217/782-2113

JOINT CONSTRUCTION AND OPERATING PERMIT - PSD APPROVAL - NSPS SOURCE
REVISED

PERMITTEE

PQ Corporation
Attn: Robert Pickens, Plant Manager
P.O. Box 840
Valley Forge, Pennsylvania 19482-0840

Application No.: 96010005
Applicant's Designation: PQCHICAGO
Subject: Sodium Silicate Manufacturing
Date Issued: July 3, 2001
Location: 1945 Delany Road, Gurnee

I.D. No.: 097035ABN
Date Received: February 17, 1999

Expiration Date: July 3, 2006

This permit is hereby granted to the above-designated Permittee to CONSTRUCT and OPERATE emission source(s) and/or air pollution control equipment consisting of alterations to an existing glass plant to produce sodium silicate (waterglass), with emission units and equipment as listed in Attachment 1, as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special conditions:

In conjunction with this permit, approval for the above activity is given with respect to the federal rules for Prevention of Significant Deterioration of Air Quality Regulations (PSD) for the above referenced equipment as described in the application, in that the Illinois Environmental Protection Agency (Illinois EPA) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401, the Federal regulations promulgated thereunder at 40 CFR 52.21 for Prevention of Significant Deterioration of Air Quality (PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency (USEPA) and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the findings and conditions which follow:

Findings

1a. PQ Corporation (PQ) has requested a permit to alter the existing glass plant previously owned and operated by Anchor Glass, Inc. (Anchor), to produce sodium silicate. The plant previously produced container glass for bottles and jars in two furnaces, by melting sand (silica), soda ash, salt cake and lime. These furnaces would now be used to produce sodium silicate from sand and soda ash.

b. As part of these alterations, PQ plans to install a new natural gas fired boiler, with backup oil capacity.

2. The plant is located in north Gurnee in Gurnee Township in Lake County. The area is currently designated attainment for all air quality standards except ozone.

3a. The proposed alterations are subject to PSD review for nitrogen oxides (NO_x), because the potential annual NO_x emissions of the altered plant, 558 tons, will be 8.9 tons greater than Anchor:s past emissions, which is significant. The proposed alterations are not subject to PSD for SO_2 and CO because the emissions are not significant.

b. The proposed alterations are not subject to PSD for particulate matter (PM), because the potential annual emissions, 72 tons, are lower than Anchor:s historical emissions.

4. The furnaces and their associated equipment must be operated so that emissions are in compliance with (i) all applicable Pollution Control Board emission standards, (ii) Best Available Control Technology (BACT) for emissions of NO_x as set in the conditions of this permit. The application submitted by PQ, as reviewed by the Illinois EPA shows that the project will comply with these requirements.

5. The air quality analysis submitted by PQ and reviewed by the Illinois EPA shows that this project will not cause a violation of the ambient air quality standard.

6. The Illinois EPA has determined that the application for the proposed project complies with all applicable Pollution Control Board Regulations and the federal Prevention of Significant Deterioration of Air Quality Regulations (PSD), 40 CFR 52.21.

7. A copy of the application, and the Illinois EPA's review of the application and a draft of this permit were placed in a location in Gurnee, and the public has been given notice and opportunity to examine this material and to submit comments and to request and participate in a public hearing on this matter.

The Illinois EPA is issuing approval subject to the following conditions and consistent with the specifications and data included in the application. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization of the Illinois EPA.

Conditions

1. Standard conditions for issuance of construction permits, attached hereto and incorporated herein by reference, shall apply to this project, unless superseded by the following conditions.

2a. Emissions of the furnaces shall not exceed 6.0 pounds of NO_x per ton of sodium silicate produced. Compliance with this limit shall be determined by testing and monitoring in accordance with Conditions 7, 8 and 9.

b. The furnaces will be equipped with low NO_x burner/low excess air operating technology.

This condition represents the application of the Best Available Control Technology (BACT) for the source as required by Section 165 of the Clean Air Act.

3a. The new boiler is subject to a New Source Performance Standard (NSPS) for Small Industrial Steam Generating Units, 40 CFR 60, Subparts A and Dc. The Illinois EPA is administering NSPS in Illinois on behalf of the United States EPA under a delegation agreement.

b. The opacity from the boiler shall not exceed 20 percent, pursuant to the NSPS, 40 CFR 60.43c(c).

c. At all times, the permittee shall also maintain and operate the boiler, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions.

4a. i. Pursuant to 40 CFR 60.42c(d), emissions of SO_2 from the boiler shall not exceed 0.5 lb/million Btu when firing residual oil.

ii. Pursuant to 35 IAC 214.122, emissions of SO_2 from the boiler shall not exceed 0.3 lb/mmBtu when firing distillate oil.

b. The Permittee shall not keep, store, or utilize at the plant other liquid fuels, e.g., distillate fuel oil, with a sulfur content greater than the larger of the following two values:

i. 0.28 weight percent, or

ii. The wt. percent given by the formula: Maximum wt. percent sulfur = (0.000015) x (Gross heating value of oil, Btu/lb).

c. Organic liquid by-products or waste materials shall not be used as fuel at the plant without written approval from the Illinois EPA.

d. The Illinois EPA shall be allowed to sample all fuels stored at the plant.

5a. The emissions of the furnaces shall not exceed the limits in Table I. Compliance with hourly limits shall be determined on a block 24-hour averaging basis.

b. The emissions of particulate matter from process equipment shall not exceed the limits in Table III.

c. i. Natural gas, other gaseous fuel and distillate or residual oil shall be the only fuels used in the boiler.

ii. The maximum firing rate of the boiler shall not exceed 17.1 million Btu/hour.

iii. Emissions from the boiler shall not exceed the limit in Table I.

d. i. Annual usage of residual fuel oil shall not exceed 264,177 gallons.

ii. Annual usage of liquid fuel other than residual oil shall not exceed 1,996,031 gallons.

iii. Emissions of SO_2 shall not exceed the limits specified in Table II.

e. Compliance with annual limits shall be determined from a running total of twelve months of data, i.e., the sum of the data for the current month and the previous 11 months of data.

f. This permit is issued based on these alterations not being subject to PSD for particulate matter because the emissions will not increase significantly. The change in emissions from the altered plant compared to the previously operated plant are shown in Table IV.

6. The Permittee shall notify the Illinois EPA in writing within 30 days of firing any gaseous fuel other than natural gas in the furnaces.

7a. i. A. On or before October 1, 1998, the emissions of PM, NO_x and CO and the opacity of each furnace shall be measured by an approved testing service as follows. The duct work from the furnaces
shall include a properly located test port defined by the test methods so that the furnace emissions may be tested.

B. The Permittee will also conduct emission tests for NO_x, CO, and PM within 90 days of a written Illinois EPA request.

C. These tests shall be conducted during operating conditions which are representative of normal operation under the circumstances which would produce the greatest emissions. Operating conditions during the test shall be recorded.

ii. Emissions measurements shall be made as follows:

A. PM emission measurements shall be made in accordance with 40 CFR 60, Appendix A, Method 5, and 40 CFR 60.296.

B. NO_x emission measurements shall be made in accordance with 40 CFR 60, Appendix A, Method 7, 7A, or 7E

C. SO_2 emission measurements shall be made in accordance with 40 CFR 60, Appendix A, Method 6.

D. CO emission measurements shall be made in accordance with 40 CFR 60, Appendix A, Method 10

E. Opacity of stack emissions shall be determined in accordance with 40 CFR 60, Appendix A, Method 9.

b. The Illinois EPA shall be notified prior to each of these tests to enable the Illinois EPA to observe these tests. Notification for the expected date of testing shall be submitted a minimum of thirty (30) days prior to the expected date, and shall be accompanied by a detailed plan describing the testing which will be performed. Notification of the actual date and expected time of testing shall be submitted a minimum of five (5) working days prior to the actual date of the test. The Illinois EPA may at its discretion accept notifications with shorter advance notice provided that the Illinois EPA will not accept such notifications if it interferes with the Illinois EPA's ability to observe testing.

c. Three (3) copies of the Final Report(s) for each of these tests shall be forwarded to the Illinois EPA within 45 days after completion of sampling. The Final Report shall include as a minimum:

i. A summary of results

ii. General information

iii. Description of test method(s), including description of sampling points, sampling train, analysis equipment, and test schedule.

iv. Detailed description of test conditions, including fuel and raw material consumption and furnace operating temperature.

v. Data and calculations, including copies of all raw data sheets and records of laboratory analyses, sample calculations, and data on equipment calibration.

8a. The Permittee shall operate and maintain monitors for necessary operating parameters of the sodium silicate furnaces consistent with Parametric Monitoring Plan approved by the Illinois EPA, to predict compliance with NO_x emission limits set by Conditions 2(a) and 5(a).

b. i. The Permittee shall submit a protocol for development of the Parametric Monitoring Plan within 60 days of routine production of sodium silicate.

ii. The Parametric Monitoring Plan shall be submitted to the Illinois EPA for its review and approval after at least 3 months of NO_x data is collected for the furnace operation for commercial production of sodium silicate.

c. i. The furnaces shall be equipped with appropriate facilities for "Portable NO_x Monitoring." The Permittee shall provide the capability to perform such portable monitoring on these furnaces.

ii. A. Such portable monitoring shall be fully operational during testing of the furnaces pursuant to Condition 7.

B. Such portable monitoring shall be conducted within 90 days of a written request from the Illinois EPA.

C. Such portable monitoring shall be performed with prior notification, as specified in Condition 7.

9a. i. As an alternative to parametric monitoring, as addressed by Condition 8, the Permittee may install, operate, calibrate and maintain a continuous emission monitoring system (CEMS) to measure NO_x emissions from the furnaces. This CEMS may be a "portable" system. This monitor shall determine NO_x emissions in lbs/hour, to determine a block 24-hour average.

ii. The Permittee shall notify the Illinois EPA about the choice for CEMS rather than parametric monitoring within 60 days of routine sodium silicate production.

b. This CEMS shall be installed to satisfy the applicable performance specifications in 40 CFR 60, Appendix B.

c. The Permittee shall maintain a log or file of all measurements, including continuous monitoring systems performance evaluations; all continuous monitoring systems performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices in a permanent form suitable for inspection.

10. The Permittee shall install and operate meters to measure and record fuel consumption by each furnace.

11a. The permittee shall fulfill applicable notification and record keeping requirements of the NSPS, 40 CFR 60.7 and 60.11, for the new boiler.

b. The Permittee shall maintain records of the amount of sodium silicate produced on a daily basis.

c. The Permittee shall maintain records of the following items, and such other items as may be appropriate to allow the Illinois EPA to review compliance with the limits in this permit.

i. Supplier certification of heat content, density and sulfur content for each shipment of fuel oil pursuant to 40 CFR 60.44c(g) on a quarterly basis.

ii. Fuel usage, on a monthly basis.

d. The Permittee shall maintain a shipping receipt from the fuel supplier for each shipment of distillate or residual oil delivered. The shipping receipt must indicate the location of the oil when a sample was drawn for analysis and must include the results of that analysis.

12. All records required by this permit shall be retained for three years at a readily accessible location at the plant and be available for inspection and copying by the Illinois EPA.

13a. After the altered plant is in operation the Permittee shall submit a written report of all excess emissions from the furnaces and boiler to the Illinois EPA for every calendar quarter.

The report shall include the following:

i. The magnitude of excess emissions computed in accordance with 40 CFR 60.13(h), and conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions.

ii. Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the furnaces. The nature and cause of any malfunction (if known) and the corrective action taken or preventative measures adopted shall also be reported.

iii. The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

iv. When no excess emissions have occurred or the continuous monitoring system has not been inoperative, repaired, or adjusted, such information shall be stated in the report.

v. Excess emissions indicated by the CEM system shall be considered violations of the applicable emission limit for the purpose of this permit, unless such excess emissions are related to initial shakedown and testing of each furnace, or are otherwise excused by regulation or other permitting conditions including but not limited to malfunctions, break downs, or startups.

b. If no excess emissions occur in a particular quarter, then a semiannual report is required stating that no excess emissions occurred during the reporting period.

14. With the Annual Emission Statement submitted to the Illinois EPA the Permittee shall separately report the sodium silicate production (tonnage) and the lb/ton emissions for NO_x, PM and CO.

15a. Submittals of information shall be made in duplicate to the Illinois EPA as follows:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Compliance Section (#40)
P.O. Box 19276
Springfield, Illinois 62794-9276

b. One copy of any required reports and notifications concerning equipment operation, performance testing or a continuous monitoring system shall also be sent to the Illinois EPA's regional Office at the following address unless otherwise indicated:

Illinois Environmental Protection Agency
Division of Air Pollution Control
9511 West Harrison
Des Plaines, Illinois 60016

16. This approval to construct does not relieve the Permittee of the responsibility to comply with all Local, State and Federal Regulations which are part of the applicable Illinois State implementation plan, as well as all other applicable Federal, State and Local requirements.

It should be noted that this permit has been revised to a Joint Construction and Operating Permit to increase the permitted PM emission limit for Furnace #1 from 31 tons/year to 41.3 tons/year and to remove from service SSS molding conveyor F-301. These revisions do not relax hourly emission limits, testing, monitoring, or reporting requirements contained in this permit. This permit continues to assure that approval of this activity is given with respect to the federal rules for Prevention of Significant Deterioration of Air Quality.

If you have any questions on this permit, please call Kevin Smith at 217/782-2113.

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

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Attachment

cc: Region 1
USEPA Region V

Table I Furnace and Boiler Emission Limits

Pollutant	Furnace 1 (Lb/Hour)	Furnace 2 (Lb/Hour)	Boiler (Lb/Hour)	Furnace 1 (Ton/Yr)	Furnace 2 (Ton/Yr)	Boiler (Ton/Yr)	Total (Ton/Yr)
NO_x	60.0	65.0	2.4	262.8	284.7	10.5	558.0
PM	9.43	7.5	0.1	41.3	32.9	0.3	74.5
CO	3.5	3.7	1.0	15.3	16.2	4.5	36.0

Table II Sulfur Dioxide (SO_2) Emissions from Furnace 1 & 2 and Boiler

Fuel	Maximum Usage Rate* (Gal/Yr)	Max. Sulfur Content (Wt. %)	(Lb/Gal)	Combined SO_2 Emissions* (Tons/Yr)
Residual Oil	264,177	0.5	0.4	-----
Distillate Oil	1,996,031	0.28	0.02	-----
			Total	39.9

* Predicted usage rates of fuel oil are unspecified at this time; however limits on maximum usage have been provided so as to limit the combined emissions of SO_2 to 39.9 tons/year.

Table III Particulate Matter (PM) Emissions from Process Equipment

Process	Baghouse	Design Flow Rate (scfm)	PM Loading (gr/scf)	Maximum PM Emissions (Lb/Hr)	(Tons/Yr)
Batch Transport	F-101	3800	0.02	0.65	2.85
Raw Material Unloading	F-102	1000	0.02	0.17	0.75
Batch Dense Phase	F-201	200	0.02	0.03	0.15
SSS Recycling	F-302	1000	0.02	0.17	0.01
Salt Tank	F-701	1000	0.02	0.17	0.001
SSS Loading	F-1202	5000	0.02	0.86	3.75
				Total	7.51

Table IV Contemporaneous Change in Emissions (tons per year)

	Actual Emissions Before Project (Previous Plant)*	Potential Emissions After Project (Altered Plant)**	Net Change
NO_x	549.1	558.0	$^{+}$8.9
PM	105.2	72.3	$^{-}$32.9

* Previous plant emissions reflect the average actual emissions of the furnaces based on the rate at which this furnace actually emitted during a representative two year period, which is calendar year 1993 and 1994 prior to shutdown in 1995.

** New plant emissions reflect permitted emissions from the altered plant.

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Attachment 1: List of Emission Units
and Air Pollution Control Equipment

- Furnace 1 and Furnace 2
- Boiler
- Spray water tank T-203 and solid sodium silicate (SSS) glass reclaim hopper (multiple units)
- Check tanks T-502 and T-503 and storage tanks T-601, T-602, T-603 and T-604
- Sulfuric acid drum
- Sulfite tank T-802, anticoagulant tank T-803 and deaerator tank V-801
- Filtered centrifugal separator F-801A, air line filter F-801B, oil removing filter F-801C, oil vapor adsorber F-801D, high temperature afterdryer F-801E, oil/water separator F-801F and air receiver T-801B
- Utility stations and sump pumps
- Hot glass transfer conveyor C-501, solids tank T-508 and hydroclone HC-508
- Equipment controlled by the batch house dust collector F-101: raw material vibratory feeder C-102A, raw material vibratory feeder C-102B, batch belt conveyor C-103, raw material storage bins T-101A and T-101B, raw material rotary feeder MS-101, raw material weigh hopper T-102, batch elevator BE-103, batch check weight tank T-103 and batch mixer M-103
- Equipment controlled by the raw material unloading bin vent dust collector F-102: raw material unloading elevator C-101, first raw material elevator BE-101 and second raw material elevator BE-102
- Equipment controlled by the transporter bin vent dust collector F-201: pneumatic batch transporter C-201 and transporter surge hopper T-201
- Equipment controlled by the batch bin vent dust collector F-202: charger C-202 and charger feed hopper T-202
- Equipment controlled by the bunker bin vent dust collector F-301: molding conveyor C-203 and glass bunker T-301
- Equipment controlled by the recycle bin vent dust collector F-302: dissolver feed hopper T-302, recycle bucket elevator BE-301, bin vent blower B-302
- Equipment controlled by the conveyor bin vent dust collector F-303: glass return vibratory feeder C-301 and glass return apron conveyor C-302

- Equipment controlled by the salt bin vent dust collector F-505: Akso salt tank T-704 and resin tanks T-704A and T-704B

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