Department of
Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

June 25, 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Louis Molina
10731 Southwest 117th Place
Miami, Florida 33196

Dear Mr. Molina:

Thank you for your recent inquiries regarding Rinker Materials. Attached is a copy of our Intent to Issue an air construction permit to Rinker for modernization of their cement manufacturing operations. We are requiring continuous emissions monitoring of sulfur dioxide, nitrogen oxides and opacity, which ought to provide assurances that they will comply with the Department's regulations at all times.

According to the attached public notice, you may submit comments to us within the next 30 days. If you have any questions, please call me at (850) 488-1344.

Sincerely,

6/25

A. A. Linero, P.E.
Administrator
New Source Review Section

AAL/kt

enclosures

P 265 659 233

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PS Form **3800**, April 1995

0250014-002-AC

TECHNICAL EVALUATION

AND

PRELIMINARY DETERMINATION

RINKER MATERIALS CORPORATION
MIAMI, DADE COUNTY, FLORIDA

Portland Cement Manufacturing Facility
Modernization and Expansion Project

Permit No. 0250014-002-AC

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

June 23, 1997

I. APPLICANT NAME AND ADDRESS

Rinker Materials Corporation
1200 NW 137th Avenue
Miami, Florida 33182

II. FACILITY INFORMATION

A. FACILITY LOCATION

Rinker Materials Corporation (RMC) plans to modernize the existing Miami Cement plant by replacing the wet -process cement plant with a 1.2 million TPY clinker dry-process cement production line [137 ton of clinker per hour (TPH)] at its existing Miami cement facility.

This site is approximately 8.2 kilometers to the Everglades National Park, a Class I PSD Area, and in an ozone (O_3) maintenance areas in Dade County. The USGS Hialeah SW quadrangle map, and a map of the Everglades National Park were compared. The northeast corner of the Park, bounded by U.S. 41 to the North and Levee No.31N to the east, is the nearest point to the Rinker facility. The UTM coordinates of this facility are Zone 17, 558.20 East and 2851.20 km North.

B. FACILITY CLASSIFICATION CODE (SIC)

Major Group No. 32, Clay, Glass, and Concrete Products

Industry Group No. 324 Cement, Hydraulic

Industry No. 3241 Cement, Hydraulic

C. FACILITY CATEGORY

The Rinker Materials Corporation facility is classified as a major air pollutant emitting facility. As proposed, the revised project is not subject to New Source Review including provisions for the Prevention of Significant Deterioration of air quality (PSD) because the proposed modernized plant will result in less air pollution than the existing plant. This is primarily due to the lower fuel requirements per unit of product characteristic of the dry processes. Although there will be an increase in cement production capacity as a result of the proposed project, there will be a reduction in the emissions of most air pollutants.

Emissions decreases or less than significant increases with respect to PSD are expected for the following pollutants in tons per year (TPY): -108 TPY of sulfur dioxide (SO2), +11.8 TPY of nitrogen oxides (NO_x), +9.8 TPY of particulate matter (PM), -163.3 TPY of particulate matter smaller than 10 microns (PM_{10}), +57.6 TPY of carbon monoxide (CO), +32.9 TPY of volatile organic compounds (VOC), and -13.4 TPY of sulfuric acid mist (SO_3). Slight reductions or insignificant increases are also expected in emissions of lead (Pb), mercury (Hg), and beryllium (Be).

III. PROJECT DESCRIPTION

RMC is applying for a permit to modify the existing wet process plant by incorporating the modern dry process technology including a preheater and precalciner along with indirect firing. The dry process preheater/precalciner (PH/PC) kiln is the most fuel efficient cement pyroprocessing technology currently available. Thermal efficiencies will be improved with the PH/PC kiln and the amount of fuel combusted per ton of clinker produced is expected to be reduced

The proposed modernized cement plant will be designed to produce up to 137 TPH of clinker (highest maintained rate over a day). The annual potential production rate will not exceed 1.2 million TPY of clinker. The major equipment will include a PH/PC kiln, a clinker cooler, raw mill, finish mill, silos, conveyers, and particulate control/dust collection and recycling equipment. The cement product will be stored in silos and shipped in bags or in bulk by rail or truck.

The currently permitted Rinker facility consists of a quarry, limestone crushing system, material receiving facilities both by rail and truck, open short-term material storage piles, a storage building for intermediate raw material and clinker storage, a soil dryer, two raw mills, kiln feed slurry system, two kilns, two coolers, five finish mills, four pack houses, thirty cement silos, a rail and truck bulk loadout facility, and, a liquid fuel tank farm.

The proposed plant modernization will include limestone crushing, limestone premixing and storage, raw grinding, blending and kiln feed, pyroprocessing, clinker storage, coal grinding, and additional finish mill and cement transport to existing silos. The existing quarry operation, soil dryer, five finish mills, packhouses, and , cement silos will remain in operation.

Equipment changes resulting from the change in kiln technology and plant modernization consist of the following:

- A new primary crushing facility will be constructed.
- A new raw materials handling system
- A new raw mill system and new raw meal handling and storage equipment will be constructed
- The existing two wet process cement kiln will be replaced with a single dry process kiln with a preheater and a precalciner
- The existing two clinker coolers will be replaced with a new single clinker cooler
- New clinker handling and storage equipment will be constructed
- A new coal/coke preparation system will be constructed. This will allow indirect firing of coal/coke.

The main raw materials will be limestone, clay, ash, iron ore from various sources and gypsum.

IV. PROCESS DESCRIPTION

Portland cement is a fine powder, usually gray in color, that consists of a mixture of dicalcium silicate, tricalcium silicate, tricalcium aluminate, and tricalcium aluminoferrite, and miscellaneous minerals to which one or more forms of calcium sulfate have been added. About 95% of the cement production in the United States is portland cement. Masonry cement, also produced at the portland cement plant, represents the balance of the domestic cement production.

There are several variations in cement manufacturing including the wet, dry, dry preheater (PH), and dry preheater/precalciner (PH/PC) processes. These processes are essentially identical relative to the manufacture of cement from raw materials. However, the type of process does affect the equipment design, method of operation, and fuel consumption. Because of its lower fuel requirements, most new portland cement plants use the dry PH/PC. RMC proposes to switch to the dry PH/PC process depicted in simplified form in Figure 1 (from a Portland Cement Association publication).

The choice of fuel is based on economics. The most commonly used kiln fuels are coal, natural gas, and oil. Supplementary fuels such as petroleum coke, tires, used oil and various kinds of wastes are burned at many plants. Fuel combustion differs between the various processes. In all of the variations, some or all combustion occurs in the kiln. In the dry PH/PC process, substantial fuel combustion also occurs in PC vessel between the PH and kiln material entry point. This reduces the thermal load on the kiln and allows for a shorter kiln.

The production of portland cement is a four-step process: (1) raw materials acquisition and handling (2) kiln feed preparation for pyroprocessing, (3) pyroprocessing, and (4) finished cement grinding. The chemical reactions and physical processes that constitute the transformation are quite complex. The main portion of the advanced, dry processes is the pyroprocessing system which includes the rotary kiln, suspension preheater, and calcining loop. Several complex chemical reactions necessary to produce portland cement minerals take place in the rotary kiln. Pyroprocessing (dry process with preheater) may be conveniently divided into five stages, depending on location and temperature of the materials in the system.

1. Uncombined water evaporates from raw materials as the material temperature increases to 100°C (212°F) in the upper PH or raw materials roller mill.

2. As the material temperature increases from 100°C to approximately 430°C (800°F) in the PH, combined water is liberated from argillaceous compounds.

3. Between 430°C and 900°C (1650°F), calcination begins in the lower PH and is completed in the PC. Carbon dioxide is liberated from the carbonates. A portion of the fuel is burned in the PC vessel to effect the greatest degree of calcination.

4. Following calcination, sintering of the oxides occurs in the burning zone of the rotary kiln at temperatures up to 1510°C (2750°F). Lime, silica, and iron and aluminum compounds react to form calcium silicates, aluminates, ferrites and aluminoferrites. Alkali sulfates and chlorides evaporate.

5. Following sintering, clinker nodules are produced as the temperature of the material decreases from 1510°C to 1370°C (2500°F).

The raw materials enter the pyroprocessing system in the uppermost PH. They exit the PC and (together with tires) enter the kiln at the elevated end. The rotation of the kiln causes the solid materials to be slowly transported downward from the front end. Coal (or fuel oil blend or natural gas) is supplied at the lower or discharge end of the kiln. The hot, gaseous combustion products move counter-current to the materials flow, thereby transferring heat to solids in the kiln and preheater.

The product of the rotary kiln is known as clinker which enters a vessel where it is cooled by air. Hot air from the clinker cooler is recovered and returned to the pyroprocessing system as combustion air or to dry or convey materials. The cooled clinker is mixed with a form of calcium sulfate, such as waste gypsum from electric utility scrubbers, and ground in the finish mill to produce portland cement.

Portland cement is shipped from the packhouse or shipping department in bulk or in paper bags by truck or rail.

V. FUEL CONSUMPTION

The main fuels to be burned in the kiln are coal and petroleum coke. Tires will also be burned as supplemental fuel for the heat and iron content. No.2 fuel oil, residual fuel oil, on-spec and off-spec used oil will be used for startup and as supplemental fuels. The applicant proposes to use gas at any time. There are no plans to burn hazardous wastes. Solid waste materials such as booms and rags from spill cleanup, unused diapers, paper products, non-chlorinated plastic waste, and sewage sludge from Publicly Owned Treat Works (POTW). Tires and solid waste will not exceed 40 percent of the heat input value at any time.

Startup of the proposed cement kiln will be accomplished with oil or gas. Oil and gas will be combusted first at low utilization rates. Cold start-up requires approximately 24 hours until the kiln is ready to receive feed. Since oil or gas utilization rates during the entire startup period are less than fuel consumption rates at normal operating conditions and no product or coal is introduced to the kiln, emissions during start up period should be less than emissions under normal operation. No coal or product will be introduced into the kiln until optimum operating conditions are attained. Like the start-up period, coal and product feed begins at reduced rates, ramping up gradually to the final operating conditions.

Tires will not be fed until the kiln is hot enough to support proper combustion and the temperature maintained high enough to destroy dioxins and furans.

The revision in technology will add one primary emission source, the precalciner (PC). Fuel burned in the PC offsets some of the fuel requirement of the kiln. This new source of combustion is integral in the preparation of the raw material feed and the cement clinker production. The combined gross heat input to the PC and the kiln is 437 MMBtu/hr, to be fired on coal, natural gas, and/or tires or tire-derived fuel (start-up with natural gas, fuel oil, and/or on-spec used oil).

VI. RULE APPLICABILITY

The proposed project is subject to the preconstruction review requirements under the provisions of Chapter 403, Florida Statutes, and Chapters 62-4, and 62-204, 62-210, 62-212, 62-296, and 62-297, Florida Administrative Code (F.A.C.).

The present facility is a Major Source of air pollution per Rule 62-210.200., F.A.C., "Definitions." The new cement plant will be a major source for PM, PM_{10}, SO_2, NO_x, and CO. The proposed plant will be located in an area (Dade County) designated attainment for all criteria pollutants (Rule 62-204.360, F.A.C.) and maintenance area for Ozone (O3). The proposed project is not subject to the Prevention of Significant Deterioration (PSD) regulations (Rule 62-212.400., F.A.C.) because the potential emissions increases of each of these pollutants do not exceed the significant emission rates given in Table 62-212.400-2, F.A.C., "Regulated Air Pollutants Significant Emission Rates."

A PSD net emission increase analyses showed that this facility nets out of review for all pollutants. This is mainly due to the lower fuel input per unit of product resulting from the replacement of the existing wet-process plan for the new dry process plant.

This cement plant is subject to review for the applicable requirements of the federal New Source Performance Standards (NSPS) including:

- 40 CFR 60 Subpart F, Standards of Performance for Portland Cement Plants.
- 40 CFR 51 Subpart P, "Protection of Visibility."
- 40 CFR 60, Subpart Y, Standards of Performance for Coal Preparation Plants
- 40 CFR 60, Subpart OOO, Standards of Performance for Nonmettallic Mineral Processing Plants
- 40 CFR 60, Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23,1984
- 40 CFR 60, Subpart Eb-Standards of Performance for Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994. (Co-fired combustor reporting requirements only)

The proposed cement plant is also subject to the applicable requirements related to used fuels and wastes given in 40 CFR 279 and 40 CFR Part 261 (July 1996 version), which is adopted by reference in Chapter 62-710, F.A.C. and Chapter 62-730, F.A.C. and to the applicable requirements of Chapter 24 of the Code Of Metropolitan Dade County, which limits the allowable SO_2 from combustion of solid and liquid fuels to 1.2 and 1.1 lb/MMBtu, respectively.

The emission units affected by this modification shall comply with all applicable provisions of the Florida Administrative Code (including applicable portions of the Code of Federal Regulations) and, specifically, the following chapters and rules:

- Chapter 62-4 Permits
- Rule 62-204.220 Ambient Air Quality Protection
- Rule 62-204.240 Ambient Air Quality Standards
- Rule 62-204.260 Prevention of Significant Deterioration Increments
- Rule 62-204.360 Designation of Prevention of Significant Deterioration Areas
- Rule 62-204.800 Federal Regulations Adopted by Reference
- Rule 62-210.300 Permits Required
- Rule 62-210.350 Public Notice and Comments
- Rule 62-210.370 Reports
- Rule 62-210.550 Stack Height Policy
- Rule 62-210.650 Circumvention
- Rule 62-210.700 Excess Emissions
- Rule 62-210.900 Forms and Instructions
- Rule 62-212.300 General Preconstruction Review Requirements
- Rule 62-296.320 General Pollutant Emission Limiting Standards
- Rule 62-297.310 General Test Requirements
- Rule 62-297.400 EPA Methods Adopted by Reference
- Rule 62-297.401 EPA Test Procedures
- Rule 62-297.520 EPA Performance Specifications
- Rule 62-297.570 Reasonably Available Control Technology (RACT)

VII. SOURCE EVALUATION

A. CONTROL TECHNOLOGY REVIEW

A.1 PARTICULATE MATTER

As proposed by the applicant, all emissions sources addressed in Table 1.1 Allowable Opacity Limits will be controlled by baghouses. The major emission unit in the cement plant is the kiln. The exhaust gases from the kiln and cooler will be controlled by a common baghouse and emitted to the atmosphere through a dedicated stack. The particulate emission rates from the kiln, cooler

and raw mill will be 0.2 pounds per ton of preheater feed. This compares with the combined NSPS limit of 0.4 pounds per ton of preheater feed and represents the lowest permitted limit in the state.

All the baghouses used in the proposed cement plant are designed to operate such that particulate matter concentrations in the exhaust gas stream will not exceed 0.01 grains per dry cubic foot (gr/dscf).

All dry raw materials, intermediate products and final products within the cement plant will be transferred by enclosed conveyer, air slides, screw conveyors, or enclosed elevators. All of the enclosed transfer systems will be operated under negative pressure with the gases vented through baghouses before being discharged to the atmosphere. Storage silos and the coal receiving and storage system will also be vented through baghouses. Water sprays will be used as necessary to control fugitive particulate matter emission. Quarrying and raw material storage piles will be under moist conditions with relatively low unconfined emissions. Roads will be washed on a daily basis in order to control excessive dust.

According to RMC, the new cement plant will not generate cement kiln dust (CKD) as a waste product. This is consistent with the greater opportunity for recycle afforded by the dry processes CKD was generated by the existing wet process and there is an inventory of material on-site. The present inventory has been reduced in recent years as techniques have been developed to re-introduce the material into the kiln feed and product as well as development of uses of CKD in other masonry products. RMC will eventually be required to comply with Subtitle C regulations to be promulgated by EPA to address CKD.

A covered coal conveyer and baghouse will be used to limit fugitive emissions from the coal handling system.

Manual and automatic control of the combustion process will insure that the combustion process can be optimized for both normal operation and for startup and shutdown conditions. At no time will the baghouse be bypassed during either startup or shutdown periods.

A.2 SULFUR DIOXIDE

The Department's SO_2 emission limit of 0.7 pounds per million BTU (2.23 lb/ton of clinker) will be accomplished by removal of sulfur oxides as alkali salts including sodium and potassium sulfates as well as removal by reactions with lime and limestone in the kiln, PH/PC, raw mill, and kiln baghouse. Removal is enhanced by maintaining proper ratios of sulfur and alkali in the pyroprocessing environment and intimate contact between raw materials and exhaust gases. Ultimately the sulfur oxides are incorporated into the clinker, thus minimizing the amount emitted to the atmosphere and reducing the amount of gypsum which must be added to the clinker to make cement.

The Department expects SO_2 emissions to be substantially less than permitted based on the performance of other dry process kilns in the state. The installation of the SO_2 CEMS will likely confirm this conclusion and insure that SO_2 emission limit will not be exceeded.

A.3 NITROGEN OXIDES

A NO_X emission limit of 1.53 pound per million BTU (4.9 lb/ton of clinker) will be met through proper combustion practices and distribution of the thermal load by indirect firing of fuel in the kiln, burning a portion of the fuel in the PC burner, and tire burning near the entry point of the kiln. The Department expects the emissions of NOx to be lower than projected by RMC based on emissions from similar kilns in the state. The installation of the NOx CEMS will likely confirm this conclusion and insure that the NOx emission limit will not be exceeded

A.4 CARBON MONOXIDE AND VOLATILE ORGANIC COMPOUNDS

CO and VOC emission limits of 3.01 and 0.1 pounds per ton of clinker, respectively, will be accomplished through good combustion controls. RMC will install process monitors to continuously measure either oxygen, carbon monoxide, or carbon dioxide for both safety and optimization of operations. These measures, together with the NOx and SO_2 CEMS units will allow RMC to incorporate good combustion practices into its Operations and Maintenance (O&M) procedures

A.5 METALS EMISSIONS

Most trace metals in the kiln systems behave in a manner similar to the main elements, i.e. Ca, Si, Al, Fe and Mg. As such, most of the trace metals are incorporated into the lattice structure of the product clinker. Studies show that where all CKD is recycled, more than 99 percent of heavy metals ultimately leave the kiln system via the product clinker. In the case of volatile metals such as mercury and thallium, the capture is lower. However the amounts in the raw materials are minimal and emissions through the exhaust stack are not significant.

Although baghouses are approximately equivalent to electrostatic precipitators in terms of dust collection efficiency, baghouses generally perform better in the removal of some of the non-PSD air pollutants.

B. EMISSION LIMITATIONS

The proposed emissions for this dry process cement plant are summarized in Table A and B. Table 1-1 and Table 1-2 (attached) list permitted emissions for each emission unit. The proposed facility will emit PM/PM_{10}, SO_2, NO_X, CO, VOC, SO_3, Be, Hg, and Pb at less than the PSD significant levels. The detailed analysis below shows that there will be no significant net emissions increases for any PSD pollutants with respect to Table 62-212.400-2, F.A.C.

The proposed modernized plant will produce lesser quantities of air pollutants per ton of clinker than the existing plant. Although there will be an increase in cement production capacity as a result of the proposed project, there will be a reduction in the overall emissions of air pollutants.

C. EMISSIONS SUMMARY

The net emissions increase for all PSD pollutants as a result of this modification are calculated below:

CONTEMPORANEOUS CREDITABLE CHANGES (TPY) [1]

POLLUTANTS	MODIFICATION (Plant modernization)	+ INCREASES (Contemporaneous period)	DECREASES (Shutdown of existing emissions units)	= TOTAL (Decrease or Increase)	PSD Significant Level ton/yr
PM	353	23.5	539.8	-163.3	25
PM_{10}	285	8.3	283.5	9.8	15
SO_2	1340	36.8	1884.8	-108.0	40
NO_x	2940	60.4	2988.6	11.8	40
CO	1807	15.4	1764.8	57.6	100
VOC	60	20.5	47.6	32.9	40
SO_3	8.4	0	21.8	-13.4	7

(1) Sum of Contemporaneous Creditable Changes (TPY) detailed in Rinker Materials

BACT/LAER/RACT CLEARINGHOUSE DATABASE COMPARISON

Although this project is not subject to BACT, the following table is a comparison with portland cement facilities listed in the BACT/LAER/RACT Clearinghouse database:

POLLUTANT	lb/ton clinker	lb/ton $kiln_{ph}$ feed	lb/MM BTU
PM (kiln)	0.32	0.20	0.10
PM_{10} (kiln)	0.27	0.17	0.085
SO_2 (kiln)	2.23	1.39	0.7
NO_x (kiln)	4.9	3.05	1.53
CO (kiln)	3.01	1.87	0.94
VOC (kiln)	0.1	0.06	0.031
SO_3 (kiln)	0.014	8.7 E-03	4.39 E-03
Be (kiln)	6.6×10^{-7}	4.10 E-07	2.07 E-07
Hg (kiln)	2.4×10^{-5}	1.5 E-05	7.55 E-06
Pb (kiln)	7.5×10^{-5}	4.55 E-05	2.28 E-05
PM (Cooler)	0.16	0.10	0.05
PM_{10} (Cooler)	0.13	0.09	0.04

Based on the following RMC process rates:
Preheater feed rate ($kiln_{ph}$ feed): 220 TPH
Clinker production : 137 TPH
Heat Input : 437 MMBtu/hr

VIII. CONCLUSION

Based on the foregoing technical evaluation of the application and additional information submitted by Rinker Materials Corporation, the Department has made a preliminary determination that the proposed project will result in a reduction in emissions of most air pollutants and insignificant increases in others. The Department has reasonable assurance that the project will comply with all applicable state and federal air pollution regulations provided the Department's allowable emissions limits are not exceeded and certain conditions are met. The general and specific conditions are listed in the attached draft conditions of approval.