MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION

October 18, 2024

PERMIT TO INSTALL
170-18A

ISSUED TO
General Shale Brick, Inc.

LOCATED AT
3820 E Serr Road, Michigan Brick
Corunna, Michigan 48817

IN THE COUNTY OF
Shiawassee

STATE REGISTRATION NUMBER
A6497

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: **October 9, 2024**	
DATE PERMIT TO INSTALL APPROVED: **October 18, 2024**	SIGNATURE:
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

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COMMON ACRONYMS

AQD	Air Quality Division
BACT	Best Available Control Technology
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
COMS	Continuous Opacity Monitoring System
Department/department/EGLE	Michigan Department of Environment, Great Lakes, and Energy
EU	Emission Unit
FG	Flexible Group
GACS	Gallons of Applied Coating Solids
GC	General Condition
GHGs	Greenhouse Gases
HVLP	High Volume Low Pressure*
ID	Identification
IRSL	Initial Risk Screening Level
ITSL	Initial Threshold Screening Level
LAER	Lowest Achievable Emission Rate
MACT	Maximum Achievable Control Technology
MAERS	Michigan Air Emissions Reporting System
MAP	Malfunction Abatement Plan
MSDS	Material Safety Data Sheet
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standard for Hazardous Air Pollutants
NSPS	New Source Performance Standards
NSR	New Source Review
PS	Performance Specification
PSD	Prevention of Significant Deterioration
PTE	Permanent Total Enclosure
PTI	Permit to Install
RACT	Reasonable Available Control Technology
ROP	Renewable Operating Permit
SC	Special Condition
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SRN	State Registration Number
TBD	To Be Determined
TEQ	Toxicity Equivalence Quotient
USEPA/EPA	United States Environmental Protection Agency
VE	Visible Emissions

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 psig

POLLUTANT / MEASUREMENT ABBREVIATIONS

acfm	Actual cubic feet per minute
BTU	British Thermal Unit
°C	Degrees Celsius
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
°F	Degrees Fahrenheit
gr	Grains
HAP	Hazardous Air Pollutant
Hg	Mercury
hr	Hour
HP	Horsepower
H_2S	Hydrogen Sulfide
kW	Kilowatt
lb	Pound
m	Meter
mg	Milligram
mm	Millimeter
MM	Million
MW	Megawatts
NMOC	Non-Methane Organic Compounds
NO_x	Oxides of Nitrogen
ng	Nanogram
PM	Particulate Matter
PM10	Particulate Matter equal to or less than 10 microns in diameter
PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
pph	Pounds per hour
ppm	Parts per million
ppmv	Parts per million by volume
ppmw	Parts per million by weight
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
scf	Standard cubic feet
sec	Seconds
SO_2	Sulfur Dioxide
TAC	Toxic Air Contaminant
Temp	Temperature
THC	Total Hydrocarbons
tpy	Tons per year
µg	Microgram
µm	Micrometer or Micron
VOC	Volatile Organic Compounds
yr	Year

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**

2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**

3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to Rule 210 (R 336.1210), operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**

4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**

5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to Rule 219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of Rule 219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(R 336.1219)**

6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**

7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**

8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of Rule 301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with Rule 303 (R 336.1303). **(R 336.1301)**
    a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
    b) A visible emission limit specified by an applicable federal new source performance standard.
    c) A visible emission limit specified as a condition of this Permit to Install.

12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

EMISSION UNIT SPECIAL CONDITIONS

EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date / Modification Date	Flexible Group ID
EUKILN01	Natural gas-fired brick tunnel kiln, dryer, and other associated equipment. Dry lime injection and baghouse collector are used for control.	1-26-77/ 1-15-86	FGKILNS
EUKILN02	Natural gas-fired brick tunnel kiln, dryer, and other associated equipment. Dry lime injection and baghouse collector are used for control.	1-26-77/ 1-15-86	FGKILNS
EUPUG-30	Pug 30 mixer and extruder with dust collector for control.	11-24-93/ 4-09-2019	FGPLANT1
EUPUG-50	Pug 50 mixer and extruder with dust collector for control.	11-24-93/ 4-09-2019	FGPLANT1
EUSMALLDRYER	Small dryer for Plant 1 with dust collector for control.	11-24-93/ 4-09-2019	FGPLANT1
EUSMALLMIXER	Small add-on mixer for Plant 1 with dust collector for control.	11-24-93/ 4-09-2019	FGPLANT1

Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1291.

FLEXIBLE GROUP SPECIAL CONDITIONS

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGKILNS	Brick tunnel kilns no. 1 and no. 2 and associated dryers, lime injection system, two fabric filter collectors.	EUKILN01 EUKILN02
FGPLANT1	All emission sources in Plant no. 1 which are all vented to the same control device (dust collector with dry filter) - includes a paddle mixer, sand dryer system, 30 pug line (with small extruder) and 50 pug line (with mixer and extruder).	EUPUG-30 EUPUG-50 EUSMALLDRYER EUSMALLMIXER

FGKILNS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Natural gas-fired brick tunnel kilns no. 1 and no. 2 and associated brick dryers.

Emission Unit: EUKILN01, EUKILN02

POLLUTION CONTROL EQUIPMENT

Each kiln has a fabric filter collector (Gore-Tex brand bags) and dry lime injection.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. Sulfur Dioxide	241 pph (both kilns combined)	Averaged over a calendar month	EUKILN01 EUKILN02	SC V.1 SC V.2 SC VI.3 SC VI.5 SC VI.6	40 CFR 52.21
2. Sulfur Dioxide	650 tons per calendar year (both kilns combined)	Calendar year	EUKILN01 EUKILN02	SC V.1 SC V.2 SC VI.3 SC VI.5 SC VI.6	40 CFR 52.21
3. Particulate Matter	0.10 lbs. per 1,000 lbs. exhaust gases, (each kiln)	Calculated on a dry gas basis	EUKILN01 EUKILN02	SC V.2 SC VI.1 SC VI.2 SC VI.4	R 336.1331(1)(c)

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall not operate FGKILNS unless a malfunction abatement plan (MAP) as described in Rule 911(2) has been submitted within 30 days of permit issuance, and is implemented and maintained. The MAP shall, at a minimum, specify the following:

   a) A complete preventative maintenance program including identification of the supervisory personnel responsible for overseeing the inspection, maintenance, and repair of air-cleaning devices, a description of the items or conditions that shall be inspected, the frequency of the inspections or repairs, and an identification of the major replacement parts that shall be maintained in inventory for quick replacement.

   b) An identification of the source and air-cleaning device operating variables that shall be monitored to detect a malfunction or failure, the normal operating range of these variables, and a description of the method of monitoring or surveillance procedures.

   c) A description of the corrective procedures or operational changes that shall be taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits.

If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 45 days after such an event occurs. The permittee shall also amend the MAP within 45 days, if new equipment is installed or upon request from the District Supervisor. The permittee shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits. **(R 336.1225, R 336.1331, R 336.1702(a), R 336.1910, R 336.1911, 40 CFR 52.21(c) and (d))**

2. The permittee shall not operate each kiln if the pressure drop across the kiln fabric filter is less than or equal to 2 inches H_2O or greater than or equal to 10 inches H_2O. An alarm shall sound when the pressure drop exceeds 10 inches H_2O for longer than 2 hours. **(R 336.1205(1)(a))**

3. The permittee shall not operate each kiln unless the temperature in each fabric filter collector is maintained 15°F below bag degradation temperature. A warning alarm shall sound when the temperature in either collector gets within 25°F of bag degradation temperature or the set point, if it is lower than this range. (Note: Set point could be lower with a higher temperature bag, but must be above the dew point.) **(R 336.1910)**

4. The permittee shall not operate each kiln unless the feed rate of hydrated lime into each fabric filter collector is maintained at a rate that shall be determined monthly using the appropriate methods found in Appendices 1 and 2. **(R 336.1910)**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The fabric filter collectors with dry lime injection shall be installed, maintained, and operated in a satisfactory manner. Satisfactory manner shall be defined as operating in accordance with the MAP. **(R 336.1910)**

2. The permittee shall install, calibrate, maintain and operate in a satisfactory manner a temperature monitoring device for the inlets into each fabric filter collector for each kiln to monitor and record the temperature on a continuous basis during operation of FGKILNS. **(R 336.205(1)(a))**

3. The permittee shall install, calibrate, maintain and operate, in a satisfactory manner, devices to continuously monitor and record the pressure differential for each fabric filter collector for each kiln during operation of FGKILNS. **(R 336.205(1)(a))**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall test monthly and record the average total sulfur content of at least one dry brick and one fired brick. This information shall be used as a basis for hourly and yearly sulfur dioxide emission calculations. Permittee shall use sulfur test method outlined in Appendix 1. **(R 336.1205(1)(a) & (3))**

2. Within 5 years of the previous stack test, verification of the particulate matter (PM) and sulfur dioxide (SO_2) emission rates from either EUKILN01 or EUKILN02 will be required by testing at the permittee's expense. No less than 30 days prior to testing, a complete stack testing plan must be submitted to the AQD. The final plan must be approved by the AQD prior to testing. The AQD must approve the final plan prior to testing. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.1205(1)(a), R 336.2001, R 336.2003, R 336.2004)**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall monitor and record the temperature entering each fabric filter for each kiln on a continuous basis in a manner and with instrumentation acceptable to the Air Quality Division. **(R 336.1205(1)(a))**

2. The permittee shall continuously monitor and record the pressure drop across each fabric filter for each kiln daily as an indicator of proper operation of the dust collector. **(R 336.1205(1)(a))**

3. The permittee shall monitor and record the hourly lime feed rate according to the feeder into each kiln gas reaction chamber on a once every two hours in a manner and with instrumentation acceptable to the Air Quality Division. **(R 336.1205(1)(a))**

4. The permittee shall perform and record the results of a 6-minute visible emission observation during routine operating conditions at least once per calendar month. This observation shall be performed by staff knowledgeable with US EPA Test Reference Method 9, but certification in the Test Method is not required. The purpose of the visible emission observation is to determine whether or not visible emissions were present. If any visible emissions are observed during the observation, an observation shall be made by a staff person certified in US EPA Test Reference Method 9, within 24 hours. Visible emissions recorded by the Method 9-certified observer shall be documented. **(R 336.1205(1)(a))**

5. The permittee shall record the operating hours and production rate in tons of brick for each kiln on a daily basis. **(R 336.1205(1)(a))**

6. Calculations to determine compliance with hourly and yearly sulfur dioxide emissions limits for the brick kilns. Emission rates shall be calculated according to the method outlined in Appendix 2. **(R 336.1205(1)(a))**

7. The permittee shall record the monthly lab data, including the lab-calculated lb/ton fired brick emission rates. The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a), R 336.1910, 40 CFR 52.21)**

8. The permittee shall record on a daily basis :

   a) The car push rate, which is the number of cars sent through each kiln per day (variable C_{day} in Appendix 2). This shall be determined at the beginning of each operating day.

   b) The weight of bricks per car (variable B_{day} in Appendix 2), based on the weight of each car sent through each kiln per day.

   The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a), R 336.1910, 40 CFR 52.21)**

9. The permittee shall record on a monthly basis:

   a) The total cars processed each calendar month (variable C_{month} in Appendix 2). This is calculated by adding the number of cars sent through the kiln each day over the calendar month.

   b) The weight of bricks per car averaged over a calendar month (variable B_{month} in Appendix 2). This is based on the weight of each car sent through each kiln per day.

   The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a), R 336.1910, 40 CFR 52.21)**

VII. REPORTING

NA

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SVKILN01	40	60	R 336.1331(1)(c)
2. SVKILN02	40	60	R 336.1331(1)(c)

IX. OTHER REQUIREMENT(S)

NA

Footnotes:[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

FGPLANT1
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

All emission sources in Plant no. 1 which are all vented to the same control device (dust collector with dry filter) - includes a paddle mixer, sand dryer system, 30 pug line (with small extruder) and 50 pug line (with mixer and extruder).

Emission Unit: EUPUG-30, EUPUG-50, EUSMALLDRYER, EUSMALLMIXER

POLLUTION CONTROL EQUIPMENT

Dust collector with a dry filter (Donaldson Torit DFO3-12)

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. Particulate Matter	0.05 lbs. per 1,000 lbs. of exhaust gases	Calculated on a dry gas basis	FGPLANT1	SC VI.1, SC VI.2	R 336.1331(1)(c)

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. Permittee shall not operate this emission unit unless the dust collector is operating within a pressure drop range as established by the manufacturer. **(R 336.1910)**

IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall maintain the manufacturer specifications for the dust collector on site. The permittee shall keep all records on file at the facility and make them available to the Department upon request. **(R 336.1331(1)(c))**

2. Permittee shall monitor and record pressure drop across the dust collector on a weekly basis. **(R 336.1331(1)(c))**

VII. REPORTING

NA

VIII. STACK/VENT RESTRICTION(S)

NA

IX. OTHER REQUIREMENT(S)

NA

Footnotes:
[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

FGFACILITY CONDITIONS

DESCRIPTION

The following conditions apply source-wide to all process equipment including equipment covered by other permits, grand-fathered equipment, and exempt equipment.

POLLUTION CONTROL EQUIPMENT

Control devices within the emission units.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. Each Individual HAP	8.9 tpy	12-moth rolling time period determined at the end of each calendar month	FGFACILITY	SC VI.2	R 336.1205(1)(a) & (3)
2. Aggregate HAPs	22.4 tpy	12-moth rolling time period determined at the end of each calendar month	FGFACILITY	SC VI.2	R 336.1205(1)(a) & (3)

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

NA

IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. At least once every five years, the permittee shall verify HAP emission rates from either EUKILN01 or EUKILN02 by testing at owner's expense, in accordance with Department requirements. For determining compliance with the individual and aggregate HAP limits; HCl, hydrogen fluoride, chlorine, mercury (Hg), and non-Hg metal HAPs at a minimum to be tested. Testing shall be performed using an approved EPA Method listed in:

Pollutant	Test Method Reference
Metals	40 CFR Part 60, Appendix A; 40 CFR Part 61, Appendix B; 40 CFR Part 63, Appendix A
HAPs	40 CFR Part 63, Appendix A
Mercury	40 CFR Part 60, Appendix A; 40 CFR Part 61, Appendix B; 40 CFR Part 63, Appendix A

Pollutant	Test Method Reference
Hydrogen Halides / Halogens	40 CFR Part 60, Appendix A
Hydrogen Chloride	40 CFR Part 60, Appendix A

An alternate method, or a modification to the approved EPA Method, may be specified in an AQD-approved Test Protocol. No less than 30 days prior to testing, the permittee shall submit two complete test plans to the AQD Technical Programs Unit Supervisor and the District Supervisor. The plans shall describe the test method(s) and the maximum routine operating conditions, including targets for key operational parameters associated with air pollution control equipment to be monitored and recorded during testing. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. Verification of emission rates includes the submittal of a complete report of the test results to the AQD Technical Programs Unit Supervisor and the District Supervisor within 60 days following the last date of testing. **(R 336.1205, R 336.2001, R 336.2003, R 336.2004)**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor by the end of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. **(R 336.1205(3)**

2. The permittee shall keep the following information on a monthly basis for FGKILNS:
   a) The quantity of each HAP containing material used or emitted.
   b) The HAP emission factor of each HAP containing material used or emitted. (Emission factors are to be based on testing at the facility or as approved by the AQD District Supervisor.)
   c) Individual and aggregate HAP emission calculations determining the monthly emission rate of each in tons per calendar month.
   d) Individual and aggregate HAP emission calculations determining the annual emission rate of each in tons per 12-month rolling time period as determined at the end of each calendar month.

   The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (3))**

VII. REPORTING

NA

VIII. STACK/VENT RESTRICTION(S)

NA

IX. OTHER REQUIREMENT(S)

NA

Footnotes:
[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

APPENDIX 1
Testing Procedures

The permittee shall use the following approved test plans, procedures, and averaging to measure the pollutant emissions for the applicable requirements referenced in FGKILNS to determine sulfur content of the bricks. For the purposes of this appendix, “dry brick” is defined as those bricks that have gone through the dryer to remove moisture; “fired brick” is defined as those bricks that have gone through EUKILN01 or EUKILN02.

1. Pick 1 new dry brick and 1 new fired brick at random per month for analysis. Bricks shall be manufactured in the same month that the test represents. Data from the test shall be used for the following month’s calculations outlined in Appendix 2. A test will not be required for those months that bricks are not manufactured.

2. Send bricks to a nationally accredited and ISO certified lab.

3. Lab will process each brick separately and generate a report of the results, along with a calibration/quality control procedure report.

4. The samples will be tested through combustion of the sample and analysis using infrared absorption and detection techniques or other methods acceptable to the AQD District Supervisor. Sample results will be reported in lb (sulfur, fluorine, chlorine) released/ ton brick.

Upon request of the AQD District Supervisor, the permittee shall provide all documentation demonstrating the accuracy of a specific test result

APPENDIX 2
Emission Calculations for FGKILNS

The permittee shall use the following calculations in conjunction with monitoring, testing or recordkeeping data to determine compliance with the applicable requirements referenced in FGKILNS.

Lime Feed Rate Calculations

1. Determine the sulfur, chlorine, and fluorine content using the procedures in Appendix 1. The lab shall provide emission factors in lb (sulfur, fluorine, chlorine) released/ ton brick.

2. Determine the amount of pollutant (sufur dioxide (SO_2), hydrogen fluoride (HF), and hydrogen chloride (HCl)) released/ ton brick based on stoichiometric conditions. The lab may also provide these emission factors:

   1 lb/ton fluorine produces 1.05 lb HF per ton bricks

   $$A_{HF}\left(\frac{lb\ HF}{ton\ bricks}\right) = F\ \left(\frac{lb\ F}{ton\ bricks}\right) \times 1.05$$

   1 lb/ton chlorine produces 1.03 lb HCl per ton bricks

   $$A_{HCl}\left(\frac{lb\ HCl}{ton\ bricks}\right) = Cl\ \left(\frac{lb\ Cl}{ton\ bricks}\right) \times 1.03$$

   1 lb/ton sulfur produces 2 lb SO_2 per ton bricks

   $$A_{SO2}\left(\frac{lb\ SO_2}{ton\ bricks}\right) = S\left(\frac{lb\ S}{ton\ bricks}\right) \times 2$$

3. Determine the amount of lime ($Ca(OH)_2$) needed for each reaction in lb lime/ ton bricks based on stoichiometric conditions:

   $$Ca(OH)_2 + 2HF \rightarrow CaF_2 + 2H_2O$$
   $$Ca(OH)_2 + 2HCl \rightarrow CaCl_2 + 2H_2O$$
   $$Ca(OH)_2 + SO_2 \rightarrow CaSO_4 + H_2O$$

$$L_{HF,HCl,SO2}\left(\frac{lb\ lime}{ton\ bricks}\right) = \frac{A_{HF,HCl,SO2}\left(\frac{lb\ HF,HCl,SO_2}{ton\ brick}\right) \times M_{HF,HCl,SO2}\left(\frac{lb-mol}{lb\ HF,HCl,SO_2}\right) \times \frac{74\ lb\ Ca(OH)_2}{lb-mol}(molecular\ wt\ of\ lime)}{X_{HF,HCl,SO_2}\ mol\ \ (based\ on\ stoichiometric\ conditions)}$$

Where:

L= The amount of lime needed to perform a reaction (lb lime/ton bricks). This would be calculated three times: one for each reaction.
A= Amount of pollutant produced/ ton brick, the pollutant being HF, HCl, or SO_2, depending on which reaction is being calculated. These values are found in Step 2.
M= The inverse molecular weight of HF, HCl, or SO_2, depending on which reaction is being calculated. The molecular weight of HF is 20 lb/lb-mol (M=1/20), HCl is 36 lb/lb-mol (M=1/36), and SO_2 is 64 lb/lb-mol (M=1/64).
X= Moles of pollutant needed to perform reaction based on the chemical reactions above, the pollutant being HF, HCl, or SO_2, depending on which reaction is being calculated. HF and HCl require 2 moles (X=2) whereas SO_2 requires 1 mole (X=1).

4. Determine lime feed rate needed with a 100% safety factor:

$$H_{HF,HCl,SO2}\left(\frac{lb\ lime}{hr}\right) = L_{HF,HCl,SO2}\left(\frac{lb\ lime}{ton\ bricks}\right) \times B_{day}\left(\frac{lb\ brick}{car}\right) \times \frac{ton\ bricks}{2000\ lb\ brick} \times C_{day}\left(\frac{cars}{day}\right) \times \frac{day}{24\ hours} \times 2\ (100\%\ safety\ factor)$$

Where:

H= Hourly lime feed rate (lb lime/hr). This would be calculated three times: one for each reaction.
L= The amount of lime needed to perform a reaction (lb lime/ton bricks). This would be calculated in Step 3.
C_{day}= Number of cars anticipated to be processed that day (cars/ day). Also known as the push rate, this shall be determined at the beginning of each day.
B_{day}= Weight of bricks per car (lb brick/ car). This is based on the weight of each car sent through each kiln per day.

5. To determine the total lime feed rate for a kiln, add the lime feed rate needed for each reaction.

$$H_{Kiln}\left(\frac{lb\ lime}{hr}\right) = H_{HF}\left(\frac{lb\ lime}{hr}\right) + H_{HCl}\left(\frac{lb\ lime}{hr}\right) + H_{SO2}\left(\frac{lb\ lime}{hr}\right)$$

SO_2 Emission Calculations

1. Follow Steps 1 and 2 in the lime feed rate calculations to determine the lb SO_2 released/ ton bricks, A_{SO2}.

2. Calculate the SO_2 monthly emission rate for each kiln. Assume 11% removal of SO_2 w/lime injection/baghouse based on previous stack test:

$$S_{month}\left(\frac{lb\ SO_2}{month}\right) = A_{SO2}\left(\frac{lb\ SO_2}{ton\ bricks}\right) \times \frac{ton\ bricks}{2000\ lb\ brick} \times B_{month}\left(\frac{lb\ brick}{car}\right) \times C_{month}\left(\frac{cars}{month}\right) \times (1 - 0.11)$$

Where:

S_{day}= Monthly SO_2 emission rate (lb SO_2/month). This shall be calculated for each kiln.
A_{SO2}= Amount of SO_2 produced/ ton brick.
C_{month}= Number of total cars processed that month (cars/ month). This is calculated by adding the number of cars sent through the kiln each day over the calendar month.
B_{month}= Weight of bricks per car (lb brick/ car) averaged over a calendar month. This is based on the weight of each car sent through each kiln per day.

3. Add the monthly SO_2 emissions from each kiln to determine the total monthly SO_2 emission rate.

4. To determine hourly SO_2 emissions, divide the monthly SO_2 emissions (determined in Step 2 if calculating for a single kiln or Step 3 if calculating for both kilns) by the number of operating hours in that calendar month.