John K.

Florida Department of
Environmental Protection

Memorandum

TO: Donna Gordon, Chief, Code Enforcement
Dade County DERM

FROM: A. A. Linero, P.E. Administrator 7/28

DATE: July 28, 1997

SUBJECT: Tarmac/Pennsuco Kiln No. 2

Per our teleconference of July 25, 1997 enclosed are the following references to nitrogen oxides emissions limits for Tarmac Kiln 2 from our permit files:

- EPA-issued Final Determination PSD-FL-050 dated July 8, 1980 for proposed conversions of Pennsucco Kilns 1, 2, and 3 to coal. Permit Condition 8 limits NOx from Kiln 2 to 118 lb/hr and 4.73 lb/ton clinker while burning coal. Per Table 4, this was the limit proposed by the applicant. Apparently the Kiln 2 conversion was deferred for some 10 years.

- Excerpt from application dated August 31, 1989 for Kiln 2 coal conversion project. Page 4 of the sealed application gives a maximum NOx emission rate of 169.25 lb/hr (6.77 lb/ton clinker). Value is also given on Page 2-6.

- Letter dated March 9, 1993 from KBN to DEP requesting exemption of Kilns 2 and 3 from Reasonable Available Control Technology (RACT) requirements for NOx. Table 2-1 attached to the letter acknowledges that the NOx limit is 113.8 lb/hr (4.55 lb/ton clinker). It includes the caveat that if emissions are between 113.8 to 169 lb/hr, Best Available Control Technology (BACT) may be re-evaluated by FDEP.

I was not the permitting engineer on any of these actions related to Tarmac and I was not involved with the Rinker consent order. At first glance, note that the Tarmac case appears to be at least a violation of a BACT limit in a PSD permit (PSD-FL-142). Construction projects offer the best chance for upgrading emissions controls and that opportunity arose for Tarmac during the coal conversion. Tarmac (or Pennsucco) has known (or should have known) for at least 17 years roughly what levels of NOx emissions represent BACT for NOx for Kiln 2. Tarmac did not approach DEP with a clear solution to its NOx problem even after they were advised in writing on October 16, 1996 that "the Department will have to take appropriate action to enforce the existing permit limits."

The Rinker case involves violation of a fairly recent RACT rule and Rinker apparently did not implement a major construction project affording a routine opportunity to upgrade its emissions control. That does not excuse a violation, but it is a difference. Presumably the modernization project at Rinker will afford that opportunity. In any case, Rinker approached the DEP with proposed solutions to its problem.

Our staff is available to assist, but by and large it appears that the facts to adequately support your action can be readily retrieved from your files. I can come by during one of my routine visits and review them with DERM. Please call me or John Reynolds if you have technical questions regarding Tarmac. If you wish to consult on Rinker or (possible) Tarmac consent orders, please contact Jim Pennington directly. We can be contacted at 850/488-1344.

AAL/aal

cc: Pat Wong, DERM
Sharon Crabtree, DERM
Clair Fancy, BAR
Jim Pennington, BAR
Tom Tittle, SED

JR
Kiln # 2

METROPOLITAN DADE COUNTY, FLORIDA

METRODADE

RECEIVED

JUN 24 1997

BUREAU OF
AIR REGULATION

DERM

ENVIRONMENTAL RESOURCES MANAGEMENT
ENFORCEMENT SECTION
33 SOUTHWEST 2nd AVENUE
SUITE 1100
MIAMI, FLORIDA 33130-1540
(305) 372-6902

June 17, 1997

John D. Carr, President
Tarmac Florida, Inc.
1151 Azalea Garden Rd.
Norfolk, Va. 23502

CERTIFIED MAIL NO:P333150717
RETURN RECEIPT REQUESTED

Michael R. Kane, Vice President
Tarmac Florida, Inc.
11000 NW 121 Way
Medley, FL 33178

CERTIFIED MAIL NO:P333150723
RETURN RECEIPT REQUESTED

RE: Exceedances of permitted emissions at Tarmac/ Pennsuco portland Cement plant located at, near or in the vicinity of 11000 NW 121 Way, Medley, Florida, 33178.

Dear Messrs Carr and Kane:

NOTICE OF VIOLATION
AND
ORDERS FOR CORRECTIVE ACTION AND SETTLEMENT

A departmental review of reports for emission tests conducted on May 31, 1995 and December 17-20, 1996 revealed exceedances of allowable pollutants as follows:

Test Date	Emission Unit	Pollutant Test	Result	Allowable Emissions
5/31/95	kiln #2	Nitrogen Oxide	328.4 lbs/hr	113.8 lbs/hr
12/17/96	cooler #3	Particulate Matter	0.49 lbs/ton	0.1 lbs/ton
12/18/96	cooler #2	Particulate Matter	41.99 lbs/hr	23.71 lbs/hr
12/18/96	kiln #2	Particulate Matter	20.46 lbs/hr	14.40 lbs/hr
12/18/96	kiln #2	Nitrogen Oxide	307.21bs/hr	113.8 lbs/hr
12/19/96	kiln #3	Sulfur Dioxide	6.98 lbs/ton	4.6 lbs/ton

Additionally, you have failed to submit the 1995 Annual Operating Report (AOR) for the referenced facility.

Be advised that the above constitute violations of the facility's Annual Operating Permits # AP-00604 and #AP-00368

issued by the Department of Environmental Resources Management (DERM) and specific conditions 5 and 8 of the Construction Permit AC 13-169901 and specific conditions 2 and 7 of the Operating Permit AO 13-238048 issued by the Florida Department of Environmental Protection (DEP).

Furthermore, said operations constitute violations of Section 62-296.320, 62-296.407 and 62-297.415 of the Florida Administrative Code and Sections 24-35.1, 24-54 and 24-55 of the Metropolitan Dade County Environmental Protection Ordinance.

Based on the above, and pursuant to the authority granted to me under Chapter 24, I am ordering you to submit to this Department the following items within thirty (30) days of receipt of this Notice:

(1) A complete written plan detailing proposed corrective actions to ensure that the allowable limits for emissions are not exceeded.

Be further advised that the above-referenced violations are subject to mandatory civil penalties which have been calculated at the amount of one hundred ninety two thousand dollars ($192,000). This case penalty calculation represents a settlement offer which shall remain open for thirty (30) days from your receipt of this letter.

Failure to resolve this matter within the thirty (30) day time period may result in this case being referred to the Office of the County Attorney for further enforcement action in a court of competent jurisdiction.

If you have any questions regarding the above please contact this office at (305) 372-6902 or the Air Facilities Section at (305) 372-6925.

Sincerely,

Sharon Crabtree
Code Enforcement Officer

CC: A.A. Linero, DEP
CC: Tom Tittle, DEP
CC: Albert Townsend, Tarmac PBC
SC:kjb

Florida Department of Environmental Protection

Memorandum

TO: Donna Gordon, Chief, Code Enforcement
Dade County DERM

FROM: A. A. Linero, P.E. Administrator A A Linero 4/15

DATE: April 15, 1997

SUBJECT: Tarmac/Pennsuco Kiln No. 2

Per your verbal request of April 14, 1997, attached are the following items from the permitting files in Tallahassee:

- Copy of Operating permit AO 13-238048 issued December 17, 1993
- Letter dated May 8, 1995 relating to the Department's extension of the construction permit PSD-FL-142 Kiln No. 2
- Letter dated July 21, 1995 from Tarmac to Mr. Clair Fancy containing data for six stack emissions tests
- Letter from Tarmac dated August 30, 1995 regarding the submittal of the processing fee of $250 for an extension
- Letter from Hopping, Green, Sams & Smith dated October 3, 1995, discussing future tactics for resolving NO_x issue
- Department letter dated November 20, 1995 to Tarmac granting the requested extension
- Letter from KBN dated February 16, 1996 consisting of a literature search completed on the behalf of Tarmac relating to NO_x issues
- Letter from KBN dated May 30, 1996 to the Department relating the status of Tarmac efforts to reduce NO_x, including a summary of SO_2 and NO_x emissions
- Copy of pertinent section 62-213.420(1)(a)4

Please call me if you have any further questions or requests at (904) 488-1344.

AL/hh

cc: Pat Wong, DERM (w/o attachments)
Tom Tittle, SED (w/o attachments)
Pat Comer, OGC (w/o attachments)
Luna Ergas, OGC (w/o attachments)
Jim Pennington, BAR (w/o attachments)

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

January 21, 1997

RECEIVED
JAN 23 1997
BUREAU OF
AIR REGULATION

Mr. A. A. Linero, Administrator
New Source Review Section
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Fl 32399-2400

Re: Investigation of NO_x Emissions
Tarmac Florida, Kiln No. 2

Dear Mr. Linero:

The purpose of this letter is to respond to the Florida Department of Environmental Protection (the "Department") letter dated October 16, 1996, and to present a status report on the investigation of NO_x emissions from Kiln No. 2. As you are aware, Tarmac Florida, Inc., has been investigating the high NO_x emissions being experienced from Kiln 2, and potential methods to reduce the emissions. The thrust of our efforts has been toward discovering the reasons for the high emissions, and what can be done to reduce the emissions.

This letter presents a status report to the Department, which presents the results of our efforts to date. Some of the information presented in our May 28, 1996, status report is repeated herein, in order to be complete. In addition, Tarmac's continuing efforts to determine if NO_x reduction measures implemented by Tarmac can result in achieving the permitted NO_x limit, or to what extent they can reduce emissions, are described.

Kiln No. 3 Emissions and Basis for Original BACT

The Department has requested that Tarmac investigate why the NO_x emissions from Kiln No. 2 exceed the BACT limit stated in the permit, and why such emissions are much higher than Kiln No. 3, which was the basis for the BACT. Therefore, a review of the permitting history of the Kiln No. 2 coal conversion PSD permit is presented.

In the original PSD permit application for the Kiln No. 2 coal conversion, Tarmac proposed BACT levels of 400 lb/hr for SO_2 (16 lb/ton clinker) and 169.3 lb/hr for NQ (6.77 lb/ton clinker) as starting points for the BACT evaluation. This starting point for NO_x was based on the permitted emission limit for Kiln No. 3, which experience had shown was achievable in Kiln No. 3, as well as a limited set of test data from Kiln No. 2 in 1980 when burning fuel oil and gas (see attached data).

It is important to recognize that the proposed BACT control technology was determined by the Department to be good combustion practices and the inherent SO_2 removal within the kiln system. Due to concerns over the nearby PSD Class I area (Everglades National Park), SO_2

emissions were considered to be of much more importance at the time. Subsequently, EPA agreed that BACT for NO_x was good operating and maintenance procedures to minimize NQ emissions.

Tarmac proposed and strongly argued that a comprehensive test program be conducted prior to setting any final emission limits for Kiln No. 2. This was due to the uncertainty in emissions from Kiln No. 2 versus Kiln No. 3 (due to different size of the kilns and different firing types). Tarmac alluded to a similar experience with Kiln No. 3 when it was converted to coal. An emission limit was agreed to without any test data, and the limit proved to be unattainable. Therefore, the Kiln No. 3 emission limits were revised. Tarmac did not want to make this same error again. Tarmac's commitment was to minimize SO_2 emissions to the extent possible, again due to the Class I area concerns. EPA approved the testing plan as a mechanism to set the BACT limit for SO_2 in January 1990. The BACT limit for NQ was also to be set through the testing program.

The actual test data from Kiln No. 2 shows that the original commitment of minimizing SO_2 emissions to the extent practical is limited if NO_x emissions are to be reduced. The data reflect Tarmac's previous experience that reducing NO_x emissions results in an increase in SO_2 emissions. Prior to the most recent change to the coal burner on Kiln No. 2, actual SQ emissions were well below the allowable BACT limit. However, after installation of the new coal burner, which significantly reduced NO_x emissions, the SO_2 emissions increased markedly. As will be discussed in this report, the low NO_x emissions in effect cause the conversely high SO_2 emissions.

Kiln No. 2 NOx Emissions

A complete summary of the SO_2 and NO_x emissions data and related process data obtained to date for Kiln No. 2 is presented in Table A attached. A discussion of these tests is provided below.

Burner Modifications

The series of tests spanning April 1994 through December 1995 were required by the original construction permit. These tests were conducted with the original coal burner installed under the construction permit. The nozzle diameter of the coal burner was 13 inches during these tests. Since these series of tests resulted in relatively high NO_x emissions, Tarmac decided to modify the coal burner. The rationale for this change is described below.

Kiln No. 2 is a direct fired kiln. This means that the primary combustion air to the kiln is provided through the coal burner. Air is swept through the coal mill, which provides for drying of the coal, as well as pneumatic conveying of the coal. The air and coal is then

discharged into the kiln through the burner. Additional secondary combustion air to the kiln is provided via air from the clinker cooler. Clinker cooler air is drawn into the kiln by means of the draft created by the kiln.

In the direct fired system, the control over the primary combustion air is limited since a certain minimum air flow through the coal mill must be maintained in order to dry and convey the coal. Flame characteristics (i.e., flame length and intensity) are critical to producing clinker of acceptable quality. However, one potential means of reducing the primary air requirements, and potentially reducing NO_x emissions, is to reduce the coal burner nozzle diameter. By reducing the nozzle diameter, it may be possible to maintain the critical flame characteristics and at the same time reduce the amount of primary air.

In order to investigate this potential, prior to the May 1996 testing the coal burner was modified to a 10 inch nozzle diameter. Although this modification resulted in NO_x emissions which were at the low end of the range of emissions experienced in the past for Kiln No. 2, emissions were still well above the permitted limit. In addition, this nozzle diameter was considered to be too small by plant personnel because it limited too severely the air flow through the coal mill, and high velocities at the nozzle tip were causing excessive wear on the burner tip.

As a result, the burner nozzle diameter was increased to 11 inches prior to the July 31, 1996 testing. Initial test results indicate that this nozzle configuration has significantly reduced NO_x emissions, that the burner is not adversely affected, and that satisfactory clinker can be produced using this burner. However, additional testing is needed to confirm these initial results. The December 1996 tests results were inconclusive due to kiln operating problems during the testing period.

Results of Testing

As shown in Table A, during the tests when the coal burner diameter was 13 inches (1994 and 1995 testing), the SO_2 emissions were generally very low, while the NQ emissions were high compared to the permitted emission rates. According to plant kiln operators, the SO_2 and NO_x emissions are related to the oxygen level in the kiln. They state that as the oxygen level in the kiln increases, SO_2 emissions decrease while NO_x emissions increase. They stated that this trend has also been evident on Kiln No. 3.

The available test data for Kiln No. 2 was analyzed to determine if a correlation exists between NO_x, oxygen and SO_2 emissions. During the stack tests on Kiln No. 2, oxygen level at the stack is measured. However, this measurement is affected by infiltration of ambient air into the system and is not reflective of conditions in the kiln. Therefore, oxygen levels in the kiln itself are needed. Tarmac maintains a kiln oxygen monitor on Kiln No. 2,

and data from this monitor is archived. Due to this archiving, kiln oxygen data for only the 1996 tests were available. As a result, the stack oxygen data were analyzed to determine if any correlation exists between NO_x emissions and stack oxygen level. Kiln oxygen levels were also evaluated for the 1996 data.

Based on this evaluation, no significant relationship between stack or kiln oxygen level and NO_x or SO_2 emissions was found. However, there is a general trend towards lower NO_x emissions as oxygen level in the kiln is decreased.

The coal burner nozzle diameter was 10 inches during the May 1996 testing. As described previously, this burner diameter caused operating problems with the burner and the coal mill. Also, NO_x emissions averaged 253 lb/hr and 2.1 lb/MMBtu, which are lower than many pervious tests, but remained above the permit "window" of 169.3 lb/hr , and above the RACT limit of 2.0 lb/MMBtu.

As a result, Tarmac modified the burner to an 11 inch nozzle diameter for the July/August 1996 testing. While resulting in satisfactory kiln and coal mill operation, the NO_x emissions from the July/August testing averaged 199.4 lb/hr and 1.56 lb/MMBtu. Although this emission level exceeds the permit "window" of 169.3 lb/hr, it is within the RACT limit of 2.0 lb/MMBtu.

Additional testing was conducted in December 1996 in an effort to duplicate the success of the July/August tests. Results from this test were much higher than the July/August testing, averaging 307 lb/hr and 2.90 lb/MMBtu. However, these higher emission rates are not considered to be representative of normal operation, because the kiln was experiencing some operational problems during the testing. During the testing, the kiln was experiencing several "hot spots" on the kiln shell.

Hot spots are areas of the kiln shell where the inner coating of brick and clinker has worn thin, causing the outer shell temperature to rise. When such conditions occur, the operator reduces fuel consumption and therefore clinker production, so as to not cause damage to the kiln. During this testing, the hot spots were in the area of the coal flame. As a result, the operator also increased the combustion air to the kiln, as a means of decreasing kiln temperatures. These operating changes are believed to be the cause of the higher NO_x emissions.

Because of the hot spots developing in the kiln, Tarmac is shutting down the kiln in January for repairs. The kiln will be brought back on-line in late February. Tarmac is planning an additional test for NO_x and SO_2 emissions in February or early March to confirm the emissions with the new burner pipe when the kiln is operating normally.

Conclusions

Based on the information gathered to date for Kiln No. 2, the reasons for the high NO_x emissions can be summarized as follows:

1. Kiln No. 2 operates at a kiln oxygen level normally in the range of 2 to 2.5%. By comparison, Kiln No. 3 normally operates at an oxygen level of approximately 1.0%.

2. Kiln No. 3 is an indirect fired kiln, meaning that the coal fuel and the primary combustion air are delivered to the kiln separately. This allows more control over the combustion air, allowing the combustion air to be varied to obtain optimum combustion conditions and flame characteristics. The air associated with the coal burner normally is not varied. In a wet process cement kiln, the flame characteristics (flame length and intensity) are critical to clinker production.

   In contrast, Kiln No. 2 is a direct fired kiln, which means that the primary combustion air is delivered to the kiln through the coal feed system. In such a system, the amount of combustion air cannot be reduced or varied, because the air velocity through the burner is critical to the flame characteristics.

3. This difference in the two kilns is reflected in the gas flow rates from the kilns. Kiln No. 2, with a maximum clinker production rate of 25 TPH, has an exhaust gas flow rate of 50,000 to 60,000 dscfm. This equates to 2,000 to 2,400 dscfm per ton of clinker produced. Kiln No. 3 normally operates at 87.5 TPH clinker with exhaust gas flow of 140,000 to 160,000 dscfm. This equates to 1,600 to 1,830 dscfm per ton of clinker produced. Therefore, Kiln No. 2 requires approximately 25% more air to operate than Kiln No. 3. This in turn results in a higher oxygen level in the kiln, and hence higher NO_x emissions but lower SO_2 emissions compared to Kiln No. 3.

Continuing Investigation

Based on the above discussion, Tarmac is focusing on reducing the amount of combustion air to the kiln as the only feasible means of lowering NO_x emissions. To this end, Tarmac recently installed a modified coal burner on Kiln No. 2 during the recent outage in April 1996, and again modified the burner in July 1996. The previous coal burner had a 13 inch nozzle, while the new burner will have a 11 inch nozzle. The intention in reducing the nozzle diameter is to reduce the amount of primary air introduced through the coal burner, while maintaining the velocity through the burner obtained by the previous burner design, thus maintaining the previous flame characteristics. The additional emissions test will also be used to determine the effects of the changes upon the grind ability of the clinker product. As discussed above, proper clinker production is dependent upon the flame characteristics.

Tarmac is planning on conducting an additional stack test on Kiln No. 2 with the new burner in late February or early March. This test will further assess the effectiveness and potential in reducing NO_x emissions from Kiln No. 2. The Department will be notified prior to the testing as to the exact test dates. Upon completion of the testing, the test data will be analyzed and submitted to the Department. This analysis, along with analysis of the historic test data as described above, will be submitted to the Department within 45 days of completing the testing.

Please call if you have any questions concerning this status report.

Sincerely,

Mark J. Aguilar for

David A. Buff, P.E.
Principal Engineer
Florida P.E. #19011

SEAL

cc: Al Townsend
Scott Quass
Jim Alves

cc: C. Reynolds, DAR
F. Deiss, OGC
T. Tittle SED
E. Anderson, Dade Co.
B. Beals, EPA

Table A. Summary of NOx/SO2 Emissions From Kiln No. 2, Tarmac Florida

Date	Run#	Kiln Feed (TPH)	Clinker (TPH)	Coal Usage(a) (TPH)	Coal Heating Value(b) (Btu/lb)	Heat Input (MMBtu/hr)	Heat Rate (MMBtu/ton clinker)	Coal Sulfur %	Sulfur Dioxide Emissions					Nitrogen Dioxide Emissions					Oxygen Level (%)		Stack Flow	
									ppm	lb/hr	lb/MMBtu	lb/ton kiln feed	lb/ton clinker	ppm	lb/hr	lb/MMBtu	lb/ton kiln feed	lb/ton clinker	Stack	Kiln	acfm	dscfm
04/26/94	1	39.58	24.08	4.58	13,241	121.29	5.04	1.86	0.63	0.37	0.003	0.009	0.015	1,187	450	3.71	11.37	18.69			86,415	59,855
04/26/94	2	39.58	24.08	4.58	13,241	121.29	5.04	1.86	0.61	0.36	0.003	0.009	0.015	1,092	427	3.52	10.79	17.73			91,144	59,855
04/26/94	3	39.58	24.08	4.58	13,241	121.29	5.04	1.86	0.61	0.35	0.003	0.009	0.015	1,117	422	3.48	10.66	17.52			86,816	57,827
06/28/94	1	38.33	23.6	5.33	13,241	141.15	5.98	1.75	54.18	32.33	0.229	0.843	1.370	610	255	1.81	6.65	10.81			93,138	59,875
06/28/94	2	38.33	23.6	5.33	13,241	141.15	5.98	1.75	108.16	62.76	0.445	1.637	2.659	669	281	1.99	7.33	11.91			90,738	58,286
06/28/94	3	38.33	23.6	5.33	13,241	141.15	5.98	1.75	88.07	51.46	0.365	1.343	2.181	655	282	2.00	7.36	11.95			92,633	58,642
06/28/94	4	38.46	24.0	5.41	13,241	143.27	5.97	1.75						787	332	2.32	8.63	13.83				58,937
06/28/94	5	38.46	24.0	5.41	13,241	143.27	5.97	1.75						579	246	1.72	6.40	10.25				59,280
08/31/94	1	32.8	19.3	4.90	13,241	129.76	6.72	0.85	9.90	5.03	0.039	0.153	0.261	648	237	1.83	7.23	12.28	9.40		78,548	50,967
08/31/94	2	32.8	19.3	4.90	13,241	129.76	6.72	0.85	20.60	10.89	0.084	0.332	0.564	514	195	1.50	5.95	10.10	9.40		80,268	51,988
08/31/94	3	32.8	19.3	4.90	13,241	129.76	6.72	0.85	15.00	7.76	0.060	0.237	0.402	488	182	1.40	5.55	9.43	9.40		78,548	50,967
10/27/94	1	38.9	24.7	5.10	13,241	135.06	5.47	0.76	4.39	2.56	0.019	0.066	0.104	754	316	2.34	8.12	12.79	9.72		115,146	58,456
10/28/94	3	39.8	26.1	5.50	13,241	145.65	5.58	0.76	3.43	1.96	0.013	0.049	0.075	809	333	2.29	8.37	12.76	9.76		115,912	57,531
10/28/94	4	39.8	26.1	5.50	13,241	145.65	5.58	0.76	30.52	16.75	0.115	0.421	0.642	544	215	1.48	5.40	8.24	9.28		113,480	55,094
01/03/95	1	40.5	25.0	4.75	13,278	126.14	5.05	0.88	1.61	0.92	0.007	0.023	0.037	618	255	2.02	6.29	10.19	10.30		91,761	57,583
01/03/95	2	40.5	25.0	4.75	13,278	126.14	5.05	0.88	1.26	0.70	0.006	0.017	0.028	988	398	3.16	9.84	15.93	10.30		88,956	56,308
01/03/95	3	40.5	25.0	4.75	13,278	126.14	5.05	0.88	1.23	0.07	0.001	0.002	0.003	883	354	2.81	8.74	14.16	9.76		89,294	56,002
05/31/95	1	38.5	24.0	5.30	13,278	140.75	5.86	0.67	NA	4.23	0.030	0.110	0.176	923	347	2.46	9.01	14.45	10.70		105,551	52,186
05/31/95	2	38.5	24.0	5.29	13,278	140.48	5.85	0.67	NA	7.26	0.052	0.189	0.303	883	332	2.36	8.62	13.84	11.10		105,918	51,013
05/31/95	3	38.5	24.0	5.29	13,278	140.48	5.85	0.67	NA	1.81	0.013	0.047	0.075	821	322	2.29	8.35	13.40	11.20		107,367	53,963
12/11/95	1	35.0	20.8	5.10	13,278	135.44	6.51		1.51	0.91	0.007	0.026	0.044	728	308	2.28	8.80	14.81	11.00		113,178	59,063
12/11/95	2	35.0	20.8	5.10	13,278	135.44	6.51		1.53	0.91	0.007	0.026	0.044	824	355	2.62	10.14	17.07	11.30		120,039	60,164
12/11/95	3	35.0	20.8	5.10	13,278	135.44	6.51		0.00	0.00	0.000	0.000	0.000	1,044	448	3.31	12.80	21.54	10.90		118,322	59,898
5/31/96	1	35.0	22.1	4.80	12,893	123.77	5.60	1.19	3.90	2.13	0.017	0.061	0.096	547	217	1.75	6.20	9.82	9.80	1.50	113,456	55,435
5/31/96	2	35.0	22.1	4.80	12,893	123.77	5.60	1.19	2.20	1.25	0.010	0.036	0.057						9.70	1.70	118,408	57,881
5/31/96	2-A	35.0	22.1	4.70	12,893	121.19	5.48	1.19						629	261	2.15	7.46	11.81	9.70	1.70		
5/31/96	2-B	35.0	22.1	4.60	12,893	118.62	5.37	1.19						588	244	2.06	6.97	11.04	9.72	1.75		
5/31/96	3	35.0	22.1	4.60	12,893	118.62	5.37	1.19	1.50	0.89	0.008	0.025	0.040	646	267	2.25	7.63	12.08	9.75	1.75	118,041	57,609
5/31/96	4	35.0	22.1	4.50	12,893	116.04	5.25	1.19	1.70	1.02	0.009	0.029	0.046	655	275	2.37	7.86	12.44	9.87	1.90	118,479	58,598
7/31/96	1	27.8	21.9	5.00	12,429	124.29	5.68	0.96						433	177	1.42	6.37	8.08		0.75		56,923
8/01/96	1	32.0	20.7	5.20	12,429	129.26	6.24	1.03	253	147	1.137	4.594	7.101	468	195	1.51	6.09	9.42	9.45	1.00	117,376	58,211
8/01/96	2	32.0	20.7	5.15	12,429	128.02	6.18	1.03	339	193	1.508	6.031	9.324	487	199	1.55	6.22	9.61	9.21	0.70	115,061	57,150
8/01/96	3	32.0	20.7	5.15	12,429	128.02	6.18	1.03	311	181	1.414	5.656	8.744	512	215	1.68	6.72	10.39	9.06	0.50	112,202	58,517
8/01/96	4	32.0	20.7	5.15	12,429	128.02	6.18	1.03	235	133	1.039	4.156	6.425	520	211	1.65	6.59	10.19	9.04	0.60	114,985	56,793
12/18/96	1	32.6	21.0	3.90	13,589	105.99	5.05	1.19	324	183	1.727	5.613	8.714	756	307	2.90	9.42	14.62		1.50		56,751
12/19/96	2	31.0	20.4	3.90	13,589	105.99	5.20	1.19	86	48	0.453	1.548	2.353	721	291	2.75	9.39	14.26		1.50		56,401
12/19/96	3	31.0	20.4	3.90	13,589	105.99	5.20	1.19	295	157	1.481	5.065	7.696	842	323	3.05	10.42	15.83		1.50		53,484
							Number of Tests =		32	32	32	32	32	36	36	36	36	36	25	14	29	35
							Minimum =		0.0	0.0	0.000	0.000	0.000	433	177	1.40	5.40	8.08	9.04	0.50	78,548	50,967
							Average =		68.6	39.3	0.322	1.199	1.863	721	291	2.27	8.05	12.87	9.95	1.31	103,144	56,786
							Maximum =		339.0	193.0	1.727	6.031	9.324	1187	450	3.71	12.80	21.54	11.3	1.90	120,039	60,164
							RACT Limit =			NA			NA		NA	2.00		NA				
							Permit Limit =			195.0			7.8		113.8			4.55				
										275.0 (c)			11.0 (c)		169.3 (c)			6.77 (c)				

(a) As-fired values.
(b) 1996 data based on weekly as-fired coal analysis; all other data based on yearly average coal analysis.
(c) Represents maximum value which limit can be raised to based on test data.