UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

4APT/AEB

APR 13 1990

Mr. Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental
Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Tarmac Florida, Inc. (PSD-FL-142)
Kiln No. 2 Coal Conversion

Dear Mr. Fancy:

We have received a copy of your March 29, 1990, prevention of significant deterioration (PSD) Technical Evaluation and Preliminary Determination for the above referenced project. As discussed between Mr. John Reynolds of your staff and Mark Armentrout of my staff on April 4, 1990, we are offering the following comments.

The draft permit does not address PM_{10} emissions. We suggest that the final permit contain a PM_{10} emission limit for the kiln and a test method for determining compliance.

The draft permit does not include any specific provisions regarding the control of fugitive emissions from the coal handling operations and haul roads. Tarmac was able to avoid applicability to the PSD regulations for particulate matter based on certain assumptions for controlling these fugitives. Therefore, these assumptions must be reflected in the final permit.

The final permit needs to contain an emission limit and test method for determining carbon monoxide emissions from the kiln.

Thank you for the opportunity to review this PSD package. If you have any questions concerning this letter, please contact Mark Armentrout of my staff at (404) 347-2904.

Sincerely yours,

Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides and Toxics
Management Division

cc: Mr. David Buff, KBN
Mr. Scott Quaas, Tarmac Florida

KBN

April 12, 1990

Mr. C.H. Fancy, P.E.
Bureau of Air Regulation
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Tarmac Florida, Inc., Kiln 2 Coal Conversion AC13-169901; PSD-FL-142

Dear Mr. Fancy:

Attach are comments to the Technical Evaluation and Preliminary Determination for the above-referenced application. These comments are submitted on behalf of Tarmac Florida in response to the published Public Notice. I look forward to meeting with you and your staff on April 17 to discuss these comments and our concerns.

Sincerely,

David A Buff/CB

David A. Buff M.E., P.E.
Principal Engineer

DAB/mah

Attachments

cc: Al Townsend, Tarmac
Bruce Miller, EPA
Patrick Wong, DERM
Steve Smallwood, FDER
Barry Andrews, FDER

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

TECHNICAL COMMENTS
TO THE
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION
TARMAC FLORIDA, INC.
AC13-169901

The Florida Department of Environmental Regulation (FDER) has issued the Technical Evaluation and Preliminary Determination and proposed Prevention of Significant Deterioration (PSD) permit for the conversion of Kiln 2 at Tarmac Florida to coal firing. The FDER's Best Available Control Technology (BACT) Determination is also contained in the preliminary determination.

Provided herein are technical comments and additional information on the preliminary BACT determination. This response is organized according to the BACT determination issued by FDER.

BACT DETERMINATION REQUESTED BY THE APPLICANT

The applicant's proposed BACT emission rate as stated by FDER for nitrogen oxides (NO_x) [8.02 pounds per ton (lb/ton) clinker] is incorrect. The correct figure should be 6.77 lb/ton clinker.

It is also incorrect that Tarmac has proposed an sulfur dioxide (SO_2) emission level of 400 pounds per hour (lb/hr) or 16.0 lb/ton clinker as BACT, as inferred by FDER. Tarmac has clearly stated in the application, as well as in numerous conversations with FDER staff, that the stated emission level will be used only as the starting point in determining what BACT should actually be. A comprehensive testing program has been proposed to determine an appropriate emission level (BACT) for Kiln 2 because no actual operating data for Kiln 2 burning coal is available, Kiln 2 is very different than Kiln 3, and SO_2 emissions from coal-fired kilns are very kiln specific (depends on absorption in kiln, sulfur in raw feed, and operating conditions within the kiln). The results from this testing can be utilized by FDER to set the BACT limit. This BACT strategy was approved by EPA Region IV in January 1990.

BACT DETERMINATION PROCEDURE

This section briefly outlines FDER's and U.S. Environmental Protection Agency's (EPA's) BACT determination procedure and current "top-down" approach. The applicant agrees with this approach, but several areas in FDER's BACT determination are not consistent with these regulations and policies.

EPA has issued draft policy guidance concerning the top-down BACT approach. These are contained in a draft document entitled "Top-Down Best Available Control Technology: A Summary" (May 25, 1989) and an EPA memo containing "Background Statement on the Environmental Protection Agency's Top-Down Policy" (June 13, 1989). The following relevant quotations from these documents are presented:

> In summary, all available control technologies are ranked, and the most stringent alternative is considered initially in the BACT analysis. However, when supported by a complete and objective review, technologies that can be demonstrated to be infeasible, unreasonable, or otherwise not achievable considering source-specific energy, economic, environmental, or technological reasons can be set aside.
>
> The top-down policy does not establish a national BACT standard. The statute provides that technical considerations may, alone or in conjunction with energy, environmental, or economic factors, render a given control technology or associated emission limitation not "achievable" in a given PSD case. It is precisely the purpose of the BACT analysis to weigh these factors in determining whether an "available" technology or emission limit is "achievable" in the given case. Adoption of a top-down methodology does not change or alter this requirement.
>
> Rejection of a control technology by a reviewing agency must have a rationale arrived at after full consideration of data determined in a consistent and sound manner. Such decisions may not be arbitrary, capricious, or contrary to law.

In the BACT determination for Tarmac Florida Kiln 2 coal conversion, FDER has not followed this policy guidance by:

1. Ignoring and improperly interpreting the applicant's site-specific emissions data;

2. Arbitrarily comparing completely different processes and industries to Tarmac's proposed process; and
3. Failing to provide a complete and objective review of available data and ignoring the site-specific factors set forth in the application, resulting in a flawed BACT determination.

Each of these will be discussed in greater detail in the following sections.

BACT ANALYSIS FOR SO_2

FDER presents a summary of previous BACT determinations for coal-fired cement kilns. This summary contains only the least stringent and most stringent percent SO_2 reduction and the lowest and highest emission rate in terms of pounds per million British thermal units (lb/MM Btu) contained in any previous BACT determination. No description of the type of cement kiln (i.e., wet, dry, or preheater/precalciner/kiln system), the sulfur content of the fuel, the clinker production rate, sulfur content of the raw feed, or other site-specific factors that were the basis of the decisions is presented. This analysis does not constitute a complete and objective review, nor does it represent a sound rationale, as required by the BACT guidelines.

A complete listing of all BACT determinations for cement plants, as contained in the BACT Clearinghouse documents, is contained Table 1. The list is arranged chronologically and segregated according to dry and wet process kilns. The list shows that almost all cement plants requiring BACT review were the dry process type.

Review of this information reveals that the 90 percent SO_2 reduction efficiency cited by FDER as the most stringent was based upon the Monolith Cement Co. (California) BACT determination. This is a wet process kiln which burns a coal/coke combination with a maximum of 1.5 percent sulfur. Further investigation of this limit revealed that the applicant actually proposed a range of efficiency of between 50 percent and 90 percent,

Table 1. Summary of BACT Determinations for Portland Cement Kilns - SO2 Emission

Company Name	State	Date of Permit	Source +	Fuel, sulfur content, %	Process	Capacity	Clinker Production	SO2 Emission Limit				Comments
								lb/hr	lb/MMBtu	lb/ton cl.	% Reduction	
Dry Process Kilns												
Kaiser Cement & Gypsum Corp.	CA	26-Dec-78	PH/PC/Kiln/Mill	Coal, <1%	Dry	1.60 MMTPY	104 TPH	481		4.63		Baghouse alkali dust
Calif. Portland Cement Co.	CA	12-Jan-79	PC/Kiln	Coal	Dry	1 MMTPY	114 TPH	616		5.40	70%	Absorption by alkaline
Lonestar Industries Inc.*	TX	19-Feb-80	PC/Kiln/Mill	Coal	Dry	1 MMTPY	114 TPH	960		8.42	80%	Baghouse alkali dust
Texas LeHigh Cement Co.	TX	16-May-80	PC/Kiln/Mill	Coal	Dry	2,750 TPD	115 TPH	416		3.62	86%	Baghouse alkali dust
Creole Corp.	CA	20-May-80	PC/Kiln/Mill	Coal	Dry	1.10 MMTPY	67 TPH	344		5.13	85%	SO2 limit to be revised
Lonestar Portland Cement *	UT	16-Jan-81	PC/Kiln	Coal, low	Dry	510,000 TPY	71 TPH	64.6		0.91	85%	
Dixie Cement Co. *	TN	10-Sep-81	PH/PC/Kiln	Coal	Dry	800,000 TPY	99 TPH	4.16		0.04	85%	Limestone injection
Southwestern Portland Cement	TX	05-Nov-81	Kiln #3	Coal, mod.	Dry	2,500 TPD	104 TPH	134	0.49	1.30		Low S coal/partial scrubbing
Southwestern Portland Cement	TX	05-Nov-81	Kiln #1	Coal, low	Dry		71 TPH	209	1.12	2.94		No control equipment
Southwestern Portland Cement	TX	05-Nov-81	Kiln #2	Coal	Dry		62 TPH	86	0.52	1.40		Partial liq. scrub.
Lonestar Industries Inc.	WA	25-Jan-82	PC/Kiln/Mill	Coal	Dry	750,000 TPY	100 TPH	275		2.75		Precalciner/baghouse
Las Vegas Portland Cement *	NV	01-Feb-82	Kiln	Coal, <.9%	Dry	6,000 TPD	125 TPH	260		2.08	80%	2hr ave., low S coal
Florida Crushed Stone	FL	27-Mar-84	PH/PC/Kiln	Coal, <.8%	Dry	600,000 TPY	124 TPH	74		0.60		Integrated power plant
Nevada Cement Co. *	NV	05-Mar-85	PH/PC/Kiln	Coal	Dry		42 TPH	16		0.38	90%	Multistage susp. preheater
Lone Star Industries	CA	29-Jul-86	PH/PC/Kiln	Coal	Dry		100 TPH	250		2.50		40-60% SO2 control expected
Florida Mining & Material	FL	26-Dec-86	PH/Kiln/Mill	Coal, <1%	Dry		73.5 TPH	20		0.28	96%	<1 Wt.%S coal, design
Wet Process Kilns												
Southwestern Portland Cement	TX	26-Feb-81	Rotary Kiln	Coal	Wet	775 TPD	32 TPH	513	2.41	16.00	20%	Alkali in raw matl. rx w/ S
Monolith Portland Cement Co.	CA	23-Dec-81	Rotary Kiln	Coal, <1.5%	Wet	500,000 TPY	62 TPH	300		4.48	50 to 75%	Baghouse alkali cement dust
Lonestar Florida Pennsuco	FL	28-Dec-84	Kiln #3	Coal, <2%	Wet		87.5 TPH	400		4.60		<2 Wt.% S coal (max. value)
Lonestar Florida Pennsuco*	FL	28-Dec-84	Kiln #2	Coal, <2%	Wet		25 TPH	125		5.00		<2 Wt.% S coal (max. value)
Lonestar Florida Pennsuco*	FL	28-Dec-84	Kiln #1	Coal, <2%	Wet		25 TPH	125		5.00		<2 Wt.% S coal (max. value)

* Facility was never built

+ PH = Preheater
PC = Precalciner

because it was not known what the kiln would actually achieve. EPA's BACT determination on this project actually states between 50 percent and 75 percent removal efficiency is expected (excerpts of the determination are attached). The 50 percent minimum removal efficiency is not very different from the 36 percent stated by Tarmac as the starting point for its BACT determination. More importantly, the 300 lb/hr SO_2 emission limit set for the Monolith kiln was based on actual source test data from an identical kiln located at the facility. Thus, site-specific data were used to set the emission limit for Monolith.

The most stringent BACT limit set in terms of lb/MM Btu heat input, cited by FDER as 0.488 lb/MM Btu, is based upon Southwest Portland Cement (Texas). Further investigation reveals that this is a dry process kiln.

There is a fundamental difference between the dry process and the wet process used at Tarmac. The dry process is more energy efficient than the wet process, therefore requiring less fuel (on the order of 50 percent less fuel). This translates directly into lower SO_2 emissions. In addition, most of the dry process kilns incorporate a preheater or precalciner, and many pass the kiln gases through the raw mill. This translates into significantly more contact time between the raw feed and the SO_2 in the exhaust gases, allowing much better absorption of the SO_2. FDER ignores this fundamental difference between the wet and dry processes, thereby grossly exaggerating the inherent SO_2 removal capabilities of Tarmac Kiln 2.

The fact that Tarmac Kiln 2 is a wet process kiln demonstrates that FDER fails to consider the site-specific considerations of this project. The entire Tarmac facility is an existing cement plant based upon the wet process. Kiln 2 is part of the existing plant, and, therefore, must also utilize the wet process. If Tarmac was building a new kiln, they would undoubtedly build a dry process kiln, because of the energy efficiencies. However, this is not the case, and ignoring this site-specific aspect is contrary to BACT regulations and policy.

If only wet process kilns are considered from previous BACT determinations, only the Monolith and a Southwest Portland Cement BACT's remain (other than BACT's for the Tarmac facility itself). The Southwest determination is for a wet process kiln, and the BACT limit set is identical to Tarmac's proposed limits--16 lb/ton clinker. SO_2 reduction efficiency was estimated at only 20 percent, below the minimum stated by Tarmac for Kiln 2.

There is no discussion in the FDER's BACT determination on the effect of sulfur in the raw feed upon SO_2 emissions. Sulfur in the raw feed can be expected to translate directly into potential SO_2 emissions. Tarmac's raw feed could contain higher sulfur levels than those at other plants having BACT determinations, resulting in higher SO_2 emissions. However, such information is not presented or considered by FDER. Tarmac has shown in its application the maximum expected sulfur content of the raw feed and the potential SO_2 emissions resulting from the raw feed. However, FDER has given no consideration to this site-specific factor in determining the BACT emission limit.

FDER bases their BACT determination, in part, on the contention that Kiln 2 should be able to achieve a 69 percent SO_2 reduction efficiency when burning coal. This conclusion is based on SO_2 emission tests conducted on oil for Kilns 2 and 3 and on coal for Kiln 3. FDER rationale for this conclusion is based on an incorrect calculation that is not supported by the engineering data. One source test on Kiln 3 when burning oil showed a 98.7 percent SO_2 reduction efficiency, and several stack tests showed an average of 75 percent reduction when this kiln was burning coal. Kiln 2 was also tested one time burning oil, and showed a 91.3 percent SO_2 reduction. Based on these data, FDER concludes that Kiln 2 should be able to achieve a 69 percent SO_2 reduction from the following calculation:

$$\frac{98.7 \text{ percent}}{91.3 \text{ percent}} - \frac{75 \text{ percent}}{x} \qquad x = 69 \text{ percent}$$

This is an incorrect calculation and is not based on engineering principles. Emissions are a function not of the efficiency, but one minus

the efficiency. When burning oil, Kiln 2 displays SO_2 emissions that are 7.5 times that of Kiln 3 when it is burning oil:

Kiln 2 1 - 0.913 = 0.097 = 9.7 percent of potential SO_2 is emitted

Kiln 3 1 - 0.987 = 0.013 = 1.3 percent of potential SO_2 is emitted

Why then should Kiln 2 not display 7.5 times the SO_2 emissions of Kiln 3 when burning coal? In fact, Tarmac is requesting an initial emission limit for Kiln 2 that is only 3.5 times greater than that for Kiln 3 (on a lb/ton basis). Although it is expected that Kiln 2 will achieve greater than the minimum 36 percent efficiency stated by Tarmac, the 69 percent efficiency stated by FDER to be achievable is not supported by the engineering data.

The 69 percent efficiency for Kiln 2 stated by FDER is virtually the same as the 75 percent efficiency demonstrated by Kiln 3 (31 percent of the potential SO_2 emitted versus 25 percent of the SO_2 emitted). This conclusion ignores the applicant's clear documentation that the shorter length of Kiln 2 versus Kiln 3 and different operating conditions within the kilns could result in a significantly lower SO_2 emission reduction than that achieved by Kiln 3. The 36 percent efficiency stated by Tarmac as a starting point for BACT is a reasonable level given these uncertainties. These are site-specific factors which FDER has failed to adequately weigh in setting their BACT emission limit.

In addition, the SO_2 emission reduction efficiencies for Kilns 2 and 3 when burning oil are based on only one source test on each kiln. This affects the confidence of this rationalization.

In the BACT determination, FDER improperly compares federal New Source Performance Standards (NSPS) for fossil-fuel-fired steam-generating units. These NSPS are for a completely different process and completely different industry, and have no bearing upon SO_2 emissions from cement kilns. SO_2 emissions from fossil-fuel steam-generating units are controlled by add-on control equipment, which can be adjusted to obtain a high SO_2 removal efficiency. In contrast, SO_2 control in a cement kiln is inherent in the

process, and the removal efficiency is dependent upon the kiln and its operating parameters. These operating parameters are constrained within certain limits to maintain clinker quality. The 1.2 lb SO_2/MM Btu maximum limit under NSPS can easily be met by fossil fuel steam generators burning the highest sulfur coal because the NSPS also requires 90 percent SO_2 removal efficiency (through the use of add-on scrubbers). As a result, the 1.2 lb/MM Btu limit referenced by FDER does not truly account for the sulfur content of the coal Tarmac will burn. Further, in making this comparison, FDER has ignored the fact that the raw feed to the kiln contains sulfur, and this sulfur is a potential source of SO_2 emissions, just like the sulfur in the coal. Again, site-specific factors have not been recognized.

FDER has also not recognized the potential relationship between SO_2 and NO_x emissions in setting the BACT limit for SO_2. Extensive testing and operation on Kiln 3 has shown there is a distinct inverse relationship between these two pollutants. However, FDER has set a much lower NO_x limit for Kiln 2 than the emission limit for Kiln 3, and the engineering data indicate that in order to meet such a limit, SO_2 emissions from Kiln 2 will increase. FDER's BACT determination is flawed further by ignoring this site-specific data and by basing their BACT limit on totally different dry process kilns, located at other sites.

Lastly, FDER has completely ignored Tarmac's proposal to conduct a 1-year testing program to collect adequate data upon which a true BACT limit can be established. The 400 lb/hr (16 lb/ton) limit and 36 percent removal efficiency proposed by Tarmac is not suggested to be BACT for Kiln 2. This has been made very clear by Tarmac. It is only proposed as a <u>starting point</u>, or an initial limit, pending the results of the test program. The following are the primary reasons for this proposal:

1. Experience with the conversion of Kiln 3 to coal has shown that the SO_2 emissions and removal efficiency are dependent upon the kiln and its operation, and that generally NO_x emissions increase as SO_2 emissions decrease. These emissions and their relationship

to operating parameters can be determined only through testing, unless an identical kiln at the same plant has already been tested.

2. Kiln 2 is much shorter than Kiln 3, and, therefore, the expected SO_2 removal efficiency for Kiln 2 is expected to be less. However, the efficiency achievable is not known and can only be determined through source testing on Kiln 2.
3. The initial BACT limits for Kiln 3 were set without adequate test data, and this led to exceedances of the emission limits and enforcement action by FDER. Tarmac does not wish to repeat this situation.

BACT ANALYSIS FOR NITROGEN OXIDES

As for SO_2, FDER presents a summary of previous NO_x BACT determinations for coal-fired cement kilns. This summary contains only the least stringent and most stringent emission rates in terms of lb/ton feed and lb/MM Btu contained in any previous BACT determination. No description of the type of cement kiln (i.e., wet, dry, or preheater/precalciner/kiln system), the clinker production rate, or other site-specific factors that were the basis of the decisions is presented. This analysis incorrectly compares dry process cement kilns to Tarmac's wet process kiln and does not consider site-specific data and factors related to Kiln 2.

A complete listing of all NO_x BACT determinations for cement plants is contained Table 2. The list shows that almost all cement plants requiring BACT review were of the dry process type. There are fundamental differences between the dry process and the wet process in regards to NO_x emissions. The dry process is more energy efficient than the wet process, therefore requiring less fuel (on the order of 50 percent less fuel). This translates into lower fuel-bound nitrogen for dry kilns and, hence, lower NO_x emissions. Secondly, dry process kilns with preheaters and/or precalciners have two or more points in the kiln system where energy is released, as opposed to only one release point in a wet process kiln. As a

Table 2. Summary of BACT Determinations for Portland Cement Kilns - NOx Emission

Company Name	State	Date of Permit	Source +	Fuel, sulfur content, %	Process	Capacity	Clinker Production	NOx Emission Limit lb/hr	lb/MMBtu	lb/ton cl.	Comments
					Dry Process Kilns						
Kaiser Cement & Gypsum Corp.	CA	26-Dec-78	PH/PC/Kiln/Mill	Coal, <1%	Dry	1.60 MMTPY	104 TPH	1158		11.13	Reduced fuel usage, low temp.
Calif. Portland Cement Co.	CA	12-Jan-79	PC/Kiln	Coal	Dry	1 MMTPY	114 TPH	None		None	Reduced fuel usage, low furnace temp.
Lonestar Industries Inc.*	TX	19-Feb-80	PH/Kiln/Mill	Coal	Dry	1 MMTPY	114 TPH	360		3.16	Precalciner process design
Texas Lehigh Cement Co.	TX	16-May-80	PC/Kiln/Mill	Coal	Dry	2,750 TPD	115 TPH	240		2.09	Flash calciner
Creole Corp.	CA	20-May-80	PC/Kiln/Mill	Coal	Dry	1.10 MMTPY	67 TPH	213		3.18	Reduced temp. in precalcining furnace
Lonestar Portland Cement *	UT	16-Jan-81	PC/Kiln	Coal, low	Dry	510,000 TPY	71 TPH	236.6		3.33	
Dixie Cement Co. *	TN	10-Sep-81	PH/PC/Kiln	Coal	Dry	800,000 TPY	99 TPH	110		1.11	Dry process
Southwestern Portland Cement	TX	05-Nov-81	Kiln #3	Coal, mod.	Dry	2,600 TPD	104 TPH	88	0.32	0.85	Kiln design
Lonestar Industries Inc.	WA	25-Jan-82	PC/Kiln/Mill	Coal	Dry	750,000 TPY	100 TPH	300		3.00	Process design
Las Vegas Portland Cement *	NV	01-Feb-82	Kiln	Coal, <.9%	Dry	6,000 TPD	125 TPH	281		3.95	
Florida Crushed Stone	FL	27-Mar-84	PH/PC/Kiln	Coal, <.8%	Dry	600,000 TPY	124 TPH	360		2.90	Dry feed, design
Lone Star Industries	CA	29-Jul-86	PH/PC/Kiln	Coal	Dry		100 TPH	250		2.50	Alkali slurry, injection system
Florida Mining & Material	FL	26-Dec-88	PH/Kiln/Mill	Coal, <1%	Dry		73.5 TPH	320		4.35	
					Wet Process Kiln						
Monolith Portland Cement Co.	CA	23-Dec-81	Rotary Kiln	Coal, <1.5%	Wet	5 MTPY	67 TPH	260		3.88	Coal-fired, wet process

* Facility was never built

+ PH = Preheater
PC = Precalciner

result, the combustion flame in the wet process kiln is more intense than the flames in the dry process kiln. The more intense wet process flame inherently produces higher NO_x emissions. FDER ignores this fundamental difference between the wet and dry processes, thereby flawing the BACT determination.

As in the case of SO_2, FDER improperly compares federal NSPS for fossil-fuel-fired steam-generating units to cement kiln emission limits. These NSPS are for a completely different process and completely different industry, and have no bearing upon NO_x emissions from cement kilns. A major difference between steam generators and cement kilns is that high temperature can be controlled much more effectively, since this does not adversely affect steam generation. However, in a wet process cement kiln, high temperature is critical to the final product. Even so, in making this comparison, FDER fails to recognize that the NSPS specifically sets different emission limits for different types of steam-generating units (i.e., pulverized coal, spreader stoker, fluidized bed). FDER does not differentiate between wet and dry process kilns, or other differences between fossil fuel steam generators and cement kilns which should be considered in their BACT evaluation.

FDER has totally ignored the site-specific test data available from Kiln 3 for coal burning. Tarmac has requested an NO_x emission limit for Kiln 2 that is the same as the limit on Kiln 3 (6.77 lb/ton clinker). Extensive source testing on Kiln 3 when burning coal has shown that this emission level has been exceeded or approached in the past. A summary of all previous NO_x emission tests on Kiln 3 when burning coal is presented in Table 3. The averages of all of these tests are 4.2 lb/ton feed and 6.4 lb/ton clinker, with maximums up to 6.4 lb/ton feed and 10.0 lb/ton clinker. Why does FDER believe that a much lower NO_x emission level can be achieved in Kiln 2? The proposed BACT emission limit is not supported by the site-specific data.

Table 3. NOx Emission Tests, Tarmac Kiln No. 3 Burning Coal

Test Date	Kiln Feed (TPH)	Production Rate (TPH)	Coal Feed Rate (TPH)	Heat Input * Rate (MMBtu/hr)	Heat/Clinker Ratio (MMBtu/ton)	NOx Emission lb/hr	NOx Emission lb/ton feed	NOx Emission lb/ton clinker
Apr-82	138.30	85.6	16.5	412.5	4.82	405	2.9	4.7
	138.30	85.6	16.5	412.5	4.82	512	3.7	6.0
	138.30	85.6	16.5	412.5	4.82	695	5.0	8.1
May-82	127.59	79.0	13.9	347.5	4.40	792	6.2	10.0
	127.59	79.0	13.5	337.5	4.27	520	4.1	6.6
	127.59	79.0	14.4	360.0	4.56	464	3.6	5.9
	127.59	79.0	14.4	360.0	4.56	438	3.4	5.5
	127.59	79.0	14.4	360.0	4.56	218	1.7	2.8
	127.59	79.0	15.5	387.5	4.91	346	2.7	4.4
16-May-85	133.50	87.5	14.9	372.5	4.26	643	4.8	7.3
	132.80	87.5	14.6	365.0	4.17	854	6.4	9.8
	132.70	87.4	14.7	367.5	4.20	750	5.7	8.6
24-May-85	132.80	87.2	14.8	370.0	4.24	732	5.5	8.4
	132.50	87.3	14.5	362.5	4.15	809	6.1	9.3
	132.30	87.7	14.5	362.5	4.13	768	5.8	8.8
31-May-85	132.80	87.6	14.6	365.0	4.17	647	4.9	7.4
	132.80	87.6	14.6	365.0	4.17	618	4.7	7.1
	132.80	87.6	14.6	365.0	4.17	779	5.9	8.9
Aug-85	133.00	86.7	15.2	380.0	4.38	549	4.1	6.3
	133.00	86.7	15.2	380.0	4.38	593	4.5	6.8
	133.00	86.7	15.0	375.0	4.33	602	4.5	6.9
Dec-86	133.50	85.3	16.2	405.0	4.75	678	5.1	7.9
	133.50	85.3	15.9	397.5	4.66	671	5.0	7.9
	133.50	85.3	15.9	397.5	4.66	624	4.7	7.3
Apr-87	133.30	85.9	16.3	407.5	4.74	378	2.8	4.4
	133.30	85.9	15.9	397.5	4.63	438	3.3	5.1
	133.30	85.9	16.0	400.0	4.66	436	3.3	5.1
Dec-87	133.10	87.4	17.5	437.5	5.01	447	3.4	5.1
	133.10	87.4	17.6	440.0	5.03	534	4.0	6.1
	133.10	87.4	17.8	445.0	5.09	532	4.0	6.1
Jul-88	133.50	85.1	18.2	455.0	5.35	484	3.6	5.7
	133.50	85.1	18.1	452.5	5.32	411	3.1	4.8
	133.50	85.1	17.9	447.5	5.26	360	2.7	4.2
Aug-88	132.90	86.4	18.9	472.5	5.47	444	3.3	5.1
	132.90	86.4	18.9	472.5	5.47	488	3.7	5.7
	132.90	86.4	18.7	467.5	5.41	491	3.7	5.7
May-89	133.00	87.5	16.7	417.5	4.77	855	6.4	9.[illegible]
	133.00	87.5	16.7	417.5	4.77	717	5.4	8.2
	133.00	87.5	16.7	417.5	4.77	521	3.9	6.0
Aug-89	140.25	92.1	18.3	457.3	4.97	381	2.7	4.1
	140.25	92.1	18.3	457.3	4.97	261	1.9	2.8
	140.25	92.1	18.3	457.3	4.97	333	2.4	3.6
					Maximum =	855	6.4	10.0
					Minimum =	218	1.7	2.8
					Average =	553	4.2	6.4

* Assuming a coal heating value of 12,500 Btu/hr

FDER refers to the most stringent BACT limits for cement kilns of 1.6 lb/ton feed and 0.32 lb/MM Btu. Investigation reveals that these limits were for Lonestar (Utah) and Southwest Portland (Texas), respectively. Both of these determinations were for dry process kilns, which is not the same process as Tarmac's wet process kiln.

FDER has also not recognized the potential relationship between SO_2 and NO_x emissions in setting the BACT limit for NO_x. Extensive testing and operation on Kiln 3 has shown there is a distinct inverse relationship between these two pollutants. However, FDER has set a much lower NO_x limit for Kiln 2 than the BACT limit for Kiln 3; the engineering data indicate that to meet this limit, SO_2 emissions will increase. FDER's BACT determination is further flawed by ignoring this site-specific data.

Lastly, FDER has completely ignored Tarmac's proposal to conduct a 1-year testing program to collect adequate data upon which a true BACT limit can be established. The 169.3 lb/hr (6.77 lb/ton feed) is not suggested to be BACT for Kiln 2. This has been made very clear by Tarmac. It is only proposed as a starting point, or an initial limit, pending the results of the test program. The primary reasons for this were discussed for SO_2.

SUMMARY

To summarize, Tarmac strongly believes that the SO_2 and NO_x emission limits proposed by FDER are not achievable in Kiln 2. There are site-specific technical considerations alone which render the proposed emission rates as not achievable. Economic considerations preclude the use of a different type of kiln or different process. However, FDER has elected to ignore the site-specific aspects and data for this project and has imposed limits for totally different processes and projects. This is contrary to BACT guidelines, which require the BACT analysis to have a rationale arrived at after full consideration of data determined in a sound and consistent manner. Such decisions cannot be arbitrary, capricious, or contrary to law.

Table 1. Summary of BACT Determinations for Portland Cement Kilns - SO2 Emission

Company Name	State	Date of Permit	Source +	Fuel, sulfur content, %	Process	Capacity	Clinker Production	SO2 Emission Limit				Comments
								lb/hr	lb/MMBtu	lb/ton cl.	% Reduction	
					Dry Process Kilns							
Kaiser Cement & Gypsum Corp.	CA	26-Dec-78	PH/PC/Kiln/Mill	Coal, <1%	Dry	1.60 MMTPY	104 TPH	481		4.63		Baghouse alkali dust
Calif. Portland Cement Co.	CA	12-Jan-79	PC/Kiln	Coal	Dry	1 MMTPY	114 TPH	616		5.40	70%	Absorption by alkaline
Lonestar Industries Inc.*	TX	19-Feb-80	PC/Kiln/Mill	Coal	Dry	1 MMTPY	114 TPH	960		8.42	80%	Baghouse alkali dust
Texas LeHigh Cement Co.	TX	16-May-80	PC/Kiln/Mill	Coal	Dry	2,750 TPD	115 TPH	416		3.62	86%	Baghouse alkali dust
Creole Corp.	CA	20-May-80	PC/Kiln/Mill	Coal	Dry	1.10 MMTPY	67 TPH	344		5.13	85%	SO2 limit to be revised
Lonestar Portland Cement *	UT	16-Jan-81	PC/Kiln	Coal, low	Dry	510,000 TPY	71 TPH	64.5		0.91	85%	
Dixie Cement Co. *	TN	10-Sep-81	PH/PC/Kiln	Coal	Dry	800,000 TPY	99 TPH	4.16		0.04	85%	Limestone injection
Southwestern Portland Cement	TX	05-Nov-81	Kiln #3	Coal, mod.	Dry	2,500 TPD	104 TPH	134	0.49	1.30		Low S coal/partial scrubbing
Southwestern Portland Cement	TX	05-Nov-81	Kiln #1	Coal, low	Dry		71 TPH	209	1.12	2.94		No control equipment
Southwestern Portland Cement	TX	05-Nov-81	Kiln #2	Coal	Dry		82 TPH	86	0.52	1.40		Partial liq. scrub.
Lonestar Industries Inc.	WA	25-Jan-82	PC/Kiln/Mill	Coal	Dry	750,000 TPY	100 TPH	275		2.75		Precalciner/baghouse
Las Vegas Portland Cement *	NV	01-Feb-82	Kiln	Coal, <.9%	Dry	6,000 TPD	125 TPH	260		2.08	80%	2hr ave., low S coal
Florida Crushed Stone	FL	27-Mar-84	PH/PC/Kiln	Coal, <.8%	Dry	600,000 TPY	124 TPH	74		0.60		Integrated power plant
Nevada Cement Co. *	NV	05-Mar-85	PH/PC/Kiln	Coal	Dry		42 TPH	16		0.38	90%	Multistage susp. preheater
Lone Star Industries	CA	29-Jul-86	PH/PC/Kiln	Coal	Dry		100 TPH	250		2.50		40-50% SO2 control expected
Florida Mining & Material	FL	26-Dec-88	PH/Kiln/Mill	Coal, <1%	Dry		73.5 TPH	20		0.28	96%	<1 Wt.%S coal, design
					Wet Process Kilns							
Southwestern Portland Cement	TX	26-Feb-81	Rotary Kiln	Coal	Wet	775 TPD	32 TPH	513	2.41	16.00	20%	Alkali in raw matl. rx w/ S
Monolith Portland Cement Co.	CA	23-Dec-81	Rotary Kiln	Coal, <1.5%	Wet	500,000 TPY	62 TPH	300		4.48	50 to 75%	Baghouse alkali cement dust
Lonestar Florida Pennsuco	FL	28-Dec-84	Kiln #3	Coal, <2%	Wet		87.5 TPH	400		4.60		<2 Wt.% S coal (max. value)
Lonestar Florida Pennsuco*	FL	28-Dec-84	Kiln #2	Coal, <2%	Wet		25 TPH	125		5.00		<2 Wt.% S coal (max. value)
Lonestar Florida Pennsuco*	FL	28-Dec-84	Kiln #1	Coal, <2%	Wet		25 TPH	125		5.00		<2 Wt.% S coal (max. value)

* Facility was never built

+ PH = Preheater
PC = Precalciner

Table 2. Summary of BACT Determinations for Portland Cement Kilns - NOx Emission

Company Name	State	Date of Permit	Source +	Fuel, sulfur content, %	Process	Capacity	Clinker Production	NOx Emission Limit lb/hr	lb/MMBtu	lb/ton cl.	Comments
					Dry Process Kilns						
Kaiser Cement & Gypsum Corp.	CA	26-Dec-78	PH/PC/Kiln/Mill	Coal, <1%	Dry	1.60 MMTPY	184 TPH	1158		11.13	Reduced fuel usage, low temp.
Calif. Portland Cement Co.	CA	12-Jan-79	PC/Kiln	Coal	Dry	1 MMTPY	114 TPH	None		None	Reduced fuel usage, low furnace temp.
Lonestar Industries Inc.*	TX	19-Feb-80	PH/Kiln/Mill	Coal	Dry	1 MMTPY	114 TPH	360		3.16	Precalciner process design
Texas Lehigh Cement Co.	TX	16-May-80	PC/Kiln/Mill	Coal	Dry	2,750 TPD	115 TPH	240		2.09	Flash calciner
Creole Corp.	CA	20-May-80	PC/Kiln/Mill	Coal	Dry	1.10 MMTPY	67 TPH	213		3.18	Reduced temp. in precalcining furnace
Lonestar Portland Cement *	UT	16-Jan-81	PC/Kiln	Coal, low	Dry	510,000 TPY	71 TPH	236.6		3.33	
Dixie Cement Co. *	TN	10-Sep-81	PH/PC/Kiln	Coal	Dry	800,000 TPY	99 TPH	110		1.11	Dry process
Southwestern Portland Cement	TX	05-Nov-81	Kiln #3	Coal, mod.	Dry	2,500 TPD	104 TPH	86	0.32	0.85	Kiln design
Lonestar Industries Inc.	WA	25-Jan-82	PC/Kiln/Mill	Coal	Dry	750,000 TPY	100 TPH	300		3.00	Process design
Las Vegas Portland Cement *	NV	01-Feb-82	Kiln	Coal, <.9%	Dry	6,000 TPD	125 TPH	281		3.95	
Florida Crushed Stone	FL	27-Mar-84	PH/PC/Kiln	Coal, <.8%	Dry	800,000 TPY	124 TPH	360		2.90	Dry feed, design
Lone Star Industries	CA	29-Jul-86	PH/PC/Kiln	Coal	Dry		100 TPH	250		2.50	Alkali slurry, injection system
Florida Mining & Material	FL	26-Dec-88	PH/Kiln/Mill	Coal, <1%	Dry		73.6 TPH	320		4.35	
					Wet Process Kiln						
Monolith Portland Cement Co.	CA	23-Dec-81	Rotary Kiln	Coal, <1.5%	Wet	5 MTPY	67 TPH	260		3.88	Coal-fired, wet process

* Facility was never built

+ PH = Preheater
PC = Precalciner

For Routing To Other Than The Addressee

To _____ Location _____

To _____ Location _____

To _____ Location _____

From _____ Date _____

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

TO: Bill Thomas, P.E., Bureau of Air Regulation

FROM: Stephanie Brooks, P.E., DER-SEFD Stephanie Brooks, P.E.

DATE: April 10, 1990

SUBJECT: Proposed Permit for Tarmac Kiln 2

Specific Condition 3. does not reference Kiln 2 like all other Specific Conditions that are related to emission limitations do. No other comments about this permit from the air section.