NORTH CAROLINA DIVISION OF AIR QUALITY

Air Permit Review

Region: Winston-Salem Regional Office
County: Rockingham
NC Facility ID: 7900038
Inspector's Name: Ray Stewart
Date of Last Inspection: 02/16/2005
Compliance Code: 3/In Compliance - Inspection

Facility Data

Applicant (Facility's Name): Pine Hall Brick Company Incorporated

Facility Address:
Pine Hall Brick Company Incorporated
634 Lindsey Bridge Road
Madison, NC 27025

SIC: 3251 / Brick And Structural Clay Tile
NAICS: 327121 / Brick and Structural Clay Tile Manufacturing

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 2D .0515, .0516, .0521
NSPS: N/A
NESHAP: MACT JJJJJ for Plant 4 Kilns
PSD: N/A
PSD Avoidance: N/A
NC Toxics: 2D .1100 & 2Q .0705
112(r): N/A
Other: 2Q .0317 - MACT Avoidance for Plant 3 and Plant 5 Brick Kilns

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Vernon Moore Jr Plant Manager (336) 548-6007 P O Box 836 Madison, NC 27025	Vernon Moore Jr Plant Manager (336) 548-6007 P O Box 836 Madison, NC 27025	Harold Newman Vice President of Technical Services (336) 548-6007 P O Box 836 Madison, NC 27025

Application Data

Application Number: 7900038.05A, 7900038.05B
Date Received: 1/4/06, 12/1/05
Application Type: Modification
Application Schedule: TV-Sign-501(c)(2) and (c)(1)

Existing Permit Data
Existing Permit Number: 03997/T17
Existing Permit Issue Date: 03/05/2003
Existing Permit Expiration Date: 02/28/2008

Review Engineer: Rahul P. Thaker

Review Engineer's Signature: **Date:** 2/22/06

Comments / Recommendations:
Issue 03997/T18
Permit Issue Date:
Permit Expiration Date:

1. Purpose of Application

Pine Hall Brick Company Incorporated submitted a 2Q .0501(c)(2) application (7900038.05A) to obtain approval for the following:

- to burn off-site processed wood dust as a fuel in the Plant 3 kilns.
- to restrict each kiln operation for Plant 3 kilns to less than 10 tons per hour of fired product on a 12-month rolling average basis.
- to increase the production rate for Plant 4 kilns.
- to construct and operate dry limestone adsorber (DLA) on Plant 4 kilns.
- to restrict each the kiln operation for Plant 5 kilns to less than 10 tons per hour of fired product on a 12-month rolling average basis.
- to construct and operate wood dust bin, screen, and conveyors.

The company submitted another application (7900038.05B) using the provision of 2Q .0501(c)(1), requesting extension of the compliance date for Plant 4 kilns under brick MACT standard.

As per company e-mail dated 2/9/06, these two applications will be consolidated in to one application and one permit revision will be issued using the provision of 2Q .0501(c)(1). The application (7900038.05A) has therefore, been consolidated in to application (7900038.05B).

2. Facility Description

The company manufactures bricks at this facility. The SIC for the facility is SIC 3251 "Brick and Structural Clay Tile".

3. Application Chronology

The application chronology is detailed in the IBEAM Report.

4. Permit Modification/Changes

4.1 To burn off-site processed wood dust as a fuel in the Plant 3 kilns.
To restrict each kiln operation for Plant 3 kilns to less than 10 tons per hour of fired product on a 12-month rolling average basis.

Plant 3 has two permitted kilns (ID Nos. 3ES-LK3.1 and 3ES-LK3.2). As permitted, each has a brick production rate of 10 tons/hr, a natural gas/off-site green wood (or wood dust) heat input rate of 19.8 million btu/hr, and a combined wood firing rate of 5 tons/hr maximum. Per Permittee, the Plant 3 kilns were originally constructed in 1956 (ID No. 3ES-LK3.1) and 1963 (ID No. 3ES-LK3.2), and they have never been modified or reconstructed since its initial construction. Except for routine maintenance, repair, and replacement, and any permitted modifications (including fuel types), the burners, fans, kiln size, etc., have been the same since they were originally constructed for Plant 3. The Permittee adds that these kilns are capable of firing wood at a maximum rate of 5 tons/hr since its initial construction.

The Plant 3 has been restricted to produce maximum of 20 tons/hr bricks from two kilns, as a state-only enforceable permit condition in the current permit.

In this application, the Permittee proposes to burn off-site processed wood (sawdust) in these kilns. This wood is expected from the furniture manufacturers and similar operations. The MSDS included in the application for the unfinished medium density fiberboard (processed wood) suggests that the wood contains a maximum of 12 percent by weight urea-formaldehyde resin.

The Permittee also proposes to restrict each kiln operation for Plant 3 kilns to less than 10 tons per hour of fired product on a 12-month rolling average basis.

The following is a combined emission summary for Plant 3 kilns after this modification:

Pollutant	**Potential Emissions** tons per year
PM	98.8
PM-10	98.6
SO_2	58.6
NOx	32.4
CO	140.0
VOC	30.3
Lead	0.01
HF (single largest HAP)	51.6
Total HAPs	> 25

Formaldehyde	14.5
Ammonia	16.6

The above emission estimate is based upon emission factors[1], process rate of not to exceed 10 tons/hr for fired bricks for each kiln and operating hours of 8760.

For estimate of all NC air toxics emissions, which might possibly be emitted from these kilns, please refer to Section 6.

The kiln is subject to the requirements of 2D .0515, .0516, .0521 and .1100, and 2Q .0317 and .0705.

15A NCAC 2D .0515: Particulates from Miscellaneous Industrial Processes

This regulation limits allowable emissions of particulates using process rate of an industrial process. Based on the process rate of 15 tons/hr for one kiln (10 tons/hr for fired bricks per kiln plus 6 tons/hr for wood assuming entire plant capacity for firing wood will be utilized through only one kiln), the allowable emission rate for each kiln in Plant 3 kiln can be estimated to be 25.2 lbs/hr. The Permittee has estimated the worst-case potential emissions of particulate matter (filterable only) of 5.4 lbs/hr per kiln. Hence, compliance is expected.

15A NCAC 2D .0516: Sulfur Dioxide Emissions from Combustion Sources

The allowable emissions of sulfur dioxide from the kiln shall not exceed 2.3 lbs/million Btu. The Permittee has estimated sulfur dioxide emission rate of each Plant 3 kiln as 6.7 lbs/hr, which is based on AP-42 emission factor of 0.67 lb/ton fired bricks and 10 tons/hr production rate. This emission rate can also be written as 0.34 lb/million btu, using 19.9 million btu/hr heat input of each kiln. Hence, compliance is indicated.

15A NCAC 2D .0521: Control of Visible Emissions

The kiln is subject to 20% opacity limit. The last inspection of Plant 3 kilns indicated that these kilns were operating with no visible emissions. Compliance is expected.

15A NCAC 2D .1100: Control of Toxic Air Pollutants
15A NCAC 2Q .0711: Emission Rates Requiring a Permit

The existing permit includes modeled, DAQ approved emission rates for hydrogen fluoride and fluorides for Plant 3 kilns.

Due to burning of off-site processed wood containing urea-formaldehyde resin in these kilns, the Permittee has reviewed emissions of formaldehyde and ammonia for a possible need for modeling.

In addition, the Permittee is submitting in this application brick MACT compliance demonstration for Plant 4 kilns. Hence, it has also reviewed emissions on a facility wide basis for all NC air toxics in conjunction with this compliance demonstration, as per 2Q .0705(b)(1).

The company has concluded that the facility will have a potential emissions for the following air toxics above their respective toxic air pollutant emission (TPER) rates: ammonia, arsenic, benzene, cadmium, chlorine, chromium, di (2-ethylhexyl) phthalate, formaldehyde, hydrogen chloride, hydrogen fluoride, and nickel. Hence,

[1] Section 11.3 "Brick and Clay Product Manufacturing", 8/97, AP-42. For PM and HAP emissions (excluding formaldehyde and ammonia), the company has used site-specific stack test emission factors (Stack Testing of 9/95 for HF stack testing on Plant 4 kilns and 7/93 testing for PM on Plant 3 kilns). The stack tests for PM on Plant 3 kilns were only for filterable portion. Hence, the condensible PM emission factor from AP-42 was added to the stack test value to obtain a total PM emission factor. Formaldehyde and ammonia emissions have been based on maximum 20 weight percent resin content although the MSDS indicates a maximum of 12 percent by weight.

the Permittee has modeled these pollutants on a facility wide basis to assure compliance with their respective Acceptable Ambient Levels (AAL). In addition to the above, the facility wide potential emissions of beryllium, manganese, and mercury will be almost equal to their respective TPERs. Hence, the Permittee has decided to model these pollutants as well at their potential emission rates. Please refer to Section 6 for further details on this issue.

Finally, the facility also emits or has a potential to emit the following NC air toxics below their respective TPERs: benzo (a) pyrene, carbon disulfide, p-dichlorobenzene, n-hexane, methyl ethyl ketone, methyl chloroform, perchloroethylene, phenol, styrene, toluene, and xylene.

15A NCAC 2Q .0317: Avoidance Conditions

The 2Q .0317(a)(5) states that the Permittee can request to the DAQ to modify the permit to include a term or a condition to avoid any MACT requirement under 2D .1111.

EPA has promulgated a MACT standard in 40 CFR 63 Subpart JJJJJ "National Emission Standard for Hazardous Air Pollutants for Brick and Structural Clay Products Manufacturing" on May 16, 2003.

The Plant 3 kilns are deemed as existing affected sources under this MACT standard, requiring compliance no later than May 16, 2006. However, Section 63.8390(d) allows that the MACT standard does not apply to any existing tunnel kiln with a federally enforceable condition, limiting the process rate to less than 10 tons of fired brick per hour on a 12-month rolling average basis.

The Permittee has requested a federally enforceable permit condition in the revised permit, limiting process rate for each kiln in Plant 3 to less than 10 tons fired bricks per hour on a 12-month rolling average basis.

Therefore, DAQ will include a federally enforceable permit condition limiting the process rate to less than 10 tons of fired brick per hour on a 12-month rolling average basis for each kiln in Plant 3. This condition will also include appropriate monitoring/record keeping/reporting requirements to assure compliance. The requirements of this condition will become effective May 16, 2006.

4.2 To increase the production rate for Plant 4 kilns.
To construct and operate dry limestone adsorber (DLA) on Plant 4 kilns.

Plant 4 has two permitted kilns (ID Nos. 4ES-LKD4.1 and 4ES-LKD4.2). As permitted, each has a brick production rate of 12.5 tons/hr and a natural gas/propane-firing rate of 28.8 million btu/hr. Per Permittee, the Plant 4 kilns were originally constructed in 1970 (ID No. 4ES-LKD4.1) and 1972 (ID No. 4ES-LKD4.2). The Permittee states that these kilns have never been physically modified nor they have had any operational changes to the original kiln design. Except for routine maintenance, repair, and replacement, and any permitted modifications (including fuel types), the burners, fans, kiln size, etc., have been the same since they were originally constructed for Plant 4.

The Plant 4 has been restricted to produce maximum of 25 tons/hr bricks from two kilns, as a state-only enforceable permit condition in the current permit.

This application includes increase in production rate from 12.5 to 13.5 tons fired bricks per hour. The Permittee states that the Plant 4 kilns were each capable of producing at a rate of 13.5 tons/hr at the time of initial construction. The Permittee also proposes to install one DLA on Plant 4 kilns to comply with the brick MACT standard.

The following is a combined emission summary for Plant 4 kilns after this modification:

Pollutant	**Potential Emissions** tons per year

PM	119.4
PM-10	108.2
SO_2	79.2
NOx	41.4
CO	141.9
VOC	2.8
Lead	0.02
HCl (single largest HAP)	30.8
Total HAPs	> 25

The above emission estimate is based upon emission factors[2], process rate of 13.5 tons/hr for fired bricks for each kiln and operating hours of 8760.

For estimate of all NC air toxics emissions, which might possibly be emitted from these kilns, please refer to Section 6.

The kiln is subject to the requirements of 2D .0515, .0516, .0521, .1100, .1111, and 2Q .0711.

15A NCAC 2D .0515: Particulates from Miscellaneous Industrial Processes

This regulation limits allowable emissions of particulates using process rate of an industrial process. Based on the process rate of 13.5 tons/hr for one kiln, the allowable emission rate for each kiln in Plant 4 can be estimated to be approximately 23.4 lbs/hr. The Permittee has estimated the worst-case potential emissions of particulate matter of 5.7 lbs/hr per kiln (filterable only). Hence, compliance is expected.

15A NCAC 2D .0516: Sulfur Dioxide Emissions from Combustion Sources

The allowable emissions of sulfur dioxide from the kiln shall not exceed 2.3 lbs/million Btu. The Permittee has estimated sulfur dioxide emission rate for each kiln as approximately 9 lbs/hr, which is based on AP-42 emission factor of 0.67 lb/ton fired bricks and 13.5 tons/hr production rate. This emission rate can also be written as 0.31 lb/million btu using 28.8 million btu/hr heat input for each kiln. Hence, compliance is indicated.

15A NCAC 2D .0521: Control of Visible Emissions

The kiln is subject to 20% opacity limit. The last inspection of Plant 4 kilns indicated that these kilns were operating with no visible emissions. Compliance is expected.

15A NCAC 2D .1100: Control of Toxic Air Pollutants
15A NCAC 2Q .0711: Emission Rates Requiring a Permit

The existing permit includes modeled, DAQ approved emission rates for hydrogen fluoride and fluorides for Plant 4 kilns.

As indicated above, the Permittee is submitting in this application brick MACT compliance demonstration for Plant 4 kilns. Hence, it has reviewed emissions on a facility wide basis for all NC air toxics in conjunction with this compliance demonstration, as per 2Q .0705(b)(1).

[2] Section 11.3 "Brick and Clay Product Manufacturing", 8/97, AP-42. For PM, HF, and HCl, the company has used MACT limits to estimate potential emissions. For PM, the condensible PM emission factor from AP-42 was added to the MACT PM limit to obtain a total PM emission factor.

The company has concluded that the facility will have a potential emissions for the following air toxics above their respective toxic air pollutant emission (TPER) rates: ammonia, arsenic, benzene, cadmium, chlorine, chromium, di (2-ethylhexyl) phthalate, formaldehyde, hydrogen chloride, hydrogen fluoride, and nickel. Hence, the Permittee has modeled these pollutants on a facility wide basis to assure compliance with their respective Acceptable Ambient Levels (AAL). In addition to the above, the facility wide potential emissions of beryllium, manganese, and mercury will be almost equal to their respective TPERs. Hence, the Permittee has decided to model these pollutants as well at their potential emission rates. Please refer to Section 6 for further details on this issue.

Finally, the facility also emits or has a potential to emit the following NC air toxics below their respective TPERs: benzo (a) pyrene, carbon disulfide, p-dichlorobenzene, n-hexane, methyl ethyl ketone, methyl chloroform, perchloroethylene, phenol, styrene, toluene, and xylene.

15A NCAC 2D .1111: Maximum Achievable Control Technology

As indicated in Section 4.1 above, EPA has promulgated a MACT standard at 40 CFR 63 Subpart JJJJJ "National Emission Standard for Hazardous Air Pollutants for Brick and Structural Clay Products Manufacturing" on May 16, 2003.

This Subpart applies to each existing affected facility with a design capacity 10 tons/hr fired brick. As indicated above, the Plant 4 kilns have been constructed in late 1970s, and therefore they have been deemed to be existing, affected sources for the MACT standard. These kilns therefore must comply with the MACT standard by May 16, 2006.

It should be noted that the Plant 4 kilns were capable of producing at 13.5 tons/hr at the time of initial construction and there is no capital expenditure involved in increase in production rate from 12.5 to 13.5 tons/hr. Hence, it is concluded here that these kilns are not reconstructed affected sources.

Emission Limits

Per Table 1 of the Subpart, these kilns are subject to the following emission limits:

HF - 0.057 lb/ton of fired product
HCl - 0.26 lb/ton of fired product
PM - 0.42 lb/ton of fired product

Operating Limits

The operating limits in Table 2 for the kilns equipped with a DLA require the Permittee to maintain the following: average pressure drop across the DLA for each 3-hour block period at or above the average pressure drop established during the performance test; adequate amount of limestone in the limestone hopper storage bin (located at the top of the DLA), and the limestone feeder setting at or above the level established during the performance test; records of the source and grade of limestone (use the same grade of limestone from the same source as was used during the performance test); and no VE from the DLA stack.

General Compliance Requirements

The Permittee shall be in compliance with the emission limitations (including operating limits) in this Subpart at all times, except during periods of startup, shutdown, and malfunction and during periods of routine control device maintenance. The Permittee shall always operate and maintain the affected source including air pollution control and monitoring equipment in accordance with 63.6(e). The Permittee shall develop and implement a written startup, shutdown, and malfunction plan (SSMP) according to the provisions in §63.6(e)(3). The Permittee shall prepare and implement a written operation, maintenance, and monitoring (OM&M) plan according to the requirements in §63.8425.

If the Permittee owns or operates an affected kiln and performs routine maintenance on the control device for that kiln, the Permittee may bypass the kiln control device and continue operating the kiln upon approval by the Director provided the Permittee satisfies the conditions listed in the MACT standard. The Permittee has made a request to bypass the control device during its routine maintenance. The DAQ will approve this request based upon the following conditions: (i) The routine control device maintenance exemption shall not exceed 4 percent of the annual operating uptime of the kiln. (ii) The Permittee must minimize HAP emissions during the period when the kiln is operating and the control device is offline. (iii) The Permittee must minimize the time period during which the kiln is operating and the control device is offline.

The Permittee shall be in compliance with the provisions of Subpart A of this Part, except as noted in Table 7 to this Subpart. The Permittee shall prepare, implement, and revise as necessary an OM&M plan that includes the information included in the MACT standard. The Permittee's OM&M plan shall be available for inspection by the permitting authority upon request. Changes to the operating limits in the Permittee's OM&M plan will require a new performance test. If the Permittee is revising the inspection and maintenance procedures in the OM&M plan, the Permittee does not need to conduct a new performance test.

Performance Testing

The Permittee shall conduct the initial performance test for the existing kiln within 180 days from the compliance date of May 16, 2006. Through the compliance extension approval, DAQ has required that the Permittee perform the initial tests by November 16, 2006 - this date is the same as the original date of 180 days from May 16, 2006. The Permittee shall demonstrate initial compliance with each emission limitation in Table 1 that applies according to Table 4 of Subpart JJJJJ. The Permittee shall establish each site-specific operating limit in Table 2 according to the requirements of 40 CFR 63.8445 and Table 3 of Subpart JJJJJ. The Permittee shall conduct all performance tests and establish operating limits according to the requirements of 40 CFR 63.8445. The Permittee shall submit the Notification of Compliance Status containing the results of the initial compliance demonstration according to the requirements in 40 CFR 63.8480(e). The Permittee shall conduct subsequent performance test before renewing the Title V Operation Permit or at least every 5 years following the initial performance test. The Permittee shall also conduct a performance test when the Permittee wants to change a parameter value for any operating limit specified in the Operation, Maintenance & Monitoring (OM&M) plan that is defined in 40 CFR 63.8425.

Monitoring

The Permittee shall monitor and collect data to demonstrate continuous compliance according the requirements in 40 CFR 63.8465. The Permittee shall demonstrate continuous compliance with each emission limit and operating limit in Tables 1 and 2 that applies according to the following (Ref. Table 5 of Subpart JJJJJ): The Permittee shall collect the DLA pressure drop using a Continuous Monitoring System (CMS) and then reduce the DLA pressure drop data to 3-hour block averages according to the requirements of 40 CFR 63.8450. The Permittee will demonstrate continuous compliance by maintaining the average DLA pressure drop for each 3-hour block period at or above the average pressure drop established during the performance test. The Permittee shall also verify that the limestone hopper storage bin (located at the top of the DLA) contain an adequate amount of limestone by performing a daily check. The Permittee shall record the limestone feeder setting daily to verify that the limestone feeder setting is at or above the level established during the performance test. The Permittee shall record the source and grade of limestone, and verify the use the same grade of limestone from the same source as was used during the performance test. The Permittee shall perform VE observations of the DLA stack at the frequency specified in 40 CFR 60.8470(g) using Method 22 (see below) and maintain no VE.

The Permittee shall demonstrate continuous compliance with the operating limits in Table 2 above for visible emissions (VE) from tunnel kilns equipped with DLA by monitoring VE at each kiln stack according to the following: (1) The Permittee shall perform daily VE observations of each kiln stack according to the procedures of Method 22 of 40 CFR part 60, appendix A, and the Permittee shall conduct the Method 22 test while the kiln is operating under normal conditions. The duration of each Method 22 test must be at least 15 minutes; (2) If VE are observed during any daily test conducted using Method 22 of 40 CFR part 60, appendix A, the Permittee shall promptly initiate and complete corrective actions according to the OM&M plan.

If no VE are observed in 30 consecutive daily Method 22 tests for any kiln stack, the Permittee may decrease the frequency of Method 22 testing from daily to weekly for that kiln stack. If VE are observed during any weekly test, the Permittee shall promptly initiate and complete corrective actions according to the OM&M plan, resume Method 22 testing of that kiln stack on a daily basis, and maintain that schedule until no VE are observed in 30 consecutive daily tests, at which time the Permittee may again decrease the frequency of Method 22 testing to a weekly basis. If VE are observed during any test conducted using Method 22 of 40 CFR part 60, appendix A, the Permittee shall report these deviations by following the requirements in § 63.8485.

Record keeping

The Permittee shall keep the records according to 40 CFR 63.8490 and 63.8495. The Permittee's records shall be in a form suitable and readily available for expeditious review. The Permittee shall keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report or record with each record being keep onsite for at least 2 years and then may be kept offsite for the remaining 3 years. It should be noted here that the record keeping requirements do not become effective until November 16, 2006, as per the DAQ compliance deadline extension approval.

Reporting

The Permittee must submit initial notification within 120 days from May 16, 2003 for the Plant 4 kilns. The Permittee shall submit a notification of intent to conduct a performance test at least 60 calendar days before the performance test is scheduled to begin. The Permittee shall also submit the Notification of Compliance Status, including performance test results, within 60 calendar days following completion of the performance test. The Permittee shall submit compliance reports semiannually according the requirements of 40 CFR 63.8485(b) that allows DAQ to afford the Permittee to use the standard semiannual reporting (e.g. no later than January 30 for the preceding six-month period from July 1 through December 31). It should be noted here that the reporting requirements do not become effective until November 16, 2006, as per the DAQ compliance deadline extension approval.

Compliance Date Extension Approval

As indicated in Section 1 above, the company has requested a six-month extension to the compliance date, and for the record keeping and reporting requirements, and a waiver of routine control device maintenance. The DAQ has, through a letter dated 2/3/06, approved a six-month extension to the MACT compliance date. This approval contains the following terms of conditions:

- The affected sources for the MACT are two natural gas/propane-fired combination brick kilns sharing a single stack (ID Nos. 4ES-LKD4.1 and 4ES-LKD4.2).
- On-site construction shall begin by June 1, 2006.
- The purchase of the equipment or the component parts to accomplish emission control or process changes shall be completed by July 1, 2006.
- On-site construction, installation of emission control equipment or a process change shall be completed by September 16, 2006.
- Initial start-up of the emission control equipment or a process change shall occur by October 16, 2006.
- The initial performance tests on the affected sources shall be completed by November 16, 2006.
- The new compliance date or the termination date of the extension shall be November 16, 2006.

In addition, this approval granted the waiver of record keeping and reporting requirements of the MACT standard for a limited time for kilns (ID Nos. 4ES-LKD4.1 and 4ES-LKD4.2). The termination date for this waiver is November 16, 2006.

The above terms of approval will be added to the revised permit.

Control Device Review

This is a single tower (four cascades) granular limestone packed bed adsorber. Adsorption media will normally be Jurassic limestone (minimum 95 % $CaCO_3$) with a mesh size of 4 mm-6 mm.

It is to be employed to reduce mainly emissions of hydrogen fluoride. Some emissions reduction in hydrogen chloride, sulfur dioxide, and particulates are also expected, however, the Pemittee is not claiming any credit for emission reductions for these pollutants.

Above the adsorption tower is a storage silo (12 ft height, 1,200 ft^3 volume, and 50 tons limestone storage capacity), which feeds a constant supply of fresh limestone by gravity. The following are specifications of this control device:

Inlet Air Flow Rate: 56,000 acfm at 350-450^0 F
Pressure Drop: 0.25-2 inches of water
Outlet Temperature: 300-430^0 F
Size: 157.5" (l) x 157.5" (w) x 72" (h) each cascade
Control Efficiency for HF: greater than 90%
Media Consumption: 170 lbs/hr (without desorption or descaling)

The control device will be equipped with Dwyer Photohelic differential pressure gauge to measure pressure drop across the adsorber.

The control device may be equipped with an optional descaling machine, which would allow removal of contaminants ($CaSO_4$, $CaCl_2$, CaF_2, etc.) from the saturated limestone. Thus it will ensure reuse of the same limestone media until it is completely exhausted.

The vendor guarantees to reduce emissions of HF, HCl, and PM, below their respective MACT limits in Subpart JJJJJ.

It is this engineer's judgment that this limestone adsorber should be able to meet MACT limits for HF, HCl, and PM, if it is constructed and operated per manufacturer's specifications.

4.3 To restrict each the kiln operation for Plant 5 kilns to less than 10 tons per hour of fired product on a 12-month rolling average basis.

Plant 5 has two permitted kilns (ID Nos. 5ES-LKD5.1 and 5ES-LKD5.2). As permitted, each has a brick production rate of 10.2 tons/hr and a natural gas firing rate of 28.88 million btu/hr. Per Permittee, the Plant 5 kilns were originally constructed in 1996 (ID No. 5ES-LKD5.1) and 1998 (ID No. 5ES-LKD5.2), and they have never been modified or reconstructed since their initial construction.

The Plant 5 has been restricted to produce maximum of 20.4 tons/hr bricks from two kilns, as a state-only enforceable permit condition in the current permit.

The Permittee proposes to restrict each kiln operation for Plant 5 kilns to less than 10 tons per hour of fired product on a 12-month rolling average basis.

The following is a combined emission summary for Plant 5 kilns after this modification:

Pollutant	**Potential Emissions** tons per year
PM	84.0
PM-10	76.1
SO_2	58.6
NOx	30.6

CO	105.0
VOC	2.1
Lead	0.01
HF (single largest HAP)	51.6
Total HAPs	> 25

The kiln is subject to the requirements of 2D .0515, .0516, .0521 and .1100, and 2Q .0317 and .0711.

15A NCAC 2D .0515: Particulates from Miscellaneous Industrial Processes

This regulation limits allowable emissions of particulates using process rate of an industrial process. Based on the process rate of 10.2 tons/hr for one kiln, the allowable emission rate for each kiln in Plant 5 can be estimated to be approximately 19.4 lbs/hr. The Permittee has estimated the worst-case potential emissions of particulate matter of 3.77 lbs/hr per kiln (filterable only). Hence, compliance is expected.

15A NCAC 2D .0516: Sulfur Dioxide Emissions from Combustion Sources

The allowable emissions of sulfur dioxide from the kiln shall not exceed 2.3 lbs/million Btu. The Permittee has estimated sulfur dioxide emission rate for each kiln as approximately 6.8 lbs/hr, which is based on AP-42 emission factor of 0.67 lb/ton fired bricks and 10.2 tons/hr production rate. This emission rate can also be written as 0.24 lb/million btu using 28.88 million btu/hr heat input for each kiln. Hence, compliance is indicated.

15A NCAC 2D .0521: Control of Visible Emissions

The kiln is subject to 20% opacity limit. The last inspection of Plant 5 kilns indicated that these kilns were operating with no visible emissions. Compliance is expected.

15A NCAC 2D .1100: Control of Toxic Air Pollutants
15A NCAC 2Q .0711: Emission Rates Requiring a Permit

The existing permit includes modeled, DAQ approved emission rates for hydrogen fluoride and fluorides for Plant 5 kilns.

As indicated above, the Permittee is submitting in this application brick MACT compliance demonstration for Plant 4 kilns. Hence, it has reviewed emissions on a facility wide basis for all NC air toxics in conjunction with this compliance demonstration, as per 2Q .0705(b)(1).

The company has concluded that the facility will have a potential emissions for the following air toxics above their respective toxic air pollutant emission (TPER) rates: ammonia, arsenic, benzene, cadmium, chlorine, chromium, di (2-ethylhexyl) phthalate, formaldehyde, hydrogen chloride, hydrogen fluoride, and nickel. Hence, the Permittee has modeled these pollutants on a facility wide basis to assure compliance with their respective Acceptable Ambient Levels (AAL). In addition to the above, the facility wide potential emissions of beryllium, manganese, and mercury will be almost equal to their respective TPERs. Hence, the Permittee has decided to model these pollutants as well at their potential emission rates. Please refer to Section 6 for further details on this issue.

Finally, the facility also emits or has a potential to emit the following NC air toxics below their respective TPERs: benzo (a) pyrene, carbon disulfide, p-dichlorobenzene, n-hexane, methyl ethyl ketone, methyl chloroform, perchloroethylene, phenol, styrene, toluene, and xylene.

15A NCAC 2Q .0317: Avoidance Conditions

The 2Q .0317(a)(5) states that the Permittee can request to the DAQ to modify the permit to include a term or a condition to avoid any MACT requirement under 2D .1111.

EPA has promulgated a MACT standard in 40 CFR 63 Subpart JJJJJ "National Emission Standard for Hazardous Air Pollutants for Brick and Structural Clay Products Manufacturing" on May 16, 2003.

The Plant 5 kilns are deemed as existing affected sources under this MACT standard, requiring compliance no later than May 16, 2006. However, Section 63.8390(d) allows that the MACT standard does not apply to any existing tunnel kiln with a federally enforceable condition, limiting the process rate to less than 10 tons of fired brick per hour on a 12-month rolling average basis.

The Permittee has requested a federally enforceable permit condition in the revised permit, limiting process rate for each kiln in Plant 5 to less than 10 tons fired bricks per hour on a 12-month rolling average basis.

Therefore, DAQ will include a federally enforceable permit condition limiting the process rate to less than 10 tons of fired brick per hour on a 12-month rolling average basis for each kiln in Plant 5. This condition will also include appropriate monitoring/record keeping/reporting requirements to assure compliance. The requirements of this condition will become effective May 16, 2006.

4.4 To construct and operate wood dust bin, screen, and conveyors.

The wood waste storage bin is approximately 2,800 ft^3 in size. The Permittee plans to construct this bin airtight to prevent any loss of material to the atmosphere. The emissions are expected to be negligible.

The screener will be used to remove oversize material. The wood waste will then be transported to the above storage bin via 9 inches diameter conveyor, which is capable of handling 6,000 acfm. Another 12 inches diameter conveyor will be used to transport wood waste from storage bin to the brick kilns. Per Permittee, the emissions from the screener and the conveyor (12 inch conveyor) are expected to be negligible, as they will be kept under negative pressure when the wood waste is dumped from the truck (trailer).

All above equipment are expected to meet 2Q .0503 criteria. They will be deemed insignificant activities.

5. NSPS, NESHAPS, PSD, 112(r), CAM

NSPS

None of the proposed changes are subject to any promulgated NSPS.

NESHAP/MACT

The brick kilns in Pant 3 and Plant 5 have avoided applicability of "bricks and structural clay products" MACT standard. Brick kilns in Plant 4 are subject to this MACT standard. Please review Sections 4.1 through 4.3 above for complete details.

PSD

The facility is currently a major source (on a facility wide basis) for PSD for carbon monoxide (CO), TSP, and PM-10 emissions. The facility has taken a federally enforceable permit condition to limit CO emissions from Plant 3 and Plant 4 only to not exceed 250 tons per consecutive 12-month period.

It should be noted that the production increase in Plant 4 kilns from a combined 25 tons/hr to 27 tons/hr is allowed to be exempted under 40 CFR 51.166 (b)(2)(iii)(f) for applicability review under major modification under PSD. In brief, the increase in production rate in Plant 4 kilns is allowed to be exempted from the definition of physical change or change in method of operation, if such change is not prohibited under any federally permit condition issued after January 6, 1975, under either 51.166 or the 52.21 of 40 CFR. Because the Plant 4 kills are limited to produce up to 25 tons/hr combined under *state-only* applicable requirement, it is

deemed that these kilns do not operate under any federally enforceable permit condition and thus increase in production rate for these kilns is exempt from review under major modification provision of PSD. However, the emission increase from these kilns associated with production rate increase from 12.5 tons/hr to 13.5 tons/hr need to be reviewed under the PSD SILs. The Permittee has quantified the emission increases in PM-10, SO_2, and NOx to be 4.0 tons/hr (0.92 lb/hr), 2.9 tons/hr (0.67 lb/hr), and 1.5 tons/hr (0.35 lb/hr), respectively.
The company submitted modeling analysis for these pollutants was reviewed by AQAB. The Feb 8, 2005 memorandum from AQAB (J. Sellman) indicates that the impact due to the increases in these pollutants is well below the respective PSD Significant Impact Levels (SIL), and thus it is insignificant and no further analysis is required.

Because these emission increases are each less than 1 lb/hr, the emission increases tracking for these pollutants is not required.

Finally, the Permittee has provided justification on how increase in production rate from 25 tons/hr to 27 tons/hr has been achieved without any modification to the Plant 4 kilns. DAQ has reviewed this justification and has found it to be acceptable.

Attainment Status

The Rockingham County is in attainment of NAAQS for all criteria pollutants, including for PM-2.5. For 8-hr ozone NAAQS, this County has been deferred for designation until December 2007. This County has agreed to comply with each milestone under Greensboro-Winston-Salem-High Point EAC area. Thus for 8-hr ozone standard, EPA has deferred NAAQS attainment designation until that date. All major sources or major modifications in Rockingham County must be reviewed under PSD program and not under non-attainment NSR program until EPA determines attainment classification for this county.

112(r)

This facility is not subject to Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the thresholds in the Rule.

CAM

The 2D .0614 implements the requirements of 40 CFR 64 "Compliance Assurance Monitoring. Per Section 64.5, the Permittee must analyze whether any proposed emission unit undergoing a "significant permit revision", be deemed as large "pollutant-specific emission unit (PSEU)" and therefore a CAM plan needs to be submitted. Large PSEU are those emission units, which have after control potential to emit (PTE) equal or more of either 100 tons (for criteria pollutants) or 10/25 tons (for HAPs).

For this significant permit modification, the Permitteee has sought approval to construct DLA (active control device) on Plant 4 kilns (PSEU) to reduce emissions of HF (HAP) and HCl (HAP) so that it can comply with brick MACT standard under Subpart JJJJJ (applicable requirement). Because the PSEU is subject to post-1990 MACT standard, it is exempt from the Part 64 requirements as per 40 CFR 64.2(b)(1)(i).

It should be noted here that after control HF emissions from the two kilns are less than 10 tons/yr. Although, the after control combined emissions for HCl from both kilns exceed 10 tons threshold, the Permittee has provided emissions data for HCl which indicates that that the control device (DLA) is not needed to assure compliance with the HCl MACT limit. Specifically, the Permittee has provided source-specific stack test data for HCl (0.114 lb/ton), which proves that the before control emission rate for these kilns is less than MACT limit (0.26 lb/ton) and hence, control for HCl may not be required to assure compliance with this applicable requirement.

This significant permit modification does not involve any other new control device or a modification to the existing control device.

6. Facility Wide Air Toxics

The following Table represents facility wide modeled emission rates. Per AQAB memorandum of February 8, 2006, the modeling analysis adequately demonstrates compliance with the AAL for the referred pollutants.

Emission Source	Toxic Air Pollutant	Emission Rate
Facility wide	Ammonia	3.8 lb/hr
	Arsenic	0.05 lb/day
	Benzene	1,701.1 lb/yr
	Beryllium	0.25 lb/yr
	Cadmium	8.8 lb/yr
	Chlorine	2.09 lb/day
	Chromium	0.082 lb/day
	di (2-thylhexyl)phthalate	3.24 lb/day
	Formaldehyde	3.3 lb/hr
	Hydrogen Chloride	13.9 lb/hr
	Hydrogen Fluoride	25.4 lb/hr
	Hydrogen Fluoride	610.4 lb/day
	Manganese	0.47 lb/day
	Mercury	0.012 lb/day
	Nickel	0.12 lb/day

No monitoring / record keeping / reporting is justified as the modeled emission rates incorporate worst-case potential emissions from the permitted source using maximum production rates, and 24 hrs/day and 365 days/yr operation. Moreover, the compliance with all applicable requirements for monitoring, record keeping and reporting in MACT standard would also help ensure compliance with the NC air toxics.

As indicated above, this modeling demonstration also satisfies the requirement of 2Q .0705(b)(1) - the last MACT v/s NC air toxics demonstration. After the issuance of air permit 03997T18, DAQ can only require future NC air toxics demonstrations on a five-year basis as per 2Q .0701(c).

7. Facility Emissions Review

The following table represents facility-wide emissions. Actual emissions are for year 2004 as reported by the facility in its emissions inventory and the potential emissions are from the application.

Pollutant	**Actual Emissions** tons per year	**Potential Emissions** tons per year
Particulate (TSP)	332	> 332
Particulate (PM-10)	201	> 283
Particulate (PM-2.5)	19	No Data
Carbon Monoxide	279	390
Nitrogen Oxides	86	104
Sulfur Dioxide	0.3	197
Volatile Organic Compounds	18	20.7
Single largest HAP (HF)	123	> 123
All HAP (combined)	> 123	> 187

8. Statement of Compliance

Mr. Ray Stewart of WSRO last inspected the facility on 1/12/06. His inspection report indicated that the facility appeared to be in compliance with all applicable air quality regulations at the time of inspection.

9. Stipulation Review

The following changes will be performed to the air permit 03997T17:

- Revise insignificant activity list to include one wood dust bin, one screener, and two conveyors.
- Revise Section 1 Table to include revised production rates for Plant 4 kilns and to include a new control device for these kilns. Also include a footnote to this Table to indicate that the Plant 3 kilns are permitted to burn off-site green wood and processed wood.
- Revise references for NC air toxics to Section 2.2 B.1. (2D .1100) and Section 2.2 B.2. (2Q .0705) in the entire permit. Remove reference of 2Q .0711 from the permit.
- Revise reference to odor emissions requirement to Section 2.1 B.3. in the entire permit.
- Insert applicable requirement of 2Q .0317 in Section 2.1 B. Table and Section 2.1 D. Table.
- Remove the requirement to establish normal for visible emissions from Section 2.1 A.1.c., Section 2.1 B.3.c., Section 2.1. C. 2.c., Section 2.1 E.2.c., and 2.1 F.3.c. Also update the visible emissions requirement in these sections using the latest Title V permit shell. Keep the requirement to establish normal for visible emissions in Section 2.1 D.3.c. due to change in production rate for Plant 4 kilns.
- Insert a new applicable requirement for Plant 3 and Plant 5 kilns for MACT avoidance as Section 2.1 B.4. and Section 2.1 F.4., respectively.
- Insert a new applicable requirement for Plant 4 kilns for MACT Subpart JJJJJ as Section 2.1 D.4.
- Revise Section 2.1 A.1.e. to require reporting from quarterly to semi-annual.
- Remove existing modeled emission rates for 2D .1100 in Section 2.2 B.1. and amend them with the emission rates of pollutants in facility wide NC air toxics modeling analysis, as submitted in the applications (7900038.05A and 7900038.05B).
- Revise applicable requirement for 2.2 C.1. for pollutants, whose emissions are less than the TPERs, as per the applications (7900038.05A and 7900038.05B).
- Include a latest set of General Conditions from the Title V permit shell.
- Include an attachment for routine control device exemption company request.

10. Public Notice / EPA and Affected State Review

This permit modification is being processed using the 2Q .0500 procedures. The public participation, and EPA and affected states review is required. The changes performed to the existing permit will, hence, afford a permit shield.

Pursuant to 2Q .0521, a notice of the draft Title V Permit will be placed in the newspaper of general circulation in the area where the facility is located. The notice will provide for a 30-day comment period with an opportunity for a public hearing. Copies of the public notice will also be sent to persons on the Title V mailing list. Also pursuant to 2Q .0522, a notice of the draft Title V permit will be provided to each affected State at or before the time notice provided to the public under 2Q .0521 above. The Affected states as specified by 15A NCAC 2Q .0503(1) and 40 CFR 70.8(b) are Virginia and North Carolina local air pollution control program for Forsyth County.

EPA will be provided a copy of the public notice and the draft permit for their 45-day review simultaneously with noticing it in the newspaper.

11. Conclusions, Comments, and Recommendations

- Per 2Q .0112 "Applications Requiring Professional Engineer Seal," the new control device - dry limestone adsorber (ID No. 4ES-DLA) on Plant 4 kilns (ID Nos. 4ES-LKD4.1 and 4.2) was reviewed by Ramesh Kalagnanam (PE Number 20367) of Cary, NC. The NCBELS website indicates that the PE license of Mr. Kalagnanam is current.

- Per 2Q .0304(b) "Consistency Determination", a zoning consistency determination request was sent to and received by Ms. Amy L. Roberts, Planning and Zoning Administration Officer, City of Madison, on June

22, 2005, along with a copy of the permit application for the review of local zoning and subdivision ordinances.

- The draft permit was sent to WSRO (Ray Stewart) on 2/16/06 for review and comments. Ray Stewart replied on 2/22/06 via e-mail stating that he did not have any comment on the draft permit.

- The draft permit was also sent to company on 2/16/06 for review and comments. The company, via their consultant (Mark Huncik) replied on 2/22/06 through an e-mail, with a few comments. All comments are self-explanatory and attached herein, and do not require any discussion. The only change to the draft permit will be to the HF emission rate. The correct 24-hour emission rate for HF is 610.4 lbs/day.

- This engineer recommends issuing the permit.