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BUREAU OF AIR REGULATION

February 21, 2007

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Program Administrator – Permitting South
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Department of Environmental Protection
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CEMEX Cement, Inc.
DEP File No. 0530010-029-AC (PSD-FL-384) Proposed Kiln No. 3
Response to Request for Additional Information dated November 22, 2006

Dear Mr. Linero:

This letter and its attachments are in response to your Request for Additional Information dated November 22, 2006. Your information request items are reproduced, preserving your numbering. A response follows each item.

This response letter is certified by a professional engineer registered in the State of Florida, using the correct seal in compliance with the applicable requirements of the Florida Board of Professional Engineers.

1. Please provide more specific details of which type of KHD calciner design is likely to be used.

Response: This information was not available at the time of this response, and will be provided to the Department when available.

2. In the application, CEMEX estimated that a reasonable CO emission rate entering the lower stages of a KHD preheater with SNCR should be in the range of 1.5-2.5 lbs/ton of clinker. Upon what ammonia to NOx molar ratio is this based? Why does CEMEX feel that a CO limit of 2.9 lb/ton of clinker is necessary when averaged over a 30-day period? The application states that the KHD calciners are designed with a residence time on the order of seven seconds. The combination of a high residence time, tangential introduction of raw meal in the calciner, and mixing in the "pyrotop" created by the KHD design suggests lower CO emissions more comparable to those at Titan Miami (due to the long residence time) could easily be achieved especially when averaged over a 30-day period. Please explain why lower CO emissions could not be achieved on a 30-day average. Note that the performance tests at Kosmosdale and La Calera (where KHD designs were used) suggest lower CO emission rates. How much of an affect could the firing of petcoke have on CO emissions?

Response: Estimating carbon monoxide emissions from a Portland cement plant of any design is difficult as little or no continuous emission monitoring data for carbon monoxide (CO) are available. In Florida, it has been only the most recently permitted new Portland cement plants that are required to install and operate CEMS for CO and none of these plants are yet operating. And, in all probability, requirements for CO CEMS in other states are lagging Florida requirements.

CO compliance data are available for several Florida Portland cement plants but these data, typically collected over a 3-hour compliance test period, provide little insight into CO emissions from Portland cement plants when monitored on a continuous basis.

The only continuously monitored CO data that we are aware of is a six-month record of data collected during the period January – June 2005 at the Titan Miami cement plant and a six-month record of data developed at the Rinker Miami cement plant during the period June-November 2004. Both of these sets of data were collected with CO process monitors located in the downcomers of the respective plants. Being process instruments, these CO monitors obviously do not meet the QA/QC requirements of a stack gas CEMS. Furthermore, as the CO data were collected in downcomers, adjustments must be made to the data before the data can be considered somewhat representative of stack gas data. To the best of our knowledge, the data and/or information required to make these adjustments for all operating periods are not available for either the Titan or Rinker plants.

Furthermore, as referenced in our original permit application, the CO data for the Titan Miami plant were collected during a period when the plant operated at approximately 82 percent capacity, when the plant was fired with coal (not pet coke) and when bauxite (not fly ash) was used as the primary alumina source. As stated in the original permit application, it is not known what the CO data might have shown if the plant operated at capacity, was fired with pet coke and used fly ash as the alumina source.
Another factor to consider with the Titan CO data is that the data presented to the Department represent 24-hour average concentrations. The Rinker data, on the other hand, do represent hourly average CO concentrations but, again, these concentrations were measured in the downcomer of the plant. This fact aside, the Rinker data show that carbon monoxide concentrations range from approximately 150 ppm to over 1300 ppm and average around 700 ppm. This represents quite a variability in CO concentrations and demonstrates that CO emissions are influenced by several operating and raw material related factors.

In the Technical Evaluation and Preliminary Determination for Rinker Permit 0250014-016-AC, the Department makes a generalization based on a single point comparison of CO in the downcomer and CO in the stack gas. The generalization was that the permitted CO emission limit for Rinker of 3.01 pounds per ton of clinker, based on the single point adjustment of six months of CO monitoring data, could be continually achieved.

In our opinion, the continuously monitored CO data that are available are not representative of stack gas conditions or stack gas CO emission rates and there is no information available to adjust the monitored process CO data to make them representative of emission data. The available data are of some use and interest in showing trends and variability in potential CO emissions but are of little use in establishing carbon monoxide emission limits that must be complied with on a continuous basis.

In the Department's November 22, 2006 Request for Additional Information (RAI), CO performance test data for KHD plants at Cosmosdale and La Calera were referenced. These data are not available to us but we would be willing to review and consider the data if the data represent continuous CO emission monitoring data collected with certified CEMS. If, on the other hand, the data are representative of only 3-hour compliance test data, it is our opinion that the data are not useful for establishing a compliance limit to be demonstrated with a CO CEMS.

Regarding the effects of SNCR on CO emissions, we reference in the original permit application that Polysius (R. Erpelding, Latest Developments in NOx Reduction Technology in the Cement Industry, Cement Plant Environmental Handbook, 2003) reported potential increases in CO emissions between 0 and 0.5 pounds per ton of clinker at a ammonia:NOx molar ratio of 0.4, potential CO increases of 0.3-1.0 pounds per ton of clinker at a molar ratio of 0.8 and potential CO emissions increases of 0.5-1.5 pounds per ton of clinker at a molar ratio of 1.0. These CO emission increases were measured in three European plants of Polysius design and the potential increases were reported to be the result of a competing reaction between CO and ammonia for the OH* radicals. This reaction has previously been described.

With the KHD plant proposed by CEMEX, the residence time in the calciner is on the order of seven seconds which is significantly greater than the residence time in conventional Polysius plants. That being the case, it is expected that some of the CO in the proposed CEMEX plant will burn out in the calciner making the competing reaction between CO and ammonia less significant. If this is the case, the CO emission increases with SNCR, as reported by Polysius, may not be observed or may not be as pronounced in the KHD plant. Regardless of the theoretical considerations, no continuously monitored CO emission data are available to confirm what might actually happen on a continuous, long-term basis.

To be responsive to part of the Question No. 2 posed by the Department in the RAI, the ammonia: NOx molar ratio considered when estimating CO levels in the lower stages of the KHD preheater was 1.0; the maximum expected molar ratio that CEMEX will use during the operation of the proposed Kiln No. 3.

In summary, there can be considerable conjecture regarding the affects of many variables on CO emissions from Portland cement plants of any design. But, until actual CO emission data collected with certified CEMS are available, it is not possible to state with any certainty what CO emission rate might be achieved when averaged over a 30-day period.

3. The application indicates that CEMEX does not intend to use high LOI flyash, nor inject flyash into the calciner. However the flow diagrams (Attachment I) suggest

the ability to inject flyash directly into the calciner. Please re-verify CEMEX's plans regarding the injection of flyash into the calciner and raw mill or preheater.

Response: CEMEX does not intend to use high LOI flyash, nor inject such ash into the calciner. However, fly ash may be interground with the raw materials in the raw mill. This raw meal will then move through the preheater.

4. VOC control to achieve 0.12 lb/ton of clinker is given as good combustion practices. Regardless of combustion practices, VOC emissions can be high unless raw materials (especially additives) are selected that will not evolve VOC in the preheater. Please describe the raw material procurement practices for mill scale, fly ash, etc. that can influence both VOC and CO emissions.

Response: It is CEMEX's operating experience that mill scale is the only raw material that strongly affects VOC emissions. Whenever the vendor or source changes for mill scale, the material is evaluated by four methods:

- Visual inspection for oil residue
- Manual evaluation ("feel")
- Plastic bag evaluation
- Laboratory analysis for total hydrocarbons (THC)

Any mill scale that appears to contain noticeable organic compounds after the above evaluations will be rejected for use.

Fly ash may affect CO emissions, so fly ash with low loss on ignition (LOI) is procured for use. LOI analysis is typically provided by the fly ash generator.

5. Please provide acceptance test data and any available test reports from the CEMEX Victorville plant. According to the application, the method of compliance for NOx at this facility is a NOx CEMS. Please provide hourly and 30-day averages of NOx data on CD from this plant from the last quarter of representative operation. Include the channels for VOC (or THC) as well as CO if available.

Response: This information is not considered representative for the proposed kiln at Brooksville, and is not included with this response.

6. CEMEX is proposing a BACT limit by SNCR of 1.95 lb NOx/ton on a 30-day basis. The cost of further control by other technologies was calculated presuming that emissions without add-on control would be 3.5 lb/ton. Please evaluate costs, cost - effectiveness, and NOx reductions by further increasing ammonia injection up to a molar ratio of 1.0 (NH_3/NOx) in increments of 0.1 moles NH3 per mole NOx.

7. A selective catalytic reduction (SCR) system would be necessary to achieve lower NOx emissions. CEMEX estimated cost of SCR at $5,520,000 (capital) and greater than $2,000,000 per year. The cost of removal was estimated to be $2,000 per ton of NOx removed. Starting from the same "pre-control" baseline of 3.5 lb/ton, please estimate the cost effectiveness of removal to 1.5 and 1.0 lb NOx/ton of clinker.

Response: In the permit application, Total Installed Costs (TIC) and annual costs were estimated for SNCR and SCR. The annual costs were based on reducing NOx emissions from an "uncontrolled" emission rate of 3.5 pounds of NOx per ton of clinker to a controlled emission rate of 1.95 pounds per ton of clinker. This reduction required an NH3:NOx molar ratio of approximately 0.7 for the SNCR system and a molar ratio of approximately 0.63 for the SCR system. The Department has requested cost information for both control technologies for increasing the NH3:NOx molar ratios incrementally up to 1.0.

First, a correction to information provided in the permit application. It was stated in the application that the cost for reducing NOx emissions to 1.95 pounds per ton of clinker using SNCR was in the range $470-$500 per ton of NOx removed and that the cost for reducing NOx emissions to this same level using SCR was on the order of $2000 per ton of NOx removed. In developing the information reported herein, it was discovered that when calculating the ammonia usages in the permit application, the ammonia utilization effectiveness (the moles of NH3 required to remove a mole of NOx; a number greater than 1) was used as a divisor when calculating ammonia utilization rates. This resulted in more NOx being removed (on a molar basis) than ammonia injected.

With this error corrected, the control costs reported in the permit application for reducing NOx emissions from 3.5 to 1.95 pounds per ton of clinker become approximately $995 per ton of NOx removed for SNCR (opposed to the reported cost of $470-$500 per ton) and approximately $2775 per ton for SCR (opposed to the $2000 per ton originally reported).

With this correction made, the costs requested by the Department in the RAI were estimated. To estimate these costs it was first necessary to determine the ammonia utilization effectiveness at various NH3:NOx molar ratios for both SNCR and SCR. The ammonia utilization effectiveness for SNCR was estimated from data reported by Horton et al Erpelding , Florida Rock Industries and Suwannee American Cement . Based on these data, it was determined that the average ammonia utilization effectiveness ranged from approximately 64 percent at a NH3:NOx molar ratio of 0.6 to 55 percent at molar ratio of 1.0. At NH3:NOx molar ratios greater than 1.0, the ammonia utilization becomes progressively less effective.

Very little data were available to estimate similar ammonia utilization factors for SCR systems. For purposes of this response, the ammonia utilization effectiveness for SCR was assumed to follow the same pattern as for SNCR; but at an 11 percent greater efficiency. The 11 percent increase in ammonia utilization effectiveness is based on information presented in the permit application. This assumption resulted in an ammonia utilization effectiveness of 71 percent for SCR at a NH3:NOx molar ratio of 0.6, decreasing to an effectiveness of 61 percent at a molar ratio of 1.0.

Also incorporated in the cost analyses were on-line operating times for the cement plant, the SCNR system, and the SCR system. For the cement plant, it was assumed that the on-line factor would be 92 percent. The operating time of the SNCR system was assumed to be 96 percent of the cement plant operating time and for the SCR system, it was assumed that the operating time would be 82 percent of the cement plant operating time. The on-line time for the SCR system was based on information provided in the permit application.

Other factors included in the cost analyses were total installed costs of $351,313 for the SNCR system and $6,222,000 (including catalyst) for the SCR system. Both of these costs were reported in the permit application. Another significant cost is that of ammonia. This cost varies with the availability of natural gas. For purposes of this response, an ammonia cost of $750 per ton of 100 percent ammonia was assumed. For evaluating the impact of SNCR and SCR on production costs, the current cost of clinker production was taken as $47.60 per ton.

Direct and indirect annual costs were calculated using standard EPA cost estimating procedures. Total annual costs (direct plus indirect costs) are summarized in the following table for SNCR and SCR systems for various NH3:NOx molar ratios.

SUMMARY OF SNCR AND SCR CONTROL COSTS
AT VARIOUS NH3/NOx MOLAR RATIOS(1)

NH3:NOx Mol-Ratio	NOx Reduction (%)(2)	Controlled NOx Emmissions (lb/ton Cl)	Annual non-NH3 Cost ($/yr)	Annual Ammonia Cost ($/yr)(3)	Total Annual Cost ($/yr)	NOx Control Cost: Ammonia ($/ton NOx)(3)	NOx Control Cost: non-NH3 ($/ton NOx)	NOx Control Cost: Total ($/ton NOx)	NOx Control Cost: Total(4) $/ton Clinker
SNCR Data(5)									
0.7	43	1.98	262,598	671807	934,406	715	280	995	0.76
0.8	47	1.85	262,598	767780	1,030,378	752	257	1009	0.83
0.9	51	1.70	262,598	863752	1,126,351	778	237	1015	0.91
1.0	55	1.58	262,598	959725	1,222,323	806	221	1027	0.99
1.1	57	1.50	262,598	1055697	1,318,295	853	212	1065	1.07
SCR Data(6)									
0.6	43	2.00	1,748,918	490768	2,239,686	621	2213	2834	2.13
0.7	48	1.82	1,748,918	572563	2,321,481	645	1971	2616	2.20
0.8	53	1.65	1,748,918	654358	2,403,275	671	1794	2465	2.28
0.9	57	1.50	1,748,918	736152	2,485,070	700	1662	2362	2.36
1.0	61	1.37	1,748,918	817947	2,566,865	730	1562	2292	2.44

(1) - Assuming an on-line time of 92% for the Plant, 96% (of plant operating time) for SNCR and 82% (of plant operating time) for SCR
(2) - Assuming an uncontrolled NOx emission rate of 3.5 lb/ton clinker
(3) - Current ammonia price of $750/ton of 100% ammonia
(4) - Current clinker production cost is $47.60 per ton
(5) - Total Installed Cost estimated at $351,313 (see original application)
(6) - Total Installed Cost estimated at $6,222,000 (see original application)

Total annual costs and the cost to control NOx ($/ton of NOx removed) are presented as non-ammonia costs, ammonia costs and total costs. Additionally, the impact of the cost of control on clinker production is reported.

Cost data are presented for SNCR for NH3:NOx molar ratios ranging from 0.7 to 1.1. These molar ratios correspond approximately to controlled NOx emission rates ranging from 1.96 to 1.07 pounds per ton of clinker, respectively. For SCR, cost data are presented for molar ratios ranging from 0.6 to 1.0. These molar ratios correspond approximately to controlled NOx emission rates ranging from 2.03 to 1.05 pounds per ton of clinker, respectively.

In reviewing the cost data, it is noted that the non-ammonia costs for SNCR and SCR remains essentially constant regardless of the NH3:NOx molar ratio. There will be some differences related to energy costs and maintenance costs, but for purposes of these analyses, it is assumed that the non-ammonia costs are constant.

The fact that the non-ammonia costs are constant means that the non-ammonia cost per ton of NOx removed decreases as the NH3:NOx molar ratio increases. This is obvious as the constant non-ammonia costs are divided by an increasing amount of NOx removed as the molar ratio increases.

The ammonia costs for the SNCR and SCR systems, on the other hand, increase with increasing NH3:NOx molar ratios both as a function of greater ammonia use and as a result of ammonia utilization becoming less and less effective as the NH3:NOx molar ratio increases.

When the ammonia costs and non-ammonia costs for SNCR are totaled, the total annual cost of control ($/ton of NOx removed) increases modestly from $995 to $1027 per ton at molar ratios between 0.7 and 1.0. This is a result of the fact that the ammonia cost increases at a rate that is only slightly greater than the rate of decrease in non-ammonia costs in this molar ratio range. As the molar ratio increases above 1.0, however, the decreasing ammonia utilization effectiveness begins to become apparent and the cost of control at a 1.1 molar ratio increases to $1065 per ton of NOx removed. .

In terms of production costs, the cost of SNCR at a molar ratio of 0.7 is approximately $0.76 per ton of clinker while at a molar ratio of 1.1, the cost is approximately $1.07 per ton of clinker.

The cost of control for SCR is quite interesting. Again, the non-ammonia annual costs remain essentially constant as the NH3:NOx molar ratio increases from 0.6 to 1.0; at a cost that is approximately 6.7 times greater than the SNCR non-ammonia cost. And, as with SNCR, the increased ammonia usage and the decrease in the ammonia utilization effectiveness, result in an increase in ammonia costs as the NH3:NOx molar ratio increases. When looked at in terms of the cost of control ($/ton of NOx removed), however, the total annual cost of SCR decreases as the NH3:NOx molar ratio increases from 0.6 to 1.0. This is because the non-ammonia costs are so much greater than the ammonia cost and the rate of decrease in the non-ammonia costs (with the increasing molar ratio) more than offsets the rate of increase in the cost of ammonia. The total cost of control for SNCR decreases from approximately $2834 per ton of NOx removed at a molar ratio of 0.6 to $2292 per ton at a molar ratio of 1.0. The cost of SCR per ton of clinker, however, increases from $2.13 per ton at a molar ratio of 0.6 to $2.44 at a molar ratio of 1.0.

In summary, these cost analyses do not affect the BACT NOx emission limit proposed in the permit application or the technology proposed for achieving the limit.

8. In the application, CEMEX has entered the "Maximum Process or Throughput Rate" for the raw mill as 306 tons/hour wet raw material to the mill. What does this equate to on a dry basis?

Response: The wet raw material process rate of 306 tons/hour to the raw mill is based on an estimated moisture content of 15%. This equates to 260 TPH dry feed to the preheater.

9. Provide a description and diagram of the tire feeding mechanism. Provide the technical specifications for the proposed tire feeding system.

Response: A detailed description, drawings, and technical specifications of the tire feeding system will be provided to the Department when available. As the construction period for a cement kiln is approximately two years, and tires aren't typically fired upon startup, this information may not be available during the permit processing timeframe.

10. Typical fuel specifications were provided for the proposed fuels with the exception of alternate fuels including rice hulls, cotton gin, sugarcane bagasse, wood chips, vegetative fuels, and corn husks. To the extent possible, provide a description and expected analysis of these additional fuels to be combusted. Please submit the information required in the application related to the Process Fuel Segments for all fuels to be fired in the kiln and calciner.

Response: The information for the process fuels is provided below, as available. The table is based on the process fuel segment part of the application.

Process Fuel Information

Fuel	SCC	SCC Units	Hourly	Annual	% S	% Ash	MMBtu/SCC
Coal[1]	3-90-002-01	Tons burned	21.2	185,308	0.6 – 5.4	4 – 20	26
Natural gas[1]	3-90-006-02	MMcf burned	0.5	4,589	Negligible	Negligible	1050
Distillate oil[1]	3-90-005-02	10^3 Gallons burned	3.9	34,414	0.2 – 1.0	Negligible	140
Petroleum coke[1]	3-90-008-99	Tons burned	20.7	181,128	0.5 – 1.0	0.5 – 5.0	26.6
Tires[2]	3-90-012-99	Tons burned	3.4	30,113	0.9 – 1.8	1.5 – 25.2	24
Used oil[3]	3-90-013-89	10^3 Gallons burned	4.2	37.062	0.0 – 4.0	0.4 – 1.5	130
Rice hulls[4]	3-90-999-99	Tons burned	42.9	376,112	0.06	21	13
Cotton gin[4]	3-90-999-99	Tons burned	38.9	341,218	Negligible	18	14
Sugarcane bagasse[4]	3-90-999-99	Tons burned	36.3	318,133	0.01	11	15
Wood chips[1]	3-90-008-99	Tons burned	52.9	463,269	Negligible	1 – 3	10
Vegetative fuels[4]	3-90-999-99	Tons burned	55	481,800	0 – 0.11	0.25 – 25	10 – 20
Corn husks[4]	3-90-999-99	Tons burned	36.2	317,412	0.01	6	15
Other biomass[4]	3-90-999-99	Tons burned	55	481,800	0 – 0.11	0.25 – 25	10 – 20

[1] AP-42 Appendix A
[2] *Air Emissions Associated with the Combustion of Scrap Tires,* Malcolm Pirnie, May 1991.
[3] XERAY Systems facsimile, *Typical Used Lube Oil Specifications,* December 1998.
[4] *Woodgas: Proximate and Ultimate Analysis,* http://www.woodgas.com/proximat.htm

11. What measures have been considered to minimize emissions of mercury entering the process or emitted from the kiln stack? Has CEMEX considered the possibility of inter-grinding a small portion of the dust collected in the (kiln/calciner/raw mill) air pollution control device with the clinker?

Response: Department staff met with CEMEX at the CEMEX Materials testing laboratory in Tampa on February 20, 2007 to discuss this issue. Additionally CEMEX has discussed currently available means for reducing mercury emissions from dry process cement plants with the Department on various occasions; Koogler & Associates has discussed this matter with the Department on behalf of CEMEX and others and has provided the Department with information on the cycling of mercury in preheater/precalciner plants in Florida; and mercury emissions and CEMEX's approach to minimizing mercury emissions were discussed in the report submitted to the Department in support of the original permit application for Kiln No. 3.

In summary, mercury enters a cement plant as a trace element in the raw materials and coal. In approximate terms, the mercury concentration in raw materials in a typical Florida cement plant is around 0.02 mg/kg and the mercury concentration in coal is around 0.04 mg/kg. Taking into consideration the mass input of raw materials and coal on an annual basis, the raw materials will contribute approximately 90 percent of the mercury input to a cement plant and coal will contribute the remaining 10 percent. For purposes of this discussion, it will be assumed that all of the mercury that enters a cement plant will be released to the atmosphere. This is a conservative assumption as information available in the literature indicates that there is some mercury in the clinker leaving the pyroprocessing system; mercury that will leave the plant in finished cement.

As a first step to controlling mercury emissions, CEMEX is committed to tracking the mercury content of raw materials and fuel to assure that the mercury content of these materials remains in an acceptable range. The other thing that CEMEX will do is use only low LOI flyash. This will eliminate the possibility of getting a flyash with a high carbon content (a high LOI) with the added potential of higher levels of adsorbed mercury.

The other matter that CEMEX has discussed with the Department and addressed in the initial application is the potential for "wasting" kiln dust when the raw mill is not operating. When the raw mill is not operating, the kiln dust (partially calcined raw meal) in the gas stream leaving the preheater goes to the main baghouse; bypassing the raw mill. Limited data provided to the Department by Koogler & Associates indicates that the mercury concentration in this kiln dust is somewhere around 15 mg/kg; or 400-800 times greater than the mercury concentration in the raw materials and coal. In contrast, the mercury concentration in the dust leaving the raw mill (fresh ground raw materials plus the kiln dust) is somewhere around 1.0 mg/kg. Thus, if mercury is to be removed from a cement plant, the logical place to take the mercury out would be through the removal of kiln dust when the raw mill was not operating.

Keeping in mind that this material is normally recycled through the kiln, it is obvious that it has an economic value. To landfill this material would be the waste of a raw material with an economic penalty equal to the value of the wasted material, the labor and related costs associated with removing the dust, and the cost of landfilling the dust. To avoid these penalties, CEMEX has discussed with the Department the possibility of grinding the wasted dust with clinker, gypsum and other additives in the finish mill. There are two obstacles to intergrinding kiln dust. First is the effect of the kiln dust on the characteristics (and hence specifications) of the finished cement and the second is related to the physical difficulty of grinding and blending the kiln dust with the clinker, gypsum and other additives.

The effect of the kiln dust on the characteristics of finished cement and the effect of these changes on the acceptability by the end user is a matter over which CEMEX has no control. CEMEX must provide a product that is acceptable to the end user and to do so CEMEX must produce a cement that meets acceptable standards.

The other potential problem is related to grinding and blending kiln dust with clinker, gypsum and other additives. It has been reported to the Department that cement clinker has a typical bulk density of 105 pounds per cubic foot while kiln dust has a typical bulk density of 35 pounds per cubic foot. It has been reported that grinding and blending these materials in an air-sweep mill has created difficulties in producing a homogenous product.

CEMEX will continue to monitor mercury related issues but until specifying organizations and agencies (e.g., DOT, AASHTO, and ASTM) accept the concept of intergrinding, that option is not viable. At the present time, the only practical means of minimizing mercury emissions from a Portland cement plant is to monitor the mercury content of raw materials and fuels and CEMEX is committed to this.

12. Has CEMEX or its affiliates had any violations (or received warning letters) in the past two years related to any Department regulations at any of their facilities? Please provide the status of any matters that have not yet been resolved.

Response: CEMEX resolved outstanding compliance issues in July 7, 2006, in Consent Order No. 05-2192. CEMEX resolved earlier compliance issues in April of 2005 in Consent Order No. 04-0685. Currently, CEMEX is investigating recent test results indicating a D/F exceedance on kiln 2 in raw mill down condition at the company's Brooksville, Florida cement plant No other matters have yet to be resolved.

13. Has CEMEX or its cement operations affiliates had any violations (or received warning letters) in the past two years related to the regulations of other states or EPA? Please provide the status of any matters that have not yet been resolved. Provide additional information in case the matters relate to actions by previous owners of the assets.

Response: This question seeks information outside of the scope of FDEP statutes and rules. Further the permit application is for a facility that is not comparable, in many respects, to other CEMEX facilities. The question seeks "any violations," which could include violations of even the most minor, technical and irrelevant nature. Moreover, in contravention of Section 403.0875, Florida Statutes, the department's RAI does not cite any regulatory authority for the question. The information contained in the permit application, including the responses to the department's RAI provide sufficient reasonable assurances for the permit to be issued.

14. The meteorological data used for the modeling associated with the CEMEX Kiln 3 project was from Tampa, years 1986-1990. The Department has more recent (1991-1995) data. The most recent data set should be used for all modeling associated with this project. Please submit updated results to the Department.

Response: The more recent meteorological data set was received from the Department. The attached CD includes all of the updated modeling associated with this project. The updated modeling also considers the other Department comments.

Updated tables from the PSD report are included below.

TABLE 6 – SIGNIFICANT AMBIENT AIR QUALITY IMPACTS FOR CLASS II AREAS

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
SO_2	1 $\mu g/m^3$	5 $\mu g/m^3$	--	25 $\mu g/m^3$	--
PM_{10}	1 $\mu g/m^3$	5 $\mu g/m^3$	--	--	--
NO_2	1 $\mu g/m^3$	--	--	--	--
CO	--	--	500 $\mu g/m^3$	--	2000 $\mu g/m^3$

The following table shows the SIA for each year and averaging period for each pollutant.

TABLE 7 – EVALUATION OF SIGNIFICANT IMPACTS FOR CLASS II AREAS

		1991	1992	1993	1994	1995
SO_2	Annual	Less than significant: Maximum impact = 0.05589 $\mu g/m^3$ [1991]				
	24-Hour	Less than significant: Maximum impact = 0.98564 $\mu g/m^3$ [1995]				
	3-Hour	Less than significant: Maximum impact = 3.52061 $\mu g/m^3$ [1993]				
PM_{10}	Annual	2.5 km	2.2 km	2.2 km	2.4 km	2.2 km
	24-Hour	3.5 km	4.5 km	4.5 km	7 km	5 km
NO_2	Annual	Less than significant: Maximum impact = 0.69925 $\mu g/m^3$ [1991]				

CO	8-Hour	Less than significant: Maximum impact = 34.87725 μg/m^3 [1995]
	1-Hour	Less than significant: Maximum impact = 113.91212 μg/m^3 [1994]

Sulfur dioxide, nitrogen dioxide and carbon monoxide were determined to have less than significant impacts in the Class II area. This demonstrates compliance with ambient air quality standards and PSD increments for these pollutants. No further dispersion modeling was performed for these pollutants in the Class II area.

The ambient air concentrations of PM_{10} for all periods were below the Class II significance levels within a 7-kilometer radius of the facility. Refined dispersion modeling was conducted for PM_{10} to demonstrate compliance with the PSD increments and the AAQS. The following table shows the estimated concentrations resulting from a fine-grid (50-meter spacing) centered on the regulatory high value receptors from coarse-grid increment modeling.

TABLE 12 – CLASS II AREA INCREMENT ANALYSIS [PM_{10}]

	1991	1992	1993	1994	1995
Annual H1H < 17 μg/m^3	4.5 μg/m^3	3.9 μg/m^3	3.6 μg/m^3	4.2 μg/m^3	3.9 μg/m^3
24-Hour H2H < 30 μg/m^3	24.4 μg/m^3	21.6 μg/m^3	23.9 μg/m^3	25.2 μg/m^3	27.1 μg/m^3

The proposed facility is shown to not exceed any applicable Class II area PSD increments, by showing that such increments were not exceeded when the facility's emissions were modeled with the PSD inventory (20-D inventory).

The background concentrations were added to the modeled concentrations to evaluate compliance with the AAQS. The ambient air concentrations from the proposed cement plant, including the 20-D inventory, plus the background concentrations, were evaluated with respect to the applicable AAQS. This was accomplished by adding the background concentrations from the Quick Look reports to the concentrations from the fine grid PSD modeling. For simplicity and conservatism, the 24-hour H2H impacts for each year were used instead of the 5-year H6H.

TABLE 13 – NAAQS ANALYSIS [PM_{10}]

	1991	1992	1993	1994	1995
Annual H1H < 50 μg/m^3 Background = 20	24.5 μg/m^3	23.9 μg/m^3	23.6 μg/m^3	24.2 μg/m^3	23.9 μg/m^3
24-Hour <150 μg/m^3 Background = 54	78.4 μg/m^3	75.6 μg/m^3	77.9 μg/m^3	79.2 μg/m^3	81.1 μg/m^3

The Class I Area modeling was also updated with the meteorological data provided by the Department.

The Class I Increment analysis included an initial screening analysis to determine whether the new sources will have a significant impact on air quality in the Class I area. The determination was made by comparing the estimated impacts from the sources under review to the Class I "Significance Levels" proposed by EPA, as shown in the following table.

TABLE 14 – CLASS I AREA SIGNIFICANCE

Pollutant	Averaging Period	Significance Level ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	Significant?
PM_{10}	Annual	0.2	0.12 (1991)	No
	24-hour	0.3	1.64 (1991)	Yes
Sulfur dioxide	Annual	0.1	0.02 (1991)	No
	24-hour	0.2	0.19 (1991)	No
	3-hour	1.0	0.83 (1990)	No
Nitrogen dioxide	Annual	0.1	0.20 (1991)	Yes

Reference: 61FR38292, July 23, 1996

As SO2 for all averaging periods and PM10 for the annual averaging period are less than significant, no further review for compliance with Class I PSD increments is required for these pollutants for these averaging times.

PM10 was modeled with the 20-D inventory provided in the initial submittal for the Class II Area to assess 24-hour impacts and a 20-D inventory was developed for NOx and was provided in the initial submittal.

PM10 (24-hr) and NOx (annual) impacts were modeled using ISC, with the proposed new sources in combination with the inventories. These impacts were compared to the Class I Area Increment. The estimated impacts, for the specified pollutants and averaging periods, were below the applicable PSD Class I Area increments.

TABLE 16 – CLASS I AREA INCREMENT ANALYSIS

	1991	1992	1993	1994	1995
NOx Annual H1H < 2.5 $\mu g/m^3$	1.3 $\mu g/m^3$	1.3 $\mu g/m^3$	1.2 $\mu g/m^3$	1.3 $\mu g/m^3$	1.3 $\mu g/m^3$
PM_{10} 24-Hour H2H < 8 $\mu g/m^3$	4.1 $\mu g/m^3$	3.5 $\mu g/m^3$	4.2 $\mu g/m^3$	3.7 $\mu g/m^3$	4.6 $\mu g/m^3$

NOx for the annual averaging period and PM10 for the 24-hour averaging period were modeled with appropriate inventories. The estimated impacts are less than the PSD increments and no further review for compliance with Class I PSD increments is required.

15. EPA's final 8-hour ozone implementation rule, 70 FR 71612 dated Nov. 29, 2005, amends the PSD rule, as underlined, to provide that "a major source that is major for volatile organic compounds or NOx shall be considered major for ozone." The proposed new kiln will increase NOx by 1370 TPY. Please perform or otherwise address the ambient air quality analysis for ozone.

Response: Ozone formation results from a series of reactions between NOx and VOC in the presence of sunlight. Since the potential increase in NOx emissions due to the proposed project is 1,370 TPY, the ozone ambient air quality analysis is addressed below.

NOx emissions are primarily emitted from combustion sources, such as power plants and motor vehicles. Emissions are primarily in the form of NO and are oxidized in the atmosphere to form NO_2. NO_2 concentrations in Florida during 2004 were less than 35 percent of the annual average AAQS. This is in spite of the substantial growth that Florida, and specifically, Hernando County, has experienced. Manufacturing establishments in Hernando County have increased from 19 in 1977 to 74 in 2003.

Although there are currently no ozone monitors in Hernando, there are two monitors in one of the surrounding (to the south) counties: Pasco. The Pasco county monitors indicate that the area is in currently in attainment with the 8-hour ozone AAQS standard (average from the past three years: 2004 – 2006).

Despite the substantial industrial growth that Hernando County has experienced, it has remained and is expected to remain attainment for ozone and is well below the AAQS for NO_2. In addition, the Clean Air Interstate Rule (CAIR) is projected to decrease power plant actual NO_x emissions significantly. The proposed project's potential NO_x emissions of 1,370 TPY are relatively minor compared to the amount of NO_x emissions generated by the vehicular traffic and other combustion sources. Since Florida is in attainment for ozone and well below the AAQS for NO_2, and since NO_x emissions are expected to decrease significantly throughout Florida, the proposed new cement kiln will not significantly impact ambient ozone levels in Hernando County.

16. The fence-line receptors for the increment analysis should be no greater than 50m apart. Please add appropriate receptors to the grid and update the analysis.

Response: Fenceline receptors with 50-meter spacing were used for the updated increment analyses.

17. What is the nearest distance in kilometers between the proposed Kiln 3 stack and the closest boundary to the Chassahowitzka?

Response: The nearest boundary at Chassahowitzka NWR to the proposed Kiln 3 stack is at a distance of 14.8 kilometers. The farthest boundary point is at a distance of 25.9 kilometers.

18. The PM10 increment modeling analysis includes existing CEMEX sources. When modeling with the more recent meteorological data, please verify that the emission rate for source "PMINV15" is correct. The current modeling shows that this source has an emission rate of 1.134. Table 11 in the application shows an emission rate of 4.54 for this source.

Response: The emission limit for the inventory source PMINV15 (CEMEX Emission Unit 005, Finish Mills #1 & #2 With Two Dust Collectors) has been addressed in other recent permitting with the Department. This is addressed specifically in an August 15, 2006 letter to Trina Vielhauer. Consistent with that letter, the emission rate for the inventory source has been revised to 2.27 grams/second.

19. Attachment 2 of the application states that there will be "no truck traffic expected between 8pm and 4am." Was the emission calculations for cement and raw material trucks submitted based on this statement, limiting the facility to only 16 hours of truck activity? Please show how 59 tons per year of raw materials being transported by truck was calculated.

Response: That statement was in error for this project. The emission calculations for cement and raw material trucks were based on continuous operation (24 hours per day).

59 tons per hour of raw materials will be transported by truck. This was calculated from the raw material target mix of approximately 81% onsite materials and 19% of the materials being trucked from offsite. The total raw material rate is 306 tons per hour.

20. The application states that there will be 500 tons per hour of cement "loadout." The modeling shows that there will be 179 tons per hour of cement "loadout" on trucks. Will the remaining 321 tons be on rail?

Response: The 500 tons per hour of cement loadout is a short-term maximum process rate (i.e., hourly). The 179 tons per hour is the long-term average cement loadout process rate (i.e., daily). The difference is that individual cement trucks can be loaded at a higher rate, but the total annual cement loaded out cannot exceed the cement produced. Although rail is projected to be available at the new cement silos, it was more conservative to model all the cement production as being shipped by truck.

21. How was the Initial Vertical Dimension calculated for the volume sources?

Response: The value of 1.84 meters for the initial vertical dimension (init vert) was developed in accordance with the *User's Guide For The Industrial Source Complex (Isc3) Dispersion Models Volume II - Description Of Model Algorithms.*

The initial vertical dimensions (init vert) for surface-based sources are determined by dividing the vertical dimension of the source by 2.15. The vertical dimension of each volume source is the height of the trucks, assumed as 13 feet (3.96 m).

3.96 m ÷ 2.15 = **1.84 meters**

22. The PLUVUE II model was used to model visibility impacts. This model allows for input of one emission source. Only the main source for this project was modeled. The application states that there is "no recommended procedure for conducting analyses of multiple sources." The Fish and Wildlife Service has received the application for the new Kiln and may still comment regarding this issue.

Response: No specific response is required for this item.

23. According to the application, PLUVUE II, entry code 5: Mixing Height was set to zero, vertical mixing is not limited. Is this option the most conservative or a worst case scenario?

Response: The mixing height value of 0 meters is assumed to be conservative after evaluation. The model was run several more times using the parameters that resulted in the highest reported regulatory values, but altering the mixing height.

The highest impacts were previously observed with the 113° angle, 14.8 kilometers downwind receptor on December 21, at 9 am. These parameters were modeled again, with 4 different mixing height inputs including stack height and rural mixing height values from the 10-year metdata set (1986-1995) for this day and time.

- Mixing height set to 97.2 meters (stack height)
- Mixing height set to 170.9 meters (minimum from metdata)
- Mixing height set to 411.5 meters (average from metdata)
- Mixing height set to 957.2 meters (maximum from metdata)

No effect was observed on the contrast (0.0142) or extinction (0.7271) previously reported, with the various mixing height values.

24. In the application, please indicate which plot plan shows the location of the roads that are included in the modeling analysis.

Response: A plot plan showing the location of the roads and the road volume sources is included with this response.

We are hopeful that this response letter and its attachments will make the permit application complete. If further information is required, Please contact me.

Sincerely,

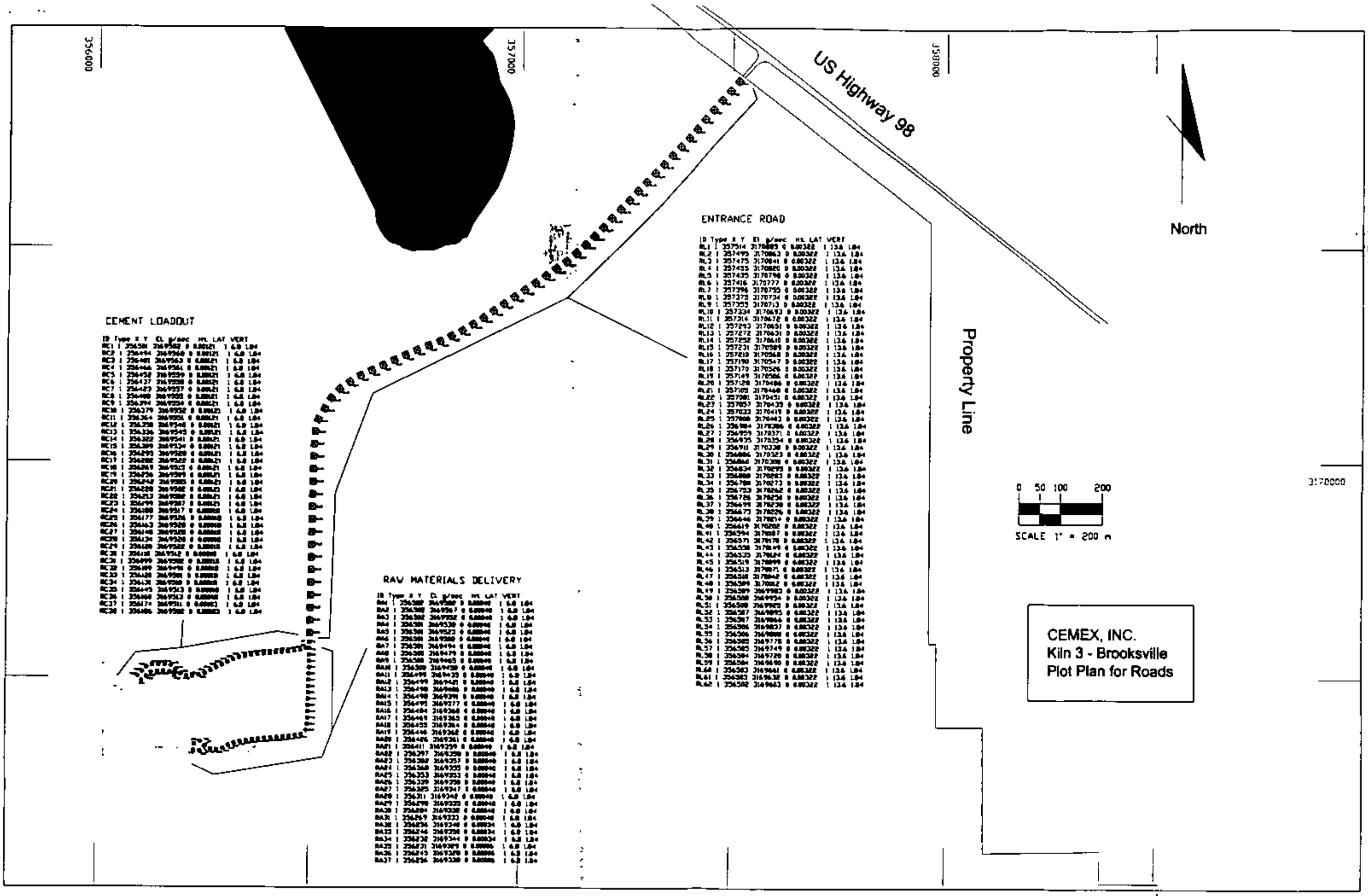
SEAE 2/21/2007

Steven C. Cullen, PE

Koogler & Associates

Consultant to CEMEX

Copies to: Mr. Michael Gonzales, Plant Manager
Charlie Walz, CEMEX
Jeet Gill, CEMEX
Segundo Fernandez, Esq., OHFC



356000
357000
358000
US Highway 98
North
ENTRANCE ROAD
CEMENT LOADOUT
Property Line
3170000
0 50 100 200
SCALE 1" = 200 m
RAW MATERIALS DELIVERY
CEMEX, INC.
Kiln 3 - Brooksville
Plot Plan for Roads

Mulkey, Cindy

From: Linero, Alvaro

Sent: Wednesday, November 22, 2006 12:25 PM

To: michaelanthony.gonzales@cemexusa.com

Cc: charles.walz@cemexusa.com; 'Little.James@epamail.epa.gov'; 'john_bunyak@nps.gov'; 'Dee_Morse@nps.gov'; Nasca, Mara; 'scullen@kooglerassociates.com'; John Koogler (John Koogler); 'Segundo J. Fernandez'; 'gkuhl@hernandocounty.us'

Subject: Proposed Cemex Brooksville Kiln No. 3 - Information Request.

Attachments: CEMEXRAI.pdf

Dear Mr. Gonzales:

Attached is our request for addtional information regarding the Air Construction (PSD) Permit for the proposed Kiln 3 project in Hernando County.

Feel free to call and discuss.

Thank you.

Alvaro Linero, Program Adminstrator
State of Florida DEP
Bureau of Air REgulation
South Permitting Section
850-921-9523
alvaro.linero@dep.state.fl.us

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Telephone: (850) 488-0114 FAX: (850) 922-6979

Colleen M. Castille
Secretary

November 22, 2006

Electronically sent – Received Receipt requested.

Mr. Michael Gonzales, Plant Manager
CEMEX Cement, Inc.
16301 Ponce De Leon Boulevard
Brooksville, Florida 34614-0849

Re: Request for Additional Information
DEP File No. 0530010-029-AC (PSD-FL-384)
Proposed Kiln No. 3

Dear Mr. Gonzales:

On October 27, 2006 we received your application for an air construction permit for a third kiln at the existing Brooksville cement plant in Hernando County.

Pursuant to Rules 62-4.055, and 62-4.070 F.A.C., Permit Processing, the Department requests submittal of the additional information prior to processing the application. Should your response to any of the below items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application form.

1. Please provide more specific details of which type of KHD calciner design is likely to be used.
2. In the application, CEMEX estimated that a reasonable CO emission rate entering the lower stages of a KHD preheater with SNCR should be in the range of 1.5-2.5 lbs/ton of clinker. Upon what ammonia to NO_X molar ratio is this based? Why does CEMEX feel that a CO limit of 2.9 lb/ton of clinker is necessary when averaged over a 30-day period? The application states that the KHD calciners are designed with a residence time on the order of seven seconds. The combination of a high residence time, tangential introduction of raw meal in the calciner, and mixing in the "pyrotop" created by the KHD design suggests lower CO emissions more comparable to those at Titan Miami (due to the long residence time) could easily be achieved especially when averaged over a 30-day period. Please explain why lower CO emissions could not be achieved on a 30-day average. Note that the performance tests at Kosmosdale and La Calera (where KHD designs were used) suggest lower CO emission rates. How much of an affect could the firing of petcoke have on CO emissions?

3. The application indicates that CEMEX does not intend to use high LOI flyash, nor inject flyash into the calciner. However the flow diagrams (Attachment I) suggest the ability to inject flyash directly into the calciner. Please re-verify CEMEX's plans regarding the injection of flyash into the calciner and raw mill or preheater.

4. VOC control to achieve 0.12 lb/ton of clinker is given as good combustion practices. Regardless of combustion practices, VOC emissions can be high unless raw materials (especially additives) are selected that will not evolve VOC in the preheater. Please describe the raw material procurement practices for mill scale, fly ash, etc. that can influence both VOC and CO emissions.

5. Please provide acceptance test data and any available test reports from the CEMEX Victorville plant. According to the application, the method of compliance for NO_X at this facility is a NO_X CEMS. Please provide hourly and 30-day averages of NO_X data on CD from this plant from the last quarter of representative operation. Include the channels for VOC (or THC) as well as CO if available.

6. CEMEX is proposing a BACT limit by SNCR of 1.95 lb NO_X/ton on a 30-day basis. The cost of further control by other technologies was calculated presuming that emissions without add-on control would be 3.5 lb/ton. Please evaluate costs, cost-effectiveness, and NO_X reductions by further increasing ammonia injection up to a molar ratio of 1.0 (NH_3/NO_X) in increments of 0.1 moles NH3 per mole NO_X.

7. A selective catalytic reduction (SCR) system would be necessary to achieve lower NO_X emissions. CEMEX estimated cost of SCR at $5,520,000 (capital) and greater than $2,000,000 per year. The cost of removal was estimated to be $2,000 per ton of NO_X removed. Starting from the same "pre-control" baseline of 3.5 lb/ton, please estimate the cost effectiveness of removal to 1.5 and 1.0 lb NO_X/ton of clinker.

8. In the application, CEMEX has entered the "Maximum Process or Throughput Rate" for the raw mill as 306 tons/hour wet raw material to the mill. What does this equate to on a dry basis?

9. Provide a description and diagram of the tire feeding mechanism. Provide the technical specifications for the proposed tire feeding system.

10. Typical fuel specifications were provided for the proposed fuels with the exception of alternate fuels including rice hulls, cotton gin, sugarcane bagasse, wood chips, vegetative fuels, and corn husks. To the extent possible, provide a description and expected analysis of these additional fuels to be combusted. Please submit the information required in the application related to the Process Fuel Segments for all fuels to be fired in the kiln and calciner.

11. What measures have been considered to minimize emissions of mercury entering the process or emitted from the kiln stack? Has CEMEX considered the possibility of inter-grinding a small portion of the dust collected in the (kiln/calciner/raw mill) air pollution control device with the clinker?

12. Has CEMEX or its affiliates had any violations (or received warning letters) in the past two years related to any Department regulations at any of their facilities? Please provide the status of any matters that have not yet been resolved.

    [Rule 62-4.070(5), F.A.C., "The Department shall take into consideration a permit applicant's violation of any Department rules at any installation when determining whether the applicant has provided reasonable assurances that Department standards will be met".

13. Has CEMEX or its cement operations affiliates had any violations (or received warning letters) in the past two years related to the regulations of other states or EPA? Please provide the status of any matters that have not yet been resolved. Provide additional information in case the matters relate to actions by previous owners of the assets.
    [Rule 62-4.070(5), F.A.C.]

14. The meteorological data used for the modeling associated with the CEMEX Kiln 3 project was from Tampa, years 1986-1990. The Department has more recent (1991-1995) data. The most recent data set should be used for all modeling associated with this project. Please submit updated results to the Department.

15. EPA's final 8-hour ozone implementation rule, 70 FR 71612 dated Nov. 29, 2005, amends the PSD rule, as underlined, to provide that "a major source that is major for volatile organic compounds or NO_X shall be considered major for ozone." The proposed new kiln will increase NO_X by 1370 TPY. Please perform or otherwise address the ambient air quality analysis for ozone.

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24. In the application, please indicate which plot plan shows the location of the roads that are included in the modeling analysis.

We will forward any comments received from other agencies as soon as we receive them. Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please advise the professional engineer to make sure he/she uses the correct seal in compliance with the applicable requirements of the Florida Board of Professional Engineers.

Permit applicants are advised that Rule 62-4.055(1), F.A.C. requires applicants to respond to requests for information within 90 days. If there are any questions, please call Cindy Mulkey at 850/921-8968. Matters regarding modeling issues should be directed to Debbie Nelson at 850/921-9537.

Sincerely,

A.A. Linero, Program Administrator
Bureau of Air Regulation
Permitting South

AAL/cm

cc: Charlie Waltz, CEMEX: charles.walz@cemexusa.com
Jeet Gill, CEMEX: amarjits.gill@cemexusa.com
Jim Little, EPA: little.james@epamail.epa.gov
John Bunyak, NPS: john_bunyak@nps.gov
Dee Morse, NPS: dee_morse@nps.gov
Meredith Bond, FWS: meredith_bond@fws.gov
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Mara Nasca, DEP SWD: mara.nasca@dep.state.fl.us
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