. In order to demonstrate compliance with this requirement:

i) the results of all external audits of the Environmental Management System or part thereof shall be included in a report submitted annually to, and;

ii) the results of all internal audits shall be retained on site at the installation and shall be made available for inspection on request by, the Regulator.

Any deviation from the systems, procedures, techniques or timetables in Condition 6.1.1 above shall be approved in writing by the Regulator.

6.4 An appropriate person (and deputy) shall be appointed as the primary point of contact with the Regulator and the public. The Regulator shall be notified in writing of the name of the appointed person (and deputy).

6.5 The potential environmental risks posed by the work of contractors shall be assessed and the Operator shall provide instruction to contractors about protecting the environment while working on site.

7. Energy Efficiency of the Installation

7.1 The Operator shall reduce energy consumption by using one or a combination of the following techniques:

(i) process optimisation through the control of operating parameters
(ii) regular maintenance of the melting furnace
(iii) optimisation of the furnace design and the selection of the melting technique
(iv) application of combustion control techniques
(v) use of increasing levels of cullet where available
(vi) use of a waste heat boiler for energy recovery
(vii) use of batch and cullet preheating where technically and economically viable.

7.2 An energy efficiency programme for the installation shall be submitted to the Regulator within 12 months of the date of this permit. The programme shall detail the energy efficiency measures to be carried out at the site including the areas outlined in Condition 7.1.

The energy efficiency programme shall consider the use of gas, electricity, heavy fuel oil and vehicle fuel.

An annual report on the progress of the programme shall be submitted to the Regulator within 8 weeks of the anniversary date of this permit. The report shall detail those works that have been completed, reductions achieved or predicted and give energy use in terms of energy used per tonne of melted glass and per tonne of finished product.

7.3 Prior to the finalisation of the plans for the furnace rebuild a feasibility study shall be undertaken into the incorporation of a waste heat boiler into the plans for the furnace after the completion of the rebuild. The feasibility study shall be submitted and agreed with the Regulator prior to the commencement of the rebuild of the furnace. The study shall details the predicted energy savings from the waste heat boiler and the cross media effects on emissions, waste, use of raw materials and life of the furnace.

7.4 Prior to the finalisation of the plans for the furnace rebuild a feasibility study shall be undertaken into the incorporation of a batch and cullet preheating into the plans for the furnace after the completion of the rebuild. The feasibility study shall be submitted and agreed with the Regulator prior to the commencement of the rebuild of the furnace. The study shall details the predicted energy savings from the waste heat boiler and the cross media effects on emissions, waste, use of raw materials and life of the furnace.

7.5 The Operator shall ensure that all appropriate containment methods, (e.g. seals and self- closing doors) are employed and maintained to minimise energy loss.

7.6 The Operator shall demonstrate participation in and compliance with a

Climate Change Agreement for the installation, and in doing so shall:

– make available, on request by the Regulator, records of all external and internal audits, which shall be retained on site; and

– advise the Regulator of any withdrawal or intended withdrawal from the Climate Change Agreement.

7.7 The Operator shall monitor oxygen and carbon monoxide concentrations in waste gases and the readings shall be used to optimise furnace combustion.

8.0 Systems to Minimise Environmental Risks and Accidents

8.1 The Operator shall maintain and implement an accident management plan which:

- identifies the hazards to the environment posed by the installation;
- assesses the risks of accidents and their possible consequences;
- introduces measures to reduce the risks of accidents and contingency plans for any accidents that occur;
- contains written procedures for investigating incidents and near misses and the identification of suitable corrective action.

The plan shall be made available for inspection by the Regulator and shall form part of the Environmental Management System for the installation required by Condition 6.1.

8.2 The accident management plan shall be reviewed at least every 4 years or as soon as practicable after an accident (whichever is the earlier) and appropriate changes identified by the review shall be implemented by the Operator.

8.3 In the event of abnormal emissions arising from an accident, the Operator shall:

– investigate and undertake remedial action immediately;
– promptly record the events and actions taken;
– ensure the Regulator is made aware without delay.

8.4 The Regulator 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 specified emission limit; or

(c) any significant adverse environmental effects.

9. <u>Waste Management of Installation</u>

9.1 A Waste Management Programme for the installation shall be implemented by the Operator in accordance with and form part of the Environmental Management System required by Condition 6.1.

The programme shall cover an inventory of the quantity, nature, origin and where relevant, the destination, frequency of collection, mode of transport and treatment method of any waste which is disposed of or recovered, and shall follow the Environmental Management System document EMSP001 and the prevention of the generation of waste.

An annual review shall be carried out to demonstrate that the best environmental options are being used for dealing with the waste streams identified.

9.2 Prior to the rebuild of the furnace consideration shall be given to the valorisation of the refractory materials. A report of the proposals for the refractory materials shall be presented to the Regulator prior to the shutdown of the furnace.

9.3 Waste shall be stored in the appropriate containers as laid down in EMSP010: Identifying & Disposing of Waste Arising and in areas allocated on Figure 1E: Waste Storage Areas in Schedule 2.

9.4 Dust produced during production and removed by the EP unit shall be pneumatically transported from the holding hopper to an enclosed silo within the batch plant and added back into the batch material for processing.

9.5 Waste batch materials and cullet rejected from the production or brought back to site shall be recycled where possible. Within 14 months of the date of this permit the Operator shall provide a report to the Regulator detailing the waste produced on site and recycled for the preceding 12 month period.

9.6 To facilitate opportunities for recovery, recycling and re-use and to maximise the scope for effective waste management, the Operator shall ensure that waste types are segregated and stored in containers that are durable for the substances stored.

Waste storage areas shall be clearly marked and signed and all individual containers clearly marked and labelled. Incompatible waste types shall be stored and kept separate.

9.7 At least once every three years, the Operator shall investigate potential markets for the recovery and/or re-use of wastes generated at the installation.

10. Efficient use of Raw Materials

10.1 The Operator shall adopt procedures to control the specification of raw materials in order to minimise the potential for environmental impact, and in particular shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently;

(b) maintain records of raw materials and water used at the installation;

(c) review and record annually 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 appropriate further measures identified by any audit or review.

10.2 The Operator shall reduce water consumption by minimisation of spillages and leaks, reusing cooling and purging water after purging and operating a quasi-closed loop waster system.

11. Closure and Decommissioning

Conditions relating to Closure and Decommissioning

11.1 The Operator shall maintain and operate the installation so as to prevent or minimise, upon its closure or decommissioning, any pollution risk including the generation of waste and shall do so in particular by:

- Attention to the design of new plant and equipment;
- The maintenance of a record of any events which have, or might have, impacted on the condition of the site along with further investigation or remediation work carried out. This shall include and be a development of the initial site condition report submitted as Appendix 2 in the Permit application.
- The development of a site closure plan to demonstrate that the installation can be decommissioned avoiding any pollution risk and returning the site of operation to a satisfactory condition.

11.2 The Operator shall carry out a full review of the site closure plan at least every four years.

11.3 The site closure plan shall be implemented on final cessation or decommissioning of the permitted activities or part thereof.

11.4 The Operator shall give at least 30 days written notice to the Regulator before implementing the site closure plan.

12. Records

12.1 The Operator shall ensure that all records required to be made by this Permit and any other records made by it in relation to the operation of the Permitted installation shall:-

- be made available for inspection by the Regulator at any reasonable time;
- be supplied to the Regulator on demand and without charge;
- be legible;
- be made as soon as reasonable practicable;
- indicate any amendments which have been made and shall include the original record wherever possible;
- be retained at the Permitted installation, or other location agreed by the Regulator in writing, for a minimum period of 4 years from the date when the records were made, unless otherwise agreed in writing; and
- Where they concern the condition of the site of the installation, be kept at the Permitted installation, or other location agreed by the Regulator in writing, until all parts of the Permit have been surrendered.

13. Reporting

13.1 All reports, and written and or oral notifications required by this Permit, and notifications required by Regulation 16 of the PPC Regulations shall be made or sent to the Regulator using the contact address indicated on page 2 of this Permit.

13.2 The Operator shall, unless otherwise agreed in writing, submit reports of the monitoring and assessments carried out in accordance with the conditions of this Permit.

14. Notifications

14.1 The Operator shall notify the Regulator **without delay** of:-

- the detection of an emission of any substance, which exceeds any limit or criterion in this Permit, specified in relation to the substance;
- the detection of any fugitive emissions that has caused, is causing or may cause significant pollution, unless the quantity emitted is so trivial that it would be incapable of causing significant pollution;
- the detection of any malfunction, breakdown or failure of plant or techniques which has caused, is causing or has the potential to cause significant pollution; and

- any accident, which has caused, is causing or has the potential to cause significant pollution.

14.2 The Operator shall give written notification as soon as practicable (and at least 30 days prior to any of the following;

- permanent cessation of the operation of part or all of the Permitted installation;
- cessation of operation of all or part of the Permitted installation for a period likely to exceed 1 year; and
- resumption of the operation of part or all of the Permitted installation after a temporary cessation of activities as above.

14.3 The Operator shall notify the following matters to the Regulator in writing within 14 days of their occurrence:-

- any change in the Operators trading, name, registered name or registered office address;
- any change to the particulars of the Operators ultimate holding company (including details of an ultimate holding company where an Operator has become a subsidiary);
- any steps taken by the Operator going into administration, entering into a company voluntary arrangement, being wound up or bankruptcy;

14.4 Where the Operator has entered into a Climate Change Agreement with the Government, the Operator shall notify the Regulator within one month of:

- any decision by the Secretary of State no to re-certify that Agreement;
- a failure to comply with an annual target under that agreement at the end of the trading compliance period.

SCHEDULE 1

PROCESS DESCRIPTION AND IN-PROCESS CONTROLS

Saint-Gobain's Eggborough plant is a float glass manufacturing facility for the production of a basic flat soda lime silica glass, for applications in the construction industry. The installation includes the storage and handling of sand (silicon dioxide), soda ash (sodium oxide), limestone (calcium carbonate), dolomite (calcium-magnesium oxide) and cullet to produce the glass by the application of heat in a furnace followed by a float bath, lehr, glass cutting, and subsequent warehousing. The process has an output of up to 230,000 tonnes of float glass per annum, and operates continuously. The float tank is operational 24 hours per day without stopping until it its refurbished approximately every 12 to 15 years.

Furnace Operations

The raw materials are melted in the main cross fired regenerative type furnace to produce molten glass of uniform composition, temperature and viscosity for delivery to the float bath.

The glass is contained in an enclosed rectangular tank constructed of blocks of appropriate refractory materials. Mixed raw material is fed onto molten glass in the furnace by the means of a reciprocating plate which also serves to push the materials into the furnace through an enclosed doghouse, or filling pocket, reducing fugitive losses of volatiles and dust. The furnace is heated to 1600°C by natural gas burners. The burners are located immediately above the molten glass at either side of the furnace. Heat input is arranged to induce recirculation currents within the melted batch materials to ensure consistent homogeneity of the finished glass fed to the forming process. To ensure even fusion the furnace is equipped with banks of burners at both sides of the molten glass, which operate in sequence.

Significant energy efficiency gains are made through the "regenerative" furnace design, whereby heat contained in the waste gases from combustion and glass melting is recovered to preheat the combustion air. Incoming combustion air enters at the bottom of the regenerator at one side of the furnace, where it is preheated by the warm refractories. The waste gases from the combustion then reverses, and the combustion air enters from the opposite side and is preheated by the warm refractories, cooling them down, with the waste gases now re-heating the first bank of refractories. The mass of molten glass contained in the furnace is held constant, and the residence time is typically seventy-two hours.

On leaving the combustion or "melting" zone, the molten glass is cooled very gradually to 1100°C in the lower refiner or "braise" zone. At this temperature the glass is refined, air bubbles are removed and the glass acquires a uniform consistency. Sodium sulphate is used as a refining agent in the furnace, the furnace design ensuring uniform consistency. From here the glass enters into the float bath.

Waste [Flue] Gas Treatment

After exiting the regenerators into the flue gas system, the waste gases normally undergo treatment to reduce harmful emissions. Hydrated lime, a sorbent material, is injected into the gas steam and mixes with the waste gas before a flue gas cooler.

This gives maximum time for the sorbent/SO_x reactions to take place. The flue gas cooler is necessary to reduce inlet temperatures to an electrostatic precipitator (EP) to acceptable levels. Between the flue gas cooler and EP, there is also a "reactor" to ensure the necessary mixing time of the hydrated lime with SO_x is completed prior to the resultant particulate removal.

The particulate matter removed in the EP is fed back into the batch fed into the glass making process.

After the EP there is a further stage to waste gas treatment by selective catalytic reduction (SCR), which will be operational from mid-2020. In this process aqueous ammonia <25% concentration is injected into the waste gas stream where it mixes prior to a reactor containing a catalyst to promote the reaction with the NO_x elements. This reduces the NO_x concentration in the waste gas to allowable levels.

An induced draft fan helps to draw the waste gas through the treatment systems and to the stack for emission to atmosphere (emission point reference A1).

Hydrated lime storage

The hydrated lime powder is stored in a silo on the EP forecourt close to its injection point in the process

Aqueous ammonia storage

The aqueous ammonia (<25% concentration) reagent is stored in a double wall tank system, providing its own bund, adjacent to the EP forecourt.

By-pass of waste gas treatment

From time to time it is necessary to service and clean the waste gas treatment plant and equipment. For this purpose, there is a by-pass system that can route waste gas direct to the stack from the regenerators for limited periods.

The SCR system can also be by-passed independently of the overall bypass, so that SO_x/particulate removal can continue during any necessary SCR outages outside full by-pass periods.

Heavy Fuel Oil (HFO) Storage

A heavy fuel oil storage facility is placed on site to ensure flexibility to provide an uninterrupted supply of energy to the furnace and maintain the melting temperatures required. The installation consists of one fully bunded 500m^3 tank. The HFO is brought to site by a contractor who is responsible for filling the storage tank. Discharge operations will be carried out under the supervision of an SGGUK employee. In the event of an emergency situation site procedures as set out in SGGUK's EMS system will come into effect.

Production forming and conditioning processes

Flat Glass – The float process

After the melting and refining phases, flat glass is formed on a float bath. The principle is that the molten glass exits the furnace at a temperature of approximately 1100ºC and discharges as a sheet onto a bath of molten tin, which is denser. Glass spreads on the molten tin as oil spreads on water. It must then be guided, floated on the tin bath and pulled in order to form a sheet of determined thickness. The bath casing is ventilated and designed such that any leakages are solidified before they pass through the casing. As an additional precaution, the bath is constructed over a tanked basement.

At the end of the furnace canal the glass pours onto the tin bath through a special refractory lip ("the spout") which ensures correct glass spreading. The glass flow is controlled by means of an adjustable suspended refractory shutter in the canal ("the front tweel").

The float tank is approximately 60 metres long, divided into bays. The float tank consists of a steel bath casing, supported by a steel framework, with a refractory lining holding the molten tin itself. The tin is kept in molten state from the heat of the glass, backed up with electric heaters. The bath casing is ventilated to control temperature within safety parameters, by using cooled air, with backup generators ensuring ventilation continues in the event of a power failure. The ventilation air has no contact with the atmosphere within the float. As the ribbon passes through the tank, potentially 'dirty' glass flows to the edge of the ribbon to be removed with edge loss. Inside the float tank there are several pairs of water cooled top rollers, adjustable in direction, height, penetration and angle. These rollers catch the glass sheet on both edges by cog-wheels and draw it in length and width. Their rotation speeds up to help govern the thickness of the glass, typically from 2mm to 12mm.

The tank is air tight to prevent the molten tin from oxidising. The atmosphere over the tin is maintained oxygen free by injection though the roof of a slightly reducing N_2/H_2 mixture, supplied from the nitrogen hydrogen storage compound (see Section 3.1.4). The glass becomes gradually solid, as the temperature is reduced from 1100ºC to 600ºC, from where it can be laid on steel rollers at the end of the float bath. The temperature is carefully regulated by the use of heating zones.

The float atmosphere gases are extracted to atmosphere via a wet scrubbing system (Venturi scrubber, emission point reference A4). The wet scrubber, which uses water re-circulated (correct to give approximately pH7) scrubs the tin oxide and chlorides from the gas.

The liquor and any solids are contained in a tank which is neutralised by alkali solutions (automatic pH measurement and dosing system). The liquor is removed from the tank and disposed of as hazardous waste by specialist contractor approx 2-3 times per annum.

Cooling and Annealing Area

At the exit of the float bath, glass taken out by the lift-out rollers is annealed and cooled down in the annealing lehr.

The lehr annealing chamber is approximately 85m x 5-6m, and is divided into sections in which there is either heating or cooling of the glass by forced and natural convection, gradually reducing the glass temperature fro 600 to 60ºC. The environment in the lehr is carefully controlled in order to reduce residual stress in the glass to an acceptable level, which would otherwise be visible in the final product, increasing waste generation. At the beginning of the lehr, a surface treatment of SO_2 is sprayed on to the underside of the ribbon, to provide protection for the surface of the glass from the rollers. Emissions from this area are vented to atmosphere (emission point reference A5-A8).

There is a location near the exit of the covered zone of the lehr where water can be sprayed onto the hot glass to break the ribbon when required. Any broken glass (cullet) is returned to the process.

Cutting, Quality Control Area and Storage

Glass exits the annealing area on rollers and passes through the online quality control procedures, which enable instantaneous identification of faults using laser. Any glass failing quality control checks is broken up for re-use in the process. The glass is cut into sheets of varying dimensions ranging from a maximum of 6m x 3m to smaller sizes.

The computer controlled cutting schedule minimises the amount of waste produced, by cutting around any remaining defects. All off-cuts and breakages are returned by conveyors to silos in the batch plant where they are recycled into the furnace. After being cut, the glass sheets are off-loaded and stored in a vertical position. The temperature of the warehouse is maintained at a set temperature to avoid condensation on the glass which would cause straining and defects. As required, further off-line quality test are undertaken in respect of dimensions, optical properties and glass chemistry.

Coating Process

In 2004 the Eggborough plant commenced the use of a Physical Vapour Deposition (PVD) process in order to apply extremely thin coatings to glass sheets to enhance the thermal emissivity properties of the glass. The coating plant will be housed in a purpose built extension to the existing finished product warehouse measuring some 100 x 48m. The glass to be coated will be sourced from within the production line or external sources.

The production capacity of the coater is up to approximately 130,000 tonnes, and will operate across all shifts on a continuous basis.

Loading and Washing

Glass will be loaded automatically from a storage bay, from where each single sheet will move horizontally into an enclosed Washing Machine to remove surface deposits that would be detrimental to coating. A closed loop softened water system is used to supply the cleaning water at ambient temperature where cleaning occurs using a combination of brushes and rollers before drying off using an air knife. Used water will be subject to a filtering process and re-circulated. No detergents will be used. The glass sheets will be advanced towards the coating line on a horizontal conveyor system.

Configuration of the Coating Line

The coating process occurs under vacuum conditions, which are created within consecutive chambers subject to the action of vacuum pumps. The glass is advanced at a constant speed with an interlock operating between chambers opening to allow the passage of glass and closing to allow pumping of the vacuum once the sheet is fully within the chamber. The entrance and buffer chambers are for pumping a vacuum only as reduction from the atmospheric pressure to the operating pressure is only achievable in a staged sequence. The process area exists within fully enclosed compartments which act as a position to pump the vacuum or as a position for this film coating deposition.

The process can be stopped at any time although times to re-achieve necessary vacuum levels mean that these stop periods will be limited to maintenance requirements, periods of prolonged stoppage or due to abnormal operation. It is envisaged that there will be short maintenance stop periods between production runs, depending upon commercial product requirement and cathode life experienced.

In the event of an interruption to the process where no glass is travelling through, entry to the coating line would be closed and the coater would be maintained under stable vacuum conditions. The process chamber is constantly kept under vacuum because of the buffer and transfer chamber.

How Coating Works

An electrical potential is applied to the material to be deposited as the coating (known as the target). This acts as a cathode and gas is introduced into the chamber to create a plasma.

The cathodes used in the coating process are water cooled, on a dedicated cooling circuit, utilising three cooling towers. The water will be treated with biocide and corrosion inhibitor.

A permanent magnetic field concentrates the plasma at the cathode and the gas bombardment onto the cathode material cause target material to be displaced which is subsequently deposited onto the glass sheet giving the required thin film deposit or onto the sidewalls of the compartment. Individual film thickness is of the order of 10nm (nano metres). Several layers coating will be applied.

Gases to be used are either inert, when a single element coating layer is required, or reactive where the gas combines with the target material in vapour form in order to deposit the required compound:

- **Inert Gases**: Predominantly this will be Argon with other noble gases potentially used as alternatives, although this is unlikely on cost grounds.

- **Reactive Gases**: Nitrogen, Oxygen and Hydrogen are the reactive gases to be employed.

All gases used in the process will be stored in dedicated cylinders, with appropriate ventilation to reduce explosion risk. There will be no bulk storage of gases in relation to the coating process.

Target cathode materials to be deposited as layers may include:

- Tin
- Zinc
- Silver
- Nickel-Chrome alloy
- Titanium-Aluminium alloy
- Ti-Zinc-Antimony alloy
- Tin-Zinc-Aluminium alloy

Target materials will be vaporised and deposited onto the glass substrate or compartments walls. Compartment walls have interchangeable shields which are removed and sent away for external cleaning before re-use.

The entry and exit chambers will vent to atmosphere each time the cycle completes and a new sheet of glass is introduced to the entrance chamber or a coated sheet exits from the exit chamber. In normal operation the entry, exit and buffer chambers will be vented to atmosphere. Air venting at the entrance and exit chamber is fitted with a silencer and filter to remove any residual oil from the pumps. During processing small quantities of plasma gas and inert gas are continually released to atmosphere, at concentrations below detection limits.

Laminating Process

The Eggborough plant has commenced the use of a Laminating process in order to produce laminate and laminate safety glass for the building industry. The laminating plant is housed in a purpose built 3665m^2 extension to the existing finished produce warehouse.

The production capacity of the installation is up to approximately 2.2 million m^2 per annum, with initial production rate of the equivalent of 1 million m^2 per annum, running Monday to Friday by a fully trained competent Operator, one shift a day on the laminating line and 2 shifts on the autoclave. The glass to be laminated will be sourced internally from float and coating line or from external sources.

Laminating Line

The aim of the laminating line is to create a sealed laminate sandwich consisting of a glass/PVB/glass as show opposite. In order to successfully create this, the line is split into four distinct sections.

Loading and Washing

Glass will be loaded automatically from racks onto the line by one of two portal loading machines, from where each sheet will move horizontally into an enclosed washing machine to remove surface deposits that would de detrimental to the finished product. The glass initially passes through a pre-wash during which the interleave powder applied to the glass on both the float and coater is removed with the waste water filtered before entering the foul drain. The glass then entered the main washing section, a closed loop softened water system is used to supply the cleaning water at ambient temperature where cleaning occurs using brushed and spray bards before drying off using air knifes. Used water will be subject to a filtering process and re-circulated. No detergents will be used. The glass sheet will then advance into the assembly room.

Assembly/Trimming

The first glass sheet will enter the assembly room, which is temperature and humidity controlled, and travels through to the assembly table and is lifted vertically by the glass lifter. The second sheet enters and is stopped momentarily under the PVB film laying devise during which the front edge of the PVB film is aligned automatically on the front edge of the glass sheet. Transport of the sheet restarts and simultaneously the PVB is fed from the unwinding room directly above the laying device onto the glass sheet. The PVB is then cut and the sheet conveyed to the assembly table, the first sheet is then lowered to create the laminate sandwich. When leaving the assembly table the excess PVB along with longitudinal edge of the sandwich is trimmed to within 1mm of the glass edge and the plate then stops to allow the leading and trailing edge to be trimmed. (NB All trims are collected and sent recycled). The assembled and trimmed sandwich will then advance out of the assembly towards the de-airing section.

De-airing

When the glass/PVB/glass sandwich is initially created, a significant amount of air is present at both interfaces. This air must be removed in order to have intimate contact between the PV and the glass. Subsequent to removal of the air the edge of the sandwich must be sealed so the air cannot return and to avoid blow-ins during the autoclave cycle. The process is done by a nip roll and calendar system. The sandwich is heated, using medium wave heater and put through rollers which squeeze the air out along the length of the laminate and deal the edge.

Stacking

After de-airing the sheets will be conveyed to the stackers, during transit interleave powder will be applied. The laminate sandwich is picked up by vacuum stacker and loaded onto a special rack, suitable for entering the autoclave. At regular predefined interval spacers are automatically placed between packs and once the rack is

complete it will be removed by glass moving vehicle and stored until it is able to be autoclaved.

Autoclave

Autoclaving is the final step in laminating. It is the process of subjecting the laminate sheets to high temperature (~135°C and high pressure (~13 bar) to allow the PVB to flow and provide intimate contact with the glass which is required for full development of the performance and to allow any residual air to dissolve and disperse.

A full rack of laminate glass is placed inside the autoclave and undergoes a cycle composed of three distinct steps: ramp up, hold and ramp down, all controlled by the inbuilt PID control system. A typical autoclave cycle is shown below.

During the ramp up and hold section the glass is heated via a heat exchanger supplied from a closed look hot oil system. The oil is heated using a natural gas burner. During the ramp down section the same principle is used but this time with chilled water to cool the glass.

Once complete the finished laminate glass is inspected pack by pack and samples cut, on a semi automatic cutting table, for testing.

Ancillary Processes

Batch House steam raising boiler

A small gas fired boiler is operated in the batch house for raising the steam for injection into the batch prior to transport to the furnace. The boiler, which is rated at 0.95 MW Thermal (MWTh) is operated continuously, supplying steam on demand. The boiler has a dedicated soft water supply, dosed with corrosion inhibitors. Blow down water goes to foul sewer, under trade effluent consent. Emissions from the boiler are vented to air via a dedicated stack (emission point reference A9).

Hydrogen/Nitrogen Storage

A hydrogen and nitrogen storage plant is in place on site to provide the necessary gases for maintaining the appropriate reducing atmosphere within the float bath. Additionally nitrogen is used to supply some control systems. There are two liquid nitrogen storage tanks (approximately 62.5 tons per tank), with compressed hydrogen gas stored in portable multi-cylinder trailers. Gases are brought to site by a contractor, who is responsible for re-filling the storage tanks. Re-filling operations are done under the supervision of Saint-Gobain Operators. In the event of an emergency, procedures supplied by the gas supply contractors will be followed.

Water Treatment Plants

There are two existing water treatment plants on site:

- A small water treatment plant is in place on sire to provide softened water for the boiler cooling circuits. An ion exchange resin system is used, with brine to back flush the resin. Corrosion inhibitors and primary/secondary biocides are also automatically dosed at this point; and

- A small reverse osmosis plant (RO) is also located on site to provide demineralised water for the zinc nitrate coating and the laboratory.

Additionally another RO demineralisation plant will be used to provide water for the washing machine on the coating line. This will be located in the coating building.

Schedule 2: Site Location and Installation Boundary

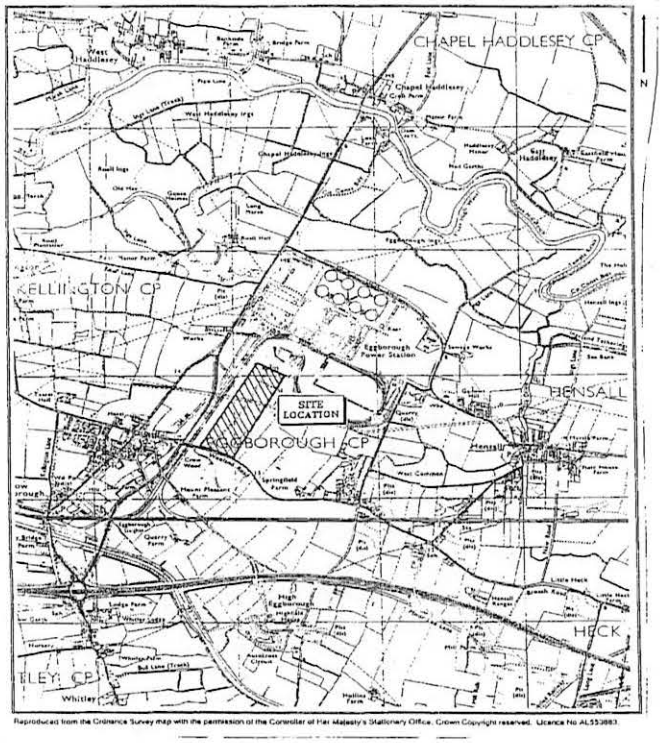


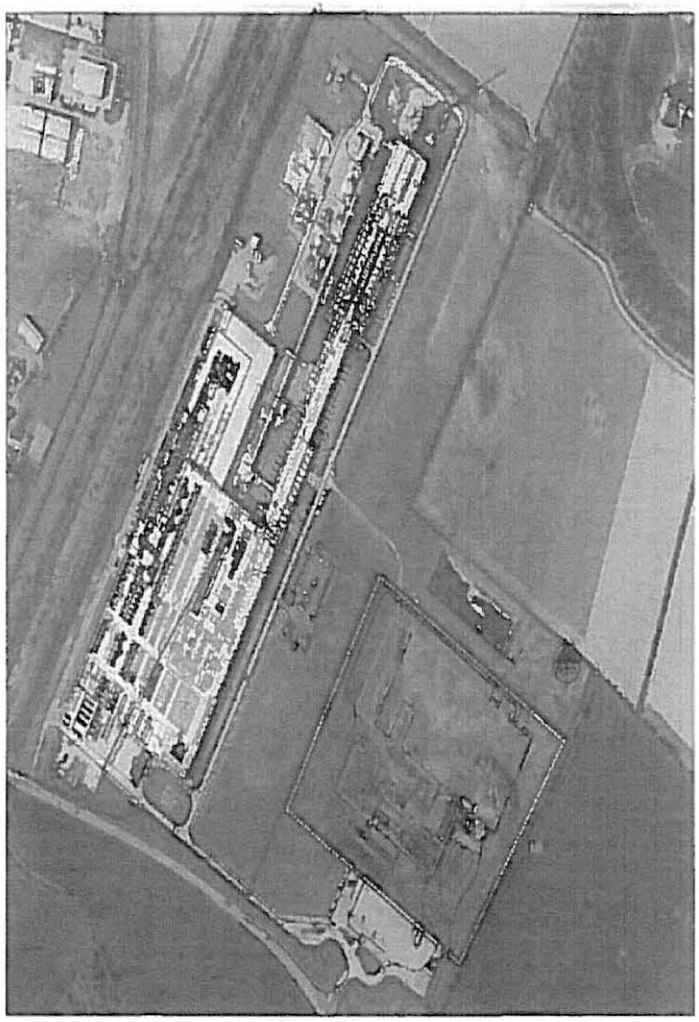
Figure 1 a

Site Location Plan

Saint Gobain Glass
Eggborough
PPC Permit A(2) 51P

A(2)51PV5

Figure 1B Installation Boundary



A(2)51PV5

A(2)51PV5

Figure 1G: Laminating Line Storage area

SCHEDULE 3

POINT SOURCE EMISSIONS TO AIR AND ASSOCITED EMISSION LIMITS

Table 1a – Emission Limits

Release Point Reference	Emission Type	Concentration not to be exceeded (mg/m^3)	Monitoring required C=Continuous I=Indicative NR=None A=Annual
A1-Main Stack	Particulates	20	CI, A
	Sulphur Oxides (as SO_2)	Gas Fired 300-500 / Oil Fired 500-1200	CI, A / CI, A
	Nitrogen Oxides (asNO2)-	See Condition 3.4.4	CI, A
	Ammonia (expressed as NH_3)	30	CI, A
	Carbon monoxide (as CO)	<100 mg/Nm^3	A
	Chloride (as HCL)	25	A
	Fluorides (as HF)	4	A
	Arsenic Cobalt Nickelt Selenium Chromium VI-Group1	1 (annual)	A
	Antimony lead Chromium III Vanadium-Group2	5 (annual)	A
A2 – EP cooling stack*	E P cooling stack not measured		NR
A3-Working end* Chimney	Particulates	20	NR
	Chlorides	30	NR
	Fluorides	5	NR
	Arsenic Cobalt Nickel Selenium Chromium VI	<1	NR
	Total metals	< 5	NR
A4-wet scrubber vent* A5 to A8 Emissions measured at A5 if considered to be representative are de-minimis.	Particulates	20	NR
	Chlorides	10	NR
	Fluorides	5	NR
	Arsenic, Cobalt, Nickel, Selenium, Chromium VI	<1	NR
	Total Metals	<5	NR
A9 A10 to A20, A27	Combustion	see conditions 3.3.1 and 3.3.2	Visual

A21 A22*	Extraction/vacuum	see condition 3.3.1	Visual

Table 1a – Emission Limits

Release Point Reference	Emission Type	Concentration not to be exceeded (mg/m^3)	Monitoring required C=Continuous I=Indicative NR=None A=Annual
A21-portable extractor*	Not identified/measured		NR
A22-Batteryroom extractor*	Not identified/measured		NR
A23 A24 A25-Coating Vacuum discharge*	Not identified/measured		NR
A26 Coating plant workshop extractor*	Not identified/measured		NR
A27 Coating plant space heater*	Not identified/measured		NR
A28 A29 A30 Coating vacuum room exhaust*	Not identified/measured		NR
A31 Laminate exhaust*	Not identified/measured		NR

*Sources of emissions considered not to be significant

Table1b: Emissions to Water and Sewer and monitoring provisions (to be read in conjunction with Figure 1c in Schedule 3)

Release Point	Operational Description	Parameter	Release mg/1	Justification
S1	Point of exit to public sewer	Not measured	Not measured	Domestic and Trade effluent only; No monitoring requirements placed on the trade effluent consent. Saint-Gobain commits to undertake any monitoring required by the sewage undertaker, in line with revised trade effluent consent issued due to coating process.
W1	Discharge point to land drainage board	Not measured	Not measured	Surface water releases only, no monitoring parameters in respect of land drainage discharge consent.

SCHEDULE 4

STORAGE AND HANDLING OF RAW MATERIALS

The primary raw materials are delivered to that factory by road in bulk, where they are elevated to closed hoppers at the batch house for storage prior to being used in the glass production process. Traffic circulation around the site is possible via a perimeter road with ample space for manoeuvring of HGV's, parking and queuing. Incoming vehicles delivering raw materials to the plant circulate in a clockwise direction.

Although the principal raw materials are inert, their storage and handling is managed to minimise emissions of dust and to avoid overfilling during loading. Raw materials are stored in fully enclosed storage silos which are fitted with high level probes and alarms to warn of overfilling (both locally and in the central control room), with interlocks which automatically stop loading. The alarms are tested, as part of ongoing site maintenance programmes. Air displayed during filling passes through a reverse jet air filter to minimise dust emissions to atmosphere.

Sand is transferred to the silos by bucket elevators, all other materials by pneumatic discharge. Air displaced from the storage silos on filling is passed through a reverse air jet filter to arrest particulate material. To ensure that the unloading processes are operated safely and with minimal environmental impact, written procedures have been developed. These procedures will be incorporated into the EMS which is currently under development and will be revised to formally include consideration of potential environmental impacts from unloading operations.

Cullet, which arises from both internal and external sources is stored in partially enclosed storage bays and fully enclosed silos. The size of the cullet is such that windblown loses are minimal. Internal cullet arises due to unavoidable losses, e.g. edge loss, quality and cutting loss. External cullet is generally sourced from Saint-Gobain customers and as such is of the same composition as produced at the Eggborough plant. External cullet is brought onto site by road transport. On-line metal detectors (ferrous and non-ferrous) ensure that there is no contamination of cullet. The cullet also undergoes a visual inspection. The existing and proposed cullet bays, which are on hard-standing will drain to the balancing pond, via the oil interceptor, together with other site surface drainage (See also Section 3.3.4).

Other raw materials stored on site include:

- **Diesel fuel** is stored on site for use in safety generators and on-site vehicles (see Section 3.4.2). Maximum storage capacity is 80,000 litres in two above ground storage vessels. The tanks are bunded to 110% capacity of the largest tank. The loading connections are within a dedicated bunded area and unloading is supervised.

  - Loading and unloading areas designated and marked and are protected by an oil interceptor.
  - Automatic cut off valves to prevent overfilling of the diesel oil tank. The tank is protected with high level alarms.
  - Diesel oil tanks are bottom filled, to reduce fume generation.

- **Water treatment chemicals.** Water treatment chemicals are stored in bulk vessels, protected by bunding. Storage volumes on site are kept low, due to regular deliveries by water treatment contractors.

- **Lube oil/glass cutting oil storage areas**. Lube and glass cutting oils are stored in bunded containers, or on portable bunds skids.

- **Hydrated Lime.** Hydrated lime is stored a silo near its injection point in the flue gas ducting. The silo is filled directly from delivery tankers via pipework.

- **Aqueous Ammonia (<25% Solution).** Aqueous ammonia is stored in a 60m3 capacity double walled tank, providing integral bunding. The tank is re-filled via pump from supply tankers.

Raw materials are removed form storage silos by vibrational feeders. The raw materials are weighed on scales at the bottom of he silos, to an accuracy of 0.2% to minimise raw material wastage, and then deposited on to conveyors which lead to the mixer. Raw materials are mechanically mixed in discrete quantities of between 3 to 6 tonnes. Steam is added in the mixer to control temperature and water content of batch. The mixed batch is deposited onto a conveyor (which is enclosed within the process building to minimise dust) then cullet is deposited on top, comprising up to approximately 25% of batch (although if necessary 100% cullet can be used, to detriment of glass quality). At the top of this conveyor, the falling of batch and cullet onto a further conveyor mixes batch and cullet before entry into the furnace. The procedure of measuring and mixing raw materials from the hoppers to produce that batch is fully automated. Any dust associated wit the transport and mixing of granular materials is abated through a reverse jet dust extraction system and may be returned to the batch.

The batch is conveyed to a reciprocating spade batch charger where it is contained in 6 hoppers before being introduced to the furnace for melting. To minimise "carry-over" of fine particulates in the furnace (which could ultimately be transferred to the flue gas stream), the moisture content of the batch is checked and adjusted (if required) every two hours.

The **Coating Process** will use either inert gases, when a single element coating layer is required, or reactive gases where the gas combines with the target material in vapour form in order to deposit the required compound:

All gases used in the process will be stored in dedicated cylinders, with appropriate ventilation to reduce explosion risk. There will be no bulk storage of gases in relation to the coating process.

Schedule 5:

Improvement Plan

Condition Number	Requirement	Time limit from receiving permit
3.4.4	A programme of examination and maintenance of the permit to prevent increase in Nox emissions.	1 month
5.4	The tanks and pipework referred to in Condition 5.1.1 and 5.1.3 shall be subject to an inspection and testing programme to be agreed in writing with the Regulator.	6 months
5.10	Emissions to water from the installation shall be monitored according to a scheme to be agreed in writing with the Regulator.	12 months
6.2	A copy of the Environmental Management System required by condition 6.1 shall be forwarded to the Regulator	9 months
7.2	An energy efficiency programme for the installation shall be submitted to the Regulator. .	12 months
9.4	A report to the Regulator detailing the waste produced on site and recycled for the preceding 12 months.	14 months

SCHEDULE 6

POINT SOURCE EMISSIONS TO SURFACE WATER AND SEWER

Emissions to water from the process are minimal. Wastewater streams are kept separate and disposed of in a manner appropriate to their nature, as described below.

Principal process water usage is for cooling systems, and for steam generation for injection into batch. Wastewater is minimised through careful control and management of water usage in the process. Discharges of cooling water and boiler blowdown water are authorised under a trade effluent discharge consent, with Yorkshire Water Services Ltd. Liquid discharges from the laboratories and battery charging room are collected in sub-surface tanks, and are disposed of off-site as special waste.

Surface run-off from all areas of hard-standing (pavements, roadways, raw material storage areas) is discharged from the site drainage system into a balancing pond, via a full retention oil-fuel interceptor, and from there via a point source discharge to the local land drainage system (Knottingley to Gowdall Internal Drainage Board, consented under the Land Drainage Act 1991, consent number RRS/SD/KtoG(43), dated 22/1/99.).

The roof run-off water is interconnected into the roads surface drainage system where it is then pumped into the balancing pond, again, via the oil interceptor. The site has considered utilising roof water for re-use as "brown" supplies; the study is still ongoing.

The oil interceptors are inspected and cleaned monthly, as appropriate, with any oily residues being disposed of off-site by appropriately licensed contractor. To ensure that the effectiveness of the oil interceptors are maintained, any detergents which may be used for domestic cleaning purposes (e.g. office toilet facilities) are disposed of to foul sewer.

The balancing pond is situated within the installation to accommodate run-off storm flow periods. The pond is approximately 3000m^3 in area, and holds some 1500m^3 of water, but provides a temporary storage capacity of a further 6000m^3 for storm water. In addition to isolating both the interceptors through the use of cut-off valves (via automatic oil level detection), the outfall from the balancing pond can also be shut to create a totally closed system. Water is pumped from the pond to a drain operated by the Knottingley to Gowdall Land Drainage Board drainage board. The ultimate outfall of this system, together with discharge from the remainder of the drainage board area is to the River Aire.

The site has a closed circuit cooling water system, with a total volume of approximately 300m^3.

Domestic effluents from the site are disposed of to foul sewer for subsequent treatment at Hensall STW.

Schedule 7: Derogation Request Decision Document

Schedule 8: EXPLANATORY NOTES: These notes do not form part of the Permit.

For the purpose of this document the Regulator is Selby District Council.

This Permit is issued on the basis that the information provided by the applicant in support of the application was neither false nor misleading. Any change affecting the accuracy of such information shall be promptly notified, in writing, to the Regulator at the contact address given in the permit.

The permit includes conditions that must be complied with. It should be noted that aspects of the operation of the installation which are not regulated by those conditions are subject to the best available techniques, BAT, which shall be used to prevent or where that is not practicable, reduce the emissions from the installation.

1. **Appeals:**

Anyone who is aggrieved by the conditions attached to a permit can appeal to the Secretary of State for the Environment or the Secretary of State for Wales, as appropriate. **Appeals must be sent to the appropriate Secretary of State no later than 6 months from the date of the decision (normally the date on the bottom of the Permit).**
Appeals relating to installations in England should in the first instance be sent to the Planning Inspectorate at:

The Planning Inspectorate
Environmental Appeals Team
Room 3/25 – Hawk Wing
Temple Quay House
2 The Square
Temple Quay
Bristol BS1 6PN

Tel: 0303 444 5584

Email: environment.appeals@pins.gsi.gov.uk .

Details in relation to the making and determination of appeals under Regulation 31 are contained in Schedule 6 to the Environmental Permitting (England and Wales) Regulations 2016. Further guidance is available in chapter 30 of the Secretary of State's Guidance '*General Guidance Manual on Policy and Procedures for A(2) and B Installations*'.
The appeal must be in the form of a written notice or letter stating that the person wishes to appeal and listing the condition(s) which is/are being appealed against. For an appeal to be valid the following items **must** be included:
a) written notice of the appeal
b) a statement of the grounds of appeal;
c) a copy of any relevant application;
d) a copy of any relevant Permit;
e) a copy of any relevant correspondence between the person making the appeal ("the appellant") and the Council;
f) a copy of any decision or notice which is the subject matter of the appeal; and
g) a statement indicating whether the appellant wishes the appeal to be in the form of a hearing or dealt with by way of written representations.

At the same time, the notice of appeal and documents (a) and (f) must be sent to the Council, and the person making the appeal should inform the Secretary of State that this has been done.

Please note:
- an appeal will not suspend the effect of the conditions appealed against; the conditions must still be complied with.
- in determining an appeal against one or more conditions, the Regulations allow the Secretary of State in addition to quash any of the other conditions not subject to the appeal and to direct the local authority either to vary any of these other conditions or to add new conditions.

2. **Change in Operation:**
An operator can at any time notify the Regulator if they wish to make a relevant change in the operation of the installation. This can be done in one of two ways:
i) a notification under Regulation 20(1), **or**

ii) an application for a variation of the Permit, again under Regulation 20(1).
Notification of a relevant change must be in writing and is appropriate for changes that are not likely to require the variation of permit conditions. It is not necessary to make such a notification if an application to vary this permit has been made and the application contains a description of the proposed change.
Further guidance and definitions for "change in operation" and "substantial change in operation" are given in chapter 24 of the Secretary of State's Guidance: '*General Guidance Manual on Policy and Procedures for A(2) and B Installations*'.
"Change in operation" means a change in the nature or functioning or an extension of the installation which may have consequences for the environment.

3. **Best Available Techniques:**

BAT is defined in Article 3(10) of the Industrial Emissions Directive 2010/75/EC. As follows:
"Best available techniques" means the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole.
"available techniques" means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the cost and advantages, whether or not the techniques are used or produced inside the United Kingdom, as long as they are reasonably accessible to the operator.

"best" means most effective in achieving a high general level of protection of the environment as a whole.

"techniques" includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.

In the context of this permit, 'activity' comprises the whole activity including the treating, handling and storage of any materials used and products and waste produced by the activity.

The Regulator is statutorily obliged to include conditions in any permit it issues which are designed to ensure the activity is operated using the 'Best Available Techniques'. The Regulations' principles are that 'Installations should be operated in such a way that:
(a) all appropriate preventative measures are taken against pollution, in particular through the application of best available techniques (BAT);
(b) no significant pollution is caused'.
(c) The best available techniques shall be used to prevent or where that is not practical, reduce the emissions from the installation in relation to that aspect of the operations of the installation which is not regulated by any other condition of this permit.

It should be noted that Section 6 (1) and (2) of Schedule 7 to the Environmental Permitting (England and Wales) Regulations 2016 specifies that the Regulator must ensure that it is informed of developments in best available techniques and the publication of any new or updated BAT conclusions. This requirement is as defined in Articles 3(10), 3(11), 3(12) and 3(14) of the Industrial Emissions Directive 2010/75/EU.

In considering BAT, the Regulator would expect the Operator to have regard to all relevant sectorial or other technical guidance, including BAT Conclusions and BAT Reference Documents published by the European Commission and technical guidance published by the Environment Agency and other relevant regulatory authorities.

4. **PENALTIES**
Penalties under Regulation 39 of the Environmental Permitting Regulations are:

1. A person guilty of an offence under regulation 38(1), (2) or (3) is liable-
(a) On summary conviction to a fine or imprisonment for a term not exceeding 12 months, or to both; or
(b) On conviction on indictment to a fine or imprisonment for a term not exceeding 5 years, or both.

2. In relation to an offence committed before the commencement of section 154(1) of the Criminal Justice Act 2003(a), paragraph (1)(a) has effect as if for "12 months" there were substituted "6 months".

3. A person guilty of an offence under regulation 38(4) is liable-
(a) On summary conviction to a fine; or

(b) On conviction on indictment to a fine or imprisonment for a term not exceeding 2 years, or to both.

4. An establishment or undertaking guilty of an offence under regulation 38(5) is liable on summary conviction to a fine not exceeding level 2 on the standard scale.

5. **Transfer of the Permit or Part of the Permit**
The permitted operator who wishes to transfer the whole or part of the permit to a person who proposes to carry out the activity in the holder's place may do so in accordance with Regulation 21. Both the operator and the proposed transferee shall jointly make an application to the regulator to effect the transfer. An application shall include the permit and any fee prescribed in respect of the transfer under Regulation 65 and shall contain the operator's and the proposed transferee's contact details.

6. **Public Registers**
To comply with the requirements of Regulation 46 a copy of this Permit will be placed on the public register and will be available for inspection free of charge at the relevant Council offices.

7. **Variation to the Permit**
The Regulations require permits to be 'reviewed' periodically but do not specify a frequency. It is considered that a review frequency of once every eight years is adequate for the purposes of Regulation 34(1). Where significant pollution is encountered or where there are changes in BAT or where the operational safety of the activity requires other techniques to be used an immediate review will be undertaken.

An operator can at any time notify the Regulator if they wish to make a relevant change in the operation of the installation. This can be done in one of two ways:
i) a notification under Regulation 20(1), **or**
ii) an application for a variation of the Permit, again under Regulation 20(1).
Notification of a relevant change must be in writing and is appropriate for changes that are not likely to require the variation of permit conditions. It is not necessary to make such a notification if an application to vary this permit has been made and the application contains a description of the proposed change.
Further guidance and definitions for "change in operation" and "substantial change in operation" are given in chapter 24 of the Secretary of State's Guidance: '*General Guidance Manual on Policy and Procedures for A(2) and B Installations*'.
"Change in operation" means a change in the nature or functioning or an extension of the installation which may have consequences for the environment.

8. **Surrender of the Permit**
The operator may apply to surrender their permit under Regulation 25. The application must be accepted if paragraph 14 of Part 1 of Schedule 5 to the Environmental Permitting (England and Wales) Regulations 2016, and Article 22 of the Industrial Emissions Directive 2010/75/EU have been met. The operator will be required to supply evidence that necessary measures have been taken to:
(a) avoid a pollution risk resulting from the operation of the regulated facility; and
(b) return the site of the regulated facility to a satisfactory state, having regard to the state of the site before the facility was put into operator.

9. **Planning Permission:**
This Permit does not in any way imply that the Operator named is exempt from the requirement to obtain planning permission (where necessary) to carry out any works which are required to meet the conditions herein. Neither does this Permit imply that planning permission or building regulation approval (where necessary) will be granted. Any necessary application for planning permission must be submitted to the Planning Department of Selby District Council and for Building Regulation approval to the Building Control Department of Selby District Council.

10. **Health and Safety at Work:**
This Permit is given in relation to the requirements of the Pollution, Pollution Prevention & Control Act 1999 only. It must not be taken to replace any responsibilities you may have under workplace Health and Safety legislation.

11. **Subsistence Charges:**
A subsistence fee, prescribed annually by the Department of Environment, Food and Rural Affairs (DEFRA) is payable in respect of this Permit. The annual fee covers the period 1 April to 31 March and a Permit may be revoked if the annual fee, determined by means of a risk assessment methodology, is not paid. An invoice will be issued for this fee at the appropriate time.

12. **Local Authority Contact:**

01757 706291.
Where reports, including copies of monitoring results, are required to be sent to the Authorised Officer they shall be sent to:

Environmental Health
Selby District Council
Civic Centre
Doncaster Road
Selby
YO8 9FT

Tel: 01757705101

Email: ehdutyofficer@selby.gov.uk

Where the notification of a breach of emission limits is required to be made to the Regulator, this may be done in the following ways:-

a) in writing, where time permits (address as above)
b) by telephone on 01757 705101.
Monday to Thursday 08.30 - 17.00 hours
Friday 08.30 - 16.30 hours
c) by e-mail to: ehdutyofficer@selby.gov.uk

Incidents occurring outside these hours shall be reported on the next working day unless there is an imminent risk to health or of serious environmental harm which shall be reported immediately by telephoning the Council's out of hours service on 01653 600941 and asking for the Duty Officer.

13. **ENFORCEMENT & OFFENCES**
Under Regulation 38 of the Regulations:
1) It is an offence for a person to: a) Contravene regulation 12(1); or
b) knowingly cause or knowingly permit the contravention of regulation 12(1)(a)

2) It is an offence for a person to fail to comply with or to contravene an environmental permit condition.

3) It is an offence for a person to fail to comply with the requirements of an enforcement notice or of a prohibition notice, suspension notice or landfill closure notice or mining waste facility closure notice.

4) It is an offence for a person: a) To fail to comply with a notice under regulation 60(1) requiring the provision of information, without reasonable excuse;

b) To make a statement which the person knows to be false or misleading in a material particular, or recklessly to make a statement which is false or misleading in material particular, where the statement is made-
i) In purported compliance with a requirement to provide information imposed by or under a provision of these Regulations.
ii) For the purpose of obtaining the grant of an environmental permit to any person, or the variation, transfer in whole or in part, or surrender in whole or in part of an environmental permit, or
iii) For the purpose of obtaining, renewing or amending the registration of an exempt facility; c) Intentionally to make a false entry in a record required to be kept under an environmental permit;

d) With intent to deceive-

i.) To forge or use a document issued or authorised to be issued or required for any purpose under an environmental permit condition, or
ii.) To make or to have in the person's possession a document so closely resembling such a document as to be likely to deceive.

5) It is an offence for an establishment or undertaking to:

a) fail to comply with paragraph 14(3) or (4) of Schedule 2; or

b) intentionally make a false entry in a record required to be kept under that paragraph.

6) If an offence committed by a person under this regulation is due to the act or default of some other person, that other person is also guilty of the offence and liable to be proceeded against and punished accordingly, whether or not the proceedings for the offence are taken against the first-mentioned person.

14 Our enforcement of your permit will be in accordance with the Regulators Compliance Code. A copy can be found on the Business, Innovation and Skills Department website:
http://webarchive.nationalarchives.gov.uk/20121212135622
http://www.bis.gov.uk/files/file45019.pdf

Saint Gobain Glass (United Kingdom) Ltd: Derogation Determination Document June 2020

Derogation Assessment Methodology for BAT-AELs

Table 1. Summary information	
Operator, Location, Permit:	Saint Gobain Glass (United Kingdom) Ltd (company number 2442570) Weeland Road Eggborough Goole DN14 0FD PERMIT REF NO: A(2)51PV4
GLASS INDUSTRY BREF:2012:	Best Available Techniques (BAT) Reference Document for the Manufacture of Glass (Glass Industry BREF:2012)
BAT Conclusions Ref. No.& date:	2012/134/EU - 08/03/2012 Implementing Decision of 28 February 2012 establishing the best available techniques under Directive 2010/75/EU
BAT-AEL compliance date:	08 March 2016
Details of any Regulation 60 Notices:	Revised permit and derogation issued on 7 March 2016 to allow an increased level of NO_x until the 31 December 2019.
Details of additional information requested by letter or e-mail:	Letter from AEcom dated 22 July 2019 regarding Substantial Change Application and Derogation Application. Completed Variation of Permit Conditions application dated 05 April 2019. Figure 1 - Saint Gobain Glass (UK) Limited, Eggborough – Site Layout Plan Saint-Gobain Glass (United Kingdom) Ltd, Eggborough Best Available Techniques (BAT) assessment and Options Appraisal, 60595721-ACM-PM-RP-EN-001-A, July 2019 Email from Paul Wilson Saint-Gobain, Industrial Director 19 March 2020 regarding DxNox installation Covid 19 Situation document from Tri-Mer Global Technologies Saint Gobain Glass Eggborough DeNox Project Progress 05 June 2020 document Revised installation time line June 2020 Email from DeNox supplier 19 June 2020

Summary of Derogations Requested by the Operator

Table 2.1 Derogation from the BAT AEL for oxides of nitrogen during the manufacture of glass in the flat glass sector using primary methods of abatement including staged combustion and Low NOx burners.

Short description:	BAT conclusions for flat glass manufacturing: Nitrogen oxides (NO_X) from melting furnaces BAT reference number 25: BAT-AELs for NO_X emissions from the melting furnace in the flat glass sector

Parameter	BAT	BAT-AEL (1)	
		mg/Nm^3	kg/tonne melted glass (2)
NOx expressed as NO2	Combustion modifications, Fenix process (3)	700 – 800	1.75 – 2.0
	Oxy-fuel melting (4)	Not applicable	<1.25 – 2.0
	Secondary techniques (5)	400 – 700	1.0 – 1.75

(1) Higher emission levels are expected when nitrates are used occasionally for the production of special glasses.
(2) The conversion factor reported in Table 5.2 (2.5 x 10-3) has been applied.
(3) The lower levels of the range are associated with the application of the Fenix process.
(4) The achievable levels depend on the quality of the natural gas and oxygen available (nitrogen content).
(5) The higher levels of the range are associated with existing plants until a normal or complete rebuild of the melting furnace. The lower levels are associated with newer/retrofitted plants.

Has operator claimed that releases are insignificant?	No
Permitting Officer confirms releases are insignificant?	Not applicable
Derogation criteria:	Technical characteristics
Duration of derogation:	An extension to the original derogation was sought to allow the installation to keep the current NOx ELV of 1,500mg/Nm3 until the end of June 2020, when the ELV can be reduced to

	700mg/Nm3 following the installation of Selective Catalytic Reduction (SCR) and compliance with BAT can be achieved from the start of July 2020. This extension to the derogation was issued in December 2019. Due to the restrictions on manufacture of equipment and the movement of contractors imposed during the Covid-19 pandemic Saint-Gobain Glass (United Kingdom) Ltd has not been able to meet the timeline to enable the SCR to be in place and operational by the end of June 2020. A further extension of the derogation is, therefore, proposed until the 1 March 2021.
Permitting Officer initial assessment (applicability of the BAT-AEL, interaction between multiple derogations etc.)	The BAT-AEL is definitely applicable to this installation. There is only a single derogation application for this installation.
Permitting Officer: Diana Adamson	Date: 17 June 2020

Selby District Council Derogation Panel
Thursday 18 June 2020

The Selby District Council Derogation Panel consists of:

June Rothwell (Head of Operational Services)
Wayne Palmer (Team Leader – Environmental Health)
Diana Adamson (Senior Environmental Health Officer)

Table 3.1: Executive summary of the derogation request and minded to position	
Installation details	Saint Gobain Glass (United Kingdom) Ltd (company number 2442570) Weeland Road Eggborough Goole DN14 0FD PERMIT REF NO: A(2)51PV4
Short description of derogation request	**BAT conclusions for flat glass manufacturing: Nitrogen oxides (NOx) from melting furnaces** BAT reference number 25: BAT-AELs for NO_X emissions from the melting furnace in the flat glass sector. Saint Gobain Glass (United Kingdom) Ltd (SGG(UK)Ltd) requested a time limited derogation to comply with the BAT Reference Number 25 by the 30 June 2020. However, restrictions imposed by the Covid -19 pandemic have delayed the installation of the Selective Catalytic Reduction (SCR) equipment which is required to the reduce the emissions of Nox. The emission limit requested is 1,500 mg/Nm^3 as opposed to the BAT-AEL of 700 mg/Nm^3 for secondary techniques. The request is made due to Technical Characteristics of the SGG(UK)Ltd site at Eggborough. SGG(UK)Ltd has consistently sought to reduce NO_x emissions through the use of primary techniques, in order to push the boundaries of emission levels

	that can be achieved without the need for secondary abatement. Through trails carried out at the Eggborough site and within the extended Saint Gobain group it has found that the BAT-AEL of 800 mg/Nm^3 cannot be made by primary measures on a float glass furnace. As these trials did not conclude until November 2018, at which point SGG(UK)Ltd conceded that the BAT-AEL could not be achieved by primary measures alone, there was insufficient time for the secondary measures, of a SCR system to be designed, manufactured and installed at the Eggborough site. SGG(UK)Ltd have, therefore, programmed the work to be undertaken in the least possible time.
Permitting officers minded to position	I am minded to **accept** the derogation. The reasons for issuing a derogation are set out below: The application is based on the technical characteristics and is within the scope of derogations allowed under article 15(4) of the Industrial Emissions Directive. In this case the recent history of trials at the site on primary measures and other measures considered in relation to the reduction of NOx. The operator has provided a Cost Benefit Analysis (CBA) to demonstrate that the achievement of the BAT AEL for Nitrogen oxides through the secondary measures of SCR is the best environmental option. The site is currently subject to a derogation for BAT reference number 25: BAT-AELs for NO_X emissions which terminates on the 30 June 2020 requiring that the BAT-AEL is met with secondary measures by the installation of the SCR. Considering the technical characteristic of a float glass furnace it may be seen that the installation of SCR should be delayed until the cold repair is carried out. However, due to the rigorous maintenance carried out on the furnace during its lifetime the company has decided to extend the furnace life and, therefore, the installation of SCR during a cold repair of the furnace could be delayed for an unknown term.

	In order to meet the BAT reference number 25: BAT-AELs for NO_X, secondary measures in the form of SCR is to be installed in the quickest possible time. The derogation was issued to allow 6 months for this work to be completed. However, three months into this period the Covid-19 pandemic caused considerable disruption to the civil works on site and the manufacture of equipment. The time line with regards to installation is still not clear and outside the control of the operator. The restrictions to be imposed on the derogation document are set in the Annex: NOx Limit Condition. The restrictions on the emission limit in the time frame before the introduction of SCR are imposed to ensure that the furnace is operated to its potential in minimising the emissions of NOx. The condition requires the BAT-AEL for NOx will be met after the installation of SCR as indicated in the BAT Assessment document and Cost Benefit Analysis submitted in support of the derogation request.
Previous DP recommendations or comments on this or similar requests	SGG(UK)Ltd has previously applied for and been granted derogation in respect to BAT Reference Number 25: BAT-AELs for NO_X emissions. This derogation terminates on the 30 June 2020 and requires compliance with the BAT-AEL with secondary measures. It should be noted that a number of different Glass Manufacturing Operators throughout the UK have submitted similar derogation requests that were approved. The Environment Agency has received derogation requests from other Operators in different sectors.

Overview of the site and installation

Saint-Gobain's Eggborough plant is a float glass manufacturing facility for the production of a basic flat soda lime silica glass, for applications in the construction industry.

The installation includes the storage and handling of sand (silicon dioxide), soda ash (sodium oxide), limestone (calcium carbonate), dolomite (calcium-magnesium oxide), and cullet to produce the glass by the application of heat in a furnace followed by a float bath, lehr, glass cutting, and subsequent warehousing.

The process has an output of up to 230,000 tonnes of float glass per annum, and operates continuously. The float tank is operational 24 hours per day without stopping until it is refurbished. It was originally planned to refurbish the plant approximately every 12 to 15 years but in 2004 the placage cooling fans and superstructure was installed to extend the life of the furnace which is now continually reviewed.

The raw materials are melted in the main cross fired regenerative type furnace to produce molten glass of uniform composition, temperature and viscosity for delivery to the float bath. The plant also operates a Physical Vapour Deposition (PVD) process which applies extremely thin coatings to glass sheets to enhance the thermal emissivity properties of the glass. The coating plant is housed in a purpose built extension to the existing finished product warehouse. The glass to be coated is sourced from within the production line. The production capacity of the coater is up to approximately 80,000 tonnes, and operates across all shifts on a continuous basis.

The plant also operates a Laminating process which produces laminate and laminate safety glass by creating a sealed laminate sandwich consisting of glass/PVB/glass. The laminating plant is housed in a further purpose built extension to the existing warehouse. The glass to be laminated is sourced from within the production line. The production capacity of the laminator is up to approximately 2.2 million m^2 per annum.

Summary of the minded to position

The Operator has requested a time limited derogation to 2023 for BAT reference number 25: BAT-AELs for NO_X emissions from the melting furnace in the flat glass sector.
Saint Gobain Glass (United Kingdom) Ltd (SGG(UK)Ltd) has requested a time limited derogation to comply with the BAT reference Number 25 by the 30 June 2020.

This is to allow for the installation of Selective Catalytic Reduction (SCR). The emission limit requested in the derogation is 1,500 mg/Nm^3 as opposed to the BAT-AEL of 700 mg/Nm^3 for secondary techniques.

In the application the operator considered 3 options for meeting the BAT-AEL. These options are:
Option 1) Business as Usual: Control of NO_x using primary measures with a rebuild of the furnace in 2019. This has, however, now been shown not to achieve the BAT-AEL.
Option 2) Proposed derogation: Installation of SCR in 2020, with an ELV of 1,500 mg/Nm^3 applied until the 30 June 2020 and BAT-AEL compliance (700 mg/Nm^3) from 1 July 2020.
Option 3) Current derogation: Furnace rebuild in 2019 without SCR.

Selby District Council has reviewed the application and concluded:

- That the application is based on the technical characteristics and is within the scope of derogations allowed under article 15(4) of the Industrial Emissions Directive and is based on:
  1) The installation of secondary measures as outlined in the Glass Industry BREF: SCR to achieve the BAT AEL.
  2) the recent history of pollution control investment in the installation in respect of the pollutant(s) for which the derogation is sought;
  3) the general investment cycle for a particular type of installation;
  4) the effect of reducing the excess emission(s) upon other pollutant emissions, energy efficiency, water use or waste arisings from the installation as a whole.

- That the operator has provided a credible argument evaluation for each option in terms of:

  1. The emissions and the achievable emission limit and the subsequent comparison of emission impacts (environmental damage costs and emission reductions associated with each option).
  2. Feasibility in terms of the technical specifics at the Eggborough installation
  3. Costs to maintain the current or rebuilt furnace.
  4. Energy use

- That the increased costs for achieving the BAT AEL are linked to the technical characteristics
  Yes the operator has requested a time-limited derogation to apply an appropriate technique within an extended timescale rather than not complying with the BAT AEL at any point.
  The Glass Industry BREF: 2012 has identified a number of primary and secondary techniques that are considered appropriate for this type of plant to achieve the BAT AEL for NO_x. The operator has presented evidence to identify those options which are applicable to the furnace at Eggborough and monetised these options.

Only option 2 involves the installation of SCR which is now seen as the only method of complying with the BAT-AEL for this float glass plant.

Whilst the operator has provided a Cost Benefit Analysis considering the options as listed above it is now recognised by the operator than in order to comply the BAT reference Number 25 that secondary measures will need to employed at this site. This follows trials of primary measures at the Eggborough site and within the wider Saint Gobain Glass group it has been found that the reductions in emissions are not sufficient to meet the BAT AEL limit. Selective catalytic reduction is the secondary measure employed at other float glass plant located in England.

The technique is based on the reduction of NOX to nitrogen in a catalytic bed by reaction with ammonia (in general aqueous solution) at an optimum operating temperature of around 300 – 450 °C. One or two layers of catalyst may be applied. A higher NOX reduction is achieved with the use of higher amounts of catalyst (two layers).

Selby District Council is therefore minded to allow this derogation request subject to the following condition

The emission of Nox shall not exceed the levels given in the table below. The levels given in the table below will be subject to an annual review and may be revised after consideration has been given to the current emission level, on-going trials, maintenance completed and planned maintenance.

Date	Emission level	Averaging period	Monitoring required
1 January 2020 to 28 February 2021	1500 mg/Nm^3	Daily average values. Where failures/maintenance work lead to temporary increases in level the averaging period may be extended at the regulators discretion.	Continuous indicative and annual
1 March 2021	700 mg/Nm^3	Daily average values	

Emissions due to regenerator failure:
Where regenerator failure leads to a sudden increase (over 300mg/Nm^3) in levels immediate actions in line with the examination, maintenance and reporting parts of this condition shall be carried out.

If the emission levels have exceeded the appropriate limit given above and cannot be reduced to the appropriate level within the timeframe agreed with the regulator under this condition; then the operator will produce a plan of action detailing either how the emission limit will be met and the associated time frame for consideration by the

regulator. This plan may include the bringing forward the planned rebuild of the furnace.

Examination and Maintenance:
A programme of examination and maintenance shall be submitted and agreed in writing with the regulator within 1 month of the date of this permit. The programme shall detail the examination programme in regards to the furnace area and timescales, and the regular maintenance programme.

Where a sudden increase (over 300mg/Nm^3) in No_x levels is detected by the continuous monitor the operator shall take immediate steps to determine the cause of the increase, identify remedial action and determine a timescale for restoration.

Reporting:
A report on the daily average results of continuous monitoring of Nitrogen oxides shall be forwarded to the regulator once every three months. The report shall include a graph trending the average monthly emissions for the furnace, year on year.

Every six months the operator shall submit to the regulator a report detailing the examinations and maintenance carried out in respect to the agreed programme.

The regulator shall be notified within one working day of a sudden increase in No_x emission levels. A report detailing the reason for the increase, remedial actions identified and timescales for restoration shall be submitted to the regulator within 1 month of the notification. The report shall be agreed with the regulator and completion of the restorative actions shall be notified on a monthly basis until completion.

Where Saint-Gobain Glass (United Kingdom) Ltd intend to carry out maintenance work which will cause a temporary increase in Nox levels prior notice shall be sent to the regulator and agreed in writing prior to work commencing.

Permitting officer's assessment of the derogation request

Table 3.2. Is the derogation request within the scope of the derogations allowed under the IED?		YES
1	**Is the emission subject to a mandatory minimum emission limit value in Annex 5 or 6 of the IED?** No limits in Annexes 5 and 6 do not apply to the releases from glass manufacture. The emission limit that needs to be complied with is laid down in the Glass Industry BREF:2012.	
2	**Where the BAT Conclusions identify multiple options for achieving the BAT-AEL, has the operator addressed all the options for achieving the BAT AEL?** Yes the operator has considered the primary and secondary measures outlined in the Glass Industry BREF:2012 in the derogation application previously submitted with the exception of one Primary Technique. This technique is i(b) Reduced combustion air temperature. The reason why the regulator agrees it is not appropriate for this site is given in Section 3 below. The options considered by the operator and regulator are Primary and Secondary techniques as laid down in the BAT conclusions: **Primary Techniques:** i Combustion Modifications: (a)Reduction of air/fuel ratio (b) Reduced combustion air temperature (c) Staged combustion: • Air staging • Fuel staging (d) Flue-gas recirculation (e) Low-NOX burners (f) Fuel choice ii Fenix process iii Oxy-fuel melting **Secondary Techniques:** i Chemical reduction by fuel ii Selective catalytic reduction (SCR)	

The Operator also considered Sorg LoNox as a Primary measure and electric melting as a Secondary technique.

In the application for the previous derogation the operator considered three options identified in the cost benefit assessment. These were:

Staged combustion
Air-staged or fuel-staged combustion both involve forms of reducing the oxygen concentration within the flame, increasing the soot (unburned hydrocarbon) content of the flame and thus lowering the flame temperature, resulting in lower thermal NO_x generation.

In air-staged combustion, sub-stoichiometric firing is undertaken with the remaining air added into the furnace to achieve complete combustion and minimise CO formation.

In fuel-staged combustion a secondary flame fires at the base of the primary flame to reduce the oxygen concentration within the primary flame and thus lowers its temperature.

SGG UK Ltd therefore considered that this, in conjunction with the new Low NOx burners, could reduce NO_x emissions to approximately 800mg/Nm3.

Low- NO_x burners and Furnace Design
Aspects of a regenerative furnace, such as that in operation at Eggborough, can be modified to deliver optimum control over NO_x levels through improving combustion and mixing of the air and fuel, and improved transfer of heat to the glass.

Low nox burners were installed on a number of ports at the Eggborough site and staged combustion investigated further but the reduction in Nox emission levels anticipated were not realised.

Selective catalytic reduction (SCR)
The Selective Catalytic Reduction (SCR) technique is a secondary control measure that involves the injection of ammonia into the waste gas in the presence of a catalyst to oxidise the NOx to nitrogen and water. The catalyst is typically titanium dioxide or vanadium oxide held within a matrix, and the necessary temperature range for optimum reaction is 300-450°C, although this is dependent on the catalyst type.

Using SCR, emission concentrations below 700mg/Nm3 are reported for within the

	flat Glass Industry and this level is presented as the upper range for the BAT-AEL for the use of secondary measures in flat glass. An emission level of 700mg/Nm3 has therefore been used to reflect this in this assessment when considering the long-term environmental impact. The NO_x emission levels achieved will depend mainly on the inlet concentration and on the amount of catalyst and ammonia used. The level of ammonia is usually kept below the ratio 1.1:1 to limit the potential for ammonia slippage due to incomplete reaction (Glass Industry BREF:2012, Section 4.4.2.7). This is equivalent to an ammonia usage (25% w/w solution) of 2.37kg per kg (unabated) NO_x emission. The March 2012 Glass Industry BREF:2012 states that flat glass furnaces obtained values of between 460–500mg/Nm3 with this technique, without exceeding NH3 concentrations of 30mg/Nm3 downstream of the SCR. However, in line with the BAT-AEL for secondary measures, it is conservatively assumed that emissions are at the upper range of 700mg/Nm3, particularly as secondary abatement would be retrofitted to the existing furnace. Ammonia releases from the SCR process are assumed to occur from ammonia slippage due to incomplete reaction. The ammonia slippage increases with higher NH3 to NO_x ratios. A potential emission limit value of 30mg/Nm3 is applied to represent the upper range of the BAT-AEL for ammonia. This provides a conservative assessment of the potential impact. Cross-media effects of SCR include fugitive emissions from on-site storage and handling of 25% ammonia solution, the use of electrical energy and the production of solid waste at the end-of-life of the catalyst. However, provided that BAT is applied for storage and handling of ammonia, such as back-venting to tankers during delivery and use of scrubbers to abate any breathing losses, these fugitive emissions should be minimal. Operational data suggests that any extra NO_x emissions associated with increased electricity use through operation of the SCR typically account for only 0.3 to 0.5% of the amount of NOx reduced by SCR although there are additional CO2 emissions from the increased power demand as well which are offset by the purchase of green electricity. Waste material is produced when the catalyst must be renewed after its lifetime, typically every 10 years. The Eggborough Installation currently operates electrostatic precipitators for particulate abatement, which are generally more compatible with the installation of SCR, due to their higher operating temperature being within the range for optimum SCR operation.

	The Eggborough site is currently investigating the potential for waste heat recovery on the flue gas, to generate electricity for use at the Installation. The waste heat recovery system will greatly reduce the carbon footprint of plant as all the electricity produced will be consumed directly rather than taken from the grid. The use of SCR would reduce the potential for waste heat recovery output by approximately 20%, due to having to maintain flue gas temperatures at the correct level for an SCR to be effective. Concerns were raised over the emission rate applied in the assessment after the retrofit of SCR and the following information presented by the operator. IED stipulates that "where the BAT AELs are expressed as a range, the ELV should be set on the basis of the top of the relevant BAT-AEL range – that is to say, at the highest associated emission level - unless the installation is demonstrably capable of compliance with a substantially lower ELV, based on the BAT proposed by the operator, or exceptional environmental considerations compel a tighter ELV." Until the site was operational with SCR and actual emission levels were known it would therefore be inappropriate to suggest that emissions would be lower than 700mg/Nm3, the upper end of the BAT-AEL range, as lower levels may not be achievable at the Eggborough site, and therefore it is considered that this is the ELV that would be applied in the Permit. This level has therefore been assumed in the assessment, as the site are not in a position to demonstrate that they would be able to achieve and be consistently compliant with a lower ELV, and it is considered that unless operating in this way for a number of years, that no site would be capable of demonstrating this. Due to the level of environmental impact determined through dispersion modelling, it is not considered that there are any exceptional environmental considerations that would result in the site requiring a tighter ELV (i.e. no breaches of AQS standards or critical levels are predicted).
3	**Where the operator is proposing not to conduct a cost benefit assessment of an option for achieving the BAT AEL have they adequately justified this decision?** Saint Gobain have considered all primary and secondary techniques outlined in the Glass Industry BREF:2012 Conclusions but not to the extent of integrating them into the cost benefit assessment. Those areas not considered are as follows together with the operators reasoning for not considering further: **<u>Primary Techniques:</u>**

	Trials on the use of Primary Techniques both at the Eggborough plant and at other sites in the Saint Gobain group have demonstrated that the BAT-AEL for NO_x cannot be achieved by primary measures alone. **Secondary Techniques:** **Electric Melting:** The absence of direct combustion in electric melting means that the waste gas volumes are extremely low, reducing the size of any secondary abatement equipment. Associated NOx emissions are expected to be below 100mg/Nm3. Electric furnaces can usually achieve higher melt rates per square metre of furnace, and the thermal efficiency of electric furnaces (based on the energy delivered to the furnace, not on the primary energy necessary to generate the electricity) is two to three times higher than fossil fuel fired furnaces. The Glass Industry BREF:2012 note suggests that the installation of an electric melting furnace could cost an extra £2.34 million (€3 million) to install than a standard end-fired regenerative furnace. There is an upper size limit to the economic viability of electric furnaces which is closely related to the prevailing cost of electricity compared with fossil fuels. Smaller furnaces (<75 tonnes melt/day) are considered most likely to be a viable option for electric melting, whilst for larger furnaces (>150 tonnes melt/day) the benefits from electric melting are often not sufficient to compensate the higher costs of electricity, and are generally unlikely to be viable. It is considered that whilst electric melting may be appropriate for small-scale (<75 tonnes/day) new build facilities and locations where gas supply is not available, these aspects do not apply to SGG UK Ltd Eggborough due to the larger furnace capacity requirements (up to 630tpd), excessive capital investment that is required and high running costs for larger furnaces. There are also significant indirect emissions from the generation of electricity to supply the furnace, which reduces any potential environmental improvement. Therefore the option of electric melting is not considered further within this report. Electric boosting of float furnaces is a relatively new idea that has surfaced in recent years and is not at a stage where it can be evaluated effectively. This technique would be complementary to other primary measures and can only be accommodated at a furnace rebuild so it would be a consideration in the planning process for the rebuild of the Eggborough furnace in the future. Therefore electric boosting is also not

	considered further in this report. **Chemical Reduction by Fuel** Through this process, fuel is added to the waste gas stream to chemically reduce NO_x to N2. There are two techniques, known as the 3R process and the reburn process, however the reburn process has not yet been demonstrated at a commercial scale and therefore is not considered further. The 3R process involves the injection of natural gas or oil into the flue gas at the regenerator entrance. This introduces a significant increase in fuel use (up to 10% of the melting fuel requirement) and consequent CO2 generation. It is also prone to damaging the regenerator if not tightly controlled, with corrosion resulting from condensation and deposition. This would significantly reduce the lifetime of the furnace and consequently increase the investment cycle for a furnace rebuild. A licence fee is also payable for the use of the patented technology. The combination of significant operational costs and increased risk of furnace damage means this technique is not considered appropriate for the Eggborough Installation. **SNCR:** Selective Non-Catalytic Reduction (SNCR) has been excluded from the assessment as there are technical impediments to the application of the technique within regenerative furnaces such as the one installed at Eggborough. Ammonia injection within the correct temperature window (800 - 1,100°C) presents control difficulties, as this temperature range typically occurs within the regenerator, which has a variable temperature and limited access. Failing to inject in the required temperature window would affect the performance of the treatment. Emissions of ammonia (low temperature slippage) and nitrogen oxides (high temperature reaction) can occur as a result. Furthermore, for glass mixtures using sulphate-based refining agents, ammonium bisulphate generation can occur, which requires sulphur scrubbing to be undertaken downstream of the ammonia injection. This technique is therefore not considered to be technically viable for retrofit on regenerative furnaces and has been discounted from this assessment.
4	**Is the derogation request based on one of the three criteria set out in the IED?** Yes The derogation request is based on technical characteristics. The Defra Industrial emissions Directive EPR Guidance on Part A installations: February 13

	indicates that Technical Characteristics are relevant in the following circumstances: • the recent history of pollution control investment in the installation in respect of the pollutant(s) for which the derogation is sought; The operator has previously carried out trials with various makes of Lox Nox burners at a cost of £80,000 in 2015 and an investment of £100,000 was made in 2016 for further trials and staged combustion. This however, did not prove successful leaving the operator with the only option of secondary measures. • the general investment cycle for a particular type of installation; Yes. The Glass Industry BREF:2012 note indicates that a float glass furnace will operate continuously for 12 to 15 years (or longer in some cases) after which time they are rebuilt with either partial or total replacement of the structure. The operator has taken extreme care in the maintenance of the furnace to extend the life beyond the original planned 15 years cycle and optimise the return on the initial investment. Also in 2004 the site installed superstructure and placage cooling fans in order to extend the life of the furnace to 20 years. • the configuration of the plant on a given site, making it more technically difficult and costly to comply; Yes the application of SCR would provide the lowest emissions of NO_x but has the potential to be the most expensive as well. It also introduces significant health and safety management requirements at the Installation for the transport, delivery and safe storage of the ammonia reagent. The use of ammonia also introduces a number of indirect environmental effects, including increased CO2 generation, additional indirect NOx release and high energy consumption from the production of ammonia. However the installation of SCR is now seen as the only method by which the BAT AEL will be achieved. • the practicability (particularly bearing in mind Health & Safety and other relevant legal obligations) of interrupting the activity so as to install improved emission control upon the pollutant(s) The current derogation application proposes the retrofit of SCR during the operation of the float glass kiln. This poses Health and Safety considerations which need to be taken account of. • the effect of reducing the excess emission(s) upon other pollutant emissions, energy efficiency, water use or waste arisings from the installation as a whole Yes the installation would emit ammonia due to ammonia slippage and

	increased particulate for around 2 weeks during installation when the EP would need to be turned off. There will be an increase in energy use associated with the running of the SCR unit and the additional waste in the form of solid waste of the end-of-life catalyst. • the intended remaining operational lifetime of the installation as a whole or of the part of it giving rise to the emission of the pollutant(s), where the operator is prepared to commit to a timetable for closure. The operator is currently not willing to commit to a timetable for closure despite the age of the furnace and is investing heavily in maintenance to extend its life.

Table 3.3 : Has the operator provided a credible argument that increased costs for achieving the BAT AEL are linked to the criteria which is the basis of their derogation request	Yes
1	The Operator produced a Cost Benefit Analysis, using the Environment Agency's CBA tool, for the original extension to the derogation. A further CBA was not requested as the installation of SCR is the only recognised method of achieving the BAT-AEL and work has already commenced. The CBA compared 3 different options to meet the BAT AEL's for control of NO_x (expressed as NO2) emissions from the melting furnace in the flat glass sector. In the application the operator considered 3 options for meeting the BAT-AEL. These options are: Option 1) Business as Usual: Control of NO_x using primary measures with a rebuild of the furnace in 2019. This has, however, now been shown not to achieve the BAT-AEL so is not a realistic option and has not been considered further. Option 2) Proposed derogation: Installation of SCR in 2020, with an ELV of 1,500 mg/Nm^3 applied until the 30 June 2020 and BAT-AEL compliance (700 mg/Nm^3) from 1 July 2020. Option 3) Current derogation: Furnace rebuild in 2019 without SCR. As this expires at the end of 2019 it is not a realistic option and has not been considered further. **Option 2 – Retrofit of Selective Catalytic Reduction (SCR)** Assumed capital costs: • £2.5 million purchase of SCR equipment (cost provided by SGG (UK) Ltd) including the additional auxiliary equipment –- ammonia tanks, site preparation and civils. Work on the installation has already commenced. Assumed operating costs:

	• £20K/year labour for SCR operation • Current maintenance costs are estimated at £284K for 2019 reducing to £80 for the new furnace. As the furnace ages it is expected that maintenance costs will increase by £6,600 per year. • £1229K Purchase of ammonia • Replacement of catalyst assumed every 10 years with £50K additional maintenance • 5 Tonnes of catalyst waste every 10 years is expected to cost £500 to dispose of the waste to landfill. This is based on the current landfill gate fee of around £15/tonne (for Yorkshire and Humberside) and landfill tax of £91.35/tonne. These costs will apply in 2030 and 2040 when the catalyst is due to be replaced. Energy Consumption: additional 2,000,000kWh / year assumed (data provided by SGG (UK) Ltd). Delivery of each load of ammonia approximately 150 mile round journey (assuming CF Fertilisers of Billingham as supplier) – delivery approximately once a fortnight, so approximately 4,000 truck miles a year. This figure should reduce with increased furnace efficiency after cold repair, when we expect that deliveries might be once every 3 weeks on average. Damage costs: The annual damage cost of approximately 880 tonnes of NO_x being released in 2019 is approximately £11,600,000. The annual damage cost for NO_x emissions from the installation will reduce to approximately £8,500,000 in 2020 (assuming operation of the SCR from July 2020), and to £5,400,000 per year when the new furnace is installed, and operating with the SCR. There are additional damage costs for the emissions of ammonia associated with SCR. The damage cost assigned to ammonia in the CBA tool is approximately £2,360 per tonne, which equates to an annual cost of £4,720 per annum when the SCR is expected to release 2tpa of ammonia a year. There would also be additional damage costs associated with the emissions of particulates during the bypass of EP for the installation of the SCR plant. The damage cost assigned to particulate matter (asPM_{10}) in the CBA tool is approximately £30,225 per tonne, which equates to an annual cost of £160,190 on the basis of 5.3 tonnes of particulates released for 2 weeks when the EP is bypassed. Based on the damage costs provided in the CBA tool, with a rate of inflation applied to each year of operation, the total damage costs for NO_x, ammonia and particulate emissions over the assessment period (as 'Present Value') is approximately £118,200,000, which is £5,700,000 less than the current derogation (Option 1). This therefore demonstrates that this option actually results in a decrease in the environmental impacts of the site over the current derogation.

	Applying the Defra damage costs and the accompanying Damage Costs Appraisal Toolkit, the damage costs for NO_x emissions from the installation based on the alternative damage cost (£5,847/tonne in 2017) are approximately £5,400,000 in 2019; with the damage costs subsequently reducing to approximately £2,650,000/year following the installation of the SCR plant along with the new furnace in 2021. The damage costs for NO_x emissions from the installation over the lifetime of the furnace have been estimated to be £88,750,000 (with the baseline year being 2015). Based on the revised damage costs for ammonia in the Damage Costs Appraisal Toolkit (£6,234/tonne in 2017), the annual damage cost for ammonia emissions from the installation in 2020 are estimated to be approximately £12,000, when the SCR is proposed to be installed. These costs are therefore approximately three times those in the current version of the CBA tool. The damage costs for ammonia emissions from the installation over the lifetime of the furnace (with the baseline year being 2015) have been estimated to be approximately £290,000 using the values presented in the Damage Costs Appraisal Toolkit. On the basis of the revised damage costs for particulates in the Damage Costs Appraisal Toolkit (£98,825/tonne in 2017), the annual damage cost for particulate emissions from the installation are estimated to be approximately £297,000 in 2020 when the SCR is proposed to be installed. It should be noted that the revised damage costs for particulates in the Damage Costs Appraisal Toolkit are based on emissions of $PM_{2.5}$ instead of PM_{10}; based on the conversion factors provided in the Toolkit, the amount of $PM_{2.5}$ emissions in 2020 are expected to be 2.8 tonnes. These costs are therefore lower than those in the current version of the CBA tool. Based on the revised damage costs, with a rate of inflation applied to each year of operation, the total damage costs for NO_x, ammonia and particulate emissions over the lifetime of the assessment period (as 'Present Value') is approximately £89,340,000, which is £5,962,000 less than the current derogation (Option 1).
2	**Has the operator satisfactorily demonstrated that the costs of meeting the BAT AEL at this site are significantly increased due to the technical characteristics compared to the typical cost of installing the appropriate technique?** The operator has demonstrated that installation of SCR will reduce the damage costs associated with the emissions from the site. The installation of SCR is the only viable method of meeting the BAT AEL for Nox.

Table 3.4 Summary of the environmental consequences of allowing this derogation		
1	**Summarise the relevant impacts of achieving the BAT AEL vs the impacts of delivering the alternative or alternatives and identify any issues with the data provided by the operator that are relevant for your final decision.** The derogation aims to deliver the BAT AEL for Nox in the least possible time available to the operator. The alternatives are to require closure of the furnace at the end of the current derogation period, however, rebuilding the furnace without SCR means that the BAT-AEL would not be met. As the SCR cannot be installed before the end of June 2020 the damage costs show that the applied for derogation is the best environmental option under the current circumstances.	R A Green
2	**Summarise the current and predicted impact of derogating from the BAT AEL on any short term Environmental Quality Standards (EQS) / Environmental Assessment Levels (EAL).** Allowing a further derogation for a period of 6 months allows the operator to continue to operate the furnace within all BAT-AEL's apart from that of Nox. The short term EAL for NO_x (as NO_2) is 200 µg/m^3 as a 1-hour mean (99.8th percentile) with an annual average of 40 µg/m^3. Assessment of a peak emission of 1,516mg/Nm^3 of No_x results in a predicted off-site short-term PC for NO2 of 23.1µg/m3 (as the 99.79th percentile of hourly averages), representing 12% of the relevant AQS objective. When combined with the background concentration at this location of 26.7µg/m3, it forms a PEC of 49.8µg/m3, representing 25% of the AQS objective. As the process contribution represents 13% of the AQS objective no further assessment is necessary according to the EA's screening threshold.	R A Green
3	**Summarise the predicted impact of derogating from the BAT AEL on any long term Environmental Quality Standards / Environmental Assessment Levels?** The long term EAL for NO_x (as NO_2) is annual average of 40 µg/m^3 The maximum predicted off-site long-term PC for NO_2 (based upon average monitored emissions) so representing Option 1 was 1.2µg/m3,	R A Green

	which represents 3% of the relevant AQS objective. When combined with the background concentration at this location of 13.4µg/m3 it forms a PEC of 14.5 g/m3, representing 36% of the AQS objective. This is below the Environment Agency's screening threshold of 70% for further assessment.	
4	**Would the environmental impacts resulting from derogating from a BAT AEL as covered in 3.2 and 3.3 above mean that an Air Quality Standard or an EQS for water may not be achieved?** No for the following reasons: The short and long term AQSs for NO_2 are achieved within the immediate vicinity of the installation.	R A Green
5	**Summarise the predicted impact of derogating from the BAT AEL on any relevant site of heritage, landscape or nature conservation, and/or protected species or habitat.** The emissions of NO_x (as NO_2) will not affect any sites of heritage, landscape or nature conservation, and/or protected species or habitat. The predicted concentrations have been compared with National Air Quality Strategy (AQS) objectives and the Critical Level for the Protection of Vegetation and Ecosystems (CLPVE) and the EALs. The current situation Option 1 is that at the adjacent BAP priority habitats sites, the long-term PC for NO_x was 1.2µg/m3, representing 4% of the relevant CLPVE. This is marginally above the Environment Agency's threshold of 1% for insignificance for long term impacts. When combined with the background concentration of 18.0µg/m3 it forms a PEC of 19.2µg/m3, representing 64% of the CLPVE. This is below the Environment Agency's screening threshold of 70% for further assessment. The maximum value for the daily critical mean for NO_x at the adjacent BAT priority habitat was 19.5µg/m3, which is 26% of the CLPVE.	R A Green
6	**Would derogating from the BAT AEL result in higher emissions of persistent, bio-accumulative and/or biologically active compounds from the site?** No	R A Green
7	**Has the operator identified any other site or region specific environmental impacts that support derogating from the BAT AEL?** The derogation is a time limited derogation to allow the BAT AEL to be achieved.	R A Green

8	**Are there any other environmental impacts that are relevant to the consideration of the derogation request?** No The site has a history of compliance with permit requirements and no complaints have been made by members of the public in the last 9 years. The Glass Industry BREF:2012 document indicates that lower emission levels can be achieved by the installation of SCR. This is being implemented in the shortest possible time since the decision that Primary measures alone will not achieve the BAT-AEL.	R A Green
9	**Summarise the benefits of achieving the BAT AEL compared to the alternative or alternatives and identify any issues that are relevant for your final decision.** Following the failure of trails of primary measures to achieve the BAT AEL the operator has no choice but to install secondary measures which are relevant and appropriate for the cross fired regenerative float glass furnace at Eggborough. Whilst installing SCR has negative environmental effects in terms of additional energy use, ammonia slippage and associated HGV movements and waste produced this is seen as BAT for the installation and must be applied for the installation to continue to operate.	

Table 3.5: Does the Cost Benefit Analysis support a derogation	**YES**
1	It should be noted that due to current timescales the operator is not now in a position to amended the process or install mitigation measures in time to comply with the emission level by the current June 2020 deadline. A time limited derogation is therefore required to enable the continued operation of the furnace. A Cost Benefit Assessment has been undertaken using the Environment Agency's CBA tool (Version 6.17 September 2017), which has compared 3 different options but the installation of SCR (Option 2) is the only viable option to meet the BAT AEL for NO_x (expressed as NO_2) emissions from the melting furnace in the flat glass sector. The assessment did identify that Options 2: Proposed Derogation resulted in the least Nox produced over the lifetime of the furnace when compared to primary measures achieving a higher BAT AEL level. The proposed Derogation also had the lowest pollution costs of £118.2M and the greatest reduction benefit of -£5.7M. If the revised damage costs are considered the Proposed Derogation still is ranked 1 in terms of pollution and damage costs.
2	**Does a sensitivity analysis change the outcome of the CBA?**

	Yes The operators CBA using the original damage costs in the EA CBA tool indicated that under central and lowest NPV the proposed derogation is the most favourable option. However when the highest NPV (EEA damage costs) are applied the outcome of the assessment is reversed.
3	**Are there any other factors that are relevant to the cost benefit decision?** No

Table 3.6: Final Considerations	
1	**Summarise any information provided from the sector group, derogation panel or a consultee that hasn't been included above but has an impact on the final decision.** Consideration has been given to the guidance provided in the BAT Reference Document for the Manufacture of Glass and in particular Section 5.3.2 BAT is to reduce NOX emissions from the melting furnace by using one or a combination of the following techniques: II. secondary techniques, ii. Selective catalytic reduction (SCR). When considering the secondary measures the BAT Reference Document in Section 4.4.2.7 points out that the emission level achieved depends on the inlet concentration and the amount of catalyst used indicating that the amount of Ammonia required to achieve the BAT-AEL would be reduced when a high level of primary measures are employed. Hence the optimisation of primary measures would be the preferable first step in NOx abatement whether secondary measures need to be employed or not. The document also points out that employment of SCR limits the possibilities for heat recovery which the operator is currently considering. Other possible disadvantages of this method of abatement are the possible emission of Ammonia to air and the cross-media effects related to ammonia production and the environmental and safety concerns associated with storage and handling.
2	**In the event that we are proposing to accept a derogation request but place additional conditions on it summarise the reasons for these.** Yes The restrictions to be imposed on the derogation document are set in the Annex: NOx Limit Condition. The restrictions on the emission limit in the time frame before rebuild are imposed to ensure that the furnace is operated to its potential in minimising the emissions of NOx. The condition requires the BAT-AEL for NOx will be met after rebuild as indicated in the BAT Assessment document and Cost

	Benefit Analysis submitted in support of the derogation request.

Annex Decision and public consultation summary

Table 4.

Permitting officers decision	The derogation request was accepted, and an extension of the compliance date is now deemed necessary to allow the necessary construction works to be completed. . The reasons for issuing the derogation in December 2019 are set out below: The application is based on the technical characteristics and is within the scope of derogations allowed under article 15(4) of the Industrial Emissions Directive. The operator has conducted a number of trials on primary measures and has now determined that the BAT AEL cannot be met by the primary measures alone. They have provided a Cost Benefit Analysis to demonstrate that the achievement of the BAT AEL for Nitrogen oxides through the secondary measures SCR as quickly as possible is the best environmental option. Allowing the derogation until the installation and commissioning of the SCR plant allows for the continued operation of the furnace until a planned rebuild can take place at the end of the furnace life. The restrictions to be imposed on the derogation document are set in the NOx Limit Condition. The restrictions on the emission limit in the time frame before rebuild are imposed to ensure that the furnace is operated to its potential in minimising the emissions of NOx. The condition requires the BAT-AEL for NOx will be met after rebuild as indicated in the BAT Assessment document and Cost Benefit Analysis submitted in support of the derogation request.
Recommendation from Derogation Panel	Approve subject to condition
Recommendation of Chief Executive	Approve subject to condition
Public participation dates:	21 August 2019 to 17 September 2019 02 April 2020 to 8 May 2020

Responses received from public participation: 2019	1) Public Health England letter dated 17 September sent by Amanda Craswell, Environmental Public Health Scientist. Copy attached. It is noted that PHE considers that their previous response of to the original derogation application should be considered which indicated that in their view all permit holders should take all appropriate measures to prevent or control pollution, in accordance with the relevant sector guidance and industry best practice. The following comments were also made: • Those that are most affected by exposure to air pollution are children, older adults and those with existing health problems. Nitrogen dioxide has been linked to reduced lung development (lung function growth) in childhood, respiratory infections in early childhood and effects on adult lung function. • Currently there is no clear evidence of a threshold concentration of nitrogen dioxide in ambient air below which there are no harmful effects for human health. Therefore, reduction of nitrogen dioxide concentrations below EU limit values and UK Air Quality Standards is likely to bring additional health benefits. • Population exposure to air pollutants such as nitrogen dioxide are associated with adverse impacts on public health, so we support efforts by the operator and local authority (as the regulator) to reduce emissions from the site to air and to deliver long term improvements to local air quality. The recent letter from PHE indicated that reducing exposure to pollutants such as nitrogen dioxide below air quality standards has potential public health benefits and support such an approach. Also that exposure to nitrogen dioxide is associated with adverse impacts on health and, therefore, support compliance with standards in the shortest time possible. The regulator welcomes the response from PHE and has noted the comments in relation to the impact of No_x on health. The regulator will continue to monitor the emissions from the site in relation to Nox and other pollutants and to work with the operator to reduce emissions where possible via the employing the best

Responses received from public participation: 2020	available techniques. The Air Quality Strategy Objectives are the current guidance available to local authorities to be employed in protecting public health and the level for pollutant will not be breached at relevant locations due to emissions allowed by this derogation approval. 2) Local Authority Unit, Environment Agencyo responding in an email from Simon Holbrook stating that the short delay (from the original derogation end date) is acceptable if there is a high degree of certainty that the new target date will be achieved. 1) Regulatory Officer, Environment Agency responded by email advising that the best option was to extend the deadline by 2-3 months. 2) Eggborough Parish Council: did no object but requested ao limited extension to no later than July 2021.
Janet Waggott: Chief Executive	[redacted]
Date:	19.6.20