UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30308

DEC 15 1980

PSD-FL-0063
FL. MINING MAT., CEMENT
BROOKSVILLE

REF: 4AH-AF

Mr. Steve Smallwood, Chief
Bureau of Air Quality Management
Division of Environmental Programs
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

RE: Florida Mining & Materials
Corporation, PSD-FL-063

Dear Mr. Smallwood:

Enclosed for your review and comment are the Public Notice and Preliminary PSD Determination for the Florida Mining & Materials Corporation proposed new Portland cement plant located in Brooksville, Florida. The Public Notice will appear in a local newspaper, Sun-Journal, in the near future.

Please let my office know if you have comments or questions regarding this determination. You may contact Mr. Kent Williams of my staff at 404/881-4552 or Mr. Jeffrey L. Shumaker of TRW Inc. at 919/541-9100. TRW Inc. is under contract to EPA, and TRW personnel are acting as authorized representatives of the Agency in providing aid to the Region IV PSD review program.

Sincerely yours,

Tommie A. Gibbs

Tommie A. Gibbs, Chief
Air Facilities Branch

TAG:JLS:clu

Enclosure

Dick DuBose
404-881-7654

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PUBLIC NOTICE

A new air pollution source is proposed for construction by the Florida Mining & Materials Corporation near the town of Brooksville, in Hernando County, Florida. The source is a Portland cement plant and will increase emissions of air pollutants by the following amounts in tons per year:

PM	SO_2	NO_x	CO	VOC	Other
179	13.1	855	39	11.7	Negl.

The proposed construction has been reviewed by the U.S. Environmental Protection Agency (EPA) under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21), and EPA has made a preliminary determination that the construction can be approved provided certain conditions are met. A summary of the basis for this determination and the application for a permit submitted by Florida Mining & Materials Corporation are available for public review in the office of the Clerk of Circuit Courts, 20 North Brooksville Avenue, Brooksville, Florida.

The maximum percentage of allowable increment consumed by the proposed construction is as follows:

	Class I		Class II	
	Annual	24-hour	Annual	24-hour
PM	2.2%	15%	17%	57%
SO_2	----------Insignificant Impact----------			

Any person may submit written comments to EPA regarding the proposed modification. All comments, postmarked not later than 30 days from the date of this notice, will be considered by EPA in making a Final determination regarding approval for construction of this source. These comments will be made available for public review at the above location. Furthermore, a public hearing can be requested by any person. Such requests should be submitted within 15 days of the date of this notice. Letters should be addressed to:

Mr. Tommie A. Gibbs, Chief
Air Facilities Branch
U.S. Environmental Protection Agency
345 Courtland Street, NE
Atlanta, Georgia 30308

Preliminary Determination
Florida Mining and Materials Corporation
PSD-FL-063

I. Applicant

Florida Mining and Materials Corporation
P.O. Box 6
Brooksville, Florida 33512

II. Project Location

The applicant proposes to modify an existing plant located off Highway 98 near the town of Ringgold, about 10 miles northwest of Brooksville, Florida. The latitude and longitude for the plant site are $28^{o}38'34"$ N and $82^{o}28'25"$ W.

III. Project Description

The applicant plans to expand the existing Portland cement plant through the addition of a second rotary kiln, clinker cooler, finish mill and associated processing units. The facility will produce a maximum of 71 tons per hour of finished Portland cement. The kiln will be fired with low sulfur coal (1% sulfur; 12% ash; 12,000 Btu/lb) at a maximum rate of 8.9 tons per hour. Table 1 outlines the new and modified emissions units proposed for construction. Figure 1 shows schematically the location of each emissions unit. The cement plant/clay crusher (C-10) and one of two emissions units in the cement plant raw materials handling system (C-11) are existing facilities which will increase utilization of previously permitted capacity. Since the capacity was not restricted previously by enforceable limits, these two existing emissions units are not part of the modification.

IV. Source Impact Analysis

The existing Portland cement plant which is similar to the proposed modification has the potential to emit greater than 100 tons per year of pollutants regulated under the Clean Air Act (Act). The source, therefore, is an existing major stationary source which is located in an area designated attainment under section 107 of the Act. In addition, the proposed construction will significantly increase emissions of regulated pollutants (see Table 2). For these reasons the proposed construction is a major modification subject to review under Federal Prevention of Significant Deterioration (PSD) regulations (40 CFR 52.21). PSD review involves an analysis of the following:

Table 1
Emission Units

Unit Description	Emission Point Numbers	Status
Finish Mill (Dust Collection System)	N-23 and N-27	New
Cement/Masonry Silos (Dust Collection System)	P-05, P-07, and Q-17	New
Clinker Silo (Dust Collection System)	L-07, M-09, and M-10	New
Clinker Cooler (Dust Collection System)	K-09	New
Kiln Mill (Dust Collection System)	E-19	New
Kiln Feed Silo (Dust Collection System)	H-13	New
Blending Silos (Dust Collection System)	G-11 and F-17	Modified
Cement Plant/Clay Crusher (Dust Collection System)	C-10	Existing source; increased capacity utilization
Cement Plant/Raw Materials Handling (Dust Collection System)	C-11	Existing source; increased capacity utilization
	C-11A	Modified

A. Best Available Control Technology;
B. PSD Increment Impacts;
C. National Ambient Air Quality Standards (NAAQS) Impacts;
D. Class I Area Impacts;
E. Growth Impacts; and
F. Additional Impacts on Soils, Vegetation and Visibility.

PSD review applies to each pollutant regulated under the Act for which a significant net emissions increase results from the modification. As shown in Table 2, this includes particulate matter (PM) and nitrogen oxides (NO_x). Emissions of other pollutants are insignificant. As proposed by the applicant, sulfur dioxide (SO_2), carbon monoxide (CO) and volatile organic compounds (VOC) emissions will be restricted by Federally enforceable allowable emission limits to ensure insignificant emissions.

A. BACT Analysis

NO_x Emissions

The kiln-mill is the only NO_x emissions unit requiring BACT review. NO_x is formed from the combustion of coal in the kiln. The applicant proposes to minimize NO_x emissions by maintaining low excess air firing conditions. This operating technique reduces both available free nitrogen and peak flame temperature thus limiting NO_x formation. Low excess air firing conditions will be maintained by continuously monitoring oxygen in the combustion gases. The allowable emissions rate proposed by the applicant is considerably lower than the majority of NO_x emissions rates found during an industry survey of NO_x performance test data at cement plants located across the country. The rate also compares reasonably well with the AP-42 emissions factor. For easy comparison these values are listed as follows:

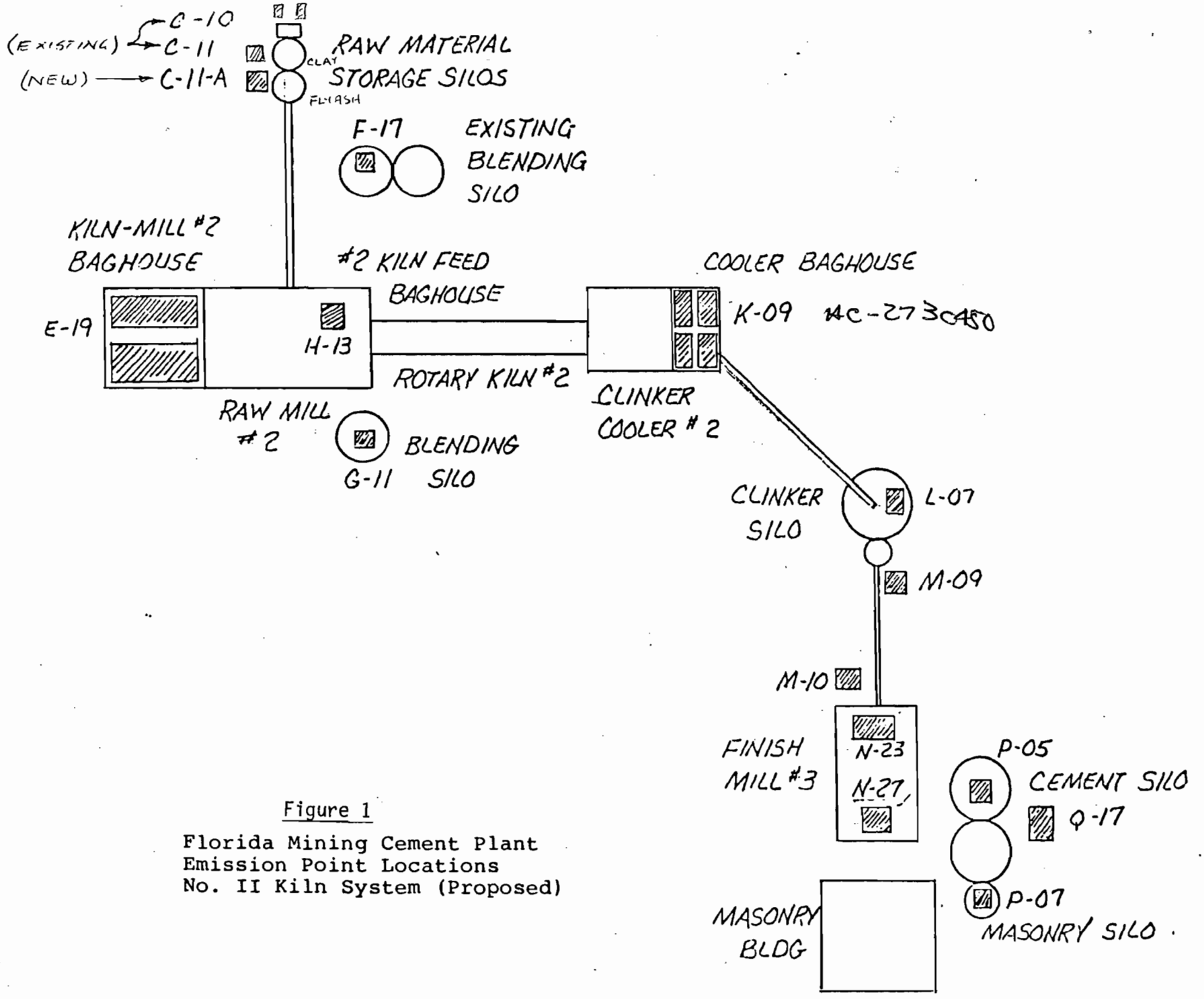

Figure 1

Florida Mining Cement Plant
Emission Point Locations
No. II Kiln System (Proposed)

Table 2
Emissions Summary[a]

Emissions Unit	Pollutant (Tons per Year) PM[b]	SO_2	NO_x	CO	VOC	Other
1. Kiln Mill (E-19)	94.8	13.1[c]	855.2[d]	39[e]	11.7[e]	Negl.
2. Finish Mill	47.4 142.2					
(N-23)	17.3					
(N-27)	3.2					
3. Cement/Masonry Silos						
(P-05)	4.3					
(P-07)	2.1					
(Q-17)	2.1					
4. Clinker Silo						
(L-07; M-09; M-10)	7.5					
5. Clinker Cooler						
(N-09)	31.6 15.8					
6. Kiln Feed Silo (M-13)	2.2					
7. Blending Silos						
(G-11)	8.6					
(F-17)	2.2					
8. Cement Plant Raw Material Handling (C-11A)	3.8					
TOTAL	179.2	13.1	855.4	39	11.7	Negl.
PSD Significance Levels	25	40	40	100	40	

[a]Estimates based on maximum capacity continuous operation (8760 hrs/yr).

[b]Figures are based on the proposed allowable emissions rates. The kiln emissions rate (E-19) was based on 0.2 lb PM/dry ton kiln feed. Other emissions units estimates were based on baghouse design flow rates and (0.01 grains/ACFM in exit stream).

[c]The applicant estimated and proposed an allowable rate of 13.1 tons/yr (3 lb/hr) based on stack tests performed on an existing unit and a sulfur mass balance. To ensure insignificant potential to emit a 3 lb/hr allowable emissions limit is required by this permit.

[d]Based on cement industry NO_x survey data (2.75 lb NO_x/ton clinker).

[e]Based on AP-42 factors for bituminous coal firing.

	NO_x Emissions Rate (lb/ton clinker Produced)
Proposed Limit	2.75
Industry Survey Data for Coal-fired Dry Process Kilns	
Arithmetic Average	4.66
Range	3.3 to 6.3
AP-42 Factor*	2.74

*Note this value is the 2.6 lb/ton cement produced factor listed in AP-42 Table 8.6-1 corrected to account for a 5 percent finished cement gypsum content.

Based on this comparison EPA accepts low excess air firing and the proposed emissions limit (2.75 lb/ton clinker; 195.3 lb/hr) as BACT for NO_x for the proposed modification.

PM Emissions

BACT also is required for all PM emissions units. The kiln (E-19) and clinker cooler (K-09) are the largest PM emissions sources. In addition, 12 other point sources exist in various materials handling systems, and several fugitive PM emissions units (coal pile, limestone storage, haul roads, etc.) are a part of the proposed modification.

The applicant evaluated low efficiency scrubbers, high efficiency scrubbers, electrostatic precipitators, and fabric filters as alternative technologies to be applied to the kiln (E-19) and clinker cooler (K-09). The following factors were estimated and considered in the BACT analysis: collection efficiency, capital and operating costs, product recovery capability, water consumption and generation of waste byproducts. The scrubber technologies were shown incapable of meeting the applicable NSPS limits (see Table 3). Further, due to low exhaust gas SO_2 content and resulting high particle resistivity and low collection efficiency, the electrostatic precipitator is considered to be less reliable than a fabric filter, which has been demonstrated on similar existing kilns as a reliable effective control technology. The applicant proposed NSPS

allowable emissions limits as BACT for the kiln (0.3 lb/ton dry kiln feed) and a limit slightly lower than NSPS for the clinker cooler (0.066 vs 0.1 lb/ton dry kiln feed). However, the Florida State Department of Environmental Resources (FDER) has determined, on the basis of emissions rates achieved by other recently constructed kilns, that a more stringent level can be met for the kiln (0.2 lb/ton dry kiln feed). The limits proposed by the applicant and required by the State are summarized in Table 3. EPA agrees with the clinker cooler limit proposed by the applicant and the kiln limit required by FDER. BACT for PM for these limits, therefore, is determined to be 0.2 lb/ton dry kiln feed and 10 percent opacity for the kiln and 0.066 lb/ton dry kiln feed and 10 percent opacity for the clinker cooler.

An analysis was perfomed to evaluate economic and environmental impacts of a cyclone scrubber, a venturi scrubber and a baghouse for each of the additional 12 PM emissions units. Fabric filter technology was chosen as the lower cost, more reliable control system for these applications. The applicant proposed pound-per-hour limits based on 0.02 gr/ACFM outlet grain loading for each of the 12 additional PM emissions units. This limit, however, exceeds the manufacturer's outlet grain-loading design specification for each fabric filter (0.01 gr/ACFM). The manufacturer's specification is consistent with BACT determinations made on similar Portland cement kilns and other fabric filter controlled PM emissions units. On this basis, EPA determines BACT for PM for the 12 emissions units (L-07, M-10, M-09, H-13, G-11, F-17, N-23, N-27, P-05, P-07, Q-17, and C-11A) to be fabric filter technology and pound-per-hour limits based on maximum design flow rate and 0.01 gr/ACFM.

BACT must also be applied to all fugitive PM emissions sources including coal, raw materials and cement products storage and handling, haul roads, and other fugitive sources. The following techniques and practices will be employed by the applicant in controling fugitive PM emissions.

1. All permanant haul roads shall be paved.
2. Temporary haul roads shall be watered or treated with chemical dust suppressants at regular intervals.
3. Raw materials shall be stored in silos or enclosed structures.

Table 3
BACT for Particulate Matter

Emissions Unit	NSPS Limits	Applicant Proposed Limits	State Permit Limits[a]	PSD BACT Limits
Kiln (E-19)				
lb/ton dry kiln feed	0.3	0.3	0.2[a]	0.2
Opacity	20%	20%	10%	10%
Clinker Cooler (K-09)				
lb/ton dry kiln feed	0.1	0.066[a]	0.066[a]	0.066
Opacity	10%	10%	10%	10%
Other 12 Emissions Units				
gr/ACFM	-	0.02[a]	0.02[a]	0.01[b]
Opacity	10%	-	Zero %	Zero %

[a]Calculated from a lb/hr emissions limit assuming 120 T/hr wet kiln feed at 9.8 percent moisture as specified in the application.

[b]Based on manufacturer's equipment design specifications for fabric filter outlet grain loadings.

4. The coal storage pile shall be compacted, watered to maintain a minimum 8 percent moisture in the surface layer and aligned with the predominant wind direction to minimize wind erosion.

5. Abandoned haul roads and other disturbed areas shall be revegetated within 60 days of the date active service ends.

6. All cement products shall be transferred to transport trucks with a sealed pnuematic conveying system which is either a closed system or exhausted through a bag filter.

7. Exhaust gases from all materials handling systems other than those for which specific allowable emissions limits are specified in Condition 2 and any other fugitive PM emissions units shall not exceed 5 percent opacity as measured by EPA Standard Method 9.

B. Increment Analysis

Maximum allowable increases in ambient air pollutant concentrations have been set by the PSD regulations for emissions of PM and SO_2 in Class II areas. PSD review for the proposed project does not apply to SO_2 which is emitted in insignificant quantities. An analysis, however, is required to show that the PM emissions impacts from the proposed project, in conjunction with all other interacting increment consuming source impacts, do not exceed the allowable increment.

In identifying other pertinent increment consuming sources, the applicant searched FDER air permit files and the existing State air inventory and screened all major sources within 50 kilometers of the proposed plant site. Also, all minor sources located within the proposed impact area of the modification were screened (circular impact area with 3.8 km radius defined with CRSTER model results). Due to the rural surroundings of the plant location, no increment consuming sources were identified within the impact area. Also, no new or modified major sources having undergone construction or other emissions increases were found within 50 kilometers. Thus, only the proposed new and modified emissions units were considered in the increment analysis.

Air quality impacts from the 14 proposed new and modified emissions units were predicted through dispersion modeling using approved UNIMAP models; CRSTER was used for annual averages and PTMTP for refined short-term averages. Four years (1970-1974) of digitized hourly observations from Tampa Airport were used as meteorology data input to the CRSTER model. Refined short-term maximum impacts were estimated with PTMTP using the worst case 24-hour period identified by the CRSTER results. A 0.1 kilometer spacing was used in refining the maximum impacts. The results of the Class II increment analysis are listed in Table 4.

The applicant also evaluated the effect of aerodynamic downwash on short-term air impacts from the proposed emissions units. Plant boundary line concentrations were generated for each emissions unit for the directions which predictably could result in building downwash effects due to stack heights which do not meet minimum Good Engineering Practices. The Huber-Snyder "enhanced sigmas" technique was utilized along with the conservative Pasquill-Gifford, Gausian dispersion equation to estimate maximum property line concentrations. No off-property increment violations occurred from individual units. Further, by summing all maximum individual impacts which may be physically capable of interacting due to wind direction (note that this is an ultra-conservative technique) a total impact of $\leq$23.5 ug/m^3 (24-hour average) is estimated. This value also does not exceed the available increment of 37 ug/m^3.

On the basis of the downwash analysis results and the results presented in Table 4, EPA concludes that the proposed modification does not threaten Class II increments. The Class I impact analysis is discussed in a later section. It should be noted that an analysis of the impacts of fugitive PM emissions was not required consistent with EPA Region IV policy for applications submitted prior to August 7, 1980. Finally, no areas of known increment violation exist within the impact area of the proposed modification.

C. NAAQS Analysis

An air quality analysis was performed to demonstrate that emissions from the proposed modification, along with existing ambient concentrations,

Table 4
PM Increment Analysis Results*

Averaging Period	Distance from Source	Maximum Impact (ug/m^3)	Class II Increment (ug/m^3)	Percent Increment Consumed
Annual	0.1 km	3.2	19	17%
24-hour	0.25 km	21	37	57%

* Modification does not significantly increase SO_2 emissions and no SO_2 increment analysis is required.

will not exceed the NAAQS. Also, as required by the PSD regulations, the analysis must show that emissions from the modification will not significantly impact any designated non-attainment area. The analysis addresses only emissions of PM and NO_x. The modification does not result in a significant increase for other criteria pollutants for which NAAQS ceilings exist.

The maximum annual NO_x emissions impact was estimated using CRSTER and 5-year Tampa Airport meteorological data with a method similar to the method previously described in the increment analysis. The kiln is the only NO_x emitting unit in the proposed modification and it alone was modeled to determine NO_x impacts. As shown in Table 5, the NO_x modeling results show impacts which are less than the significance levels outlined in the Preamble to the June 19, 1978 PSD regulations (43FR26398). For this reason, no refined analysis is required, and it is concluded that NO_x emissions from the proposed modification do not pose a threat to the NAAQS for NO_x.

Site-specific preconstruction PM monitoring data was collected at four sites in the vicinity of the existing plant to quantify existing air quality for use in the NAAQS analysis for PM. Four months of data were collected with 3-day sampling intervals. The results were reasonably consistent with the results of two previous monitoring programs conducted during the periods of October 1974 to March 1975 and April 1976 to October 1976. EPA agrees that the monitoring data is sufficient to characterize existing air quality for PM.

The highest annual geometric mean of four stations (36.4 ug/m^3) is considered to represent the worst case background ambient concentration for the annual averaging period. Similarly, the highest individual sample concentration (120 ug/m^3) represents the worst case background for the 24-hour averaging period.

Maximum annual and 24-hour air quality impacts from the 14 proposed new and modified emissions units were estimated with dispersion models as discussed previously. The results of this modeling analysis are presented in Table 5 along with the background values. Making the conservative assumption that maximum modeled impacts and background concentrations occur simultaneously at the same location, the worst case projected ambient

Table 5
NAAQS Analysis Results

Pollutant	Averaging Time	Significance Value (ug/m^3)	Maximum Impact from Proposed Units (ug/m^3)	Existing Air Quality (ug/m^3)	Total Projected Air Quality (ug/m^3)	$NAAQS_3$ (ug/m^3)
NO_x	Annual	1	0.36[a] (at 5km)	a	a	100
PM	Annual	1	3.2 (at 0.1km)	36.4[b]	39.6	60
	24-hour	5	21 (at 0.25km)	120[c]	141	150
PM impact on Tampa non-attainment area (65 kilometers to the south)	Annual	1	0.01[a]			
	24-hour	5	0.3[a]			

[a]This value is not significant (i.e. <1 ug/m^3) and refined analysis is not required.

[b]Maximum annual geometric mean of four site-specific monitoring stations.

[c]Maximum 3-hour concentration of four site-specific monitoring stations.

24-hour ?

impact is estimated. A comparison of these values with the NAAQS (see Table 5) shows the proposed modification to pose no threat to the standards.

The analysis also estimated the maximum impact from the proposed modification on the PM non-attainment area located 65 kilometers to the south. The area of significant PM impact for the proposed units is limited to a circle with a 3.8 kilometer radius. Projected maximum impacts at the non-attainment area are 0.01 ug/m^3 annual geometric mean and 0.3 ug/m^3 24-hour average. These impacts do not exceed the significance criteria (43FR26398), and the proposed modification is determined not to pose a threat to the Tampa PM non-attainment area.

D. Class I Area Analysis

The plant site for the proposed modification is located at a distance of 12 kilometers to the east of the Chassahowitzka Class I area. The air quality impact of the proposed construction was estimated in the previously discussed dispersion modeling analysis. In addition, all sources permitted since January 6, 1975 within 100 kilometers of the Class I area were screened to identify increment consuming sources which, by virtue of their location, could interact with the proposed modification in impacting the Class I area. Consideration was given only to those sources located in a sector area east of both the Class I area and the existing plant site and to those sources in the direct vicinity which could interact due to lateral plume dispersion.

The screening identified only minor increment consuming sources (i.e. <100 tons/year) located outside of the impact area for the proposed modification. No other increment consuming sources were found within the impact area, and no major source construction since January 6, 1975 was identified within the 100 kilometer sector. Therefore, it was concluded that no other increment consuming sources exist which are capable of interaction with the proposed modification in impacting the Class I area.

The results of the Class I impact analysis are presented in Table 6. The impacts are less than the significance levels applicable to Class II

Table 6
Class I Area Impact Analysis Results

	PM Annual (ug/m^3)	PM 24-hour (ug/m^3)	NO_x Annual
Proposed Modification Impacts	0.11	1.5	0.22
Interacting Increment Consuming Source Impacts	0	0	a
Total Impact from the Modification	0.11	1.5	0.22
Class I Increments	5	10	a
Percent of Increment Consumed	2.2%	15%	a

[a]No increment has been established for NO_x.

areas (1 ug/m^3 annual average and 5 ug/m^3 24-hour average); however, this criteria, as discussed in the Preamble to the 1978 PSD regulations (43FR26398), is not applicable to Class I areas. Further, the 24-hour impact exceeds the significance criteria triggering PSD review for sources located within 10 kilometers of a Class I area (1 ug/m^3 24-hour average). Most significantly, the proposed modification consumes a maximum of 15 percent of the available increment (24-hour average) in the Chassahowitzka Class I area. The results of the Class I area impact analysis have been forwarded to the Federal Land Manager responsible for managing the Chassahowitzka Refuge*. Comments received regarding the significance of the estimated Class I area impacts will be considered in making a final determination regarding permitting for the proposed modification.

E. Growth Analysis

The applicant estimates the proposed modification will increase plant employment by 250 temporary workers during construction and 10 permanent employees. Consumption of cement products is expected to be regional and should not significantly increase local growth. Increased power consumption (12 megawatts) will be supplied by existing capacity at Florida Power's Crystal River plant.

Increased truck traffic to the cement plant hauling products, etc. will generate the following quantities of pollutants.

Year	CO(t/y)	VOC(t/y)	NO_x(t/y)
1980	101	19.5	176
1982	95	18	176
1985	91	14	163
1990	89	11	76

Increased coal consumption will necessitate a larger number of cars on each delivery train. The emissions associated with the increased load are considered to be insignificant.

*Edward Collinsworth, Refuge Manager, National Wildlife Refuge, Route 2, Box 44, Homosassa, Florida 32646.

F. Soils, Vegetation and Visibility Analysis

Based on the results of the air quality impacts analysis and a general survey of the soils and vegetation indicative of the plant vicinity, no significant adverse soils, vegetation or visibility impacts are anticipated to result from the proposed modification. Conservative modeling results, discussed previously, show that the project does not cause air impacts in excess of the NAAQS developed to protect public health and welfare. Moreover, the modification consumes less than 15 percent and 57 percent of the Class I and Class II increments, respectively. On this basis, no significant adverse soils or vegetation impacts are anticipated.

Regional visibility in this subtropical environment is limited by naturally occurring high humidity. PM emissions from the modification will consist primarily of submicron size particles. Although particles in this size range possess active light scatters properties, the total emissions increase amounts to less than 179 tons per year. This amount is not anticipated to cause significant adverse visibility effects. Adverse plume visibility effects also will be limited by the 10 percent maximum opacity standard.

V. Conclusions

EPA Region IV proposes a preliminary determination of approval with conditions for the construction of the kiln, clinker cooler and the associated production units described in the Florida Mining and Materials Corporation, application received complete by EPA on August 2, 1980 (Materials May 12, July 17, July 30, and October 9, 1980). The conditions set forth in the permit are as follows:

1. The modification shall be constructed in accordance with the specifications, capabilities and descriptions contained in the application except as otherwise required by the permit conditions. This specifically includes a maximum design kiln feed rate of 120 tons per hour (wet basis), a clinker production rate of 71 tons per hour (dry basis), and a kiln fuel input rate of 8.9 tons per hour of coal (12,000 Btu/hr) with sulfur content not to exceed 1 percent by weight.

2. The maximum emissions rate for each emissions unit shall not exceed the allowable limits specified in Table 7.

3. Compliance with each allowable emissions limit shall be demonstrated with performance tests conducted with the provisions of 40 CFR 60.8 and the attached General Conditions. EPA standard reference methods shall be utilized for all performance tests in accordance with applicable sampling provisions as follows:

Pollutant	40 CFR 60 Appendix A Reference Method	Applicable Provisions
PM	Method 5	40 CFR 60.64
SO_2	Method 6	40 CFR 60.46
NO_x	Method 7	40 CFR 60.46
Opacity	Method 9	--
CO	Method 10	--

Compliance with the VOC allowable emissions rate will be assumed provided the CO allowable emissions rate is achieved; specific VOC compliance testing is not required.

4. The kiln feed rate and clinker production rates shall be monitored and recorded daily in accordance with 40 CFR 60.63. Also, the coal feed rate to the kiln and the coal sulfur content of each coal shipment will be determined and recorded.

5. Actual emissions of NO_x will be minimized through the use of low excess air firing. A continuous kiln exhaust gas oxygen monitor/ recorder will be installed, calibrated and operated in accordance with the attached general provision, "Use of a Flue Gas Oxygen Meter as BACT for Combustion Controls."

6. The applicant shall comply with the following work practices to minimize fugitive PM emissions:

   a. All permanant haul roads shall be paved.

   b. Temporary haul roads shall be watered or treated with chemical dust suppressants at regular intervals.

   c. Raw materials shall be stored in silos or enclosed structures.

Table 7
Allowable Emissions Limits
(PSD-FL-063)

Emissions Unit	Allowable Emissions Rate (pounds per hour)					
	PM	NO_x	SO_2	CO	VOC	Opacity
Clinker Silo L-07, M-09, M-10	1.72 1.22					0%
Clinker Cooler (K-09)	7.1 (0.066)[a]					10%
Kiln (E-19)	21.6 (0.2)[a]	195.3 (0.81)[b]	3	8.9	2.7	10%
Kiln Feed (H-13)	0.51					0%
Blending Silo						
(G-11)	1.97					0%
(F-17)	0.51					0%
Finish Mill						
(N-23)	3.94					0%
(N-24)	0.73					0%
Cement/Masonry Silos						
(P-05)	0.99					0%
(P-07)	0.47					0%
(Q-17)	0.47					0%
Cement Plant Raw Materials Handling						
(C-11A)	0.86					0%

[a]Allowable emissions limit in pounds per ton of kiln feed materials (dry basis).

[b]Allowable emissions limit in pounds per million Btus of kiln heat input.

d. The coal storage pile shall be compacted, watered to maintain a minimum 8 percent moisture in the surface layer and aligned with the predominant wind direction to minimize wind erosion.

e. Abandoned haul roads and other disturbed areas shall be revegetated within 60 days of the date active service ends.

f. All cement products shall be transferred to transport trucks with a sealed pnuematic conveying system which is either a closed system or exhausted through a bag filter.

g. Exhaust gases from all materials handling systems other than those for which specific allowable emissions limits are specified in Condition 2 and any other fugitive PM emissions units shall not exceed 5 percent opacity as measured by EPA Standard Method 9.

7. The applicant shall comply with the provisions and requirements of the attached General Conditions.

USE OF FLUE GAS OXYGEN METER AS BACT FOR COMBUSTION CONTROLS

Within the time limits specified in General Condition 3 of this permit, the permittee shall determine the emissions of nitrogen oxides and carbon monoxide from the permitted combustion device in accordance with test methods and procedures set out in 40 CFR Part 60, Appendix A, Methods 7 and 10, respectively. These emission determinations shall be made at:

1) Maximum design capacity; and

2) Normal operational load.

The permittee shall install a continuous oxygen monitor in the flue of the permitted combustion device which meets the requirements of 40 CFR Part 60, Appendix B, Performance Specification 3. Results of emission determinations shall be correlated to the flue gas oxygen content to define:

1) The point at which Nitrogen Oxides (NO_x) emissions (lb/MMBtu) equals the allowable NO_x emission rate contained in the permit.
2) The point at which carbon monoxide (CO) emissions exceed the allowable CO emission rate contained in the permit.

The flue gas oxygen content shall be maintained between these points and alarms shall be set to sound when flue gas oxygen levels exceed either side of this range. Any operation outside of this range will constitute noncompliance with this specific condition, shall be recorded in accordance with General Condition 4 of this permit, and will be reported quarterly along with excess emissions in accordance with 40 CFR 60.7 (c).

Should any combustion equipment modifications be made such as different type burners, combustion air relocation, fuel conversion, tube removal or addition, etc., emissions correlations as described above shall be conducted within 90 days of attaining full operation after such modification. Results of all emission determinations shall be sent to the permitting authority within 90 days after completion of the tests.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

   (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

   Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

analyses and monitoring of coal feed rates. Because firing a larger quantity of lower heating value coal at 1.0 percent sulfur would increase the quantity of sulfur dioxide which must be absorbed on a finite quantity of alkalai product materials, such a firing scenario increases the risk of sulfur dioxide emissions from the plant. Since the plant is located at a distance of 12 kilometers from the Chassahowitzka Class I area, the additional stipulation is made that the sulfur content per heat value of any lower heating value coal (lbs/MMBTU) fired in the kiln shall not exceed that of the coal specified in the application (1.0% sulfur; 12,000 BTU/lb; 0.83 lb sulfur/MMBTU). The modified conditions of approval allow the plant the requested operating flexibility, but at the same time ensure the integrity of the analyses submitted in the application to demonstrate compliance with the air quality standards and other regulatory requirements.

Comment 2: The commenter was concerned that fugitive PM controls requiring enclosed storage of process raw materials applied to other than "dry" raw materials in unlikely restrictive raw materials (clays, etc.) with moisture content exceeding 14 percent do not pose a fugitive PM emissions threat.

Response 2: EPA agrees providing the moisture content of the surface layer of exposed materials is considered. The determination has been modified to clarify this point.

Comment 3: The commenter stated that PM BACT limits based on manufacturer's design specifications (0.01 gr/dscf) for a number of materials handling systems controlled with bag filters is unduly restrictive and requests a 0.02 gr/dscf limit be imposed. Further, that performance testing for these units is unnecessarily expensive and that opacity testing is sufficient to demonstrate control.

Response 3: EPA cannot agree with BACT limits based on 0.02 gr/dscf for these units. Manufacturer's design specifications are normally quoted as minimum efficiencies to be obtained by a product design for a specific purpose. In addition, fabric filtration systems on a number of other similar applications are capable of achieving 0.01 gr/dscf exit particulate loading. EPA does agree, however, that opacity is a good indicator of compliance for small PM emissions units of this type controlled with fabric

filters. For this reason, EPA agrees to waive performance testing requirements for mass emissions rates providing compliance with the opacity limits contained in the conditions of approval are achieved and maintained. Should compliance with opacity limits not be achieved at start-up or maintained thereafter, performance tests for mass emissions limits shall be conducted.

Comment 4: The commenter is concerned that moisture content of coal (8 to 14%) is sufficient to control PM fugitives and that watering will unnecessarily decrease the net heat value of the coal.

Response 4: The conditions of approval require watering of the coal pile only to maintain a surface layer moisture content at a minimum of 8 percent. The minimum surface content also may be maintained by turning the surface layer of the pile. Watering is expected to be necessary only during dry periods of the year. The condition does not require watering when the minimum surface moisture content can be maintained by other means.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

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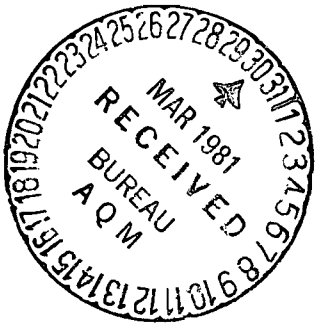


CERTIFIED MAIL - RETURN RECEIPT REQUESTED

REF: 4AH-AF

Mr. Fred Cohrs
Vice President
Florida Mining and Materials Corporation
P. O. Box 6
Brooksville, Florida 33512

Re: FMMC's PSD Application
FILE → PSD-FL-063

Dear Mr. Cohrs:

Review of your May 15, 1980 application to construct a portland cement plant near Brooksville, Florida has been completed. The construction is subject to the rules for Prevention of Significant Air Quality Deterioration (PSD), contained in 40 CFR §52.21.

We have determined that the construction, as described in the application, meets all applicable requirements of the PSD regulations. EPA has performed the Preliminary Determination concerning the proposed construction and published a request for public comment on December 20, 1980. Your comments were the only ones received. Our response to your comments is attached to the Final Determination. Authority to Construct a Stationary Source is hereby issued for the facility described above, subject to the conditions in the Conclusions section to the Final Determination (enclosed). This Authority to Construct is based solely on the requirements of 40 CFR §52.21, the Federal regulations governing significant deterioration of air quality. It does not apply to NPDES or other permits issued by this agency or permits issued by other agencies. Information regarding EPA permitting requirements can be provided if you contact Mr. Joe Franzmathes, Director, Office of Program Integration and Operations, at 404/881-3476. Additionally, construction covered by this Authority to Construct must be initiated within 18 months from the date of this letter.

Please be advised that a violation of any condition issued as part of this approval, as well as any construction which proceeds in material variance with information submitted in your application, will be subject to enforcement action.

2cx to TPAI

Authority to Construct will take effect on the date of this letter. The complete analysis which justifies this approval has been fully documented for future reference, if necessary. Any questions concerning this approval may be directed to Dr. Kent Williams, Chief, New Source Review Section (404/881-4552).

Sincerely yours,

Thomas W. Devine
Director
Air and Hazardous Materials Division

Enclosure

cc: Steve Smallwood, FL DER

Final Determination
Florida Mining and Materials Corporation
PSD-FL-063

I. Applicant

Florida Mining and Materials Corp.
P.O. Box 6
Brooksville, Florida 33512

II. Project Location

The applicant proposes to modify an existing plant located off Highway 98 near the town of Ringgold, about 10 miles northwest of Brooksville, Florida. The latitude and longitude for the plant site are 28°38'34" N and 82°28'25" W.

III. Project Description

The applicant plans to expand the existing Portland cement plant through the addition of a second rotary kiln, clinker cooler, finish mill and associated processing units. The facility will produce a maximum of 71 tons per hour of finished Portland cement. The kiln will be fired with low sulfur coal (1% sulfur; 12% ash; 12,000 Btu/hr) at a maximum rate of 213.6 million BTUs per hour heat input. Table 1 outlines the new and modified emissions units proposed for construction. Figure 1 shows schematically the location of each emissions unit. The cement plant/clay crusher (C-10) and one of two emissions units in the cement plant raw materials handling system (C-11) are existing facilities which will increase utilization of previously permitted capacity. Since the capacity was not restricted previously by enforceable limits, these two existing emissions units are not part of the modification.

IV. Source Impact Analysis

The existing Portland cement plant which is similar to the proposed modification has the potential to emit greater than 100 tons per year of pollutants regulated under the Clean Air Act (Act). The source, therefore, is an existing major stationary source which is located in an area designated attainment under section 107 of the Act. In addition, the proposed construction will significantly increase emissions of regulated pollutants (see Table 2). For these reasons the proposed construction is a major modification subject to review under Federal Prevention of Significant Deterioration (PSD) regulations (40 CFR 52.21). PSD review involves an analysis of the following:

Table 1
Emission Units

Unit Description	Emission Point Numbers	Status
Finish Mill (Dust Collection System)	N-23 and N-27	New
Cement/Masonry Silos (Dust Collection System)	P-05, P-07, and Q-17	New
Clinker Silo (Dust Collection System)	L-07, M-09, and M-10	New
Clinker Cooler (Dust Collection System)	K-09	New
Kiln Mill (Dust Collection System)	E-19	New
Kiln Feed Silo (Dust Collection System)	H-13	New
Blending Silos (Dust Collection System)	G-11 and F-17	Modified
Cement Plant/Clay Crusher (Dust Collection System)	C-10	Existing source; increased capacity utilization
Cement Plant/Raw Materials Handling (Dust Collection System)	C-11	Existing source; increased capacity utilization
	C-11A	Modified

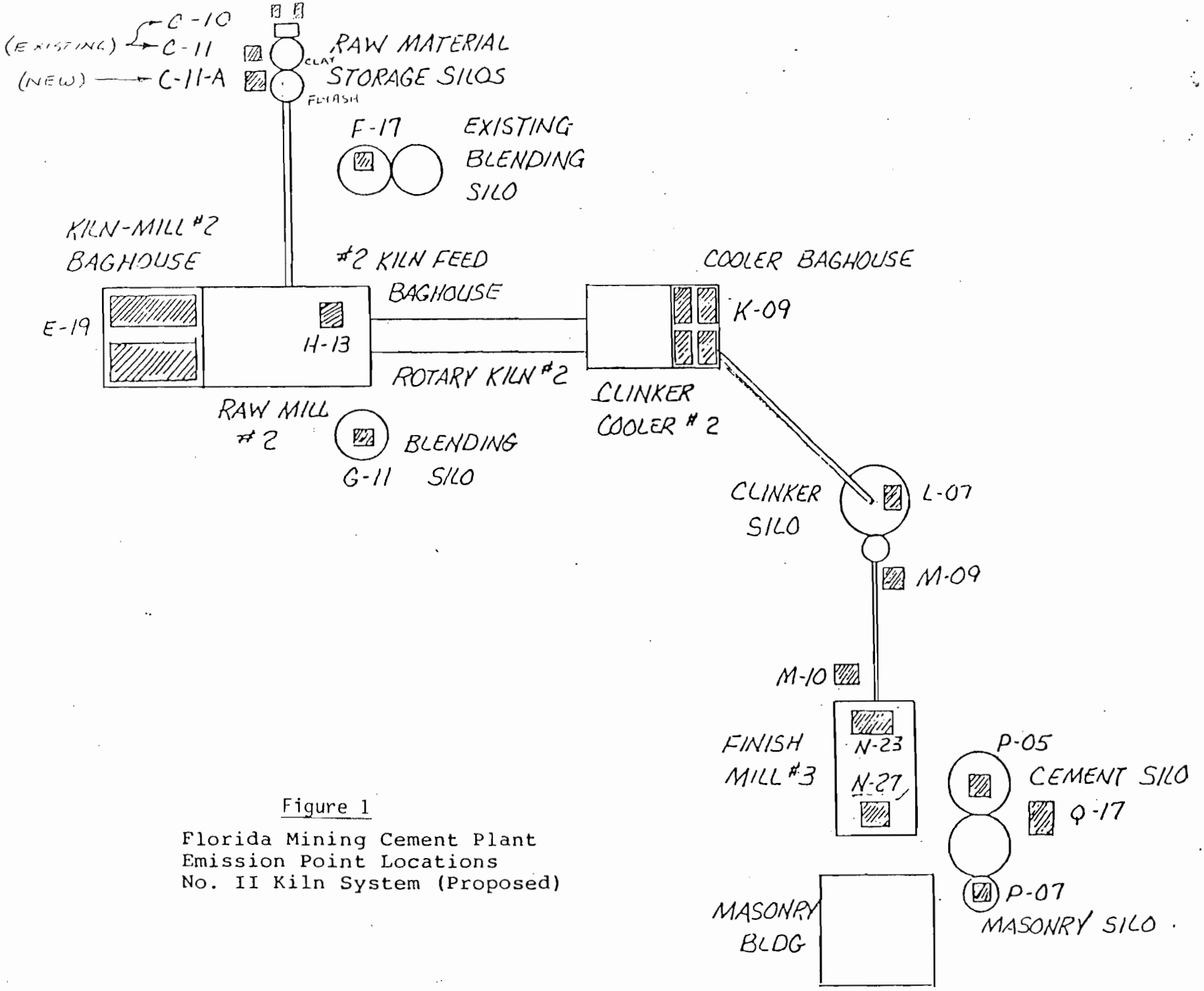


Figure 1

Florida Mining Cement Plant
Emission Point Locations
No. II Kiln System (Proposed)

A. Best Available Control Technology;
B. PSD Increment Impacts;
C. National Ambient Air Quality Standards (NAAQS) Impacts;
D. Class I Area Impacts;
E. Growth Impacts; and
F. Additional Impacts on Soils, Vegetation and Visibility.

PSD review applies to each pollutant regulated under the Act for which a significant net emissions increase results from the modification. As shown in Table 2, this includes particulate matter (PM) and nitrogen oxides (NO_x). Emissions of other pollutants are insignificant. As proposed by the applicant, sulfur dioxide (SO_2), carbon monoxide (CO) and volatile organic compounds (VOC) emissions will be restricted by Federally enforceable allowable emission limits to ensure insignificant emissions.

A. BACT Analysis

NO_x Emissions

The kiln-mill is the only NO_x emissions unit requiring BACT review. NO_x is formed from the combustion of coal in the kiln. The applicant proposes to minimize NO_x emissions by maintaining low excess air firing conditions. This operating technique reduces both available free nitrogen and peak flame temperature thus limiting NO_x formation. Low excess air firing conditions will be maintained by continuously monitoring oxygen in the combustion gases. The allowable emissions rate proposed by the applicant is considerably lower than the majority of NO_x emissions rates found during an industry survey of NO_x performance test data at cement plants located across the country. The rate also compares reasonably well with the AP-42 emissions factor. For easy comparison these values are listed as follows:

Table 2
Emissions Summary[a]

Emissions Unit	Pollutant (Tons per Year) PM[b]	SO_2[c]	NO_x[d]	CO[e]	VOC[e]	Other
1. Kiln Mill (E-19)	94.8	13.1	855.2	39	11.7	Negl.
2. Finish Mill						
(N-23)	17.3					
(N-27)	3.2					
3. Cement/Masonry Silos						
(P-05)	4.3					
(P-07)	2.1					
(Q-17)	2.1					
4. Clinker Silo						
(L-07; M-09; M-10)	7.5					
5. Clinker Cooler						
(N-09)	31.1					
6. Kiln Feed Silo (M-13)	2.2					
7. Blending Silos						
(G-11)	8.6					
(F-17)	2.2					
8. Cement Plant Raw Material Handling (C-11A)	3.8					
TOTAL	179.2	13.1	855.4	39	11.7	Negl.
PSD Significance Levels	25	40	40	100	40	

[a]Estimates based on maximum capacity continuous operation (8760 hrs/yr).

[b]Figures are based on the proposed allowable emissions rates. The kiln emissions rate (E-19) was based on 0.2 lb PM/dry ton kiln feed. Other emissions units estimates were based on baghouse design flow rates and (0.01 grains/ACFM in exit stream).

[c]The applicant estimated and proposed an allowable rate of 13.1 tons/yr (3 lb/hr) based on stack tests performed on an existing unit and a sulfur mass balance. To ensure insignificant potential to emit a 3 lb/hr allowable emissions limit is required by this permit.

[d]Based on cement industry NO_x survey data (2.75 lb NO_x/ton clinker).

[e]Based on AP-42 factors for bituminous coal firing.

	NO_x Emissions Rate (lb/ton clinker Produced)
Proposed Limit	2.75
Industry Survey Data for Coal-fired Dry Process Kilns	
Arithmetic Average	4.66
Range	3.3 to 6.3
AP-42 Factor*	2.74

*Note this value is the 2.6 lb/ton cement produced factor listed in AP-42 Table 8.6-1 corrected to account for a 5 percent finished cement gypsum content.

Based on this comparison EPA accepts low excess air firing and the proposed emissions limit (2.75 lb/ton clinker; 195.3 lb/hr) as BACT for NO_x for the proposed modification.

PM Emissions

BACT also is required for all PM emissions units. The kiln (E-19) and clinker cooler (K-09) are the largest PM emissions sources. In addition, 12 other point sources exist in various materials handling systems, and several fugitive PM emissions units (coal pile, limestone storage, haul roads, etc.) are a part of the proposed modification.

The applicant evaluated low efficiency scrubbers, high efficiency scrubbers, electrostatic precipitators, and fabric filters as alternative technologies to be applied to the kiln (E-19) and clinker cooler (K-09). The following factors were estimated and considered in the BACT analysis: collection efficiency, capital and operating costs, product recovery capability, water consumption and generation of waste byproducts. The scrubber technologies were shown incapable of meeting the applicable NSPS limits (see Table 3). Further, due to low exhaust gas SO_2 content and resulting high particle resistivity and low collection efficiency, the electrostatic precipitator is considered to be less reliable than a fabric filter, which has been demonstrated on similar existing kilns as a reliable effective control technology. The applicant proposed NSPS

allowable emissions limits as BACT for the kiln (0.3 lb/ton dry kiln feed) and a limit slightly lower than NSPS for the clinker cooler (0.066 vs 0.1 lb/ton dry kiln feed). However, the Florida State Department of Environmental Resources (FDER) has determined, on the basis of emissions rates achieved by other recently constructed kilns, that a more stringent level can be met for the kiln (0.2 lb/ton dry kiln feed). The limits proposed by the applicant and required by the State are summarized in Table 3. EPA agrees with the clinker cooler limit proposed by the applicant and the kiln limit required by FDER. BACT for PM for these limits, therefore, is determined to be 0.2 lb/ton dry kiln feed and 10 percent opacity for the kiln and 0.066 lb/ton dry kiln feed and 10 percent opacity for the clinker cooler.

An analysis was perfomed to evaluate economic and environmental impacts of a cyclone scrubber, a venturi scrubber and a baghouse for each of the additional 12 PM emissions units. Fabric filter technology was chosen as the lower cost, more reliable control system for these applications. The applicant proposed pound-per-hour limits based on 0.02 gr/ACFM outlet grain loading for each of the 12 additional PM emissions units. This limit, however, exceeds the manufacturer's outlet grain-loading design specification for each fabric filter (0.01 gr/ACFM). The manufacturer's specification is consistent with BACT determinations made on similar Portland cement kilns and other fabric filter controlled PM emissions units. On this basis, EPA determines BACT for PM for the 12 emissions units (L-07, M-10, M-09, H-13, G-11, F-17, N-23, N-27, P-05, P-07, Q-17, and C-11A) to be fabric filter technology and pound-per-hour limits based on maximum design flow rate and 0.01 gr/ACFM.

BACT must also be applied to all fugitive PM emissions sources including coal, raw materials and cement products storage and handling, haul roads, and other fugitive sources. The following techniques and practices will be employed by the applicant in controling fugitive PM emissions.

1. All permanant haul roads shall be paved.
2. Temporary haul roads shall be watered or treated with chemical dust suppressants at regular intervals.
3. Dry raw materials (moisture content $\leq$ 14%) shall be stored in silos or enclosed structures.

Table 3
BACT for Particulate Matter

Emissions Unit	NSPS Limits	Applicant Proposed Limits	State Permit Limits[a]	PSD BACT Limits
Kiln (E-19)				
lb/ton dry kiln feed	0.3	0.3	0.2[a]	0.2
Opacity	20%	20%	10%	10%
Clinker Cooler (K-09)				
lb/ton dry kiln feed	0.1	0.066[a]	0.066[a]	0.066
Opacity	10%	10%	10%	10%
Other 12 Emissions Units				
gr/ACFM	-	0.02[a]	0.02[a]	0.01[b]
Opacity	10%	-	Zero %	Zero %

[a]Calculated from a lb/hr emissions limit assuming 120 T/hr wet kiln feed at 9.8 percent moisture as specified in the application.

[b]Based on manufacturer's equipment design specifications for fabric filter outlet grain loadings.

4. The coal storage pile shall be compacted, watered to maintain a minimum 8 percent moisture in the surface layer and aligned with the predominant wind direction to minimize wind erosion.

5. Abandoned haul roads and other disturbed areas shall be revegetated within 60 days of the date active service ends.

6. All cement products shall be transferred to transport trucks with a sealed pnuematic conveying system which is either a closed system or exhausted through a bag filter.

7. Exhaust gases from all materials handling systems other than those for which specific allowable emissions limits are specified in Condition 2 and any other fugitive PM emissions units shall not exceed 5 percent opacity as measured by EPA Standard Method 9.

B. Increment Analysis

Maximum allowable increases in ambient air pollutant concentrations have been set by the PSD regulations for emissions of PM and SO_2 in Class II areas. PSD review for the proposed project does not apply to SO_2 which is emitted in insignificant quantities. An analysis, however, is required to show that the PM emissions impacts from the proposed project, in conjunction with all other interacting increment consuming source impacts, do not exceed the allowable increment.

In identifying other pertinent increment consuming sources, the applicant searched FDER air permit files and the existing State air inventory and screened all major sources within 50 kilometers of the proposed plant site. Also, all minor sources located within the proposed impact area of the modification were screened (circular impact area with 3.8 km radius defined with CRSTER model results). Due to the rural surroundings of the plant location, no increment consuming sources were identified within the impact area. Also, no new or modified major sources having undergone construction or other emissions increases were found within 50 kilometers. Thus, only the proposed new and modified emissions units were considered in the increment analysis.

Air quality impacts from the 14 proposed new and modified emissions units were predicted through dispersion modeling using approved UNIMAP models; CRSTER was used for annual averages and PTMTP for refined short-term averages. Four years (1970-1974) of digitized hourly observations from Tampa Airport were used as meteorology data input to the CRSTER model. Refined short-term maximum impacts were estimated with PTMTP using the worst case 24-hour period identified by the CRSTER results. A 0.1 kilometer spacing was used in refining the maximum impacts. The results of the Class II increment analysis are listed in Table 4.

The applicant also evaluated the effect of aerodynamic downwash on short-term air impacts from the proposed emissions units. Plant boundary line concentrations were generated for each emissions unit for the directions which predictably could result in building downwash effects due to stack heights which do not meet minimum Good Engineering Practices. The Huber-Snyder "enhanced sigmas" technique was utilized along with the conservative Pasquill-Gifford, Gausian dispersion equation to estimate maximum property line concentrations. No off-property increment violations occurred from individual units. Further, by summing all maximum individual impacts which may be physically capable of interacting due to wind direction (note that this is an ultra-conservative technique) a total impact of $\leq$23.5 ug/m^3 (24-hour average) is estimated. This value also does not exceed the available increment of 37 ug/m^3.

On the basis of the downwash analysis results and the results presented in Table 4, EPA concludes that the proposed modification does not threaten Class II increments. The Class I impact analysis is discussed in a later section. It should be noted that an analysis of the impacts of fugitive PM emissions was not required consistent with EPA Region IV policy for applications submitted prior to August 7, 1980. Finally, no areas of known increment violation exist within the impact area of the proposed modification.

C. NAAQS Analysis

An air quality analysis was performed to demonstrate that emissions from the proposed modification, along with existing ambient concentrations,

Table 4
PM Increment Analysis Results*

Averaging Period	Distance from Source	Maximum Impact (ug/m^3)	Class II Increment (ug/m^3)	Percent Increment Consumed
Annual	0.1 km	3.2	19	17%
24-hour	0.25 km	21	37	57%

* Modification does not significantly increase SO_2 emissions and no SO_2 increment analysis is required.

will not exceed the NAAQS. Also, as required by the PSD regulations, the analysis must show that emissions from the modification will not significantly impact any designated non-attainment area. The analysis addresses only emissions of PM and NO_x. The modification does not result in a significant increase for other criteria pollutants for which NAAQS ceilings exist.

The maximum annual NO_x emissions impact was estimated using CRSTER and 5-year Tampa Airport meteorological data with a method similar to the method previously described in the increment analysis. The kiln is the only NO_x emitting unit in the proposed modification and it alone was modeled to determine NO_x impacts. As shown in Table 5, the NO_x modeling results show impacts which are less than the significance levels outlined in the Preamble to the June 19, 1978 PSD regulations (43FR26398). For this reason, no refined analysis is required, and it is concluded that NO_x emissions from the proposed modification do not pose a threat to the NAAQS for NO_x.

Site-specific preconstruction PM monitoring data was collected at four sites in the vicinity of the existing plant to quantify existing air quality for use in the NAAQS analysis for PM. Four months of data were collected with 3-day sampling intervals. The results were reasonably consistent with the results of two previous monitoring programs conducted during the periods of October 1974 to March 1975 and April 1976 to October 1976. EPA agrees that the monitoring data is sufficient to characterize existing air quality for PM.

The highest annual geometric mean of four stations (36.4 ug/m^3) is considered to represent the worst case background ambient concentration for the annual averaging period. Similarly, the highest individual sample concentration (120 ug/m^3) represents the worst case background for the 24-hour averaging period.

Maximum annual and 24-hour air quality impacts from the 14 proposed new and modified emissions units were estimated with dispersion models as discussed previously. The results of this modeling analysis are presented in Table 5 along with the background values. Making the conservative assumption that maximum modeled impacts and background concentrations occur simultaneously at the same location, the worst case projected ambient

Table 5
NAAQS Analysis Results

Pollutant	Averaging Time	Significance Value (ug/m^3)	Maximum Impact from Proposed Units (ug/m^3)	Existing Air Quality (ug/m^3)	Total Projected Air Quality (ug/m^3)	$NAAQS_3$ (ug/m^3)
NO_x	Annual	1	0.36[a] (at 5km)	a	a	100
PM	Annual	1	3.2 (at 0.1km)	36.4[b]	39.6	60
	24-hour	5	21 (at 0.25km)	120[c]	141	150
PM impact on Tampa non-attainment area (65 kilometers to the south)	Annual	1	0.01[a]			
	24-hour	5	0.3[a]			

[a]This value is not significant (i.e. <1 ug/m^3) and refined analysis is not required.

[b]Maximum annual geometric mean of four site-specific monitoring stations.

[c]Maximum 3-hour concentration of four site-specific monitoring stations.

impact is estimated. A comparison of these values with the NAAQS (see Table 5) shows the proposed modification to pose no threat to the standards.

The analysis also estimated the maximum impact from the proposed modification on the PM non-attainment area located 65 kilometers to the south. The area of significant PM impact for the proposed units is limited to a circle with a 3.8 kilometer radius. Projected maximum impacts at the non-attainment area are 0.01 ug/m^3 annual geometric mean and 0.3 ug/m^3 24-hour average. These impacts do not exceed the significance criteria (43FR26398), and the proposed modification is determined not to pose a threat to the Tampa PM non-attainment area.

D. Class I Area Analysis

The plant site for the proposed modification is located at a distance of 12 kilometers to the east of the Chassahowitzka Class I area. The air quality impact of the proposed construction was estimated in the previously discussed dispersion modeling analysis. In addition, all sources permitted since January 6, 1975 within 100 kilometers of the Class I area were screened to identify increment consuming sources which, by virtue of their location, could interact with the proposed modification in impacting the Class I area. Consideration was given only to those sources located in a sector area east of both the Class I area and the existing plant site and to those sources in the direct vicinity which could interact due to lateral plume dispersion.

The screening identified only minor increment consuming sources (i.e. <100 tons/year) located outside of the impact area for the proposed modification. No other increment consuming sources were found within the impact area, and no major source construction since January 6, 1975 was identified within the 100 kilometer sector. Therefore, it was concluded that no other increment consuming sources exist which are capable of interaction with the proposed modification in impacting the Class I area.

The results of the Class I impact analysis are presented in Table 6. The impacts are less than the significance levels applicable to Class II

Table 6
Class I Area Impact Analysis Results

	PM Annual (ug/m^3)	PM 24-hour (ug/m^3)	NO_x Annual
Proposed Modification Impacts	0.11	1.5	0.22
Interacting Increment Consuming Source Impacts	0	0	a
Total Impact from the Modification	0.11	1.5	0.22
Class I Increments	5	10	a
Percent of Increment Consumed	2.2%	15%	a

[a]No increment has been established for NO_x.

areas (1 ug/m^3 annual average and 5 ug/m^3 24-hour average); however, this criteria, as discussed in the Preamble to the 1978 PSD regulations (43FR26398), is not applicable to Class I areas. Further, the 24-hour impact exceeds the significance criteria triggering PSD review for sources located within 10 kilometers of a Class I area (1 ug/m^3 24-hour average). Most significantly, the proposed modification consumes a maximum of 15 percent of the available increment (24-hour average) in the Chassahowitzka Class I area. The results of the Class I area impact analysis have been forwarded to the Federal Land Manager responsible for managing the Chassahowitzka Refuge*. Comments received regarding the significance of the estimated Class I area impacts will be considered in making a final determination regarding permitting for the proposed modification.

E. Growth Analysis

The applicant estimates the proposed modification will increase plant employment by 250 temporary workers during construction and 10 permanent employees. Consumption of cement products is expected to be regional and should not significantly increase local growth. Increased power consumption (12 megawatts) will be supplied by existing capacity at Florida Power's Crystal River plant.

Increased truck traffic to the cement plant hauling products, etc. will generate the following quantities of pollutants.

Year	CO(t/y)	VOC(t/y)	NO_x(t/y)
1980	101	19.5	176
1982	95	18	176
1985	91	14	163
1990	89	11	76

Increased coal consumption will necessitate a larger number of cars on each delivery train. The emissions associated with the increased load are considered to be insignificant.

*Edward Collinsworth, Refuge Manager, National Wildlife Refuge, Route 2, Box 44, Homosassa, Florida 32646.

F. Soils, Vegetation and Visibility Analysis

Based on the results of the air quality impacts analysis and a general survey of the soils and vegetation indicative of the plant vicinity, no significant adverse soils, vegetation or visibility impacts are anticipated to result from the proposed modification. Conservative modeling results, discussed previously, show that the project does not cause air impacts in excess of the NAAQS developed to protect public health and welfare. Moreover, the modification consumes less than 15 percent and 57 percent of the Class I and Class II increments, respectively. On this basis, no significant adverse soils or vegetation impacts are anticipated.

Regional visibility in this subtropical environment is limited by naturally occurring high humidity. PM emissions from the modification will consist primarily of submicron size particles. Although particles in this size range possess active light scatters properties, the total emissions increase amounts to less than 179 tons per year. This amount is not anticipated to cause significant adverse visibility effects. Adverse plume visibility effects also will be limited by the 10 percent maximum opacity standard.

V. Conclusions

EPA Region IV proposes a final determination of approval with conditions for the construction of the kiln, clinker cooler and the associated production units described in the Florida Mining and Materials Corp. application received complete by EPA on August 2, 1980 (Materials dated May 12, July 17, July 30, and October 9, 1980). The conditions set forth in this permit are as follows:

1. The modification shall be constructed in accordance with the specifications, capabilities and descriptions contained in the application except as otherwise required by the permit conditions. This specifically includes a maximum design kiln feed rate of 120 tons per hour (wet basis), a clinker production rate of 71 tons per hour (dry basis), and a kiln fuel input rate of 213.6 million BTUs per hour of coal (12,000 Btu/lb heating value) with sulfur content not to exceed 1 percent by weight. Coals of lower heating values than 12,000 BTUs per pound shall be fired only

if the sulfur content to heat value ratio of the coal does not exceed 0.83 pounds of sulfur per million BTUs of heat input. In no instance shall the quantity of coal fired in the kiln exceed 10.5 tons per hour.

2. The maximum emissions rate for each emissions unit shall not exceed the allowable limits specified in Table 7.

3. Compliance with each allowable emissions limit shall be demonstrated with performance tests conducted with the provisions of 40 CFR 60.8 and the attached General Conditions. EPA standard reference methods shall be utilized for all performance tests in accordance with applicable sampling provisions as follows:

Pollutant	40 CFR 60 Appendix A Reference Method	Applicable Provisions
PM	Method 5	40 CFR 60.64
SO_2	Method 6	40 CFR 60.46
NO_x	Method 7	40 CFR 60.46
Opacity	Method 9	--
CO	Method 10	--

Compliance with the VOC allowable emissions rate will be assumed provided the CO allowable emissions rate is achieved; specific VOC compliance testing is not required. Particulate matter performance testing for demonstrating compliance with the mass emissions limits for the clinker silo (L07, L09, M10), the kiln feed (H-13), the blending silos (G-11, F-17), the finish mill (N-24 only), the cement/masonry silos (P-05, P-07, Q-17) and the cement plant raw materials handling (C-11A) emissions units will not be required providing compliance with opacity limits are demonstrated and maintained. Should compliance with opacity limits not be maintained, performance testing as discussed previously shall be conducted in accordance with the requirements of this condition.

4. The kiln feed rate and clinker production rates shall be monitored and recorded daily in accordance with 40 CFR 60.63. Also, the coal feed rate to the kiln and the average coal sulfur content and heating value (BTU/lb) of each coal shipment will be determined

and recorded. If coal of sulfur content exceeding 1.0 percent by weight is fired in the kiln (due to variability in the sulfur content of coal within a shipment) samples will be taken of coal entering the kiln at a minimum frequency of once per hour and analyzed for sulfur content. The average sulfur content of samples taken within each 3-hour period shall not exceed 1.0 percent by weight.

5. Actual emissions of NO_x will be minimized through the use of low excess air firing. A continuous kiln exhaust gas oxygen monitor/ recorder will be installed, calibrated and operated in accordance with the attached general provision, "Use of a Flue Gas Oxygen Meter as BACT for Combustion Controls."

6. The applicant shall comply with the following work practices to minimize fugitive PM emissions:

   a. All permanant haul roads shall be paved.

   b. Temporary haul roads shall be watered or treated with chemical dust suppressants at regular intervals.

   c. Dry raw materials (moisture content $\leq$ 14%) shall be stored in silos or enclosed structures.

   d. The coal storage pile shall be compacted, turned and/or watered as necessary to maintain a minimum 8 percent moisture content in the surface layer and aligned with the predominant wind direction to minimize wind erosion.

   e. Abandoned haul roads and other disturbed areas shall be revegetated within 60 days of the date active service ends.

   f. All cement products shall be transferred to transport trucks with a sealed pnuematic conveying system which is either a closed system or exhausted through a bag filter.

Table 7
Allowable Emissions Limits
(PSD-FL-063)

Emissions Unit	Allowable Emissions Rate (pounds per hour)					
	PM	NO_x	SO_2	CO	VOC	Opacity
Clinker Silo L-07, M-09, M-10	1.72					0%
Clinker Cooler (K-09)	7.1 (0.066)[a]					10%
Kiln (E-19)	21.6 (0.2)[a]	195.3 (0.81)[b]	3	8.9	2.7	10%
Kiln Feed (H-13)	0.51					0%
Blending Silo						
(G-11)	1.97					0%
(F-17)	0.51					0%
Finish Mill						
(N-23)	3.94					0%
(N-24)	0.73					0%
Cement/Masonry Silos						
(P-05)	0.99					0%
(P-07)	0.47					0%
(Q-17)	0.47					0%
Cement Plant Raw Materials Handling (C-11A)	0.86					0%

[a]Allowable emissions limit in pounds per ton of kiln feed materials (dry basis).

[b]Allowable emissions limit in pounds per million Btus of kiln heat input.

g. Exhaust gases from all materials handling systems other than those for which specific allowable emissions limits are specified in Condition 2 and any other fugitive PM emissions units shall not exceed 5 percent opacity as measured by EPA Standard Method 9.

7. The applicant shall comply with the provisions and requirements of the attached General Conditions.

USE OF FLUE GAS OXYGEN METER AS BACT FOR COMBUSTION CONTROLS

Within the time limits specified in General Condition 3 of this permit, the permittee shall determine the emissions of nitrogen oxides and carbon monoxide from the permitted combustion device in accordance with test methods and procedures set out in 40 CFR Part 60, Appendix A, Methods 7 and 10, respectively. These emission determinations shall be made at:

1) Maximum design capacity; and

2) Normal operational load.

The permittee shall install a continuous oxygen monitor in the flue of the permitted combustion device which meets the requirements of 40 CFR Part 60, Appendix B, Performance Specification 3. Results of emission determinations shall be correlated to the flue gas oxygen content to define:

1) The point at which Nitrogen Oxides (NO_x) emissions (lb/MMBtu) equals the allowable NO_x emission rate contained in the permit.
2) The point at which carbon monoxide (CO) emissions exceed the allowable CO emission rate contained in the permit.

The flue gas oxygen content shall be maintained between these points and alarms shall be set to sound when flue gas oxygen levels exceed either side of this range. Any operation outside of this range will constitute noncompliance with this specific condition, shall be recorded in accordance with General Condition 4 of this permit, and will be reported quarterly along with excess emissions in accordance with 40 CFR 60.7 (c).

Should any combustion equipment modifications be made such as different type burners, combustion air relocation, fuel conversion, tube removal or addition, etc., emissions correlations as described above shall be conducted within 90 days of attaining full operation after such modification. Results of all emission determinations shall be sent to the permitting authority within 90 days after completion of the tests.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

   (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

   Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increased emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency and/or representatives of the Environmental Protection Agency, upon the the presentation of credentials:

   (a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

   (b) to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

   (c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit;

   (d) to sample at reasonable times any emission of pollutants;

   and

   (e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted by this permit to the permitting agency shall be mailed to the:

   Chief, Air Facilities Branch
   Air and Hazardous Materials Division
   U.S. Environmental Protection Agency
   Region IV
   345 Courtland Street
   Atlanta, Georgia 30308

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit shall constitute a violation of the terms and conditions of this permit.

RESPONSE TO COMMENT
FLORIDA MINING AND MATERIALS CORP.
(PSD-FL-063)

One comment was received in response to the Public Notice (published in the Sun Journal on December 20, 1980) and the opportunity for public comment on the PSD application submitted by the Florida Mining and Materials Corp. to construct a second Portland cement plant at their existing plant near Ringgold, Florida. A summary of each substantive comment (see comment letter attached) and EPA Region IV's response are as follows:

Comment 1: The commenter indicated the permit conditions limiting coal fired to a maximum of 8.9 tons per hour and a maximum percent sulfur of 1.0 percent were too restrictive in that, depending on heat content, the firing rate can range between 7.5 and 10.5 tons per hour and that sulfur content of coal within average 1.0 percent sulfur content can range for samples taken within a train load between 0.7 and 1.3 percent.

Response 1: The allowable emissions rate for SO_2 proposed in the application is based on performance tests and a mass balance performed on a similar kiln firing coal analyzed to contain 0.9 percent sulfur coal. For this reason, EPA retains the condition that the sulfur content of the coal shall not exceed 1.0 percent. However, recognizing that the sulfur content of individual coal samples from a particular seam varies to a certain extent, the conditions of approval have been modified to allow hourly samples to be taken of coal entering the kiln with the restriction that no 3-hour average exceed the maximum 1.0 percent sulfur content. The condition limiting the quantity of coal fired in the kiln (8.9 tons per hour) is a design specification listed in the application which determines the maximum heat input and thus the capacity of the kiln. EPA does not object to the firing of lower heat content coal in greater amounts within the design considerations of the pollutant control devices, providing compliance with specified capacity and allowable emissions limits are maintained. For this reason, the conditions of approval were modified to include a maximum heat input to the kiln to be demonstrated by coal

PRESENTATION

TO

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TALLAHASSEE, FLORIDA

9 SEPTEMBER 1986

ON BEHALF OF

FLORIDA MINING AND MATERIALS CORPORATION

BROOKSVILLE, FLORIDA

CROSS/TESSITORE & ASSOCIATES, P.A.
4759 SOUTH CONWAY ROAD
ORLANDO, FLORIDA 32812

(305) 851-1484

FLORIDA MINING AND MATERIALS, BROOKSVILLE, FLORIDA

HISTORY:

KILN 2 AC27-30450 JUNE 9, 1980

EMISISON LIMITS: NO_X = 195.3 LBS/HOUR

SO_2 = 3.0 LBS/HOUR

@120 TONS/HOUR KILN INPUT

TESTING RESULTS

YEAR	RESULTS (LB/HOUR) SO_2	NO_X
1983	2.7 TO 12.0	
1984	4.63	141
1985	9.53	128
1986 (APRIL)	2.40	403
1986 (MAY)	N/A	244

PROBLEM:

(1) EXCESSIVE NO_X EMISSIONS

CAUSE: FLY ASH FROM TAMPA ELECTRIC
BIG BEND 4
NH_3 (AMMONIA) ≅ 0.357%

VERIFICATION: FLUSH OUT ALL FLY ASH IN KILN 2 SYSTEM AND TEST USING FLY ASH WITHOUT NH_3.

RESULTS: TESTING AUGUST 1986

SO_2	NO_X
<2.77 LBS/HOUR	114 LBS/HOUR

CONCLUSIONS: TESTING AND MASS BALANCE SHOW EXCESS NH_3 IN FLY ASH CAN RESULT IN NO_X EXCEEDANCE OF PERMIT CONDITIONS.

PROBLEM:

(2) EXCESSIVE SO_2 EMISSIONS

CAUSE: VARIATION IN COAL % SULFUR FROM 0.7% TO 1.5% AND COAL MOISTURE CONTENT CAN CAUSE SO_2 EMISSION TO VARY BETWEEN <2.7* LBS/HOUR TO 12.0 LBS/HOUR.

VERIFICATION: EXTENSIVE STACK TESTING IN 1983.

CONCLUSION: EVEN WITH COAL SUPPLY GUARANTEED AT 1% S, VARIATION IN CARLOAD % S MAY CAUSE EXCEEDANCE IN SO_2 EMISSION LIMITS OF 3 LBS/HOUR.

*ACCURACY OF MEASUREMENT TECHNIQUE (± 2.7 LBS/HOUR)

PERSPECTIVE

PERMIT LIMITS	COMMENTS
SO_2 = 3.0 LBS/HOUR @ 120 TONS/HOUR	(A) EPA METHOD 6 ACCURACY = ± 2.7 LBS/HOUR
	(B) FDER BACT FLORIDA CRUSHED STONE (1984) SO_2 = 50 LBS/HOUR @ 120 T/HOUR
NO_X = 195.3 LBS/HOUR @ 120 TONS/HOUR	(C) FDER BACT FLORIDA CRUSHED STONE (1984) NO_X = 380 LBS/HOUR @ 120 T/HOUR

SHORT TERM NO_X SOLUTION

* USE FLY ASH FROM BIG BEND 4 MOSTLY FOR CONCRETE ADDITIVE. THIS FLY ASH BECOMES AN ADDITION TO FINAL PRODUCT.

* LIMIT AMOUNT OF BIG BEND 4 FLY ASH WHICH WILL BE USED IN KILN 2.

* SIGNIFICANT AMOUNT OF RESISTANCE FROM USERS DUE TO HEAVY NH_3 SMELL. SOME USERS HAVE REPORTED EYE IRRITATION AND RESPIRATORY PROBLEMS DUE TO NH_3. FDOT HAS REJECTED NH_3 FLY ASH IN CONCRETE FOR STATE PROJECTS.

NO_X LONG TERM PROBLEM:

* TAMPA ELECTRIC, BIG BEND 4 FLY ASH
* FM&M HAS 17 YEAR CONTRACTUAL OBLIGATION TO PURCHASE BIG BEND 4 FLY ASH
* FLY ASH NH_3 ≅ 0.357% FOR FUTURE
* FLY ASH IS PERMANENT SOLUTION TO H_2O_4 PLUME PROBLEM. ALSO CONTROLS CORROSION IN ELECTROSTATIC PRECIPITATOR

$$NH_3 + SO_3^- \rightarrow [NH_4]_2SO_4$$

* CONCRETE PLANTS CANNOT USE NH_3 FLY ASH/CONCRETE BECAUSE OF FDOT RESPONSE AND GENERAL ODOR AND NUISANCE PROBLEM USING CONCRETE WITH HEAVY AMMONIA ODOR.

PROPOSED SOLUTION

* MINIMIZE USE OF NH_3 FLY ASH IN KILN 2

* REQUEST FDER PERMIT MODIFICATION AS FOLLOWS:

  NO_X = 380 LBS/HOUR (BACT)

  SO_2 = 20 LBS/HOUR (BACT = 50 LBS/HOUR)

*REQUEST WITH DEMONSTRATION OF INSIGNIFICANT PSD AND AIR QUALITY IMPACT OF ABOVE EMISSION LIMITS.

I. INTRODUCTION

INTRODUCTION

In November of 1979, Environmental Resource Consultants, Inc. (ERC), at the request of Florida Mining & Materials Corporation (FMMC), as a part of the Prevention of Significant Deterioration (PSD) permitting requirements, undertook a testing program to determine sulfur dioxide emissions at the existing portland cement plant in Brooksville, Florida.

Tests for SO_2 performed during November of 1979 and February of 1980, resulted in no detectable amounts of SO_2 either from the kiln baghouse exhausts or the inlet to the kiln baghouse. This occurance is realistic due to the kiln-preheater process used in the existing plant and to be duplicated by the expanded facility. In brief, SO_2 generated by the burning of coal at one end of the process is passed four times through a lime mixture where reactions occur to chemically bind the SO_2 and thus allow virtually no emissions of SO_2.

A meeting with the U.S. Environmental Protection Agency (EPA) in February resulted in further testing for SO_2 using the EPA ambient air method. This testing detected, in one instance, a very small but measureable amount of SO_2 (Appendix D). Also, as a result of the EPA meeting and to be offered as support to the empirical tests, ERC prepared a scheme of the major chemical reactions occurring through the kiln-preheater system and an

approximate mass balance of the system for sulfur. Within the limits of accuracy of the criteria involved, the mass balance shows the sulfur to exit the process with the product in solid form and confirms the extremely low amount of SO_2 directly measured.

Dr. Paul Urone of the University of Florida, advised in the selection of the SO_2 test methods, evaluation of the data, preparation of the process chemical reactions and mass balance. Presentation of the above data was made in March to EPA and is herewith presented in report form to EPA for their review and concurrence with the determination of no requirement for SO_2 PSD for the proposed expanded facility.

In mid December, upon request of the Florida Department of Environmental Regulation (DER) and EPA, FMMC reestablished a four month Total Suspended Particulate monitoring program at the same locations as were monitored in 1975 and 1976. These sites are the same sites as were selected and monitored prior to and subsequent to the construction of the existing plant. Results of two months of monitoring show no significant change in TSP from the earlier years monitoring. As well, the amount of TSP measured in these two months is within the 30 to 40 ug/m^3

background to be used in remote areas where no monitoring data exists.

As a result of the EPA meeting in March and with the subsequent concurrence of DER, FMMC is submitting this PSD criteria review for particulate prior to the completion of monitoring.

Actual plant emissions of particulate have been used. These are based on the most recent tests performed on the existing plant in November, 1979, as required under the DER permit for kiln and clinker cooler systems. Tests were conducted under criteria established for New Source Performance Standards testing for the existing plant. The actual test reports (Appendix B & C) and calculations of PSD criteria are presented for review and concurrence with no requirement for particulate PSD for the proposed expanded plant.

VI. MASS BALANCE FOR SULFUR

MASS BALANCE FOR SULFUR

Sulfur enters the process in two ways:

1. As sulfate and sulfites contained in the flyash which is used as one of the raw material components in the production of kiln feed. Table 1 shows the chemical composition of all raw materials and the proportions in which they are used to form raw mix or kiln feed. The sulfur content is 0.044% in the wet raw feed (0.045% calculated for dry) and 0.048% after removal of this moisture. The drying takes place in the air swept raw mill and the moisture leaves the system with the exit gas through the kiln-mill baghouse.

2. As organic and inorganic sulfur in the coal. The sulfur content of the coal presently in use is 0.92%.

The coal requirements for the conversion of 100 tons of kiln feed are 7.4 tons of dry coal. The ash content of the coal is 12%. The quantity of clinker resulting from this process is 66.4 tons. The balance (loss) is principally CO_2 from the decarbonation of calcium carbonate and other volatile materials including 90% of the combustibles contained in the coal.

TABLE I

RAW MATERIAL COMPOSITION

Material	SiO_2	Al_2O_3	Fe_2O_3	CaO	K_2O	SO_3*	Other	LOI	H_2O
Limestone	.8	.5	.2	48.1	0	0	.6	37.8	12.0
Clay	75.0	9.3	2.8	2.8	0	0	0	2.7	7.4
Fly Ash	45.2	20.2	16.7	7.1	3.6	1.31	1.2	4.7	0
Staurolite + Millscale Blend	30.1	30.3	29.7	0	.1	0	0	0	9.8
Coal Dry	3.8	3.1	1.8	.4	.2	2.30	.5	87.9	0

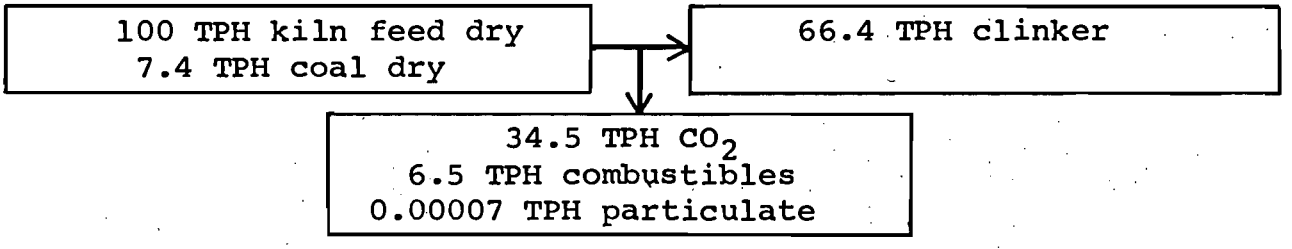
* ASTM Procedures require that sulfur in coal must be reported as sulfur and not as sulfate. The equivalent values would, therefore, be:

Fly Ash: 1.31% SO_3----- .52% S
Coal: 2.30% SO_3----- .92% S

MASS BALANCE FOR SULFUR - CONTINUED

A block diagram demonstrates the quantity balance:

SOLIDS AND GAS FLOW



The sulfur content of the process is accounted for in the following manner:

Material	Percent Sulfur
raw materials (dry)	0.045
coal (dry)	0.92
particulate in exit gas	0.104
clinker	0.168

Inserting the measured sulfur content into the material balance diagram given above, the sulfur is accounted for as follows:

Input:

	TPH	% S	lbs/hr. S
raw material	100 (dry)	0.045	90
coal	7.4 (dry)	0.92	136
		TOTAL	226

Output:

clinker	66.4	0.168	223
particulate	0.00007	0.104	0.0001
		TOTAL	223
SO_2 (exit gas) BY DIFFERENCE			3

MASS BALANCE FOR SULFUR - CONTINUED

The materials balance leaves 3 lbs/hour unaccounted for. This occurrence is likely to be caused by basic inaccuracies in the methods of measurements involved. The measurement accuracies are estimated to be:

kiln feed rate ± 5%

coal feed rate ± 5%

Sampling and analysis variations are likely to add additional inaccuracies, although no estimate can be given.

As an example, if the kiln feed rate was at its upper limit and the coal at its lower limit, the sulfur balance would be as follows:

Input:

	TPH	% S	lbs/hr. S
kiln feed	105	0.045	94.5
coal	7	0.92	128.8
	TOTAL		223.3

Output:

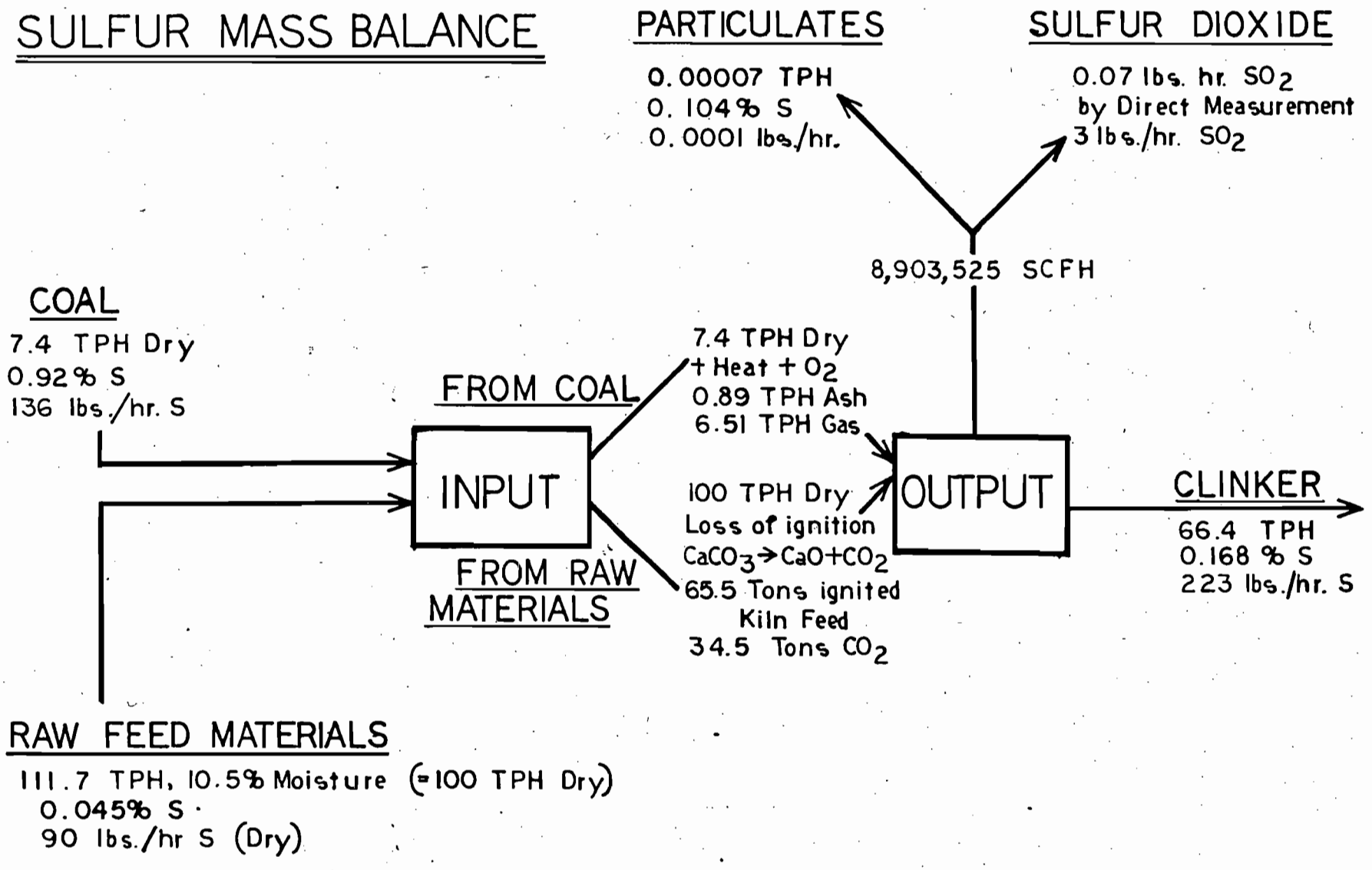
clinker	69.7	0.168	234.2
	SO_2 EXIT GAS BY DIFFERENCE		(10.9)

Considering the modest inaccuracies inherent in a mass balance approach, the results of a mass balance analysis do support the actual measurement of SO_2 found.

SAMPLING PROCEDURES USED

The kiln feed sulfur content has been measured by combining each constituent in the proper proportions used in the raw mix. Samples were taken at the individual weigh hoppers prior to entrance to the raw mill. As the actual kiln feed going to the preheater contains circulating filter cake from the kiln baghouse and has been exposed to SO_2 in the raw mill, its analysis has not been used in the material balance. The raw materials prior to the raw mill are easy to sample and are representative. Copies of all test procedures used to measure sulfur in the solid materials as well as stack test procedures for measuring SO_2 gas are included in Appendix A.

SULFUR MASS BALANCE



NOTES

METHODS OF ANALYSIS - APPENDIX A

Coal sulfur - analyzed by ASTM Method D3177, Method B.

Raw Feed Materials - analyzed from mixed sample, Standard Methods Of Chemical Analysis, Vol. One, Precipitation Of Barium Sulfate From Hot Solutions, page 1008.

Clinker - sulfur analyzed by ASTM Method C114, Referee Method.

Particulate - emission rate based in actual EPA reference Method 5, test on November 26, 27 and 28, 1979.

Sulfur analyzed by ASTM Method C114, Referee Method.

Sulfur Dioxide - direct measurement by EPA Reference Method 40CFR50.11, ambient air Method.

GENERAL COMMENTS

All solid material sulfur analyses verified by X-ray absorption method.

All solid samples collected at 45 minute intervals and composited for analysis on February 15, 1980 from 10:00 A.M. to 1:15 P.M.

SAMPLING LOCATIONS

Coal	Transfer point between coal mill and kiln firing point.

SAMPLING LOCATIONS - CONTINUED

Raw Feed Materials	Each weigh hopper.
Clinker	Bucket elevators before entering storage silo.
Particulate	Kiln baghouse filter cake.
Sulfur Dioxide	Kiln baghouse out No. 1004.

Sept. 9, 1986 meeting @ BAQM @ 5:00PM

Bruce Mitchell
Barry Andrews
Bill Thomas
} DER's BAQM 488-1344

Joe Tessitore Cross/Tessitore (305) 851-1484

PSD review on NO_x vs Class I Area (✓ w/ Denver: Nat. Park Service)
"Chassa."

✓ on Anheuser-Busch Co. (Willard Hanks)

✓ @ TECO when they began using "NH_3 + fly ash"

120 x 10^6 Btu/hr HI combustion source @ 50 TPH coal

120 TPH kiln feed

CROSS/TESSITORE AND ASSOCIATES
Environmental and Civil Engineers
4759 South Conway Road, Suite D
Orlando, Florida 32812
(305) 851-1484

JOB FMM Kiln 2 Ash/NH_3 Balance
SHEET NO. 1 OF 1
CALCULATED BY J.L. Tessitore DATE 9-8-86
CHECKED BY _____ DATE _____
SCALE _____

NH_3 / NO_x Mass Balance

Ash Content ≈ 0.357 % NH_3

FMM Kiln 2 Ash Input = A x B x C

$$= (120)\frac{Ton}{hr} \times (0.12) \times (0.00357) \times (2000)\frac{lb}{ton}$$

A = Kiln Feed Rate

B = ash concentration of feed

C = NH_3 concentration of ash

$$\Rightarrow \quad NH_3 \text{ (Input)} = 102.8 \text{ lbs/hr}$$

$$N \text{ (Input)} = \left(\frac{14}{17}\right)(102.8) = 84.7 \text{ lb/hr}$$

Assuming all N is utilized as NO_2

$$\text{Rate of } NO_2 \text{ Formation} = \left(\frac{84.7}{14}\right) 46 = 278.3 \text{ lb/hr}$$

$$\text{Total } NO_2 = (NO_2)_{\text{combustion}} + (NO_2)_{NH_3}$$

$$= 128 \text{ lb/hr} + 278 \text{ lb/hr}$$

$$= 406 \text{ lb/hr} \quad \text{(Predicted Maximum)}$$