

PSD-FL-050  
Final Determination

PSD - FL - 0050  
LONESTAR, CEMENT  
HIALEAH

1980

I. Applicant

Lonestar Florida/Pennsuco, Inc.  
Cement and Aggregate Division  
P. O. Box 122035  
Palm Village Station  
Hialeah, Florida 33012

II. Location

The proposed modification is located at the applicant's existing Portland Cement Plant at 11000 N.W. 121 Street, Hialeah (Dade County), Florida. The UTM coordinates are: Zone 17-562.75 km East and 2861.65 km North.

III. Project Description

The applicant proposes to convert fuel used in kilns #1, #2, and #3 from the permitted gas or oil firing to coal firing. Each kiln has one emission point. The coal to be fired will have a maximum sulfur content of 2 percent.

Further, the applicant proposes to construct a coal handling system with four (4) emission points. Each of these points are to be controlled by baghouse dust collectors.

A summary of new and modified facilities is shown in Table 1.

IV. Source Impact Analysis

Table 2 summarizes the total potential to emit (uncontrolled) from the proposed modification. The proposed modification has the potential to emit greater than 100 tons per year of particulates (TSP) and sulfur dioxide (SO<sub>2</sub>). Therefore, in accordance with the provisions of Title 40, Code of Federal Regulations, Part 52.21 (40 CFR 52.21) promulgated June 19, 1978, a Prevention of Significant Deterioration (PSD) review is required for each of these pollutants.

TABLE 1  
SUMMARY OF PROJECT

Facilities	Operating Capacity, Tons/Hour Input	Fuel	Process Weight Tons/Hour	Product Cement Clinker Tons/Hour
New Coal Handling				
Mill A	23	N/A	N/A	N/A
Mill B	15	N/A	N/A	N/A
Feedbin & Elevator	150 <sup>a</sup>	N/A	N/A	N/A
Hopper & Weight Feeder	150 <sup>a</sup>	N/A	N/A	N/A
Modified (After)	Feed	Coal (T/hr)		
#1 Kiln	40.5	7.5	48 <sup>c</sup>	25
#2 Kiln	40.5	7.5	48 <sup>c</sup>	25
#3 Kiln	141.75 <sup>b</sup>	23		87.5
		<u>38</u>		<u>137.5</u>
Modified (Before)		Gas (MMCF/hr)		
#1 Kiln	40.5	.18	40.5 <sup>c</sup>	25
#2 Kiln	40.5	.18	40.5 <sup>c</sup>	25
#3 Kiln	141.75 <sup>b</sup>	.54		87.5
		<u>.90</u>		<u>137.5</u>

<sup>a</sup> Intermittent capacity since average capacity equals the sum of the two mills (38 tons/hr).

<sup>b</sup> Basis of particulate emission standard - standards of Performance for New Stationary Sources (NSPS); 40 CFR 60 Subpart F.

<sup>c</sup> Basis of particulate emission standard - Florida State Implementation Plan (SIP); 17-2.05 (2) FAC.

The change in potential nitrogen oxide emissions due to the modification are not quantified. Without data to the contrary, the applicant has assumed the modification is subject to PSD review for nitrogen oxides. All other regulated pollutants are not subject to PSD review because potential emissions increase by less than 100 tons per year.

Full PSD review consists of:

1. Control Technology Review
2. Air Quality Review
  - a. Impact upon Ambient Air Quality
  - b. Impact upon Increment
  - c. Impact upon Soils, Visibility and Vegetation
  - d. Impact upon Class I Areas
3. Growth Analysis

Table 3 summarizes allowable emissions and the various categories of changes that determine the level of PSD review required under the regulations. Each type of facility and each pollutant is classified.

Line E of Table 3 shows that TSP has increased allowable emissions of less than 50 tons per year. With no limits placed upon operating time, 50 tons per year is more restrictive than the additional 100 pounds per hour or 1000 pounds per day criteria. Therefore, consistent with the provisions of 40 CFR 52.21(j) and (k), PSD review for particulates is limited to:

1. Ensuring compliance with State Implementation Plans (SIP) and Federal Regulations (40 CFR Parts 60 and 61), and
2. Impacts upon Class I areas and upon areas of known increment violation.

Table 3 shows that SO<sub>2</sub> increased allowable emissions of 562 tons per year requires full PSD review.

TABLE 2  
APPLICABILITY SUMMARY

<u>Facilities</u>	<u>Potential to Emit (Uncontrolled), Tons/Year</u>				
	<u>TSP</u>	<u>SO<sub>2</sub></u>	<u>NO<sub>x</sub></u>	<u>CO</u>	<u>HC</u>
A. New	25100 <sup>a</sup>	0	0	0	0
B. Modified (After)	137313 <sup>b</sup>	612 <sup>c</sup>	(d)	Negl.	Negl.
C. Modified (Before)	137313 <sup>b</sup>	50 <sup>e</sup>	(d)	Negl.	Negl.
Net Increase from Modification <sup>f</sup>	25100	562	(d)	Negl.	Negl.
Accumulated from Previous Modification <sup>g</sup>	N/A	97	N/A	6.6	38
Total Increase	25100	659	(d)	6.6	38

<sup>a</sup> Calculated from vender guaranteed controlled emissions (5.7 lb/hr) and assumed 99.9% efficiency.

<sup>b</sup> Based on AP-42 Table 8.6-1 uncontrolled emissions 228 pounds of particulate per ton on cement ash in coal is absorbed in the cement product. Substantially less kiln feed ash is required for coal burning.

<sup>c</sup> Potential emissions is based on the proposed allowable emission rate which is based on absorption of SO<sub>2</sub> in the clinker of 91.3 percent in kilns #1 and #2 and 98.7 percent in kiln #3.

<sup>d</sup> The change in nitrogen oxides emissions are not quantified. Without data to the contrary, the applicant assumed PSD review applies. (See discussion in Section IV, A.4).

<sup>e</sup> Based upon test results on existing facilities.

<sup>f</sup> Source is subject to PSD review for specific pollutant if potential increased by 100 tons/year or more.

<sup>g</sup> PSD-FL-028 was not major for SO<sub>2</sub>, HC, and CO, thus potential increases are accumulated.

TABLE 3  
 ALLOWABLE EMISSIONS, TONS PER YEAR  
 (No Limits Upon Hours Per Year)

Facilities	TSP	SO <sub>2</sub>	NO <sub>x</sub>
A. New or Reconstructed	25.4		
B. Modified (After)	468.2	612	<2624 <sup>a</sup>
C. Modified (Before)	<u>460.3</u>	<u>50</u>	<u>2624</u>
D. Increases from Modified	7.9	562	NONE
E. Increase New and Modified (A&D)	33.3	562	NONE

<sup>a</sup> The applicant will determine minimum NO<sub>x</sub> emission rates with performance tests following start-up. The proposed allowable represent the maximum allowable rate.

It should be noted that the application was reviewed under the Partial Stay of PSD Regulations, published February 5, 1980 and the proposed revisions to the PSD regulations referenced in that partial stay. It was determined that the exemption outlined in the partial stay does not apply and that the proposed modification is subject to review under existing PSD regulations (promulgated 6/19/78) because:

1. The existing source is a major source of particulates as defined in the September 5, 1979 proposed revised regulations (greater than 100 tons of allowable emissions), and the proposed modification would significantly (greater than 10 tons per year) increase allowable emissions of particulates. And further,
2. The proposed modification alone is making the source a major modification because sulfur dioxide emissions increase by greater than 100 tons per year, irrespective of the sulfur dioxide emissions from the existing source.

A. Control Technology Review

~~Although these facilities are exempt from a Best Available Control Technology (BACT) review for the specific pollutants (TSP) and  $\text{NO}_x$ , they are required to meet all applicable emission limits and standards of performance under the Florida State Implementation Plan (SIP) and Federal Regulations (40 CFR Parts 60 and 61).~~ In addition, and as discussed later in this section, the modification is subject to BACT review for  $\text{SO}_2$ . ~~Several of the facilities proposed for construction are subject to Federal New Source Performance Standards (NSPS) and/or requirements under the Florida SIP. These requirements are referenced in Table 4 which summarizes the allowable emission limits for the proposed emission limits for the proposed new and modified facilities. Only the most stringent requirement of (1) NSPS, (2) Florida SIP, (3) Florida permit, or (4) allowable limit proposed by the applicant is listed.~~

The limitations upon emissions of nitrogen oxides from the three kilns were proposed by the applicant and are conditions of this permit to ensure the

TABLE 4  
SUMMARY OF ALLOWABLE EMISSIONS LIMITS

Facility/Pollutant	Basis for Requirement	Emissions Limits Standard	lbs/hr
<b>23 Ton Mill</b>			
TSP	Proposed by Applicant, Florida BACT	<.01 grains/ACF	≤ 3.1
Opacity	NSPS Subpart Y (40 CFR 60.252)	<20%	-
<b>15 Ton Mill</b>			
TSP	Same	≤.01 grains/ACF	≤2.1
Opacity	Same	<20%	-
<b>Feedbin &amp; Elevator</b>			
TSP	Same	<.01 grains/ACF	≤0.3
Opacity	Same	<20%	-
<b>Hopper &amp; Weight Feeder</b>			
TSP	Same	≤.01 grains/ACF	≤0.3
Opacity	Same	<20%	-
<b>#1 Kiln</b>			
TSP	Florida SIP, Operating Permit	Florida Process Weight Equation	≤32.2
SO <sub>2</sub>	Proposed by Applicant as BACT	≤2% S in Coal, 2.27 lbs/ton <sup>a</sup>	≤56.7
NO <sub>x</sub>	Proposed by Applicant	≤4.73 lbs/Ton <sup>a</sup>	<118

TABLE 4  
SUMMARY OF ALLOWABLE EMISSIONS LIMITS  
(Continued)

Facility/Pollutant	Basis for Requirement	Emissions Limits Standard	lbs/hr
#2 Kiln			
TSP	Florida Permit	Florida Process Weight Equation	≤32.2
SO <sub>2</sub>	Proposed by Applicant as BACT	≤2% S in Coal, 2.27 lbs/Ton <sup>a</sup>	≤56.7
NO <sub>x</sub>	Proposed by Applicant	<4.79 lbs/Ton <sup>a</sup>	<118
#3 Kiln			
TSP	Florida SIP & Federal NSPS Subpart F (40 CFR 60.62)	≤0.30 lb/Ton feed <sup>b</sup>	≤42.5
SO <sub>2</sub>	Proposed by Applicant as BACT	≤2% S in Coal, 0.3 lbs/Ton <sup>a</sup>	≤26.3
NO <sub>x</sub>	Proposed by Applicant	<6.77 lbs/Ton <sup>a</sup>	<592
Opacity	Federal NSPS Subpart F (40 CFR 60.62)	≤20%	-

<sup>a</sup> Pounds of pollutant per ton of clinker produced.

<sup>b</sup> Pounds of TSP per ton of feed (except fuel).



validity of the exemption from further PSD review (no net increase in emissions).

The three kilns emitting increased sulfur dioxide are reviewed for a determination of Best Available Control Technology (BACT). To achieve the limited emissions of Table 4 the following control technologies will be utilized:

1. Coal Handling System - Particulates

All potential particulate emissions points are controlled by baghouse type dust collectors. These are to control 99.9 percent of the particles above 0.5 microns. The exhaust gases will have a maximum concentration of 0.01 grains per actual cubic foot.

These have been proposed to the State of Florida to meet the SIP BACT requirements.

These facilities must not emit gases which exhibit 20 percent opacity or greater. These baghouses and properly ducted dust collection system should comply with this requirement.

2. Kilns - Particulates

The existing kilns will continue to utilize their existing electrostatic precipitators to maintain compliance with the emission standards specified in their operating permits in accordance with the Florida SIP. Number 3 kiln will continue to operate in compliance with the NSPS standards under which it has been certified with continued compliance verified by the State of Florida.

A small increase in allowable TSP emissions is due to the addition of the solid coal to the process weight. The allowable emissions are calculated according to the Florida SIP process weight rule. The actual emissions will probably not increase because the ash introduced with the coal (compared with gas as a fuel) is compensated by a decrease in fly ash in the cement feed materials.

### 3. Kilns - Sulfur Dioxide (BACT)

The three kilns are subject to a BACT review for the control of sulfur dioxide.

Sulfur dioxide potentially is derived from sulfur in the process feed materials and from sulfur in the fuel.

The majority of this potential sulfur dioxide combines with the process products (limestone). The efficiency of this absorption is a function of the size and design (mixing of gas and solids) of the kilns and also of the type of particulate control (baghouse is better than electrostatic precipitator - due to intimate contact of gas with fine particles). Since the three kilns and their particulate controls are existing these parameters will not change. The applicant presents test results using oil (2.38% sulfur) as fuel. These results show that 91.3 percent of the potential sulfur dioxide was absorbed by the products in the smaller kilns (#1 and #2), and that 98.7 percent of the potential sulfur dioxide was absorbed in the larger kiln (#3). The applicant proposes BACT be the use of low sulfur coal (maximum 2% sulfur) and a maximum of 2.27 pounds of  $SO_2$  per ton of clinker produced from kiln #1 and #2, and 0.30 pounds of  $SO_2$  per ton of clinker produced from kiln #3.

EPA concurs with the applicant that for the cases of existing kilns with existing particulate control technology these do constitute BACT. Further the applicant used these emission rates at full design operating rates in its air quality presentation.

### 4. Kilns - Nitrogen Oxides

The applicant has proposed to run tests to optimize operating conditions. The criteria to judge such optimization would be:

- a. satisfactory product,
- b. energy economy,
- c. minimum  $NO_x$  emissions, and
- d. continued negligible emissions of carbon monoxide and hydrocarbons.

The applicant further stipulates that the  $\text{NO}_x$  emissions shall be less than those from the existing gas fueled operation. These current  $\text{NO}_x$  emissions have been established by tests to be 6.77 pounds of  $\text{NO}_x$  per ton of clinker produced from Kiln #3 and 4.7 pounds per ton from Kilns #1 and #2.

The applicant has presented published<sup>1</sup> test data which reports emissions of nitrogen oxides are less using coal than when using gas or oil as a fuel for cement kilns. This report attributes this reduction to the characteristics of the flame. It has been described as a longer, "lazier" flame (with lower temperature in the center of the flame). The conclusion that reduced emissions of nitrogen oxides are experienced when cement kilns are converted from gas to coal fuel has also been reported in reference 2.

The coal to be used in this proposed modification will contain ~1.7 percent nitrogen (compared with ~0 percent for gas or <.5 percent for oil). Therefore, the potential for fuel derived  $\text{NO}_x$  is greater. The literature<sup>2</sup> confirms that less than 20 percent of the fuel nitrogen will be converted to nitrogen oxides and that the amount of conversion is a function of the same flame characteristic variables (maximum temperature, and time at high temperature) that control thermally derived  $\text{NO}_x$  (oxidation of atmospheric nitrogen). AP-42 emission factors and NSPS for large utility boilers seem to indicate the potential for increased  $\text{NO}_x$  emissions of coal firing over gas firing. Regardless of these factors that indicate nitrogen oxide emissions could increase, the EPA concurs with the applicant that operating conditions can be found which will result in reduced emissions, or at least no net increased emissions. Therefore, with testing to find allowable operating conditions required as a permit condition. No net increase in  $\text{NO}_x$  emissions will occur and no air quality impact analysis is required for  $\text{NO}_x$  consistent with paragraph (k) of 40 CFR 52.21.

TABLE 5  
AIR QUALITY IMPACT ANALYSIS

	<u>SO<sub>2</sub>, micrograms/meter<sup>3</sup></u>		
	<u>Annual</u>	<u>24-hour average<sup>a</sup></u>	<u>3-hour average<sup>a</sup></u>
NAAQS	80	365	1300
Class II increments	20	91	512
Maximum Predicted Concentration	0.63	<u>4.90</u>	18
Significance Level	1	5	25

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<sup>a</sup> Not to be exceeded more than once per year.

### B. Air Quality Review - 40 CFR 52.21 (e)

The applicant has demonstrated with the modeling results summarized in Table 5 that the impact upon the annual, 24-hour and 3-hour National Ambient Air Quality Standards for SO<sub>2</sub> and upon the annual and 24-hour Class I increment are below the significance levels as published 43 FR 26398, June 19, 1978.

The modeling was conservatively run upon the total SO<sub>2</sub> emissions from the three kilns rather than only the increase (coal less gas).

The CRSTER model was used to determine maximum predicted annual concentrations and to identify worst-case 24-hour and 3-hour meteorological conditions. The CRSTER was run using five years (1970-1974) of meteorological data. The maximum short term 24-hour and 3-hour predictions were made using the PTMTP-W model.

The lack of significant impact indicated by this modeling eliminates requirements for monitoring, detailed NAAQS and increment impact analyses, growth impacts and additional impact analyses upon visibility, soils, and vegetation.

### C. Class I Area Impact

The proposed modification is located about 30 km from the Everglades National Park. As discussed previously maximum impacts which occur in the vicinity of the plant are insignificant. On the basis that further dilution will occur over the 30 kilometers, the impact on this Class I area is considered insignificant and detailed assessment of Class I area impacts is not required.

### V. Conclusions

EPA Region IV proposes a final determination of approval for construction of the new coal handling facilities and the conversion to coal as a fuel for kilns #1, #2, and #3 by Lonestar Florida/Pennsuco, Inc. as proposed in its application dated February 11, 1980 as amended by letter dated April 25, 1980.

The conditions set forth in the permit are as follows:

1. The modifications and the facilities constructed shall be in accordance with the capacities and specifications stated in the application. Specifically included are the operating capacities listed in Table 1 for new and modified facilities.
2. Particulate emissions from each of the four new emitting points of the coal handling system shall not exceed 0.01 grains per actual cubic foot or the emission limits listed in Table 4.
3. Visible emissions from four emission points of the coal handling system shall be less than 20 percent opacity. Visible emissions from any fugitive sources associated with the coal handling system shall be less than 20 percent opacity. Opacity shall be measured by EPA standard method 9.
4. Emissions of sulfur dioxide from #1 and #2 kilns shall not exceed 56.7 pounds per hour from each kiln at the maximum operating rate of 25 tons per hour of clinker produced per kiln. At lesser operating rates the emissions of sulfur dioxide shall not exceed 2.27 pounds per ton of clinker produced.  
*Kiln 1+2 SO<sub>2</sub> std*
5. Emissions of sulfur dioxide from #3 kiln shall not exceed 26.3 pounds per hour at the maximum operating rate of 87.5 tons per hour of clinker produced. At lesser operating rates the emissions of sulfur dioxide shall not exceed 0.30 pounds per ton of clinker produced.  
*Kiln 3 SO<sub>2</sub> std*
6. The coal used to fuel kilns #1, #2 and #3 shall have a sulfur content of 2 percent or less.  
*2% S in coal*
7. Tests shall be run to optimize the operating conditions toward a minimum emissions of nitrogen oxides. The results of the test shall be analyzed and the resulting optimum operating conditions shall be described to EPA Region IV with a plan describing how continuing compliance will be maintained.

8. Emissions of nitrogen oxides from #1 and #2 kilns shall be less than 118 pounds per hour from each kiln at the maximum operating rate of 25 tons per hour of clinker produced per kiln. At lesser operating rates the emissions of nitrogen oxides shall not exceed 4.73 pounds per ton of clinker produced.
9. Emissions of nitrogen oxides from #3 kiln shall be less than 592 pounds per hour from each kiln at the maximum operating rate of 87.5 tons per hour of clinker produced. At lesser operating rates the emissions of nitrogen oxides shall not exceed 6.77 pounds per ton of clinker produced.
10. Visible emissions from #3 kiln shall be less than 20 percent opacity as measured by EPA standard method 9.
11. Compliance with all hourly emissions limits (Table 4) shall be determined by performance tests scheduled in accordance the General Conditions attached. The performance tests shall be in accordance with the provisions of reference methods in Appendix A of 40 CFR 60, except as provided under 40 CFR 60.8(b), as follows:
  - a. Method 1 for sample and velocity traverses;
  - b. Method 2 for velocity and volumetric flow rate;
  - c. Method 3 for gas analysis;
  - d. Method 5 for concentration of particulate matter and associated moisture content;
  - e. Method 6 for concentration of SO<sub>2</sub>; and
  - f. Method 7 for concentration of NO<sub>x</sub>. For Method 7, each run shall consist of at least four grab samples taken at approximately 15-minute intervals. The arithmetic mean of the samples shall constitute the run value.

- g. For Method 6, the minimum sampling time shall be 20 minutes and the minimum sampling volume 0.02 dscm (0.71 dscf) for each sample. The arithmetic mean of two samples shall constitute one run. Samples shall be taken at approximately 30-minute intervals.

A compliance test shall consist of the average of at least three (3) consecutive runs.

The processes shall operate within 10 percent of maximum capacity during sampling.

12. The source will comply with the requirements of the attached General Conditions.



## REFERENCES

1. Hilovsky, Robert J., PE; NO<sub>x</sub> Reductions in the Portland Cement Industry with Conversion to Coal-Firing, Presented at the 1977 EPA Emission Inventory/Factor Workshop, Raleigh, North Carolina. September 13-15, 1977
2. EPA-450/1-78-001, January 1978, Control Techniques for Nitrogen Oxide Emissions from Stationary Sources.

## 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 or representatives of the Environmental Protection Agency, upon 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.