Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650

March 27, 2015

Mr. Brian Jaggernauth
Plant Manager
Ardagh Glass Inc.
1 National Street
Milford, MA 01757-3618

RE: Milford
Transmittal No.: X253446
Application No.: CE-13-020
Class: OP
FMF No.: 2756
AIR QUALITY CONDITIONAL PLAN APPROVAL
Fast Track Agreement TF 62

Dear Mr. Jaggernauth:

The Massachusetts Department of Environmental Protection ("MassDEP"), Bureau of Air and Waste, has reviewed your Non-Major Comprehensive Plan Application ("Application") listed above. This Application concerns the proposed reconstruction and operation of your glass container manufacturing facility located at 1 National Street in Milford, Massachusetts ("Facility"). The Application bears the seal and signature of Nicholas L. Steenhaut, Massachusetts Registered Professional Engineer Number 49661.

This Application was submitted in accordance with 310 CMR 7.02 Plan Approval and Emission Limitations as contained in 310 CMR 7.00 "Air Pollution Control" regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Section 142 A-O, Chapter 21C, Section 4 and 6, and Chapter 21E, Section 6. MassDEP's review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory requirements.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this **Conditional Plan Approval** for said Application, as submitted, subject to the conditions listed below.

Please review the entire Plan Approval, as it stipulates the conditions with which the Facility owner/operator ("Permittee") must comply in order for the Facility to be operated in compliance with this Plan Approval.

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1. DESCRIPTION OF FACILITY AND APPLICATION

Ardagh Glass Inc. ("AGI") operates a glass container manufacturing facility located at 1 National Street in Milford, Worcester County, Massachusetts (the "site" or "Facility"). The Facility was previously owned and operated by Saint- Gobain Containers, Inc.

A. Facility Description

The Milford Facility manufactures glass containers. The glass manufacturing process is continuous. Glass melting occurs in two furnaces that utilize natural gas fuel. Operations conducted at the Facility consist of mixing batches of dry ingredients including sand, soda ash, limestone, feldspar, colorants, fining agents, and recycled glass (cullet); melting the ingredients in two natural gas fired glass furnaces at temperatures exceeding 2500 degrees Fahrenheit (^{0}F); and molding, annealing, coating, and packaging the glass containers.

The raw materials are received at the batch plant by rail or trucks. The bulk materials are elevated in a closed system to concrete storage bins in the batch house where they are automatically weighed and mixed. The mixed batch is then conveyed to the furnaces in individual batch amounts in an enclosed system. Generally, the batch is automatically charged into the furnace at a rate directly related to the amount of glass being withdrawn from the forming machines. Molten glass flows from the melting furnaces through the distributor and then through the forehearths to the forming machines where it is blown and/or pressed into containers. Consistency of the glass gob temperature, glass gob weight, glass flow rate and machine speed is maintained to produce commercial glass containers. Machine speed is monitored and produces the most accurate data on furnace pulls. Hot containers are conveyed to the annealing lehrs where the containers are slowly cooled. Upon exiting the annealing lehrs, the containers enter an inspection and packaging area where automatic machines and trained inspectors remove defective containers. The defective containers are recycled back into the melting operations as cullet. Finished containers are packed in corrugated boxes or on pallets and sent to the warehouse.

Mold swab is used to coat the forming machine molds to prevent the glass gob from sticking to the molds. Prior to entry into the lehrs, the containers are coated with a hot end coating to prevent scratches from handling during inspection and packaging.

Furnace 15 is rated at 58 MMBtu/hr. It is equipped with five (5) Combustion TECPF400 Model 10 burners and two (2) Combustion Tec PF400 Model 4 burners. Furnace 15 uses Oxy-Fuel technology whereby oxygen is used as the oxidant instead of combustion air. Furnace 15 was converted to Oxy-Fuel from a regenerative furnace in October 2010 (TR#X226121). This Furnace has a maximum pull rate of 348 tons of glass pulled per day.

Furnace 16 is rated at 50 MMBtu/hr. This regenerative glass melting furnace will be rebuilt in 2015/ 2016 and will continue to operate as a regenerative furnace. The re-bricked Furnace will be equipped with 2 AGI DIG burners per firing side utilizing natural gas. The regenerative furnace uses 'checker packs' to conserve energy by absorbing heat from the furnace exhaust and then transferring that heat to the incoming ambient combustion air that is fed to the furnace. This is an alternating process, repeated approximately every 20 minutes. This Furnace has a maximum pull rate of 348 tons of glass pulled per day.

The manufacture of glass containers in two glass melting furnaces results in emissions to the ambient air that include nitrogen oxides (NO_X), particulate matter (PM), sulfur dioxides (SO_2), volatile organic compounds (VOC), carbon monoxide (CO), sulfuric acid mist (SAM), greenhouse gases (GHG) that include carbon dioxide, methane and nitrous oxide, and hazardous air pollutants (HAP) such as hydrochloric acid (HCl), hydrogen fluoride (HF), chromium (CR), and lead (Pb).

The exhaust gas from each Furnace is sent through the three pollution control devices and exhausts through one common stack. Each Furnace has associated combustion equipment associated with it: a distributor, forehearths, and annealing lehrs. This equipment has uncontrolled fugitive emissions which exhausts through the roof vents.

There are 4 hot end coating process hoods that have uncontrolled fugitive emissions of hydrochloric acid (HCl). Hot end coating hood #151 exhausts to roof vent #151. Hot end coating hoods #152, #161, and #162 exhaust to roof vent #152.

Raw materials, which consist of sand, soda ash, limestone, colorants and fining agents, and recycled glass (cullet), are delivered by truck or rail. Materials such as limestone, soda ash, and sand are stored in silos, while cullet is stored in covered bays and a silo. Other raw materials are received in bags or pails. Raw material handling consists of unloading materials from either railcar or truck. Bulk raw materials unloaded from rail cars and trucks are controlled with a dust collector. Nuisance particulate matter from the raw material unloading, transfer and handling is kept to a minimum with a series of dust collectors and the use of Best Management Practices. Outside storage and material handling of cullet also results in fugitive particulate matter ("PM") emissions. Nuisance particulate matter from the cullet handling is kept to a minimum with the use of Best Management Practices.

Appendix A of this Plan Approval provides additional information about the emission units and the glass manufacturing process.

Supporting operations include wastewater treatment and general maintenance. There are also several pieces of auxiliary equipment such as space heaters, boilers, mold ovens, and emergency engines that are exempt from the air quality permitting process. Although this equipment is exempt from Plan Approval requirements, they were collectively included in the evaluation of applicability of MassDEP's Nonattainment New Source Review (NNSR) program (310 CMR

7.00 Appendix A) and/or USEPA's Prevention of Significant Deterioration (PSD) program (40 CFR 52.21), as required.

Based on operations conducted at the Facility, AGI's Standard Industrial Classification (SIC) code is 3221 (glass containers) and North American Industry Classification System (NAICS) code is 327213 (beverage containers/glass manufacturing).

B. Global Consent Decree

The Permittee (when operating under the name Saint-Gobain Containers, Inc.) entered into a Global Consent Decree (GCD) with the United States Environmental Protection Agency (USEPA or EPA) and the Massachusetts Department of Environmental Protection (MassDEP) on May 7, 2010: United States, et al. v. Saint-Gobain Containers, Inc. US District Court for the Western District of Washington at Seattle, Civil Action No 2:10-cv-00121-TSZ. The obligations of the GCD apply to and are binding upon AGI and its officers, employees, agents, subsidiaries, successors, assigns or other entities or persons otherwise bound by law.

The GCD established emission limits (in pounds per ton of glass pulled) for NO_x, SO_2, SAM, and PM; it required pollution control devices, (and/or Oxy-Fuel conversion of furnaces); it required installation of continuous emissions monitoring system (CEMS) and continuous opacity monitoring system (COMS) units, it established deadlines by which the Oxy-Fuel conversions, pollution control devices, CEMS, and COMS needed to be online, and it required the Permittee to obtain air permits. See Appendix B of this Plan Approval for additional information on the requirements of the GCD.

GCD Definitions:

The following definitions shall be used throughout this Plan Approval.

1) "24-hour Block Average" shall be calculated by averaging the twenty-four (24) one-hour relevant data outputs (concentration or pounds) for a given Day and using the daily glass production rates (tons) on that Operating Day where applicable.

2) "Abnormally Low Production Rate" shall mean a glass production rate at or below the production rate set forth in Paragraph 10 of the GCD. If production on a furnace is increased by a permit, the Abnormally Low Production Rate Day Threshold would be 35 percent of the new permitted production (or design production, where there is no permitted production) as determined on a daily basis. In this Plan Approval, this Abnormally Low Production Rate is 35% of the maximum design rate of 348 tons per day of glass pulled or 122 tons per day.

3) "Abnormally Low Production Rate Day" shall mean any Operating Day where production falls into the range of Abnormally Low Production Rate, for at least one continuous hour.

4) "CEMS" means Continuous Emission Monitoring System.

5) "CEMS Certification" means the certification of the CEMS required by 40 C.F.R. § 60.13, 40 C.F.R. Part 60 Appendix B (Performance Specification 2) and 40 C.F.R. Part 60 Appendix F (Quality Assurance Procedures).

6) "CEMS Certification Event" shall mean an event that triggers the requirement to complete a first or subsequent CEMS Certification. The first CEMS Certification shall not be required until the dates set forth in Table 8 of the GCD. Events that will trigger subsequent CEMS Certification include a Furnace Startup or a First Control Device Startup. SGCI shall commence such recertification no later than thirty (30) days after the Furnace Startup period concludes (but no later than seventy (70) Days after Furnace Startup commences) or First Control Device Startup period concludes. If a Furnace Startup and a First Control Device Startup happen at the same time, then the recertification shall not be conducted until the first Operating Day after the conclusion of the later startup event.

7) "COMS" shall mean a Continuous Opacity Monitoring System.

8) "Continuous Operating Year" shall mean a Calendar Year during which, on every day of the year, at least one of the Furnaces connected to a control system is Operating.

9) "Control Device Startup" shall mean the period of time from commencement of operation of an SCR, Scrubber System, ESP, CCSS, or similar add-on control device until the operation of the device has been stabilized and the device has achieved normal operating conditions. Such period shall not exceed thirty (30) Days.

10) "Day" shall mean a calendar day unless expressly stated to be a working day or unless a State rule requires that CEMs data be reported on Standard time (with no change for Daylight Savings Time). In computing any period of time for determining reporting deadlines under this Consent Decree, where the last day would fall on a Saturday, Sunday, or Federal or State holiday, in the State where the Facility is located, the period shall run until the close of business of the next working day.

11) "Emission Rate 30-day Rolling Average" shall be expressed as pounds of pollutant per ton of glass produced calculated at the Furnace in question in accordance with the following formula and Subparagraphs i. and ii below:

$$30-day\ average\ \frac{lb\ E}{ton} = \frac{COD_E\ (lbs) + P29D_E(lbs)}{COD_{Prod}\ (tons) + P29D_{Prod}(tons)}$$

Where: 30-day average (lb E/ton) = The Emission Rate 30-day Rolling Average

E = Emissions of the pollutant in question (NO_x or SO_2),

COD = Current Operating Day where the relevant Emission Rate 30-day Rolling Average is the applicable limit,

COD_E = The daily Emissions as measured by a CEMS on the COD, in pounds,

COD_{Prod} = Daily glass production on the COB, in tons of glass,

P29D = The Previous 29 Operating Days where the relevant Emission Rate 30-day Rolling Average is the applicable limit,

$P29D_E$ = The sum of the daily NO_x or SO_2 Emissions as measured by a CEMS during the P29D, in pounds, and

$P29D_{Prod}$ = The sum of the daily glass production during the P29D, in tons of glass.

i. A new Emission Rate 30-day Rolling Average shall be calculated for each new Operating Day where the Emission Rate 30-day Rolling Average is the applicable standard. Any Operating Day where the newly calculated Emission Rate 30-day Rolling Average exceeds the limit is a separate one Day violation; and
ii. As specified in this Consent Decree, some Operating Days will be excluded from the Emission Rate 30-day Rolling Average as set forth in Paragraphs 7-9 of this Consent Decree.

12) "First Control Device Startup" shall only refer to the first startup of the relevant add-on control device (an SCR, Scrubber System, ESP, CCSS, or similar add-on control). First Control Device Startup shall represent the period of time from commencement of operation of the device until the operation of the device has been stabilized and the device has achieved normal operating conditions, but shall not exceed thirty (30) Days.

13) "Furnace Startup" means the period of time while a Furnace's refractory is being heated up from ambient temperature and includes the Initial Heating Phase, Refractory Soak and Seal Phase, and Furnace Stabilization Phase.

14) "Operating Day" shall mean any Day where any fuel is fired into the Furnace. The Day starts at 12:00 am and ends at 11:59 pm.

15) "Outlet 30-day Rolling Average" is a term which applies only to SO_2 and shall be calculated by determining the Outlet 24-hour Block Average concentration from each

Furnace (or combined stack, if applicable) during an Operating Day and previous twenty-nine (29) Operating Days when Outlet 30-day Rolling Average was the applicable standard. A new Outlet 30-day Rolling Average shall be calculated for each Operating Day. Any Operating Day where the newly calculated Outlet 30-day Rolling Average exceeds the limit is a separate one Day violation. As specified in this Consent Decree, the following Operating Days are exempt from this average: Control Device Startup, Malfunction of the control device (Scrubber System, CCSS, or ESP) and Maintenance on the control device (Scrubber System, CCSS, or ESP).

16) "Removal Efficiency" for SO_2 means the percent reduction in concentration of that pollutant achieved by a Furnace's pollution control device. This percent reduction shall be calculated by subtracting the Outlet from the Inlet, dividing by the Inlet and then multiplying by 100.

17) Removal Efficiency 30-day Rolling Average" is a term which applies to SO_2 emissions and shall be calculated by summing the Removal Efficiency 24-hour Block Averages from each Furnace (or combined stack, if applicable) for each Operating Day and previous twenty-nine (29) Operating Days when Removal Efficiency 30-day Rolling Average was the applicable standard and then dividing by 30. A new Removal Efficiency 30-day Rolling Average shall be calculated for each new Operating Day. Any Operating Day where the newly calculated Removal Efficiency 30-day Rolling Average is less than the Removal Efficiency limit is a separate one-day violation. As specified in this Consent Decree, the following Operating Days are exempt from this average: Control Device Startup of the Scrubber System, CCSS, or ESP; Malfunction of the Scrubber System, CCSS, or ESP; and Maintenance on the Scrubber System, CCSS, or ESP.

C. Project Description

This Plan Approval authorizes changes to Furnaces 15 and 16 and to ancillary operations and establishes short term and long term emission limits for the Facility. This Plan Approval also addresses the terms of the Global Consent Decree. A Non- Major Comprehensive Plan Application (CE-13-020) was submitted and most recently revised in March 2015 that includes the following modifications:

1) Delimiting the daily production rate for Furnace 15 from 300 to a maximum of 348 tons of glass per day. The Furnaces at AGI typically operate continuously for periods of 8 to 10 or more years, after which time they are re-bricked. Furnace 15 was re-bricked in 2010 under Non-Major Comprehensive Plan Approval Transmittal (Tr #) X226121.

2) Re-bricking of glass melting Furnace 16 and incorporation of applicable requirements from the GCD. Furnace 16 is scheduled to be re-bricked in 2015/2016.

3) An increase in the daily production rate for Furnace 16 from 290 to maximum of 348 tons of glass pulled per day.

4) A total production cap of 610 tons of glass per day with the outputs of both Furnaces combined.

5) Installation of an enhanced insulation package and low-NO_x burners and changes made to associated equipment (e.g., batch charging equipment, distributor, fore hearths, forming machines, etc.).

6) Installation of an enhanced regenerative checker pack that will provide continuous thermal heat recovery and result in a net decrease in natural gas consumption (USEPA approved the installation of a checker pack, in lieu of a cullet pre-heater as the heat recovery project required by the GCD, in December 2013).

7) Incorporate the production of green glass containers (e.g. green glass) into the Facility's process. Production of green glass subjects the Facility to Area Source National Emission Standards for Hazardous Air Pollutants (NESHAP) for Glass Manufacturing (40 CFR Part 63, Subpart SSSSSS) ("6S NESHAP").

8) Installation of Air Pollution Control Equipment. For controlling NO_x, SO_2, PM, Metal HAP, and acid emissions from Furnaces 15 and 16, the Permittee is installing a combination of a Semi-dry Scrubber, followed by an Electrostatic Precipitator (ESP), and then a Selective Catalytic Reduction (SCR) system. The combined exhaust from both Furnaces is controlled by these Control Devices and then vents to the common exhaust stack known as the 'SCR stack'. Pursuant to the GCD, the Permittee shall have these Control Devices fully operational by December 31, 2015.

   a) Semi-Dry Scrubber is designed to control sulfur dioxide and acid gas emissions produced from the glass melting furnaces and to cool the exhaust stream before it enters the ESP. It is a thermally insulated tower with a high turbulence design and a total volume of 4,300 cubic feet (ft^3). The capacity of the unit is 65,355 actual cubic feet per minute (acfm). Model no. QR-AVG 350-122 is manufactured by Area Impianti and uses a sodium carbonate (soda ash) and water solution of approximately 4-10% by weight in strength as a reactant to remove acids gases (i.e. SO_2, SAM, HCl, and HF). This sodium carbonate solution is injected into the scrubber to neutralize the pH of the combustion gases. The sodium carbonate solution is injected at a rate of 4-12 gallons per minute (GPM). The semi-dry scrubber is dimensioned to optimize sufficient contact time (residence time) of at least 4.2 seconds between the gas and the absorbent at a temperature less than 837 ^{0}F. The sodium carbonate solution tank has a high/low level alarm.

      A sodium carbonate solution flow meter monitors the flow rate of the sodium carbonate solution to the scrubber. A pressure transducer will alarm if the soda ash

solution injection rate falls below 35 pounds per square inch (psi). This is a 'once through' system; the scrubbing liquid is not recirculated as the moisture vaporizes inside the scrubber.

Sodium carbonate (soda ash) is delivered to the Facility and off-loaded into a storage silo using a pneumatic unloading system. The silo has a volume of 2,648 cubic feet (ft^3). The silo is equipped with a pressure /vacuum relief hatch, access way, isolation gate valves, screw feeder and a level switch. The silo is also equipped with a pulse - jet cartridge dust collector to prevent emissions from discharging from the silo to the atmosphere. The dust collector has an area of 129 square feet (ft^2) in area. There is a visual alarm when the dust collector pressure drop is out of normal range.

The Semi-dry scrubber must be bypassed to the SCR stack if either the scrubber and/or the ESP is undergoing maintenance or malfunctions.

b) Electrostatic Precipitator (ESP) is designed to control particulate matter entrained in the exhaust stream exiting the scrubber.

The Facility's two existing ESPs are being replaced by one new wire-plate type Dry ESP. The new ESP unit is manufactured by Area Impianti, Model no. ESPA8. The gas superficial velocity for both furnaces is approximately 2.93 feet per second (ft/sec) or 57,803 acfm. The ESP unit has a capacity of 57,913 acfm at 577.4 degrees Fahrenheit (^0F) and will operate with a pressure drop of approximately 1.2 inches of water. It is a single stage unit with 2 modules. It operates with 100 plates with a specific collection surface area of 214.7 square feet per 1,000 actual cubic feet per minute (ft^2/1000 acfm).

The power requirements for the ESP are 319.6 watts per 1,000 actual cubic feet per minute and 35-50 kilovolts. The power supply control system is based on thyristors driven by a microprocessor. The collector plates are cleaned with a rapping system using hammers.

Precipitate from the ESP is collected in enclosed hoppers located under the ESP and then either collected in the ESP precipitate storage silo or in the super sack container enclosed inside a building. The super sack container is utilized when the precipitate transport system or silo is unavailable. The ESP precipitate contains materials consisting of sodium sulfate, sodium carbonate, and traces of heavy metals including lead and chromium compounds. Both the super sack and the precipitate storage silo are equipped with level signal switches that indicate when precipitate levels are high.

The precipitate in the silo is recycled into the raw material batches as an ingredient in the glass manufacturing process. The silo is equipped with a WAMFLO (model no. FNC3J22) pulse jet dust collector, or equivalent, to control dust emissions that may occur while the silo is being filled. The precipitate transfer system is a

pneumatic conveying system. The silo is filled by a completely sealed and enclosed mechanized conveyor transfer system to prevent the discharge of precipitate to the ambient air. The silo has an actual capacity of 3,460.8 ft^3 and can contain approximately 10 days of the precipitate generated at maximum operating conditions of the ESP and furnaces.

A dust collector is located on the top of the precipitate silo and is equipped with a round stack that is 60 feet high and 5.9 inches diameter. The dust collector has an area of 237 ft^2 and has a rated capacity of 1,177 actual cubic feet per minute (acfm). The pressure drop across the dust collector is designed to be 30 inches water gauge. There is a visual alarm when the dust collector pressure drop is out of range. For abnormal operation, there is a gravity drop under the precipitate silo to fill super sacks. A mechanical screw under the precipitate storage silo can load a super sack. The super sack is equipped with a level signal switch that indicates when precipitate levels are high.

During cleanouts of the ESP, a truck removes the ESP precipitate by vacuum ("vacuum truck") in accordance with the ESP Standard Operating and Maintenance Procedure. The vacuum truck is equipped with an operational dust collector. Super sacks may be placed in a trailer or a roll off for off-site disposal. The ESP precipitate is tested prior to disposal to determine the regulated status of the waste and managed appropriately.

The ESP must be bypassed to the SCR stack if either the scrubber and/or the ESP is undergoing maintenance or malfunctions.

c) Selective Catalytic Reduction ("SCR") is designed to remove the nitrogen oxides (NO_x) from the Furnaces.

The GCD specified that Furnace 16 be converted to Oxy-Fuel technology to reduce NO_x emissions, but also it provided an option for the use of alternative control technology. USEPA, in consultation with MassDEP, approved the SCR as an acceptable alternative to the Oxy-Fuel technology.

The SCR is manufactured by Area Impianti and is a SCR-VDS model 30/30-HT-76-T. It controls NO_x emissions by using a reducing agent and 2 layers of vanadium-tungsten-titania catalyst suitable for a medium dust environment. The catalyst has a honeycomb configuration and operates in a temperature range of 516- 554 ^{o} F. The reducing agent is aqueous ammonia up to 19% by weight. It is atomized and directly injected into the flue gases. The ammonia metering module is controlled by a feedback signal from the NO_x analyzer. Some of the ammonia will be unreacted and will result in an ammonia slip of up to 10 parts per million volume dry (ppmvd), adjusted to 8% oxygen. The catalyst is cleaned with a compressed air blower that

flows co-current with the exhaust gas flow. The exhaust gas is ducted to the SCR stack.

Aqueous ammonia is stored as a 19% solution in a tank with a volume of 30 cubic meters (m^3). The tank is equipped with a safety relief valve, level switches, vacuum breaker, temperature gauge and pressure gauge. Aqueous ammonia deliveries utilize a 'closed loop' system that returns residual pressure back to the tank, thus eliminating the need to vent the tank. A flow meter and flow control valve modulate the flow of ammonia to the SCR based on the NO_x signal received from the Continuous Emissions Monitor (CEM).

The SCR must be bypassed to the SCR stack if any piece of air pollution equipment is either undergoing maintenance or malfunctions.

9) Continuous Emissions Monitors (CEMs), Continuous Opacity Monitors (COMs), and Data Acquisition and Handling System (DAHS).

Both Furnaces are exhausted by way of a common duct to the emission control systems. SO_2 and moisture are monitored at both the scrubber inlet and the SCR outlet. The SCR stack is also equipped with a flow monitor, an opacity monitor, a NO_x analyzer, an ammonia (NH_3) analyzer and an oxygen (O_2) analyzer. Nexus Solution, Inc. CEMView software on a windows platform (or equivalent) is installed for the Data Acquisition and Handling System (DAHS). An automated calibration sequence (drift check) is performed once every 24 hours. The actual response of the analyzers and expected values are recorded in the DAHS. Values outside the allowable limits are flagged as invalid (out-of-control) in the system. Pursuant to the GCD, the Permittee shall have these monitoring devices and DAHS fully operational by December 31, 2015. See Appendix C of this Plan Approval for additional information on these monitoring devices.

10) These changes to the emission units, the addition of the pollution control devices, and all previous Plan Approvals for the Facility are incorporated into this Plan Approval. The following previously issued Air Quality Plan Approvals are superseded by this Plan Approval:

a) Plan Approval Tr# X250039, June 20, 2012 (Cullet Preheat System),
b) Plan Approval Tr# X226121, January 13, 2010 (Furnace #15 Rebrick and switch to Oxyfuel),
c) Plan Amendments Tr# W008014, June 23, 2000, and
d) NO_x RACT Emission Control Plan Tr# 87670, August 17, 1994.

D. Applicable Regulatory Requirements

1) Each glass melting Furnace is an affected facility subject to the New Source Performance Standards (NSPS) for Glass Manufacturing Plants (40 CFR 60 Subpart CC) and General Provisions of the NSPS (40 CFR 60 Subpart A).

2) This Facility is not a major source of Hazardous Air Pollutants (HAP) as individual HAP and total HAP emission limits are below 10 tons per year (TPY) and 25 TPY respectively.

3) The melting of green glass in Furnace 16 requires that the Facility comply with area source National Emission Standards for Hazardous Air Pollutants (NESHAPS), 40 CFR 63 Subpart SSSSSS (6S): "National Emission Standards for Hazardous Air Pollutants for Glass Manufacturing", because the furnace is continuous and will produce more than 50 tons per year of glass that contains one or more of the glass manufacturing metal HAP as raw materials. Furnace 15 is also subject to Subpart 6S requirements if it manufactures glass using one of the metal HAPs as a raw material.

4) The Facility has one existing emergency diesel generator that is subject to NSPS for Stationary Compression Ignition (CI) Internal Combustion Engines under NSPS (40 CFR 60, Subpart IIII) and NESHAP for stationary Reciprocating Internal Combustion Engines (RICE) (40 CFR Part 63, Subpart ZZZZ).

5) The emission limits established herein meet Best Achievable Control Technology (BACT) requirements for NO_x, SO_2, PM, SAM, Pb, CO, and VOC.

6) Ambient Air Quality Impact Analysis. A refined air quality impact analysis was conducted using an air quality dispersion model approved by the MassDEP and EPA for the pollutants emitted by the Facility which have annual potential emissions greater than or equal to the applicable Significant Emission Rate (SER). The simulations using the American Meteorological Society/Environmental Protection Regulatory Model (AERMOD) provide pollutant concentrations at each receptor location averaged over periods determined by the applicable National Ambient Air Quality Standard (NAAQS). Concentrations less than the applicable Significant Impact Level (SIL) indicate that emissions for the Facility are in compliance with the NAAQS for that pollutant. Concentrations that equal or exceed the applicable SIL require additional analysis involving nearby existing sources and a representative background concentration to assess compliance with the NAAQS. The following pollutants had potential annual emissions that were greater than the respective SIL:

   - Particulate Matter less than 10 microns (PM_{10})
   - Fine Particulate Matter less than 2.5 microns ($PM_{2.5}$)
   - Oxides of Nitrogen (NO_x)
   - Sulfur dioxide (SO_2)

Carbon Monoxide and lead were also included in the modeling. In all cases, the predicted total concentrations indicate compliance with the NAAQS.

Additionally, Hazardous Air Pollutants listed in Table 2, which are emitted from the Facility, were modeled and compared to MassDEP's listed health-based air toxic guidelines, the Ambient Air Limits (AALs) and Threshold Effect Exposure Limits (TELs). The AALs/TELs are used to evaluate potential human health risks from exposures to chemicals in air. In all cases, the predicted total concentrations indicate compliance with the AALs/TELs.

E. Non-Applicability Provisions

1). Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) preconstruction applicability determination and review procedures under 40 CFR Part 52, section 52.21, apply to projects at major stationary sources. A glass manufacturing facility is a major stationary source, under PSD, if its potential emissions are 250 tons per year or more of a regulated NSR pollutant.

The Facility's potential NO_x and SO_2 emissions are greater than 250 tons per year. Therefore, the project is subject to PSD applicability determination.

The project would be subject to PSD review for any regulated NSR pollutant with a significant increase and/or a significant net emission increase.

This project does result in an actual $PM_{2.5}$ and PM_{10} emissions increases. This Plan Approval includes both $PM_{2.5}$ and PM_{10} emission limits and production limits that ensure the actual emissions $PM_{2.5}$ increase will be less than 10 tons per year, and the actual PM_{10} emissions increase will be less than 15 tons per year. As such, the project will not cause a future actual increase in emissions of any regulated NSR pollutant.

Therefore, the project is not subject to PSD review.

2). 310 CMR 7.00: Appendix A

The Emission Offsets and Nonattainment Review preconstruction applicability determination requirements of 310 CMR 7.00: Appendix A apply to projects at Major Stationary Sources. A facility is a major stationary source under Appendix A, if its potential emissions of NO_x or VOC are 50 tons per year or more.

The Facility's potential VOC emissions are less than 50 tons per year. Therefore, the project is not subject to Appendix A review for VOC.

The Facility's potential NO_x emissions are greater than 50 tons per year. Therefore, the project would be subject to Appendix A review if it results in a significant net increase in NO_x emissions, 25 tons per year or more.

The project will cause a reduction, however, in actual NO_x emissions from the modified emission units, and a net reduction in actual NO_x emissions from the Facility including other contemporaneous changes. Therefore, the project is not subject to preconstruction review under Appendix A.

3). Pursuant to 310 CMR 7.19(1)(c)9, the NO_x RACT requirements contained in 310 CMR 7.19, the previous Plan Approval and the ECP no longer apply to the emission units (EUs) identified in this Plan Approval. This is because this Plan Approval establishes BACT emission limits which are more stringent than the RACT emission limits for a facility size and type as defined in 310 CMR 7.19. If the applicable RACT standards of 310 CMR 7.19 becomes more stringent than BACT emission limits established in this Plan Approval, the Facility will become subject to the updated RACT standards at that time.

2. EMISSION UNIT (EU) IDENTIFICATION

Each Emission Unit ("EU") identified in Table 1 is subject to and regulated by this Plan Approval:

Table 1 - Emission Unit Description

EU	Description	Design Capacity	Pollution Control Device
1	Furnace 15 Oxy-Fuel	348 TPD glass pull rate [1] Furnace rated at 58 MMBtu/hr	• Semi-dry Scrubber designed for 85% SO_2 control efficiency or 45 ppmvd • ESP designed for 99% PM control efficiency • SCR designed for 90% NO_x control efficiency with aqueous ammonia injection
2	Furnace 16 Regenerative	348 TPD glass pull rate [1] Furnace rated at 50 MMBtu/hr	
3	Furnace Associated Combustion Sources	• Distributor 15 :8.12 MMBtu/hr • Distributor 16: 3.48 MMBtu/hr • Forehearths: 151A (1.87 MMBtu/hr),	NA

Table 1 - Emission Unit Description

EU	Description	Design Capacity	Pollution Control Device
3		151B (1.87 MMBtu/hr), and 152 (2.46 MMBtu/hr) • Forehearths: 161 (2.21 MMBtu/hr) and 162 (2.21 MMBtu/hr) • Annealing Lehrs 151 (4.00 MMBtu/hr) and 152 (2.03 MMBtu/hr) • Annealing Lehrs 161 (2.03 MMBtu/hr) and 162 (5.00 MMBtu/hr) • Combined: 35.27 MMBtu/hr	
4	Storage Silos	• Sodium Carbonate storage silo - capacity of 2,648 ft^3 • Precipitate storage silo - capacity of 3,460.8 ft^3 • 1177 acfm each	One dust collector for each silo with a 99.9% PM control efficiency
5	4 Hot End Coating Hoods and Mold swabbing	NA	NA
6	Raw Material handling	Between 200 scfm and 12,000 scfm	13 Dust collectors with a 99.9% PM control efficiency and Best Management Practices for raw material handling

Table 1 Key:

acfm = actual cubic feet per minute
ESP = Electrostatic precipitator
EU = Emission Unit Number
F15 = Furnace 15
F16 = Furnace 16
ft^3 = cubic feet
MMBtu/hr = million British thermal units / hour
NA = Not applicable
NO_x= nitrogen oxides
% = percent
PCD = Pollution Control Device
PM = Particulate Matter
ppmvd = parts per million volume dry
SCR= selective catalytic reduction
scfm = standard cubic feet per minute
SO_2 = Sulfur dioxide
TPD = tons per day

Table 1 Note:

1. Each Furnace will still maintain a maximum pull rate of 348 TPD, however the Facility will limit the *total* tons of glass pulled in one day to 610 TPD from the two Furnaces.

3. APPLICABLE REQUIREMENTS

A. Operational, Production and Emission Limits During Normal Operations

The Permittee is subject to, and shall not exceed the Operational, Production, and Emission Limits as contained in Tables 2, 2A, and 2C.

The Emission Rate 30 Day Rolling Average Limits listed in Table 2A are expressed as pounds of the pollutant in question per ton of glass pulled. It is calculated by averaging the emissions of the current Operating Day plus the previous 29 Operating Days. As specified in this Plan Approval and the GCD, some Operating Days will be excluded from the Emission Rate 30 day rolling average (see Section 3.B of this Plan Approval). Any Operating Day where the newly calculated Emission Rate 30 day rolling average exceeds the limit is a separate one Day violation pursuant to the GCD.

The initial Emission Rate 30 Day Rolling Average Limit for both NO_x and SO_2 for this Plan Approval shall commence on the first Operating Day after the completion of the CEMS Certification following the completion of the Control Device Startup. Notwithstanding the Emission Rate 30 Day Rolling Average Limits for NO_x and SO_2, the Permittee shall comply with the NO_x and SO_2 tons per month and tons per year emission limits in Table 2 at all times.

The emission factors listed in Table 2B are the basis for the emission limits in Table 2. For any air contaminants listed in Table 2 not directly monitored by a CEMS, the emissions of that air contaminant shall be calculated based on the emission factors listed in Table 2B or by emission factors that are determined by compliance stack testing, whichever is lower.

Likewise, notwithstanding the emission limits in Table 2C for Abnormal Conditions, the Permittee shall comply with the NO_x and SO_2 pounds per month and tons per year emission limits in Table 2 at all times.

Table 2 - Emission Limits

EU	Operational / Production Limit	Air Contaminant		Emission Limit			
				lb/hr	lb/day	lb/month	TPY [1]
1, 2, and 3	1. Furnace 15: 58 MM Btu/hr 2. Furnace 16: 50 MM Btu/hr 3. Maximum of 610 TPD glass pull between the 2 furnaces.	NOx [2]	Furnaces Only	54.9	1171	33,398	133.6
			Furnaces & Equipment [3]	NA	NA	37,152	148.6
		SO_2 [2]	Furnaces Only	36.6	781	22,265	89.1
			Furnaces & Equipment [3]	NA	NA	22,288	89.2

Table 2 - Emission Limits							
EU	Operational / Production Limit	Air Contaminant		Emission Limit			
				lb/hr	lb/day	lb/month	TPY [1]
1, 2, and 3	4. Good combustion practices	CO	Furnaces Only	9.2	195.2	5,566	22.3
			Furnaces & Equipment [3]	NA	NA	8,720	34.9
		VOC	Furnaces Only	4.6	97.6	2,783	11.1
			Furnaces & Equipment [5]	NA	NA	3,111	12.4
1, 2, 3, and 5		Total PM (TPM) [4]	Furnaces Only	14.2	302.6	8,628	34.5
			Furnaces & Equipment [5]	NA	NA	9,707	38.8
		Filterable PM (FPM) [6, 7, 10]	Furnaces Only	9.2	195.2	5,566	22.3
			Furnaces & Equipment [5]	NA	NA	6,432	25.7
		Total PM_{10}	Furnaces Only	11.9	253.8	7,236	28.9
			Furnaces & Equipment [5]	NA	NA	8,120	32.5
		PM_{10} (Filterable) [6, 7, 10]	Furnaces Only	6.9	146.4	4,175	16.7
			Furnaces & Equipment [5]	NA	NA	4,844	19.4
		Total $PM_{2.5}$	Furnaces Only	9.9	210.8	6,012	24.1
			Furnaces & Equipment [5]	NA	NA	6,723	26.9
		$PM_{2.5}$ (filterable) [6, 7, 10]	Furnaces Only	4.9	103.5	2,950	11.8
			Furnaces & Equipment [5]	NA	NA	3,448	13.8
1 and 2		Individual HAP (Hexane)	Furnaces Only	1.01	21.5	612	2.5
		Total VOC HAP	Furnaces Only	1.05	22.4	640	2.6
		Total HAP [8]	Furnaces Only	4.7	102.1	3,307	13.2
		Ammonia [9]	Furnaces Only	2.0	41.5	1,184	4.7
		SAM	Furnaces Only	6.4	136.6	3,896	15.6

Table 2 - Emission Limits							
EU	**Operational / Production Limit**	**Air Contaminant**		**Emission Limit**			
				lb/hr	**lb/day**	**lb/month**	**TPY [1]**
1 and 2		Lead	Furnaces Only	0.08	1.8	50.9	0.2
		Antimony	Furnaces Only	0.002	0.038	1.1	0.004
		Arsenic	Furnaces Only	0.009	0.195	5.6	0.02
		Cadmium	Furnaces Only	0.004	0.079	2.2	0.009
		Chromium	Furnaces Only	0.042	0.89	25.4	0.1
		Chromium VI	Furnaces Only	0.002	0.038	1.1	0.004
		HCl	Furnaces Only	0.82	17.6	501	2.0
		HF	Furnaces Only	0.82	17.6	501	2.0
		Nickel	Furnaces Only	0.0015	0.032	0.9	0.004
		Selenium	Furnaces Only	0.024	0.521	14.9	0.06
		Zinc	Furnaces Only	0.017	0.354	10.1	0.04
		Opacity		Not to exceed 10% (1 minute block average) except for 20% to 25% for ≤ 2 minutes during any one hour.			
4		PM Total		No Visible Emissions		66.7	0.2
5		HCl		0.48	11.5	526.0	2.1
6		PM total		No Visible Emissions		175	0.7
		Opacity		No Visible Emissions			

Table 2 Notes:

1. Rolling 12 month period
2. Monthly and yearly limits include emissions from abnormal episodes listed in Table 2C.
3. Total emissions include the Distributor, Forehearth, and Lehr in addition to the Furnaces emissions.
4. Total PM includes filterable and condensable and includes particulate matter having a diameter of 10 microns or less (PM_{10}) and particulate matter having a diameter of 2.5 microns or less ($PM_{2.5}$).
5. Total emissions include the Distributor, Forehearth, Lehr, Mold Swabbing, and Hot End Coating in addition to the Furnaces emissions.
6. PM Filterable includes particulate matter having a diameter of 10 microns or less (PM_{10}) and particulate matter having a diameter of 2.5 microns or less ($PM_{2.5}$).

7. Filterable PM_{10} and $PM_{2.5}$ for furnaces are based on the particle size distribution in AP-42 (Table 11.15-3) for ESP-controlled furnaces (75% PM_{10}, 53% $PM_{2.5}$). If particle size distribution data become available in the future, these limits will be revised accordingly.
8. Total HAP is based on the maximum total of all Non VOC HAP (metals), total VOC HAP, HF, and HCl
9. Ammonia emissions from the Furnaces only ("ammonia slip") are 10 ppmvd from the SCR and is corrected to 8% oxygen.
10. Filterable PM_{10} and $PM_{2.5}$ from mold swab are based on the particle size distribution in AP-42 (Table 11.15-3) for uncontrolled furnaces (95% PM_{10}, 91% $PM_{2.5}$). If particle size distribution data become available in the future, these limits will be revised accordingly.

Table 2 Key:

% = percent

$\leq$ = less than or equal to

$\geq$ = greater than or equal to

CO = Carbon Monoxide

EU = Emission Unit Number

FPM = Filterable Particulate Matter

GCD = Global Consent Decree

gr/dscf = grains per dry standard cubic foot

HAP = Hazardous Air Pollutant

Individual HAP = maximum single Hazardous Air Pollutant

HCl = hydrogen chloride

HF = hydrogen fluoride

lb/ton = pound of pollutant per ton of glass pulled

NO_x = Nitrogen Oxides

PM filterable = Particulate Matter filterable

PM total= Total Particulate Matter filterable and condensable

$PM_{2.5}$ filterable= Particulate Matter less than or equal to 2.5 microns in diameter filterable

$PM_{2.5}$ total= Particulate Matter less than or equal to 2.5 microns in diameter filterable and condensable

PM_{10} filterable= Particulate Matter less than or equal to 10 microns in diameter filterable

PM_{10} total= Particulate Matter less than or equal to 10 microns in diameter filterable and condensable

ppmvd = parts per million, volume dry

SAM = Sulfuric Acid Mist

SO_2 = Sulfur Dioxide

Total HAP = Total Hazardous Air Pollutants

TPY = tons per consecutive12-month period

VOC = Volatile Organic Compounds

Table 2A - GCD 30 Day Rolling Limit During Normal Operations		
EU	**Air Contaminant**	**30 Day Rolling Limit [1]**
1 and 2	NO_x	1.2 lb/ ton
	SO_2	0.8 lb/ton
		If daily inlet 24-hour block average SO_2 concentration ≥ 300 ppmvd, the SO_2 removal efficiency [2] shall be ≥85%
		If daily inlet 24-hour block average SO_2 concentration <300 ppmvd, the outlet SO_2 concentration shall be ≤45 ppmvd

Table 2A Notes

1. Notwithstanding the emission limits in Table 2A, the Permittee shall comply with the NO_x and SO_2 tons per month and tons per year emission limits in Table 2 at all times.
2. The Removal Efficiency 30 day rolling average term applies to SO_2 only. It is calculated by summing the Removal Efficiency 24-hour Block Average for the current Operating Day and the previous 29 Operating Days and dividing by 30. As specified in this Plan Approval and the GCD, some Operating Days will be excluded from the Removal Efficiency 30 day rolling average. Any Operating Day where the newly calculated Removal Efficiency 30 day rolling average exceeds the limit is a separate one Day violation pursuant to the GCD.

Table 2A Key

EU = Emission Unit
NO_x = Nitrogen Oxides
SO_2 = Sulfur Dioxide
ppmvd = parts per million, volume dry
% = percent
GCD = Global Consent Decree
lb/ton = pounds per ton
≥ = greater than or equal to
≤ = less than or equal to
< = less than

Table 2B - Emission Factors by Emission Unit						
Air Contaminant	**F15/F16 (lb/ton)**	**Distributor (lb/MMBtu)**	**Forehearths (lb/MMBtu)**	**Lehrs (lb/MMBtu)**	**Mold Swab (lb/lb dope)**	**Hot End Coating (lb/lb coating)**
NO_x	1.2	0.097	0.097	0.097	NA	NA
SO_2	0.8	0.0006	0.0006	0.0006	NA	NA
CO	0.20	0.0816	0.0816	0.0816	NA	NA
VOC	0.1	0.0053	0.0053	0.0053	NA	0.042
Total PM [1] (TPM)	0.31	0.0074	0.0074	0.0074	0.061	0.24
Filterable PM (FPM) [2]	0.2	0.0018	0.0018	0.0018	0.061	0.24
Total PM_{10}	0.26	0.0069	0.0069	0.0069	0.058	0.18
PM_{10} (Filterable)	0.15	0.0014	0.0014	0.0014	0.058	0.18

Table 2B - Emission Factors by Emission Unit

Air Contaminant	F15/F16 (lb/ton)	Distributor (lb/MMBtu)	Forehearths (lb/MMBtu)	Lehrs (lb/MMBtu)	Mold Swab (lb/lb dope)	Hot End Coating (lb/lb coating)
3, 6						
Total PM $_{2.5}$	0.22	0.0065	0.0065	0.0065	0.056	0.13
PM $_{2.5}$ (filterable) **3, 6**	0.11	0.0010	0.0010	0.0010	0.056	0.13
Individual HAP	0.022	0.00175	0.00175	0.00175	NA	0.21 **4**
Total VOC HAP	0.023	0.00183	0.00183	0.00183	NA	NA
Total HAP	0.023	0.00183	0.00183	0.00183	NA	0.21 **4**
Ammonia **5**	10 ppmvd	NA	NA	NA	NA	NA
SAM	0.14	NA	NA	NA	NA	NA
Lead	0.002	NA	NA	NA	NA	NA
Antimony	0.000039	NA	NA	NA	NA	NA
Arsenic	0.0002	NA	NA	NA	NA	NA
Cadmium	0.00008	NA	NA	NA	NA	NA
Chromium	0.00091	NA	NA	NA	NA	NA
Chromium VI	0.00004	NA	NA	NA	NA	NA
HCl	0.018	NA	NA	NA	NA	0.21 **4**
HF	0.018	NA	NA	NA	NA	NA
Nickel	0.00003	NA	NA	NA	NA	NA
Selenium	0.0005	NA	NA	NA	NA	NA
Zinc	0.0004	NA	NA	NA	NA	NA

Table 2B Notes

1. Total PM includes filterable and condensable and includes particulate matter having a diameter of 10 microns or less (PM_{10}) and particulate matter having a diameter of 2.5 microns or less ($PM_{2.5}$).
2. PM Filterable includes particulate matter having a diameter of 10 microns or less (PM_{10}) and particulate matter having a diameter of 2.5 microns or less ($PM_{2.5}$).
3. For filterable PM, the PM_{10} and PM $_{2.5}$ from furnace emission factors are based on the particle size distribution in AP-42 (Table 11.15-3) for ESP-controlled furnaces (75% PM_{10}, 53% PM $_{2.5}$). If particle size distribution data become available in the future, these limits will be revised accordingly.
4. 0.21 lb/lb HEC coating used (and 0.09 lb HEC/ton glass pulled).
5. Ammonia emissions from the furnaces only ("ammonia slip") are10 ppmvd from the SCR and is corrected to 8% oxygen.
6. Filterable PM_{10} and PM $_{2.5}$ from mold swab are based on the particle size distribution in AP-42 (Table 11.15-3) for uncontrolled furnaces (95% PM_{10}, 91% PM $_{2.5}$). If particle size distribution data become available in the future, these limits will be revised accordingly.

Table 2B Key

CO = Carbon Monoxide

EU = Emission Unit Number

FPM = Filterable Particulate Matter

PM filterable = Particulate Matter filterable

PM $_{2.5}$ total= Particulate Matter less than or equal to 2.5 microns in diameter filterable and condensable

PM total= Total Particulate Matter filterable and

condensable

HAP = Hazardous Air Pollutant

Individual HAP = maximum single Hazardous Air Pollutant

HCl = Hydrogen chloride

HF = Hydrogen fluoride

HEC = hot end coating

lb/lb = pound per pound

lb/MMBtu = pounds per million British thermal units

lb/ton = pound of pollutant per ton of glass pulled

NA = not applicable

NO_x = Nitrogen Oxides

$PM_{2.5}$ filterable= Particulate Matter less than or equal to 2.5 microns in diameter filterable

PM_{10} total= Particulate Matter less than or equal to 10 microns in diameter filterable and condensable

PM_{10} filterable= Particulate Matter less than or equal to 10 microns in diameter filterable

ppmvd = parts per million, volume dry

SAM = Sulfuric Acid Mist

SO_2 = Sulfur Dioxide

Total HAPs = Total Hazardous Air Pollutants

TPY = tons per consecutive12-month period

VOC = Volatile Organic Compounds

B. NO_x and SO_2 Emission Limits During Abnormal Episodes

The limits in Table 2C below identify the exceptions to the NO_x and SO_2 emission rates for Furnaces 15 and 16 in Table 2 above. These emission limits are applicable for demonstrating compliance with the GCD and with this Plan Approval. These emission limits were calculated based on the formulas in the GCD which are duplicated in Appendix D.

The abnormal episode exceptions are:

1) Abnormally Low Production Rate (ALPR)
2) Malfunction of any of the pollution control devices [1]
3) Maintenance of any of the pollution control devices
4) Up to the first seven (7) days of Furnace startup
5) Pollution control device start-up

ALPR is defined as 35% of maximum production rate of 348 tons per day per furnace (or 122 tons per day per furnace).

Pursuant to the GCD, for any Operating Day, where an abnormal episode occurs for any period of time, the Permittee may elect to exclude the emissions generated during that Operating Day (Operating Days if the event covers more than one Operating Day) from the Emission Rate 30-

[1] Consistent with 40 CFR 60.2, a Malfunction refers to any sudden, infrequent, and not reasonably preventable failure of the air pollution control equipment to operate in a normal or usual manner, but shall not include failures that are caused in part by poor maintenance or careless operation.

day Rolling Average, the 30-Day Rolling Average SO_2 Removal Efficiency or 30-Day Rolling Average SO_2 outlet concentration limit. An "Operating Day" is defined in the GCD as any day where any fuel is fired into the Furnace, starting at 12:00 AM and ending at 11:59 PM. During these episodes, the CEMS shall be used to demonstrate compliance with the emissions listed in Table 2C based on a 24-hour Block Average.

Notwithstanding the emission limits in Table 2C, the Permittee shall comply with the NOx and SO_2 pounds per month and tons per year emission limits in Table 2 at all times.

Table 2C - Emission Limits During Abnormal Operations

EU	Air Contaminant	Abnormal Operating Condition		Emission Limit [1]		
				Furnace 15 Only[5]	Furnace 16 Only [5]	Both Furnaces Operating [6]
1 and 2	NO_x	Abnormally Low Production Rate Days		418 lb/day	418 lb/day	732 lb/day
		Malfunction of any Control Device [2]		418 lb/day	2,091 lb/day	2,406 lb/day
		Maintenance of any Control Device [3,4]	MH = 4 hrs	418 lb/day	697 lb/day	1,021 lb/day
			MH = 8 hrs	418 lb/day	976 lb/day	1,290 lb/day
			MH = 12 hrs	418 lb/day	1,255 lb/day	1,569 lb/day
			MH = 16 hrs	418 lb/day	1,534 lb/day	1,848 lb/day
			MH = 20 hrs	418 lb/day	1,813 lb/day	2,127 lb/day
			MH = 24 hrs	418 lb/day	2,091 lb/day	2,406 lb/day
1 and 2	SO_2	Abnormally Low Production Rate Days		279 lb/day	279 lb/day	488 lb/day
		Malfunction of the Scrubber or ESP [2]		871 lb/day	871 lb/day	1,525 lb/day
		Maintenance of the Scrubber or ESP [3,4]	MH = 4 hrs	387 lb/day	387 lb/day	678 lb/day
			MH = 8 hrs	484 lb/day	484 lb/day	847 lb/day
			MH = 12 hrs	581 lb/day	581 lb/day	1,017 lb/day
			MH = 16 hrs	678 lb/day	678 lb/day	1,186 lb/day
			MH = 20 hrs	775 lb/day	775 lb/day	1,356 lb/day
			MH = 24 hrs	871 lb/day	871 lb/day	1,525 lb/day

Table 2A Notes:

1. Emissions limits are based on a 24-hour Block Average
2. When any piece of pollution control device malfunctions, the Permittee must go to ALPR within 24 hours of the malfunction.
3. Maintenance lasting greater than twenty four (24) consecutive hours shall occur only during Abnormally Low Production Rate Days.
4. Maintenance hours for all pollution control equipment shall not exceed 144 hours per device annually in any Calendar Year.
5. Based on a scenario with only the one Furnace operating with a glass pull rate of 348 TPD.
6. Based on a worst case scenario of both Furnaces operating with a glass pull rate of 348 TPD on Furnace 16 and 262 TPD on Furnace 15.

Table 2A Key:

ESP = Electrostatic Precipitator
EU = Emission Unit Number
hrs = hours
lbs/day = pounds per day
MH = Hours of Maintenance for Control Device
NO_x = Nitrogen Oxides
SO_2 = Sulfur Dioxide
TPD = tons per day

C. Operational Restrictions During A Control Device Startup Or Up To The First Seven Days Of Furnace Startup

The restrictions in Table 2D are applicable during all pollution control device startups, and up to the first seven days of the Furnace Startup period. The emissions generated during these periods may be excluded from the Emission Rate 30-day Rolling Average for NO_x and SO_2, the 30-Day Rolling Average SO_2 Removal Efficiency, and the 30-Day Rolling Average Control Device SO_2 outlet concentration emission limits. Notwithstanding the exclusions from the rolling 30 day averages pursuant to the GCD, the Permittee shall comply with the NO_x and SO_2 pounds per month and tons per year emission limits in Table 2 at all times.

For no more than the first 7 days of Furnace Startup or Control Device Startup, the Furnace exhaust gas may bypass the scrubber, ESP and the SCR to avoid having the operating inlet temperature of the scrubber, ESP or SCR fall below its operational range. During this period, the fuel and sulfur restrictions in Table 2D are applicable and the Permittee shall calculate all emissions from the Furnace undergoing Furnace Startup on a daily basis. Once the exhaust gas from the Furnace undergoing Furnace Startup is sent through the control devices, this calculation is no longer necessary and the Permittee shall comply with the emission limits in Table 2.

The First Control Device Startup, pursuant to the GCD Section 3(w), shall represent the period of time from commencement of operation of the device until such time that the device is stable and has achieved normal operating conditions. This Control Device Startup time shall not exceed 30 days. Within 30 days of the first Operating Day of the Control Devices installed under this Plan Approval, the CEMS units shall commence certification. Until the CEMS units are certified, the fuel and sulfur restrictions in Table 2D are applicable and the Permittee shall

calculate all emissions from the Emission Units on a daily basis during this period. Once the CEMS units are certified, this calculation is no longer necessary and the Permittee shall comply with the emission limits in Table 2.

Table 2D – Fuel Restrictions and Operational Limits		
EU	**Operating Parameter / Condition**	**Restriction /Fuel Use Limits**
1 and 2	During Control Device Start-Up or First 7 days of Furnace Start up	≤ 15.0 MMscf
	During Control Device Startup or First 7 days of Furnace Startup	≤ 2.6 lbs of sulfur added per ton of total batch material (including cullet)

Table 2B Key:

≤ = less than or equal to
lbs = pounds
EU = emission unit number
MMscf = million standard cubic feet

D. Compliance Demonstration

The Permittee is subject to, and shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 3, 4, and 5.

Table 3 - Monitoring and Testing	
EU	**Requirements**
1 and 2	**COMS/CEMS**
	1. By December 31, 2015, the Permittee shall install, calibrate, certify, maintain, and continuously operate a Continuous Opacity Monitoring System (COMS) to monitor opacity from Furnaces 15 and 16 combined at the SCR stack. The COMS shall be maintained in an accurate operating condition and shall be installed, calibrated, certified, and operated in accordance with 40 CFR 60 Appendix B (Performance Specifications) and with 40 CFR Part 60, Appendix F, Procedure 3.
	2. The Data Acquisition and Handling System (DAHS) shall collect and record opacity values from the COMS monitor. It shall continuously monitor and record once every 7.5 seconds with 1 minute block averages.
	3. In the event the COMS monitor is off-line more than four hours, a certified opacity observer shall conduct opacity observations once every day during day-light hours. The opacity observer shall take and record daily opacity readings until such time the COMs is placed back in proper operating condition. The log shall include the date, time and opacity reading and the name of person making the observations ('the observer'). Opacity observations shall be in accordance with EPA reference Method 9. All reading logs and certifications shall be maintained on site.

Table 3 - Monitoring and Testing

EU	Requirements
	4. The Permittee shall install the COMS with a visible alarm which activates whenever the opacity is within 2 % of the limit established in Table 2 of this Plan Approval.
1 and 2	5. The Permittee shall obtain and record opacity data from the COMS for at least 75% of the COMS unit operating hours per calendar day, for at least 84% of the COMS unit operating hours per calendar month, and for at least 95% of the COMS unit operating hours per calendar quarter that the COMS unit operates except for periods of calibration checks, zero and span adjustments, and preventive maintenance.
	6. The Permittee shall use and maintain the COMs system as a 'direct-compliance' monitor to measure compliance with the opacity limit contained herein. 'Direct-compliance' monitors generate data that legally documents the compliance status of a source. MassDEP shall utilize the data generated by the 'direct-compliance' monitors, by MassDEP- recognized emission testing, or by other credible evidence for its determination of compliance with the limits and conditions established in the Plan Approval.
	7. Pursuant to the GCD, by December 31, 2015, the Permittee shall install, calibrate, certify, maintain and continuously operate a DAHS and a Continuous Emission Monitoring System (CEMS) in an accurate operating condition to measure and record the following: a) Oxygen (O_2): located at the SCR stack, b) Oxides of Nitrogen (NO_x): located at the SCR stack, c) Sulfur Dioxide (SO_2) located at the combined inlet duct and SCR stack, d) Ammonia (NH_3) located at the SCR stack, e) Moisture located at the combined inlet duct and SCR stack, and f) Flow located at the SCR stack. A calibration check sequence for each CEM monitor shall be programmed into the DAHS and performed daily.
	8. The DAHS shall continuously collect and record oxygen, moisture, and flow data from the monitors and track any Control Device bypass.
	9. All CEMS shall be installed, calibrated, certified, maintained, and operated in accordance with 40 CFR 60 Appendix B (Performance Specifications) and 40 CFR 60 Appendix F (Quality Control Procedures).
	10. The Permittee shall ensure that the NO_x, SO_2, and NH_3 CEMS units monitor continuously and record hourly the NO_x, SO_2, and NH_3 emission concentrations. The DAHS shall calculate the emissions in pounds per hour to determine compliance with Table 2 or Table 2A as applicable emission limits. At the end of each 24 hour day, the DAHS shall calculate the total daily emissions in pounds per day and in pounds per ton of glass pulled.

Table 3 - Monitoring and Testing	
EU	**Requirements**
	11. The Permittee shall determine the daily inlet and outlet concentrations of SO_2, the 24 hour block average, 30 day rolling average (when inlet concentrations are < 300 ppmvd) or the Removal Efficiency 30 day rolling average (when inlet concentrations are ≥ 300 ppmvd).
	12. The Permittee shall determine the 24 hour block average and 30 day rolling average for NO_x.
1 and 2	13. The Permittee shall determine the daily Furnace emissions for Total PM.
	14. The Permittee shall calculate the monthly emissions for all other pollutants listed in Table 2 which are not directly measured by CEMS by using the glass pull rates, fuel usage, material throughput, hours of operation, and the emission factors in Table 2B to provide assurance that these air pollutants levels are in compliance with Table 2 Emission Limits.
	15. The Permittee shall use and maintain the CEMS system as a 'direct-compliance' monitor to measure NO_x, SO_2, and Ammonia. 'Direct-compliance' monitors generate data that legally documents the compliance status of a source. MassDEP shall utilize the data generated by the 'direct-compliance' monitors, by MassDEP- recognized emission testing, or by other credible evidence for its determination of compliance with the limits and conditions established in the Plan Approval.
	16. The Permittee shall use and maintain the CEMS with a visible alarm to activate when emissions approach the limits established in Tables 2, 2A, and/or 2C as applicable of this Plan Approval.
	17. The Permittee shall operate each CEMS at all times except for periods of CEMS calibration checks, zero and span adjustments, preventive maintenance, and periods of malfunction.
	18. If a CEMS certification event occurs, then the requirement to demonstrate compliance continuously with the applicable NO_x, SO_2, and NH_3 emission limits for Furnaces 15 and 16 will be suspended until the Certification is completed (provided the seven day drift test required for Certification is commenced the first Operating Day following the conclusion of the CEMS Certification Event).
	19. The Permittee shall obtain and record emission data from each CEMS for at least 75% of the emission unit operating hours per calendar day, for at least 84% of the emission unit operating hours per calendar month, and for at least 95% of the emission unit operating hours per calendar quarter that the CEMS unit(s) operates except for periods of calibration checks, zero and span adjustments, and preventive maintenance.

Table 3 - Monitoring and Testing

EU	Requirements
	20. For the times when the NH_3 CEMS is not available for greater than two hour, the Permittee shall monitor the following parameters to provide assurance that the NO_x levels, operating loads, and NH_3 injection rates being maintained are consistent with prior NH_3 compliant operation: a) NO_x CEMS, b) Temperature of SCR inlet, c) Temperature of ammonia injection system, d) Ammonia injection rate, and e) Three catalyst pressure drops of the SCR.
1 and 2	21. For the times when the NO_x CEMS is not available for greater than two hour, the Permittee shall monitor the following parameters to provide assurance that the NO_x levels are consistent with prior NO_x compliant operation: a) Ammonia CEMS, b) Temperature of SCR inlet, c) Temperature of ammonia injection system, d) Ammonia injection rate, and e) Three catalyst pressure drops of SCR.
	22. For the times when the SO_2 CEMS are not available for greater than two hour, the Permittee shall monitor the following parameters to provide assurance that the SO_2 levels are consistent with prior SO_2 compliant operation: a) Temperature in scrubber, b) Reagent solution feed rate, c) Weight of sodium carbonate added for each reagent solution batch, d) Volume of water additions for reach reagent solution batch, and e) Flow rate of cooling water, if any is added.
	23. For determining compliance with the particulate matter (PM) emission limits with Table 2, the Permittee shall monitor the following parameters to provide assurance that the PM levels are consistent with prior PM compliant operation: a) ESP secondary voltage of Transformers #1 and #2, b) ESP secondary amperage of Transformers #1 and #2, c) ESP inlet temperature, d) SCR stack opacity as measured by COMS, and
	24. The Permittee shall monitor the level of precipitate dust in precipitate silo.

Table 3 - Monitoring and Testing

<table>
<tr><th>EU</th><th>Requirements</th></tr>
<tr><td></td><td>25. For all periods of excess emissions, even if attributable to an emergency/malfunction, Furnace Startup, Control Device Startup, Control Device malfunction, Control Device maintenance, and/or ALPR days, the Permittee shall quantify the emissions to determine compliance with the daily, monthly and annual emissions limits stated in Tables 2, 2A, and/or 2C of this Plan Approval.</td></tr>
<tr><td></td><td>26. The Permittee shall not certify the COMS or CEMS during periods of ALPR, Furnace Startup, Furnace Malfunction, Furnace Maintenance, Control Device Startup, Control Device Malfunction, Control Device Maintenance, or Color Transition.</td></tr>
<tr><td>1, 2, and 4</td><td>27. By December 31, 2015, the Permittee shall install, operate, and continuously monitor measuring devices (unless otherwise specified) for the following operational parameters. Any excursions from these parameters shall be responded to pursuant to the SOP for each PCD. See Schematic in Appendix E for location numbers noted in brackets in this sub table. The Compliance testing shall verify the normal range of operating parameters of the pollution control devices.
<table>
<tr><th>PCD</th><th>Operational Parameter</th><th>Monitoring Device</th><th>Range</th></tr>
<tr><td rowspan="7">Scrubber</td><td>Pressure drop (wc) of Sodium Carbonate Silo dust collector</td><td>Magnehelic or similar unit [1]</td><td>0 - 30 inches of water column</td></tr>
<tr><td>Reagent soda ash addition</td><td>Reagent Scale upstream of scrubber solution tank [2]</td><td>80 - 200 pounds
Monitored per reagent batch</td></tr>
<tr><td>Reagent water addition</td><td>Flow meter upstream of scrubber solution tank [3]</td><td>1 - 4 gpm
Monitored per reagent per batch</td></tr>
<tr><td>Level of Reagent</td><td>Level indicator in scrubber solution tank [4]</td><td>0-790 gallons
High/Low Alarm</td></tr>
<tr><td>Reagent liquid addition</td><td>Flow Meter located upstream of scrubber solution tank [5]</td><td>4 – 12 gpm</td></tr>
<tr><td>Scrubber Cooling Water Flow Rate</td><td>Flow meter located downstream of cooling water tank [6]</td><td>4 – 12 gpm</td></tr>
<tr><td>Pressure of solution</td><td>Pressure alarm</td><td>Low pressure alarm</td></tr>
</table></td></tr>
</table>

Table 3 - Monitoring and Testing

EU	Requirements			
		entering scrubber	downstream of solution and cooling water connection [28]	(when < 35 psi)
		Temperature (^{0}F) of Scrubber	Temperature transmitter on scrubber[7]	580 - 610 ^{0}F
	ESP	Temperature	Temperature transmitter on inlet to ESP [8]	580-590 ^{O}F
		Transformer #1 secondary voltage	Voltmeter [9]	35 - 50 kV Control room
		Transformer #2 secondary voltage	Voltmeter [10]	35 -50 kV Control room
1, 2, and 4	ESP	Transformer #1 secondary current	Ammeter [11]	1 phase = 200 – 400 mA Control room 3 phase = 300 – 500 mA Control room
		Transformer #2 secondary current	Ammeter [12]	200 – 400 mA Control room
		Hopper #1 level of precipitate	Level alarm [13]	High alarm
		Hopper #2 level of precipitate	Level alarm [14]	High alarm
		Dust transport level of precipitate	Level alarm [15]	High alarm
		Super sack level of precipitate	Level alarm [16]	High alarm
		Pressure (wc) of Precipitant silo dust collector	Magnehelic or similar unit [17]	0 - 30 inches of water
		Precipitant Silo level of precipitate	Level indicator [18]	0-39.5 feet
		Precipitant Silo level of precipitate	Level alarm [19]	High/.low alarm
		Precipitant Silo super sack level of precipitate	Level alarm [20]	High alarm
		Temperature (^{0}F) of the SCR inlet	Temperature indicator [21]	514 - 544 ^{O}F
		Leak Detector at NH_3 tank	Leak alarm [22]	Alarm

Table 3 - Monitoring and Testing

EU	Requirements
	SCR: Ammonia injection — Flow meter downstream of ammonia tank [23] — 0.1 - 0.4 gpm SCR: Temperature (^{0}F) of the injected ammonia — Temperature indicator [24] — 284 – 428 ^{O}F SCR: Catalyst layer #1 pressure drop — Magnehelic or similar unit [25] — 0.01 - 0.05 psi SCR: Catalyst layer #2 pressure drop — Magnehelic or similar unit [26] — 0.01 - 0.05 psi SCR: SCR total catalyst pressure drop — Magnehelic or similar unit [27] — 0.02 - 0.1 psi
1, 2, and 4	28. The Permittee shall perform all of the manufacturer's required monitoring protocols, schedules, and inspections as specified in each CEMS, COMS, and control device's SOMP
1 and 2	29. The Permittee shall sample and test the top layer of the SCR catalyst media at least once every 12 calendar months period or per the manufacturer's specifications, whichever is more frequent, to assess the SCR catalyst performance, and to determine if there is the presence of any trace elements that may lead to catalyst deactivation and decrease in SCR efficiency.
	30. The Permittee shall comply with the Compliance Assurance Monitoring ("CAM") Rule (40 CFR Part 64) for PM and with 310 CMR 7.00, Appendix C monitoring requirements for SO_2, and NO_x.
	Furnace monitors
	31. The Permittee shall continuously monitor the quantity of glass pulled for each furnace on an hourly (while in production), daily, monthly, and annual basis.
	32. The Permittee shall monitor the quantity of green glass pulled for each furnace on an hourly (while in production), daily, monthly, and annual basis.
	33. The Permittee shall ensure the startup contractor uses a fuel meter and continuously monitors the natural gas use for each Furnace during Furnace Startup.
	34. The Permittee shall install fuel meters and continuously monitor natural gas usage for each Furnace while operating the Furnaces after Furnace Startup Initial Heating Phase is complete (fuel meter 0 – 60,000 scfm).
	35. The Permittee shall continuously monitor and continuously record Furnace crown temperatures (0 – 3,000 ^{o}F).
	36. The Permittee shall monitor the quantity of sulfur added to total batch materials including cullet during up to the first 7 days of Furnace Startup, until the furnace exhaust is vented to the control devices, and during Control Device Startup.

Table 3 - Monitoring and Testing

<table>
<tr><th>EU</th><th>Requirements</th></tr>
<tr><td rowspan="4"></td><td>Compliance Tests</td></tr>
<tr><td>37. The Permittee shall perform the initial Furnace compliance emission testing within 120 days of the First Operating Day after the completion of the Control Device Startup and the initial CEMS certification.</td></tr>
<tr><td>38. All Furnace emission testing shall be conducted in accordance with USEPA reference test methods as specified in 40 CFR Part 60 Appendix A or methods as approved by the Department for the following: all pollutants listed in Table 2, exhaust volume flow rates, O_2, and moisture.</td></tr>
<tr><td>39. As part of the initial Furnace compliance emission testing, the Permittee shall determine the particle size distribution for PM_{10} and $PM_{2.5}$.</td></tr>
<tr><td rowspan="3">1 and 2</td><td>40. Compliance testing shall be performed under representative operating conditions and shall not be conducted during ALPR days, Furnace Startup, Control Device Startup, Malfunctions of either the Furnaces or Control Devices, maintenance of the Furnaces or the Control Devices, or color transitions. The Compliance testing shall verify the normal range of operating parameters of the pollution control devices.</td></tr>
<tr><td>41. After the initial Furnace compliance test, the Permittee shall demonstrate compliance with all of the Furnace emission limits in Table 2 through compliance tests on the following schedule:
<table>
<tr><td>Total PM (filterable and total)</td><td>Once every calendar year.</td></tr>
<tr><td>PM_{10} (filterable and total)</td><td>Once every calendar year (or use the results from Total PM and particle size distribution to verify compliance with the PM_{10} limits).</td></tr>
<tr><td>$PM_{2.5}$ (filterable and total)</td><td>Once every calendar year (or use the results from Total PM and particle size distribution to verify compliance with the $PM_{2.5}$ limits)</td></tr>
<tr><td>NO_X</td><td>RATA Annually; Once every 5 years</td></tr>
<tr><td>SO_2</td><td>RATA Annually; Once every 5 years</td></tr>
<tr><td>Ammonia</td><td>RATA Annually; Once every 5 years</td></tr>
<tr><td>PM_{10} and $PM_{2.5}$</td><td>Once every 5 years, determine the particle size distribution for PM_{10} and $PM_{2.5}$.</td></tr>
<tr><td>All other pollutants</td><td>Once every 5 years</td></tr>
</table></td></tr>
<tr><td>4</td><td>42. The Permittee shall start monitoring for visible emissions from Precipitate and Sodium Carbonate Silos within 60 days after the completion of the Control Device Startup using EPA Method 22. Thereafter, the Permittee shall monitor for visible emissions daily using EPA Method 22.</td></tr>
</table>

Table 3 - Monitoring and Testing	
EU	**Requirements**
	43. The Permittee shall monitor, daily during day-light hours, the visible emissions from the dust collector of the Precipitate Silo using EPA Method 22. The Permittee shall monitor also for any visible emissions from the Sodium Carbonate Silo when it is being filled using EPA Method 22.
5	44. The Permittee shall monitor and record the hot end coating usage daily to-determine HCL emissions.
	45. The Permittee shall monitor and record the mold swab usage monthly to-determine emissions.
6	46. The Permittee shall continuously measure the pressure drop across each dust collector and manually record the pressure drop weekly to ensure that it does not exceed 6 inches of water gauge.
6	47. The Permittee shall monitor once per day during day-light hours for visible emissions associated with the Facility including but not limited to the batch house and exterior raw material handling, to ensure there are no visible emissions. If visible emissions are observed, the Permittee shall take corrective action to reduce the visible emissions.
Facility Wide	48. The Permittee shall monitor all operations to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.
	49. The Permittee shall construct the Facility to accommodate emission-testing requirements contained herein.
	50. If and when MassDEP requires it, the Permittee shall conduct emission testing in accordance with USEPA Reference Test Methods and Regulation 310 CMR 7.13 to demonstrate compliance with the emissions limits specified in Table 2.
	51. The Permittee shall conduct sound testing post construction to demonstrate compliance with the Department's noise policy within 90 days of the First Operating Day after the completion of the Control Device Startup.

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Table 3 Key:

^{0}F = degrees Fahrenheit
ALPR = Abnormally Low Production Rate
EPA = United States Environmental Protection Agency
EU = Emission Unit
CEMS = Continuous Emissions Monitoring System
CFR = Code of Federal Regulation
CMR = Code of Massachusetts Regulation
COMS = Continuous Opacity Monitoring System
DAHS = Data Acquisition and Handling System
ESP = electrostatic precipitator
mA = milliampere (1/1000 of an ampere)
NH_3 = ammonia
NO_x = nitrogen oxides
PM = particulate matter
ppmvd = parts per million volume dry
psi = pounds per square inch
RATA = Relative Accuracy Test Audit
SAM = sulfuric acid mist
scfm = standard cubic feet per minute
SCR = selective catalytic reduction

GCD = Global Consent Decree
gpm = gallons per minute
kV = kilovolts
% = percent
SOMP = standard operating and maintenance procedure
SOP = standard operating procedure
SO_2 = sulfur dioxide

Table 4 - Record Keeping

EU	Requirements
1 and 2	1. The Permittee shall maintain the following records during Furnace Startup and Control Device Startup: a) natural gas usage, b) pounds of sulfur added to the batch, c) date and time of commencement of Furnace and/or Control Device Startup, d) date and time of conclusion of Furnace and/or Control Device Startup, and e) date and time when Furnace stops bypassing control devices during Furnace Startup.
	2. For any Operating Day for which the Permittee is excluding NO_x and/or SO_2 emissions from the relevant Emission Rate 30-day Rolling Average, the Permittee shall record the following: a) the date, b) the abnormal condition (i.e. ALPR, Furnace Startup, Control Device Startup, Malfunction or Maintenance) under which it is excluded, c) the NO_x and SO_2 emissions as measured by the CEMS (in pounds per day) to determine compliance with the applicable limit (pounds per day) in Table 2C. d) the duration of the abnormal condition.
	3. The Permittee shall record the hourly emissions of SO_2, the daily inlet and outlet concentrations of SO_2, the 24 hour block average, 30 day rolling average of SO_2 and if applicable, the SO_2 Removal Efficiency 30 day rolling average.
	4. The Permittee shall record the NO_x hourly emissions, the 24 hour block average and 30 day rolling average for NO_x.
	5. The Permittee shall record the daily Furnace emissions for Total PM.
	6. The Permittee shall maintain adequate records on-site to demonstrate compliance with all operational, production, and emission limits contained in Tables 2, 2A, 2C, and 2D above. These records will include all associated calculations, and all supporting data used to verify compliance with the emission limits contained in Table 2. a. Records shall also include the actual emissions of air contaminant(s) emitted for each hour, each 24-hour day, each calendar month, and for each consecutive twelve-month period (current month plus prior eleven months) for NO_x, SO_2 and ammonia, b. Records shall also include the actual emissions of air contaminant(s) emitted for each 24-hour day, each calendar month, and for each consecutive twelve-month period (current month plus prior eleven months) for PM, c. Records shall also include the actual emissions of air contaminant(s) emitted for each calendar month and for each consecutive twelve-month period (current month plus prior eleven months) for all other pollutants, and d. These records shall be compiled no later than the 15th day following each month. An electronic version of the MassDEP approved record keeping form, in Microsoft Excel format, can be

Table 4 - Record Keeping	
EU	**Requirements**
	downloaded at http://www.mass.gov/eea/agencies/massdep/air/approvals/limited-emissions-record-keeping-and-reporting.html#WorkbookforReportingOn-SiteRecordKeeping.
	7. The Permittee shall keep records of the monitoring equipment calibration events during passing calibration procedures.
1 and 2	8. The Permittee shall record the maintenance hours for each Control Device per calendar year to ensure those hours do not exceed 144 hours for each Control Device per calendar year.
	9. The Permittee shall record all of the manufacturer's required monitoring protocols and inspections as specified in the SOMP for each Control Device, CEMS, and COMs. The records shall include: the date, time of monitoring and/or inspection, the results of inspection, and the name of the staff member performing the monitoring and/or inspection.
	10. The Permittee shall record the date, time of observation and name of the observer (if applicable) for the opacity readings made when the COMS unit is unavailable for more than four hours as described in Table 3, Item 3.
	11. The Permittee shall record and maintain the daily and hourly glass pull rates for each Furnace under both normal and abnormal operating conditions.
	12. The Permittee shall maintain records of the amount of green glass produced and the dates and times the green glass is produced and the Furnace that produced the green glass
	13. The Permittee shall record shall continuously record the following items on the SCR: • Temperature (^{0}F) of the SCR inlet [21], • Ammonia injection rate[23], • Temperature (^{0}F) of the injected ammonia [24], • Catalyst layer #1 pressure drop [25], • Catalyst layer #2 pressure drop [26], and • SCR total catalyst pressure drop [27].
	14. The Permittee shall record the date, time of observation and name of the observer (if applicable) for the following items on the SCR: • Daily: condition of Ammonia system and • Alarm event when triggered on the ammonia leak detection system [22].

Table 4 - Record Keeping	
EU	**Requirements**
1, 2, and 4	15. The Permittee shall continuously record the following items on the Scrubber : • Pressure drop (wc) of Sodium Carbonate Silo dust collector [1], • Reagent water addition [3], • Level of Reagent [4], • Reagent liquid addition [5], • Scrubber Cooling Water Meter [6], and • Temperature (^{0}F) of Scrubber [7].
	16. The Permittee shall record the date, time of observation and name of the observer (if applicable) for the following items on the Scrubber as described: • Reagent soda ash addition on a batch basis [2], • Alarm events for level of reagent [5] and pressure of solution entering scrubber [28], and • As needed: Visible emissions when filling the Sodium Carbonate Silo.
1, 2, and 4	17. The Permittee shall continuously record the following items on the ESP: • Inlet temperature [8], • Transformer #1 secondary voltage [9], • Transformer #2 secondary voltage [10], • Transformer #1secondary current [11], • Transformer #2 secondary current [12], • Pressure (wc) of Precipitant silo dust collector [17], and • Precipitant Silo level of precipitate [18].
	18. The Permittee shall record the date, time of observation and name of the observer (if applicable) for the following items on the ESP: • Hourly: Plot secondary voltage and current values to detect long term trends as a diagnostic tool for optimal ESP operation, • Daily: visible emissions from the Precipitate Silo dust collector, • Weekly: ESP Precipitate levels in the Precipitate Silo [18],and • Weekly: pressure drop across Precipitate Silo dust collector [17].

Table 4 - Record Keeping

EU	Requirements
	19. The Permittee shall record High level alarms for the following items on the ESP: • Hopper #1 level of precipitate [13], • Hopper #2 level of precipitate [14], • Dust transport level of precipitate [15], • Super sack level of precipitate [16], • Precipitant Silo level of precipitate [19], and • Precipitant Silo super sack level of precipitate [20].
1, 2, and 3	20. The Permittee shall record and maintain the daily fuel usage for each Furnace based on fuel meter readings and the monthly fuel usage for associated furnace combustion equipment based on the fuel bill minus the Furnace usage.
1, 2, 3, and 5	21. The Permittee shall record the emissions for all other pollutants listed on Table 2 which are not directly measured by CEMS on a monthly basis.
5	22. The Permittee shall maintain records of the hot end coating material usage.
	23. The Permittee shall maintain records of the mold swab material usage.
6	24. The Permittee shall manually record weekly the pressure drop across each dust collector to ensure that it does not exceed 6 inches of water gauge.
	25. The Permittee shall record daily the visible emission observations associated with the Facility including but not limited to the batch house and exterior raw material handling. The record shall include the date, time of observation, name of the observer, and if visible emissions are observed, the record shall contain the source and location of the emissions and the corrective action taken.
Facility-wide	26) The Permittee shall maintain a copy of this Plan Approval, underlying Application and the most up-to-date SOMP for the EU(s) and PCD(s) approved herein on-site.
Facility-wide	27. The Permittee shall maintain all monitoring records and testing records as required by Table 3.
	28. The Permittee shall maintain a record of maintenance, repair, and inspection activities performed on the approved EU(s) and their associated equipment, the PCD(s) and their associated equipment, and the monitoring equipment. The records shall include, at a minimum, the type or a description of the inspection, repair, and maintenance performed and the date and time the work was completed.
	29. The Permittee shall maintain a record of all malfunctions on the approved EU(s) and their associated equipment, the PCD(s) and their associated equipment, and monitoring equipment. At a minimum, the records shall include: date and time the malfunction occurred; description of the malfunction; date and time that emissions bypassed the PCDs, corrective actions taken; the date and time corrective actions were initiated and completed and returned to normal operation and the calculated emissions.
	30. The Permittee shall maintain records to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.

Table 4 - Record Keeping	
EU	**Requirements**
	31. The Permittee shall maintain records required by this Plan Approval on-site for a minimum of five (5) years.
	32. The Permittee shall make records required by this Plan Approval available to MassDEP and USEPA personnel upon request.

Table 4 Key:

ALPR = Abnormally Low Production Rate
CEMS = Continuous Emissions Monitoring System
COMS = Continuous Opacity Monitoring System
EU = Emission Unit
ESP = electrostatic precipitator
NH_3 = ammonia
NO_x = nitrogen oxides
PCD = pollution control device
PM = particulate matter
SCR = selective catalytic reduction
SOMP = standard operating and maintenance procedure
SO_2 = sulfur dioxide
wc = water gauge
^0F = degrees Fahrenheit

Table 5 - Reporting	
EU	**Requirements**
1 and 2	1. The Permittee shall notify MassDEP in writing of the Facility's first Operating Day within five (5) business days of the first day of operation after completion of the Control Device Startup and CEMs certification.
	2. The Permittee shall notify MassDEP immediately by telephone, email, or FAX and followed by a written report within ten (10) business days of any upset, bypass, emergency, malfunction, or excursion indicating a malfunction of the PCD ("event"), when the event may cause emissions to the ambient air that exceed any of the emissions limits contained in this Plan Approval, or cause a condition of air pollution, or otherwise violate a term or condition of this Plan Approval.

Table 5 - Reporting	
EU	**Requirements**
1 and 2	3. The written report identified above shall contain: a) description of the upset, bypass, emergency malfunction, or excursion indicating a malfunction of the PCD, b) the nature and cause of the upset, bypass, emergency malfunction, or excursion indicating a malfunction of the PCD, c) time when the upset, bypass, emergency malfunction, or excursion indicating a malfunction of the PCD, was first observed, d) steps taken to mitigate emissions, e) an estimate of the quantity of emissions released as a result of the upset, bypass, emergency malfunction, or excursion indicating a malfunction of the PCD, f) duration of excess emissions, and g) any corrective actions taken.
	4. The Permittee shall notify MassDEP in writing within five (5) business days if the amount of sulfur added to the batch materials exceeds 2.6 pounds per ton of total batch material (including cullet) during the Control Device Startup and/or up to the first seven (7) days of Furnace Startup.
	5. The Permittee shall notify MassDEP in writing prior to any scheduled maintenance on the PCD(s) when the PCD(s) will be bypassed.
	6. The Permittee shall notify the Central Regional Office of MassDEP, BAW Permit Chief by telephone: 508-767-2845, email: Roseanna.Stanley@massmail.state.ma.us, or fax : 508-792-7621, as soon as possible, but no later than three (3) business day after discovery of an exceedance(s) of Tables 2, 2A,, or 2C requirements. A written report shall be submitted to Permit Chief at MassDEP within ten (10) business days thereafter and shall include: identification of exceedance(s), duration of exceedance(s), reason for the exceedance(s), corrective actions taken, and action plan to prevent future exceedance(s).
	7. The Permittee does not have to report as a deviation the down time of the monitoring equipment during passing calibration procedures.

Table 5 - Reporting	
EU	**Requirements**
1, 2 and 4	8. The Permittee shall submit a standard operating and maintenance procedures ("SOMP") for the Semi-dry scrubber, ESP, SCR, Precipitate Silo dust collector, Sodium Carbonate dust collector and the COMS and CEMS monitoring devices to MassDEP for written approval within 60 days after First Control Device Startup. The Department must approve in writing any significant changes to the SOMP prior to the SOMP becoming effective. The SOMPs shall include: a) hourly, daily, weekly, monthly and annual monitoring and/or testing measures that the Permittee shall take to insure that the equipment and the compliance indicator monitors are properly maintained and operating as recommended by the vendor, b) a list of spare parts inventory, as recommended by the vendor, c) operating, safety controls and emergency procedures as recommended by the vendor, and d) Where appropriate, it shall include dust minimization procedures, as-built construction (blueprint) plans, clean-out areas, potential areas of air infiltration, as recommended by the vendor. The Permittee shall maintain the most recent copies of the SOMPs on-site at all times.
1, 2, and 5	The Permittee shall submit to MassDEP after commencing operation of the COMS and the CEMS, in a format acceptable to the MassDEP, a quarterly COMS/CEMS report which contains minimally the following information: a) Reports from the Facility's CEMS (NO_x, SO_2, NH_3) and COMS Excess Emissions and Monitor Performance Reports, b) The number of hours each of the COMS/CEMS were obtaining and recording emission data to ensure that each COMS/CEMs is operating for at least 75% of the emission unit operating hours per calendar day, for at least 84% of the emission unit operating hours per calendar month, and for at least 95% of the emission unit operating hours per calendar quarter that the COMS/CEMS unit(s) operates except for periods of calibration checks, zero and span adjustments, and preventive maintenance, c) Description of the number, type, and duration of Abnormal Episodes, d) The total amount of natural gas fuel used in the Furnaces and associated furnace combustion equipment, including distributors, forehearths, and Lehrs, and e) The total amount of Mold Swab, and Hot End Coating material usages.
	9. The Permittee shall submit to MassDEP after commencing operation of the CEMS and the rebuilt Furnace 16, in a format acceptable to the MassDEP, a semi-annual report postmarked by no later than January 30th of each year (containing the records generated for the immediately preceding July through December six month period) and July 30th of each year (containing the records generated for the immediately preceding January through June six month period), which minimally contains for the prior calendar 6 consecutive month period the following information: a) Reports from the Facility's CEMS (NO_x, SO_2, NH_3) and COMS Emissions Reports indicating

Table 5 - Reporting	
EU	**Requirements**
	maximum hourly, maximum daily, monthly, and rolling TPY emissions, b) The monthly glass pull rates from each Furnace, c) Amount of green glass pulled on a monthly basis, d) List of deviations from the conditions of this Plan Approval, e) For each period of excess emissions or excursions from allowable operating conditions, the Permittee shall list the duration, cause (including whether it was attributable to a malfunction or an emergency), the response taken, and the total amount of excess emissions. Periods of excess emissions shall include malfunctions, emergency, and upsets or failures associated with the emission control system, CEMS, or COMS, f) Maximum Emission Rate Rolling 30 Day Average, maximum Outlet 30 Day Rolling Average for SO_2, and minimum Removal Efficiency 30-day Rolling Average for SO_2, and g) The calculated monthly and rolling 12 month emissions for all pollutants listed in Table 2 which are not recorded by CEMS. Associated calculations and all supporting data may be required upon request by MassDEP.
1, 2, 3, and 5	10. For all other pollutants listed in Table 2, besides Particulate Matter, that are not monitored directly by a CEMS unit, the Permittee shall submit to MassDEP for approval a proposed parametric monitoring methodology to provide assurance that these air pollutants levels are in compliance with Table 2 emission limits. The Permittee shall submit the proposed parametric monitoring methodology within 60 Days after the First Operating Day.
	11. The Permittee shall provide to MassDEP the Compliance Assurance Monitoring plan for PM within 60 days after submittal of the final stack emission test results report.
	12. The Permittee shall submit an Emission Testing Protocol to the Department for written approval at least 60 days before the initiation of the testing program. The Emission testing protocol shall contain at a minimum: a detailed description of all pollutants to be tested, sampling point locations, sampling equipment, sampling and analytical procedures, and operating conditions including glass pull rates, and PCD operating parameters e.g. temperatures, pressure, flows etc. All Protocols submittals shall be approved in writing by the Department prior to conducting such testing.
	13. The Permittee shall notify the MassDEP at least 30 days prior to conducting any compliance test when the test is scheduled so that Department or EPA personnel may be in attendance at the test.
	14. Within 60 days after emission testing, the Permittee shall submit to MassDEP a final stack emission test results report.
6	15. The Permittee shall develop and submit Best Management Practices for minimizing dust and visible emissions from the raw material handling to MassDEP for written approval within 60 days after First Control Device Startup.

Table 5 - Reporting	
EU	**Requirements**
Facility-wide	16. Within 60 days after submittal of the final stack emission test results report, the Permittee shall submit a report identifying any changes from this Plan Approval in operating parameters of Control Devices and, emission rates, if needed.
	17. The Permittee shall submit a pre-test sound monitoring protocol to MassDEP for approval within 60 days after the First Operating Day.
	18. The Permittee shall submit the sound monitoring test results to MassDEP within 60 days after conducting the sound tests.
	19. The Permittee shall provide a copy to MassDEP of any record required to be maintained by this Plan Approval within 30 days from MassDEP's request.
	20. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a "Responsible Official" as defined in 310 CMR 7.00 and shall include the Certification statement as provided in 310 CMR 7.01(2)(c).
	21. The Permittee shall report annually to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form. This reporting will include all HAPs listed in this Plan Approval in accordance with 310 CMR 7.12(3)(a). The Permittee shall note therein any minor changes (under 310 CMR 7.02(2) (e), 7.03, 7.26, etc.), which did not require Plan Approval.

Table 5 Key:

EPA = United States Environmental Protection Agency
EU = Emission Unit
CEMS = Continuous Emissions Monitoring System
CMR = Code of Massachusetts Regulation
COMS = Continuous Opacity Monitoring System
ESP = electrostatic precipitator
GCD = Global Consent Decree
NH_3 = ammonia
NO_x = nitrogen oxides
PM = particulate matter
PCD = Pollution Control Device
SCR = selective catalytic reduction
SOMP = standard operating and maintenance procedure
SO_2 = sulfur dioxide

4. SPECIAL TERMS AND CONDITIONS

A. The Permittee is subject to, and shall comply with, the Special Terms and Conditions as contained in Table 6 below:

Table 6 - Special Terms and Conditions	
EU	**Requirements**

Table 6 - Special Terms and Conditions

EU	Requirements
1	1. In accordance with Section IV (7)(c)(ii) of the GCD, the Permittee shall install, maintain and Operate the Oxy-Fuel Furnace (Furnace 15) such that the gas that provides the oxidant for combustion of the fuel is at least 90 percent oxygen.
1 and 2	2. Pursuant to the GCD, the Permittee shall install and have fully operational all control devices and associated monitoring devices, CEMS, COMS, and DAHS before December 31, 2015.
	3. The Semi-dry scrubber must be bypassed to the SCR stack if either the scrubber and/or the ESP is undergoing maintenance or malfunctions.
	4. The ESP must be bypassed to the SCR stack if either the scrubber and/or the ESP is undergoing maintenance or malfunctions.
	5. The SCR must be bypassed to the SCR stack if any piece of air pollution equipment is either undergoing maintenance or malfunctions.
	6. The Permittee shall ensure that scheduled or preventative Furnace Maintenance, including checker raking and burning shall be conducted only when the downstream control devices are operating.
	7. In accordance with the GCD, no later than the first Operating Day after the conclusion of the Control Device Start-up period, the Permittee shall operate the Furnace(s) so that all stack gases (except during up to the first seven (7) days of the Furnace Startup; during Malfunction of the SCR or Scrubber/ ESP or during Maintenance of the SCR or Scrubber/ ESP) pass through the Scrubber, ESP, and SCR
1 and 2	8. The Permittee shall ensure that Scheduled or preventative Maintenance of the emission control system shall occur when the Furnace(s) connected to the control system are not Operating. However, for any Calendar Year which is a Continuous Operating Year pursuant to the GCD, scheduled or preventative maintenance may be conducted while the Furnace(s) are Operating. During these Continuous Operating Years, Maintenance lasting greater than twenty four (24) consecutive hours shall occur only during Abnormally Low Production Rate Days. Control Device system Maintenance must be done in compliance with the following: a) Bypass for the purpose of preventative Maintenance of any pollution control device shall not exceed 144 hours per device annually in any Calendar Year, b) Bypass of the SCR required by the bypass of the Scrubber and ESP shall be included in the 144 maintenance hours of the SCR, c) Bypass of the ESP required by the bypass of the Scrubber shall be included in the 144 maintenance hours of the ESP. If the ESP is bypassed, the Scrubber and the SCR Systems shall be bypassed as well, and d) Bypass of the Scrubber System required by the bypass of the ESP shall be included in the 144 maintenance hours of the Scrubber.
	9. The Permittee shall submit final ('as-built') plans, blue prints, or schematics of the air pollution control equipment indicating the location of the flow meters, pressure gauges, voltage meters, ammeters and temperature gauge/ indicators, etc within 60 days after first Control Device Startup as defined in the GCD (Section III.6.O).
1 and 2	10. An excursion of operating parameters of a PCD shall trigger an inspection of the unit, corrective action and if necessary, reporting to MassDEP pursuant to Table 5 Items 2 and 3 for any excursion

Table 6 - Special Terms and Conditions

EU	Requirements
	indicating a malfunction of the PCD.
	11. In accordance with Section IV.12 of the GCD, the Permittee shall at all times, including periods of ALPR, Furnace Startup, Control Device Startup, Control Device Malfunction, and Control Device Maintenance, to the extent practicable, maintain and operate all Furnaces and all control devices in a manner consistent with good air pollution control practice for minimizing emissions.
	12. Commercial arsenic shall not be used as a raw material in glass melting Furnaces 15 or 16 per 40 CFR 61, Subpart N.
	13. The Permittee shall ensure that the scrubber system is operating according to manufacturer's specifications and is equipped with the following equipment or devices: a) Visual alarms shall be installed and operated to alert the operator that operating parameters are outside design ranges and b) Temperature monitoring. The scrubber shall be equipped with a temperature monitoring device that has a minimum accuracy of ± 4 ^{0}F or ± 0.75%, whichever is greater to measure and record the temperature of the exhaust gas inside the scrubber. The device shall be calibrated annually.
	14. In accordance with Section IV, (8)(c)(ii)a.1 of the GCD, the Permittee shall not intentionally add dilution air to the stack gases between the Scrubber System and the CEMS. When determining compliance with all Scrubber limits, there shall be no oxygen correction per vendor guarantee.
1 and 2	15. The Permittee shall pass all exhaust gases from the Operating Furnaces through the ESP, except during periods of Control Device Startup, up to the first 7days of Furnace Startup, Malfunction of the Scrubber and/or ESP, and Maintenance of the Scrubber and/or ESP.
	16. The Permittee shall ensure that the ESP system is operating according to manufacturer's specifications and is equipped with the following equipment or devices: a) Visual alarms shall be installed and operated to alert the operator that operating parameters are outside design ranges and b) The ESP shall be equipped with a temperature monitoring device that has a minimum accuracy of ± 4 ^{0}F or ± 0.75%, whichever is greater. The device shall be calibrated annually.
	17. The Permittee shall ensure that the SCR system is operating according to manufacturer's specifications and is equipped with the following equipment or devices: a) Visual alarms shall be installed and operated to alert the operator that operating parameters are outside design ranges, b) SCR will be equipped with a poppet valve to seal the by-pass when SCR is in operation, and c) The SCR shall be equipped with a temperature monitoring device that has a minimum accuracy of ± 4 ^{0}F or ± 0.75%, whichever is greater. The device shall be calibrated annually.
	18. The Permittee shall ensure that ammonia is not injected into the SCR system while the air pollution control equipment is in bypass.

Table 6 - Special Terms and Conditions

EU	Requirements
	19. The Permittee shall ensure that vapor recovery of ammonia emissions shall be employed while the storage tank is being filled.
	20. The Permittee shall install an ammonia leak detector. It shall be equipped with a visual alarm that alerts the operator in the event that ammonia levels exceed harmful levels.
	21. The Permittee shall ensure that Standard Operating and Maintenance Procedures (SOMPs) for each of the pieces of air pollution control equipment and monitors shall be followed and posted at or near the equipment.
1 and 2	22. The Permittee shall ensure that compliance with the PM limits on each Furnace shall be determined using the following equation for stack testing: $$PM_{Emission\_Rate} = \frac{[lbs\_of\_PM\_from\_ST]}{Daily\_Production(tons)} \times \frac{24\_hours}{Source\_Test\_Length(hrs)}$$ where: $PM_{Emission\_Rate}$ = PM emission limit in pounds PM per ton glass produced *Lbs_of_PM_from_ST* = The pounds of PM measured during the entire length of the source test (including all runs). *Daily Production* = The amount of glass produced on all Furnaces during the Day of the source test. *Source Test Length* = Length of the entire source test (including all runs), in hours. If the resulting number is below the limit set forth on each Furnace individually, then all included Furnaces are in compliance. If the resulting number is above the limit set forth on each Furnace individually, then all included Furnaces are in noncompliance.
1, 2, and 4	23. In accordance with the vendor recommendations, the Permittee shall maintain on-site for the COMS, CEMS, ESP, SCR, scrubber, equipment an adequate supply of spare parts to maintain the on-line availability and data capture requirements contained herein.
	24. The Permittee shall ensure that operators and users of the air pollution control equipment are trained in the proper operation of each piece of air pollution control equipment and what steps are necessary during repairs and malfunctions.
6	25. . The Permittee shall install and operate a pressure manometer or similar device on each dust collector serving the raw material batch plant. The gauges shall be read weekly.
Facility Wide	26. This Plan Approval shall supersede in their entirety (with the exception that all plan application materials submitted as part of the Plan Approval Tr. X226121become part of this Plan Approval, Tr. X253446) the following:

Table 6 - Special Terms and Conditions	
EU	**Requirements**
	a) Plan Approval Tr# X250039, June 20, 2012 (Cullet Preheater Furnace 15), b) Plan Approval Tr# X226121, January 13, 2010 (Furnace 15 Rebricking and Oxy-fuel Conversion), c) Plan Amendments Tr# W008014, June 23, 2000 (Furnaces 15 and 16), and d) NO_x RACT Emission Control Plan Tr# 87670, August 17, 1994.

Table 6 Key:
^0F = Fahrenheit
ESP = Electrostatic Precipitator
EU = Emission Unit
GCD = Global Consent Decree
hrs = hours
PCD = Pollution Control Device
lbs = pounds
NO_x = nitrogen oxides
% = percent
± = plus or minus
PM = Particulate Matter
RACT = Reasonably Available Control Technology
SO_2 = Sulfur dioxide
SCR = Selective Catalytic Reduction
Tr# = Transmittal Number

B. The Permittee shall install and use an exhaust stack, as required in Table 7, on each of the Emission Units that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. Each exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including but not limited to rain protection devices known as "shanty caps" and "egg beaters."

C. The Permittee shall install and utilize exhaust stacks with the following parameters, as contained in Table 7, for the Emission Units that are regulated by this Plan Approval:

Table 7 - Stack Information				
EU	**Stack Height Above Ground (feet)**	**Stack Inside Exit Dimensions (feet)**	**Stack Gas Exit Velocity Range (feet per second)**	**Stack Gas Exit Temperature Range (^oF)**
1 and 2	168	5	20-50	520-560
4 (Precipitate Silo)	60	0.49	0.0095	ambient

Table 7 - Stack Information				
EU	**Stack Height Above Ground (feet)**	**Stack Inside Exit Dimensions (feet)**	**Stack Gas Exit Velocity Range (feet per second)**	**Stack Gas Exit Temperature Range (^{o}F)**
4 (Sodium Carbonate Silo)	59	0.49	0.049	ambient

Table 7 Key:

EU = Emission Unit Number

^{o}F = Degree Fahrenheit

5. GENERAL CONDITIONS

The Permittee is subject to, and shall comply with, the following general conditions:

A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition(s).

B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.

C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.

D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and / or USEPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.

E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local regulations now or in the future.

F. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.

G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.

H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.

I. This Plan Approval may be modified or amended when in the opinion of MassDEP such is necessary or appropriate to clarify the Plan Approval conditions or after consideration of a written request by the Permittee to amend the Plan Approval conditions.

J. Pursuant to 310 CMR 7.01(3) and 7.02(3) (f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

6. MASSACHUSETTS ENVIRONMENTAL POLICY ACT

MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Energy & Environmental Affairs, for air quality control purposes, was not required prior to this action by MassDEP. Notwithstanding this determination, the Massachusetts Environmental Policy Act (MEPA) and 301 CMR 11.00, Section 11.04, provide certain "Fail-Safe Provisions," which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report (EIR) at a later time.

7. APPEAL PROCESS

This Plan Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date of issuance of this Plan Approval.

Under 310 CMR 1.01(6) (b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought. Additionally, the request must state why the Plan Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100.00) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

This request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing-filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Enclosed is a stamped approved copy of the application submittal.

Should you have any questions concerning this Plan Approval, please contact Maria L'Annunziata by telephone at 508-767-248 or in writing at the letterhead address.

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Roseanna E. Stanley
Section Chief
Bureau of Air and Waste

Enclosure

ecc: Milford of Board of Health
Milford Fire Department
MassDEP/Boston - Yi Tian
Alan Kao, Environ

Appendix A - Additional Description of Facility and Emission Units

Furnace temperatures at the glass melting furnaces, pressures, glass levels and fuel usages are monitored by instrumentation. These instruments along with the batch melting and firing behaviors are visually examined with pertinent observations and data being noted on a daily furnace log sheet by the furnace operators. Efforts are made to reduce dust carry over from the glass meting furnaces because it reduces air contaminants, prolongs furnace campaigns, lowers maintenance costs and saves fuel. Dust minimization procedures utilized at the Facility include wetting the charge material with water or a surfactant soap solution prior to introduction into the furnaces to suppress entrainment of fine particles. These steps minimize dust loading to the air pollution control equipment.

Furnace 15 (EU1)

This Furnace is rated at 58 MMBtu/hr. It is equipped with five (5) Combustion TECPF400 Model 10 burners and two (2) Combustion Tec PF400 Model 4 burners. They use oxy- fuel technology whereby oxygen is used as the oxidant instead of combustion air. Furnace 15 was converted to oxy-fuel from a regenerative furnace in October 2010 (TR#X226121). This Furnace has a maximum pull rate of 348 tons of glass pulled per day.

Furnace 16 (EU2)

This Furnace is rated at 50 MMBtu/hr. This regenerative glass melting furnace will be rebuilt in 2015/ 2016 and will continue to operate as a regenerative furnace. The rebricked furnace will be equipped with 2 AGI DIG burners per firing side utilizing natural gas. The regenerative furnace uses ‘checker packs’ to conserve energy by absorbing heat from the furnace exhaust and then transferring that heat to the incoming ambient combustion air that is fed to the furnace. This is an alternating process, repeated approximately every 20 minutes. There are two exhaust – gas / combustion - air chambers on the furnace that alternate between exhaust gas service and air intake service. They are lined with refractory brick (checker brick) which serves as a heat storage / transfer medium. Reclamation of heat occurs in the chambers by transfer of heat from combustion gases to the checker brick during the exhaust cycle and subsequent heating of combustion air during the air intake cycle. This furnace has a maximum pull rate of 348 tons of glass pulled per day.

Associated Furnace Combustion Equipment and Sources (EU3)

Various combustion equipment sources are associated with the Furnaces. These include:

1) Distributor 15 – 8.12 MMBtu/hr
2) Distributor 16 – 3.48 MMBtu/hr
3) Forehearths 151A (1.87 MMBtu/hr), 151B (1.87 MMBtu/hr), and 152 (2.46 MMBtu/hr)

4) Forehearths 161 (2.21 MMBtu/hr) and 162 (2.21 MMBtu/hr)
5) Annealing Lehrs 151 (4.00 MMBtu/hr) and 152 (2.03 MMBtu/hr)
6) Annealing Lehrs 161 (2.03 MMBtu/hr) and 162 (5.00 MMBtu/hr)

Sodium Carbonate Storage Silo (EU4)

Sodium carbonate is added to water to make a solution which is injected into the scrubber for the control of sulfur oxides and acids. The sodium carbonate storage silo is equipped with a pulse - jet cartridge dust collector or equivalent to control the sodium carbonate as it is loaded pneumatically from a truck. The silo has a volume of 2,648 cubic feet (ft^3) and the dust collector filter has an area of 129 square feet (ft^2) in area. Failure notification of the dust collector is provided electronically with a visual alarm when the pressure drop across the dust collector is out of normal range.

ESP Precipitate Storage Silo (EU4) and Dust Conveyor System.

Precipitate from the new Electrostatic Precipitator (ESP) is collected in enclosed hoppers located under the ESP. The precipitate may either be collected in the ESP precipitate storage silo or in the super sack container enclosed inside a building. Super sacks may be placed in a trailer or a roll off for off-site disposal. The precipitate is tested prior to disposal to determine the regulated status of the waste. Both the ESP precipitate storage silo and the super sack contain materials consisting of sodium sulfate, sodium carbonate, and traces of heavy metals including lead and chromium compounds. Both the super sack and the precipitate storage silo are equipped with level signal switches that indicate when precipitate levels are high.

The precipitate in the silo is recycled into the raw material batches as an ingredient in the glass manufacturing process. The silo is equipped with a WAMFLO (model no. FNC3J22) pulse jet dust collector, or equivalent, to control dust emissions that may occur while the silo is being filled. The precipitate transfer system is a pneumatic conveying system. The silo is filled by a completely sealed and enclosed mechanized conveyor transfer system to prevent the discharge of precipitate to the ambient air. The silo has an actual capacity of 3,460.8 ft^3 and can contain approximately 10 days of the precipitate generated at maximum operating conditions of the ESP and furnaces.

A dust collector is located on the top of the precipitate silo and is equipped with a round stack that is 60.35 feet high and 5.9 inches diameter. The dust collector has an area of 237 ft^2 and has a rated capacity of 1,177 actual cubic feet per minute (acfm). The pressure drop across the dust collector is 30 inches water gauge. Failure notification of the dust collector is provided electronically with a visual alarm when the pressure drop across the dust collector is out of normal range. For abnormal operation, there is a gravity drop under the precipitate silo to fill super sacks. A mechanical screw under the precipitate storage silo can load a super sack. The super sack is equipped with a level signal switch that indicates when precipitate levels are high.

Emergency Engines

The Facility currently operates two emergency generators:

1) The Facility installed a 500 kW (755 hp) diesel-fired emergency generator on October 29, 2010, and operation commenced on November 22, 2010. This emergency generator was included in TR#X226121, and is certified as meeting USEPA's Tier 2 emission limits for stationary emergency engines, and
2) The Facility also operates a 30 hp natural gas-fired emergency generator that was installed around 1973.

Raw Material (EU6)

The following tables identify ingredients and particle size for some of the raw materials used in glass manufacturing:

Container Glass - Raw Materials Approximate Median Particle Sizes (microns)		
Sand: 200 - 300	Soda Ash: 300	Limestone: 400-700
Salt Cake: 190	Nephaline Syenite: 200	Carbocite : 46
Selenium Mix: 70	Cuprous oxide: 13	Cullet: 1000-1500+
Iron oxide: 100		

The Facility maintains a batch house where it stores and transfers raw materials used in glass manufacturing. PM emissions from the batch house are controlled through a series of 13 existing Donaldson –Torit dust collectors with Dura-Life filter media. The Donaldson dust collectors are designed to filter a variety of airflows depending on hoods and control points. Typical air flows are:

890-1898 scfm – (8) DLMC 6/10 (Bin Vents)
1,084 scfm – (1) IAC BD-36 (Cuprous oxide dust collector)
1,500 scfm – (1) DLMC 1/2/15 (Day Tank)
1,898 scfm – (1) DLMC 1/5/15(Unloading bin vent)
2,343 scfm – (1) DLMC 12/15 (North Bin Vent)
4,817 scfm – (1) DLMC 3/5/15 Batch Silo

Each dust collector has a design particulate emission rate of 0.001 grain/dry standard cubic foot (gr/dscf) and a design collection efficiency of 99.9%. These dust collectors are inspected weekly to confirm that the differential pressures are 0-6 inches of water column and the units are working according to manufacturer specifications. Preventative maintenance is performed and results are maintained on site. The table below lists the dust collectors in the batch house, raw materials and emission rates.

Batch House Operations:
1) Unloading
2) Transfer & Storage
3) Weighing & Mixing
4) Mixed Batch Conveying to Furnaces

Particulate Emission Design	0.001	gr/dscf

DC Location	Make	Model No.	ACFM	SCFM	PTE TSP (tpy)	PTE PM10 (tpy) [2]	PTE PM2.5 (tpy) [2]
Limestone Bin Vent	Donaldson-Torit	DLMC 6/10	830	890	0.03	0.03	0.03
Iron Oxide Bin Vent	Donaldson-Torit	DLMC 6/10	830	890	0.03	0.03	0.03
Unloading Bin Vent	Donaldson-Torit	DLMC 1/5/15	1769	1898	0.07	0.07	0.06
Salt Cake Bin Vent	Donaldson-Torit	DLMC 6/10	830	890	0.03	0.03	0.03
Syenite Bin Vent	Donaldson-Torit	DLMC 6/10	830	890	0.03	0.03	0.03
Soda Ash Bin Vent	Donaldson-Torit	DLMC 6/10	830	890	0.03	0.03	0.03
Sand Bin Vent	Donaldson-Torit	DLMC 6/10	830	890	0.03	0.03	0.03
15 North Bin Vent	Donaldson-Torit	DLMC 1/2/15	2184	2343	0.09	0.08	0.08
16 North Bin Vent	Donaldson-Torit	DLMC 6/10	830	890	0.03	0.03	0.03
16 South Bin Vent	Donaldson-Torit	DLMC 6/10	830	890	0.03	0.03	0.03
Sacle 3 Silo	Donaldson-Torit	DLMC 1/2/15	1398	1500	0.06	0.05	0.05
Batch Silo	Donaldson-Torit	DLMC 3/5/15	4490	4817	0.18	0.17	0.16
Copper Dust Collector	Donaldson-Torit	IAC BD-36	1010	1084	0.04	0.04	0.04
				Total:	0.70	0.67	0.64

[2] PM10 and PM2.5 assumed to be 95% and 91% of PM/TSP respectively.

Notes:
ACFM based on measurements during annual service except for eight smaller bin vents, where measurements not feasible; max design of 830 cfm used for these bin vents; actual flow rate expected to be much lower

Appendix B - Global Consent Decree

The GCD contains various requirements for the Milford facility, including:

1) Conversion of Furnace 15 to Oxy-fuel technology by December 31, 2010 to reduce emissions of nitrogen oxides (NO_x) (GCD IV.7.b) (completed under Tr# X226121, issued January 13, 2010);

2) Installation of an approved control device by December 31, 2015 on Furnace 16 to reduce emissions of NO_x (GCD IV.7.b);[2]

3) Installation of a heat recovery system designed to reduce or eliminate the energy demand of the Facility from external sources, no later than one year after the installation of Oxy-fuel technology or installation of approved alternative control device on Furnace 16 (GCD IV.7.l);

4) Installation of a Semi-dry scrubber or approved alternative control device on both Furnace 15 and 16 by December 31, 2015 to reduce emissions of sulfur dioxide (SO_2) (GCD IV.8.b);

5) Installation of an Electrostatic Precipitator (ESP) or approved alternative control device on both Furnace 15 and 16 by December 31, 2015 to reduce emissions of particulate matter (PM) (GCD IV.9.b);

6) Installation of a continuous emissions monitoring system (CEMS) for NO_x from Furnace 15 by December 31, 2010 (completed under Tr# X226121), for NO_x from the combined Furnace 15 and Furnace 16 exhaust when routed through a common control device by December 31, 2015, and for SO_2 from both Furnaces by December 31, 2010 (completed under Tr# X226121) (GCD IV.15);

7) Installation of a continuous opacity monitoring system (COMS) on the combined exhaust for both Furnaces by May 7, 2010 (completed under Tr# W008014) (GCD IV.15.b.); and

8) Compliance with emission limits for NO_x (GCD IV.7.d), SO_2 (GCD IV.8.c), sulfuric acid mist (SAM) (GCD IV.8.n), and filterable and total Particulate Matter (GCD IV.9.c.ii.) by various deadlines between 2010 and 2015. Because the GCD was executed after Tr#X226121 was issued, not all of the requirements for Furnace 15 were included in that Plan Approval (e.g., emission limits for sulfuric acid mist), although they are incorporated into the current Operating Permit (Tr#W125000).

[2] The EPA approved the installation of SCR on August 2, 2013 instead of the conversion to OxyFuel technology on Furnace 16 as directed in the GCD.

Appendix C - CEMS, COMS, and DAHS information

1) Emissions of SO_2 from the combined SCR stack will be monitored by a Thermo Model 43i, a pulsed fluorescent SO_2 analyzer or equivalent. An additional SO_2 CEMS will be installed upstream of the Scrubber to measure control efficiency.

2) Emissions of Nitrogen Oxides (NO_x) will be monitored by a Thermo Model 42i NO_x Analyzer, a chemiluminescent analyzer or equivalent.

3) An Optical Scientific OFS-2000 flow monitor, or equivalent, will measure the exhaust gas velocity passing through the stack using scintillation. The unit consists of an optical transmitter, optical receiver and control box. The DAHS system uses the SCR stack and measured stack temperature to calculate flow in standard cubic feet per minute (scfm). The scfm values and the pollutant parts per million (ppm) values are used to calculate emission rates in pounds per hour (lbs/hr). .

4) The MAC 155 Moisture Analyzer or equivalent probe and controller system will continuously monitor emission stack moisture at the Scrubber inlet and the SCR stack using a high temperature capacitive sensor. A daily calibration check sequence will be programmed into the controller. The moisture analyzers will allow the SO_2 concentrations to be calculated on a dry basis (as required by the GCD).

5) The Continuous Opacity Monitor (COMs) is a Teledyne LightHawk Model 560 Opacity Monitor using Double Pass Extinction. The data acquisition and reporting will be controlled by the DAHS. The DAHS will collect and record an opacity value from the monitor every 7.5 seconds, and will average these values over a one-minute period to create and record a block average.

6) The ammonia analyzer is a Siemens LDS-6 or equivalent employing single-line molecular absorption spectroscopy. The analyzer is equipped with an internal reference cell and does not require an external calibration using bottled calibration gases.

7) The Ametek WDG-Insitu TM2000 Oxygen Analyzer or equivalent uses a zirconium oxide sensor with an output oxygen range of 0-25%. .

Appendix D - Equation Sheet

1. NO_x Limit During Abnormally Low Production Rate Days

During ALPR Days, a CEMS shall be used to demonstrate compliance on a 24-hour Block Average with the following pound per day limit:

$NO_{X\,Abn}$ = NO_x emission limit for Furnace 15 or 16 during an Abnormally Low Production Rate Day = 418 pounds per day if only one Furnace is operating or a total of 732 pounds per day if both Furnaces are operating.

This limit was calculated using the following equation:

$$NO_{X\,Abn} = 1.2 \frac{\text{lb NOx}}{\text{t}} \times \frac{\text{t}}{0.35}$$

Where:

P = Furnace ALPR threshold (i.e., 35% of 348 tons of glass produced per day, or 122 tons of glass per day if only one Furnace is operating, or 35% of 610 tons of glass produced per day, or 214 tons of glass per day, for both Furnaces combined).

This is equivalent to the daily emission limit (in lb/day) during normal operations

2. NO_x Limit During Malfunction of the Control Device

During the Malfunction Days excluded from the Emission Rate 30-day Rolling Average, a CEMS shall be used to demonstrate compliance on a 24-hour Block Average with the following pound per day limit:

$NO_{X\,CDMalf}$ = NO_x emission limit for Furnace 15 or 16 during a Malfunction Day

Based on the above equation,

$NOx_{\_CDMalf}$ = 418 lbs/day if only Furnace 15 is Operating,
2,091 lbs/day if only Furnace 16 is Operating, and
2,406 lbs/day if both Furnaces are Operating.

These limits were calculated using the following equations:

$NO_{X\ CDMalf15} = NO_{X\ Abn}$, and

$NO_{X\ CDMalf16} = 5 \times NO_{X\ Abn}$

Where:

NO_{X_Abn} = NO_x emission limit for Furnace 15 or 16 during an Abnormally Low Production Rate Day = 418 pounds per day per Furnace

If both Furnaces are operating, the combined NO_x emission limit for both Furnaces is 2,406 lb/day, which is based on a scenario in which $NO_{X\_CDMalf16}$ is calculated based on the maximum glass pull rate of 348 tpd but $NO_{X\_CDMalf15}$ is calculated based on a lower glass pull rate of 262 tpd

3. NO_x Limit During Maintenance of Any Control Device

For any day which is excluded from the Emission Rate 30-day Rolling Average, a CEMS shall be used to demonstrate compliance on a 24-hour Block Average with the following pound per day limit:

$$NO_{X\ CDMaint15} = \frac{MH \times [4 \times NO_{X\ Abn15}]}{24} + \frac{NH \times [4 \times NO_{X\ Abn15}]}{24}$$

$$NO_{X\ CDMaint16} = \frac{MH \times [5 \times 4 \times NO_{X\ Abn16}]}{24} + \frac{NH \times [4 \times NO_{X\ Abn16}]}{24}$$

Where:

$NO_{X\ CDMaint}$ = NO_x emission limit for Furnace 15 or 16 during a Maintenance Day, in pounds per day per Furnace,

NO_{X_Abn} = NO_x emission limit for Furnace 15 or 16 during an Abnormally Low Production Rate Day = 418 pounds per day per Furnace when based on glass pull rate of 348 tpd,

MH = Hours of Maintenance for Control Device during a Maintenance Day (less than or equal to 24 hours per day), and

NH = Normal Operating Hours for Control Device during a Maintenance Day = 24 – *MH*

For two furnaces operating, $NOx_{CDMaint}$ would be equal to sum of the above equations for each furnace with the appropriate values of *MH* and *NH* (i.e., $NOx_{CDMaint}$ for Furnace 15 + $NOx_{CDMaint}$ for Furnace 16) and NO_{X_Abn} is based on a maximum glass pull rate of 348 tpd for Furnace 16 and a lower glass pull rate of 262 tpd for Furnace 15.

4. SO_2 Limit During Abnormally Low Production Rate Days

During ALPR Days, a CEMS shall be used to demonstrate compliance on a 24-hour Block Average with the following pound per day limit:

$SO_{2\ Abn}$ = SO_2 emission limit for Furnace 15 or 16 during an Abnormally Low Production Rate Day = 279 pounds per day if only one Furnace is operating or a total of 488 pounds per day if both Furnaces are operating.

This limit was calculated using the following equation:

$$SO_{2\ Abn} = 0.8 \frac{lb\ SO_2}{\quad} \times \frac{\quad}{0.35}$$

Where:

P = Furnace ALPR threshold (i.e., 35% of 348 tons of glass produced per day, or 122 tons of glass per day if only one Furnace is operating, or 35% of 610 tons of glass produced per day, or 214 tons of glass per day, for both Furnaces combined).

5. SO_2 Limit During Malfunction of the Scrubber

During the Malfunction Days excluded from the 30-Day Rolling Averages, a CEMS shall be used to demonstrate compliance on a 24-Hour Block Average with the following lbs/day limit for the Malfunctioning Control Device.

$$SO_{2\_CD\_Malf} = 2.5 \frac{lb SO_2}{ton} \times \frac{P}{0.35}$$

Where:

$SO_{2\_CD\ Malf}$ = SO_2 emission limit for Furnace 15 or 16 during a Malfunction Day, and

P = Furnace-specific production threshold (i.e., 122 tons of glass produced per day per Furnace).

Based on the above equation,

$SO_{2\_CD\_Malf}$ = 871 lbs/day if only one Furnace is operating, and

$SO_{2\_CD\_Malf}$ = 1,525 lbs/day if both Furnaces are operating.

If both Furnaces are operating, the combined SO_2 emission limit for both Furnaces is 1,525 lb/day, which is based on a combined glass pull rate of 610 tpd.

6. SO_2 Limit During Maintenance of the Control Device

For any Day which is excluded from the 30-Day Rolling Average Emission Rate, a CEMS shall be used to demonstrate compliance on a 24-Hour Block Average with the pound per day limit for the Control Device undergoing Maintenance calculated using the following equations:

For one furnace operating:

$$SO_{2\_CD\_\text{Maint}} = \frac{MH \times [SO_{2\_CD\_Malf}]}{24} + \frac{NH \times [1/3 x SO_{2\_CD\_Malf}]}{24}$$

Where:

$SO_{2\_CD\ Maint}$ = SO_2 emission limit for Furnace 15 or 16 with a control device during a Maintenance Day, in lbs/day,

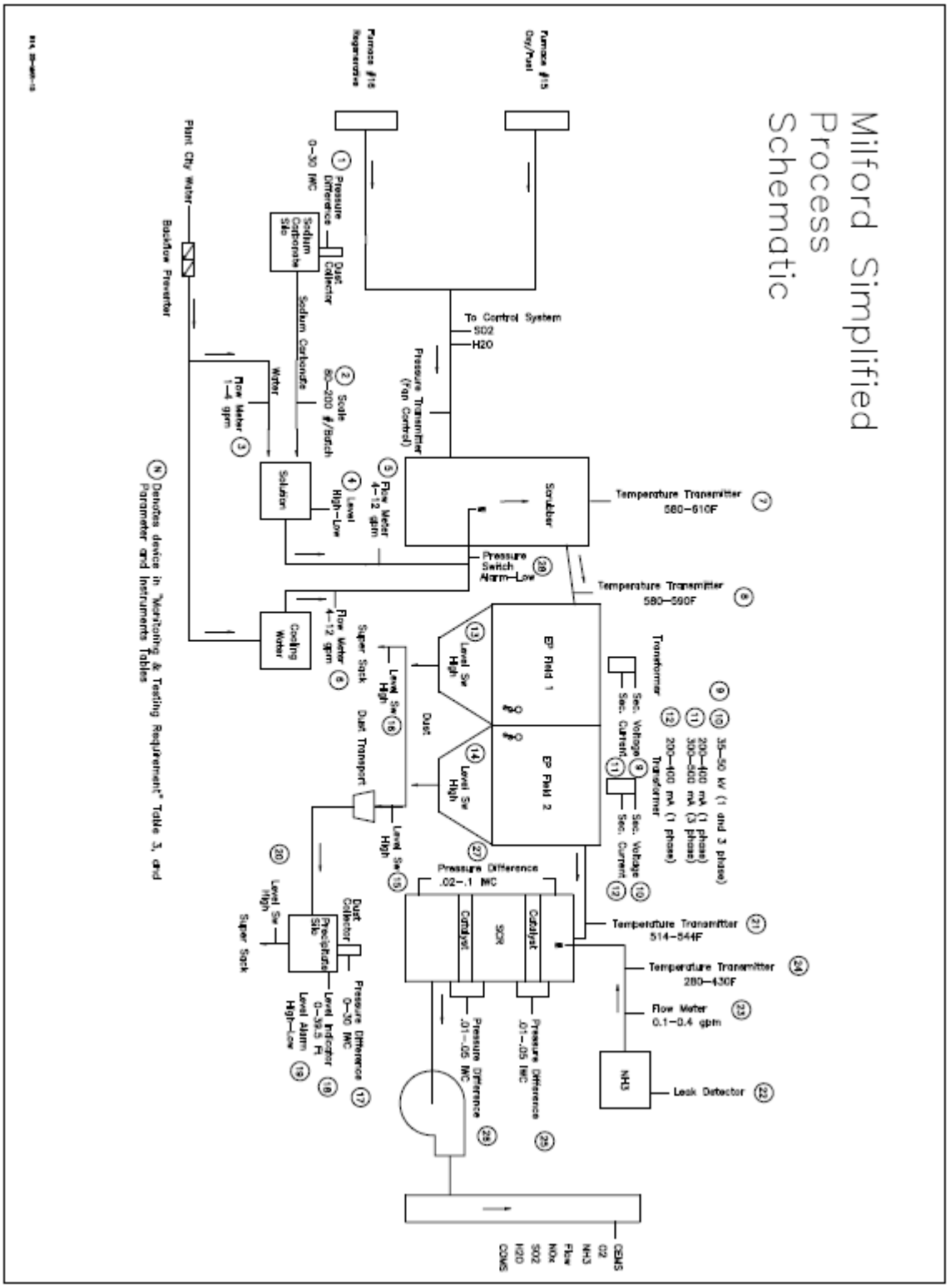
$SO_{2\_CD\text{-}Malf}$ = SO_2 emission limit for Furnace 15 or 16 during a Malfunction Day,

MH = Hours of Maintenance during a Maintenance Day (less than or equal to 24 hours per day), and

NH = Normal Hours = 24 – *MH* during a Maintenance Day.

For two furnaces operating, $SO_{2\_CD\_Maint}$ would be equal to sum of the above equation for each furnace with the appropriate values of *MH* and *NH* (i.e., $SO_{2\_CD\_Maint}$ for Furnace 15 + $SO_{2\_CD\_Maint}$ for Furnace 16), based on a combined glass pull rate of 610 tpd.

Appendix E - Control Device Schematic


Milford Simplified Process Schematic
Furnace #15 Dry/Fuel
Furnace #16 Regenerative
Plant City Water
Backflow Preventor
Pressure Differential 0-30 IWC
Dust Collector
Sodium Carbonate Silo
Sodium Carbonate
Scale 80-200 #/Batch
Flow Meter 1-4 gpm
Water
Solution
Level High-Low
Flow Meter 4-12 gpm
To Control System SO2 H2O
Pressure Transmitter (Fan Control)
Scrubber
Temperature Transmitter 580-610F
Pressure Switch Alarm-Low
Temperature Transmitter 580-590F
Cooling Water
Flow Meter 4-12 gpm
Super Sack
Level Sw High
Dust Transport
Dust
EP Field 1
EP Field 2
Transformer
Sec. Voltage
Sec. Current
35-50 kV (1 and 3 phase)
200-400 mA (1 phase) 300-600 mA (3 phase)
200-400 mA (1 phase) Transformer
Pressure Difference .02-.1 IWC
Catalyst
SCR
Catalyst
Temperature Transmitter 514-544F
Temperature Transmitter 280-430F
Flow Meter 0.1-0.4 gpm
NH3
Leak Detector
Pressure Difference .01-.05 IWC
Pressure Difference .01-.05 IWC
Pressure Difference 0-30 IWC
Dust Collector Precipitate Silo
Level Indicator 0-38.5 Ft
Level Alarm High-Low
Level Sw High
Super Sack
CEMS
O2
NH3
Flow
NOx
SO2
H2O
CO/HS
(N) Denotes device in "Monitoring & Testing Requirements" Table 3, and Parameter and Instruments Tables