Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Mr. James S. Jenkins III
Vice President-Cement Operations
Rinker Materials Corp.
P. O. Box 650679
Miami, FL 33265-0679

4a. Article Number
P 230 523 750

4b. Service Type
☐ Registered ☐ Insured
XX Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery

MIAMI, FL ... JUN 17 1993 USPO

5. Signature (Addressee)

Chelsea A. Martinez

6. Signature (Agent)

8. Addressee's Address (Only if requested and fee is paid)

PS Form **3811**, December 1991 ☆U.S. GPO: 1992—323-402 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

P 230 523 750

Receipt for Certified Mail
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

UNITED STATES POSTAL SERVICE

Sent to Mr. James S. Jenkins III	
Street and No. Rinker Materials P- O. Box 650679	
P.O., State and ZIP Code Miami, FL 33265-0679	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date Mailed: 6-14-93 Permit: AC13-213153	

PS Form **3800**, June 1991

NOTICE OF PERMIT ISSUANCE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT ISSUANCE

CERTIFIED MAIL

In the Matter of an Application for Permit by:

DER File No. AC13-213153
Dade County

Mr. James S. Jenkins III
Vice President-Cement Operations
Rinker Materials Corporation
Post Office Box 650679
Miami, Florida 33265-0679

Enclosed is Permit Number No. AC13-213153 to allow continuous firing of whole tires in the No. 1 cement kiln as a supplemental fuel only at the Rinker Materials facility in Dade County, Florida, issued pursuant to Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-212 and 17-4.

A person whose substantial interests are affected by this permit may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of receipt of this Permit. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this permit. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

This permit is final and effective on the date filed with the Clerk of the Department unless a petition is filed in accordance with the above paragraphs or unless a request for extension of time in which to file a petition is filed within the time specified for filing a petition and conforms to Rule 17-103.070, F.A.C. Upon timely filing of a petition or a request for an extension of time this permit will not be effective until further Order of the Department.

When the Order (Permit) is final, any party to the Order has the right to seek judicial review of the Order pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date the Final Order is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Patricia G. Adams
for C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(904) 488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT ISSUANCE and all copies were mailed by certified mail before the close of business on 6-14-93 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

(Clerk) 6-14-93 (Date)

Copies furnished to:
- I. Goldman, SE District
- P. Wong, DERM
- M. Vardeman, Rinker Materials
- J. Koogler, P.E., K&A

Final Determination

Rinker Materials Corporation

Dade County

AC 13-213153

The request package to fire whole tires in the No. 1 cement kiln has been reviewed by the Department. Public Notice of the Department's Intent to Issue (authorization to conduct performance tests and the test review protocol) was published in the Miami Review on November 9, 1992. The proposed package was distributed on November 3, 1992, and made available for public inspection at the Department's Southeast District office and Bureau of Air Regulation office and the Dade County's Environmental Resources Managenent office. Since there were no comments received during the comment period, authorization to conduct tests on the No. 1 cement kiln and the test review protocol was signed December 14, 1992.

Since there was no demonstrated increases in actual pollutant emissions from the test results and that no previous construction permit has been issued for this source, then this construction permit is being issued for federally enforceability. Therefore, it is recommended that the construction permit be issued.

Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Virginia B. Wetherell, Secretary

PERMITTEE:
Rinker Materials Corporation
Post Office Box 650679
Miami, Florida 33265-0679

Permit Number: AC 13-213153
Expiration Date: June 30, 1994
County: Dade
APIS #: 50DAD13001408
Latitude/Longitude: 25°46'48"N
80°25'10"W
Project: Whole Tire Firing in the No. 1 Cement Kiln

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.); Florida Administrative Code (F.A.C.) Chapters 17-209 thru 17-297, and 17-4; and, 40 CFR (July, 1992 version). The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the authorization to fire whole tires in **only** the Rinker Materials Corporation's (RMC) No. 1 cement kiln as a supplemental fuel, but not as a start-up fuel. The maximum firing rate shall be 40.0% of the total Btu heat input (i.e., 105 MMBtu/hr), or 3.5 tons per hour. The No. 1 cement kiln's primary fuel is coal. The No. 1 cement kiln is rated at 262.0 MMBtu/hr maximum heat input. The facility is located in Miami, Dade County, Florida. The UTM coordinates are Zone 17, 558.2 km East and 2851.3 km North.

The Source Industrial Code: 3241 Hydraulic Cement Manufacturing

The Source Classification Code numbers are:

o 3-05-007-06	Cement Mfg-Wet Process	Tons Cement Produced
o 3-90-004-02	Residual Oil-Cement Kiln	10^3 Gallons Burned
o 3-90-006-02	Natural Gas-Cement Kiln	10^6 Ft^3 Burned
o 3-90-002-01	Bitum. Coal-Cement Kiln	Tons Burned
o 3-90-012-99	Solid Waste-General	Tons Burned

The source shall be in accordance with the request, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:

1. The Department's Intent to Issue an amendment package (i.e., authorization to conduct performance tests and test review protocol) dated November 3, 1992.
2. Public Notice on the amendment package received November 20, 1992.
3. Authorization to conduct performance tests on the No. 1 cement kiln signed December 14, 1993.

Attachments cont.:

4. RMC's No. 1 cement kiln test results received March 31, 1993.
5. Dr. John B. Koogler's letter with enclosures received April 12, 1993.
6. Mr. H. Patrick Wong's letter received May 19, 1993.
7. Dr. John B. Koogler's letter received May 24, 1993.
8. Final Determination dated June 10, 1993.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, F.S. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of F.S. and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance

GENERAL CONDITIONS:

with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

   a. Have access to and copy any records that must be kept under the conditions of the permit;

   b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and,

   c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

   a. a description of and cause of non-compliance; and,

   b. the period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the F.S. or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

GENERAL CONDITIONS:

10. The permittee agrees to comply with changes in Department rules and F.S. after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by F.S. or Department rules.

11. This permit is transferable only upon Department approval in accordance with F.A.C. Rules 17-4.120 and 17-30.300, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. The permittee shall comply with the following:

   a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
   b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
   c. Records of monitoring information shall include:

      - the date, exact place, and time of sampling or measurements;
      - the person responsible for performing the sampling or measurements;
      - the dates analyses were performed;
      - the person responsible for performing the analyses;
      - the analytical techniques or methods used; and,
      - the results of such analyses.

14. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

PERMITTEE:
Rinker Materials Corporation

Permit Number: AC 13-213153
Expiration Date: June 30, 1994

SPECIFIC CONDITIONS:

1. Operation permit No. AO 13-172954 and all associated documents and conditions are incorporated by reference.

2. Amendment to operation permit No. AC 13-172954, signed December 24, 1992, and all associated documents and conditions are incorporated by reference.

3. In the No. 1 cement kiln, whole tires shall **not** be used as a start-up fuel, but **only** as a supplemental fuel.

4. The maximum firing rate of whole tires in the No. 1 cement kiln shall not exceed 40.0 percent (i.e., 105 MMBtu/hr) of the total Btu heat input, or 3.5 tons per hour. The No. 1 cement kiln's maximum total heat input is 262 MMBtu/hr.

5. The firing rate of whole tires shall be quantified (weighed) continuously and recorded; and, the records shall be kept on file for a minimum of two years.

6. The quantity of all deliveries of whole tires shall be documented and kept on record/file for a minimum of two years.

7. Any change in the method of operation, etc., pursuant to Florida Administrative Code (F.A.C.) Rule 17-210.200 (Definitions-Modification), the permittee shall submit an application along with the appropriate processing fee to the Department's Bureau of Air Regulation.

8. Objectionable odors shall not be allowed off the facility's property in accordance with F.A.C. Rule 17-296.320.

9. The permittee shall comply with all of the applicable provisions and requirements of F.A.C. Chapters 17-209 thru 17-297, and 17-4; and, 40 CFR (July, 1992 version).

10. The No. 1 cement kiln and its associated equipment are subject to the applicable provisions of F.A.C. Rules 17-210.650: Circumvention; 17-210.700: Excess Emissions; and, 17-4.130: Plant Operations-Problems.

11. An Annual Operation Report (AOR) shall be submitted by April 1 of each year to the Department's Southeast District office and Dade County's Environmental Resources Management (DERM) office providing the No. 1 cement kiln's averaged process material input rate and clinker production rate of each month from the previous year. The AOR shall also contain the total amount, by weight, of whole tires fired by month from the previous year.

PERMITTEE:
Rinker Materials Corporation

Permit Number: AC 13-213153
Expiration Date: June 30, 1994

SPECIFIC CONDITIONS:

12. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

13. An application for an operation permit must be submitted to the Department's Southeast District office and the DERM office at least 90 days prior to the expiration date of this construction permit. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed and noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rules 17-4.055 and 17-210.350).

Issued this 9 day
of June, 1993

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Howard L Rhodes

Howard L. Rhodes
Director
Division of Air Resources
Management

Attachments 1 - 5

Available Upon Request

Attachment 6

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 • FAX 377-7158

KA 263-92-02

May 21, 1993

Mr. Bruce Mitchell
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Amendment to Operation Permit No. A013-172954 to Burn Whole Tires in Combination with Coal
Rinker Materials Corporation
Miami, Florida

Dear Mr. Mitchell:

This letter is to request an amendment to Rinker's air construction permit for Kiln No. 1 to allow the continuous burning of whole tires in combination with coal, in accordance with the terms of the agreement with FDER dated December 14, 1992 (copy attached).

It is our understanding that an operating permit amendment fee is not necessary per Rule 17-213.210, FAC; however, the requested amendment to the air construction permit will require a $250.00 fee. A check in this amount is attached hereto.

If you have any questions concerning this request, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler /nw

John B. Koogler, Ph.D., P.E.

JBK:PAR:wa
Enc.

c: Mr. Mike Vardeman, Rinker

00031

Attachment 7

METROPOLITAN DADE COUNTY, FLORIDA

METRO-DADE

DERM

ENVIRONMENTAL RESOURCES MANAGEMENT
33 S.W. 2nd AVENUE
MIAMI, FLORIDA 33130-1540
(305) 372-6789

May 13, 1993

Mr. Bruce Mitchell
State of Florida DER
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Benzene Emissions From Tire Burning at Rinker Materials Cement Plant

Attached for your review are the input data and results obtained from the computer screening model TSCREEN2 utilized to calculate the concentration of benzene emissions from the Rinker facility in Dade County when tires are burnt in kiln #1.

The results show that the maximum ambient concentration of benzene expected, 0.0049 ug/m**3 , is well below the State of Florida No-Threat Levels which are 7.2 ug/m**3 for TWA 24 hours and 0.12 ug/m**3 TWA annual concentrations. DERM therefore does not anticipate any detrimental effects to the local air quality or to the public health.

If you have any questions on the above, please call Mr. Frank Echanique of my staff at (305) 372-6943.

Sincerely,

H. Patrick Wong, Chief
Air Section

BEST AVAILABLE COPY

benzene Kinker

05-12-93
13:21:41

*** SCREEN-1.2 MODEL RUN ***
*** VERSION DATED 91/10 ***

BENZENE 5/12/93

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	.2522E-02
STACK HEIGHT (M)	=	41.75
STK INSIDE DIAM (M)	=	4.57
STK EXIT VELOCITY (M/S)	=	7.6200
STK GAS EXIT TEMP (K)	=	408.00
AMBIENT AIR TEMP (K)	=	293.00
RECEPTOR HEIGHT (M)	=	.00
IOPT (1=URB,2=RUR)	=	2
BUILDING HEIGHT (M)	=	.00
MIN HORIZ BLDG DIM (M)	=	.00
MAX HORIZ BLDG DIM (M)	=	.00

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	MAX CONC (PPM)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	.4959E-02	0.000002	1091.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

BUOY. FLUX = 109.97 M**4/S**3; MOM. FLUX = 217.72 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
50.	.5968E-17	5	1.0	1.6	5000.0	162.3	18.3	18.1	NO
100.	.7614E-07	5	1.0	1.6	5000.0	162.3	29.3	28.8	NO
200.	.8205E-05	5	1.0	1.6	5000.0	162.3	36.3	35.0	NO
300.	.1989E-04	3	10.0	11.5	3200.0	90.4	35.3	22.0	NO
400.	.3582E-03	1	3.0	3.3	960.0	237.6	99.4	79.7	NO
500.	.1926E-02	1	3.0	3.3	960.0	237.6	120.5	112.6	NO
600.	.3589E-02	1	3.0	3.3	960.0	237.6	140.9	161.0	NO
700.	.3814E-02	1	3.0	3.3	960.0	237.6	161.0	219.6	NO
800.	.3501E-02	3	10.0	11.5	3200.0	90.4	85.7	52.4	NO
900.	.4136E-02	1	1.0	1.1	630.4	629.4	253.7	400.1	NO
1000.	.4802E-02	1	1.0	1.1	630.4	629.4	267.9	483.9	NO

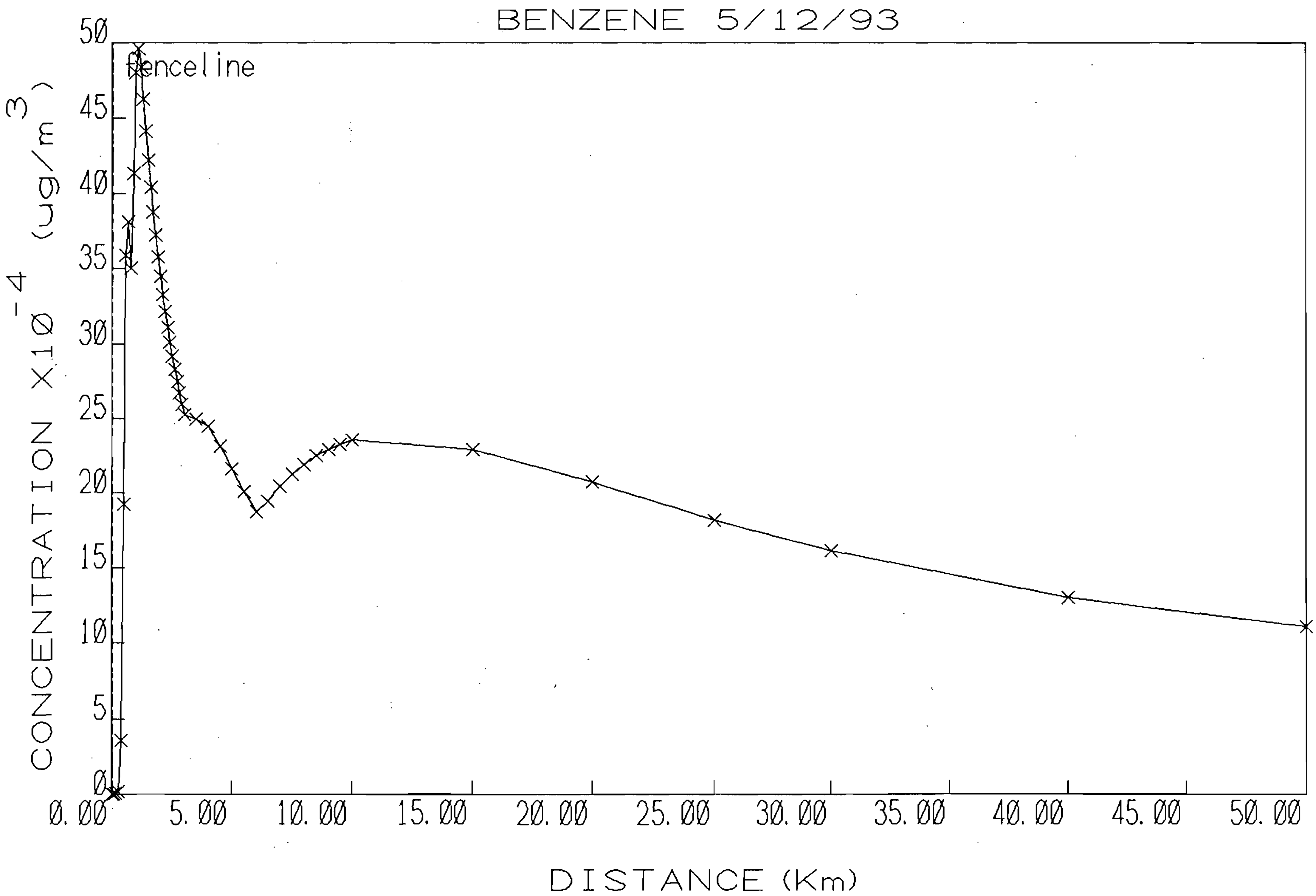
BEST AVAILABLE COPY

1100.	.4958E-02	1	1.0	1.1	630.4	629.4	282.3	580.1	NO
1200.	.4834E-02	1	1.0	1.1	630.4	629.4	297.1	688.4	NO
1300.	.4626E-02	1	1.0	1.1	630.4	629.4	312.0	808.5	NO
1400.	.4416E-02	1	1.0	1.1	630.4	629.4	327.0	940.3	NO
1500.	.4220E-02	1	1.0	1.1	630.4	629.4	342.2	1083.7	NO
1600.	.4040E-02	1	1.0	1.1	630.4	629.4	357.4	1238.7	NO
1700.	.3875E-02	1	1.0	1.1	630.4	629.4	372.7	1405.4	NO
1800.	.3721E-02	1	1.0	1.1	630.4	629.4	388.0	1583.7	NO
1900.	.3580E-02	1	1.0	1.1	630.4	629.4	403.4	1773.7	NO
2000.	.3448E-02	1	1.0	1.1	630.4	629.4	418.8	1975.4	NO
2100.	.3326E-02	1	1.0	1.1	630.4	629.4	434.1	2188.8	NO
2200.	.3213E-02	1	1.0	1.1	630.4	629.4	449.5	2414.0	NO
2300.	.3107E-02	1	1.0	1.1	630.4	629.4	464.8	2651.1	NO
2400.	.3007E-02	1	1.0	1.1	630.4	629.4	480.2	2900.0	NO
2500.	.2915E-02	1	1.0	1.1	630.4	629.4	495.5	3160.9	NO
2600.	.2827E-02	1	1.0	1.1	630.4	629.4	510.8	3433.7	NO
2700.	.2745E-02	1	1.0	1.1	630.4	629.4	526.0	3718.6	NO
2800.	.2668E-02	1	1.0	1.1	630.4	629.4	541.2	4015.6	NO
2900.	.2595E-02	1	1.0	1.1	630.4	629.4	556.4	4324.7	NO
3000.	.2526E-02	1	1.0	1.1	630.4	629.4	571.6	4645.9	NO
3500.	.2497E-02	2	1.0	1.1	630.4	629.4	498.0	463.5	NO
4000.	.2445E-02	2	1.0	1.1	630.4	629.4	553.4	527.6	NO
4500.	.2313E-02	2	1.0	1.1	630.4	629.4	608.5	593.4	NO
5000.	.2158E-02	2	1.0	1.1	630.4	629.4	663.1	660.6	NO
5500.	.2008E-02	2	1.0	1.1	630.4	629.4	717.3	729.0	NO
6000.	.1872E-02	2	1.0	1.1	630.4	629.4	771.0	798.3	NO
6500.	.1946E-02	5	1.0	1.6	5000.0	162.3	279.1	72.3	NO
7000.	.2042E-02	5	1.0	1.6	5000.0	162.3	297.9	74.5	NO
7500.	.2124E-02	5	1.0	1.6	5000.0	162.3	316.7	76.6	NO
8000.	.2191E-02	5	1.0	1.6	5000.0	162.3	335.2	78.6	NO
8500.	.2247E-02	5	1.0	1.6	5000.0	162.3	353.7	80.6	NO
9000.	.2292E-02	5	1.0	1.6	5000.0	162.3	372.0	82.5	NO
9500.	.2327E-02	5	1.0	1.6	5000.0	162.3	390.3	84.4	NO
10000.	.2354E-02	5	1.0	1.6	5000.0	162.3	408.4	86.2	NO
15000.	.2289E-02	5	1.0	1.6	5000.0	162.3	584.4	101.6	NO
20000.	.2070E-02	5	1.0	1.6	5000.0	162.3	753.1	114.6	NO
25000.	.1817E-02	5	1.0	1.6	5000.0	162.3	916.3	123.8	NO
30000.	.1610E-02	5	1.0	1.6	5000.0	162.3	1075.1	131.9	NO
40000.	.1301E-02	5	1.0	1.6	5000.0	162.3	1382.2	146.0	NO
50000.	.1106E-02	6	1.0	2.2	5000.0	132.7	1117.7	83.3	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 50. M:

1091.	.4959E-02	1	1.0	1.1	630.4	629.4	280.9	570.0	NO

```
DIST      = DISTANCE FROM THE SOURCE
CONC      = MAXIMUM GROUND LEVEL CONCENTRATION
STAB      = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M      = WIND SPEED AT THE 10-M LEVEL
USTK      = WIND SPEED AT STACK HEIGHT
MIX HT    = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
SIGMA Y = LATERAL DISPERSION PARAMETER
SIGMA Z = VERTICAL DISPERSION PARAMETER
DWASH     = BUILDING DOWNWASH:
            DWASH=   MEANS NO CALC MADE (CONC = 0.0)
            DWASH=NO MEANS NO BUILDING DOWNWASH USED
            DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
            DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
            DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB
```



Maximum concentration 4.959E-003 ug/cubic m at 1.091 Km (Automated Distances)

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To:	Location:
To:	Location:
To:	Location:
From:	Date:

Interoffice Memorandum

TO: Howard L. Rhodes

FROM: for Clair Fancy John C Brown

DATE: June 10, 1993

SUBJ: Approval of Construction Permit
AC 13-213153: No. 1 Cement Kiln
Rinker Materials Corporation

Attached for your approval and signature is a construction permit prepared by the Bureau of Air Regulation for the above referenced company to allow continuous firing of whole tires in the No. 1 cement kiln as a supplemental fuel only, and not as a start-up fuel.

Rinker Materials Corporation (RMC) is a major existing facility that produces cement from raw materials. As Florida Crushed Stone Company did, RMC was authorized and conducted tests on the No. 1 cement kiln while firing coal (100%) and while firing whole tires as a supplemental fuel to coal. The test results demonstrated that there was not an actual pollutant emissions increase. Because there was no previous construction permit to amend, then this construction permit is being issued for federally enforceability. An amendment to the operation permit, No. AO 13-172954, can be processed upon issuance of this construction permit. The facility is located in Miami, Dade County, Florida.

There were no comments received during the public notice period.

I recommend your approval and signature.

HLR/BM/rbm

Check Sheet

Company Name: Rinker Materials Corporation
Permit Number: AC 13-213153
PSD Number:
Permit Engineer:

Application:

- ☐ Initial Application
  - ☐ Incompleteness Letters
  - ☐ Responses
  - ☐ Waiver of Department Action
  - ☐ Department Response
  - ☐ Other

Cross References:
- ☐
- ☐
- ☐

Intent:

- ☐ Intent to Issue
- ☐ Notice of Intent to Issue
- ☐ Technical Evaluation
- ☐ BACT or LAER Determination
- ☐ Unsigned Permit

  Correspondence with:
  - ☐ EPA
  - ☐ Park Services
  - ☐ Other
- ☐ Proof of Publication
  - ☐ Petitions - (Related to extensions, hearings, etc.)
  - ☐ Waiver of Department Action
  - ☑ Other

Final Determination:

- ☑ Final Determination
- ☑ Signed Permit
- ☐ BACT or LAER Determination
  - ☐ Other

Post Permit Correspondence:

- ☐ Extensions/Amendments/Modifications
- ☐ Other

RECEIVED

MAR 3 1 1993

Division of Air
Resources Management

SUMMARY OF PARTICULATE MATTER, SULFUR DIOXIDE, TOTAL HYDROCARBONS, CARBON MONOXIDE, NITROGEN OXIDES, METALS AND BENZENE EMISSION RATES

BASELINE AND COAL/TDF FIRING CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27-29, 1993

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 N.W. 13TH STREET
GAINESVILLE, FL 32609
(904) 377-5822

KOOGLER & ASSOCIATES

TABLE OF CONTENTS

KOOGLER & ASSOCIATES

To the best of my knowledge, all applicable field and analytical procedures comply with Florida Department of Environmental Regulation requirements and all test data and plant operating data are true and correct.

John B. Koogler, PH.D., P.E.

State of Florida
Registration No. 12925

3/30/93

Date

JOHN B. KOOGLER
CERTIFICATE
NO. 12925
STATE OF FLORIDA
REGISTERED ENGINEER

SEAL

KOOGLER & ASSOCIATES

1.0 INTRODUCTION

Rinker Materials Corporation (Rinker) operates two wet process Portland cement kilns in Miami, Dade County, Florida. The cement plant was originally constructed in the mid-1950s. Presently, both kilns are permitted under permit A013-172954 at a feed rate of 55 tons per hour each. Each kiln is normally fired with coal at a heat input rate of approximately 200 MMBTU per hour.

Rinker applied to FDER requesting approval to burn tire derived fuel (TDF) as a supplemental heat source in Kiln No. 1 of the cement plant. On July 6, 1992, FDER issued an amendment to the referenced permit authorizing performance tests to evaluate plant performance while using TDF to supply up to 40 percent of the heat input to the kiln. During the period January 27-29, 1993, tests were conducted to measure air pollutant emissions from the stack common to both Kiln 1 and Kiln 2 while the plant was operating with whole TDF supplying up to 40 percent of the heat input to Kiln No. 1 and under baseline conditions. During the test period, Kiln No. 2 operated under normal conditions with coal providing 100 percent of the heat input.

During the two test periods, the operations of the two kilns were consistent. Kiln oxygen levels, kiln temperatures and gas flow rates were within ranges normally encountered. Overall the combined emission rate of particulate matter, total hydrocarbons, nitrogen oxides, sulfur dioxide and carbon monoxide decreased from 1959 pounds per hour under baseline conditions to 1464 pounds per hour under coal/TDF conditions. The major reduction was in nitrogen oxides emissions.

The coal/TDF tests were conducted during the period 1041-1730 on January 27, 1993. During the coal/TDF test period:

a. Coal was fed to Kiln No. 1 at an average rate of 5.56 tons per hour; providing 70.1 percent of the heat input or approximately 141.4 MMBTU per hour. TDF provided 29.9 percent of the heat input to Kiln No. 1; or approximately 60.3 MMBTU per hour. The total heat input to Kiln No. 1 averaged 201.7 MMBTU per hour. The Kiln No. 1 feed rate averaged 55.6 tons per hour and the clinker production rate averaged 33.9 tons per hour (Table 1).

b. The Kiln No. 2 feed rate averaged 55.4 tons per hour and the clinker production rate averaged 33.9 tons per hour. Coal provided 100 percent of the heat input (193.1 MMBTU/hr) at an average feed rate of 7.59 tons per hour (Table 1).

c. The particulate matter emission rate from the stack common to both kilns averaged 39.32 pounds per hour (Table 3). The allowable emission rate from the two kilns combined is 66 pounds per hour.

d. The total hydrocarbon emission rate averaged 14.1 pounds per hour as propane measured by EPA Method 25A. The emission rate of benzene averaged 0.0698 pounds per hour (Table 4).

e. The nitrogen oxides emission rate averaged 926 pounds per hour (Table 5) as measured by EPA Method 7E.

f. The carbon monoxide emission rate averaged 235 pounds per hour (Table 6) as measured by EPA Method 10.

g. The sulfur dioxide emission rate averaged 326 pounds per hour (Table 7A) as measured by EPA Method 6 and 249 pounds per hour as measured by EPA Method 6C (Table 7B).

h. The emission rates of metals ranged from 0.33 pounds per hour for zinc to less than detectable for antimony, arsenic, beryllium, cadmium, selenium and silver (Table 8).

i. All the stack gas characteristics such as flow, temperature, moisture, oxygen and CO_2 are reported in Table 9.

The baseline tests were conducted during the period 1352-1904 on January 29, 1993, after Kiln No. 1 had approximately 44 hours to equilibrate on 100 percent coal. During the baseline test period:

a. Coal was feed to Kiln No. 1 at an average rate of 6.55 tons per hour and provided 100 percent of the heat input; or approximately 177.9 MMBTU per hour. The kiln feed rate averaged 58.8 tons per hour and the clinker production rate averaged 35.8 tons per hour (Table 2).

b. Kiln No. 2 operated at an average feed rate of 58.4 tons per hour and a clinker production rate of 35.6 tons per hour. Coal provided 100 percent of the heat input; or 174.5 MMBTU/hr (Table 2). The coal feed rate for this kiln averaged 6.43 tons per hour.

c. The particulate matter emission rate from the stack common to both kilns averaged 19.37 pounds per hour (Table 10).

d. The total hydrocarbon emission rate averaged 11.5 pounds per hour as propane measured by EPA Method 25A. The emission rate of benzene averaged 0.0196 pounds per hour (Table 4).

e. The nitrogen oxides emission rate averaged 1182 pounds per hour (Table 5) as measured by EPA Method 7E.

f. The carbon monoxide emission rate averaged 426 pounds per hour (Table 6) as measured by EPA Method 10.

g. The sulfur dioxide emission rate averaged 380 pounds per hour (Table 7A) as measured by EPA Method 6 and 320 pounds per hour as measured by EPA Method 6C (Table 7B).

h. The emission rates of metals ranged from 0.74 pounds per hour for zinc to less than detectable for antimony, arsenic, beryllium, cadmium, selenium and silver (Table 11).

i. All the stack gas characteristics such as flow, temperature, moisture, oxygen and CO_2 are reported in Table 12.

2.0 PROCESS DESCRIPTION

The Rinker Materials Corporation plant consists of two wet process Portland cement kilns. Each of the two kilns has a permitted feed rate of 55 tons per hour (dry). There is no permit limit on either the clinker production or the heat input. Both kilns are normally fired with coal at an average rate of 6.5-7.0 tons per hour, each resulting in an average heat input rate of about 200 MMBTU per hour each. During the TDF test period, the coal feed rate to Kiln No. 1 averaged 5.57 tons per hour (at 12882 BTU per pound) for an average heat input rate of 141.4 MMBTU per hour. The TDF feed rate to the kiln averaged 1.84 tons per hour (at 16379 BTU per pound) for an average heat input rate of 60.3 MMBTU per hour. The total heat input to Kiln No. 1 averaged 201.7 MMBTU per hour, with coal providing 70.1 percent of the thermal energy and TDF providing 29.9 percent of the energy. The Kiln No. 2 coal feed rate averaged 7.59 tons per hour (at 12571 BTU/pound) for an average heat input of 193.1 MMBTU per hour.

During the TDF test period, the Kiln No. 1 feed rate averaged 55.6 tons per hour and the clinker production rate averaged approximately 33.9 tons per hour. The Kiln No. 2 feed rate averaged 55.4 tons per hour and the clinker production rate averaged 33.9 tons per hour.

During the baseline test period, the Kiln No. 1 feed rate averaged 58.8 tons per hour and the clinker production rate averaged approximately 35.8 tons per hour. The Kiln No. 1 coal feed rate averaged 6.55 tons per hour

(177.9 MMBTU per hour). The Kiln No. 2 feed rate averaged 58.4 tons per hour and the clinker production rate averaged 35.6 tons per hour. The Kiln No. 2 coal feed rate averaged 6.43 tons per hour for an average heat input of 174.5 MMBTU per hour.

3.0 LOCATION OF SAMPLING PORTS

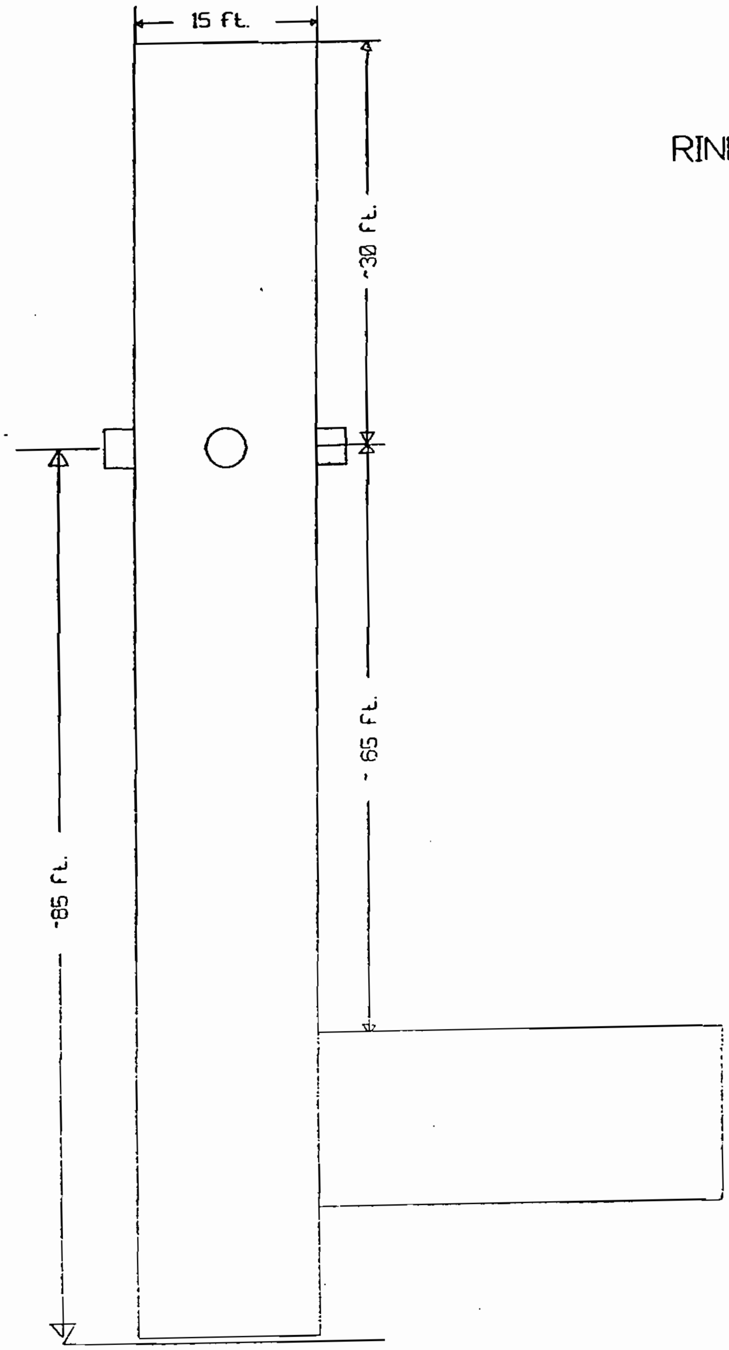
The location of the sampling points are shown in Figure 1. Stack gas flow rate measurements and sample collection for particulate matter, metals, sulfur dioxide (Method 6), and speciated volatile organic compounds (benzene) emission measurements were made through four sampling ports located at about the 85-foot level of the stack. Samples for determining the nitrogen oxides, carbon monoxide, sulfur dioxide (Method 6C) and total hydrocarbon concentrations of the stack gas were made at a single point near the center of the stack (Figure 1).

The four sampling ports at the 85 foot level of the stack are located at 90 degrees to one another in the 15-foot diameter stack; 65 feet above the point where the stack gases are introduced to the stack and approximately 30 feet below the top of the stack. A total of 24 sampling points were used for the velocity and sampling traverses. The sampling points were located in accordance with criteria established by EPA test Method 1 (40CFR60, Appendix A).

Measurements of the nitrogen oxides, carbon monoxide, total hydrocarbons, benzene and sulfur dioxide (Method 6C) concentrations in the stack gas were also made at the 85 foot level but at a single point near the center of the stack.

FIGURE 1

CEMENT PLANT
RINKER MATERIALS CORPORATION
MIAMI, FLORIDA



Distance from Stack Wall to Sampling Points

Point	Distance (in)
1	3.8
2	12.1
3	21.2
4	31.9
5	45.0
6	63.9

KOOGLER & ASSOCIATES

4.0 TEST METHODS

The nitrogen oxides concentrations were continuously measured in accordance with EPA Test Method 7E, carbon monoxide concentrations were continuously measured in accordance with EPA Test Method 10, sulfur dioxide was continuously measured in accordance with EPA Method 6C, and total hydrocarbon concentrations were continuously measured in accordance with EPA Test Method 25A. All test methods are described in 40CFR60, Appendix A. The sample of stack gas for these continuous analyzers was collected from a single point in the middle of the stack and transported to a heated manifold through a heated teflon sample line. The sample gas stream was then split with the fraction for NOx and SO_2 analyses passing through a cold trap to remove water vapor before the gas stream was introduced to the NOx and SO_2 analyzers. The gas sample for carbon monoxide was passed through as ascarite column to remove moisture and CO_2 and the sample for total hydrocarbons was transferred directly to the analyzer through another heated teflon line.

Moisture, stack gas flow rate, oxygen and CO_2 were measured in accordance with EPA Methods 1, 2, 3 and 4, 40CFR60, Appendix A. Benzene emission rates were measured at the 85 foot level of the stack with EPA Method M-0300 using the volatile organic sampling train (VOST). Sulfur dioxide samples were also collected in the EPA Method 6 sampling train (40CFR60, Appendix A). Particulate matter was determined from the probe and filter of the Multi-Metals sampling train as described in EPA SW846-0012.

5.0 SUMMARY OF RESULTS

The results of the TDF tests conducted during the period January 27, 1993, are summarized in Tables 1, 3 and 13-14. During the TDF tests:

a. The particulate matter emission rate from the stack common to both kilns averaged 39.32 pounds per hour (Table 3). The allowable emission rate from the two kilns combined is 66 pounds per hour.

b. Kiln No. 1 was fired with low-sulfur coal at a rate of 5.56 tons per hour (141.4 MMBTU/hr) and whole TDF at a rate of 1.84 tons per hour (60.3 MMBTU/hr). The total heat input rate to Kiln No. 1 averaged 201.7 MMBTU per hour (Table 1). Kiln No. 2 was fired with low sulfur coal only at a rate of 7.59 tons per hour providing 100 percent of the total heat input to the kiln of 193.1 MMBTU per hour.

   The feed rate to Kiln No. 1 averaged 55.6 tons per hour and the clinker production rate averaged 33.9 tons per hour. The feed rate to Kiln No. 2 averaged 55.4 tons per hour and the clinker production rate averaged 33.9 tons per hour.

c. The nitrogen oxides emission rate averaged 926 pounds per hour (Table 5) as measured by EPA Method 7E.

d. The carbon monoxide emission rate averaged 235 pounds per hour (Table 6) as measured by EPA Method 10.

e. The total hydrocarbon emission rate 14.1 pounds per hour as propane. The emission rate of benzene averaged 0.0698 pound per hour (Table 4).

f. The sulfur dioxide emission rate averaged 326 pounds per hour as measured by EPA Method 6 and 249 pounds per hour as measured by EPA Method 6C. A summary of these data is presented in Tables 7A and 7B, respectively.

g. Stack gas flow, temperature, moisture, oxygen and CO_2 contents are summarized in Table 9. The gas flow rate averaged 130,376 dscfm at 395°F and 32.1 percent moisture. The oxygen concentration averaged 7.4 percent and the carbon dioxide concentration averaged 17.21 percent.

h. The analyses of coal and the TDF burned in each kiln are summarized in Table 14. Analyses of feed, clinker and precipitator dust are summarized in Table 13.

i. The emission rates of metals ranged from 0.33 pounds per hour for zinc to less than detectable for antimony, arsenic, beryllium, cadmium, selenium and silver (Table 8).

The results of the baseline tests conducted during the period January 29, 1993, are summarized in Tables 2, 4-7 and 10-14. During the baseline tests:

a. The particulate matter emission rate from the stack common to both kilns averaged 19.37 pounds per hour (Table 10).

b. Kiln No. 1 was fired with low-sulfur coal at a rate of 6.55 tons per hour (177.9 MMBTU/hr). Kiln No. 2 was fired with low-sulfur coal at a rate of 6.43 tons per hour (174.5 MMBTU/hr) (Table 2).

   The feed rate to the Kiln No. 1 averaged 58.8 tons per hour and the clinker production rate averaged 35.8 tons per hour. The feed rate to Kiln No. 2 averaged 58.4 tons per hour and the clinker production rate averaged 35.6 tons per hour.

c. The nitrogen oxides emission rate averaged 1182 pounds per hour (Table 5) as measured by EPA Method 7E.

d. The carbon monoxide emission rate averaged 426 pounds per hour (Table 6) as measured by EPA Method 10.

e. The total hydrocarbon emission rate averaged 11.5 pounds per hour as propane measured by EPA Method 25A. Emission rates of benzene averaged 0.0196 pound per hour (Table 4).

f. The sulfur dioxide emission rate averaged 380 pounds per hour as measured by EPA Method 6 and 320 pounds per hour as measured by EPA Method 6C. A summary of these data is presented in Table 7A and 7B, respectively.

g. Stack gas flow, temperature, moisture, oxygen and CO_2 contents are summarized in Table 12. The gas flow rate averaged 120,109 dscfm at 274°F and 31.9 percent moisture. The oxygen concentration averaged 6.38 percent and the carbon dioxide concentration averaged 20.31 percent.

h. The analyses of coal burned in each kiln are summarized in Table 14. Analyses of feed, clinker and precipitation dust are summarized in Table 15.

i. The emission rates of metals ranged from 0.74 pounds per hour for zinc to less than detectable for antimony, arsenic, beryllium, cadmium, selenium and silver (Table 11).

TABLE 1

PLANT OPERATING PARAMETERS

TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27, 1993

	Run 1	Run 2	Run 3
Kiln No. 1			
Process weight, TPH	56.2	55.2	55.4
Coal rate, TPH	5.60	5.52	5.55
Coal heat input, MMBTU/hr	144.28	143.25	142.99
Tire feed rate, TPH	1.85	1.83	1.84
Tire heat input, MMBTU/hr	60.60	60.01	60.34
Total heat Input, MMBTU/hr	204.88	203.26	203.33
Clinker rate, TPH	34.3	33.7	33.8
Feed end temperature	415	425	425
Feed end oxygen	2.4	2.5	3.1
Kiln No. 2			
Process weight, TPH	55.5	55.7	55.1
Coal rate, TPH	7.59	7.45	7.72
Coal heat input, MMBTU/hr	190.83	187.31	194.10
Clinker rate, TPH	34.0	34.1	33.7
Feed end temperature	390	396	388
Feed end oxygen	2.3	2.1	1.8

TABLE 2

PLANT OPERATING PARAMETERS

BASELINE TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 29, 1993

	Run 1	Run 2	Run 3
Kiln No. 1			
Process weight, TPH	59.2	58.2	58.9
Coal rate, TPH	6.55	6.57	6.53
Coal heat input, MMBTU/hr	177.41	177.96	176.87
Clinker rate, TPH	36.1	35.5	35.9
Feed end temperature	270	272	280
Feed end oxygen	0.4	0.3	0.4
Kiln No. 2			
Process weight, TPH	59.1	58.2	57.9
Coal rate, TPH	6.47	6.41	6.40
Coal heat input, MMBTU/hr	176.20	174.57	174.30
Clinker rate, TPH	36.0	35.5	35.3
Feed end temperature	385	373	375
Feed end oxygen	2.5	2.6	2.6

Table 3

SUMMARY OF SOURCE EMISSION TEST DATA

Rinker Material Corporation
Cement Kiln - TDF
January 27, 1993

Run No.	Process Weight Rate (Tons/Hr)	Stack Flow Rate (SCFMD)	Stack Gas Temp. (Deg F)	Stack Gas Moisture (%)	Particulate Matter Conc. (gr/dscf)	Particulate Matter Conc. at 7% O2 (gr/dscf)	Particulate Matter Emission Rate (Lbs/Hr)
1	(1)	124926	340.2	31.7	0.0378	0.0408	40.50
2	(1)	134250	332.1	31.7	0.0339	0.0351	38.96
3	(1)	131954	314.8	32.1	0.0341	0.0367	38.51
Avg.	(1)	130377	329.0	31.8	0.0352	0.0375	39.32

(1) See Table 1

TABLE 4

SUMMARY OF TOTAL HYDROCARBON EMISSION MEASUREMENTS
BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27-29, 1993

METHOD 25A

	Total Hydrocarbon Emissions (1)			
	Baseline		TDF	
Run	PPM	lbs/hr	PPM	lbs/hr
1	13.9	11.3	11.9	10.2
2	14.5	12.2	15.6	14.4
3	13.5	11.0	19.7	17.8
Avg		11.5		14.1

(1) as propane

TABLE 5

SUMMARY OF NITROGEN OXIDES EMISSION MEASUREMENTS
BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27-29, 1993

METHOD 7E

	Nitrogen Oxides Emissions (1)			
	Baseline		TDF	
Run	PPM	lbs/hr	PPM	lbs/hr
1	1042	883	1153	1033
2	1401	1233	949	913
3	1672	1431	880	832
Avg		1182		926

(1) as NO_2

TABLE 6

SUMMARY OF CARBON MONOXIDE EMISSION MEASUREMENTS
BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27-29, 1993

METHOD 10

	Carbon Monoxide Emissions			
	Baseline		TDF	
Run	PPM	lbs/hr	PPM	lbs/hr
1	889	464	364	198
2	811	435	421	247
3	727	379	450	259
Avg		426		235

TABLE 7A

SUMMARY OF SULFUR DIOXIDE EMISSION MEASUREMENTS
BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27-29, 1993

METHOD 6

Run	Sulfur Dioxide Emissions			
	Baseline		TDF	
	PPM at Stack Conditions	lbs/hr	PPM at Stack Conditions	lbs/hr
1	324.36	378.21	215.32	248.64
2	301.86	395.74	212.25	276.66
3	286.55	365.18	345.98	452.43
Avg	304.26	379.71	257.85	325.91

TABLE 7B

SUMMARY OF SULFUR DIOXIDE EMISSION MEASUREMENTS
BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27-29, 1993

METHOD 6C

	Sulfur Dioxide Emissions			
	Baseline		TDF	
Run	PPM	lbs/hr	PPM	lbs/hr
1	243	286	148.7	186
2	279	342	137.1	183
3	280	333	287.3	378
Avg		320		249

TABLE 8

SUMMARY OF METALS EMISSION MEASUREMENTS
TDF CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27, 1993

Metal	Metals Emissions						
	Run 1		Run 2		Run 3		Average
	Sample Mass (μg)	Emission Rate (lbs/hr)	Sample Mass (μg)	Emission Rate (lbs/hr)	Sample Mass (μg)	Emission Rate (lbs/hr)	Emission Rate (lbs/hr)
Antimony	<13	<0.0043	<13	<0.0046	<13	<0.0041	<0.00433
Arsenic	<3	<0.0010	<3	<0.0011	<3	<0.0009	<0.00100
Beryllium	<3	<0.0010	<3	<0.0011	<3	<0.0009	<0.00100
Cadmium	<9	<0.0030	<9	<0.0032	<9	<0.0028	<0.00300
Chromium	25	0.0084	30	0.0106	17	0.0053	0.00809
Copper	24	0.0080	21	0.0074	12	0.0038	0.00639
Lead	91	0.0304	76	0.0268	96	0.0301	0.02911
Mercury	34.1	0.0114	38.6	0.0136	23.2	0.0073	0.01076
Nickel	14	0.0047	12	0.0042	6	0.0019	0.00359
Selenium	<200	<0.0668	<200	<0.0706	<200	<0.0627	<0.06672
Silver	<4	<0.0013	<4	<0.0014	<4	<0.0013	<0.00133
Zinc	160	0.0535	1380	0.4871	1430	0.4485	0.32969

TABLE 9

SUMMARY OF STACK GAS CHARACTERISTICS
TDF CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27, 1993

Run No.	Stack Gas Flow Rate (dscfm)	Stack Gas Temp. (^oF)	Stack Gas Moisture (%)	Meter Volume (dscf)	Stack Gas O_2 Conc (%)	Stack Gas CO_2 Conc (%)
1	124,926	340.2	31.7	49.440	8.0	15.6
2	134,250	332.1	31.7	50.310	7.5	17.5
3	131,954	314.8	32.1	55.649	6.8	18.5
Avg	130,376	329.0	32.1	51.800	7.4	17.2

Table 10

SUMMARY OF SOURCE EMISSION TEST DATA

Rinker Material Corporation
Cement Kiln - BASELINE
January 29, 1993

Run No.	Process Weight Rate (Tons/Hr)	Stack Flow Rate (SCFMD)	Stack Gas Temp. (Deg F)	Stack Gas Moisture (%)	Particulate Matter Conc. (gr/dscf)	Particulate Matter Conc. at 7% O2 (gr/dscf)	Particulate Matter Emission Rate (Lbs/Hr)
1	(1)	118174	271.9	32.1	0.0193	0.0195	19.54
2	(1)	122790	272.6	31.4	0.0184	0.0172	19.41
3	(1)	119363	278.5	32.2	0.0187	0.0175	19.16
Avg.	(1)	120109	274.3	31.9	0.0188	0.0181	19.37

(1) See Table 2

TABLE 11

SUMMARY OF METALS EMISSION MEASUREMENTS
BASELINE CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 29, 1993

Metal	Metals Emissions						
	Run 1		Run 2		Run 3		
	Sample Mass (μg)	Emission Rate (lbs/hr)	Sample Mass (μg)	Emission Rate (lbs/hr)	Sample Mass (μg)	Emission Rate (lbs/hr)	Average Emission Rate (lbs/hr)
Antimony	<13	<0.0056	<13	<0.0053	<13	<0.0052	<0.00540
Arsenic	<3	<0.0013	<3	<0.0012	<3	<0.0012	<0.00124
Beryllium	<3	<0.0013	<3	<0.0012	<3	<0.0012	<0.00124
Cadmium	<9	<0.0039	<9	<0.0037	<9	<0.0036	<0.00374
Chromium	8	0.0035	33	0.0136	40	0.0161	0.01105
Copper	2	0.0009	2	0.0008	7	0.0028	0.00150
Lead	36	0.0156	43	0.0177	45	0.0181	0.01714
Mercury	39.6	0.0172	13.5	0.0056	11.6	0.0047	0.00914
Nickel	2	0.0009	7	0.0029	10	0.0040	0.00259
Selenium	<200	<0.0869	<200	<0.0823	<200	<0.0805	<0.08322
Silver	<4	<0.0017	<4	<0.0016	<4	<0.0016	<0.00166
Zinc	2050	0.8902	1460	0.6006	1780	0.7168	0.73587

TABLE 12

SUMMARY OF STACK GAS CHARACTERISTICS
BASELINE CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 29, 1993

Run No.	Stack Gas Flow Rate (dscfm)	Stack Gas Temp. (^{o}F)	Stack Gas Moisture (%)	Meter Volume (dscf)	Stack Gas O_2 Conc (%)	Stack Gas CO_2 Conc (%)
1	118,174	271.9	32.1	35.995	7.13	19.92
2	122,790	272.6	31.4	39.482	6.00	20.50
3	119,363	278.5	32.2	39.210	6.00	20.50
Avg	120,109	274.3	31.9	38.229	6.38	20.31

TABLE 13

RAW MATERIAL AND PRODUCT ANALYSIS

TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27, 1993

Metal	UNIT	PRODUCT CLINKER	RAW MEAL SLURRY	KILN 1 COAL	KILN 2 COAL	TDF FUEL	KILN 1 ESP DUST	KILN 2 ESP DUST
Antimony	(ug/g)	<40	<40	******	******	******	<40	<40
Arsenic	(ug/g)	8	<4	17	17	<1	<4	4
Barium	(ug/g)	89.0	49.0	******	******	******	8.0	89.0
Beryllium	(ug/g)	<2	<2	******	******	******	<2	<2
Cadmium	(ug/g)	6.0	5.0	******	******	******	5.0	10.0
Copper	(ug/g)	52.0	26.0	******	******	******	36.0	42.0
Chromium	(ug/g)	54.0	19.0	69.0	69.0	73.0	27.0	27.0
Lead	(ug/g)	70.0	32.0	65.0	65.0	29.0	88.0	255.0
Manganese	(ug/g)	837.0	170.0	******	******	******	177.0	170.0
Mercury	(ug/g)	<0.02	0.08	0.12	0.14	0.07	0.03	0.07
Nickel	(ug/g)	50.0	31.0	******	******	******	38.0	38.0
Selenium	(ug/g)	<4	<4	******	******	******	5	15
Sodium	(ug/g)	742	594	******	******	******	445	890
Potassium	(ug/g)	2656	2076	******	******	******	7306	27812
Chlorine	(% Wt)	0.08	0.02	******	******	******	0.11	0.67
Sulfur trioxide	(% Wt)	0.32	0.02	******	******	******	3.32	6.40

TABLE 14

FUEL ULTIMATE ANALYSIS

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27-29, 1993

Parameter	UNIT	Baseline KILN 1 COAL	Baseline KILN 2 COAL	TDF KILN 1 COAL	TDF KILN 2 COAL	TIRE COMPOSITE
Moisture	(%)	1.11	0.98	1.64	1.79	1.09
Carbon	(%)	74.74	75.03	71.39	70.29	82.16
Hydrogen	(%)	5.21	5.11	4.68	4.64	7.65
Nitrogen	(%)	1.42	1.46	1.38	1.38	0.53
Sulfur	(%)	1.33	1.32	1.36	1.41	1.56
Ash	(%)	9.54	9.55	12.11	13.18	3.06
Oxygen	(%)	6.65	6.55	7.44	7.31	3.95
Heating Value	(Btu/lb)	13543	13617	12882	12571	16379

TABLE 15

RAW MATERIAL AND PRODUCT ANALYSIS

BASELINE TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 29, 1993

Metal	UNIT	PRODUCT CLINKER	RAW MEAL SLURRY	KILN 1 COAL	KILN 2 COAL	KILN 1 ESP DUST	KILN 2 ESP DUST
Antimony	(ug/g)	<40	<40	******	******	<40	<40
Arsenic	(ug/g)	4	<4	10	11	6	<4
Barium	(ug/g)	89.0	8.0	******	******	28.0	89.0
Beryllium	(ug/g)	<2	<2	******	******	<2	<2
Cadmium	(ug/g)	6.0	5.0	******	******	12.0	9.0
Copper	(ug/g)	58.0	26.0	******	******	39.0	45.0
Chromium	(ug/g)	46.0	19.0	88.0	85.0	19.0	19.0
Lead	(ug/g)	70.0	51.0	65.0	84.0	330.0	274.0
Manganese	(ug/g)	289.0	167.0	******	******	160.0	170.0
Mercury	(ug/g)	<0.02	<0.02	0.09	0.09	0.20	0.09
Nickel	(ug/g)	50.0	38.0	******	******	31.0	44.0
Selenium	(ug/g)	<4	4	******	******	13	18
Sodium	(ug/g)	890	594	******	******	890	964
Potassium	(ug/g)	3321	2076	******	******	27397	32212
Chlorine	(% Wt)	0.01	0.03	******	******	0.93	0.94
Sulfur trioxide	(% Wt)	0.50	0.81	******	******	3.72	6.08

APPENDIX

KOOGLER & ASSOCIATES

BASELINE TEST DATA

BASELINE CALCULATIONS

PARTICULATE MATTER AND METALS

GENERAL DATA

DATA FILE NAME: RIN_BASE

Company : Rinker Material Corporation			
Source/Unit : Cement Kiln - BASELINE			
Date : January 29, 1993		Cp :	0.840
Stack dia. : 180.00 inch	OR :	Duct Length :	0.00 inch
Oxygen Corr.: 7.0 percent		Duct Width :	0.00 inch
		Std. Temp. :	68 dF

FUEL ANALYSIS DATA,
(for calculating F-Factor)

			Process Wt.
Hydrogen, wt% :	0.00	Run 1 :	0.0 tons/hr
Carbon, wt% :	0.00	Run 2 :	0.0
Sulfur, wt% :	0.00	Run 3 :	0.0
Nitrogen, wt% :	0.00		
Oxygen, wt% :	0.00		
Btu/lb :	0		

F-Factor : dscf/MMBtu; enter this value or {F9} for result.

FIELD DATA

	RUN 1	RUN 2	RUN 3
Meter Temp., Tm (dF)	74.67	78.42	81.17
Stack Temp., Ts (dF)	271.92	272.58	278.54
Sq.Rt. dP	0.332	0.342	0.337
dH (in. H2O)	1.16	1.38	1.34
Meter Vol.,Vm (ft3)	36.304	40.080	40.011
Meter Y	0.987	0.987	0.987
Bar. Press.,Pb (in.Hg.)	30.35	30.35	30.35
Vol. H2O, Vlc (ml)	361.7	384.2	396.0
Static Press.,Ps (in.H2O)	-0.33	-0.33	-0.33
Test Time (min.)	60.0	60.0	60.0
Nozzle Dia.,Dn (in.)	0.414	0.414	0.414
Oxygen, O2 (%)	7.13	6.00	6.00
Carbon Dioxide, CO2 (%)	19.92	20.50	20.50
Carbon Monoxide, CO (%)	0.00	0.00	0.00

Is this Method 5 or Method 5/8 ? (5 or 58) : 5

LABORATORY RESULTS

	RUN 1	RUN 2	RUN 3	
GRAVIMETRIC ANALYSIS :				
Front Half Wash (FHW)	0.01490	0.01180	0.01170	grams
Filterable Particulate (MF)	0.03010	0.03540	0.03590	
Condensible Particulate (BHW)	0.00000	0.00000	0.00000	
SO2 ANALYSIS :				
SO2 Analysis (H2O2 impingers)......	0.00	0.00	0.00	mg H2SO4
Sample Volume, ml	0	0	0	
Sample Aliquot, ml	0	0	0	
Volume of Titer, ml	0.00	0.00	0.00	
Volume of Titer Blank, ml	0.00	0.00	0.00	

Normality of BaCl 0.0000000

LABORATORY RESULTS (Continued)

SULFATE ANALYSIS (FRONT HALF) :

Front Half Sulfate (FHS)	0.00	0.00	0.00	mg H2SO4
Sample Volume, ml	100	100	100	
Sample Aliquot, ml	10	10	10	
Volume of Titer, ml	0.00	0.00	0.00	
Volume of Titer Blank, ml	0.00	0.00	0.00	
	Normality of BaCl			0.0000000

SULFATE ANALYSIS (BACK HALF) :

Back Half Sulfate (BHS)	0.00	0.00	0.00	mg H2SO4
Sample Volume, ml	100	100	100	
Sample Aliquot, ml	10	10	10	
Volume of Titer, ml	0.00	0.00	0.00	
Volume of Titer IPA Blank, ml	0.00	0.00	0.00	
	Normality of BaCl			0.0000000

SOURCE TEST CALCULATIONS

PLANT : Rinker Material Corporation
Cement Kiln - BASELINE

RUN NO.: 1
DATE : January 29, 1993

STD.TEMP, Tstd	= 68 DEG. F	STATIC PRESS., Ps	= -0.33 in. H2O
METER TEMP, Tm	= 74.67 DEG. F	PITOT COFF., Cp	= 0.840
STACK TEMP, Ts	= 271.9 DEG. F	STACK I.D.	= 180.00 inch
AVG.VEL.HEAD, dP	= 0.110 in. H2O	DUCT LENGTH	= inch
METER ORIFICE, dH	= 1.16 in. H2O	DUCT WIDTH	= inch
METER VOL., Vm	= 36.304 Cu.Ft.	STACK AREA, As	= 176.715 Sq.Ft.
METER COFF., Y	= 0.987	TEST TIME	= 60.00 min.
BAR. PRESS., Pb	= 30.35 in.Hg	NOZZLE DIA.	= 0.414 inch
COND. (Vlc)	= 361.7 ml	NOZZLE DIA., An	= 9.4E-04 Sq.Ft.

GAS ANALYSIS = 7.13 % O2   0.00 % CO
19.92 % CO2   72.95 % N2

****

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x
(Pb + (dH / 13.6)) / (Tm + 460)..... = 35.995 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc = 17.025 scf

Bws = Vw(std) / (Vm(std) + Vw(std))........... = 0.321 ¦ Lower ¦ Bws

Bws @ Saturated Conditions = Vapor Press. of H2O ¦ value
@ Dew Point Temp. / (Ps, in.Hg.) .... = 1.000 ¦ used.

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 58.79

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 31.47

Ms = (Md x (1-Bws)) + (18.0 x Bws)............ = 27.15

P(stack) = Pbar + (Ps / 13.6) .... = 30.33 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460)
/ (Ms x P(stack))] .... = 22.45 ft/sec

Qs = vs x As x 60 .... = 238,070 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460))
x (P(stack)/29.92) .... = 118,174 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) /
(T(std) + 460) / 29.92] x 100 / [Time x
P(stack) x An x vs x 60] .... = 95.84 %

SOURCE TEST CALCULATIONS

PLANT : Rinker Material Corporation
Cement Kiln - BASELINE

RUN NO.: 2
DATE : January 29, 1993

STD.TEMP, Tstd	= 68 DEG. F	STATIC PRESS., Ps	= -0.33 in. H2O
METER TEMP, Tm	= 78.42 DEG. F	PITOT COFF., Cp	= 0.840
STACK TEMP, Ts	= 272.6 DEG. F	STACK I.D.	= 180.00 inch
AVG.VEL.HEAD, dP	= 0.117 in. H2O	DUCT LENGTH	= inch
METER ORIFICE, dH	= 1.38 in. H2O	DUCT WIDTH	= inch
METER VOL., Vm	= 40.080 Cu.Ft.	STACK AREA, As	= 176.715 Sq.Ft.
METER COFF., Y	= 0.987	TEST TIME	= 60.00 min.
BAR. PRESS., Pb	= 30.35 in.Hg	NOZZLE DIA.	= 0.414 inch
COND.(Vlc)	= 384.2 ml	NOZZLE DIA., An	= 9.4E-04 Sq.Ft.

GAS ANALYSIS = 6.00 % O2 0.00 % CO
20.50 % CO2 73.50 % N2

** *********

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x
(Pb + (dH / 13.6)) / (Tm + 460)..... = 39.482 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc = 18.084 scf

Bws = Vw(std) / (Vm(std) + Vw(std))........... = 0.314 ¦ Lower ¦ Bws

Bws @ Saturated Conditions = Vapor Press. of H2O ¦ value
@ Dew Point Temp. / (Ps, in.Hg.) .... = 1.000 ¦ used.

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 44.76

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 31.52

Ms = (Md x (1-Bws)) + (18.0 x Bws)............ = 27.27

P(stack) = Pbar + (Ps / 13.6) .... = 30.33 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460)
/ (Ms x P(stack))] .... = 23.11 ft/sec

Qs = vs x As x 60 .... = 245,077 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460))
x (P(stack)/29.92) .... = 122,790 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) /
(T(std) + 460) / 29.92] x 100 / [Time x
P(stack) x An x vs x 60] .... = 101.18 %

SOURCE TEST CALCULATIONS

PLANT : Rinker Material Corporation
Cement Kiln - BASELINE

RUN NO.: 3
DATE : January 29, 1993

STD.TEMP, Tstd	= 68 DEG. F	STATIC PRESS.,Ps	= -0.33 in. H2O
METER TEMP, Tm	= 81.17 DEG. F	PITOT COFF., Cp	= 0.840
STACK TEMP, Ts	= 278.5 DEG. F	STACK I.D.	= 180.00 inch
AVG.VEL.HEAD,dP	= 0.114 in. H2O	DUCT LENGTH	= inch
METER ORIFICE,dH	= 1.34 in. H2O	DUCT WIDTH	= inch
METER VOL., Vm	=40.011 Cu.Ft.	STACK AREA, As	= 176.715 Sq.Ft.
METER COFF., Y	= 0.987	TEST TIME	= 60.00 min.
BAR. PRESS., Pb	= 30.35 in.Hg	NOZZLE DIA.	= 0.414 inch
COND.(Vlc)	= 396.0 ml	NOZZLE DIA., An	= 9.4E-04 Sq.Ft.

GAS ANALYSIS = 6.00 % O2 0.00 % CO
20.50 % CO2 73.50 % N2

** *********

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460)..... = 39.210 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc = 18.640 scf

Bws = Vw(std) / (Vm(std) + Vw(std))........... = 0.322 ¦ Lower Bws value used.

Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Ps, in.Hg.) .... = 1.000

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 44.76

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 31.52

Ms = (Md x (1-Bws)) + (18.0 x Bws)............ = 27.16

P(stack) = Pbar + (Ps / 13.6) .... = 30.33 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460) / (Ms x P(stack))] .... = 22.92 ft/sec

Qs = vs x As x 60 .... = 243,032 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460)) x (P(stack)/29.92) .... = 119,363 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) / (T(std) + 460) / 29.92] x 100 / [Time x P(stack) x An x vs x 60] .... = 103.37 %

A. FIELD DATA SUMMARY

PLANT : Rinker Material Corporation
Cement Kiln - BASELINE

DATE : January 29, 1993

	RUN 1	RUN 2	RUN 3
Vlc = Vol water collected in train, ml	361.7	384.2	396.0
Vm = Sample gas vol, meter cond., dacf	36.304	40.080	40.011
Y = Meter calibration factor	0.9870	0.9870	0.9870
Pbar = Barometric pressure, in. Hg	30.35	30.35	30.35
Pstatic = Stack static pressure, in. H2O	-0.33	-0.33	-0.33
dH = Avg meter pressure diff, in. H2O	1.16	1.38	1.34
Tm = Absolute meter temp., degrees R	534.7	538.4	541.2
Vm(std) = Sample gas vol, Std. cond., dscf	35.995	39.482	39.210
Bws = Water vapor in gas stream, fraction	0.321	0.314	0.322
MF = Moisture factor (1 - Bws)	0.679	0.686	0.678
CO2 = Carbon Dioxide, dry, volume %	19.92	20.50	20.50
O2 = Oxygen, dry, volume %	7.13	6.00	6.00
N2 = Nitrogen, dry volume %	72.95	73.50	73.50
Md = Molecular weight of stack gas, dry	31.47	31.52	31.52
Ms = Molecular weight of stack gas, wet	27.15	27.27	27.16
Cp = Pitot tube coefficient	0.84	0.84	0.84
Sq.Rt. dP = Avg. square root of each dP	0.3316	0.3420	0.3371
Ts = Absolute stack temp., degrees R	731.9	732.6	738.5
A = Area of stack, ft2	176.71	176.71	176.71
Qstd = Volumetric flowrate, dscfm	118,174	122,790	119,363
An = Nozzle area, ft2	9.36E-04	9.36E-04	9.36E-04
O = Sample time, minutes	60.00	60.00	60.00
%I = Isokinetic variation, percent	95.84	101.18	103.37

B. PARTICULATE DATA SUMMARY

PLANT : Rinker Material Corporation
Cement Kiln - BASELINE

DATE : January 29, 1993

	RUN 1	RUN 2	RUN 3
Particulate Weight (FHW + MF + BHW), mg ...	45.00	47.20	47.60
Meter Volume, standard cond., Vm(std)	35.995	39.482	39.210
Carbon Dioxide, percent	19.92	20.50	20.50
Oxygen, percent	7.13	6.00	6.00
Particulate Concentration :			
gr/scf	0.0131	0.0127	0.0127
gr/dscf	0.0193	0.0184	0.0187
gr/dscf @ 12 % CO2	0.0116	0.0108	0.0110
gr/dscf @ 7% O2	0.0195	0.0172	0.0175

EMISSION RATE CALCULATIONS

PLANT :Rinker Material Corporation   RUN NO.:   1
       Cement Kiln - BASELINE   DATE   : January 29, 1993
                                          O2 CORR.:   7.0 %

STANDARD TEMP. :   68 DEG. F

****

Front Half Wash (FHW)	0.01490	grams	Vm(std)	35.995	ft3
Mass Filter (MF)	0.03010	grams	Vw(std)	17.025	ft3
Back Half Wash (BHW)	0.00000	grams	Qs(std)	118,174	dscfm
Front Half Sulfate (FHS)		mg H2SO4	Bws	0.321	
Back Half Sulfate (BHS)		mg H2SO4	CO2	19.92	%
H2O2 Catch (SO2)		mg H2SO4	O2	7.13	%

****

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528]		dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0131	gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0193	gr/dscf
gr/dscf x (12 / %CO2)	0.0116	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0195	@ 7% O2
0.00857 x Qs(std) x gr/dscf	19.54	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0131	gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0193	gr/dscf
gr/dscf x (12 / %CO2)	0.0116	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0195	@ 7% O2
0.00857 x Qs(std) x gr/dscf	19.54	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]		gr/scf
0.015432 x (FHS + BHS) / Vm(std)		gr/dscf
gr/dscf x (12 / %CO2)		@ 12% CO2
0.00857 x Qs(std) x gr/dscf		lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60864 x [T(std) + 460] x (mg H2SO4) / [98.076 x Vm(std)]		ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)]		@ O2 corr.
ppm x (1 - Bws)		ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..		lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x [20.9 / (20.9 - %O2)] x ppm		lb/MMBtu
lb/hr / (dscfm x 60 min/hr)		lb/dscf

EMISSION RATE CALCULATIONS

PLANT :Rinker Material Corporation
Cement Kiln - BASELINE

RUN NO.: 2
DATE : January 29, 1993
O2 CORR.: 7.0 %

STANDARD TEMP. : 68 DEG. F

****

Front Half Wash (FHW)	0.01180	grams	Vm(std)	39.482	ft3
Mass Filter (MF)	0.03540	grams	Vw(std)	18.084	ft3
Back Half Wash (BHW)	0.00000	grams	Qs(std)	122,790	dscfm
Front Half Sulfate (FHS)		mg H2SO4	Bws	0.314	
Back Half Sulfate (BHS)		mg H2SO4	CO2	20.50	%
H2O2 Catch (SO2)		mg H2SO4	O2	6.00	%

****

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] .... dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0127	gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0184	gr/dscf
gr/dscf x (12 / %CO2)	0.0108	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0172	@ 7% O2
0.00857 x Qs(std) x gr/dscf	19.41	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0127	gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0184	gr/dscf
gr/dscf x (12 / %CO2)	0.0108	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0172	@ 7% O2
0.00857 x Qs(std) x gr/dscf	19.41	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]		gr/scf
0.015432 x (FHS + BHS) / Vm(std)		gr/dscf
gr/dscf x (12 / %CO2)		@ 12% CO2
0.00857 x Qs(std) x gr/dscf		lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60864 x [T(std) + 460] x (mg H2SO4) / [98.076 x Vm(std)]		ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)]		@ O2 corr.
ppm x (1 - Bws)		ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..		lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x [20.9 / (20.9 - %O2)] x ppm		lb/MMBtu
lb/hr / (dscfm x 60 min/hr)		lb/dscf

EMISSION RATE CALCULATIONS

```
 PLANT :Rinker Material Corporation        RUN NO.:         3
        Cement Kiln - BASELINE             DATE    : January 29, 1993
                                           O2 CORR.:      7.0 %
        STANDARD TEMP. :        68 DEG. F
***********************************************************************
Front Half Wash (FHW)      0.01170 grams     | Vm(std)  39.210 ft3
Mass Filter (MF)           0.03590 grams     | Vw(std)  18.640 ft3
Back Half Wash (BHW)       0.00000 grams     | Qs(std) 119,363 dscfm
Front Half Sulfate (FHS)           mg H2SO4  | Bws        0.322
Back Half Sulfate (BHS)            mg H2SO4  | CO2       20.50 %
H2O2 Catch (SO2)                   mg H2SO4  | O2         6.00 %
***********************************************************************
F-FACTOR
--------
10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) -
0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] .........        dscf/MMBtu

FILTERABLE PARTICULATE
----------------------
15.432 x (FHW + MF) / [Vm(std) + Vw(std)] ..........  0.0127 gr/scf
15.432 x (FHW + MF) / Vm(std) ......................  0.0187 gr/dscf
gr/dscf x (12 / %CO2) ..............................  0.0110 @ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...  0.0175 @ 7% O2
0.00857 x Qs(std) x gr/dscf ........................   19.16 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..         lb/MMBtu

TOTAL PARTICULATE
-----------------
15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...  0.0127 gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std) ...............  0.0187 gr/dscf
gr/dscf x (12 / %CO2) ..............................  0.0110 @ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...  0.0175 @ 7% O2
0.00857 x Qs(std) x gr/dscf ........................   19.16 lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..         lb/MMBtu

TOTAL SULFATE
-------------
0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)] .......         gr/scf
0.015432 x (FHS + BHS) / Vm(std) ...................         gr/dscf
gr/dscf x (12 / %CO2) ..............................         @ 12% CO2
0.00857 x Qs(std) x gr/dscf ........................         lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..         lb/MMBtu

SULFUR DIOXIDE (SO2)
--------------------
1.60864 x [T(std) + 460] x (mg H2SO4) / [ 98.076 x
Vm(std)] ...........................................         ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)] .......         @ O2 corr.
ppm x (1 - Bws) ....................................         ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..         lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x
[20.9 / (20.9 - %O2)] x ppm ........................         lb/MMBtu
lb/hr / (dscfm x 60 min/hr) ........................         lb/dscf
```

SO2 (METHOD 6)

SO2 EMISSION CALCULATIONS

PLANT : Rinker Materials Corporation
Cement Kiln - BASELINE   DATE : January 29, 1993

Std. Temp. : 68 DEG. F
F-Factor : dscf/MMBtu

Run No.	Vm(std), dscf	lb/dscf	lb/MMBtu	ppm	ppm @7.0 %O2	lb/hr
1A	0.701	5.33E-05		321.33	324.36	378.21
1B						
Run Average	0.701	5.33E-05		321.33	324.36	378.21
2A	0.696	5.37E-05		323.58	301.86	395.74
2B						
Run Average	0.696	5.37E-05		323.58	301.86	395.74
3A	0.692	5.10E-05		307.16	286.55	365.18
3B						
Run Average	0.692	5.10E-05		307.16	286.55	365.18
Test Average	0.696	5.27E-05		317.36	304.26	379.71

CALCULATIONS :

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460) .... dscf

CSO2 = 7.061e-5 x [(Vt - Vtb) x N x (Vsoln / Va)] / Vm(std) .....lb/dscf

CSO2 = F-Factor x (lb SO2/dscf) x [20.9 / (20.9 - %O2)] .... lb/MMBtu

CSO2 = lb/dscf x (6.024e6) .... ppm

CSO2 = ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)] ..... ppm @ 7.0 % O2

ESO2 = lb/dscf x dscfm x (60 min/hr) .... lb/hr

Source/Unit : Cement Kiln - BASELINE
Date : January 29, 1993
Oxygen Corr.: 7.0 percent
F-Factor : dscf/MMBtu
Std. Temp. : 68 dF

PRINT_MENU — Place a 1 next to the pages to be printed, then select PRINT from program menu.

INPUT 1 Data Input.
SUMMARY 1 SO2 Calculations & Summary Page.

FIELD DATA	RUN 1A	RUN 1B	RUN 2A	RUN 2B	RUN 3A	RUN 3B
Meter Temp., Tm (dF)	74.67	0.00	78.42	0.00	81.17	0.00
Stack Temp., Ts (dF)	271.9	0.0	272.6	0.0	278.5	0.0
dH (in. H2O)	0.01	0.01	0.01	0.01	0.01	0.01
Meter Vol.,Vm (ft3)	0.706	0.000	0.706	0.000	0.706	0.000
Meter Y	1.000	1.000	1.000	1.000	1.000	1.000
Bar. Press.,Pb (in.Hg.)	30.05	30.05	30.05	30.05	30.05	30.05
Static Press.,Ps (in.H2O) ..	-0.33	-0.33	-0.33	-0.33	-0.33	-0.33
Test Time (min.)	20.0	20.0	20.0	20.0	20.0	20.0
Oxygen, O2 (%)	7.13	7.13	6.00	6.00	6.00	6.00
Carbon Dioxide, CO2 (%)	19.92	19.92	20.50	20.50	20.50	20.50
Carbon Monoxide, CO (%)	0.00	0.00	0.00	0.00	0.00	0.00
Gas Flow Rate, dscfm	118174	0	122790	0	119363	0

LABORATORY RESULTS	RUN 1A	RUN 1B	RUN 2A	RUN 2B	RUN 3A	RUN 3B
Sample Volume, ml	1000	0	1000	0	1000	0
Sample Aliquot, ml	50	0	50	0	50	0
Volume of Titer, ml	2.80	0.00	2.80	0.00	2.65	0.00
Volume of Titer Blank, ml ..	0.10	0.00	0.10	0.00	0.10	0.00

Barium Perchlorate
Normality :

0.00980

VOST 1415 1435

SO_2 1438 1458

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Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temp. (°F)	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Meter Temp. (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	
	3		529.8	0.07	0.71	0.71	280	276	70	74	4.0	6.4	12	350	1125	182
	4		531.0	0.07	0.71	0.71	279	265	70	74	4.0	6.5	12	427	1150	343
	5		532.3	0.05	0.50	0.50	278	271	70	74	3.0	6.6	14	378	1050	227
	6		533.5	0.02	0.20	0.20	208	273	72	74	1.0	6.6	10	427	1271	118
3-1			534.5	0.02	0.20	0.20	208	218	73	75	5.0	6.6	15	432	1050	223
	2		535.6	0.10	1.01	1.01	282	260	70	75	5.0	6.4	11	1172	950	271
	3		536.8	0.12	1.20	1.20	282	277	69	75	5.0	6.4	16	1053	1025	267
	4		538.2	0.10	1.01	1.01	282	263	69	76	5.0	6.4	18	981	975	278
	5		539.7	0.10	1.01	1.01	282	285	68	76	5.0	6.4	12	749	950	269
	6		541.3	0.05	0.50	0.50	261	291	68	76	3.0	6.2	16	918	950	302
4-1			542.5	0.18	1.81	1.81	272	280	69	77	8.0	6.2	16	1203	950	283
	2		544.1	0.20	2.02	2.02	281	293	68	77	8.0	6.2	15	1337	900	288
	3		545.9	0.20	2.02	2.02	282	298	69	77	9.0	6.4	15	1658	950	263
	4		547.9	0.17	1.71	1.71	282	283	72	77	8.0	6.4	16	1657	950	279
	5		549.8	0.14	1.41	1.41	274	229	73	77	7.0	6.2	13	1437	1000	280
	6		551.7	0.08	0.81	0.81	271	252	74	78	5.0	6.2	16	221	1000	242

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Plant: Rinker Material Corp
Sample Loc.: Cement Kiln - Baseline
Control Type: Baghouse, ESP
Sample Type: Part Multi-Metals
Date: 1/29/93 Run No.: Baseline-2
Time Start: 3:48 /15:48 Time End: 16:56
Sample Time: 2.5 min/port 60 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure 30.35 "Hg Stack Press.: -0.33 "Hg Ps: "H2O
Moisture: 30 % FDA: Gas Density Factor:
Temperature: 65 °F Wind Dir.: N-NW Wind Speed: 2-5 mph
Weather: Thermocouple Readout: KA-1
Sample Box #: KA-2 Meter Box No.: KA-2
Meter Y: 0.987 @ Delta H: 1.561 Pitot Corr.: 0.84
Nozzle Diameter: 0.4143 in. Probe Length: 8 ft
Probe Heater Setting: 4 Nomograph Cf: 11.3899
Stack Dimentions: 180 in
Stack Area: 176.71 ft^2
Effective Stack Area: 176.71 ft^2
Stack Height: ~85 ft

Stack Dimentions
Umbilical: 200
Thermocouple Probe No.: KA-50
Pitot Tube: KA-II

Material Processing Rate:
Final Gas Meter Reading: 593.593 ft^3
Initial Gas Meter Reading: 553.513 ft^3
Total Metered Gas Volume: 40.080 ft^3
Condensate Gain in Impingers: 373.0 mL
Weight Gain in Silica Gel: 11.2 g
Total Moisture Gain: 384.2 mL
Silica Gel Container No.: 110
Filter Number: 151

Leak Check - Meter Box
Initial: 0.015 cfm @ 15 in. H2O
Final: 0.00 cfm @ 6 in. H2O

Leak Check - Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

Test Conducted By: J. Garcia, S. Bell, T. Jones, G. Gable
Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO2 ppm
Average:				0.3420		1.3775	272.58			78.42		6.14	13.88	720	1535.42	283.-
	1-1		553.7	0.18	2.05	2.05	282	265	70	76	6	6.4	10	183	1525	242
	2		55.3	0.18	2.05	2.05	281	260	64	76	6	6.4	12	994	1550	306
	3		57.3	0.19	2.16	2.16	281	230	64	76	6	6.4	13	1832	1500	296
	4		59.5	0.14	1.59	1.59	282	245	64	76	6	6.2	12	834	1600	306
	5		61.4	0.16	1.82	1.82	280	249	65	77	6	6.1	12	904	1450	323
	6		63.2	0.15	1.70	1.70	277	252	65	77	6	6.1	13	915	1375	305
	2-1		65.2	0.10	1.14	1.14	264	255	69	77	4	6.2	16	1156	1500	290
	2		66.6	0.11	1.25	1.25	279	255	67	77	4	6.2	11	602	1525	274

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Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temp. (°F)	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Meter Temp. (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO_2 ppm
	3		68.4	0.09	1.02	1.02	283	259	66	77	3	6.1	14	817	1450	331
	4		69.8	0.10	1.14	1.14	281	261	65	78	4	6.2	14	596	1475	270
	5		71.3	0.06	0.68	0.68	283	275	65	78	3	6.1	14	457	1500	~~281~~ 237
	6		72.6	0.04	0.45	0.45	211	266	65	78	3	6.2	12	256	1500	268
	3-1		73.6	0.12	1.36	1.36	251	288	67	79	5	6.1	16	772	1500	287
	2		75.2	0.11	1.25	1.25	277	281	65	79	4	6.0	10	1286	1300	292
	3		76.9	0.11	1.25	1.25	278	280	65	79	4	6.1	15	234	1400	219
	4		78.5	0.09	1.02	1.02	278	274	64	79	4	6.0	15	767	1400	270
	5		79.9	0.07	0.79	0.79	277	280	65	80	3	6.1	16	523	1250	281
	6		81.3	0.04	0.45	0.45	243	267	66	80	2	6.2	18	208	1000	317
	4-1		82.3	0.18	2.05	2.05	264	269	70	80	6	6.0	17	221	1000	319
	2		84.2	0.14	1.59	1.59	279	267	68	80	6	6.0	12	796	1100	320
	3		86.1	0.16	1.82	1.82	280	268	69	80	6	6.1	15	389	950	389
	4		88.1	0.15	1.70	1.70	280	254	70	81	6	6.1	20	714	950	308
	5		89.9	0.13	1.48	1.48	280	265	71	81	6	6.0	13	828	1100	330
	6		91.8	0.11	1.25	1.25	271	263	71	81	5	6.1	13	996	1150	332

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Plant: Rinker Materials Corp
Sample Loc.: Cement Kiln - Baseline - 3
Control Type: ESP
Sample Type: Port. Multi-Metals
Date: 1/29/92 Run No.: Baseline 3
Time Start: 5:53 /1753 Time End: 19:04
Sample Time: 2.5 min/port 60 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure 30.35 "Hg Stack Press.: "Hg Ps: "H2O
Moisture: 30 % FDA: Gas Density Factor:
Temperature: 79 °F Wind Dir.: N-NW Wind Speed: 2-5 mph
Weather: Clear Thermocouple Readout: KA-II
Sample Box #: KA-1 Meter Box No.: KA-1
Meter Y: 0.987 @ Delta H: 1.561 Pitot Corr.: 0.84
Nozzle Diameter: 0.4143 in. Probe Length: 8 ft
Probe Heater Setting: 4 Nomograph Cf: 11.5161
Stack Dimentions: 180 in
Stack Area: 171.71 ft²
Effective Stack Area: 171.71 ft²
Stack Height: ~85 ft

Stack Dimentions
Umbilical: 200
Thermocouple
Probe No.: KA 50
Pitot Tube: KA-S4

Material Processing Rate:
Final Gas Meter Reading: 636.192 ft³
Initial Gas Meter Reading: 596.181 ft³
Total Metered Gas Volume: 40.011 ft³
Condensate Gain in Impingers: 376.0 mL
Weight Gain in Silica Gel: 20.0 g
Total Moisture Gain: 396.0 mL
Silica Gel Container No.: 114
Filter Number: 161

Leak Check – Meter Box
Initial: 0.00 cfm @ 15 in. H2O
Final: 0.00 cfm @ 15 in. H2O

Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable Leak
Static 3 "H2O for 15 sec: Stable Leak

Test Conducted By: J. Garcia, T. Jones, S. Bell, G. Galelo
Stack Test Observers: C. Logan

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	722.7 CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO2 ppm
Average:				0.3371		1.3404	278.54			81.17		5.99	13.37	646.94	1618.75	265.8
1-1			596.1	0.15	1.73	1.73	281	277	70	79	6	6.0	9	675	1750	296
2			597.8	0.14	1.61	1.61	281	277	64	79	6	6.0	12	406	1200	303
3			99.7	0.12	1.38	1.38	281	259	62	79	5	6.0	14	521	1650	258
4			801.5	0.14	1.61	1.61	281	260	63	79	6	6.0	12	1021	1675	258
5			3.2	0.09	1.03	1.03	277	249	64	80	4	6.0	10			
6			5.0	0.07	0.80	0.80	266	249	64	80	3	6.0	14			
2-1			6.3	0.11	1.26	1.26	268	253	62	80	5	6.0	12			
2			7.8	0.12	1.38	1.38	280	260	65	80	5	6.0	10	179	1200	223

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Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temp. (°F)	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Meter Temp. (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO2 ppm
2-3			9.5	0.11	1.26	1.26	281	259	64	80	5	6.0	19	535	1550	309
4			11.1	0.07	0.80	0.80	280	258	64	81	3	6.0	19	1368	1525	328
5			12.5	0.05	0.57	0.57	278	263	65	81	3	6.0	17	768	1650	320
6			13.6	0.05	0.57	0.57	279	258	66	82	3	6.0	12	176	1250	274
3-1			14.6	0.14	1.62	1.62	278	259	67	81	6	5.9		794		
2			16.6	0.13	1.49	1.49	281	260	65	82	6					
3			18.4	0.11	1.26	1.26	281	266	65	82	6					
4			19.9	0.12	1.38	1.38	280	264	67	82	6					
5			21.7	0.10	1.15	1.15	281	271	68	82	5					
6			23.3	0.07	0.80	0.80	280	270	69	82	4	5.9	12	794	1700	305
4-1			24.6	0.20	2.30	2.30	267	267	69	82	8	6.0	14	517	1500	303
2			26.7	0.16	1.84	1.84	280	270	70	82	8	6.0	15	1008	1400	311
3			28.6	0.14	1.62	1.62	281	260	71	82	6	6.0	12	349	1625	286
4			30.6	0.16	1.84	1.84	262	257	77	83	7	6.0	14	949	1510	237
5			32.6	0.13	1.49	1.49	281	258	70	84	7	6.0	13	455	1500	324
6			34.4	0.12	1.38	1.38	278	259	70	84	6	6.0	14	630	1525	307

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Plant: RINKER
Sample Loc.: CEMENT KILN
Control Type: ESP
Sample Type: VOST & Benzene
Date: 1-29-93 Run No.: 1 Baseline
Time Start: 1415 Time End:
Sample Time: 5 min/port 20 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed:
Weather: Thermocouple Readout:
Sample Box #: Meter Box No.:
Meter Y: @ Delta H: Pitot Corr.:
Nozzle Diameter: in. Probe Length: ft
Probe Heater Setting: Nomograph Cf:
Stack Dimentions: in
Stack Area: ft²
Effective Stack Area: ft²
Stack Height: ft

Stack Dimentions
Umbilical:
Thermocouple
Probe No.:
Pitot Tube:

Material Processing Rate:
Final Gas Meter Reading: ft³
Initial Gas Meter Reading: ft³
Total Metered Gas Volume: ft³
Condensate Gain in Impingers: mL
Weight Gain in Silica Gel: g
Total Moisture Gain: mL
Silica Gel Container No.:
Filter Number:
Leak Check – Meter Box
Initial: 0.00 cfm @ 6 in. H2O
Final: 0.00 cfm @ 6 in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

Test Conducted By: G. F. Gabel

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperatu (°F)	Sample Box Temperature (°F)	~~Last~~ 1st Cond. Impinger Temperatu (°F)	Meter Temperatu (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)
Average:															
		1415	1.00						62		4				
		1420	1.00						60		4				
		1425	1.00						59		4				
		1430	1.00						59		4				
		1435	End of 20 min Run												

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Plant: Rinker.
Sample Loc.: Cement Kiln
Control Type: ESP
Sample Type: VOST & Benzene
Date: 1-29-93 Run No.: 2 Baseline
Time Start: 1551 Time End: 1611
Sample Time: 5 min/port 20 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed:
Weather: Thermocouple Readout:
Sample Box #: Meter Box No.:
Meter Y: @ Delta H: Pitot Corr.:
Nozzle Diameter: in. Probe Length: ft
Probe Heater Setting: Nomograph Cf:
Stack Dimentions: in
Stack Area: ft^2
Effective Stack Area: ft^2
Stack Height: ft

Stack Dimentions

Umbilical:
Thermocouple
Probe No.:
Pitot Tube:

Material Processing Rate:
Final Gas Meter Reading: ft^3
Initial Gas Meter Reading: ft^3
Total Metered Gas Volume: ft^3
Condensate Gain in Impingers: mL
Weight Gain in Silica Gel: g
Total Moisture Gain: mL
Silica Gel Container No.:
Filter Number:

Leak Check – Meter Box
Initial: 0.00 cfm @ 6 in. H2O
Final: 0.00 cfm @ 4 in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

Test Conducted By: G. F. Gabel

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	1st Cond ~~Last~~ Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)
Average:															
		1551	1.00						62		2				
		1556	1.00						59		2				
		1601	1.00						59		2				
		1606	1.00						59		2				
		1611	End of 20 min Run												

Plant: RINKER
Sample Loc.: CEMENT KILN
Control Type: ESP
Sample Type: VOST & Benzene
Date: 1-29-93 Run No.: 3 Baseline
Time Start: 1819 Time End: 1839
Sample Time: 5 min/port 20 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed:
Weather: Thermocouple Readout:
Sample Box #: Meter Box No.:
Meter Y: @ Delta H: Pitot Corr.:
Nozzle Diameter: in. Probe Length: ft
Probe Heater Setting: Nomograph Cf:
Stack Dimentions: in
Stack Area: ft²
Effective Stack Area: ft²
Stack Height: ft

Stack Dimentions

Umbilical:
Thermocouple
Probe No.:
Pitot Tube:

Material Processing Rate:
Final Gas Meter Reading: ft³
Initial Gas Meter Reading: ft³
Total Metered Gas Volume: ft³
Condensate Gain in Impingers: mL
Weight Gain in Silica Gel: g
Total Moisture Gain: mL
Silica Gel Container No.:
Filter Number:

Leak Check – Meter Box
Initial: 0.00 cfm @ 10 in. H2O
Final: 0.000 cfm @ 5 in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

KODGLER & ASSOCIATES

Test Conducted By: G.F. Gabel

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	1st COND ~~Last Impinger~~ Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
Average:												
		1819	1.00						60		4	
		1824	1.00						58		4	
		1829	1.00						57		4	
		1834	1.00						57		4	
		1839										

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Plant: Rinker
Sample Loc.: Cement Kiln
Control Type: ESP
Sample Type: SO_2
Date: 1-29-93 Run No.: 1 Baseline
Time Start: 1438 Time End:
Sample Time: 5 min/port 20 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed:
Weather: Thermocouple Readout:
Sample Box #: Meter Box No.:
Meter Y: @ Delta H: Pitot Corr.:
Nozzle Diameter: in. Probe Length: ft
Probe Heater Setting: Nomograph Cf:
Stack Dimentions: in
Stack Area: ft²
Effective Stack Area: ft²
Stack Height: ft

Stack Dimentions
Umbilical:
Thermocouple
Probe No.:
Pitot Tube:

Material Processing Rate:
Final Gas Meter Reading: ft³
Initial Gas Meter Reading: ft³
Total Metered Gas Volume: ft³
Condensate Gain in Impingers: mL
Weight Gain in Silica Gel: g
Total Moisture Gain: mL
Silica Gel Container No.:
Filter Number:
Leak Check – Meter Box
Initial: 0.00 cfm @ 6 in. H2O
Final: cfm @ in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak
Test Conducted By: G. F. Gebel
Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)
Average:															
		1438	1.00						62		1				
		1443	1.00						60		1				
		1448	1.00						59		1				
		1453	1.00						59		1				
		1458	End of	20 min	Run										

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Plant: RINKER
Sample Loc.: CEMENT KILN
Control Type: ESP
Sample Type: SO_2
Date: 1-29-93 Run No.: 2 Baseline
Time Start: 1614 Time End: 1634
Sample Time: 5 min/port 20 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed:
Weather: Thermocouple Readout:
Sample Box #: Meter Box No.:
Meter Y: @ Delta H: Pitot Corr.:
Nozzle Diameter: in. Probe Length: ft
Probe Heater Setting: Nomograph Cf:
Stack Dimentions: in
Stack Area: ft²
Effective Stack Area: ft²
Stack Height: ft

Stack Dimentions
Umbilical:
Thermocouple
Probe No.:
Pitot Tube:

Material Processing Rate:
Final Gas Meter Reading: ft³
Initial Gas Meter Reading: ft³
Total Metered Gas Volume: ft³
Condensate Gain in Impingers: mL
Weight Gain in Silica Gel: g
Total Moisture Gain: mL
Silica Gel Container No.:
Filter Number:
Leak Check – Meter Box
Initial: 0.00 cfm @ 4 in. H2O
Final: cfm @ in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak
Test Conducted By: G. F. Gabel
Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperatu (°F)	Sample Box Temperature (°F)	Last Impinger Temperatu (°F)	Meter Temperatu (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)
Average:															
		1614	1.00						63		1				
		1619	1.00						60		1				
		1624	1.00						59		1				
		1629	1.00						59		1				
		1634	End of 20 min Run												

BASELINE FIELD DATA SHEETS

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Plant: Rinker Materials
Sample Loc.: Cement Kiln - Baseline
Control Type: ESP, Baghouse
Sample Type: Particulate, Multi-Metals
Date: 1/29/93 Run No.: Baseline - 1
Time Start: 1:58 Time End: 3:00
Sample Time: 2.5 min/port 60 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure 30.35 "Hg Stack Press.: -0.33 "Hg Ps: "H2O
Moisture: 30 % FDA: Gas Density Factor:
Temperature: 65 °F Wind Dir.: N-NW Wind Speed: 5-8 mph
Weather: Clear Thermocouple Readout: KA-1
Sample Box #: KA-2 Meter Box No.: KA-2
Meter Y: 0.987 @ Delta H: 1.561 Pitot Corr.: 0.85
Nozzle Diameter: .4143 in. Probe Length: ft
Probe Heater Setting: Nomograph Cf: 10.0781
Stack Dimentions: 180 in.
Stack Area: 176.71 ft²
Effective Stack Area: 176.71 ft²
Stack Height: ~85 ft ft

Stack Dimentions
Umbilical: 200
Thermocouple
Probe No.: KA-50
Pitot Tube: KA-11

Material Processing Rate:
Final Gas Meter Reading: 553.231 ft³
Initial Gas Meter Reading: 516.927 ft³
Total Metered Gas Volume: 36.304 ft³
Condensate Gain in Impingers: 348.0 mL
Weight Gain in Silica Gel: 13.7 g
Total Moisture Gain: 361.7 mL
Silica Gel Container No.: 14
Filter Number: 14'

Leak Check – Meter Box
Initial: 0.01 cfm @ 15 in. H2O
Final: 0.00 cfm @ 10 in. H2O

Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

Test Conducted By: J. Garcia, T. Jones, S. Bell, G. Gobl
Stack Test Observers: F. Delgado, A. Bolivar, C. Logan.

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperatu (°F)	Sample Box Temperature (°F)	Last Impinger Temperatu (°F)	Meter Temperatu (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO_2 (ppm)
Average:				0.3316		1.1629	271.92			74.67		6.37	13.88	844.08	1008.17	245.63
1-1			516.9	0.16	1.61	1.61	278	267	75	72	7.5	6.4	12	1040	950	206
2			518.6	0.15	1.51	1.51	279	280	73	72	7.5	6.4	11	1330	950	195
3			520.4	0.15	1.51	1.51	280	272	70	72	7.0	6.25	14	1553	1000	234
4			522.3	0.14	1.41	1.41	279	278	70	72	7.0	6.29	15	506	925	286
5			524.0	0.11	1.11	1.11	279	282	69	73	6.0	6.25	13	300	1050	228
6			525.7	0.08	0.81	0.81	274	275	70	73	4.0	6.25	14	615	1050	215
2-1			527.2	0.10	1.01	1.01	274	275	72	73	5.0	6.5	14	311	1025	211
2			528.4	0.11	1.11	1.11	279	288	70	73	5.0	6.4	15	203	1000	217

Plant: RINKER
Sample Loc.: CEMENT KILN
Control Type: ESP
Sample Type: SO2
Date: 1-29-93 Run No.: 3 Baseline
Time Start: 1844 Time End: 1904
Sample Time: 5 min/port 20 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed:
Weather: Thermocouple Readout:
Sample Box #: Meter Box No.:
Meter Y: @ Delta H: Pitot Corr.:
Nozzle Diameter: in. Probe Length: ft
Probe Heater Setting: Nomograph Cf:
Stack Dimentions: in
Stack Area: ft²
Effective Stack Area: ft²
Stack Height: ft

Stack Dimentions
Umbilical:
Thermocouple
Probe No.:
Pitot Tube:

Material Processing Rate:
Final Gas Meter Reading: ft³
Initial Gas Meter Reading: ft³
Total Metered Gas Volume: ft³
Condensate Gain in Impingers: mL
Weight Gain in Silica Gel: g
Total Moisture Gain: mL
Silica Gel Container No.:
Filter Number:

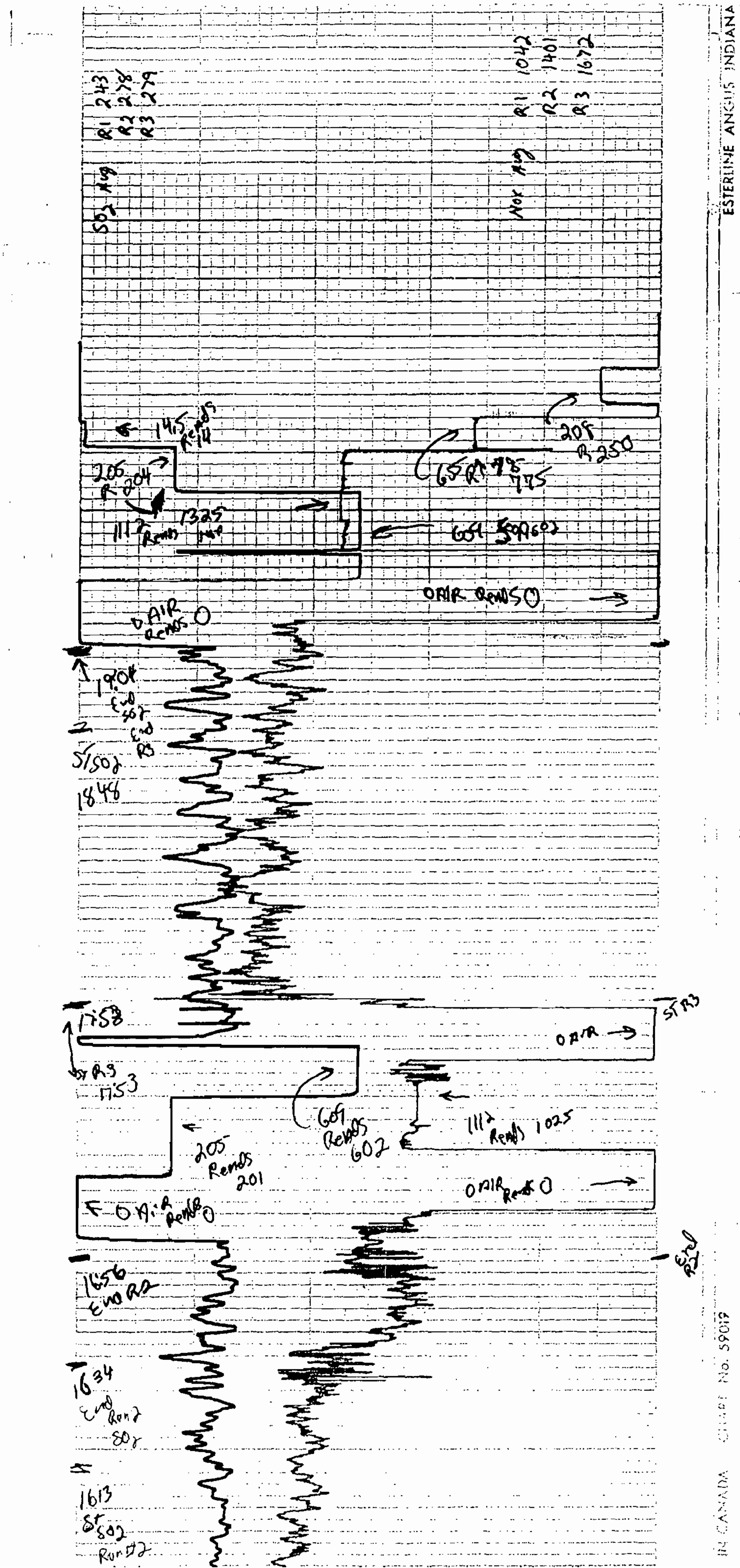
Leak Check – Meter Box
Initial: 0.00 cfm @ 5 in. H2O
Final: cfm @ in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

KOOGLER & ASSOCIATES

Test Conducted By: G. F. Gabel
Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
Average:												
		1844	1.00						62		1	
		1849	1.00						60		1	
		1854	1.00						59		1	
		1859	1.00						59		1	
		1904										

BASELINE TEST
CONTINUOUS MONITOR RECORDS

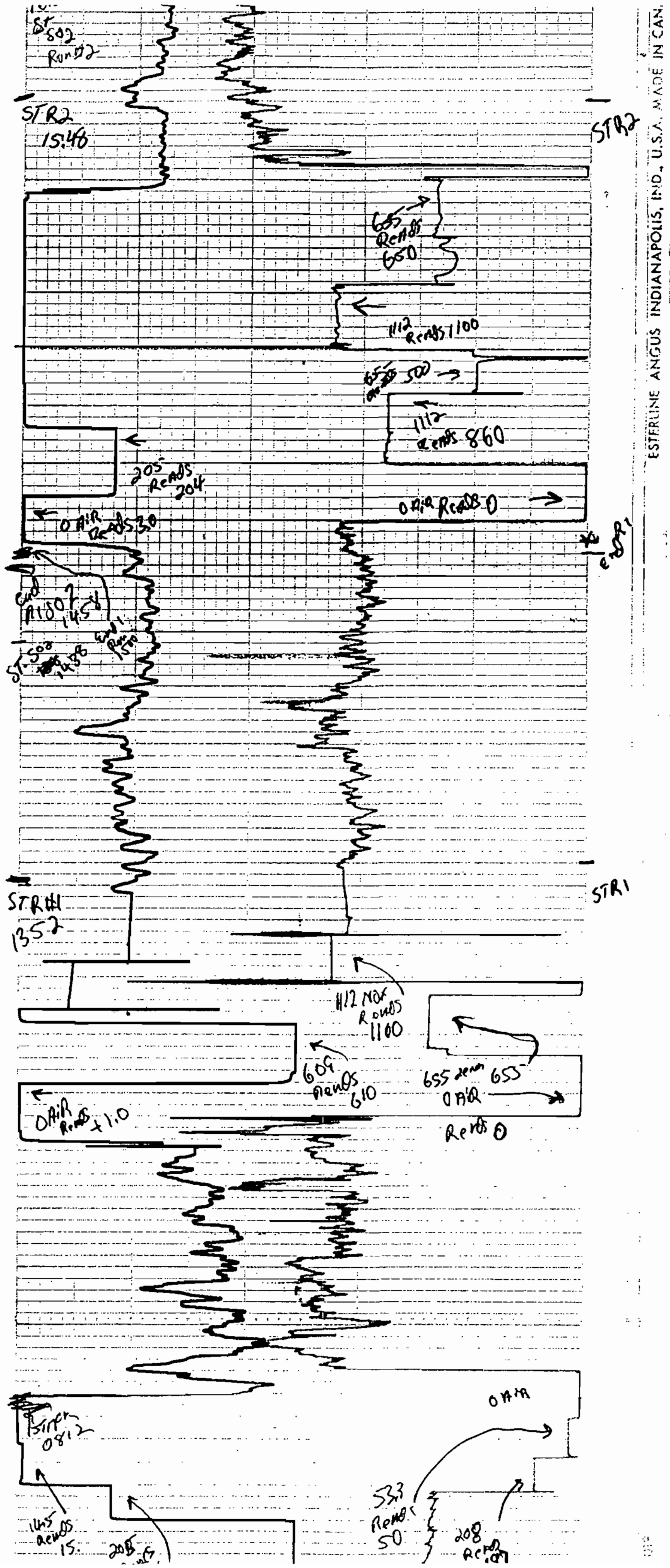


BASELINE

SO_2 and NO_x

1/29/93

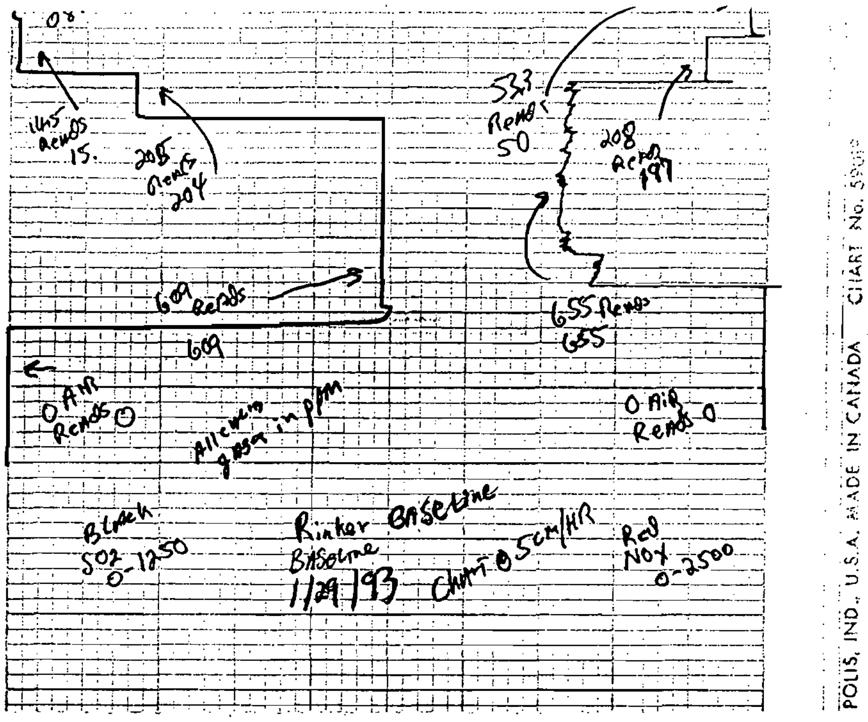
1 Of 3



BASELINE

SO_2 and NO_X

1/29/93



BASELINE

SO_2 and NO_x

1/29/93

B Hoelun

Rinker 1/29/93 NOX 67 min

NOX Run 1

1-1050	6-1040	1-1175	6-1050	1-1025	6-975
2-1020	7-1060	2-1150	7-1000	2-975	7-1000
3-1000	8-1025	3-1125	8-1025	3-950	8-1050
4 1000	9-1045	4-1300	9-1035	4-975	9- 990
5-1020	10-1100	5-1100	20-1050	5-970	30-
	1036		1101		Avg 1042.3

NOX R2

1-1550	6-1575	1-1525	6-1540	1-1400	6 1125
2-1575	7-1550	2-1550	7-1550	2-1425	7-1045
3-1625	8-1550	3-1525	8-1490	3-1050	8-1100
4 1590	9-1510	4-1460	9-1425	4-950	9-1075
5-1550	10-1460	5-1490	20-1450	5-1125	30-1200
	1553.5		1500.5		1149.5

End of Run drift -87 ppm From High Cal. 1112   Avg 1401.16

NOX R3

1-1700	6-1700	1-1750	6-1725	1-1600	6-1575
2 1650	7-1700	2- ~~1625~~ 1650	7-1625	2-1650	7-1625
3 1750	8-1650	3-1600	8-1600	3-1725	8-1625
4 1750	9-1725	4-1675	9-1600	4-1650	9-1525
5 1700	10-1650	5-1750	20-1725	5-1700	30-1525
	1717.5		1670.0		1630.0

End of Run Drift +213 ppm From Hi Cal 1112 ppm   Avg 1672.5

Rinker Baseline
1/29/93

SO_2 R1 — 72 min

1 - 235	6 - 212	1 - 200	6 - 250	1 285	6 - 275
2 - 250	7 - 220	2 - 212	7 - 230	2 285	7 - 270
3 - 275	8 - 212	3 - 175	8 - 260	3 280	8 - 265
4 - 235	9 - 210	4 - 185	9 - 270	4 275	9 - 250
5 - 245	10 - 200	5 - 230	20 - 275	5 280	30 - 240
	229.4		229.0	MG Avg. 266.8	270.5

Avg 242.96 ppm

SO_2 R2 — 69.6 min

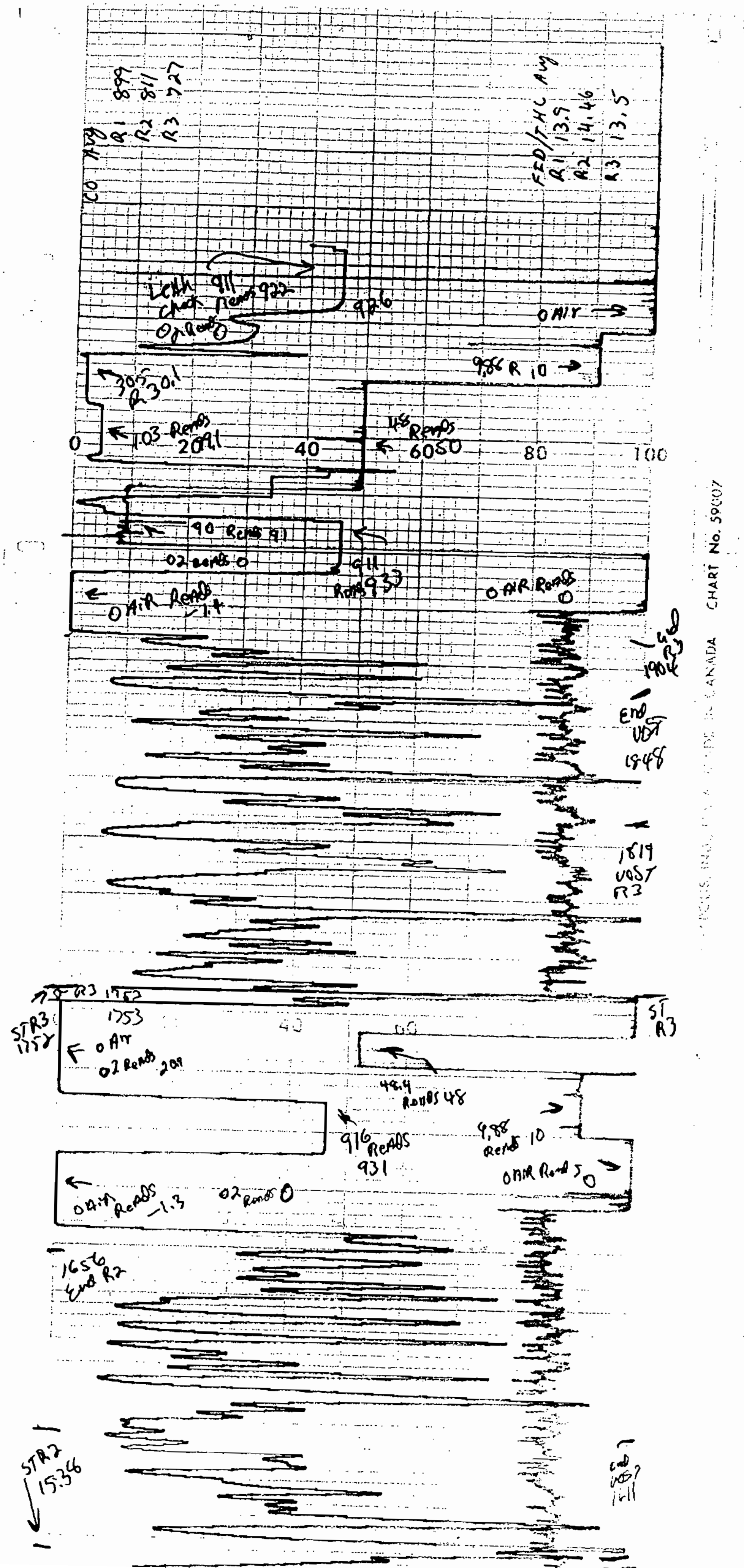
1 - 225	6 - 320	1 - 335	6. 300	1 225	6 - 310
2 - 275	7 - 312	2 - 310	7. 275	2 265	7 - 325
3 - 295	8 - 309	3 - 265	8. 285	3 275	8 - 312
4 - 300	9 - 320	4 - 250	9. 275	4 260	9 - 320
5 - 295	10 - 325	5 - 280	20. 230	5 275	30 - 125
	297.6	MG Avg 287.5	280.5		276

Avg 278.58 ppm

SO_2 R3 — 72 min

1 - 265	6 - ~~285~~ 300	1 - 325	6 - 312	1 - 300	6 - 265
2 - 285	7 - 300	2 - 275	7 - 225	2 - 275	7 - 290
3 - 275	8 - 225	3 - 235	8 - 300	3 - 250	8 - 310
4 - 250	9 - 275	4 - 295	9 - 275	4 - 300	9 - 225
5 - 285	10 - 325	5 - 335	20 - 285	5 - 250	30 - 230
	270.5	MG Avg 271.25	286.2		274.5

Avg 279.73 ppm SO_2

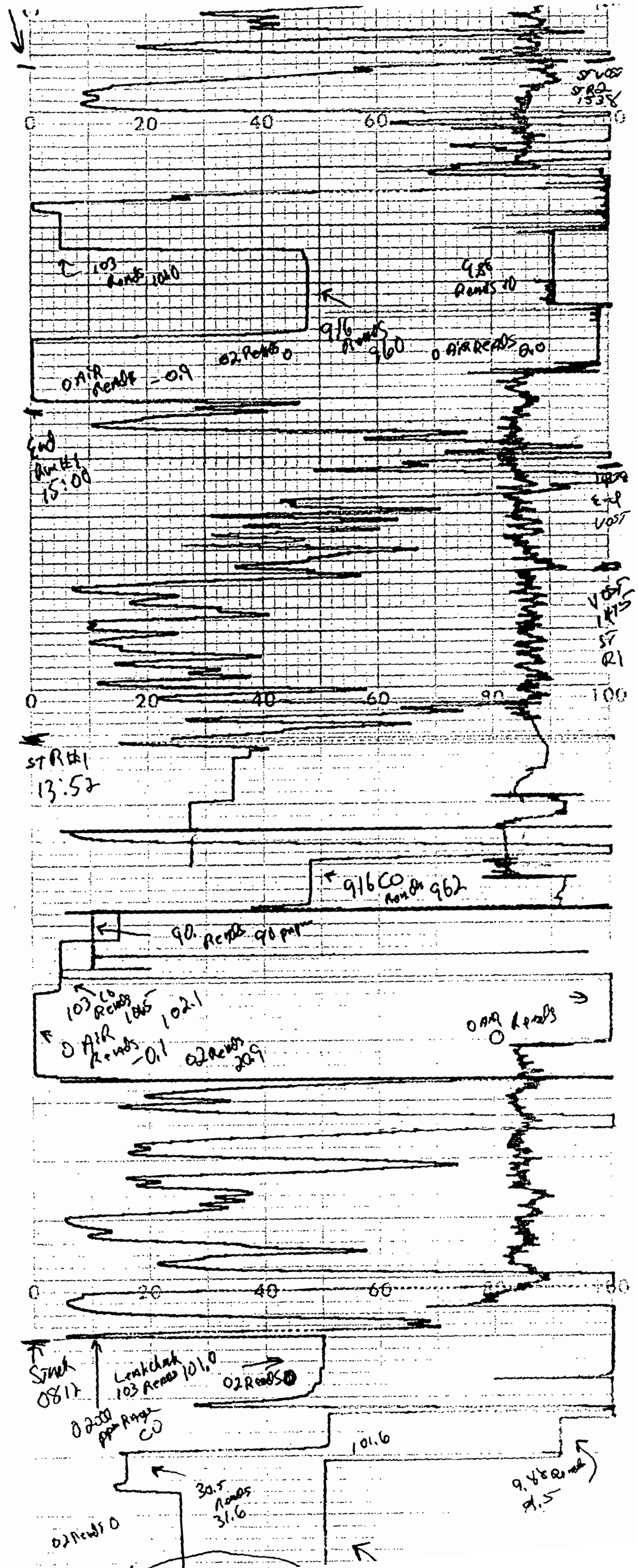


BASELINE

FID and CO

1/29/93

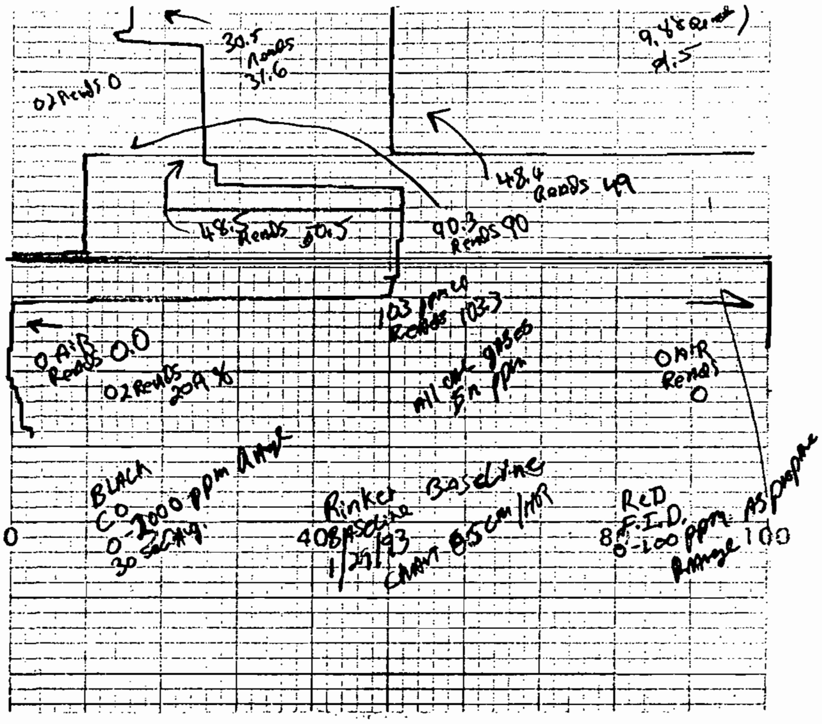
BEST AVAILABLE COPY



BASELINE

FID and CO

1/29/93



BASELINE

FID and CO

1/29/93

1/29/30

Ruckey

FID THC

R 1

1 12	6 13	1 14	6 16	1 15	~~6~~ 17
2 13	7 14	2 13	7 13	2 16	7 17
3 13	8 12	3 12	8 15	3 15	8 17
4 ~~15~~ 16	9 14	4 14	9 15	7 15	9 17
5 15	10 14	5 14	20 15	5 17	30 16
	13.6		13.5		14.6

Avg 13.9

Run 2

1 14	6 13	11 14	16 11	21 16	6 14
2 13	7 15	12 13	17 ~~18~~ 16	2 13	7 14
3 14	8 15	13 15	18 16	3 15	8 17
4 12	9 14	14 16	19 12	4 16	9 16
5 14	10 14	15 16	20 14	5 17	30 15
	13.8		14.3		15.3

avg 14.46

R 3

1 14	6 13	1 11	6 11	1 17	6 14
2 14	7 12	2 13	7 14	2 13	7 15
3 14	8 13	3 15	8 15	3 15	8 12
4 11	9 14	4 14	9 13	4 16	9 16
5 12	10 12	5 15	20 11	5 12	30 15
	12.9		13.2		14.5

406/30

avg 13.5

Rinker Baseline 1/29/92

69.6 min

CO R1

1-480	6-600	1-210	6-830	1-1100	6 1720
2-920	7-640	2-640	7-1040	2-1400	7 1460
3-1020	8-520	3-440	8-960	3-1900	8 880
4-1280	9-480	4-310	9-940	4-1620	9 520
5-740	10-280	5-680	20-990	5-1490	30 / 1343
	696		704	Avg 914	899

CO R2 60 min

1-1900	6 830	1 290	6 690	1 710	6
2-960	7 480	2 740	7 460	2 1000	7
3 1040	8 820	3 1400	8 940	3 900	8
4 820	9 540	4 420	9 700	4 940	9
5 760	10 340	5 720	20 940	5 940	30
	849		730.	898	Avg 811.

CO ~~[illegible]~~ R3

1 890	6 700	1 1100	6-1000	1 700	6 740
2 480	7 1120	2 1100	7-710	2 880	7 760
3 560	8 580	3 720	8-260	3 880	8 760
4 680	9 320	4 340	9-1080	4 600	9 700
5 610	10 400	5 920	20-680	5 1140	30 400
	634		791	Avg 727	756

BASELINE
LABORATORY DATA SHEETS

PARTICULATE LAB DATA SHEET

TEST DATE 1/29/93

PLANT NAME Rinker Materials Corp

SOURCE Cement Kiln - Baseline

	Run 1	Run 2	Run 3	Blank
Container No.	KA-77	KA-85	KA-18	KA-900
Total Volume (ml)	225	225	225	225
Aliquot Evaporated (ml)	225	225	225	225
Final Weight (g)	100.3284	103.3857	101.2182	101.3173
Tare Weight (g)	- 100.3135	- 103.3739	- 101.2065	- 101.3175
Gross Weight Gained (g)	0.0149	0.0118	0.0117	- 0.0002
Average Blank (g)	- 0	- 0	- 0	- 0
Net Weight (g)	0.0149	0.0118	0.0117	0
Aliquot Factor	x 1	x 1	x 1	x 1
Total Net Weight (g)	0.0149	0.0118	0.0117	0

	Run 1	Run 2	Run 3	Blank
Container No.	1C	2C	3C	
Filter No.	14'	15'	16'	
Final Weight (g)	0.4965	0.5034	0.5033	
Tare Weight (g)	- 0.4664	- 0.4680	- 0.4674	-
Gross Weight Gained (g)	0.0301	0.0354	0.0359	
Average Blank (g)	- 0	- 0	- 0	-
Total Net Weight (g)	0.0301	0.0354	0.0359	

Tare Balance Check

0.0	✓	10.0	✓
1.0	✓	50.0	✓
5.0	✓	100.0	✓

T/H 72/40

By [signature]

Date 2/1/93

Final Balance Check

0.0	✓	10.0	✓
1.0	✓	50.0	✓
5.0	✓	100.0	✓

T/H 73/39

By [signature]

Date 2/3/93

SO_2

LAB DATA

Plant Name Rinker Materials - Baseline Date Analyzed 2/3/93

Analyzed By Jose Garcia

Stack	Sample No.	V.T.	V.T.B.	N.	V.Soln.	V.A.
	1a	2.8	0.1	0.0098	1000	50
	1b	2.8				
	2a	2.8				
	2b	2.8				
	3a	2.6				
	3b	2.7				

V.T. = Volume of Barium perchlorate titrant used for sample (ml)
V.T.B. = Volume of Barium perchlorate titrant used for blank (ml)
N. = Normality of Barium perchlorate
V.Soln. = Total solution volume
V.A. = Volume of sample aliquot titrated (ml)

KOOGLER & ASSOCIATES

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINCIS 60148 • (708) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., P.O. BOX 127
SOUTH HOLLAND, IL 60473
TELEPHONE: (708) 331-2900
TELEX: 285950 COMTECO SH UR
FAX: (708) 333-3060

March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: Base Line Clinker

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: Baseline Clinker
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50356

Elements	Dry Basis, UG/G
Antimony, Sb	<40
Arsenic, As	4
Barium, Ba	89.0
Beryllium, Be	<2
Cadmium, Cd	6.0
Copper, Cu	58.0
Chromium, Cr	46.0
Lead, Pb	70.0
Manganese, Mn	289.0
Mercury, Hg	<0.02
Nickel, Ni	50.0
Selenium, Se	<4
Sodium, Na	890
Potassium, K	3321

	Dry Basis, % Wt.
Chlorine, Cl	0.01
Sulfur trioxide, SO_3	0.50

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

OH

Manager, South Holland Laboratory

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March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us	Base Line Clinker
Sample taken at	-----
Sample taken by	Koogler & Associates
Date sampled	------
Date received	February 17, 1993

Sample ID:	Baseline Clinker
Project No:	263-92-03
Project Name:	Rinker-Miami, FL
Location:	Cement Kiln

Analysis Report No. 71-50356

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chlorine: ASTM D 2361; Eschka
Sulfur trioxide: ASTM D 1757
Other elements: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: Raw Meal Slurry

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: Baseline Raw Material
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50353

<u>As Received Basis % Wt.</u>

Solids	67.22

Elements	Dry Basis,UG/G
Antimony, Sb	<40
Arsenic, As	<4
Barium, Ba	8.0
Beryllium, Be	<2
Cadmium, Cd	5.0
Copper, Cu	26.0
Chromium, Cr	19.0
Lead, Pb	51.0
Manganese, Mn	167.0
Mercury, Hg	<0.02
Nickel, Ni	38.0
Selenium, Se	4
Sodium, Na	594
Potassium, K	2076

	Dry Basis, % Wt.
Chlorine, Cl	0.03
Sulfur trioxide, SO_3	0.81

Respectfully submitted
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: Raw Meal Slurry

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: Baseline Raw Material
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50353

METHODS

Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chlorine: ASTM D 2361; Eschka
Sulfur trioxide: ASTM D 1757
Other elements: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: Coal

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: Baseline Coal Kiln 1
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50351

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	1.11	xxxxx
% Carbon	74.74	75.58
% Hydrogen	5.21	5.27
% Nitrogen	1.42	1.44
% Sulfur	1.33	1.34
% Ash	9.54	9.65
% Oxygen(diff)	6.65	6.72
	100.00	100.00

METHODS
Moisture: ASTM D 3302
Carbon & Hydrogen: Infrared Detection
Nitrogen: Thermal Conductivity
Sulfur: ASTM D 4239 (Method C)
Ash: ASTM D 3174
Oxygen: Calculated Value (Diff)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us	Coal
Sample taken at	-----
Sample taken by	Koogler & Associates
Date sampled	------
Date received	February 17, 1993

Sample ID:	Baseline Coal Kiln 1
Project No:	263-92-03
Project Name:	Rinker-Miami, FL
Location:	Cement Kiln

Analysis Report No. 71-50351

TRACE ELEMENT ANALYSIS

Element	**Dry Basis, UG/G**
Arsenic, As	10
Mercury, Hg	0.09
	Ignited Basis, UG/G
Chromium, Cr	88.0
Lead, Pb	65.0

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chromium & Lead: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us	Coal
Sample taken at	-----
Sample taken by	Koogler & Associates
Date sampled	------
Date received	February 17, 1993

Sample ID:	Baseline Coal Kiln 2
Project No:	263-92-03
Project Name:	Rinker-Miami, FL
Location:	Cement Kiln

Analysis Report No. 71-50352

ULTIMATE ANALYSIS

	As Received	**Dry Basis**
% Moisture	0.98	xxxxx
% Carbon	75.03	75.77
% Hydrogen	5.11	5.16
% Nitrogen	1.46	1.47
% Sulfur	1.32	1.33
% Ash	9.55	9.64
% Oxygen(diff)	6.55	6.63
	100.00	100.00

METHODS
Moisture: ASTM D 3302
Carbon & Hydrogen: Infrared Detection
Nitrogen: Thermal Conductivity
Sulfur: ASTM D 4239 (Method C)
Ash: ASTM D 3174
Oxygen: Calculated Value (Diff)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us Coal

Sample taken at -----

Sample taken by Koogler & Associates

Date sampled ------

Date received February 17, 1993

Sample ID: Baseline Coal Kiln 2
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50352

TRACE ELEMENT ANALYSIS

Element	Dry Basis, UG/G
Arsenic, As	11
Mercury, Hg	0.09
	Ignited Basis, UG/G
Chromium, Cr	85.0
Lead, Pb	84.0

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chromium & Lead: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: Dust

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: Baseline ESP Dust Kiln 1
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50354

Elements	Dry Basis, UG/G
Antimony, Sb	<40
Arsenic, As	6
Barium, Ba	28.0
Beryllium, Be	<2
Cadmium, Cd	12.0
Copper, Cu	39.0
Chromium, Cr	19.0
Lead, Pb	330.0
Manganese, Mn	160.0
Mercury, Hg	0.20
Nickel, Ni	31.0
Selenium, Se	13
Sodium, Na	890
Potassium, K	27397
	Dry Basis, % Wt.
Chlorine, Cl	0.93
Sulfur trioxide, SO_3	3.72

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us Dust

Sample taken at -----

Sample taken by Koogler & Associates

Date sampled ------

Date received February 17, 1993

Sample ID: Baseline ESP Dust Kiln 1
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50354

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chlorine: ASTM D 2361; Eschka
Sulfur trioxide: ASTM D 1757
Other elements: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: Dust

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: Baseline ESP Dust Kiln 2
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50355

Elements	Dry Basis,UG/G
Antimony, Sb	<40
Arsenic, As	<4
Barium, Ba	89.0
Beryllium, Be	<2
Cadmium, Cd	9.0
Copper, Cu	45.0
Chromium, Cr	19.0
Lead, Pb	274.0
Manganese, Mn	170.0
Mercury, Hg	0.09
Nickel, Ni	44.0
Selenium, Se	18
Sodium, Na	964
Potassium, K	32212
	Dry Basis, % Wt.
Chlorine, Cl	0.94
Sulfur trioxide, SO_3	6.08

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us Dust

Sample taken at -----

Sample taken by Koogler & Associates

Date sampled ------

Date received February 17, 1993

Sample ID: Baseline ESP Dust Kiln 2
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50355

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chlorine: ASTM D 2361; Eschka
Sulfur trioxide: ASTM D 1757
Other elements: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

ppb
ENVIRONMENTAL LABORATORIES, INC.

February 26, 1993

Mr. Mason Joye
Koogler and Associates
4014 N.W. 13th Street
Gainesville, Florida 32609

Dear Mason:

Enclosed are the results of our analysis of the samples that we received February 5, 1993.

All data were determined in accordance with published procedures (EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, Revised March 1983). PPB is certified by the Florida DHRS (Lab Nos. 82282 and E82001).

If you have any questions concerning this report, please do not hesitate to give me a call.

Sincerely,

Tom Park

Tom Park
Project Manager

MTP/kbc

Enclosures

6821 SW ARCHER ROAD, GAINESVILLE, FLORIDA 32608 Tel. (904) 377-2349

ppb
E N V I R O N M E N T A L   L A B O R A T O R I E S,   I N C.

Mr. Mason Joye
Koogler and Associates
4014 N.W. 13th Street
Gainesville, Florida 32609

Table 1.

REPORT OF ANALYSIS
(all results as total micrograms)

Station ID No.:	TDF Run 1	TDF Run 2	TDF Run 3	Baseline Run 1	Baseline Run 2	Baseline Run 3	Blank	Blank Rerun
PPB No.:	78893, 78900, 78907, 78908	78894, 78901, 78909, 78910	78895, 78902, 78911, 78912	78896, 78903, 78913, 78914	78897, 78904, 78915, 78916	78898, 78905, 78917, 78918	78899, 78906, 78919, 78920, 78921, 78922	(3/16/93)
Antimony	<13	<13	<13	<13	<13	<13	<13 ✓	—
Arsenic	<3	<3	<3	<3	<3	<3	<3 ✓	—
Beryllium	<3	<3	<3	<3	<3	<3	<3 ✓	<1
Cadmium	<9	<9	<9	<9	<9	<9	<9	<2
Chromium	28	33	20	11	36	43	~~33~~	<6
Copper	27	24	15	5	5	10	8 ✓	<5
Lead	107	92	112	52	59	61	16 ✓	<23
Mercury	4.1	5.6	4.2	1.6	2.5	1.7	6.3	
Nickel	14	12	6	2	7	10	~~48~~	<9
Selenium	<200	<200	<200	<200	<200	<200	<200	—
Silver	<4	<4	<4	<4	<4	<4	<4 ✓	<4
Thallium	12	9	9	6	6	6	<2 ✓	<2
Zinc	3510	4730	4780	5400	4810	5130	~~6,190~~	3350

ppb
ENVIRONMENTAL LABORATORIES, INC.

Mr. Mason Joye
Koogler and Associates
4014 N.W. 13th Street
Gainesville, Florida 32609

Table 2. **REPORT OF ANALYSIS**
(all results as total micrograms)

Station ID No.:	PPB No.	Mercury
~~TDF Run 1 - Hg~~	~~78943~~	~~30~~
~~TDF Run 2 - Hg~~	~~78944~~	~~33~~
~~TDF Run 3 - Hg~~	~~78945~~	~~19~~
Baseline Run 1 - Hg	78946	38
Baseline Run 2 - Hg	78947	11
Baseline Run 3 - Hg	78948	9.9
Blank - Hg	78949	<0.1

FLOWERS

CHEMICAL LABORATORIES INCORPORATED

Received From:
Koogler Assoc.
4014 NW 13th St.
Gainsvile,FL 32609

Date Reported : Feb17 1993
Project Number : 263-92-01
PO Number : Rinker Materials
FDHRSDW Number : 83139
FHRS ENVNumber : E83018
FDER COMQAPNum : 86-0008G
A2LA Number : 0312-01
NCDEHNR Number : 296
SCDHEC Number : 96019

For: BTEX
Date Sampled:Jan27 1993 Date Received:Feb 2 1993 Lab Numbers: 31198-31204

REPORT OF ANALYSIS

Parameter	Unit	Method Detection Limit	%ACC	%PRC	31198 RUN1	31199 RUN2	31200 RUN3	31201 BASELINERUN1	31202 BASELINERU2
					TDF				
Benzene	ug	.00100	92.3	2.44	3.58	2.70	2.34	0.552	0.945
Ethylbenzene	ug	.00100	89.0	3.35	<.0010	0.211	0.285	<.0010	.00543
Toluene	ug	.00100	91.1	3.71	.00540	2.08	1.81	0.539	1.27
Xylene	ug	.00100	88.3	4.72	.00720	0.683	1.18	<.0010	0.734
Total_BTEX	ug	.00100	89.2	3.00	3.59	5.67	5.62	1.09	2.95

Data Release Authorization
Sample integrity and reliability certified by Lab personnel prior to analysis. Methods of analysis in accordance with FCL QA and EPA approved methodology. This Report of Analysis may not be reproduced in part.

Jefferson S. Flowers, Ph.d.
President/Technical Director

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FLOWERS
CHEMICAL LABORATORIES INCORPORATED

Received From:
Koogler Assoc.
4014 NW 13th St.
Gainsvile,FL 32609

Date Reported : Feb17 1993
Project Number : 263-92-01
PO Number : Rinker Materials
FDHRSDW Number : 83139
FHRS ENVNumber : E83018
FDER COMQAPNum : 86-0008G
A2LA Number : 0312-01
NCDEHNR Number : 296
SCDHEC Number : 96019

For: BTEX
Date Sampled:Jan27 1993 Date Received:Feb 2 1993 Lab Numbers: 31198-31204

REPORT OF ANALYSIS

Parameter	Unit	Method Detection Limit	%ACC	%PRC	31203 BASELINERUN3	31204 FIELD BLANK
Benzene	ug	.00100	92.3	2.44	1.14	.00210
Ethylbenzene	ug	.00100	89.0	3.35	0.0143	<.0010
Toluene	ug	.00100	91.1	3.71	1.24	<.0010
Xylene	ug	.00100	88.3	4.72	0.0543	<.0010
Total_BTEX	ug	.00100	89.2	3.00	2.45	.00210
	-	-	-	-	-	-

Data Release Authorization
Sample integrity and reliability certified by Lab personnel prior to analysis.
Methods of analysis in accordance with FCL QA and EPA approved methodology.
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Jefferson S. Flowers, Ph.d.
President/Technical Director

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	282										FLOWERS CHEMICAL LABORATORIES							
2					TOP						ANALYTICAL RESULTS FORM			HRS Number 83139				
3				Run - 1	Run -2	Run - 3	Baseline Run	Baseline Ru -	Baseline Run	Field Blank					QA	Section		
4	Parameter	Symbol	Unit	31198	31199	31200	31201	31202	31203	31204				Method	MDL	%RSD	%Rec	Analys
5	Benzene	*	ug	3.58	2.7	2.34	0.552	0.945	1.14	0.0021				EPA602	0.001	2.44	92.3	CLS
6	Ethylbenzene	*	ug	<0.001	0.211	0.285	<0.001	0.00543	0.0143	<0.001				EPA602	0.001	3.35	89.0	CLS
7	Toluene	*	ug	0.0054	2.08	1.81	0.539	1.27	1.24	<0.001				EPA602	0.001	3.71	91.1	CLS
8	Xylene	*	ug	0.0072	0.683	1.18	<0.001	0.734	0.0543	<0.001				EPA602	0.001	4.72	88.3	CLS
9	Total BTEX	*	ug	3.5926	5.674	5.615	1.091	2.95443	2.4486	0.0021				EPA602	0.001	3.00	89.2	CLS
10	.	*	.											.	.			
11				Date Received:		02-02-93		Typed:		02-17-93	Sent:		02-17-93					
12	Project Number	263-92-01																
13	PO Number	Rinker Materials																
14	Date Sampled	1	01-27-93 *															
15	Date Analyzed	0																
16	Compacted	0																
17	Format	NormRR																
18	Unit Cost	Exted																
19	BTEX	12500	7 *															
20		0	0 *															
21	0.00																	

	S
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6	02-15-93
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CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name Rinker Materials

Sample Location Cement Kiln - TDF & Baseline

Sample Identification	Remarks
Beaker KA 5 Run 1 TDF	✓ Combine and test for Sb, As, Be,
Filter Run 1 TDF	Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag,
Container 4a Run 1 TDF	Tl, Zn. - Report results as TDF
Container 4b Run 1 TDF	Run 1
Beaker KA-22 Run 2 TDF	
Filter Run 2 TDF	Combine and test for Sb, As, Be,
Container 4a Run 2 TDF	Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn
Container 4b Run 2 TDF	Report results as TDF Run 2

Sampled By: (Signature) [signature] Date: 1/27-29/93 Time: SEE Data sheets

Relinquished By: (Sign) [signature] Date: 2/1/93 Time: 8:00 Am

Received By: (Sign) [signature] Date: 2/1/93 Time: 8:00 Am

Relinquished By: (Sign) [signature] Date: 2/5/93 Time: 1200

Received By: (Sign) [signature] Date: 2-5-93 Time: 1200

Relinquished By: (Sign) [signature] Date: 2-5-93 Time: 1310

Received By Lab: (Sign) [signature] Date: 2/5/93 Time: 1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ____________

CHAIN OF CUSTODY RECORD

Project Number: 263-92-01

Project Name: Rinker Materials

Sample Location: Cement Kiln TDF & Baseline

Sample Identification	Remarks
~~Beaker 66 Run 3 TDF~~	~~Combine and test for Sb, As, Be, Cd, Cu,~~
~~Filter TDF Run 3~~	~~Cr, Pb, Hg, Ni, Se, Ag, Tl, Zn - Report~~
~~Container 4a Run 3 TDF~~	~~results as TDF Run 3~~
~~Container 4b Run 3 TDF~~	
Beaker KA77 Run 1 Baseline	Combine and test for Sb, As, Be, Cd,
Filter Run 1 Baseline	Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn
Container 4a Baseline Run 1	Report Results as Baseline Run 1
Container 4b Baseline Run 1	

Sampled By: (Signature) [illegible] Date: 1/27-29/93 Time: SEE Data sheets

Relinquished By: (Sign) [illegible] Date: 2/1/93 Time: 8:00 Am

Received By: (Sign) [illegible] Date: 2/1/93 Time: 8:00 Am

Relinquished By: (Sign) [illegible] Date: 2/5/93 Time: 1200

Received By: (Sign) [illegible] Date: 2-5-93 Time: 1200

Relinquished By: (Sign) [illegible] Date: 2-5-93 Time: 1310

Received By Lab: (Sign) [illegible] Date: 2/5/93 Time: 1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ____________________

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CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name Rinker Materials

Sample Location Cement Kiln TDF & Baseline

Sample Identification	Remarks
Beaker KA-8 5 Run 2 Baseline	Combine and test for Sb, As, Be, Cd,
Filter Baseline Run 2	Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn
Container 4a Run 2 Baseline	Report Results as Baseline Run 2
Container 4b Run 2 Baseline	
Beaker KA 10 Run 3 Baseline	
Filter Baseline Run 3	Combine and test for Sb, As, Be, Cd,
Container 4a Run 3 Baseline	Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn.
Container 4b Run 3 Baseline	Report Results as Baseline Run 3
	combine with Container 5 Baseline Run 1 (Page 4/5)
* Container 5c Baseline Run 1*	Test for Hg ~~Report Results~~

Sampled By: (Signature) Steph Bell Date: 1/27-29/93 Time: SEE Data Sheets

Relinquished By: (Sign) Steph Bell Date: 2/1/93 Time: 8:00 Am

Received By: (Sign) [signature] Date: 2/1/93 Time: 8:00 Am

Relinquished By: (Sign) [signature] Date: 2/5/93 Time: 1200

Received By: (Sign) Tre E Jones Date: 2-5-93 Time: 1200

Relinquished By: (Sign) Tre E Jones Date: 2-5-93 Time: 1310

Received By Lab: (Sign) Paul Berman Date: 2/5/93 Time: 1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ____________

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4/5

CHAIN OF CUSTODY RECORD

Project Number: 263-92-01

Project Name: Rinker Materials Corp.

Sample Location: Cement Kiln - TDF & Baseline

Sample Identification	Remarks	
Container 5-TDF Run 1	Test for Hg	Report as TDF Run 1-Hg
Container 5-TDF Run 2	"	Report as TDF Run 2-Hg
Container 5-TDF Run 3	"	Report as TDF Run 3-Hg
Container 5-Baseline Run 1	"	Report as Baseline Run 1-Hg
Container 5-Baseline Run 2	"	Report as Baseline Run 2-Hg
Container 5-Baseline Run 3	"	Report as Baseline Run 3-Hg
Beaker KA-900	Combine and Test for Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn. Report as Blank.	
Filter Blank Container 12		
Container 7		
Containers 8A and 8B		
Container 9		

	Signature	Date	Time
Sampled By: (Signature)	Stephen Bell	1/27-29/93	SEE Data Sheets
Relinquished By: (Sign)	Stephen Bell	2/1/93	8:00
Received By: (Sign)		2/1/93	8:00
Relinquished By: (Sign)		2/5/93	1200
Received By: (Sign)	Ire E Jones	2-5-93	1200
Relinquished By: (Sign)	Ire E Jones	2-5-93	1310
Received By Lab: (Sign)	Paul Berman	2/5/93	1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ____________

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5/5

CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name Kunker Material Corp.

Sample Location Cement Kiln - TDF & Baseline

Sample Identification	Remarks
container 10 ~~TDF~~	Combine and test for Hg Report as
container 11	Blank-Hg.
Container 10 Baseline	

Sampled By: (Signature) ______ Date: 1/27-29/93 Time: SEE Data sheets

Relinquished By: (Sign) ______ Date: 2/1/93 Time: 8:00 Am

Received By: (Sign) ______ Date: 2/1/93 Time: 8:00 Am

Relinquished By: (Sign) ______ Date: 2/5/93 Time: 1200

Received By: (Sign) ______ Date: 2-5-93 Time: 1200

Relinquished By: (Sign) ______ Date: 2-5-93 Time: 1310

Received By Lab: (Sign) ______ Date: 2/5/93 Time: 1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ______

CHAIN OF CUSTODY RECORD

Project Number 263-92-03

Project Name Rinker Miami

Sample Location Cement Kiln - TDF & Baseline

Sample Identification	Remarks
~~Tire Composite~~	Ultimate analysis, Cr, Pb, Hg, As
~~TDF Coal Kiln 1~~	Ultimate analysis, Cr, Pb, Hg, As
~~TDF Coal Kiln 2~~	Ultimate analysis, Cr, Pb, Hg, As
~~TDF Raw meal (Slurry)~~	standard metals, Cr, Pb, Hg, As, SO_3, K, Na, Cl
~~TDF ESP Dust - Kiln 1~~	Std Metals, SO_3, K, Na, Cl
~~TDF ESP Dust Kiln 2~~	Std Metals, SO_3, K, Na Cl
~~TDF Clinker Comp.~~	Standard metals, Cr, Pb, Hg, As, SO_3 K, Na, Cl
Baseline Coal Kiln 1	Ultimate analysis, Cr, Pb, Hg, As
Baseline Coal Kiln 2	Ultimate analysis, Cr, Pb, Hg, As
Baseline Raw Meal (Slurry)	Standard metals, Cr, Pb, Hg, As, SO_3, K, Na, Cl

Sampled By: (Signature) [signature] Date: 1/27-29/93 Time: (see Data Sheets)

Relinquished By: (Sign) [signature] Date: 2/8/93 Time: 8:00 Am

Received By: (Sign) W. Auerbach Date: 2/8/93 Time: 8:00 Am

Relinquished By: (Sign) W. Auerbach Date: 2/11/93 Time: 2:00 pm

Received By: (Sign) M.E. Mixte Date: 2/16/93 Time: 1100 AM

Relinquished By: (Sign)____ Date:____ Time:____

Received By Lab: (Sign)____ Date:____ Time:____

Sample Shipped VIA: X UPS ____ Fed Express ____ Bus

Shipping Bill Number: 156047322

KOOGLER & ASSOCIATES

BEST AVAILABLE COPY

CHAIN OF CUSTODY RECORD

Project Number: 263-92-03

Project Name: Ruker Mironi

Sample Location: Cement Kiln — TDF & Baseline

Sample Identification	Remarks
Baseline ESP Dust Kiln 1	Stnd Metals, SO_3, K, Na, Cl
Baseline ESP Dust Kiln 2	Stnd Metals, SO_3, K, Na, Cl
Baseline Clinker	Standard metals, Cr, Pb, Hg, As, SO_3, K, Na, Cl

Sampled By: (Signature) [signature] Date: 1/27-29/93 Time: (SBE Data Sheets)

Relinquished By: (Sign) [signature] Date: 2/8/93 Time: 8:00 Am

Received By: (Sign) W. Auerbach Date: 2/8/93 Time: 8:00 Am

Relinquished By: (Sign) W. Auerbach Date: 2/11/93 Time: 2:00 pm

Received By: (Sign) M. E. Mcinto Date: 2/16/93 Time: 11:00 AM

Relinquished By: (Sign)____ Date:____ Time:____

Received By Lab: (Sign)____ Date:____ Time:____

Sample Shipped VIA: X UPS ____ Fed Express ____ Bus

Shipping Bill Number: 15604 7322

BEST AVAILABLE COPY

CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name RunKer Materials Corp.

Sample Location Cement Kiln

Sample Identification	Remarks	Lab#
~~Run 1 - TDFx2~~	Benzene	31198
~~Run 2 - TDFx2~~	"	31199
~~Run 3 TDFx2~~	"	31200
Baseline Run 1 x2	"	31201
Baseline Run 2 x2	"	31202
Baseline Run 3 x2	"	31203
Field Blank x2	"	31204-F

Sampled By: (Signature) ______ Date: 1/27-29/93 Time: (SEE Data sheets)

Relinquished By: (Sign) ______ Date: 2/1/93 Time: 1200

Received By: (Sign) ______ Date: ______ Time: ______

Relinquished By: (Sign) ______ Date: ______ Time: ______

Received By: (Sign) ______ Date: ______ Time: ______

Relinquished By: (Sign) ______ Date: ______ Time: ______

Received By Lab: (Sign) ______ Date: 2/2/93 Time: 8:58

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ______

COAL/TDF TEST DATA

COAL/TDF TEST CALCULATIONS

METALS AND PARTICULATE MATTERS

GENERAL DATA

DATA FILE NAME: rin_tdf

Company	: Rinker Material Corporation			
Source/Unit	: Cement Kiln - TDF			
Date	: January 27, 1993		Cp :	0.840
Stack dia.	: 180.00 inch	OR :	Duct Length :	0.00 inch
Oxygen Corr.	: 7.0 percent		Duct Width :	0.00 inch
			Std. Temp. :	68 dF

FUEL ANALYSIS DATA,
(for calculating F-Factor)

Process Wt.

Hydrogen,wt% :	0.00	Run 1 :	0.0 tons/hr
Carbon, wt% :	0.00	Run 2 :	0.0
Sulfur, wt% :	0.00	Run 3 :	0.0
Nitrogen,wt% :	0.00		
Oxygen, wt% :	0.00		
Btu/lb :	0		

F-Factor : dscf/MMBtu; enter this value or {F9} for result.

FIELD DATA

	RUN 1	RUN 2	RUN 3
Meter Temp., Tm (dF)	68.08	72.00	74.00
Stack Temp., Ts (dF)	340.21	332.13	314.75
Sq.Rt. dP	0.363	0.388	0.379
dH (in. H2O)	2.74	2.46	2.76
Meter Vol.,Vm (ft3)	49.485	50.764	56.321
Meter Y	0.987	0.987	0.987
Bar. Press.,Pb (in.Hg.)	30.09	30.09	30.09
Vol. H2O, Vlc (ml)	486.8	495.1	559.9
Static Press.,Ps (in.H2O)	-0.33	-0.33	-0.33
Test Time (min.)	60.0	60.0	60.0
Nozzle Dia.,Dn (in.)	0.470	0.470	0.470
Oxygen, O2 (%)	8.00	7.50	8.00
Carbon Dioxide, CO2 (%)	16.00	15.00	15.00
Carbon Monoxide, CO (%)	0.00	0.00	0.00

Is this Method 5 or Method 5/8 ? (5 or 58) : 5

LABORATORY RESULTS

	RUN 1	RUN 2	RUN 3	
GRAVIMETRIC ANALYSIS :				
Front Half Wash (FHW)	0.04050	0.04220	0.03290	grams
Filterable Particulate (MF)	0.08070	0.06820	0.08990	
Condensible Particulate (BHW)	0.00000	0.00000	0.00000	
SO2 ANALYSIS :				
SO2 Analysis (H2O2 impingers)......	0.00	0.00	0.00	mg H2SO4
Sample Volume, ml	0	0	0	
Sample Aliquot, ml	0	0	0	
Volume of Titer, ml	0.00	0.00	0.00	
Volume of Titer Blank, ml	0.00	0.00	0.00	

Normality of BaCl 0.0000000

LABORATORY RESULTS (Continued)

SULFATE ANALYSIS (FRONT HALF) :

Front Half Sulfate (FHS)	0.00	0.00	0.00	mg H2SO4
Sample Volume, ml	100	100	100	
Sample Aliquot, ml	10	10	10	
Volume of Titer, ml	0.00	0.00	0.00	
Volume of Titer Blank, ml	0.00	0.00	0.00	
Normality of BaCl			0.0000000	

SULFATE ANALYSIS (BACK HALF) :

Back Half Sulfate (BHS)	0.00	0.00	0.00	mg H2SO4
Sample Volume, ml	100	100	100	
Sample Aliquot, ml	10	10	10	
Volume of Titer, ml	0.00	0.00	0.00	
Volume of Titer IPA Blank, ml	0.00	0.00	0.00	
Normality of BaCl			0.0000000	

SOURCE TEST CALCULATIONS

PLANT : Rinker Material Corporation
Cement Kiln - TDF

RUN NO.: 1
DATE : January 27, 1993

STD.TEMP, Tstd	= 68 DEG. F	STATIC PRESS.,Ps	= -0.33 in. H2O
METER TEMP, Tm	= 68.08 DEG. F	PITOT COFF., Cp	= 0.840
STACK TEMP, Ts	= 340.2 DEG. F	STACK I.D.	= 180.00 inch
AVG.VEL.HEAD,dP	= 0.132 in. H2O	DUCT LENGTH	= inch
METER ORIFICE,dH	= 2.74 in. H2O	DUCT WIDTH	= inch
METER VOL., Vm	=49.485 Cu.Ft.	STACK AREA, As	= 176.715 Sq.Ft.
METER COFF., Y	= 0.987	TEST TIME	= 60.00 min.
BAR. PRESS., Pb	= 30.09 in.Hg	NOZZLE DIA.	= 0.470 inch
COND.(Vlc)	= 486.8 ml	NOZZLE DIA., An	= 1.2E-03 Sq.Ft.

GAS ANALYSIS = 8.00 % O2 0.00 % CO
16.00 % CO2 76.00 % N2

****

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x
(Pb + (dH / 13.6)) / (Tm + 460)..... = 49.440 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc = 22.914 scf

Bws = Vw(std) / (Vm(std) + Vw(std))........... = 0.317 ¦ Lower
¦ Bws
Bws @ Saturated Conditions = Vapor Press. of H2O ¦ value
@ Dew Point Temp. / (Ps, in.Hg.) .... = 1.000 ¦ used.

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 66.31

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 30.88

Ms = (Md x (1-Bws)) + (18.0 x Bws)............ = 26.80

P(stack) = Pbar + (Ps / 13.6) .... = 30.07 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460)
/ (Ms x P(stack))] .... = 26.01 ft/sec

Qs = vs x As x 60 .... = 275,736 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460))
x (P(stack)/29.92) .... = 124,926 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) /
(T(std) + 460) / 29.92] x 100 / [Time x
P(stack) x An x vs x 60] .... = 96.76 %

SOURCE TEST CALCULATIONS

PLANT : Rinker Material Corporation
Cement Kiln - TDF

RUN NO.: 2
DATE : January 27, 1993

STD.TEMP, Tstd	= 68 DEG. F	STATIC PRESS.,Ps	= -0.33 in. H2O
METER TEMP, Tm	= 72.00 DEG. F	PITOT COFF., Cp	= 0.840
STACK TEMP, Ts	= 332.1 DEG. F	STACK I.D.	= 180.00 inch
AVG.VEL.HEAD,dP	= 0.150 in. H2O	DUCT LENGTH	= inch
METER ORIFICE,dH	= 2.46 in. H2O	DUCT WIDTH	= inch
METER VOL., Vm	=50.764 Cu.Ft.	STACK AREA, As	= 176.715 Sq.Ft.
METER COFF., Y	= 0.987	TEST TIME	= 60.00 min.
BAR. PRESS., Pb	= 30.09 in.Hg	NOZZLE DIA.	= 0.470 inch
COND.(Vlc)	= 495.1 ml	NOZZLE DIA., An	= 1.2E-03 Sq.Ft.

GAS ANALYSIS = 7.50 % O2 0.00 % CO
15.00 % CO2 77.50 % N2

** *********

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x
(Pb + (dH / 13.6)) / (Tm + 460)..... = 50.310 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc = 23.304 scf

Bws = Vw(std) / (Vm(std) + Vw(std))........... = 0.317 | Lower
| Bws

Bws @ Saturated Conditions = Vapor Press. of H2O | value
@ Dew Point Temp. / (Ps, in.Hg.) .... = 1.000 | used.

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 57.87

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 30.70

Ms = (Md x (1-Bws)) + (18.0 x Bws)............ = 26.68

P(stack) = Pbar + (Ps / 13.6) .... = 30.07 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460)
/ (Ms x P(stack))] .... = 27.66 ft/sec

Qs = vs x As x 60 .... = 293,275 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460))
x (P(stack)/29.92) .... = 134,250 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) /
(T(std) + 460) / 29.92] x 100 / [Time x
P(stack) x An x vs x 60] .... = 91.63 %

SOURCE TEST CALCULATIONS

PLANT : Rinker Material Corporation
Cement Kiln – TDF

RUN NO.: 3
DATE : January 27, 1993

STD.TEMP, Tstd	= 68 DEG. F	STATIC PRESS.,Ps	= -0.33 in. H2O
METER TEMP, Tm	= 74.00 DEG. F	PITOT COFF., Cp	= 0.840
STACK TEMP, Ts	= 314.8 DEG. F	STACK I.D.	= 180.00 inch
AVG.VEL.HEAD,dP	= 0.144 in. H2O	DUCT LENGTH	= inch
METER ORIFICE,dH	= 2.76 in. H2O	DUCT WIDTH	= inch
METER VOL., Vm	=56.321 Cu.Ft.	STACK AREA, As	= 176.715 Sq.Ft.
METER COFF., Y	= 0.987	TEST TIME	= 60.00 min.
BAR. PRESS., Pb	= 30.09 in.Hg	NOZZLE DIA.	= 0.470 inch
COND.(Vlc)	= 559.9 ml	NOZZLE DIA., An	= 1.2E-03 Sq.Ft.

GAS ANALYSIS = 8.00 % O2 0.00 % CO
15.00 % CO2 77.00 % N2

*** *********

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x
(Pb + (dH / 13.6)) / (Tm + 460)..... = 55.649 dscf

Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc = 26.355 scf

Bws = Vw(std) / (Vm(std) + Vw(std))........... = 0.321 | Lower Bws value used.

Bws @ Saturated Conditions = Vapor Press. of H2O
@ Dew Point Temp. / (Ps, in.Hg.) .... = 1.000

%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100 = 64.89

Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)] = 30.72

Ms = (Md x (1-Bws)) + (18.0 x Bws)............ = 26.63

P(stack) = Pbar + (Ps / 13.6) .... = 30.07 in. Hg

vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460)
/ (Ms x P(stack))] .... = 26.78 ft/sec

Qs = vs x As x 60 .... = 283,932 acf/min

Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460))
x (P(stack)/29.92) .... = 131,954 dscf/min

I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) /
(T(std) + 460) / 29.92] x 100 / [Time x
P(stack) x An x vs x 60] .... = 103.12 %

A. FIELD DATA SUMMARY

PLANT : Rinker Material Corporation
Cement Kiln - TDF

DATE : January 27, 1993

	RUN 1	RUN 2	RUN 3
Vlc = Vol water collected in train, ml	486.8	495.1	559.9
Vm = Sample gas vol, meter cond., dacf	49.485	50.764	56.321
Y = Meter calibration factor	0.9870	0.9870	0.9870
Pbar = Barometric pressure, in. Hg	30.09	30.09	30.09
Pstatic = Stack static pressure, in. H2O	-0.33	-0.33	-0.33
dH = Avg meter pressure diff, in. H2O	2.74	2.46	2.76
Tm = Absolute meter temp., degrees R	528.1	532.0	534.0
Vm(std) = Sample gas vol, Std. cond., dscf	49.440	50.310	55.649
Bws = Water vapor in gas stream, fraction	0.317	0.317	0.321
MF = Moisture factor (1 - Bws)	0.683	0.683	0.679
CO2 = Carbon Dioxide, dry, volume %	16.00	15.00	15.00
O2 = Oxygen, dry, volume %	8.00	7.50	8.00
N2 = Nitrogen, dry volume %	76.00	77.50	77.00
Md = Molecular weight of stack gas, dry	30.88	30.70	30.72
Ms = Molecular weight of stack gas, wet	26.80	26.68	26.63
Cp = Pitot tube coefficient	0.84	0.84	0.84
Sq.Rt. dP = Avg. square root of each dP	0.3634	0.3876	0.3791
Ts = Absolute stack temp., degrees R	800.2	792.1	774.8
A = Area of stack, ft2	176.71	176.71	176.71
Qstd = Volumetric flowrate, dscfm	124,926	134,250	131,954
An = Nozzle area, ft2	1.20E-03	1.20E-03	1.20E-03
O = Sample time, minutes	60.00	60.00	60.00
%I = Isokinetic variation, percent	96.76	91.63	103.12

B. PARTICULATE DATA SUMMARY

PLANT : Rinker Material Corporation
Cement Kiln - TDF
DATE : January 27, 1993

	RUN 1	RUN 2	RUN 3
Particulate Weight (FHW + MF + BHW), mg ...	121.20	110.40	122.80
Meter Volume, standard cond., Vm(std)	49.440	50.310	55.649
Carbon Dioxide, percent	16.00	15.00	15.00
Oxygen, percent	8.00	7.50	8.00
Particulate Concentration :			
gr/scf	0.0259	0.0231	0.0231
gr/dscf	0.0378	0.0339	0.0341
gr/dscf @ 12 % CO2	0.0284	0.0271	0.0272
gr/dscf @ 7% O2	0.0408	0.0351	0.0367

EMISSION RATE CALCULATIONS

PLANT :Rinker Material Corporation
Cement Kiln - TDF

RUN NO.: 1
DATE : January 27, 1993
O2 CORR.: 7.0 %

STANDARD TEMP. : 68 DEG. F

****

Front Half Wash (FHW)	0.04050	grams	Vm(std)	49.440	ft3
Mass Filter (MF)	0.08070	grams	Vw(std)	22.914	ft3
Back Half Wash (BHW)	0.00000	grams	Qs(std)	124,926	dscfm
Front Half Sulfate (FHS)		mg H2SO4	Bws	0.317	
Back Half Sulfate (BHS)		mg H2SO4	CO2	16.00	%
H2O2 Catch (SO2)		mg H2SO4	O2	8.00	%

****

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528]		dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0259	gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0378	gr/dscf
gr/dscf x (12 / %CO2)	0.0284	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0408	@ 7% O2
0.00857 x Qs(std) x gr/dscf	40.50	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0259	gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0378	gr/dscf
gr/dscf x (12 / %CO2)	0.0284	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0408	@ 7% O2
0.00857 x Qs(std) x gr/dscf	40.50	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]		gr/scf
0.015432 x (FHS + BHS) / Vm(std)		gr/dscf
gr/dscf x (12 / %CO2)		@ 12% CO2
0.00857 x Qs(std) x gr/dscf		lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60864 x [T(std) + 460] x (mg H2SO4) / [98.076 x Vm(std)]		ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)]		@ O2 corr.
ppm x (1 - Bws)		ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..		lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x [20.9 / (20.9 - %O2)] x ppm		lb/MMBtu
lb/hr / (dscfm x 60 min/hr)		lb/dscf

EMISSION RATE CALCULATIONS

PLANT :Rinker Material Corporation		RUN NO.:	2
Cement Kiln - TDF		DATE :	January 27, 1993
		O2 CORR.:	7.0 %
STANDARD TEMP. :	68 DEG. F		

****

Front Half Wash (FHW)	0.04220	grams	Vm(std)	50.310	ft3
Mass Filter (MF)	0.06820	grams	Vw(std)	23.304	ft3
Back Half Wash (BHW)	0.00000	grams	Qs(std)	134,250	dscfm
Front Half Sulfate (FHS)		mg H2SO4	Bws	0.317	
Back Half Sulfate (BHS)		mg H2SO4	CO2	15.00	%
H2O2 Catch (SO2)		mg H2SO4	O2	7.50	%

****

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528]		dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0231	gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0339	gr/dscf
gr/dscf x (12 / %CO2)	0.0271	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0351	@ 7% O2
0.00857 x Qs(std) x gr/dscf	38.96	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0231	gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0339	gr/dscf
gr/dscf x (12 / %CO2)	0.0271	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0351	@ 7% O2
0.00857 x Qs(std) x gr/dscf	38.96	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]		gr/scf
0.015432 x (FHS + BHS) / Vm(std)		gr/dscf
gr/dscf x (12 / %CO2)		@ 12% CO2
0.00857 x Qs(std) x gr/dscf		lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60864 x [T(std) + 460] x (mg H2SO4) / [98.076 x Vm(std)]		ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)]		@ O2 corr.
ppm x (1 - Bws)		ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460]..		lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x [20.9 / (20.9 - %O2)] x ppm		lb/MMBtu
lb/hr / (dscfm x 60 min/hr)		lb/dscf

EMISSION RATE CALCULATIONS

PLANT :Rinker Material Corporation RUN NO.: 3
Cement Kiln - TDF DATE : January 27, 1993
O2 CORR.: 7.0 %
STANDARD TEMP. : 68 DEG. F

****

Front Half Wash (FHW)	0.03290	grams	Vm(std)	55.649	ft3
Mass Filter (MF)	0.08990	grams	Vw(std)	26.355	ft3
Back Half Wash (BHW)	0.00000	grams	Qs(std)	131,954	dscfm
Front Half Sulfate (FHS)		mg H2SO4	Bws	0.321	
Back Half Sulfate (BHS)		mg H2SO4	CO2	15.00	%
H2O2 Catch (SO2)		mg H2SO4	O2	8.00	%

****

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) -
0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] .... dscf/MMBtu

FILTERABLE PARTICULATE

15.432 x (FHW + MF) / [Vm(std) + Vw(std)]	0.0231	gr/scf
15.432 x (FHW + MF) / Vm(std)	0.0341	gr/dscf
gr/dscf x (12 / %CO2)	0.0272	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0367	@ 7% O2
0.00857 x Qs(std) x gr/dscf	38.51	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0231	gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0341	gr/dscf
gr/dscf x (12 / %CO2)	0.0272	@ 12% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0367	@ 7% O2
0.00857 x Qs(std) x gr/dscf	38.51	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

TOTAL SULFATE

0.015432 x (FHS + BHS) / [Vm(std) + Vw(std)]		gr/scf
0.015432 x (FHS + BHS) / Vm(std)		gr/dscf
gr/dscf x (12 / %CO2)		@ 12% CO2
0.00857 x Qs(std) x gr/dscf		lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu

SULFUR DIOXIDE (SO2)

1.60864 x [T(std) + 460] x (mg H2SO4) / [98.076 x
Vm(std)] .... ppm
ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)] .... @ O2 corr.
ppm x (1 - Bws) .... ppm (wet)
8.223E-5 x Qs(std) x 64.062 x ppm / [T(std) + 460].. lb/hr
F-Factor x 64.062 x [1.3711E-6 / [T(std)+ 460]] x
[20.9 / (20.9 - %O2)] x ppm .... lb/MMBtu
lb/hr / (dscfm x 60 min/hr) .... lb/dscf

SO2 (METHOD 6)

SO2 EMISSION CALCULATIONS

PLANT : Rinker Materials Corporation
Cement Kiln - TDF   DATE : January 27, 1993

Std. Temp. : 68 DEG. F
F-Factor : dscf/MMBtu

Run No.	Vm(std), dscf	lb/dscf	lb/MMBtu	ppm	ppm @7.0 %O2	lb/hr
1A	0.709	3.32E-05		199.83	215.32	248.64
1B						
Run Average	0.709	3.32E-05		199.83	215.32	248.64
2A	0.705	3.43E-05		206.91	212.25	276.66
2B						
Run Average	0.705	3.43E-05		206.91	212.25	276.66
3A	0.702	5.71E-05		344.24	345.98	452.43
3B						
Run Average	0.702	5.71E-05		344.24	345.98	452.43
Test Average	0.706	4.16E-05		250.32	257.85	325.91

CALCULATIONS :

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460) .... dscf

CSO2 = 7.061e-5 x [(Vt - Vtb) x N x (Vsoln / Va)] / Vm(std) .....lb/dscf

CSO2 = F-Factor x (lb SO2/dscf) x [20.9 / (20.9 - %O2)] .... lb/MMBtu

CSO2 = lb/dscf x (6.024e6) .... ppm

CSO2 = ppm x [(20.9 - Oxygen Corr.) / (20.9 - %O2)] ..... ppm @ 7.0 % O2

GENERAL DATA

DATA FILE NAME: rm_so2_tdf

Company : Rinker Materials Corporation
Source/Unit : Cement Kiln - TDF
Date : January 27, 1993
Oxygen Corr.: 7.0 percent
F-Factor : dscf/MMBtu
Std. Temp. : 68 dF

PRINT_MENU — Place a 1 next to the pages to be printed, then select PRINT from program menu.

INPUT 1 Data Input.
SUMMARY 1 SO2 Calculations & Summary Page.

FIELD DATA	RUN 1A	RUN 1B	RUN 2A	RUN 2B	RUN 3A	RUN 3B
Meter Temp., Tm (dF)	68.80	0.00	71.88	0.00	74.00	0.00
Stack Temp., Ts (dF)	340.2	0.0	332.1	0.0	327.3	0.0
dH (in. H2O)	0.01	0.01	0.01	0.01	0.01	0.01
Meter Vol.,Vm (ft3)	0.706	0.000	0.706	0.000	0.706	0.000
Meter Y	1.000	1.000	1.000	1.000	1.000	1.000
Bar. Press.,Pb (in.Hg.)	30.09	30.09	30.09	30.09	30.09	30.09
Static Press.,Ps (in.H2O) ..	-0.33	-0.33	-0.33	-0.33	-0.33	-0.33
Test Time (min.)	20.0	20.0	20.0	20.0	20.0	20.0
Oxygen, O2 (%)	8.00	8.00	7.35	7.35	7.07	7.07
Carbon Dioxide, CO2 (%)	16.00	16.00	16.00	16.00	16.00	16.00
Carbon Monoxide, CO (%)	0.00	0.00	0.00	0.00	0.00	0.00
Gas Flow Rate, dscfm	124926	0	134250	0	131954	0

LABORATORY RESULTS	RUN 1A	RUN 1B	RUN 2A	RUN 2B	RUN 3A	RUN 3B
Sample Volume, ml	1000	0	1000	0	1000	0
Sample Aliquot, ml	50	0	50	0	50	0
Volume of Titer, ml	1.80	0.00	1.85	0.00	3.00	0.00
Volume of Titer Blank, ml ..	0.10	0.00	0.10	0.00	0.10	0.00

Barium Perchlorate
Normality :

0.00980

COAL/TDF TEST
FIELD DATA SHEETS

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 • FAX 377-7158

Plant: Runker Materials, Inc.
Sample Loc.: Cement Kiln – TDF
Control Type: Baghouse, Electrostatic Precipitator (ESP)
Sample Type: Particulate Mater, Multi-Metals
Date: 1/27/93 Run No.: TDF-1
Time Start: 10:41 Time End: 11:56
Sample Time: 5 2.05 min/port 60 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure 30.09 "Hg Stack Press.: "Hg Ps: "H2O
Moisture: 25 % FDA: Gas Density Factor:
Temperature: 65 °F Wind Dir.: NW Wind Speed: 10-20
Weather: P.C. Thermocouple Readout: KA-1
Sample Box #: KA-2 Meter Box No.: KA-2
Meter Y: 0.987 @ Delta H: 1.561 Pitot Corr.: 0.84
Nozzle Diameter: ~~1.509~~ in. 0.970 JG Probe Length: 8 ft
Probe Heater Setting: 4 Nomograph Cf: ~~28.9538~~
Stack Dimentions: 15 ft ~~in~~
Stack Area: 176.71 ft²
Effective Stack Area: 176.71 ft²
Stack Height: ~85 ft

Stack Dimentions
Umbilical: 200'
Thermocouple
Probe No.: VA 50
Pitot Tube: KA-5II

Material Processing Rate:
Final Gas Meter Reading: 408.179 ft³
Initial Gas Meter Reading: 358.694 ft³
Total Metered Gas Volume: 49.485 ft³
Condensate Gain in Impingers: 465 mL
Weight Gain in Silica Gel: 21.8 g
Total Moisture Gain: 486.8 mL
Silica Gel Container No.: 17
Filter Number: 11

Leak Check – Meter Box
Initial: 0.015 cfm @ 15 in. H2O
Final: 0.010 cfm @ 11 in. H2O

Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

Test Conducted By: J. Garcia, T. Jones, S. Bell, G. Gable
Stack Test Observers: A. Bolivar, C. Logan, F. Delgado,

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperatu (°F)	Sample Box Temperature (°F)	Last Impinger Temperatu (°F)	Meter Temperatu (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO_2 ppm
Average:				0.3634		2.7367	340.21			68.08		7.5	12.88	269.66	1114	153
1-1	3.8		358.9	0.12	3.47	3.00	280	245	64	65	11	7.5	14	550	1100	144
2	12.1		360.2	0.20	5.79	3.00	346	253	64	65	11	7.5	13	369	1100	110
3	21.2		363.2	0.22	6.37	3.00	329	270	61	65	11	7.5	18	414	1100	123
4	31.9		365.7	0.20	5.79	3.00	360	248	60	66	11	7.5	11	523	1150	163
5	45.0		367.1	0.16	4.63	3.00	379	258	60	66	11	7.5	11	230	1100	155
6	63.9		369.2	0.10	2.89	2.89	344	248	60	68	11	7.4	18	480	1250	160
2-1			372.3	0.15	4.34	3.00	342	270	60	68	11	7.5	13	357	1100	153
2			373.3	0.15	4.34	3.00	356	249	60	69	11	7.5	13	292	1100	154

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Vost Run 1 - 11:43

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temp. (°F)	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Meter Temp. (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	
3			374	0.12	3.47	3.00	353	245	63	68	11	7.5	13.0	325	1150	174
4			375	0.10	2.90	2.90	354	238	61	68	11	7.5	12.9	211	1075	180
5			377	0.08	2.32	2.32	330	270	64	69	10	7.5	12.9	189.5	1100	182
6			380	0.05	1.45	1.45	343	252	62	69	7	7.5	13.1	682	1075	183
3-1			382	0.14	4.05	3.00	346	239	61	69	11	7.8	13.1	363	1125	169
2			384	0.15	4.34	3.00	344	242	61	69	11	7.5	13.1	266	1100	160
3			386.2	0.12	3.47	3.00	342	258	61	69	11	7.5	13.1	265	1100	154
4			388	0.08	2.32	2.32	341	263	61	69	10	7.5	13.0	699	1150	165
5			391	0.05	1.45	1.45	343	253	63	69	7.5	7.5	12.9	196.4	1140	122
6			392	0.05	1.45	1.45	318	269	61	69	7.5	7.5	13.0	568	1070	153
4-1			394	0.22	6.37	3.00	331	258	41	69	7.5	7.5	12.9	528	1100	133
2			396	0.20	5.79	3.00	338	263	61	69	7.5	7.5	13.0	492	1100	133
3			398	0.20	5.79	3.00	336	253	67	69	7.5	7.5	13.1	502	1100	129
4			401	0.20	5.79	3.00	337	261	74	69	7.5	7.5	13.1	280	1150	130
5			403	0.15	4.34	3.00	337	273	69	69	7.5	7.5	13.0	666	1100	172
6			405	0.10	2.90	2.90	336	270	61	69	7.5	7.5	13.0	239	1100	170

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VOC {1405 1425 SO_2 {1339 1359

Plant: Rinker Materials
Sample Loc.: Cement Kiln - TDF
Control Type: Baghouse ESP
Sample Type: P.M., M.M
Date: 1/27/93   Run No.: TDF-2
Time Start: 13:39   Time End: 15:02
Sample Time: 2.5 min/port   60 total min.
Dry Bulb: °F   Wet Bulb: °F   VP @ DP:
Bar. Pressure: 30.09 "Hg   Stack Press.: "Hg   Ps: "H2O
Moisture: 3 %   FDA: Gas Density Factor:
Temperature: °F   Wind Dir.: NW   Wind Speed: 10-20
Weather: Thermocouple Readout: KA-
Sample Box #: KA-2   Meter Box No.:
Meter Y: 0.987   @ Delta H: 1.561   Pitot Corr.: 0.84
Nozzle Diameter: ~~0.508~~ in. 0.470 J6   Probe Length: 8 ft
Probe Heater Setting: 4   Nomograph Cf: ~~22.65~~ 36
Stack Dimentions: 15 in
Stack Area: 176.71 ft²
Effective Stack Area: 176.71 ft²
Stack Height: ~85 ft

Stack Dimentions
Umbilical: 200
Thermocouple
Probe No.: KA-50
Pitot Tube: KA-SH

Material Processing Rate:
Final Gas Meter Reading: 459.415 ft³
Initial Gas Meter Reading: 408.651 ft³
Total Metered Gas Volume: 50.764 ft³
Condensate Gain in Impingers: 475 mL
Weight Gain in Silica Gel: 20.1 g
Total Moisture Gain: 495.1 mL
Silica Gel Container No.: 107
Filter Number: 121

Leak Check – Meter Box
Initial: 0.00 cfm @ 15 in. H2O
Final: 0.00 cfm @ 11 in. H2O

Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

Test Conducted By: J. Garcia, S. Bell, T. Jones, G. Goble

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO_2 ppm
Average:				0.3876		2.4563	332.13			76.88		7.35	41.80	407.53	898.33	135.25
1-1			408	0.19	4.30	2.7	335	247	61	69	11	7.2	13.0	300	900	159
2			410.2	0.20	4.52	2.7	335	233	61	69	11	7.2	13.0	310	910	160
3			412.9	0.21	4.74	2.7	354	245	61	69	11	7.2	13.1	319	950	158
4			415.	0.16	3.62	2.7	342	265	64	69	11	7.5	13	325	925	159
5			417.6	0.15	3.39	2.75	345	253	64	70	12	7.3	74	322	1000	109
6			419	0.13	2.94	2.70	338	270	64	70	12	7.5	13	450	1050	107
2-1			422	0.10	2.26	2.26	318	264	64	70	9	7.4	72	351	900	115
2			424.2	0.11	2.49	2.49	341	255	61	71	10	7.4	62	462	950	125

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Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O)		Stack Gas Temp. (°F)	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Meter Temp. (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO_2 ppm
					Calculated	Actual										
2-3			426.3	0.11	2.49	2.49	340	253	64	71	10	7.5	58	207	875	103
4			426.5	0.07	1.58	1.58	341	250	62	72	8	7.4	75	630	875	125
5			430.4	0.05	1.13	1.13	338	270	65	72	8	7.1	62	926	850	155
6			432.0	0.04	0.90	0.90	272	263	66	72	7	7.3	20	516	850	124
3-1			433.2	0.16	3.62	2.71	330	261	61	72	11	7.3	20	600	850	136
2			435.6	0.18	4.08	2.71	334	253	60	77	11	7.5	15	600	850	150
3			438	0.18	4.08	2.71	336	293	63	72	11	7.5	12	518	850	152
4			440	0.18	4.08	2.71	338	283	64	72	11	7.5	20	243	850	126
5			442	0.16	3.62	2.71	339	275	64	72	11	7.1	19	644	875	140
6			444.9	0.09	2.038	2.04	327	260	65	74	9	7.2	29	362	900	122
4-1			446.4	0.23	5.20	2.71	330	268	65	74	11	7.4	34	248	925	130
2			448.5	0.25	5.66	2.71	329	268	67	74	11	7.4	31	376	800	138
3			450.7	0.25	5.66	2.71	329	263	70	74	11	7.4	40	304	1000	161
4			452.8	0.22	4.98	2.71	328	270	71	75	11	7.4	75	376	900	143
5			455.3	0.16	3.62	2.71	328	260	70	75	11	7.4	100	186.8	850	125
6			457.4	0.18	4.08	2.71	324	260	69	75	11	7.4	120	265	875	124

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Plant: Rinker Materials
Sample Loc.: Cement Kiln TDF
Control Type:
Sample Type:
Date: 1/27/93 Run No.: TDF-3
Time Start: 16:16 Time End: 17:30
Sample Time: 2.5 min/port total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: 38 % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed: 10-20
Weather: Thermocouple Readout: KA-1
Sample Box #: KA-2 Meter Box No.: KA-2
Meter Y: 0.997 @ Delta H: 1.561 Pitot Corr.: 0.84
Nozzle Diameter: 0.470 in. JG Probe Length: 8 glass ft
Probe Heater Setting: 4 Nomograph Cf: ~~2.273~~
Stack Dimentions: 15. JG in
Stack Area: 176.71 ft²
Effective Stack Area: 176.71 ft²
Stack Height: ~85 ft

Stack Dimentions
Umbilical: 200
Thermocouple Probe No.: KA
Pitot Tube: KA-II

Material Processing Rate:
Final Gas Meter Reading: 516.062 ft³
Initial Gas Meter Reading: 459.741 ft³
Total Metered Gas Volume: 56.321 ft³
Condensate Gain in Impingers: 540 mL
Weight Gain in Silica Gel: 19.9 g
Total Moisture Gain: 559.9 mL
Silica Gel Container No.: 509
Filter Number: 13

Leak Check – Meter Box
Initial: 0.010 cfm @ 15 in. H2O
Final: 0.000 cfm @ 11 in. H2O

Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

Test Conducted By: J. Garcia, G. Bell
Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO2 ppm
Average:				0.3791		2.7583	327.25 ~~344.75~~			74		7.07	20.21	449.05	843.75	286.6
1-1			59.7	0.22	5.00	1.95	327	250	65	72	12	7.4	11	252	860	261
2			61.9	0.18	4.09	3.30	341	255	60	72	11	7.25	14	458	850	295
3			64.4	0.19	4.32	3.25	340	244	57	72	11	7.1	14	500	825	310
4			66.9	0.16	3.637	3.25	341	234	59	72	11	7.1	16	697	850	287
5			69.4	0.15	3.41	3.25	334	252	59	72	11	6.9	15	692	825	280
6			72.2	0.09	2.04	2.04	318	243	59	72	9	7.2	13	164.2	850	267
2-1			74.1	0.17	3.86	3.25	320	258	64	73	11	7.0	28	243	850	300
2			76.6	0.15	3.41	3.25	336	249	55	73	11	7.0	25	574	875	303

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SO_2 #3 { 1643 1703

1706 1726 } Vost #3

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temp. (°F)	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Meter Temp. (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)	Flame Ionization Detector Reading (ppm)	CO Monitor Reading (ppm)	NOx Monitor Reading (ppm)	SO_2 ppm
2-3			479.1	0.16	3.63	3.25	336	245	53	73	11	7.1	21	331	850	301
4			81.6	0.11	2.50	2.50	335	251	54	74	10	7.2	23	253	900	271
5			84.0	0.08	1.819	1.82	334	258	55	74	8	7.2	32	427	850	287
6			85.9	0.11	2.50	2.50	328	255	56	74	8	7.0	21	822	850	310
3-1			88.2	0.12	2.728	2.73	322	250	58	74	10	7.0	22	506	850	242
2			90.4	0.14	3.18	3.18	334	245	60	75	11	7.1	32	371	875	285
3			92.8	0.15	3.41	3.18	334	252	62	75	11	6.9	25	1694	850	257
4			95.3	0.13	2.96	2.96	333	256	63	75	11	7.0	24	442	850	261
5			97.7	0.12	2.73	2.73	332	252	64	75	11	7.1	18	597	850	293
6			00.1	0.08	1.82	1.82	293	259	66	75	8	7.1	16	300	850	309
4-1			02.2	0.07	1.59	1.59	254	250	65	75	6	7.1	14	480	850	293
2			3.9	0.22	5.00	2.95	332	247	65	75	12	7.1	16	219	800	303
3			6.4	0.21	4.77	2.90	333	243	64	75	12	7.1	14	263	850	264
4			8.7	0.19	4.32	2.85	334	252	63	76	12	7.1	40	183	800	318
5			11.2	0.18	4.09	2.85	332	249	63	76	12	6.8	14	783	800	323
6			13.6	0.15	3.41	2.85	331	252	64	77	11	6.9	17	524	850	260

Plant: Broker

Sample Loc.: Bag Stack

Control Type: ESP.

Sample Type: VOC, Benzene

Date: 1-27-93 Run No.: 1

Time Start: 1143 Time End: 1203

Sample Time: ______ min/port ______ total min.

Dry Bulb: ______ °F Wet Bulb: ______ °F VP @ DP: ______

Bar. Pressure ______ "Hg Stack Press.: ______ "Hg Ps: ______ "H2O

Moisture: ______ % FDA: ______ Gas Density Factor: ______

Temperature: ______ °F Wind Dir.: ______ Wind Speed: ______

Weather: ______ Thermocouple Readout: ______

Sample Box #: ______ Meter Box No.: ______

Meter Y: ______ @ Delta H: ______ Pitot Corr.: ______

Nozzle Diameter: ______ in. Probe Length: ______ ft

Probe Heater Setting ______ Nomograph Cf: ______

Stack Dimentions: ______ in

Stack Area: ______ ft²

Effective Stack Area: ______ ft²

Stack Height: ______ ft

Stack Dimentions

Umbilical: ______

Thermocouple

Probe No.: ______

Pitot Tube: ______

Material Processing Rate: ______

Final Gas Meter Reading ______ ft³

Initial Gas Meter Reading ______ ft³

Total Metered Gas Volume: ______ ft³

Condensate Gain in Impingers: ______ mL

Weight Gain in Silica Gel: ______ g

Total Moisture Gain: ______ mL

Silica Gel Container No.: ______

Filter Number ______

Leak Check – Meter Box

Initial: 0.00 cfm @ 6 in. H2O

Final: 0.00 cfm @ 6 in. H2O

Leak Check – Pitot Tubes

Impact 3 "H2O for 15 sec: Stable, Leak

Static 3 "H2O for 15 sec: Stable, Leak

KOOGLER & ASSOCIATES

Test Conducted By: G. F. Gabel

Stack Test Observers: ______

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	MFM LPM Gas Meter Reading ~~(ft³)~~	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	First cond. ~~Last~~ Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
Average:												
		1143	1.0						51			
		1148	1.0						50			
		1153	1.0						49			
		1158	1.0						48			
		1203	End of 20 min run									

Plant: RINKER

Sample Loc.:

Control Type:

Sample Type: VOC Benzene

Date: 1-27-93 Run No.: 2

Time Start: 1405 Time End: 1425

Sample Time: 5 min/port 20 total min.

Dry Bulb: °F Wet Bulb: °F VP @ DP:

Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O

Moisture: % FDA: Gas Density Factor:

Temperature: °F Wind Dir.: Wind Speed:

Weather: Thermocouple Readout:

Sample Box #: Meter Box No.:

Meter Y: @ Delta H: Pitot Corr.:

Nozzle Diameter: in. Probe Length: ft

Probe Heater Setting: Nomograph Cf:

Stack Dimentions: in

Stack Area: ft²

Effective Stack Area: ft²

Stack Height: ft

Stack Dimentions

Umbilical:

Thermocouple

Probe No.:

Pitot Tube:

Material Processing Rate:

Final Gas Meter Reading: ft³

Initial Gas Meter Reading: ft³

Total Metered Gas Volume: ft³

Condensate Gain in Impingers: mL

Weight Gain in Silica Gel: g

Total Moisture Gain: mL

Silica Gel Container No.:

Filter Number:

Leak Check – Meter Box

Initial: 0.00 cfm @ 6 in. H2O

Final: 0.00 cfm @ 6 in. H2O

Leak Check – Pitot Tubes

Impact 3 "H2O for 15 sec: Stable, Leak

Static 3 "H2O for 15 sec: Stable, Leak

KOOGLER & ASSOCIATES

Test Conducted By: L. F. Gabel

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	1st Can ~~Last~~ Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
Average:												
		1405	1.00						56			
		1410	1.00						54			
		1415	1.00						53			
		1420	1.00						52			
		1425	End of 20 min Run									

Plant: RINKER
Sample Loc.: CEMENT KILN
Control Type: ESP
Sample Type: VOST & Benzene
Date: 1-27-93 Run No.: 3
Time Start: 1706 Time End: 1726
Sample Time: 5 min/port 20 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed:
Weather: Thermocouple Readout:
Sample Box #: Meter Box No.:
Meter Y: @ Delta H: Pitot Corr.:
Nozzle Diameter: in. Probe Length: ft
Probe Heater Setting: Nomograph Cf:
Stack Dimentions: in
Stack Area: ft²
Effective Stack Area: ft²
Stack Height: ft

Stack Dimentions
Umbilical:
Thermocouple
Probe No.:
Pitot Tube:

Material Processing Rate:
Final Gas Meter Reading: ft³
Initial Gas Meter Reading: ft³
Total Metered Gas Volume: ft³
Condensate Gain in Impingers: mL
Weight Gain in Silica Gel: g
Total Moisture Gain: mL
Silica Gel Container No.:
Filter Number:

Leak Check – Meter Box
Initial: 0.00 cfm @ 6 in. H2O
Final: 0.00 cfm @ 6 in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

KOOGLER & ASSOCIATES

Test Conducted By: G. F. Gabel

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	1st COND. ~~Last Impinger~~ Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
Average:												
		1706	1.00						61		4	
		1711	1.00						58		4	
		1716	1.00						57		4	
		1721	1.00						57		4	
		1726										

Plant: RINKER

Sample Loc.:

Control Type: ESP

Sample Type: SO_2

Date: 1-27-93 Run No.: 1

Time Start: 1300 Time End: 1320

Sample Time: 5 min/port 20 total min.

Dry Bulb: °F Wet Bulb: °F VP @ DP:

Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O

Moisture: % FDA: Gas Density Factor:

Temperature: °F Wind Dir.: Wind Speed:

Weather: WINDY Thermocouple Readout:

Sample Box #: Meter Box No.:

Meter Y: @ Delta H: Pitot Corr.:

Nozzle Diameter: in. Probe Length: ft

Probe Heater Setting: Nomograph Cf:

Stack Dimentions: in

Stack Area: ft²

Effective Stack Area: ft²

Stack Height: ft

Stack Dimentions

Umbilical:

Thermocouple

Probe No.:

Pitot Tube:

Material Processing Rate:

Final Gas Meter Reading: ft³

Initial Gas Meter Reading: ft³

Total Metered Gas Volume: ft³

Condensate Gain in Impingers: mL

Weight Gain in Silica Gel: g

Total Moisture Gain: mL

Silica Gel Container No.:

Filter Number:

Leak Check – Meter Box

Initial: 0.00 cfm @ 6 in. H2O

Final: 0.00 cfm @ 6 in. H2O

Leak Check – Pitot Tubes

Impact 3 "H2O for 15 sec: Stable, Leak

Static 3 "H2O for 15 sec: Stable, Leak

KOOGLER & ASSOCIATES

Test Conducted By: G.F. Gabel

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
Average:												
		1300	1.00						61		1	
		1305	1.00						60		1	
		1310	1.00						59		1	
		1315	1.00						58		1	
		1320	End of 20 min Run									

Plant: RINKER

Sample Loc.:

Control Type: ESP

Sample Type: SO_2

Date: 1-27-93 Run No.: 2

Time Start: 1337 Time End: 1357

Sample Time: 5 min/port 20 total min.

Dry Bulb: °F Wet Bulb: °F VP @ DP:

Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O

Moisture: % FDA: Gas Density Factor:

Temperature: °F Wind Dir.: Wind Speed:

Weather: Thermocouple Readout:

Sample Box #: Meter Box No.:

Meter Y: @ Delta H: Pitot Corr.:

Nozzle Diameter: in. Probe Length: ft

Probe Heater Setting: Nomograph Cf:

Stack Dimentions: in

Stack Area: ft²

Effective Stack Area: ft²

Stack Height: ft

Stack Dimentions

Umbilical:

Thermocouple

Probe No.:

Pitot Tube:

Material Processing Rate:

Final Gas Meter Reading: ft³

Initial Gas Meter Reading: ft³

Total Metered Gas Volume: ft³

Condensate Gain in Impingers: mL

Weight Gain in Silica Gel: g

Total Moisture Gain: mL

Silica Gel Container No.:

Filter Number:

Leak Check – Meter Box

Initial: 0.00 cfm @ 6 in. H2O

Final: cfm @ in. H2O

Leak Check – Pitot Tubes

Impact 3 "H2O for 15 sec: Stable, Leak

Static 3 "H2O for 15 sec: Stable, Leak

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Test Conducted By: G. F. Gabel

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
Average:												
		1337	1.00						61		1	
		1342	1.00						59		1	
		1347	1.00						58		1	
		1352	1.00						58		1	
		1357	End of 20 min Run									

Plant: RINKER
Sample Loc.: CEMENT KILN
Control Type: ESP
Sample Type: SO_2
Date: 1-27-93 Run No.: 3
Time Start: 1643 Time End:
Sample Time: 5 min/port 20 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure "Hg Stack Press.: "Hg Ps: "H2O
Moisture: % FDA: Gas Density Factor:
Temperature: °F Wind Dir.: Wind Speed:
Weather: Thermocouple Readout:
Sample Box #: Meter Box No.:
Meter Y: @ Delta H: Pitot Corr.:
Nozzle Diameter: in. Probe Length: ft
Probe Heater Setting: Nomograph Cf:
Stack Dimentions: in
Stack Area: ft²
Effective Stack Area: ft²
Stack Height: ft

Stack Dimentions
Umbilical:
Thermocouple
Probe No.:
Pitot Tube:

Material Processing Rate:
Final Gas Meter Reading: ft³
Initial Gas Meter Reading: ft³
Total Metered Gas Volume: ft³
Condensate Gain in Impingers: mL
Weight Gain in Silica Gel: g
Total Moisture Gain: mL
Silica Gel Container No.:
Filter Number:
Leak Check – Meter Box
Initial: 0.00 cfm @ 6 in. H2O
Final: cfm @ in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: Stable, Leak
Static 3 "H2O for 15 sec: Stable, Leak

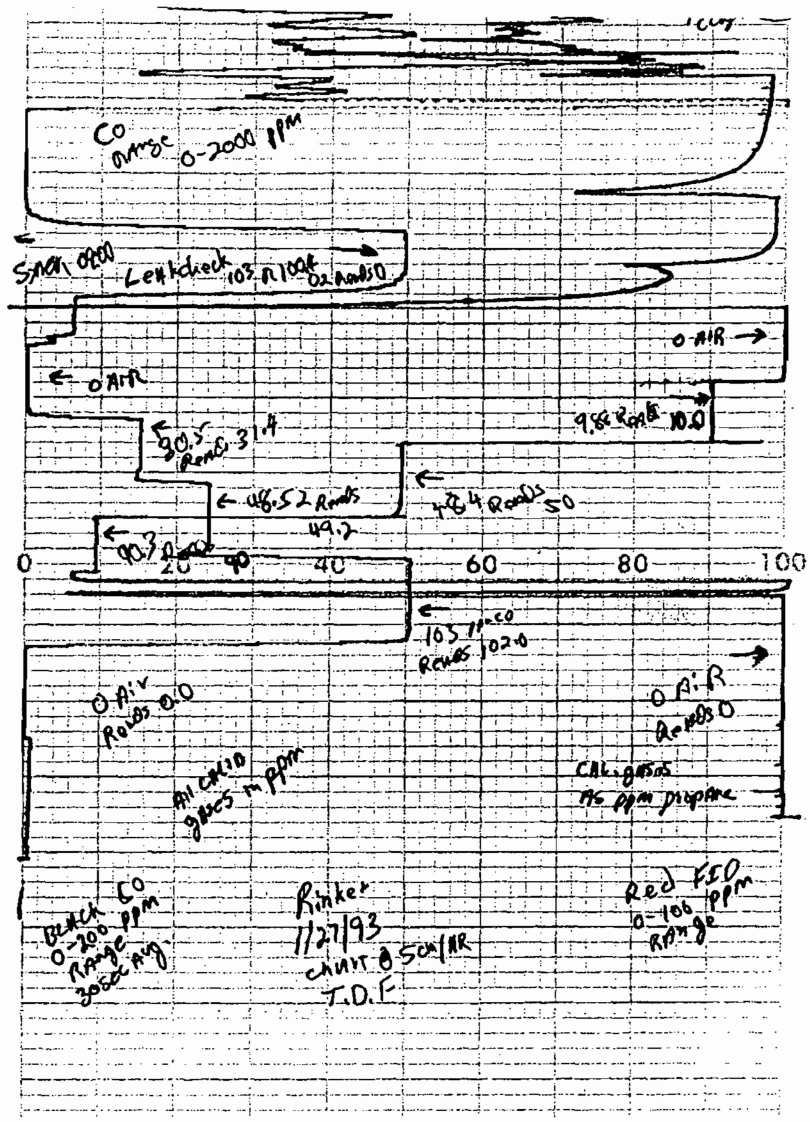
KOOGLER & ASSOCIATES

Test Conducted By: G. F. Gabel

Stack Test Observers:

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
Average:												
		1643	1.00							62	1	
		1648	1.00							59	1	
		1653	1.00							58	1	
		1658	1.00							57	1	
		1703										

COAL/TDF TEST
CONTINUOUS MONITORING RECORDS



TDF

CO and FID

1/27/93

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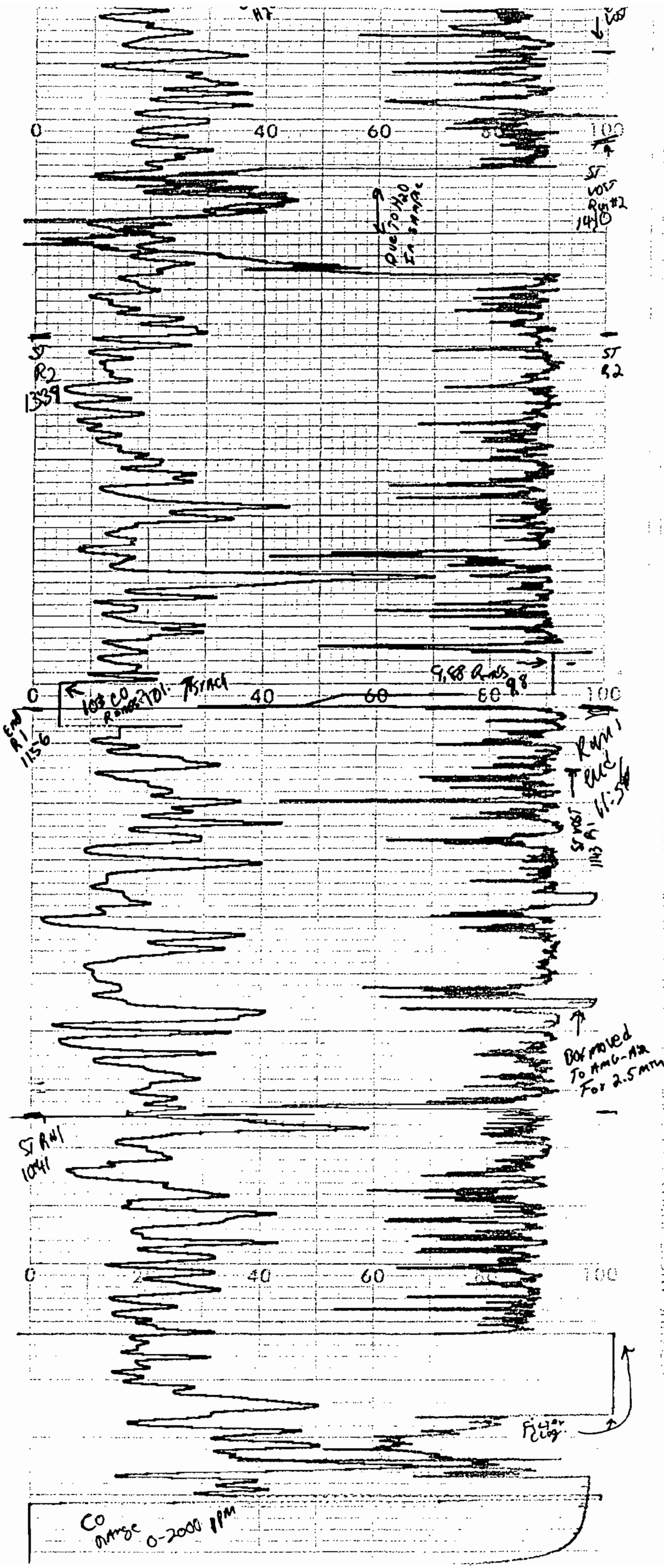

TDF

CO and FID

1/27/93

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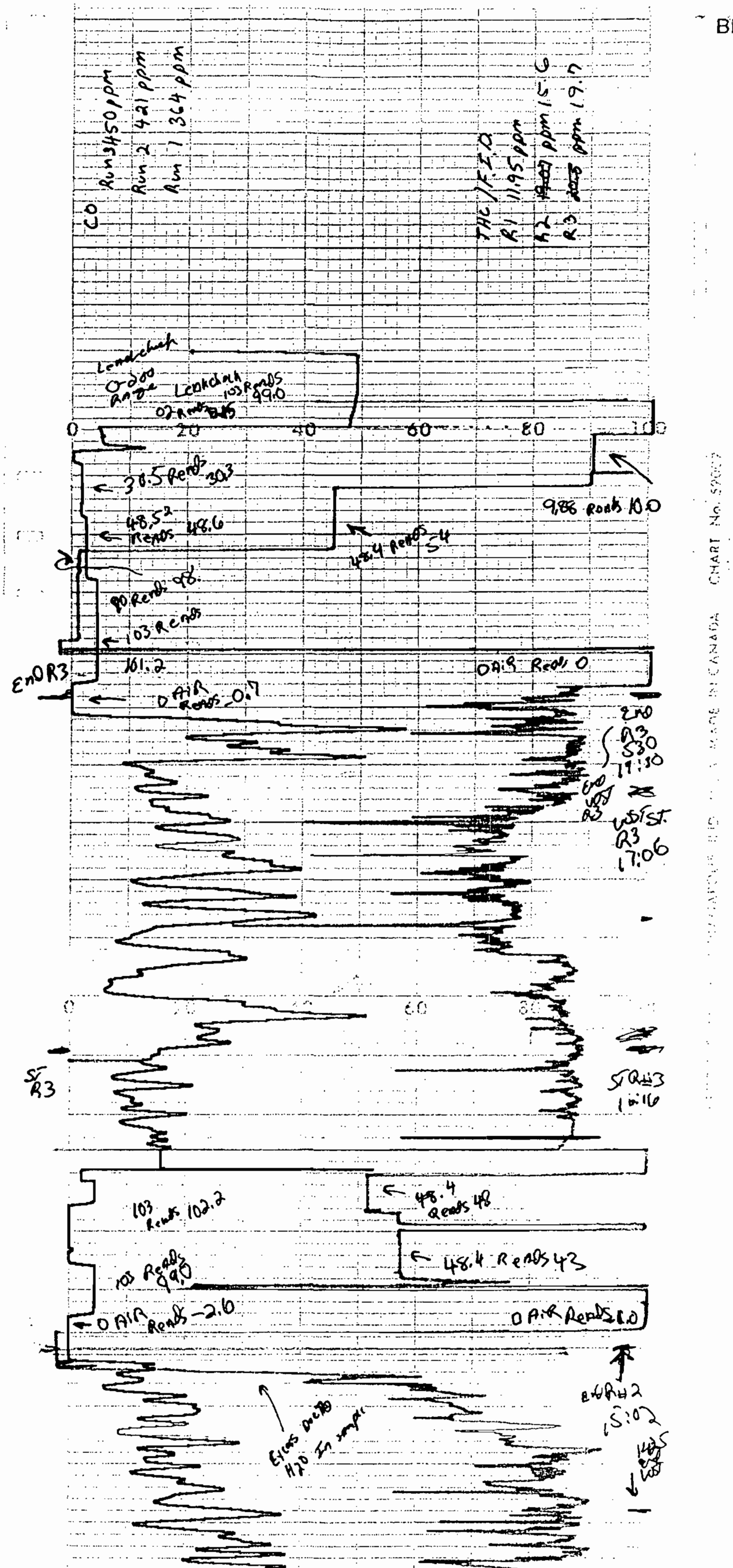

TDF

CO and FID

1/27/93

Booker 1/27/93 34. 2.4 min Avgs

T.D.F. R1

FID

1-30	11-22	21-14	31-9
2-12	12-11	22-11	32-15
3-11	13-9	23-10	33-8
4-10	14-9	24-20	34-10
5-9	15-8	25-12	10.5
6-9	16-10	26-7	
7-8	17-15	27-14	
8-15	18-20	28-22	11.95 ppm propane
9-7	19-1	29-18	
10-14	20-10	30-14	
12.5	10.6	14.2	

FID TDF R2 26 2.4 min Avgs. 62.4 min

1-12	11-X	21-26	31-25 X
2-14	12-X	22-14	2-26 X
3-16	13-X	23-16	3-32 X
4-15	14-X	4-19	4-35 X
5-14	15-X	5-16 End VOST	5-35 X
6-13	16-15	6-14 ~~20~~	6-
7-X	17-11 STVOST	7-22	7-
8-X	18-14	8-17	8-
9-X	19-18	9-15	9-
10-X	20-10	30-16	40-
14	13.6	18.1	~~30.6~~

15.6 ppm propane

~~19.07~~ ppm

VOST Avg - 16.62

T.D.F. R 3 BmKr 1/27/93

30 2.4 72 min

FID

1 - ~~13~~12	11 - ~~30~~28✓	21 - 25✓
2 - ~~13~~11	12 - ~~30~~28	2 - ~~22~~20
3 - ~~16~~15	13 - 23✓	3 - 16✓ lost 5
4 - ~~17~~15	14 - ~~29~~28	4 - ~~24~~15
5 - 16✓	15 - ~~25~~24	5 - 16✓
6 - 18✓	16 - ~~29~~28	6 - 13✓
7 - ~~15~~14	17 - 25✓	7 - ~~20~~14
8 - 13✓	18 - 28✓	8 - 18✓
9 - 15✓	19 - 27✓	9 - 16✓
10 - ~~28~~25	20 - 28✓	30 - 20✓ lost end
16.4	27.2	18

LOST Avg 16.625

Avg ~~20.5~~ 19.7 gk

CO T.D.F. R 3

1 - ~~200~~ 400	11 - 320	21 - 460
2 - ~~280~~ 480	12 - 560	2 - 300
3 - 480	13 - 560	3 - 310
4 - 720	14 - 500	4 - 290
5 - 500	15 - 460	5 - 240
6 - 180	16 - 520	6 - 590
7 - 190	17 - 660	7 - 720
8 - 420	18 - 500	8 - 510
9 - 440	19 - 440	9 - 640
10 - 320	20 - 410	30 - ~~640~~ 390
413.0	493.0	445.0

72 min Avg

450.33 ppm CO

Avg

Rinker 1/27/93

T.D.F. R.2

93.6 min

CO

1 - 480	11 - 410	21 - 620	31 - 480
2 - 440	2 - 740	2 - 560	2 - 390
3 - 310	3 - 590	3 - 565	3 - 260
4 - 280	4 - 460	4 - 480	4 - 390
5 - 360	5 - 380	5 - 500	5 - 380
6 - 430	6 - 470	6 - 460	6 - 230
7 - 460	7 - 480	7 - 440	7 - 210
8 - 380	8 - 430	8 - 390	8 - 460
9 - 450	9 - 480	9 - 320	9 - 120
10 - 490	20 - 440	30 - 310	324.44
408	488.0	464.5	421.235 ppm CO

V-1 1145 1205 | 502 1300 1320 1
V 2 - 14:05 1425

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$\frac{5}{60} = \frac{12}{\cancel{5}} = 2.4$ T.d.F.

Run Length For Run # 1 = 84 min.
" " " 2 = 93
3 = 73

R-1 F.I.D.
16, 12, 15 Avg 14.3

CO scale 0-2000 200/cm ~~40~~/min

1	~~210~~ 400	16	400	31	260
2	~~140~~ 390	17	38	32	210
3	~~590~~ 520	18	210	33	300
4	340	19	320	~~34~~	
5	590	20	250	~~35~~	
6	320	21	300		
7	700	22	640		
8	210	23	280		
9	300	24	590		
10	210	25	340		
11	280	26	380		
12	210	27	700		
13	180	28	500		
14	500	29	300		
15	400	30	540		

33 points @ 2.4 min/point

Avg 363.87 ppm 79.2 min.

Peak High Avg 444.5
Low Avg 256.5
H.L. Avg 350.5

400
360
450
403

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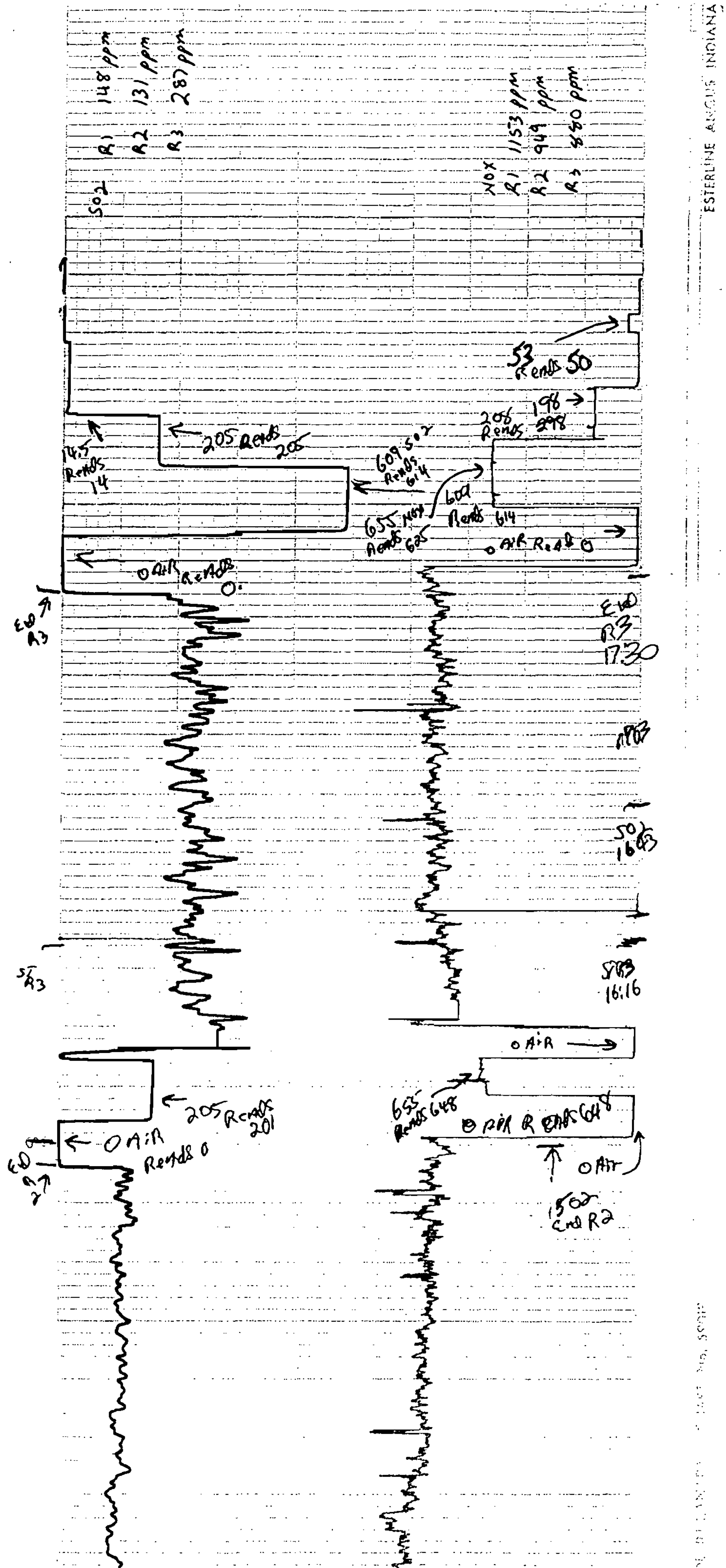
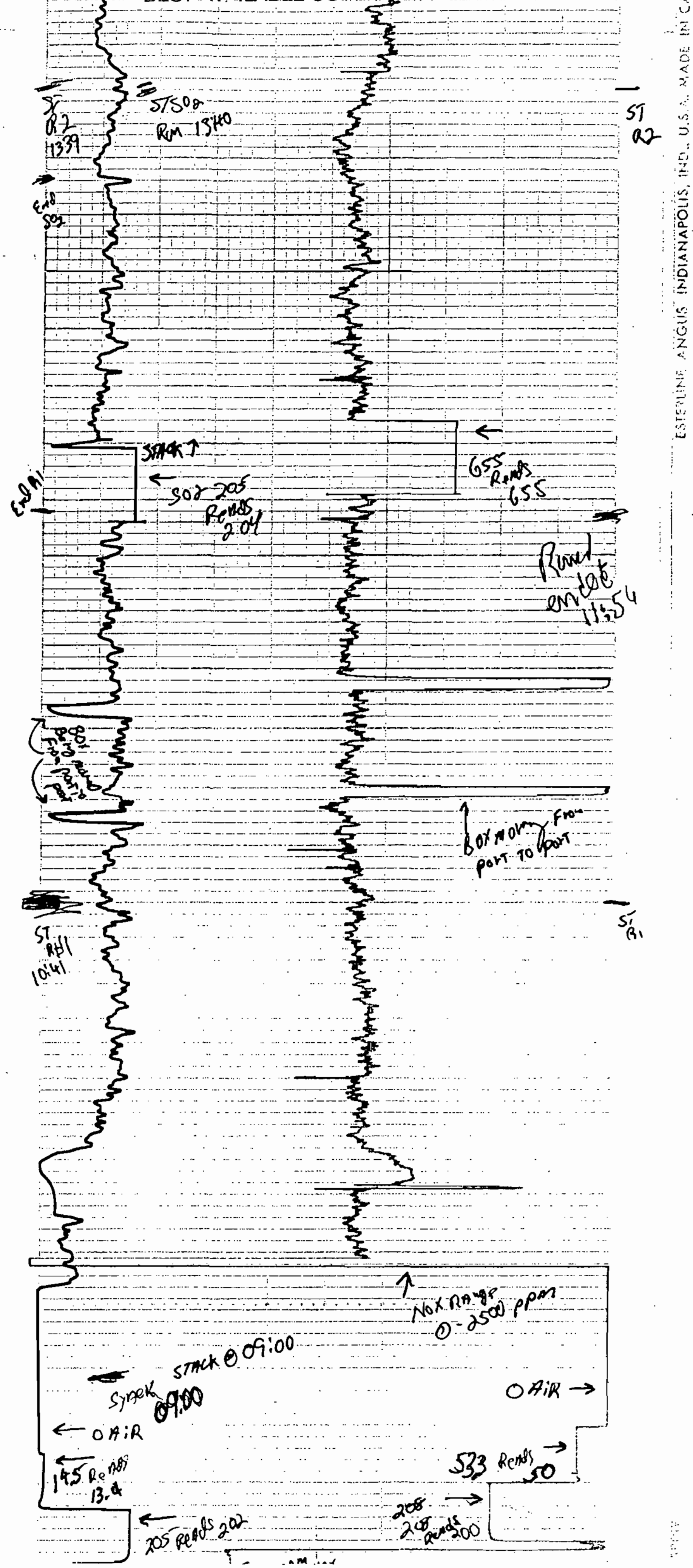


TDF

SO_2 and NO_x

1/27/93

1 of 3



TDF

SO_2 and NO_x

1/27/93

2 Of 3

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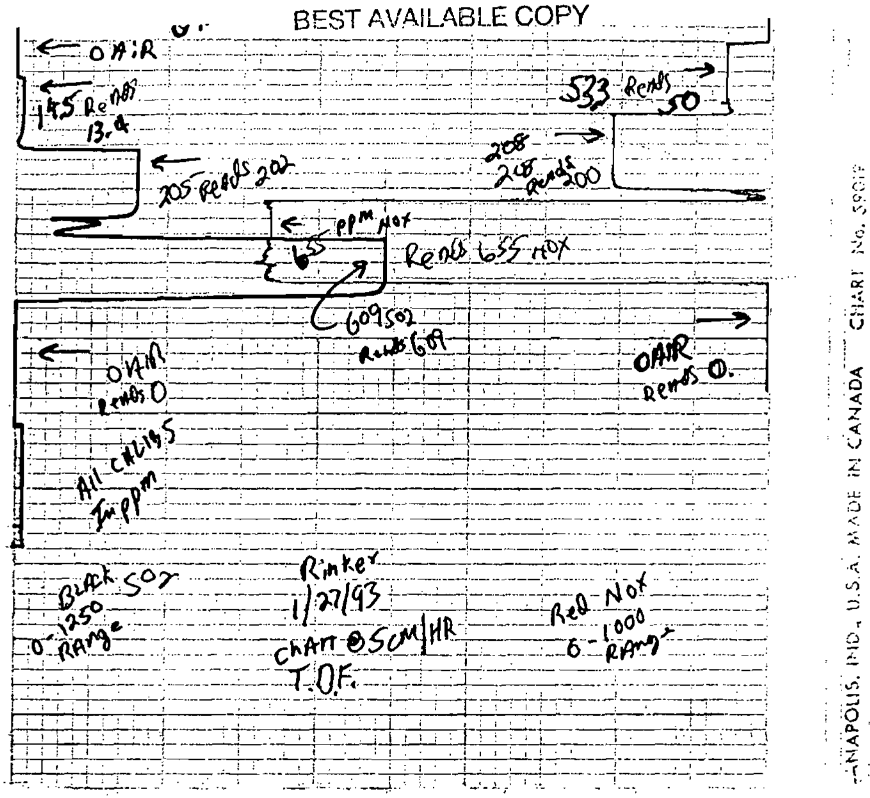

TDF

SO_2 and NO_x

1/27/93

Kinker T.D.F. 1/27/93

Run 1

~~SO~~ SO2

1 - 140	11 165	21 150	31 145
2 - 125	12 165	2 160	2 150
3 - 125	13 175	3 135	3 135
4 - 155	14 170	4 130	4
5 - 135	15 170	5 145	5
6 - 150	6 185	6 170	
7 - 162	7 X	7 135	143.33
8 - X	8 125	8 130	
9 - 185	9 170	9 120	Avg 148.66 ppm
10 - 150	20 150	30 125	
147.44	163.88	140.0	

33 - 74.4 min

Run 2 SO2

~~2??~~ min 91.2 min

1 155	6 110	11 130	16 120	21 145	26 135	31 - 120	36 - 130
2 162	7 120	12 132	17 130	22 135	27 130	32 - 130	37 - 130
3 135	8 121	13 130	18 130	23 140	28 130	33 - 125	38 - 150
4 125	9 112	14 135	19 130	24 130	29 135	34 - 162	
5 110	10 112	15 125	20 130	25 135	30 130	35 150	
	126.2		129.2	SO2 Run Avg 129.75	134.5	Avg 131.75	137.125

Run 3 SO2

1 285	6 265	11 ~~200~~ 275	16 265	21 310	26 270	31	36
2 260	7 300	12 265	17 270	22 330	7 325	2	7
3 285	8 325	13 295	18 275	3 300	8 330	3	8
4 285	9 285	14 260	19 275	4 275	9 295	4	9
5 300	10 325	15 275	20 295	5 275	30 245	5	40
	291.5	SO2 Run Avg 292.5 ppm	275.0		292.5		

72 min

Avg ~~287.33~~ 287.33

T.D.F.

Rinker 1/27/92

76.8 min.

NOX Run # 1

1-1075	6-1175	11-1150	16-1125	21-1175	26-1200	31-1150
2-1125	7-1150	12-1150	17-1125	2-1175	7-1175	2-1150
3-1125	8-1170	13-1125	18-1125	3-1160	8-1125	3-1145
4-1160	9-1225	14-1150	19-X	4-1145	9-1175	4-1150
5-1200	10-X	15-1100	20-1125	5-1125	30-1150	1148.75
	1156.11		1141.66		1165.5	Avg 1153 ppm

NOX R#2

96 min

1-1075	6-1020	1-1010	6-925	1-925	6-900	1-910	6-10
2-1160	7-1075	2-925	7-950	2-935	7-900	2-890	7-92
3-1025	8-1050	3-950	8-940	3-945	8-925	3-890	8-92
4-1000	9-975	4-910	9-925	4-910	9-900	4-950	9-87
5-1020	10-975	5-950	20-940	5-900	30-935	5-850	40-8
	1031.5		942.5		917.5	906.0	

Avg 949.375 ppm NOX

NOX Run 3

74.4 min.

1-875	6-825	11-895	6-875	21-875	6-875
2-810	7-825	12-900	7-910	2-850	7-895
3-800	8-860	13-925	8-895	3-875	8-875
4-~~850~~ 925	9-875	14-875	9-950	4-850	9-900
5-825	10-950	15-900	20-865	5-910	30-875
					31-925
	857.0		901.0		882.27

Avg 880.09

880 ppm NOX

COAL/TDF TEST
LAB DATA SHEETS

PARTICULATE LAB DATA SHEET

TEST DATE 1/27/93

PLANT NAME Rinker Materials Corp.

SOURCE Cement Kiln -TDF

	Run 1	Run 2	Run 3	Blank
Container No.	KA-5	KA-22	66	KA-900
Total Volume (ml)	225	225	225	225
Aliquot Evaporated (ml)	225	225	225	225
Final Weight (g)	87.9549	99.8886	97.1180	101.3173
Tare Weight (g)	- 87.9144	- 99.8464	- 97.0851	- 101.3175
Gross Weight Gained (g)	0.0405	0.0422	0.0329	-0.0002
Average Blank (g)	- 0	- 0	- 0	- 0
Net Weight (g)	0.0405	0.0422	0.0329	0
Aliquot Factor	x 1	x 1	x 1	x 1
Total Net Weight (mg)	0.0405	0.0422	0.0329	0

Container No.	1A	2A	3A	
Filter No.	11'	12'	13'	
Final Weight (g)	0.5473	0.5388	0.5562	
Tare Weight (g)	- 0.4666	- 0.4706	- 0.4663	-
Gross Weight Gained (g)	0.0807	0.0682	0.0899	
Average Blank (g)	- 0	- 0	- 0	-
Total Net Weight (mg)	0.0807	0.0682	0.0899	

Tare Balance Check

0.0	✓	10.0	✓
1.0	✓	50.0	✓
5.0	✓	100.0	✓

T/H 72/40

By

Date 2/1/93

Final Balance Check

0.0	✓	10.0	✓
1.0	✓	50.0	✓
5.0	✓	100.0	✓

T/H 73/39

By

Date 2/3/93

SO_2 (Meth 6)

LAB DATA

Plant Name Rinker Material - TDF Date Analyzed 2/3/93

Analyzed By Jose Garcia

Stack	Sample No.	V.T.	V.T.B.	N.	V.Soln.	V.A.
	1a	1.8	0.1	0.0098	1000	50
	1b	1.8				
	2a	1.8				
	2b	1.9				
	3a	3.0				
	3b	3.0				

V.T. = Volume of Barium perchlorate titrant used for sample (ml)
V.T.B. = Volume of Barium perchlorate titrant used for blank (ml)
N. = Normality of Barium perchlorate
V.Soln. = Total solution volume
V.A. = Volume of sample aliquot titrated (ml)

KOOGLER & ASSOCIATES

COMMERCIAL TESTING & ENGINEERING CO.
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Member of the SGS Group (Societé Générale de Surveillance)

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SOUTH HOLLAND, IL 60473
TELEPHONE: (708) 331-2900
TELEX: 285950 COMTECO SH UR
FAX: (708) 333-3060

March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: TDF

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: TDF Clinker Composite
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50350

Elements	Dry Basis,UG/G
Antimony, Sb	<40
Arsenic, As	8
Barium, Ba	89.0
Beryllium, Be	<2
Cadmium, Cd	6.0
Copper, Cu	52.0
Chromium, Cr	54.0
Lead, Pb	70.0
Manganese, Mn	837.0
Mercury, Hg	<0.02
Nickel, Ni	50.0
Selenium, Se	<4
Sodium, Na	742
Potassium, K	2656

	Dry Basis, % Wt.
Chlorine, Cl	0.08
Sulfur trioxide, SO_3	0.32

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 9, 1993

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Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us TDF

Sample taken at -----

Sample taken by Koogler & Associates

Date sampled ------

Date received February 17, 1993

Sample ID: TDF Clinker Composite
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50350

<u>METHODS</u>
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chlorine: ASTM D 2361; Eschka
Sulfur trioxide: ASTM D 1757
Other elements: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 5, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us	TDF Raw Meal Slurry
Sample taken at	-----
Sample taken by	Koogler & Associates
Date sampled	------
Date received	February 17, 1993

Sample ID:	TDF Raw Meal Slurry
Project No:	263-92-03
Project Name:	Rinker-Miami, FL
Location:	Cement Kiln

Analysis Report No. 71-50347

	As Received Basis % Wt.
Solids	63.68

Elements	Dry Basis, UG/G
Antimony, Sb	<40
Arsenic, As	<4
Barium, Ba	49.0
Beryllium, Be	<2
Cadmium, Cd	5.0
Copper, Cu	26.0
Chromium, Cr	19.0
Lead, Pb	32.0
Manganese, Mn	170.0
Mercury, Hg	0.08
Nickel, Ni	31.0
Selenium, Se	<4
Sodium, Na	594
Potassium, K	2076

	Dry Basis, % Wt.
Chlorine, Cl	0.02
Sulfur trioxide, SO_3	0.021

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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March 5, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us	TDF Raw Meal Slurry
Sample taken at	-----
Sample taken by	Koogler & Associates
Date sampled	------
Date received	February 17, 1993

Sample ID:	TDF Raw Meal Slurry
Project No:	263-92-03
Project Name:	Rinker-Miami, FL
Location:	Cement Kiln

Analysis Report No. 71-50347

<u>METHODS</u>
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chlorine: ASTM D 2361; Eschka
Sulfur trioxide: ASTM D 1757
Other elements: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

VH

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us TDF Coal

Sample taken at -----

Sample taken by Koogler & Associates

Date sampled ------

Date received February 17, 1993

Sample ID: TDF Coal Kiln 1
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50345

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	1.64	xxxxx
% Carbon	71.39	72.58
% Hydrogen	4.68	4.76
% Nitrogen	1.38	1.40
% Sulfur	1.36	1.38
% Ash	12.11	12.31
% Oxygen(diff)	7.44	7.57
	100.00	100.00

METHODS
Moisture: ASTM D 3302
Carbon & Hydrogen: Infrared Detection
Nitrogen: Thermal Conductivity
Sulfur: ASTM D 4239 (Method C)
Ash: ASTM D 3174
Oxygen: Calculated Value (Diff)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: TDF Coal

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: TDF Coal Kiln 1
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50345

TRACE ELEMENT ANALYSIS

Element	Dry Basis, UG/G
Arsenic, As	17
Mercury, Hg	0.12

Element	Ignited Basis, UG/G
Chromium, Cr	69.0
Lead, Pb	65.0

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chromium & Lead: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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FAX: (708) 333-3060

March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us TDF Coal

Sample taken at -----

Sample taken by Koogler & Associates

Date sampled ------

Date received February 17, 1993

Sample ID: TDF Coal Kiln 2
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50346

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	1.79	xxxxx
% Carbon	70.29	71.57
% Hydrogen	4.64	4.72
% Nitrogen	1.38	1.41
% Sulfur	1.41	1.44
% Ash	13.18	13.42
% Oxygen(diff)	7.31	7.44
	100.00	100.00

METHODS
Moisture: ASTM D 3302
Carbon & Hydrogen: Infrared Detection
Nitrogen: Thermal Conductivity
Sulfur: ASTM D 4239 (Method C)
Ash: ASTM D 3174
Oxygen: Calculated Value (Diff)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300
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Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., P.O. BOX 127
SOUTH HOLLAND, IL 60473
TELEPHONE: (708) 331-2900
TELEX: 285950 COMTECO SH UR
FAX: (708) 333-3060

March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: TDF Coal

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: TDF Coal Kiln 2
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50346

TRACE ELEMENT ANALYSIS

Element	Dry Basis, UG/G
Arsenic, As	17
Mercury, Hg	0.14
	Ignited Basis, UG/G
Chromium, Cr	69.0
Lead, Pb	65.0

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chromium & Lead: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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TELEPHONE: (708) 331-2900
TELEX: 285950 COMTECO SH UR
FAX: (708) 333-3060

March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: Tire Composite

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: Tire Composite
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50344

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	1.09	xxxxx
% Carbon	82.16	83.07
% Hydrogen	7.65	7.73
% Nitrogen	0.53	0.54
% Sulfur	1.56	1.58
% Ash	3.06	3.09
% Oxygen(diff)	3.95	3.99
	100.00	100.00

METHODS
Moisture: ASTM D 3302
Carbon & Hydrogen: Infrared Detection
Nitrogen: Thermal Conductivity
Sulfur: ASTM D 4239 (Method C)
Ash: ASTM D 3174
Oxygen: Calculated Value (Diff)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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FAX: (708) 333-3060

March 9, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: Tire Composite

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: Tire Composite
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50344

TRACE ELEMENT ANALYSIS

Element	Dry Basis, UG/G
Arsenic, As	<1
Mercury, Hg	0.07

Element	Ignited Basis, UG/G
Chromium, Cr	73.0
Lead, Pb	29.0

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chromium & Lead: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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SOUTH HOLLAND, IL 60473
TELEPHONE: (708) 331-2900
TELEX: 285950 COMTECO SH UR
FAX: (708) 333-3060

March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us	TDF ESP Dust
Sample taken at	-----
Sample taken by	Koogler & Associates
Date sampled	------
Date received	February 17, 1993

Sample ID:	TDF ESP Dust Kiln 1
Project No:	263-92-03
Project Name:	Rinker-Miami, FL
Location:	Cement Kiln

Analysis Report No. 71-50348

Elements	Dry Basis, UG/G
Antimony, Sb	<40
Arsenic, As	<4
Barium, Ba	8.0
Beryllium, Be	<2
Cadmium, Cd	5.0
Copper, Cu	36.0
Chromium, Cr	27.0
Lead, Pb	88.0
Manganese, Mn	177.0
Mercury, Hg	0.03
Nickel, Ni	38.0
Selenium, Se	5
Sodium, Na	445
Potassium, K	7306
	Dry Basis, % Wt.
Chlorine, Cl	0.11
Sulfur trioxide, SO_3	3.32

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300
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March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us TDF ESP Dust

Sample taken at -----

Sample taken by Koogler & Associates

Date sampled ------

Date received February 17, 1993

Sample ID: TDF ESP Dust Kiln 1
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50348

METHODS
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chlorine: ASTM D 2361; Eschka
Sulfur trioxide: ASTM D 1757
Other elements: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

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FAX: (708) 333-3060

March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us: TDF ESP Dust

Sample taken at: -----

Sample taken by: Koogler & Associates

Date sampled: ------

Date received: February 17, 1993

Sample ID: ~~TDF Raw Meal Slurry~~ Kiln 2
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50349

Elements	Dry Basis, UG/G
Antimony, Sb	<40
Arsenic, As	4
Barium, Ba	89.0
Beryllium, Be	<2
Cadmium, Cd	10.0
Copper, Cu	42.0
Chromium, Cr	27.0
Lead, Pb	255.0
Manganese, Mn	170.0
Mercury, Hg	0.07
Nickel, Ni	38.0
Selenium, Se	15
Sodium, Na	890
Potassium, K	27812

	Dry Basis, % Wt.
Chlorine, Cl	0.67
Sulfur trioxide, SO_3	6.40

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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TELEX: 285950 COMTECO SH UR
FAX: (708) 333-3060

March 8, 1993

KOOGLER & ASSOCIATES
Environmental Services
4014 NW Thirteenth Street
Gainesville, FL 32609
ATTN: N. Mason Joye, Jr.

Sample identification by
Koogler & Associates

Kind of sample reported to us TDF ESP Dust

Sample taken at -----

Sample taken by Koogler & Associates

Date sampled ------

Date received February 17, 1993

Sample ID: TDF Raw Meal Slurry
Project No: 263-92-03
Project Name: Rinker-Miami, FL
Location: Cement Kiln

Analysis Report No. 71-50349

<u>METHODS</u>
Arsenic: Graphite Furnace Atomic Absorption
Mercury: Bituminous Coal Research Report # 2, Double Gold Amalgation, Cold Vapor Atomic Absorption.
Chlorine: ASTM D 2361; Eschka
Sulfur trioxide: ASTM D 1757
Other elements: ASTM D 3683

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, South Holland Laboratory

ppb
ENVIRONMENTAL LABORATORIES, INC.

February 26, 1993

Mr. Mason Joye
Koogler and Associates
4014 N.W. 13th Street
Gainesville, Florida 32609

Dear Mason:

Enclosed are the results of our analysis of the samples that we received February 5, 1993.

All data were determined in accordance with published procedures (EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, Revised March 1983). PPB is certified by the Florida DHRS (Lab Nos. 82282 and E82001).

If you have any questions concerning this report, please do not hesitate to give me a call.

Sincerely,

Tom Park

Tom Park
Project Manager

MTP/kbc

Enclosures

6821 SW ARCHER ROAD, GAINESVILLE, FLORIDA 32608 Tel. (904) 377-2349

ppb

ENVIRONMENTAL LABORATORIES, INC.

Mr. Mason Joye
Koogler and Associates
4014 N.W. 13th Street
Gainesville, Florida 32609

Table 1.

REPORT OF ANALYSIS
(all results as total micrograms)

Station ID No.:	TDF Run 1	TDF Run 2	TDF Run 3	Baseline Run 1	Baseline Run 2	Baseline Run 3	Blank	Blank Rerun (3/16/93)
PPB No.:	78893, 78900, 78907, 78908	78894, 78901, 78909, 78910	78895, 78902, 78911, 78912	78896, 78903, 78913, 78914	78897, 78904, 78915, 78916	78898, 78905, 78917, 78918	78899, 78906, 78919, 78920, 78921, 78922	
Antimony	<13	<13	<13	<13	<13	<13	<13	—
Arsenic	<3	<3	<3	<3	<3	<3	<3	—
Beryllium	<3	<3	<3	<3	<3	<3	<3 ✓	<1
Cadmium	<9	<9	<9	<9	<9	<9	<9 ✓	<2
Chromium	28	33	20	11	36	43	~~33~~	<6
Copper	27	24	15	5	5	10	8 ✓	<5
Lead	107	92	112	52	59	61	16 ✓	<23
Mercury	4.1	5.6	4.2	1.6	2.5	1.7	6.3	
Nickel	14	12	6	2	7	10	~~48~~	<9
Selenium	<200	<200	<200	<200	<200	<200	<200	—
Silver	<4	<4	<4	<4	<4	<4	<4 ✓	<4
Thallium	12	9	9	6	6	6	<2 ✓	<2
Zinc	3510	4730	4780	5400	4810	5130	~~6,190~~	3350

Mr. Mason Joye
Koogler and Associates
4014 N.W. 13th Street
Gainesville, Florida 32609

Table 2. **REPORT OF ANALYSIS**
(all results as total micrograms)

Station ID No.:	PPB No.	Mercury
TDF Run 1 - Hg	78943	30
TDF Run 2 - Hg	78944	33
TDF Run 3 - Hg	78945	19
~~Baseline Run 1 - Hg~~	~~78946~~	~~38~~
~~Baseline Run 2 - Hg~~	~~78947~~	~~11~~
~~Baseline Run 3 - Hg~~	~~78948~~	~~9.9~~
Blank - Hg	78949	<0.1

FLOWERS CHEMICAL LABORATORIES INCORPORATED

Received From:
Koogler Assoc.
4014 NW 13th St.
Gainsvile,FL 32609

Date Reported : Feb17 1993
Project Number : 263-92-01
PO Number : Rinker Materials
FDHRSDW Number : 83139
FHRS ENVNumber : E83018
FDER COMQAPNum : 86-0008G
A2LA Number : 0312-01
NCDEHNR Number : 296
SCDHEC Number : 96019

For: BTEX
Date Sampled:Jan27 1993 Date Received:Feb 2 1993 Lab Numbers: 31198-31204

REPORT OF ANALYSIS

Parameter	Unit	Method Detection Limit	%ACC	%PRC	31198 RUN1	31199 RUN2	31200 RUN3	31201 BASELINERUN1	31202 BASELINERU2
					←TDF		→		
Benzene	ug	.00100	92.3	2.44	3.58	2.70	2.34	0.552	0.945
Ethylbenzene	ug	.00100	89.0	3.35	<.0010	0.211	0.285	<.0010	.00543
Toluene	ug	.00100	91.1	3.71	.00540	2.08	1.81	0.539	1.27
Xylene	ug	.00100	88.3	4.72	.00720	0.683	1.18	<.0010	0.734
Total_BTEX	ug	.00100	89.2	3.00	3.59	5.67	5.62	1.09	2.95

Data Release Authorization
Sample integrity and reliability certified by Lab personnel prior to analysis. Methods of analysis in accordance with FCL QA and EPA approved methodology. This Report of Analysis may not be reproduced in part.

Jefferson S. Flowers, Ph.d.
President/Technical Director

Jefferson L. Flowers, Ph.D.
Jefferson S. Flowers, Ph.D.
481 NEWBURYPORT
P.O. BOX 150-597
ALTAMONTE SPRINGS
FLORIDA 32715-0597
BUS: (407) 339-5984
FAX: (407) 260-6110

FLOWERS

CHEMICAL LABORATORIES INCORPORATED

Received From:
Koogler Assoc.
4014 NW 13th St.
Gainsvile,FL 32609

Date Reported : Feb17 1993
Project Number : 263-92-01
PO Number : Rinker Materials
FDHRSDW Number : 83139
FHRS ENVNumber : E83018
FDER COMQAPNum : 86-0008G
A2LA Number : 0312-01
NCDEHNR Number : 296
SCDHEC Number : 96019

For: BTEX
Date Sampled:Jan27 1993 Date Received:Feb 2 1993 Lab Numbers: 31198-31204

REPORT OF ANALYSIS

Parameter	Unit	Method Detection Limit	%ACC	%PRC	31203 BASELINERUN3	31204 FIELD BLANK
Benzene	ug	.00100	92.3	2.44	1.14	.00210
Ethylbenzene	ug	.00100	89.0	3.35	0.0143	<.0010
Toluene	ug	.00100	91.1	3.71	1.24	<.0010
Xylene	ug	.00100	88.3	4.72	0.0543	<.0010
Total_BTEX	ug	.00100	89.2	3.00	2.45	.00210

Data Release Authorization
Sample integrity and reliability certified by Lab personnel prior to analysis.
Methods of analysis in accordance with FCL QA and EPA approved methodology.
This Report of Analysis may ~~not~~ be reproduced in part.

Jefferson S. Flowers, Ph.d.
President/Technical Director

Serving Your Analytical and Environmental Needs Since 1957

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	282										FLOWERS CHEMICAL LABORATORIES							
2											ANALYTICAL RESULTS FORM			HRS Number 83139				
3				Run - 1	Run -2	Run - 3	Baseline Run	Baseline Ru -	Baseline Run	Field Blank					QA	Section		
4	Parameter	Symbol	Unit	31198	31199	31200	31201	31202	31203	31204				Method	MDL	%RSD	%Rec	Analys
5	Benzene	*	ug	3.58	2.7	2.34	0.552	0.945	1.14	0.0021				EPA602	0.001	2.44	92.3	CLS
6	Ethylbenzene	*	ug	<0.001	0.211	0.285	<0.001	0.00543	0.0143	<0.001				EPA602	0.001	3.35	89.0	CLS
7	Toluene	*	ug	0.0054	2.08	1.81	0.539	1.27	1.24	<0.001				EPA602	0.001	3.71	91.1	CLS
8	Xylene	*	ug	0.0072	0.683	1.18	<0.001	0.734	0.0543	<0.001				EPA602	0.001	4.72	88.3	CLS
9	Total BTEX	*	ug	3.5926	5.674	5.615	1.091	2.95443	2.4486	0.0021				EPA602	0.001	3.00	89.2	CLS
10	.	*	.											.	.			
11				Date Received:		02-02-93		Typed:		02-17-93	Sent:		02-17-93					
12	Project Number	263-92-01																
13	PO Number	Rinker Materials																
14	Date Sampled	1	01-27-93 *															
15	Date Analyzed	0																
16	Compacted	0																
17	Format	NormRR																
18	Unit Cost	Exted																
19	BTEX	12500	7 *															
20		0	0 *															
21	0.00																	

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1/5

CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name Rinker Materials

Sample Location Cement Kiln - TDF & Baseline

Sample Identification	Remarks
Beaker KA 5 Run 1 TDF	✓ Combine and test for Sb, As, Be,
Filter Run 1 TDF	Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag,
Container 4a Run 1 TDF	Tl, Zn. - Report results as TDF
Container 4b Run 1 TDF	Run 1
Beaker KA-22 Run 2 TDF	
Filter Run 2 TDF	Combine and test for Sb, As, Be,
Container 4a Run 2 TDF	Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn
Container 4b Run 2 TDF	Report results as TDF Run 2

Sampled By: (Signature) [signature] Date: 1/27-29/93 Time: SEE Data sheets

Relinquished By: (Sign) [signature] Date: 2/1/93 Time: 8:00 Am

Received By: (Sign) [signature] Date: 2/1/93 Time: 8:00Am

Relinquished By: (Sign) [signature] Date: 2/5/93 Time: 1200

Received By: (Sign) [signature] Date: 2-5-93 Time: 1200

Relinquished By: (Sign) [signature] Date: 2-5-93 Time: 1310

Received By Lab: (Sign) Paul Berman Date: 2/5/93 Time: 1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ____________

CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name Rinker Materials

Sample Location Cement Kiln TDF & Baseline

Sample Identification	Remarks
Beaker 66 Run 3 TDF	Combine and test for Sb, As, Be, Cd, Cu,
Filter TDF Run 3	Cr, Pb, Hg, Ni, Se, Ag, Tl, Zn - Report
Container 4a Run 3 TDF	results as TDF Run 3
Container 4b Run 3 TDF	
~~Beaker KA77 Run 1 Baseline~~	~~Combine and test for Sb, As, Be, Cd,~~
~~Filter Run 1 Baseline~~	~~Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn~~
~~Container 4a Baseline Run 1~~	~~Report Results as Baseline Run 1~~
~~Container 4b Baseline Run 1~~	

Sampled By: (Signature) Steph Bell Date: 1/27-29/93 Time: SEE Data sheets

Relinquished By: (Sign) Steph Bell Date: 2/1/93 Time: 8:00 Am

Received By: (Sign) [signature] Date: 2/1/93 Time: 8:00 Am

Relinquished By: (Sign) [signature] Date: 2/5/93 Time: 1200

Received By: (Sign) Trey Jones Date: 2-5-93 Time: 1200

Relinquished By: (Sign) Trey Jones Date: 2-5-93 Time: 1310

Received By Lab: (Sign) Paul Bemmer Date: 2/5/93 Time: 1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ____________

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3/5

CHAIN OF CUSTODY RECORD

Project Number: 263-92-01

Project Name: Rinker Materials

Sample Location: Cement Kiln TDF & Baseline

Sample Identification	Remarks
Beaker KA-8 S Run 2 Baseline	Combine and test for Sb, As, Be, Cd,
Filter Baseline Run 2	Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn
Container 4a Run 2 Baseline	Report Results as Baseline Run 2
Container 4b Run 2 Baseline	
Beaker KA 18 Run 3 Baseline	
Filter Baseline Run 3	Combine and test for Sb, As, Be, Cd,
Container 4a Run 3 Baseline	Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn.
Container 4b Run 3 Baseline	Report Results as Baseline Run 3
	combine with Container 5 Baseline Run 1 (Page 4/5)
* Container 5c Baseline Run 1 *	Test for Hg ~~Report Results~~

Sampled By: (Signature) Steph Bell Date: 1/27-29/93 Time: SEE Data Sheets

Relinquished By: (Sign) Steph Bell Date: 2/1/93 Time: 8:00 Am

Received By: (Sign) [signature] Date: 2/1/93 Time: 8:00 Am

Relinquished By: (Sign) [signature] Date: 2/5/93 Time: 1200

Received By: (Sign) Tre E Jones Date: 2-5-93 Time: 1200

Relinquished By: (Sign) Tre E Jones Date: 2-5-93 Time: 1310

Received By Lab: (Sign) Paul Berman Date: 2/5/93 Time: 1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ____________

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4/5

CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name Rinker Materials Corp.

Sample Location Cement Kiln - TDF & Baseline

Sample Identification	Remarks
Container 5-TDF Run 1	Test for Hg Report as TDF Run 1-Hg
Container 5-TDF Run 2	" Report as TDF Run 2-Hg
Container 5-TDF Run 3	" Report as TDF Run 3-Hg
* Container 5-Baseline Run 1	" Report as Baseline Run 1-Hg
Container 5-Baseline Run 2	" Report as Baseline Run 2-Hg
Container 5-Baseline Run 3	" Report as Baseline Run 3-Hg
Beaker KA-900	Combine and Test for Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Te, Zn. Report as Blank.
Filter Blank Container 12	
Container 7	
Containers 8A and 8B	
Container 9	

Sampled By: (Signature) Stephen Bell Date: 1/27-29/93 Time: SEE Data Sheets

Relinquished By: (Sign) Stephen Bell Date: 2/1/93 Time: 8:00

Received By: (Sign) [signature] Date: 2/1/93 Time: 8:00

Relinquished By: (Sign) [signature] Date: 2/5/93 Time: 1200

Received By: (Sign) Tre E Jones Date: 2-5-93 Time: 1200

Relinquished By: (Sign) Tre E Jones Date: 2-5-93 Time: 1310

Received By Lab: (Sign) Paul Berman Date: 2/5/93 Time: 1310

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ____________

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5/5

CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name Rinker Material Corp.

Sample Location Cement Kiln - TDF & Baseline

Sample Identification	Remarks
container 10 TDF	Combine and test for Hg Report as
container 11	Blank-Hg.
~~Container 10 Baseline~~	

Sampled By: (Signature) Steph Bell Date: 1/27-29/93 Time: SEE Data sheets

Relinquished By: (Sign) Steph Bell Date: 2/1/93 Time: 8:00 Am

Received By: (Sign) Date: 2/1/93 Time: 8:00 Am

Relinquished By: (Sign) Date: 2/5/93 Time: 1200

Received By: (Sign) Trey E Jones Date: 2-5-93 Time: 1200

Relinquished By: (Sign) Trey E Jones Date: 2-5-93 Time: 1310

Received By Lab: (Sign) Paul Berman Date: 2/5/93 Time: 1310

Sample Shipped VIA: _____ UPS _____ Fed Express _____ Bus

Shipping Bill Number: ________________

CHAIN OF CUSTODY RECORD

Project Number 263-92-03

Project Name Runker Miami

Sample Location Cement Kiln - TDF & Baseline

Sample Identification	Remarks
Tire Composite	Ultimate analysis, Cr, Pb, Hg, As
TDF Coal Kiln 1	Ultimate analysis, Cr, Pb, Hg, As
TDF Coal Kiln 2	Ultimate analysis, Cr, Pb, Hg, As
TDF Raw meal (Slurry)	Standard metals, Cr, Pb, Hg, As, SO_3, K, Na, Cl
TDF ESP Dust - Kiln 1	Std Metals, SO_3, K, Na, Cl
TDF ESP Dust Kiln 2	Std Metals, SO_3, K, Na Cl
TDF Clinker Comp.	Standard metals, Cr, Pb, Hg, As, SO_3 K, Na, Cl
Baseline Coal Kiln 1	Ultimate analysis, Cr, Pb, Hg, As
Baseline Coal Kiln 2	Ultimate analysis, Cr, Pb, Hg, As
Baseline Raw Meal (Slurry)	Standard metals, Cr, Pb, Hg, As, SO_3, K, Na, Cl

Sampled By: (Signature) [signature] Date: 1/27-29/93 Time: (See Data Sheets)

Relinquished By: (Sign) [signature] Date: 2/8/93 Time: 8:00 Am

Received By: (Sign) N. Auerbach Date: 2/8/93 Time: 8:00 Am

Relinquished By: (Sign) N. Auerbach Date: 2/11/93 Time: 2:00 pm

Received By: (Sign) M.E. Mcit[illegible] Date: 2/16/93 Time: 1100 A M

Relinquished By: (Sign)____ Date:____ Time:____

Received By Lab: (Sign)____ Date:____ Time:____

Sample Shipped VIA: X UPS ____ Fed Express ____ Bus

Shipping Bill Number: 156047322

KOOGLER & ASSOCIATES

CHAIN OF CUSTODY RECORD

Project Number 263-92-03

Project Name Puker Miami

Sample Location Cement Kiln — TDF & Baseline

Sample Identification	Remarks
~~Baseline ESP Dust Kiln 1~~	Stnd Metals, SO_3, K, Na, Cl
~~Baseline ESP Dust Kiln 2~~	Stnd Metals, SO_3, K, Na, Cl
~~Baseline Clinker~~	Standard metals, Cr, Pb, Hg, As, SO_3, K, Na, Cl

Sampled By: (Signature) [signature] Date: 1/27-29/93 Time: (SBB Data Sheets)

Relinquished By: (Sign) [signature] Date: 2/8/93 Time: 8:00Am

Received By: (Sign) W. Auerbach Date: 2/8/93 Time: 8:00Am

Relinquished By: (Sign) W. Auerbach Date: 2/11/93 Time: 2:00pm

Received By: (Sign) M. E. Minto Date: 2/16/93 Time: 11:00AM

Relinquished By: (Sign)___ Date:___ Time:___

Received By Lab: (Sign)___ Date:___ Time:___

Sample Shipped VIA: X UPS ___ Fed Express ___ Bus

Shipping Bill Number: 15604 7322

BEST AVAILABLE COPY

CHAIN OF CUSTODY RECORD

Project Number 263-92-01

Project Name Rinker Materials Corp.

Sample Location Cement Kiln

Sample Identification	Remarks	Lab#
Run 1 -TDFx2	Benzene	31198
Run 2 -TDFx2	"	31199
Run 3 TDFx2	"	31200
Baseline Run 1 x2	"	31201
Baseline Run 2 x2	"	31202
Baseline Run 3 x2	"	31203
Field Blank x2	"	31204-F

Sampled By: (Signature) [signature] Date: 1/27-29/93 Time: (SEE Data sheets)

Relinquished By: (Sign) [signature] Date: 2/1/93 Time: 1200

Received By: (Sign) ______ Date: ______ Time: ______

Relinquished By: (Sign) ______ Date: ______ Time: ______

Received By: (Sign) ______ Date: ______ Time: ______

Relinquished By: (Sign) ______ Date: ______ Time: ______

Received By Lab: (Sign) [signature] Date: 2/2/93 Time: 8:58

Sample Shipped VIA: ______ UPS ______ Fed Express ______ Bus

Shipping Bill Number: ______

PLANT DATA

Rinker Materials

January 27, 1993

Rinker Materials Corporation
1200 N.W. 137th Avenue
Miami, FL 33182

P.O. Box 650679
Miami, FL 33265-0679

Facsimile (305) 223-5403
Telephone (305) 221-7645

KOOGLER & ASSOCIATES
Mr. John B. Koogler
4014 NW Thirteenth Street
Gainsville, Florida 32609

Dear Mr. Koogler:

This is the data you requested for the scrap tire compliance test on Wednesday, January 27, 1993 with #1 kiln burning coal and scrap tires and #2 kiln burning coal.

#1 KILN

	Run #1	Run #2	Run #3
Process weight, TPH	56.2	55.2	55.4
Coal rate, TPH	5.60	5.52	5.55
Clinker rate, TPH	34.3	33.7	33.8
Tires per revolution	2	2	2
Feed end temperature	415	425	425
Feed end oxygen	2.4	2.5	3.1

#2 KILN

	Run #1	Run #2	Run #3
Process weight, TPH	55.5	55.7	55.1
Coal rate, TPH	7.59	7.45	7.72
Clinker rate, TPH	34.0	34.1	33.7
Feed end temperature	390	396	388
Feed end oxygen	2.3	2.1	1.8

Precipitator operation on both kilns was normal. Primary and secondary readings were taken on all eight units every fifteen minutes throughout the seven hour time span. Data sheets are available on request.

This is the data you requested for the baseline compliance test on Friday, January 29, 1993 with both kilns burning coal.

#1 KILN

	Run #1	Run #2	Run #3
Process weight, TPH	59.2	58.2	58.9
Coal rate, TPH	6.55	6.57	6.53
Clinker rate, TPH	36.1	35.5	35.9
Feed end temperature	270	272	280
Feed end oxygen	0.4	0.3	0.4

#2 KILN

	Run #1	Run #2	Run #3
Process weight, TPH	59.1	58.2	57.9
Coal rate, TPH	6.47	6.41	6.40
Clinker rate, TPH	36.0	35.5	35.3
Feed end temperature	385	373	375
Feed end oxygen	2.5	2.6	2.6

Precipitator operation on both kilns was normal. Primary and secondary readings were taken on all eight units every fifteen minutes throughout the seven hour time span. Data sheets are available on request.

I wish to take this opportunity to remind you that the regulatory agencies have always agreed that the allowable particulate emissions rate should take into consideration that we have a common stack shared by two kilns.

If you have any questions, please call Mike Vardeman or me.

Yours truly,

Keith R. Troutman

Keith R. Troutman
Operations Manager

KRT:lg

EQUIPMENT CALIBRATIONS
AND
CALIBRATION GAS CERTIFICATIONS

PITOT TUBE CALIBRATION MEASUREMENTS

PITOT TUBE IDENTIFICATION NO. KA-SII

DATE CALIBRATED 11-11-91

PITOT TUBE ASSEMBLY LEVEL ? ✓ YES ____ NO

PITOT TUBE OPENINGS DAMAGED ? ____ YES (EXPLAIN BELOW) ✓ NO

α_1= 2.0 ° (<10°) α_2= 3.0 ° (<10°)

β_1= 1.5 ° (<5°) β_2= 2.0 ° (<5°)

Y= 2.0 °, θ= 1.5 °, A= 0.924 IN. = (PA+PB)

Z = A SIN Y = 0.0323 IN. (<0.125 IN.)

W = A SIN θ = 0.0242 IN. (<0.031 IN.)

P_A 0.460 IN. P_b 0.464 IN.

D_t 0.374 IN. (≥ 0.1875 IN. ≤ 0.3750 IN.)

COMMENTS: ____

CALIBRATION REQUIRED? ____ YES ✓ NO

CALIBRATED BY: RCPaul

PTCMFORM 1/8/87

KOOGLER & ASSOCIATES

NOZZLE CALIBRATION

DATE 1/29/92

PLANT NAME Rinker Materials

LOCATION Miami

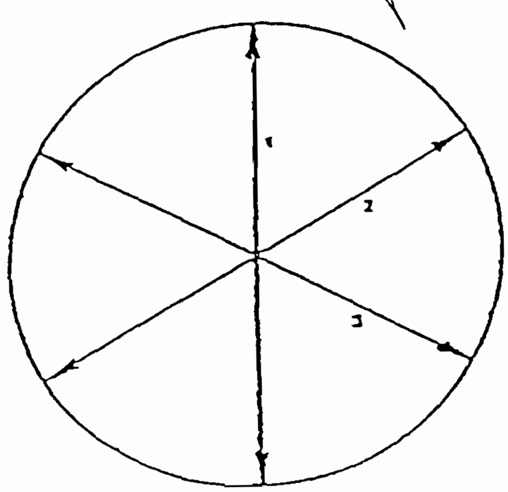
SOURCE Cement Kiln - Baseline

Measurement No.	Inside Diameter (inches)
1	0.414
2	0.414
3	0.415

Average 0.4143

Area of Nozzle 0.000112 ft^2

Calibrated by:



Nozzle X-Section

KOOGLER & ASSOCIATES

NOZZLE CALIBRATION

DATE 1/27/93

PLANT NAME Rinker Materials

LOCATION Miami

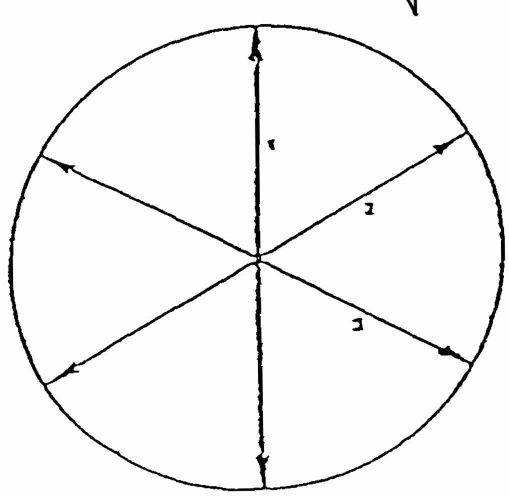
SOURCE Cement Kiln - TDF

Measurement No.	Inside Diameter (inches)
1	0.473
2	0.469
3	0.470

Average 0.470

Area of Nozzle 0.001205 ft^2

Calibrated by:



Nozzle X-Section

KOOGLER & ASSOCIATES

POST-TEST DRY GAS METER CALIBRATION FORM

Date: 2/2/93 Meter Box No.: KA-2 Plant: Rinker Materials

Barometric Pressure, P_b = 30.02 in Hg Test Meter No.: — Pretest Y: 0.987

Orifice Manometer Setting, (ΔH) in. H_2O	Gas Volume: Test Meter (V_{T_3}), Ft.	Gas Volume: Dry Gas Meter (V_{d_3}), Ft.	Dry Gas Meter Temperature: Test Meter (t_T), °F	Dry Gas Meter Temperature: Inlet (t_{d_i}), °F	Dry Gas Meter Temperature: Outlet (t_{d_o}), °F	Dry Gas Meter Temperature: Average (t_d), [a] °F	Time (θ), Min.	Vacuum Setting in. Hg.	Y_i	$Y_i = \frac{V_T P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_T + 460)}$
2.650	9.784	10.157	76			78	10	12	0.961	
2.650	9.627	9.832	76			79	10	12	0.978	
2.650	9.602	9.748	76			79	10	12	0.984	
									Y= 0.994	

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d

where:

V_T = Gas volume passing through the test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_T = Temperature of the gas in the test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in. H_2O

Y_i = Ratio of accuracy of test meter to dry gas meter for each run.

Y = Average ratio of accuracy of test meter to dry gas meter for all three runs; tolerance = pretest Y ±0.05Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, min.

KOOGLER & ASSOCIATES

POST-TEST DRY GAS METER CALIBRATION FORM

Date: 2/2/93 Meter Box No.: KA 2 Plant: Penker Materials Corp

Barometric Pressure, P_b = 30.02 in Hg Test Meter No.: — Pretest Y: 0.987

Orifice Manometer Setting, (ΔH) in. H_2O	Gas Volume: Test Meter (V_{T_3}), Ft.	Gas Volume: Dry Gas Meter (V_{d_3}), Ft.	Dry Gas Meter Temperature: Test Meter (t_T), °F	Dry Gas Meter Temperature: Inlet (t_{d_i}), °F	Dry Gas Meter Temperature: Outlet (t_{d_o}), °F	Dry Gas Meter Temperature: Average (t_d), ª °F	Time (θ), Min.	Vacuum Setting in. Hg.	Y_i	$Y_i = \frac{V_T P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_T + 460)}$
1.293	6.523	6.796	75			73	10	9"	0.953	
1.293	6.483	6.699	75			73	10	9	0.961	
1.293	6.502	6.736	75			74	10	9	0.960	
									Y = 0.958	

ª If there is only one thermometer on the day gas meter, record the temperature under t_d

where:

V_T = Gas volume passing through the test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_T = Temperature of the gas in the test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in. H_2O

Y_i = Ratio of accuracy of test meter to dry gas meter for each run.

Y = Average ratio of accuracy of test meter to dry gas meter for all three runs; tolerance = pretest Y $\pm$0.05Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, min.

KOOGLER & ASSOCIATES

METER CALIBRATION FORM

GAS METER METHOD

DATE: 10/13/92

METER BOX NO: KA-2

BAROMETRIC PRESSURE: 30.12

TEST Δ HD	ORIFICE Δ HD	TEST GAS METER VOLUME			DRY GAS METER VOLUME			TEMP OF TEST METER °F	TEMP OF DRY METER °F	RUN TIME MINUTES
		FINAL	INITIAL	ACTUAL FT^3	FINAL	INITIAL	ACTUAL FT^3			
-0.20	0.5	776.451	770.022	6.429	168.213	161.663	6.550	73	81	15
-0.23	1.0	770.022	761.614	8.408	161.663	153.115	8.548	73	79	14
-0.24	1.5	746.229	740.879	5.350	137.656	132.276	5.380	72	76	7
-0.32	2.5	752.782	746.229	6.553	144.246	137.656	6.590	72	76	7
-0.35	3.5	761.614	752.782	8.832	153.115	144.246	8.869	72	76	8

GAS METER THERMOMETER CALIBRATION

N.B.S. MERCURY °F	METER BOX °F
37	38
55	55
85	84
91	89
115	114

SIGNATURE: Stephen Bell

DRY GAS METER AND ORIFICE CALIBRATION

CONTROL BOX NO.	KA-2	BAROMETRIC PRESS.	30.12 IN. HG.
DATE	10/13/92	PERFORMED BY	Steve Bell

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5
VACUUM ("Hg)	0.0	0.0	0.0	0.0	0.0
dHw ("H2O)	-0.20	-0.23	-0.24	-0.32	-0.35
dHd ("H2O)	0.50	1.00	1.60	2.50	3.50
INITIAL WTM	770.022	761.614	740.879	746.229	752.782
FINAL WTM	776.451	770.022	746.229	752.782	761.614
INITIAL DGM	161.66	153.12	132.28	137.66	144.25
FINAL DGM	168.21	161.66	137.66	144.25	153.12
TEMP. WTM (F)	73.00	73.00	72.00	72.00	72.00
TEMP. DGM (F)	81.00	79.00	76.00	76.00	76.00
TEST TIME (MIN.)	15.00	14.00	7.00	7.00	8.00

****

NET VOLUME WTM	6.429	8.408	5.350	6.553	8.832
NET VOLUME DGM	6.550	8.548	5.380	6.590	8.869
Y	0.996	0.993	0.999	0.997	0.996
dH@	1.504	1.538	1.522	1.585	1.596

****

AVERAGE Y = 0.996

ACCEPTABLE Y RANGE = 0.976 TO 1.016

AVERAGE dH@ = 1.549

Y = (Vw (Pb - (dHw / 13.6)) x (Td + 460)) / (Vd (Pb + (dHd / 13.6)) x (Tw + 460)

dH@ = 0.0317 x dHd / (Pb (Td + 460)) x ((Tw + 460) x time) / Vw)^2

POST TEST THERMOCOUPLE
CALIBRATION

DATE 1/27/93

PLANT NAME Rinker Materials Corp.

LOCATION Miami, FL

SOURCE Cement Kiln - TDF (Stack for No 1 and No 2 Kilns)

Thermocouple Readout # KA-2

Umbilical Cord # 200'

Switch Box # KA-2

Thermocouple # KA-60

Average Stack Temperature ^{o}F 340

*Observed Mercury in Glass (ASTM) ^{o}F 340

Observed Thermocouple Reading ^{o}F 342

Percent Difference $\frac{(ASTM + 460) - (Thermo + 460)}{(ASTM + 460)} \times 100 =$ -0.25

Tolerance $\leq$ 1.5%

* Observed temperature must be within ten percent of the average stack temperature.

Signature

KOOGLER & ASSOCIATES, ENVIRONMENTAL SERVICES
ANNUAL THERMOCOUPLE CALIBRATIONS

Umbilical Cord No 100F-K TC No. KAK-12	A-B BOX 1						BOX 2					
	STACK A		BOX B		IMP		STACK		BOX		IMP	
	TC[1]	ASTM[2]	TC	ASTM	TC	ASTM	TC	ASTM	TC	ASTM	TC	ASTM
Ice Bath	34	35	34	35								
Ambient	76	75	76	75								
212°	191	191	192	192								
400°	447	458	446	456								

Thermocouple Readout No. KA-4	100 FT Type K NO. TC wire						UMBILICAL CORD NO.					
	STACK A		BOX B		IMP		STACK		BOX		IMP	
	TC	ASTM	TC	ASTM	TC	ASTM	TC	ASTM	TC	ASTM	TC	ASTM
Ice Bath	34	35	34	35								
Ambient	72	71	72	71								
212°	192	192	190	190								
400°	447 ~~458~~	458	446	456								

Thermocouple Probe No.	TEMPERATURE							
	ICE BATH		AMBIENT		212°		400°	
	TC	ASTM	TC	ASTM	TC	ASTM	TC	ASTM
KAK-38	34	35	72	71	188	185	458	465
KAK-12	36	35	72	71	192	192	463	475
KAK-72	35	34	73	72	195	197	453	458
KAK-65	35	34	76	75	196	197	463	462

1 Thermocouple reading (°F)
2 American Society of Testing Materials Mercury in glass thermometer (°F)

Signature Steph L Bell
Date 10/6/92

KOOGLER Ka ASSOCIATES

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Your P.O. # : 3750 71500 B

Customer :

C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE IL 60067

BEST AVAILABLE COPY

**** CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES ****
PERFORMED ACCORDING TO SECTION 3.0.4

Certified for Traceability
Protocol # 1

Procedure # G1

File # PU-1876

Certified Accuracy ± 1 % NBS Traceable

Expiration Date : 6-26-93

Cylinder Number : AAL20073

Cylinder Pressure 1900 psig

ANALYZED CYLINDER | REFERENCE STD | INSTRUMENTATION

COMPONENT	CERTIFIED CONC.	SRM # (CRM #)	CYLINDER NUMBER	CONC.	INSTR/MODEL/SERIAL	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
NITRIC OXIDE	1112.7 PPM	2630	FF-18659	1403.00 PPM	BECKMAN	12-16-91	CHEMILUMINESCENCE
		1687	ALM-016029	965.50 PPM	951A		
					270-022774		

BALANCE GAS : NITROGEN

NITROGEN DIOXIDE 0.00 PPM (FROM SECOND ANALYSIS)

CERTIFIED EPA PROTOCOL

FIRST ANALYSIS DATE : 12-16-91

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
0.00	110.80	1110.66	1403.00 PPM	140.30	1403.00
0.00	110.80	1110.66		140.30	1403.00
0.00	110.80	1110.66		140.30	1403.00

CALCULATED RESULTS 1110.66
1110.66
1110.66

AVERAGE : 1110.66 PPM

SECOND ANALYSIS DATE : 12-26-91

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
0.00	111.20	1114.63	1403.00 PPM	140.30	1403.00
0.00	111.20	1114.63		140.30	1403.00
0.00	111.20	1114.63		140.30	1403.00
0.00	111.20 NO	1114.63			

CALCULATED RESULTS 1114.63
1114.63
1114.63 1114.63 PPM NOX

AVERAGE : 1114.63 PPM

CALIBRATION CURVE 2 nd DEGREE

SRM # (CRM #)	CONC. PPM	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
2630	1403.00	100	140.30	1403.00	0.00
1687	965.50	69	95.90	962.44	-0.32
	748.00	53	74.50	748.89	0.12
	395.00	28	39.30	395.94	0.24
	0.00	0	0.00	0.00	0.00
		0		0.0000	0.00
		0		0.00	0.00
GMIS	395.00	LOW	39.30	395.94	0.24
2630	1403.00	HIGH	140.30	1403.00	0.00

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : L. P. Doran

Approved By : Bob Saltoff

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Your P.O. # : 3750 71500 B

Customer :

C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE IL 60067

BEST AVAILABLE COPY

* * * * CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES * * * *
PERFORMED ACCORDING TO SECTION 3.0.4

Certified For Traceability
Protocol # 1

Procedure # 61

File # PU-1876

Certified Accuracy 1 % NBS Traceable

Expiration Date : 6-26-93

Cylinder Number : AAL20073

Cylinder Pressure 1900 psig

CERTIFIED
EPA PROTOCOL

ANALYZED CYLINDER

COMPONENT	CERTIFIED CONC.
NITRIC OXIDE	1112.7 PPM

BALANCE GAS : NITROGEN

NITROGEN DIOXIDE 0.00 PPM (FROM SECOND ANALYSIS)

REFERENCE STD

SRM # (CRM #)	CYLINDER NUMBER	CONC.
2630	FF-18659	1403.00 PPM
1687	ALM-014029	965.50 PPM

INSTRUMENTATION

INSTR/MODEL/SERIAL	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
BECKMAN 951A 270-0028798	12-16-91	CHEMILUMINESCENCE

FIRST ANALYSIS

DATE : 12-16-91

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
0.00	110.80	1110.66	1403.00 PPM	140.30	1403.00
0.00	110.80	1110.66		140.30	1403.00
0.00	110.80	1110.66		140.30	1403.00

CALCULATED RESULTS 1110.66
1110.66
1110.66

AVERAGE : 1110.66 PPM

SECOND ANALYSIS

DATE : 12-26-91

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
0.00	111.20	1114.63	1403.00 PPM	140.30	1403.00
0.00	111.20	1114.63		140.30	1403.00
0.00	111.20	1114.63		140.30	1403.00
0.00	111.20 NO	1114.63			

CALCULATED RESULTS 1114.63
1114.63
1114.63 1114.63 PPM NOX

AVERAGE : 1114.63 PPM

CALIBRATION CURVE 2 nd DEGREE

SRM # (CRM #)	CONC. PPM	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
2630	1403.00	100	140.30	1403.00	0.00
1687	965.50	69	95.90	962.44	-0.32
	748.00	53	74.50	748.89	0.12
	395.00	28	39.30	395.94	0.24
	0.00	0	0.00	0.00	0.00
		0		0.0000	0.00
		0		0.00	0.00
GMIS	395.00	LOW	39.30	395.94	0.24
2630	1403.00	HIGH	140.30	1403.00	0.00

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : L. P. Doran

Approved By : Bob Ratliff

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

[redacted] Scott Environmental Technology, Inc [redacted] Ou[redacted] 537[redacted]

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Your P.O. # : 5572-71500

Customer :
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE IL 60067

BEST AVAILABLE COPY

****** CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES ******
PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Protocol # 1 — Procedure # G1

File # PQ-3611

Certified Accuracy 1 % NBS Traceable

Expiration Date : 12-22-93
Cylinder Number : ALM011423
Cylinder Pressure 1900 psig
1 of 1 Component(s)

CERTIFIED EPA PROTOCOL

ANALYZED CYLINDER: COMPONENT	CERTIFIED CONC.	REFERENCE STD: SRM # (CRM #)	CYLINDER NUMBER	CONC.	INSTRUMENTATION: INSTR/MODEL/SERIAL #	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
CARBON MONOXIDE	916.0 PPM	1681	ALM-010502	967.1 PPM	HORIBA	6-16-92	NON-DISPERSIVE INFRARED
		1680	AAL-16199	475.0 PPM	OPE-144E		
					560172153		

BALANCE GAS : NITROGEN

FIRST ANALYSIS DATE : 6-16-92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	(mV)	RESULTS PPM
0.00	95.20	918.0	967.1 PPM	100.00	967.1
0.00	95.20	918.0		100.00	967.1
0.00	95.20	918.0		100.00	967.1

CALCULATED RESULTS 918.0 / 918.0 / 918.0

AVERAGE : 918.0 PPM

SECOND ANALYSIS DATE : 6-22-92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	(mV)	RESULTS PPM
0.00	94.80	913.9	967.1 PPM	100.00	967.1
0.00	94.80	913.9		100.00	967.1
0.00	94.80	913.9		100.00	967.1

CALCULATED RESULTS 913.9 / 913.9 / 913.9

AVERAGE : 913.9 PPM

CALIBRATION CURVE 2 nd DEGREE

SRM # (CRM #)	CONC. PPM	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
1681	967.1	100	100.00	967.1	0.00
1680	475.0	49	50.60	474.6	-0.08
2636	243.4	25	26.40	243.8	0.16
1679	96.67	10	10.60	96.77	0.11
	0.0000	0	0.00	0.0000	0.00
		0		0.0000	0.00
		0		0.00	0.00
1680	475.0	LOW	50.60	474.62	-0.08
1681	967.1	HIGH	100.00	967.1	0.00

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : Don Eichler Jr

Approved By : C. Shapiro

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

[redacted] O[redacted]ject[redacted] 53[redacted]

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Your P.O. # : 5572-71500

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Certified Accuracy 1 % NBS Traceable

Expiration Date : 12-22-93
Cylinder Number : ALM011423
Cylinder Pressure 1900 psig
1 of 1 Component(s)

CERTIFIED EPA PROTOCOL

ANALYZED CYLINDER		REFERENCE STD			INSTRUMENTATION		
COMPONENT	CERTIFIED CONC.	SRM # (CRM #)	CYLINDER NUMBER	CONC.	INSTR/MODEL/SERIAL #	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
CARBON MONOXIDE	916.0 PPM	1681	ALM-010502	967.1 PPM	HORIBA	6-16-92	NON-DISPERSIVE INFRARED
		1680	AAL-16199	475.0 PPM	OPE-344E		
					560172153		
BALANCE GAS : NITROGEN							

FIRST ANALYSIS DATE : 6-16-92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
0.00	95.20	918.0	967.1 PPM	100.00	967.1
0.00	95.20	918.0		100.00	967.1
0.00	95.20	918.0		100.00	967.1

CALCULATED RESULTS 918.0
918.0
918.0

AVERAGE : 918.0 PPM

SECOND ANALYSIS DATE : 6-22-92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
0.00	94.80	913.9	967.1 PPM	100.00	967.1
0.00	94.80	913.9		100.00	967.1
0.00	94.80	913.9		100.00	967.1

CALCULATED RESULTS 913.9
913.9
913.9

AVERAGE : 913.9 PPM

CALIBRATION CURVE 2 nd DEGREE

SRM # (CRM #)	CONC. PPM	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
1681	967.1	100	100.00	967.1	0.00
1680	475.0	49	50.60	474.6	-0.08
2636	243.4	25	26.40	243.8	0.16
1679	96.67	10	10.60	96.77	0.11
	0.0000	0	0.00	0.0000	0.00
		0		0.0000	0.00
		0		0.00	0.00
1680	475.0	LOW	50.60	474.62	-0.08
1681	967.1	HIGH	100.00	967.1	0.00

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : Don Eichler Jr

Approved By : C. Shapiro

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 ▪ FAX 377-7158

KA 263-92-01

April 9, 1993

Mr. Bruce Mitchell
Florida Department of
Environmental Regulation
Division of Air Resources Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Rinker Materials Corporation
Tire Derived Fuel Tests
Comparison of Baseline and Coal/WTDF
Firing Emission Rates

Dear Mr. Mitchell:

Mike Vardeman and I appreciated the opportunity of meeting with you on March 31, 1993 to deliver to you and discuss the results of emission measurements made at the Rinker Materials Corporation cement plant in Dade County, Florida to evaluate the use of whole tire derived fuel (WTDF). The tests with coal and WTDF were conducted on January 27, 1993 and the baseline tests were conducted on January 29, 1993. During the WTDF tests, coal provided 100 percent of the heat input to the No. 2 kiln and approximately 70 percent of the heat input to the No. 1 kiln. During the baseline test period, coal was used to provide 100 percent of the heat input to both kilns.

One of the matters discussed during our meeting was the particulate matter emission rate from the No. 1 and No. 2 cement kilns under the two test conditions. Particulate matter emissions from the two cement kilns are controlled with an electrostatic precipitator and the gases from both kilns discharge through a common stack. The results of the particulate matter emission measurements show emission rates of 19.37 pounds per hour under baseline conditions and 39.32 pounds per hour under WTDF/coal firing conditions. The difference in emissions, as we discussed with you, are normal day-to-day fluctuations in particulate matter emissions from the kilns. To demonstrate this fact, we reviewed compliance particulate matter test data from the two cement kilns for the past five years (1988-1992). These data are summarized in Table 1.

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1 Date 4/9/93

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Your Phone Number (Very Important): (904)-377-5822
Company: KOOGLER & ASSOC
Department/Floor No.:
Street Address: 4014 NW 13TH ST
City: GAINESVILLE
State: FL
ZIP Required: 32609

2 To (Recipient's Name) Please Print: Mr. BRUCE MITCHELL
Recipient's Phone Number (Very Important):
Company: FDER - AIR RESOURCES
Department/Floor No.:
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 2600 BLAIR STONE ROAD
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YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 263-92-01

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REVISION DATE 11/92
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155

In reviewing data, you will note that in most cases, the reported emission rates were measured with only one kiln operating. It has been Rinker's normal protocol to conduct emission measurements on the operating kiln during a scheduled shut-down of the other kiln. To obtain a two-kiln particulate matter emission rate that could be compared with the data collected during the January 1993 WTDF tests, the emission rates from the individual kilns were added together for each calendar year.

From Table 1, you will note that under normal operating conditions (100 percent coal firing), the particulate matter emission rates from the individual kilns ranged from approximately 6-30 pounds per hour. The particulate matter emission rates of the two kilns combined ranged from approximately 21-59 pounds per hour (1988-1992). During the WTDF tests conducted in January 1993, the particulate matter emissions from the two kilns ranged from 19-20 pounds per hour under baseline conditions and from 38-40 pounds per hour under WTDF/coal firing conditions. The allowable particulate matter emission rate from the two kilns combined is 66 pounds per hour. Both sets of the January 1993 data are within the range of particulate matter emissions expected during normal kiln operations and all emission rates demonstrate compliance with the emission limiting standard.

A statistical analysis of the particulate matter emission data (Table 2) shows an average particulate matter emission rate from the two kilns under normal operating conditions of 31.4 pounds per hour (18 test runs) and an average emission rate under WTDF/coal firing conditions of 39.3 pounds per hour (three test runs). Statistically, these emission rates are not different, as shown in Table 2.

Regarding the emission rates of the various metals, the apparent difference in lead emissions during the two test periods can be explained by the relative particulate matter emission rates. The concentration of lead in the particulate matter emitted from the kiln stack was actually lower during the WTDF/coal tests than during the baseline tests by approximately 16 percent. As data presented in the previous paragraphs demonstrated, there was no significant difference in particulate matter emissions under the two sets of test conditions. This fact, combined with the lead concentration data, demonstrates that there is no difference in lead emissions under the two sets of operating conditions. The ambient impact of lead emissions has been assessed and compared with NTLs established by the Department. The results of this analysis, summarized in Table 3, demonstrate that the maximum expected concentrations of lead are well below guideline NTLs.

With copper, the data indicate that the relative copper emissions could be higher when WTDF/coal is fired, as the comparable copper concentration in the particulate matter was greater under WTDF/coal tests than under baseline tests. Modeling, summarized in Table 3, however, demonstrates that maximum expected ambient concentrations of copper are well below guideline NTLs.

The other matter we discussed was the apparent increase in benzene emissions when WTDF/coal was used as fuel. Under baseline conditions, the measured benzene emission rate averaged 0.020 pounds per hour and under WTDF/coal firing conditions, the emission rate averaged 0.070 pounds per hour. As the emissions of benzene are no longer addressed by EPA under PSD applicability and as there is no specific requirement in the Florida SIP to consider any increase in benzene emissions as a significant increase (see attached letter), benzene is addressed only as an air toxic and was modeled, demonstrating that the NTL was not exceeded. These modeling results are summarized in Table 3.

Based upon the information provided herein, it can be concluded that the use of WTDF to provide heat input to the No. 1 kiln has no effect on particulate matter or lead emissions. It can also be concluded that the discharge of lead, copper and benzene at the highest emission rates measured during the January 1993 test period does not result in the exceedance of any of the NTLs for these materials. Based upon these conclusions, there is every reason to allow the use of WTDF to provide up to 30 percent of the heat input to the No. 1 Kiln.

If there are any questions or comments regarding the information contained herein, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:mab

c: Michael Vardeman, Rinker Materials Corp.
Bruce Mitchell
Isidore Goldman, SED
Patrick Wong, DERM
Cleve Holladay
4-13-93 RAN

KOOGLER & ASSOCIATES

TABLE 1

SUMMARY OF PARTICULATE MATTER EMISSIONS
FROM KILN NO. 1 AND KILN NO. 2
WITH COAL PROVIDING 100 PERCENT OF HEAT INPUT

RINKER MATERIALS CORPORATION
DADE COUNTY, FLORIDA

Date	Particulate Matter Emissions (lb/hr) (1)		
	Kiln No. 1	Kiln No. 2	Kilns No. 1 & No. 2
2/18/88	8.2/11.2/9.8		
6/29/88	19.9/14.6/15.6/15.5		
9/21/88			44.0/31.5/33.2 (2)
1988 Avg			44.0/31.5/33.2
1/12/89	7.1/11.1/19.5		
3/14/89		12.2/10.2/8.7	
11/11/89	11.9/10.6/20.0		
1989 Avg	9.5/10.9/19.8		21.7/21.1/28.5 (3)
5/11/90		11.9/7.9/9.2	
10/11/90	27.2/24.2/23.9		
1990 Avg			39.1/32.1/33.1 (3)
4/26/91		5.7/6.3/6.5	
8/8/91	24.5/22.0/27.6		
1991 Avg			30.2/28.3/34.1 (3)
5/8/92		28.6/16.1/13.3	
8/20/92	30.0/25.3/16.0		
1992 Avg			58.6/41.4/29.3 (3)
1/29/93			19.5/19.4/19.2 (4)

(1) Emission rates are reported for individual test runs. All test data are from FDER-approved compliance tests. NOTE: Both kilns discharge through a common stack.

(2) In 1988, emission measurements were made with both kilns operating. Normal procedure is to test kilns individually; i.e., with one operating while the other is off-line.

(3) Combined emissions are the sum of Kiln No. 1 plus Kiln No. 2 emissions for each calendar year.

(4) Results of baseline test during WTDF test period. Test conducted with both kilns operating.

TABLE 2

COMPARISON OF KILN NO. 1 PLUS KILN NO. 2
PARTICULATE MATTER EMISSIONS UNDER
COAL AND COAL/WTDF FIRING CONDITIONS

RINKER MATERIALS CORPORATION
DADE COUNTY, FLORIDA

	Coal/WTDF Firing	Coal Firing
Particulate Matter Emissions (lb/hr) from Kiln No. 1 plus Kiln No. 2.	40.5	44.0
	39.0	31.5
	38.5	33.2
		21.7
		21.1
		28.5
		39.1
		32.1
		33.1
		30.2
		28.3
		34.1
		58.6
		41.4
		29.3
		19.5
		19.4
		19.2
Range	38.5-40.5	19.2-58.6
Mean	39.3	31.4
Standard Deviation	1.04	10.09
Number of Samples	3	18

Pooled Standard Deviation	9.55
t Statistic	1.33
t′ (95% C.L. with 19 deg freedom)	1.73

t <t′; therefore, difference is not significant

TABLE 3

AIR QUALITY IMPACT ANALYSIS OF SELECTED EMISSIONS FROM RINKER MATERIALS CORP. NO. 1 AND NO. 2 CEMENT KILNS

RINKER MATERIALS CORPORATION
DADE COUNTY, FLORIDA

Parameters Modeled

Stack Height	-	115 feet (35.05 m)
Stack Diameter	-	15 feet (4.57 m)
Stack Gas Velocity	-	24.8 fps (7.57 m/s)
Stack Gas Temperature	-	302°F (423 K)
Building Dimensions	-	137 ft x-wind x 70 ft high
Emission Rate		
Benzene	-	0.0698 lb/hr (0.0088 g/s)
Lead	-	0.0291 lb/hr (0.0037 g/s)
Copper	-	0.0064 lb/hr (0.0008 g/s)
Meteorological Data	-	Miami/WPB 1986
Receptor Rings	-	100 to 1000 meters
Model	-	ISC2 (Version 92273)

Impact Analysis

Constituent	Concentration (ug/m3					
	8-Hour		24-Hour		Annual	
	Impact	NTL	Impact	NTL	Impact	NTL
Benzene	0.064	30	0.034	7.2	0.0019	0.12
Lead	0.027	0.5	0.014	0.12	0.0008	0.09
Copper	0.006	2	0.003	0.48	0.0002	NA

ATTACHED LETTER

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 ▪ FAX 377-7158

KA 307-90-01

June 6, 1991

Mr. C. H. Fancy
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Florida Crushed Stone Company
Hernando County, Florida
Supplemental Information Related to
Use of Tire Derived Fuel

Dear Mr. Fancy:

In accordance with my telephone conversation with Mr. Bruce Mitchell of your staff on June 4, 1991, I am providing a written record of our response to a letter to you from EPA Region IV dated April 4, 1990, related to the referenced subject. In this letter, EPA discusses the possibility of an increase in benzene emissions during the use of tire derived fuel as a supplement for a portion of the coal normally fired to the Florida Crushed Stone cement plant.

EPA states that benzene did not appear on the list of pollutants to be included in the emission measurements conducted under baseline and tire derived fuel firing conditions. As reported in our baseline and tire derived fuel test reports submitted to your office, benzene <u>was</u> included in the emission measurements made during both periods of testing.

Regarding the benzene emissions measured during the two periods of time, I sent to you under copy of my letter dated June 3, 1991, a statistical analysis of the benzene emission rates measured during the two test periods. The analysis demonstrates that the benzene emissions during the two test periods were not significantly different. The statistical method that I used in analyzing the data was from an EPA document associated with boiler and industrial furnace regulations. I would like to bring to your attention that the same statistical procedure is included in 40CFR60, Appendix C, for comparing emission rates under different sets of conditions. I have attached hereto a copy of 40CFR60, Appendix C, for your review (Attachment 1).

As the baseline and tire derived fuel tests demonstrated, there is no increase in benzene emissions when tire derived fuel is used. Thus, benzene will not be subject to a PSD review as suggested as a possibility in the April 4, 1990, EPA letter.

As I had discussed with Mr. Mitchell of your staff, it is doubtful that the PSD review requirements would have applied to benzene even if there had been a slight increase in emissions. EPA published a guidance document dated March 11, 1991 (Attachment 2) stating that benzene and certain other pollutants were included in Title III of the 1990 Clean Air Act Amendments (the hazardous air pollutant list). The guidance document further states that Title III excludes hazardous air pollutants from the PSD requirements. As a result, it is EPA's position that federal PSD applicability no longer applies to benzene and certain other pollutants addressed in the guidance document.

The EPA position that was stated in the April 4, 1990, letter to you was discussed with Mr. Greg Worley of EPA Region IV. Mr. Worley stated that although EPA would not review benzene under PSD requirements (in accordance with Attachment 2), a state agency would still be required to do so if dictated by their State Implementation Plan. The statement in the EPA letter of April 4, 1990, that "... any increase of emissions of benzene would subject the source to PSD." is based on the federal definition of significant net emission increase contained in 40CFR51.166(b) and the presumption that this same definition is included in state regulations (State SIPs). The federal definition of significant net emission increase includes the specific increases that are included in Table 500-2 of Chapter 17-2, FAC. Additionally, the federal definition includes at 40CFR51.166(b)(23)(ii) (Attachment 3):

> **"significant" means, in reference to net emission increase or the potential of the source to emit the pollutant subject to regulation under the act that paragraph (b)(23)(i) [the emission increases paralleled in Table 500-2 of 17-2, FAC] of this section does not list, <u>any emission rate</u>. (Emphasis added)**

The FDER definition of significant net increase is codified at 17-2.500(2)(e)2, FAC. In this definition, only the emission rate increases listed in Table 500-2 are referenced. Nowhere in Chapter 17-2, FAC is there a definition of significant net emission increase that parallels the federal definition contained in 40CFR51.166(b)(23)(ii) (referenced above).

As there is no requirement in the Florida SIP to consider <u>any</u> increase in benzene emissions as a significant increase and as EPA is no longer considering benzene emissions under PSD applicability for federal purposes, there is no obligation for the Department to consider an increase in benzene emissions under PSD even if an increase had occurred.

KOOGLER & ASSOCIATES

I have presented this rule review for informational purposes and to fully respond to the EPA letter. However, as we anticipated before the tests, there was no increase in benzene emissions and the rules that have been reviewed are moot.

I trust that the information presented herein will adequately respond to the question raised in the EPA letter to you dated April 4, 1990. If there are any questions regarding this matter, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:wa
Enc.

cc: Mr. Thomas Mountain, FCS
Mr. Randy Thompson

KOOGLER & ASSOCIATES

ATTACHMENT 1

KOOGLER & ASSOCIATES

parameters that are selectively measured by the CERMS (e.g., velocity pressure), use two analogous values: one that represents zero to 20 percent of the high-level value (a value that is between 1.25 and 2 times the average potential value) for that parameter, and one that represents 50 to 100 percent of the high-level value. Introduce, or activate internally, the reference signals to the CERMS (these need not be certified). Record the CERMS response to each, and subtract this value from the respective reference value (see example data sheet in Figure 6-1).

5. RA Test Procedure

5.1 Sampling Strategy for RM's Tests, Correlation of RM and CERMS Data, Number of RM's Tests, and Calculations. These are the same as PS 2, Sections 7.1, 7.2, 7.3, and 7.5, respectively. Summarize the results on a data sheet. An example is shown in Figure 6-2. The RA test may be conducted during the CD test period.

5.2 Reference Methods (RM's). Unless otherwise specified in the applicable subpart of the regulations, the RM for the pollutant gas is the Appendix A method that is cited for compliance test purposes, or its approved alternatives. Methods 2, 2A, 2B, 2C, or 2D, as applicable are the RM's for the determination of volumetric flow rate.

6. Bibliography

1. Brooks, E.F., E.C. Beder, C.A. Flegal, D.J. Luciani, and R. Williams. Continuous Measurement of Total Gas Flow Rate from Stationary Sources. U.S. Envionmental Protection Agency. Research Triangle Park, North Carolina. Publication No. EPA-650/2-75-020. February 1975. 248 p.

Performance Specification 7—Specifications and Test Procedures for Hydrogen Sulfide Continuous Emission Monitoring Systems in Stationary Sources

[Added by 55 FR 40175, October 2, 1990]

1. Applicability and Principle

1.1. *Applicability.* 1.1.1 This specification is to be used for evaluating the acceptability of hydrogen sulfide (H_2S) continuous emission monitoring systems (CEMS's) at the time of or soon after installation and whenever specified in an applicable subpart of the regulations.

1.1.2 This specification is not designed to evaluate the installed CEMS performance over an extended period of time nor does it identify specific calibration techniques and other auxiliary procedures to assess CEMS performance. The source owner or operator, however, is responsible to calibrate, maintain, and operate the CEMS. To evaluate CEMS performance, the Administrator may require, under Section 114 of the Act, the source owner or operator to conduct CEMS performance evaluations at other times besides the initial test. *See* §60.13(c).

1.1.3. The definitions, installation specifications, test procedures, data reduction procedures for determining calibration drifts (CD) and relative accuracy (RA), and reporting of Performance Specification 2(PS 2), Sections 2, 3, 5, 6, 8, and 9 apply to this specification.

1.2 Principle. Reference method (RM), CD, and RA tests are conducted to determine that the CEMS conforms to the specification.

2. Performance and Equipment Specifications

2.1 *Instrument zero and span.* This specification is the same as Section 4.1 of PS 2.

2.2 *Calibration drift.* The CEMS calibration must not drift or deviate from the reference value of the calibration gas or reference source by more than 5 percent of the established span value for 6 out of 7 test days (e.g., the established span value is 300 ppm for subpart J fuel gas combustion devices).

2.3. *Relative accuracy.* The RA of the CEMS shall be no greater than 20 percent of the mean value of the RM test data in terms of the units of the emission standard or 10 percent of the applicable standard, whichever is greater.

3. Relative Accuracy Test Procedure

3.1 Sampling Strategy for RM Tests, Correlation of RM and CEMS Data Number of RM Tests, and Calculations. These are the same as that in PS 2, §7.1, 7.2, 7.3, and 7.5, respectively.

3.2 Reference Methods. Unless otherwise specified in an applicable subpart of the regulation, Method 11 is the RM for this PS.

4. Bibliography

1. U.S. Environmental Protection Agency. Standards of Performance for New Stationary Sources; Appendix B; Performance Specifications 2 and 3 for SO_2, NO_x, CO_2, and O_2 Continuous Emission Monitoring Systems; Final Rule. 48 CFR 23608, Washington, DC U.S. Government Printing Office. May 25, 1983.

2. U.S. Government Printing Office. Gaseous Continuous Emission Monitoring Systems—Performance Specification Guidelines for SO_2, NO_x, CO_2, O_2, and TRS. U.S. Environmental Protection Agency. Washington, D.C. EPA-450/3-82-026. October 1982. 26p.

3. Maines, G.D., W.C. Kelly (Scott Environmental Technology, Inc.), and J.B. Homolya. Evaluation of Monitors for Measuring H_2S in Refinery Gas. Prepared for the U.S. Environmental Protection Agency. Research Triangle Park, N.C. Contract No. 68-02-2707. 1978. 60p.

4. Ferguson, B.B., R.E. Lester (Harmon Engineering and Testing), and W.J. Mitchell. Field Evaluation of Carbon Monoxide and Hydrogen Sulfide Continuous Emission Monitors at an Oil Refinery. Prepared for the U.S. Environmental Protection Agency. Research Triangle Park, N.C. Publication No. EPA-600/4-82-054. August 1982. 100p.

Appendix C—Determination of Emission Rate Change

1. *Introduction.*

1.1 The following method shall be used to determine whether a physical or operational change to an existing facility resulted in an increase in the emission rate to the atmosphere. The method used is the Student's *t* test, commonly used to make inferences from small samples.

2. *Data.*

2.1 Each emission test shall consist of *n* runs (usually three) which produce *n* emission rates. Thus two sets of emission rates are generated, one before and one after the change, the two sets being of equal size.

2.2 When using manual emission tests, except as provided in § 60.8(b) of this part, the reference methods of Appendix A to this part shall be used in accordance with the procedures specified in the applicable subpart both before and after the change to obtain the data.

2.3 When using continuous monitors, the facility shall be operated as if a manual emission test were being performed. Valid data using the averaging time which would be required if a manual emission test were being conducted shall be used.

3. *Procedure.*

3.1 Subscripts a and b denote prechange and postchange respectively.

3.2 Calculate the arithmetic mean emission rate, E, for each set of data using Equation 1.

$$E=\frac{\sum_{i=1}^{n} E_i}{n}=\frac{E_1+E_2 \ldots +E_n}{n} \qquad (1)$$

Where:

E_i=Emission rate for the i th run.

n=number of runs.

3.3 Calculate the sample variance, S^2, for each set of data using Equation 2.

$$S^2=\frac{\sum_{i=1}^{n}(E_i-E)^2}{n-1}=\frac{\sum_{i=1}^{n}E_i^2-\left(\sum_{i=1}^{n}E_i\right)^2\Big/n}{n-1} \qquad (2)$$

3.4 Calculate the pooled estimate, S_p, using Equation 3.

$$S_p=\left[\frac{(n_a-1)\,S_a^2+(n_b-1)\,S_b^2}{n_a+n_b-2}\right]^{1/2} \qquad (3)$$

3.5 Calculate the test statistic, t, using Equation 4.

$$t=\frac{E_b-E_a}{S_p\left[\frac{1}{n_a}+\frac{1}{n_b}\right]^{1/2}} \qquad (4)$$

4. *Results.*

4.1 If $E_b>E_a$ and $t>t'$, where t' is the critical value of t obtained from Table 1, then with 95% confidence the difference between E_b and E_a is significant, and an increase in emission rate to the atmosphere has occurred.

TABLE 1

Degrees of freedom (n_a+n_b-2)	t' (95 percent confidence level)
2	2.920
3	2.353
4	2.132
5	2.015
6	1.943
7	1.895
8	1.860

For greater than 8 degrees of freedom, see any standard statistical handbook or text.

5.1 Assume the two performance tests produced the following set of data:

Test a	Test b
Run 1. 100	115
Run 2. 95	120
Run 3. 110	125

5.2 Using Equation 1—

$E_a=100+95+110/3=102$
$E_b=115+120+125/3=120$

5.3 Using Equation 2—

$S_a^2=(100-102)^2+(95-102)^2+(110-102)^2/3-1=58.5$

$S_b^2=(115-120)^2+(120-120)^2+(125-120)^2/3-1=25$

5.4 Using Equation 3—

$S_p=[(3-1)(58.5)+(3+1)(25)/3+3-2]^{1/2}=6.46$

5.5 Using Equation 4—

$$t=\frac{120-102}{6.46\left[\frac{1}{3}+\frac{1}{3}\right]^{1/2}}=3.412$$

5.6 Since $(n^1+n^2-2)=4$, $t'=2.132$ (from Table 1). Thus since $t>t'$ the difference in the values of E_a and E_b is significant, and there has been an increase in emission rate to the atmosphere.

6. *Continuous Monitoring Data.*

6.1 Hourly averages from continuous monitoring devices, where available, should be used as data points and the above procedure followed.

APPENDIX D—REQUIRED EMISSION INVENTORY INFORMATION

(a) Completed NEDS point source form(s) for the entire plant containing the designated facility, including information on the applicable criteria pollutants. If data concerning the plant are already in NEDS, only that information must be submitted which is necessary to update the existing NEDS record for that plant. Plant and point identification codes for NEDS records shall correspond to those previously assigned in NEDS; for plants not in NEDS, these codes shall be obtained from the appropriate Regional Office.

(b) Accompanying the basic NEDS information shall be the following information on each designated facility:

(1) The state and county identification codes, as well as the complete plant and point identification codes of the designated facility in NEDS. (The codes are needed to match these data with the NEDS data.)

(2) A description of the designated facility including, where appropriate:

(i) Process name.

(ii) Description and quantity of each product (maximum per hour and average per year).

(iii) Description and quantity of raw materials handled for each product (maximum per hour and average per year).

(iv) Types of fuels burned, quantities and characteristics (maximum and average quantities per hour, average per year).

(v) Description and quantity of solid wastes generated (per year) and method of disposal.

(3) A description of the air pollution control equipment in use or proposed to control the designated pollutant, including:

(i) Verbal description of equipment.

(ii) Optimum control efficiency, in percent. This shall be a combined efficiency when more than one device operates in series. The method of control efficiency determination shall be indicated (e.g., design efficiency, measured efficiency, estimated efficiency).

(iii) Annual average control efficiency, in percent, taking into account control equipment down time. This shall be a combined efficiency when more than one device operates in series.

(4) An estimate of the designated pollutant emissions from the designated facility (maximum per hour and average per year). The method of emission determination shall also be specified (e.g., stack test, material balance, emission factor).

APPENDIX E—[RESERVED]

APPENDIX F—QUALITY ASSURANCE PROCEDURES

PROCEDURE 1. QUALITY ASSURANCE REQUIREMENTS FOR GAS CONTINUOUS EMISSION MONITORING SYSTEMS USED FOR COMPLIANCE DETERMINATION

1. Applicability and Principle

1.1 Applicability. Procedure 1 is used to evaluate the effectiveness of quality control (QC) and quality assurance (QA) procedures and the quality of data produced by any continuous emission monitoring system (CEMS) that is used for determining compliance with the emission standards on a continuous basis as specified in the applicable regulation. The CEMS may include pollutant (e.g., SO_2 and NO_x) and diluent (e.g., O_2 or CO_2) monitors.

This procedure specifies the minimum QA requirements necessary for the control and assessment of the quality of CEMS data submitted to the Environmental Protection Agency (EPA). Source owners and operators responsible for one or more CEMS's used for compliance monitoring must meet these minimum requirements and are encouraged to develop and implement a more extensive QA program or to continue such programs where they already exist.

Data collected as a result of QA and QC measures required in this procedure are to be submitted to the Agency. These data are to be used by both the Agency and the CEMS operator in assessing the effectiveness of the CEMS QC and QA procedures in the maintenance of acceptable CEMS operation and valid emission data.

Appendix F, Procedure 1 is applicable December 4, 1987. The first CEMS accuracy assessment shall be a relative accuracy test audit (RATA) (see section 5) and shall be completed by March 4, 1988 or the date of the initial performance test required by the applicable regulation, whichever is later.

1.2 Principle. The QA procedures consist of two distinct and equally important functions. One function is the assessment of the quality of the CEMS data by estimating accuracy. The other function is the control and improvement of the quality of the CEMS data by implementing QC policies and corrective actions. These two functions form a control loop: When the assessment function indicates that the data quality is inadequate, the control effort must be increased until the data quality is acceptable. In order to provide uniformity in the assessment and reporting of data quality, this procedure explicitly specifies the assessment methods for response drift and accuracy. The methods are based on procedures included in the applicable performance specifications (PS's) in Appendix B of 40 CFR Part 60. Procedure 1 also requires the analysis of the EPA audit samples concurrent with certain reference method (RM) analy-

ATTACHMENT 2

KOOGLER & ASSOCIATES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

MAR 11 1991

MEMORANDUM

SUBJECT: New Source Review (NSR) Program Transitional Guidance

FROM: John S. Seitz, Director
Office of Air Quality Planning and Standards (MD-10)

TO: Addressees

The Clean Air Act Amendments of 1990 (1990 Amendments) make numerous changes to the NSR requirements of the prevention of significant deterioration (PSD) and nonattainment area programs. The 1990 Amendments create new and expanded nonattainment areas, extend PSD coverage to current Class I area boundaries, and mandate a PSD exemption for certain hazardous air pollutants. The Environmental Protection Agency (EPA) intends to propose by September of this year a regulatory package that will implement these and other changes to the NSR provisions. Final adoption of these revised regulations is projected for August 1992. In the interim period between passage of the 1990 Amendments and adoption of the Agency's final regulations, EPA expects that numerous issues regarding the 1990 Amendments will arise. This memorandum sets forth the Agency's position on the most important of these transitional issues involving the NSR program.

This guidance document does not supersede existing State regulations or approved State implementation plans. However, in some cases, it calls upon States to implement their NSR programs in a manner consistent with provisions of the 1990 Amendments that are applicable immediately and with the requirements that flow directly from these provisions. Nonetheless, the policies set out in this transition memorandum are intended solely as guidance and do not represent final Agency action. They are not ripe for judicial review for this reason. Moreover, they are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. The EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific circumstances. The Agency also may change this guidance at any time without public notice.

The Regional Offices should send this guidance document to their States. Questions from States and applicants concerning specific issues and cases should be directed to the appropriate EPA Regional Office. If you have any general questions, please contact Mr. Michael Sewell of the New Source Review Section at FTS 629-0873 or (919) 541-0873.

Attachment

Addressees
Director, Air, Pesticides, and Toxics Management Division, Regions I, IV, and VI
Director, Air and Waste Management Division, Region II
Director, Air Management Division, Regions III and IX
Director, Air and Radiation Division, Region V
Director, Air and Toxics Division, Regions VII, VIII, and X

cc: J. Calcagni
R. Campbell
W. Laxton
E. Lillis
J. Rasnic
L. Wegman
J. Weigold
NSR Contacts

New Source Review (NSR) Transitional Guidance

Toxics and National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Issues

1. Section 112 Hazardous Air Pollutants are No Longer Considered Regulated Pollutants Under Prevention of Significant Deterioration (PSD), but NESHAPS Still Apply

Under the 1977 Amendments to the Clean Air Act (Act) and regulations issued thereunder, the PSD requirements of the Act apply to all "major" new sources and "major" modifications, i.e., those exceeding certain annual tonnage thresholds [see 40 CFR 52.21(b)(1)(i) and (b)(2)(i)]. Typically, new sources and modifications become subject to PSD because they exceed the specified tonnage threshold for a criteria pollutant, i.e., a pollutant for which a national ambient air quality standard (NAAQS) has been established under section 109 of the Act. Once a new source or modification is subject to PSD, the PSD requirements apply to every pollutant subject to regulation under the Act that is emitted in "significant" quantities (or, in the case of a major modification, for which there is a significant net emissions increase) [see 40 CFR 52.21(b)(23) and (i)(2)]. Under the 1977 Amendments, best available control technology (BACT) and other PSD requirements apply not only to emissions of criteria pollutants but also to emissions of pollutants regulated under other provisions of the Act, such as section 111 or 112. This regulatory structure was altered by the 1990 Amendments.

Title III of the 1990 Amendments added a new section 112(b)(6) that excludes the hazardous air pollutants listed in section 112(b)(1) of the revised Act (as well as any pollutants that may be added to the list) from the PSD (and other) requirements of Part C. Thus, because they are on the initial Title III hazardous air pollutants list, the following pollutants, which had been regulated under PSD because they were covered by the section 112 NESHAPS or section 111 new source performance standards (NSPS) program, are now exempt from Federal PSD applicability:

- arsenic
- asbestos
- benzene (including benzene from gasoline)
- beryllium
- hydrogen sulfide (H_2S)
- mercury
- radionuclides (including radon and polonium)
- vinyl chloride.

The Title III exemption applies to final Federal PSD permits (i.e., those issued in final form and for which administrative appeals, if any, under 40 CFR 124.19 have been exhausted) issued on or after the date of enactment of the 1990 Amendments (November 15, 1990). For Federal PSD permit applications now under review by either an EPA Regional Office or a delegated State, PSD permit requirements do not apply to the pollutants exempted by Title III. For Federal PSD permits containing PSD requirements for the pollutants exempted by Title III issued on or after November 15, 1990, the permittee may request a revision (e.g., removal of a BACT limit for benzene) to their PSD permit to reflect the Title III exemption from Federal PSD applicability.

Note that pursuant to section 116 and the preservation clause in section 112(d)(7) of the amended Act, States with an approved PSD program may continue to regulate the Title III hazardous air pollutants now exempted from Federal PSD by section 112(b)(6) if the State PSD regulations provide an independent basis to do so. These State rules would remain in effect unless a State revised them to provide similar exemptions. Additionally, the Title III pollutants continue to be subject to any other applicable State and Federal rules; the exclusion is only for Part C rules.

Finally, section 112(q) retains existing NESHAPS regulations by specifying that any standard under section 112 in effect prior to the date of enactment of the 1990 Amendments shall remain in force and effect after such date unless modified as provided in the amended section. Therefore, the requirements of 40 CFR 61.05 to 61.08, including preconstruction permitting requirements, for new and modified sources subject to existing NESHAPS regulations are still applicable.

In summary, the pollutants currently regulated under the Act as of March 1991 that are still subject to Federal PSD review and permitting requirements are:

- carbon monoxide
- nitrogen oxides
- sulfur dioxide
- particulate matter and PM-10
- ozone (volatile organic compounds)
- lead (elemental)
- fluorides
- sulfuric acid mist
- total reduced sulfur compounds (including H_2S)
- CFC's 11, 12, 112, 114, 115

- halons 1211, 1301, 2402
- municipal waste combustor (MWC) acid gases, MWC metals and MWC organics.

2. Hazardous Air Pollutants that are Regulated as One Component of a More General Pollutant Under Other Provisions of the Clean Air Act are Still Regulated

Any hazardous air pollutants listed in section 112(b)(1) which are regulated as constituents of a more general pollutant listed under section 108 of the Act are still subject to PSD as part of the more general pollutant, despite the exemption in Title III. For example, volatile organic compounds (VOC's) (a term which includes benzene, vinyl chloride, methanol, toluene, methyl ethyl ketone, and thousands of other compounds) are still regulated as VOC's (but not as individual pollutants such as benzene, etc.) under the PSD regulations because these pollutants are ozone precursors, not because they are air toxics. Also, particulates (including lead compounds and asbestos) are still regulated as particulates (both PM-10 and particulate matter) under the PSD regulations. Lead compounds are exempt from Federal PSD by Title III, but the elemental lead portion of lead compounds (as tested for in 40 CFR Part 60, Appendix A, Method 12) is still considered a criteria pollutant subject to the lead NAAQS and still regulated under PSD.

3. Toxic Effect of Unregulated Pollutants Still Considered in BACT Analysis

Based on the remand decision on June 3, 1986 by the EPA Administrator in North County Resource Recovery Associates (PSD Appeal No. 85-2), the impact on emissions of other pollutants, including unregulated pollutants, must be taken into account in determining BACT for a regulated pollutant. When evaluating control technologies and their associated emissions limits, combustion practices, and related permit terms and conditions in a BACT proposal, the applicant must consider the environmental impacts of all pollutants not regulated by PSD. Once a project is subject to BACT due to the emission of nonexempted pollutants, the BACT analysis should therefore consider all pollutants, including Title III hazardous air pollutants previously subject to PSD, in determining which control strategy is best.

ATTACHMENT 3

from an emissions unit, as determined in accordance with paragraphs (b)(21)(ii) through (iv) of this section.

(ii) In general, actual emissions as of a particular date shall equal the average rate, in tons per year, at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. The reviewing authority may allow the use of a different time period upon a determination that it is more representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

(iii) The reviewing authority may presume that source-specific allowable emissions for the unit are equivalent to the actual emissions of the unit.

(iv) For any emissions unit which has not begun normal operations on the particular date, actual emissions shall equal the potential to emit of the unit on that date.

(22) "Complete" means, in reference to an application for a permit, that the application contains all the information necessary for processing the application. Designating an application complete for purposes of permit processing does not preclude the reviewing authority from requesting or accepting any additional information.

(23) (i) "Significant" means, in reference to a net emissions increase or the potential of a source to emit any of the following pollutants, a rate of emissions that would equal or exceed any of the following rates:

Pollutant and Emissions Rate

Carbon monoxide: 100 tons per year (tpy)
Nitrogen oxides: 40 tpy
Sulfur dioxide: 40 tpy
Particulate matter: 25 tpy of particulate matter emissions. 15 tpy of PM_{10} emissions.
Ozone: 40 tpy of volatile organic compounds
Lead: 0.6 tpy
Asbestos: 0.007 tpy
Beryllium: 0.0004 tpy
Mercury: 0.1 tpy
Vinyl chloride: 1 tpy
Fluorides: 3 tpy
Sulfuric acid mist: 7 tpy
Hydrogen sulfide (H_2S): 10 tpy
Total reduced sulfur (including H_2S): 10 tpy
Reduced sulfur compounds (including H_2S): 10 tpy

[51.166(b)(23)(i) amended by 52 FR 24712, July 1, 1987]

(ii) "Significant" means, in reference to a net emissions increase or the potential of a source to emit a pollutant subject to regulation under the Act that paragraph (b)(23)(i) of this section does not list, any emissions rate.

(iii) Notwithstanding paragraph (b)(23)(i) of this section, "significant" means any emissions rate or any net emissions increase associated with a major stationary source or major modification, which would construct within 10 kilometers of a Class I area, and have an impact on such area equal to or greater than 1 $\mu g/m^3$ (24-hour average).

(24) "Federal Land Manager" means, with respect to any lands in the United States, the Secretary of the department with authority over such lands.

(25) "High terrain" means any area having an elevation 900 feet or more above the base of the stack of a source.

(26) "Low terrain" means any area other than high terrain.

(27) "Indian Reservation" means any federally recognized reservation established by Treaty, Agreement, Executive Order, or Act of Congress.

(28) "Indian Governing Body" means the governing body of any tribe, band, or group of Indians subject to the jurisdiction of the United States and recognized by the United States as possessing power of self-government.

(29) "Volatile organic compounds" excludes each of the following compounds, unless the compound is subject to an emissions standard under sections 111 or 112 of the Act: methane; ethane; methylene chloride; 1,1,1 trichloroethane (methyl chloroform); trichlorotrifluoroethane (CFC-113) (Freon 113); trichlorofluoromethane (CFC-11); dichlorodifluouromethane (CFC-12); chlorodifluoromethane (CFC-22): trifluoromethane (FC-23); dichlorotetrafluoroethane (CFC-114): chloropentafluoroethane (CFC-115): dichlorotrifluoroethane (HCFC-123); tetrafluoroethane (HCFC-134a); dichlorofluoroethane (HCFC-141b); and chlorodifluoroethane (HCFC-142b).

[51.166(b)(29) added by 54 FR 27299, June 28, 1989]

(c) *Ambient air increments.* The plan shall contain emission limitations and such other measures as may be necessary to assure that in areas designated as Class I, II, or III, increases in pollutant concentration over the baseline concentration shall be limited to the following:

Pollutant	Maximum allowable increase (micrograms per cubic meter)
CLASS I	
Particulate matter:	
TSP, annual geometric mean	5
TSP, 24-hr maximum	10
Sulfur dioxide:	
Annual arithmetic mean	2
24-hr maximum	5
3-hr maximum	25
Nitrogen dioxide:	
Annual arithmetic mean	2.5

Pollutant	Maximum allowable increase (micrograms per cubic meter)
CLASS II	
Particulate matter:	
TSP, annual geometric mean	19
TSP, 24-hr maximum	37
Sulfur dioxide:	
Annual arithmetic mean	20
24-hr maximum	91
3-hr maximum	512
Nitrogen dioxide:	
Annual arithmetic mean	25
CLASS III	
Particulate matter:	
TSP, annual geometric mean	37
TSP, 24-hr maximum	75
Sulfur dioxide:	
Annual arithmetic mean	40
24-hr maximum	182
3-hr maximum	700
Nitrogen dioxide:	
Annual arithmetic mean	50

[51.166(c) table amended by 52 FR 24712, July 1, 1987; 53 FR 40670, October 17, 1988]

For any period other than an annual period, the applicable maximum allowable increase may be exceeded during

MODELING RESULTS

```
CO STARTING
CO TITLEONE  RINKER MATTERIALS CORPORATION **  BENZENE IMPACT  **  MET=MIAMI'86
CO MODELOPT DFAULT CONC   RURAL
CO AVERTIME 8 24 PERIOD
CO POLLUTID SO2
CO RUNORNOT RUN
CO ERRORFIL ERRORS.OUT
CO FINISHED

SO STARTING
** Source Location Cards:
**          SRCID SRCTYP         XS             YS            ZS
SO LOCATION     1 POINT         0.0            0.0           0.0

** POINT:   SRCID       QS            HS        TS          VS        DS
**          -----     -----         ------     -----       ----      -----
SO SRCPARAM     1     0.0088         35.05     422.97       7.57      4.57

** BEGIN AT 10 DEGREES
SO BUILDHGT    1     36*21.3
SO BUILDWID    1     36*41.8

SO SRCGROUP ALL
SO FINISHED

RE STARTING
RE GRIDPOLR POL1 STA
RE GRIDPOLR POL1 ORIG  0.0 0.0
RE GRIDPOLR POL1 DIST  100. 200. 300. 500. 750. 1000.
RE GRIDPOLR POL1 GDIR  36  10.  10.
RE GRIDPOLR POL1 END
RE FINISHED

ME STARTING
ME INPUTFIL  D:\ISC2\MIAMI86.ASC
ME ANEMHGHT  10.000 METERS
ME SURFDATA  12839  1986  MIAMI FL
ME UAIRDATA  12844  1986  WEST_PALM_BEACH FL
ME DAYRANGE  1-365
ME FINISHED

OU STARTING
OU RECTABLE  ALLAVE  FIRST-SECOND
OU PLOTFILE PERIOD ALL     D:\ISC2\RNK86BAN.DAT
OU PLOTFILE 24 ALL FIRST   D:\ISC2\RNK86B24.DAT
OU PLOTFILE 8  ALL FIRST   D:\ISC2\RNK86B8.DAT
OU MAXTABLE   ALLAVE  50
OU FINISHED

************************************
*** SETUP Finishes Successfully ***
************************************
```

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** MODEL SETUP OPTIONS SUMMARY ***

- -

**Model Is Setup For Calculation of Average CONCentration Values.

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
1. Final Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Use Calms Processing Routine.
5. Not Use Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.
8. "Upper Bound" Values for Supersquat Buildings.
9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 2 Short Term Average(s) of: 8-HR 24-HR
and Calculates PERIOD Averages

**This Run Includes: 1 Source(s); 1 Source Group(s); and 216 Receptor(s)

**The Model Assumes A Pollutant Type of: SO2

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
Model Outputs Tables of PERIOD Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs Tables of Overall Maximum Short Term Values (MAXTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 10.00 ; Decay Coef. = 0.0000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Input Runstream File: RNKR-BZ6.INP ; **Output Print File: RNKR-BZ6.OUT
**Detailed Error/Message File: ERRORS.OUT

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
1	0	0.88000E-02	0.0	0.0	0.0	35.05	422.97	7.57	4.57	YES	

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	1 ,

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: 1

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	21.3,	41.8,	0	2	21.3,	41.8,	0	3	21.3,	41.8,	0	4	21.3,	41.8,	0	5	21.3,	41.8,	0	6	21.3,	41.8,	0
7	21.3,	41.8,	0	8	21.3,	41.8,	0	9	21.3,	41.8,	0	10	21.3,	41.8,	0	11	21.3,	41.8,	0	12	21.3,	41.8,	0
13	21.3,	41.8,	0	14	21.3,	41.8,	0	15	21.3,	41.8,	0	16	21.3,	41.8,	0	17	21.3,	41.8,	0	18	21.3,	41.8,	0
19	21.3,	41.8,	0	20	21.3,	41.8,	0	21	21.3,	41.8,	0	22	21.3,	41.8,	0	23	21.3,	41.8,	0	24	21.3,	41.8,	0
25	21.3,	41.8,	0	26	21.3,	41.8,	0	27	21.3,	41.8,	0	28	21.3,	41.8,	0	29	21.3,	41.8,	0	30	21.3,	41.8,	0
31	21.3,	41.8,	0	32	21.3,	41.8,	0	33	21.3,	41.8,	0	34	21.3,	41.8,	0	35	21.3,	41.8,	0	36	21.3,	41.8,	0

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

100.0, 200.0, 300.0, 500.0, 750.0, 1000.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

10.0,	20.0,	30.0,	40.0,	50.0,	60.0,	70.0,	80.0,	90.0,	100.0,
110.0,	120.0,	130.0,	140.0,	150.0,	160.0,	170.0,	180.0,	190.0,	200.0,
210.0,	220.0,	230.0,	240.0,	250.0,	260.0,	270.0,	280.0,	290.0,	300.0,
310.0,	320.0,	330.0,	340.0,	350.0,	360.0,				

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
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1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 0
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: D:\ISC2\MIAMI86.ASC FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1)
SURFACE STATION NO.: 12839 UPPER AIR STATION NO.: 12844
NAME: MIAMI NAME: WEST_PALM_BEACH
YEAR: 1986 YEAR: 1986

YEAR	MONTH	DAY	HOUR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN
86	1	1	1	151.0	2.57	290.9	6	1057.8	40.0
86	1	1	2	148.0	0.00	288.7	6	1058.6	40.0
86	1	1	3	154.0	0.00	288.7	6	1059.4	40.0
86	1	1	4	3.0	2.06	289.8	6	1060.2	40.0
86	1	1	5	353.0	4.12	289.8	5	1061.0	40.0
86	1	1	6	352.0	0.00	289.8	6	1061.7	40.0
86	1	1	7	15.0	2.57	289.8	5	1062.5	40.0
86	1	1	8	3.0	2.57	290.9	4	122.6	158.0
86	1	1	9	357.0	5.14	294.3	4	280.2	309.7
86	1	1	10	11.0	4.63	297.0	3	437.7	461.3
86	1	1	11	24.0	5.14	298.2	3	595.3	613.0
86	1	1	12	356.0	4.12	299.3	3	752.9	764.7
86	1	1	13	23.0	4.63	299.8	4	910.4	916.3
86	1	1	14	39.0	4.63	300.4	3	1068.0	1068.0
86	1	1	15	342.0	6.17	299.8	4	1068.0	1068.0
86	1	1	16	354.0	5.14	298.7	4	1068.0	1068.0
86	1	1	17	351.0	5.14	298.2	4	1068.0	1068.0
86	1	1	18	87.0	5.14	298.2	4	1074.2	1074.2
86	1	1	19	124.0	4.12	295.4	5	1088.9	891.1
86	1	1	20	137.0	2.57	294.8	6	1103.5	767.1
86	1	1	21	190.0	2.06	293.7	6	1118.2	643.0
86	1	1	22	142.0	1.54	292.6	7	1132.8	519.0
86	1	1	23	360.0	2.57	293.2	6	1147.4	395.0
86	1	1	24	350.0	2.57	291.5	6	1162.1	271.0

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE PERIOD (8760 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	500.00	750.00	1000.00
10.00	0.00023	0.00022	0.00014	0.00008	0.00007	0.00007
20.00	0.00023	0.00021	0.00013	0.00007	0.00006	0.00006
30.00	0.00027	0.00025	0.00015	0.00008	0.00006	0.00006
40.00	0.00028	0.00025	0.00016	0.00008	0.00006	0.00007
50.00	0.00023	0.00021	0.00014	0.00007	0.00006	0.00006
60.00	0.00020	0.00018	0.00012	0.00006	0.00005	0.00005
70.00	0.00021	0.00019	0.00012	0.00006	0.00005	0.00005
80.00	0.00026	0.00024	0.00015	0.00007	0.00005	0.00006
90.00	0.00027	0.00024	0.00015	0.00008	0.00006	0.00006
100.00	0.00024	0.00021	0.00014	0.00008	0.00006	0.00006
110.00	0.00035	0.00032	0.00021	0.00011	0.00008	0.00008
120.00	0.00044	0.00038	0.00024	0.00012	0.00009	0.00009
130.00	0.00051	0.00043	0.00028	0.00014	0.00010	0.00010
140.00	0.00058	0.00051	0.00032	0.00016	0.00011	0.00011
150.00	0.00063	0.00057	0.00035	0.00017	0.00012	0.00013
160.00	0.00067	0.00063	0.00039	0.00019	0.00014	0.00015
170.00	0.00060	0.00057	0.00035	0.00017	0.00012	0.00013
180.00	0.00044	0.00041	0.00026	0.00013	0.00009	0.00009
190.00	0.00031	0.00029	0.00018	0.00009	0.00007	0.00007
200.00	0.00027	0.00025	0.00015	0.00008	0.00006	0.00007
210.00	0.00034	0.00030	0.00019	0.00009	0.00006	0.00007
220.00	0.00065	0.00056	0.00035	0.00016	0.00011	0.00011
230.00	0.00105	0.00091	0.00058	0.00026	0.00017	0.00018
240.00	0.00139	0.00120	0.00077	0.00035	0.00022	0.00024
250.00	0.00169	0.00152	0.00096	0.00044	0.00030	0.00032
260.00	0.00164	0.00148	0.00091	0.00042	0.00029	0.00031
270.00	0.00186	0.00174	0.00109	0.00051	0.00035	0.00038
280.00	0.00175	0.00158	0.00101	0.00048	0.00033	0.00036
290.00	0.00134	0.00119	0.00078	0.00039	0.00027	0.00030
300.00	0.00129	0.00116	0.00077	0.00040	0.00029	0.00032
310.00	0.00130	0.00117	0.00079	0.00041	0.00029	0.00032
320.00	0.00116	0.00103	0.00071	0.00039	0.00028	0.00031
330.00	0.00116	0.00103	0.00071	0.00038	0.00027	0.00030
340.00	0.00083	0.00075	0.00051	0.00028	0.00020	0.00022
350.00	0.00056	0.00051	0.00034	0.00019	0.00014	0.00016
360.00	0.00035	0.00032	0.00021	0.00012	0.00009	0.00010

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	500.00	750.00
10.0	0.01123 (86122416)	0.00935 (86122416)	0.00605 (86022716)	0.00340 (86072816)	0.00268 (86072816)
20.0	0.01472 (86011016)	0.01257 (86022808)	0.00692 (86022808)	0.00260 (86011016)	0.00207 (86031116)
30.0	0.02963 (86011016)	0.02261 (86011016)	0.01427 (86011016)	0.00599 (86011016)	0.00319 (86011016)
40.0	0.04393 (86022816)	0.03555 (86022816)	0.02327 (86022816)	0.01033 (86022816)	0.00575 (86022816)
50.0	0.02742 (86021116)	0.02383 (86021116)	0.01545 (86021116)	0.00643 (86021116)	0.00348 (86021116)
60.0	0.01510 (86022716)	0.01200 (86022716)	0.00753 (86022716)	0.00356 (86010516)	0.00232 (86010516)
70.0	0.01252 (86030424)	0.01071 (86030424)	0.00674 (86011916)	0.00275 (86011916)	0.00164 (86040816)
80.0	0.02832 (86010516)	0.02361 (86010516)	0.01544 (86010516)	0.00671 (86010516)	0.00371 (86010516)
90.0	0.02236 (86040916)	0.01810 (86040916)	0.01282 (86040916)	0.00668 (86040916)	0.00415 (86040916)
100.0	0.01601 (86041624)	0.01417 (86041624)	0.00857 (86041624)	0.00425 (86040916)	0.00312 (86041716)
110.0	0.02674 (86012724)	0.02017 (86030616)	0.01341 (86030616)	0.00586 (86030616)	0.00332 (86030616)
120.0	0.05707 (86030124)	0.04442 (86030124)	0.02884 (86030124)	0.01284 (86030124)	0.00714 (86030124)
130.0	0.06369 (86030116)	0.04361 (86030116)	0.02794 (86030116)	0.01313 (86030116)	0.00739 (86030116)
140.0	0.05199 (86032208)	0.04104 (86032208)	0.02640 (86032208)	0.01138 (86032208)	0.00620 (86032208)
150.0	0.02832 (86032216)	0.02527 (86011408)	0.01437 (86011408)	0.00542 (86032216)	0.00306 (86011408)
160.0	0.04056 (86032216)	0.03259 (86032216)	0.02204 (86032216)	0.01058 (86032216)	0.00625 (86032216)
170.0	0.02949 (86021308)	0.02622 (86021308)	0.01550 (86021308)	0.00582 (86021308)	0.00333 (86021308)
180.0	0.03168 (86032224)	0.02600 (86032224)	0.01661 (86032224)	0.00687 (86032224)	0.00368 (86032224)
190.0	0.02311 (86032224)	0.01764 (86032224)	0.01111 (86032224)	0.00464 (86032224)	0.00248 (86032224)
200.0	0.01153 (86101916)	0.00847 (86101916)	0.00515 (86032816)	0.00267 (86042416)	0.00192 (86042416)
210.0	0.01767 (86101816)	0.01471 (86101816)	0.00942 (86101816)	0.00389 (86101816)	0.00209 (86101816)
220.0	0.02386 (86101816)	0.01912 (86101816)	0.01215 (86101916)	0.00512 (86111416)	0.00300 (86060416)
230.0	0.03689 (86032416)	0.02818 (86032416)	0.01908 (86032416)	0.00934 (86032416)	0.00626 (86082316)
240.0	0.04014 (86032516)	0.03137 (86032516)	0.02026 (86032516)	0.00887 (86032516)	0.00551 (86091916)
250.0	0.04719 (86121416)	0.03830 (86121416)	0.02453 (86121416)	0.01030 (86121416)	0.00554 (86121416)
260.0	0.04212 (86110816)	0.03336 (86110816)	0.02139 (86110816)	0.00916 (86110816)	0.00498 (86110816)
270.0	0.03580 (86050616)	0.02883 (86050616)	0.01985 (86050616)	0.00983 (86050616)	0.00589 (86050616)
280.0	0.04628 (86011716)	0.03728 (86011716)	0.02403 (86011716)	0.01031 (86011716)	0.00660 (86050516)
290.0	0.02933 (86122308)	0.02515 (86122308)	0.01623 (86122308)	0.00714 (86091016)	0.00560 (86050216)
300.0	0.04376 (86030916)	0.03318 (86030916)	0.02167 (86030916)	0.00997 (86030916)	0.00562 (86030916)
310.0	0.04633 (86031316)	0.03665 (86031916)	0.02369 (86031916)	0.01028 (86031316)	0.00574 (86031316)
320.0	0.03901 (86122324)	0.03002 (86122324)	0.01918 (86031324)	0.00797 (86031324)	0.00524 (86080616)
330.0	0.04655 (86020516)	0.03751 (86020516)	0.02435 (86020516)	0.01064 (86020516)	0.00586 (86020516)
340.0	0.02565 (86031416)	0.02119 (86031416)	0.01362 (86031416)	0.00572 (86031416)	0.00396 (86072216)
350.0	0.02745 (86031516)	0.02253 (86031516)	0.01441 (86031516)	0.00598 (86031516)	0.00406 (86072916)
360.0	0.01838 (86020816)	0.01547 (86020816)	0.00976 (86020816)	0.00543 (86072916)	0.00398 (86072916)

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DIRECTION (DEGREES)	DISTANCE (METERS) 1000.00
10.0	0.00310 (86072816)
20.0	0.00265 (86031116)
30.0	0.00304 (86011016)
40.0	0.00572 (86022816)
50.0	0.00403 (86022316)
60.0	0.00253 (86010516)
70.0	0.00210 (86040816)
80.0	0.00374 (86010516)
90.0	0.00412 (86040916)
100.0	0.00366 (86041716)
110.0	0.00347 (86030616)
120.0	0.00644 (86030124)
130.0	0.00617 (86030116)
140.0	0.00564 (86032208)
150.0	0.00310 (86011408)
160.0	0.00600 (86032216)
170.0	0.00348 (86012416)
180.0	0.00372 (86032316)
190.0	0.00226 (86032224)
200.0	0.00198 (86012316)
210.0	0.00216 (86101816)
220.0	0.00313 (86060416)
230.0	0.00663 (86082316)
240.0	0.00640 (86091916)
250.0	0.00575 (86071716)
260.0	0.00494 (86110816)
270.0	0.00574 (86050616)
280.0	0.00668 (86050516)
290.0	0.00652 (86050216)
300.0	0.00555 (86051816)
310.0	0.00560 (86031916)
320.0	0.00615 (86080616)
330.0	0.00591 (86061816)
340.0	0.00489 (86072216)
350.0	0.00425 (86052116)
360.0	0.00427 (86072916)

*** ISCST2 - VERSION 92273 ***   *** RINKER MATTERIALS CORPORATION ** BENZENE IMPACT ** MET=MIAMI'86 ***   04/05/93
***   ***   17:21:44
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*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	500.00	750.00
10.0	0.01020 (86022716)	0.00930 (86022716)	0.00601 (86122416)	0.00257 (86072008)	0.00231 (86060708)
20.0	0.01331 (86022808)	0.01061 (86011016)	0.00649 (86011016)	0.00245 (86021024)	0.00188 (86070316)
30.0	0.01568 (86022816)	0.01095 (86022808)	0.00677 (86012616)	0.00332 (86081916)	0.00207 (86073116)
40.0	0.02291 (86081916)	0.01924 (86081916)	0.01324 (86081916)	0.00639 (86081916)	0.00378 (86081916)
50.0	0.02069 (86081916)	0.01588 (86081916)	0.01016 (86081916)	0.00440 (86022316)	0.00328 (86022316)
60.0	0.01263 (86012616)	0.00919 (86021116)	0.00660 (86010516)	0.00304 (86022716)	0.00184 (86062116)
70.0	0.01166 (86011916)	0.01042 (86011916)	0.00639 (86022724)	0.00263 (86022724)	0.00164 (86030424)
80.0	0.01544 (86030424)	0.01323 (86030424)	0.00842 (86030424)	0.00341 (86030424)	0.00183 (86012616)
90.0	0.01682 (86041624)	0.01438 (86041624)	0.00923 (86040924)	0.00379 (86040924)	0.00258 (86040816)
100.0	0.01368 (86021516)	0.01135 (86021516)	0.00798 (86040916)	0.00396 (86041716)	0.00274 (86040816)
110.0	0.02557 (86030124)	0.02012 (86012724)	0.01277 (86012724)	0.00548 (86012724)	0.00296 (86012724)
120.0	0.03047 (86012624)	0.02260 (86012624)	0.01430 (86012624)	0.00619 (86012624)	0.00381 (86041616)
130.0	0.03455 (86012624)	0.02677 (86012624)	0.01652 (86012624)	0.00678 (86012624)	0.00373 (86012016)
140.0	0.03605 (86030116)	0.02372 (86030116)	0.01487 (86030116)	0.00678 (86030116)	0.00372 (86030116)
150.0	0.02688 (86011408)	0.01969 (86032216)	0.01239 (86032216)	0.00506 (86011408)	0.00293 (86032216)
160.0	0.03375 (86032116)	0.02645 (86032116)	0.01674 (86032116)	0.00696 (86032116)	0.00372 (86032116)
170.0	0.01719 (86032116)	0.01294 (86032116)	0.00810 (86032116)	0.00337 (86032116)	0.00276 (86012416)
180.0	0.01436 (86021316)	0.01325 (86021316)	0.00878 (86021316)	0.00516 (86032316)	0.00355 (86032316)
190.0	0.01523 (86032316)	0.01257 (86032316)	0.00823 (86032316)	0.00358 (86032316)	0.00199 (86032316)
200.0	0.00994 (86032816)	0.00789 (86032816)	0.00512 (86101916)	0.00229 (86032816)	0.00150 (86012116)
210.0	0.01755 (86101916)	0.01462 (86101916)	0.00923 (86101916)	0.00369 (86101916)	0.00199 (86041216)
220.0	0.02322 (86111416)	0.01891 (86101916)	0.01214 (86101816)	0.00502 (86101816)	0.00287 (86111416)
230.0	0.03398 (86051016)	0.02656 (86120624)	0.01739 (86051016)	0.00877 (86082316)	0.00545 (86032416)
240.0	0.03387 (86032508)	0.02891 (86032508)	0.01862 (86032508)	0.00770 (86032508)	0.00516 (86082316)
250.0	0.03352 (86051016)	0.02579 (86051016)	0.01643 (86051016)	0.00750 (86071716)	0.00520 (86071716)
260.0	0.02729 (86110716)	0.02286 (86110716)	0.01455 (86110716)	0.00588 (86110716)	0.00340 (86091816)
270.0	0.02705 (86030824)	0.02508 (86030824)	0.01479 (86030824)	0.00655 (86120816)	0.00433 (86092516)
280.0	0.03984 (86030916)	0.03081 (86030924)	0.01987 (86030924)	0.00933 (86050516)	0.00561 (86011716)
290.0	0.02692 (86112516)	0.02311 (86112516)	0.01503 (86112516)	0.00675 (86050216)	0.00502 (86091016)
300.0	0.03627 (86031008)	0.03089 (86031008)	0.02021 (86031008)	0.00869 (86031008)	0.00511 (86051816)
310.0	0.04582 (86031916)	0.03517 (86031316)	0.02279 (86031316)	0.01027 (86031916)	0.00563 (86031916)
320.0	0.03608 (86020416)	0.02977 (86031324)	0.01884 (86122324)	0.00776 (86122324)	0.00516 (86082916)
330.0	0.04557 (86122324)	0.03668 (86122324)	0.02370 (86122324)	0.01022 (86122324)	0.00559 (86122324)
340.0	0.02395 (86020616)	0.02005 (86020616)	0.01274 (86020616)	0.00542 (86032016)	0.00356 (86081416)
350.0	0.02101 (86020816)	0.01744 (86020816)	0.01111 (86020816)	0.00558 (86072916)	0.00388 (86052116)
360.0	0.01391 (86070908)	0.01167 (86122408)	0.00745 (86122408)	0.00387 (86020816)	0.00239 (86082016)

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DIRECTION (DEGREES)	DISTANCE (METERS) 1000.00
10.0	0.00274 (86071916)
20.0	0.00246 (86070316)
30.0	0.00236 (86073116)
40.0	0.00366 (86081916)
50.0	0.00366 (86021116)
60.0	0.00250 (86062116)
70.0	0.00195 (86073116)
80.0	0.00205 (86040816)
90.0	0.00290 (86040816)
100.0	0.00323 (86040816)
110.0	0.00293 (86022016)
120.0	0.00403 (86041616)
130.0	0.00413 (86012016)
140.0	0.00454 (86050916)
150.0	0.00307 (86050916)
160.0	0.00424 (86122116)
170.0	0.00323 (86021308)
180.0	0.00352 (86032224)
190.0	0.00190 (86032316)
200.0	0.00187 (86012116)
210.0	0.00203 (86101716)
220.0	0.00286 (86050416)
230.0	0.00488 (86060416)
240.0	0.00552 (86082316)
250.0	0.00545 (86121416)
260.0	0.00395 (86091816)
270.0	0.00532 (86092516)
280.0	0.00549 (86011716)
290.0	0.00549 (86091016)
300.0	0.00524 (86030916)
310.0	0.00538 (86031316)
320.0	0.00607 (86082916)
330.0	0.00578 (86020516)
340.0	0.00417 (86081416)
350.0	0.00421 (86072916)
360.0	0.00288 (86071916)

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	500.00	750.00
10.0	0.00549 (86022724)	0.00520 (86022724)	0.00300 (86022724)	0.00158 (86073024)	0.00140 (86073024)
20.0	0.00746 (86022824)	0.00673 (86022824)	0.00390 (86022824)	0.00146 (86072024)	0.00119 (86072024)
30.0	0.01372 (86011024)	0.01111 (86011024)	0.00679 (86011024)	0.00270 (86011024)	0.00147 (86011024)
40.0	0.01619 (86022824)	0.01281 (86022824)	0.00826 (86022824)	0.00362 (86022824)	0.00200 (86022824)
50.0	0.01066 (86021124)	0.00934 (86021124)	0.00599 (86021124)	0.00245 (86021124)	0.00133 (86021124)
60.0	0.00603 (86022724)	0.00478 (86022724)	0.00290 (86022724)	0.00120 (86022724)	0.00088c(86122024)
70.0	0.00518 (86011924)	0.00466 (86011924)	0.00284 (86011924)	0.00122 (86022324)	0.00084 (86040824)
80.0	0.01304 (86010524)	0.01129 (86010524)	0.00677 (86010524)	0.00285 (86010524)	0.00172 (86010524)
90.0	0.01305 (86040924)	0.01083 (86040924)	0.00735 (86040924)	0.00349 (86040924)	0.00206 (86040924)
100.0	0.00710 (86041624)	0.00631 (86041624)	0.00404 (86041624)	0.00179 (86041624)	0.00111 (86041624)
110.0	0.01601 (86012724)	0.01289 (86012724)	0.00811 (86012724)	0.00348 (86012724)	0.00206 (86030624)
120.0	0.02961 (86030124)	0.02210 (86030124)	0.01422 (86030124)	0.00636 (86030124)	0.00353 (86030124)
130.0	0.02808 (86030124)	0.01929 (86030124)	0.01217 (86030124)	0.00550 (86030124)	0.00304 (86030124)
140.0	0.02435 (86032224)	0.01874 (86032224)	0.01230 (86032224)	0.00562 (86032224)	0.00316 (86032224)
150.0	0.01530 (86032224)	0.01091 (86032124)	0.00694 (86032124)	0.00290 (86012824)	0.00172 (86012824)
160.0	0.01764 (86032124)	0.01412 (86032224)	0.00944 (86032224)	0.00439 (86032224)	0.00255 (86032224)
170.0	0.01382 (86021324)	0.01201 (86021324)	0.00732 (86021324)	0.00295 (86021324)	0.00176 (86021324)
180.0	0.01069 (86032224)	0.00929 (86021324)	0.00605 (86032324)	0.00293 (86032324)	0.00182 (86032324)
190.0	0.00975 (86032324)	0.00823 (86032324)	0.00523 (86032324)	0.00211 (86032324)	0.00113 (86032324)
200.0	0.00574 (86032324)	0.00501 (86032324)	0.00317 (86032324)	0.00124 (86032324)	0.00081 (86042324)
210.0	0.00978 (86101924)	0.00849 (86101924)	0.00505 (86101924)	0.00189 (86101924)	0.00108 (86101924)
220.0	0.01340 (86101924)	0.01125 (86101924)	0.00685 (86101924)	0.00263 (86101924)	0.00140 (86101924)
230.0	0.02187 (86032424)	0.01738 (86032424)	0.01141 (86032424)	0.00514 (86032424)	0.00288 (86032424)
240.0	0.02968 (86032524)	0.02433 (86032524)	0.01570 (86032524)	0.00669 (86032524)	0.00365 (86032524)
250.0	0.02415 (86121424)	0.01973 (86121424)	0.01208 (86121424)	0.00476 (86121424)	0.00257 (86121424)
260.0	0.02505 (86110824)	0.02112 (86110824)	0.01324 (86110824)	0.00532 (86110824)	0.00288 (86110824)
270.0	0.02070 (86050624)	0.01755 (86050624)	0.01129 (86050624)	0.00497 (86050624)	0.00291 (86050624)
280.0	0.03397 (86030924)	0.02730 (86030924)	0.01761 (86030924)	0.00759 (86030924)	0.00415 (86030924)
290.0	0.01246 (86112524)	0.01071 (86112524)	0.00657 (86112524)	0.00279 (86091024)	0.00200 (86050224)
300.0	0.01684 (86030924)	0.01423 (86031024)	0.00923 (86031024)	0.00389 (86031024)	0.00254 (86051824)
310.0	0.02903 (86031324)	0.02313 (86031324)	0.01467 (86031324)	0.00621 (86031324)	0.00339 (86031324)
320.0	0.02611 (86031324)	0.02086 (86031324)	0.01322 (86031324)	0.00544 (86031324)	0.00290 (86031324)
330.0	0.02660 (86122324)	0.02311 (86020524)	0.01393 (86020524)	0.00597 (86122324)	0.00346 (86020524)
340.0	0.01487 (86020624)	0.01361 (86020624)	0.00813 (86020624)	0.00315 (86031424)	0.00198 (86020624)
350.0	0.01128 (86031524)	0.00949 (86031524)	0.00588 (86031524)	0.00235 (86031524)	0.00162 (86072924)
360.0	0.00807 (86122424)	0.00733 (86122424)	0.00467 (86122424)	0.00211 (86072924)	0.00157 (86072924)

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*** ISCST2 - VERSION 92273 ***    ***  RINKER MATTERIALS CORPORATION **  BENZENE IMPACT  **  MET=MIAMI'86  ***       04/05/93
                                  ***                                                                      ***       17:21:44
                                                                                                                     PAGE  14
*** MODELING OPTIONS USED:  CONC   RURAL  FLAT         DFAULT

                           *** THE   1ST HIGHEST 24-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL        ***
                               INCLUDING SOURCE(S):      1       ,

                                   *** NETWORK ID: POL1     ;  NETWORK TYPE: GRIDPOLR ***

                                        ** CONC OF SO2      IN MICROGRAMS/M**3                          **

DIRECTION |                                         DISTANCE (METERS)
(DEGREES) |         1000.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     10.0 |      0.00172 (86073024)
     20.0 |      0.00126 (86072024)
     30.0 |      0.00143 (86022824)
     40.0 |      0.00197 (86022824)
     50.0 |      0.00140 (86021124)
     60.0 |      0.00104c(86122024)
     70.0 |      0.00099 (86040824)
     80.0 |      0.00167 (86010524)
     90.0 |      0.00207 (86040924)
    100.0 |      0.00123 (86041624)
    110.0 |      0.00214 (86030624)
    120.0 |      0.00311 (86030124)
    130.0 |      0.00255 (86030124)
    140.0 |      0.00279 (86032224)
    150.0 |      0.00169 (86011424)
    160.0 |      0.00245 (86032224)
    170.0 |      0.00180 (86021324)
    180.0 |      0.00185 (86032324)
    190.0 |      0.00108 (86032324)
    200.0 |      0.00091 (86042324)
    210.0 |      0.00110 (86101924)
    220.0 |      0.00149 (86050424)
    230.0 |      0.00267 (86032424)
    240.0 |      0.00357 (86032524)
    250.0 |      0.00252 (86121424)
    260.0 |      0.00295 (86110824)
    270.0 |      0.00291 (86050624)
    280.0 |      0.00400 (86030924)
    290.0 |      0.00230 (86050224)
    300.0 |      0.00272 (86051824)
    310.0 |      0.00329 (86031324)
    320.0 |      0.00287 (86031324)
    330.0 |      0.00346 (86020524)
    340.0 |      0.00205 (86020624)
    350.0 |      0.00170 (86121224)
    360.0 |      0.00170 (86072924)
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*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DIRECTION (DEGREES)	DISTANCE (METERS) 100.00	200.00	300.00	500.00	750.00
10.0	0.00517 (86122424)	0.00438 (86122424)	0.00277 (86122424)	0.00149 (86060724)	0.00137 (86060724)
20.0	0.00696 (86011024)	0.00541 (86011024)	0.00316 (86011024)	0.00141 (86022824)	0.00102 (86073024)
30.0	0.01196 (86022824)	0.00964 (86022824)	0.00564 (86022824)	0.00220 (86022824)	0.00146 (86022824)
40.0	0.01036 (86081924)	0.00906 (86081924)	0.00579 (86081924)	0.00269 (86081924)	0.00166 (86081924)
50.0	0.00804 (86081924)	0.00640 (86081924)	0.00395 (86081924)	0.00164 (86081924)	0.00112c(86072524)
60.0	0.00452 (86021124)	0.00401 (86040924)	0.00230 (86040924)	0.00119 (86010524)	0.00077 (86010524)
70.0	0.00417 (86030424)	0.00357 (86030424)	0.00232 (86022324)	0.00112 (86011924)	0.00081 (86022324)
80.0	0.00693 (86040924)	0.00528 (86040924)	0.00340 (86040924)	0.00149 (86040924)	0.00095 (86040824)
90.0	0.00956 (86010524)	0.00801 (86010524)	0.00453 (86010524)	0.00183 (86041624)	0.00122 (86041624)
100.0	0.00624 (86021524)	0.00535 (86021524)	0.00327 (86040924)	0.00164 (86040924)	0.00104 (86041724)
110.0	0.01380 (86030624)	0.01232 (86030624)	0.00770 (86030624)	0.00323 (86030624)	0.00195 (86012724)
120.0	0.01512 (86012724)	0.01125 (86012724)	0.00693 (86012724)	0.00297 (86012724)	0.00165 (86012724)
130.0	0.01454 (86012724)	0.01177 (86012724)	0.00721 (86012724)	0.00298 (86012724)	0.00174 (86012724)
140.0	0.01664 (86030124)	0.01199 (86030124)	0.00757 (86030124)	0.00330 (86030124)	0.00180 (86030124)
150.0	0.01301 (86012824)	0.01087 (86012824)	0.00681 (86012824)	0.00279 (86032124)	0.00161 (86011424)
160.0	0.01732 (86032224)	0.01404 (86032124)	0.00889 (86032124)	0.00369 (86032124)	0.00197 (86032124)
170.0	0.00845 (86032324)	0.00674 (86032324)	0.00440 (86032324)	0.00196 (86032324)	0.00112 (86032324)
180.0	0.01040 (86021324)	0.00880 (86032324)	0.00575 (86021324)	0.00231 (86032224)	0.00124 (86032224)
190.0	0.00771 (86032224)	0.00588 (86032224)	0.00370 (86032224)	0.00155 (86032224)	0.00090 (86013124)
200.0	0.00424 (86101924)	0.00351 (86021324)	0.00210 (86021324)	0.00103 (86042424)	0.00079 (86042424)
210.0	0.00844 (86032824)	0.00688 (86032824)	0.00420 (86032824)	0.00168 (86032824)	0.00100 (86032824)
220.0	0.01082 (86032424)	0.00821 (86032424)	0.00520 (86032424)	0.00219 (86032424)	0.00134 (86050424)
230.0	0.01734 (86051024)	0.01380 (86051024)	0.00884 (86051024)	0.00385 (86051024)	0.00243 (86060424)
240.0	0.02211 (86121424)	0.01908 (86121424)	0.01185 (86121424)	0.00470 (86121424)	0.00262 (86121424)
250.0	0.01893 (86010924)	0.01484 (86110824)	0.00937 (86010924)	0.00395 (86010924)	0.00212 (86010924)
260.0	0.01964 (86110724)	0.01726 (86110724)	0.01064 (86110724)	0.00413 (86110724)	0.00228 (86110724)
270.0	0.01613 (86030924)	0.01403 (86120824)	0.00856 (86120824)	0.00376 (86050524)	0.00247 (86050524)
280.0	0.02328 (86011724)	0.01984 (86011724)	0.01210 (86011724)	0.00498 (86050624)	0.00286 (86050624)
290.0	0.01218 (86052724)	0.01007 (86052724)	0.00628 (86052724)	0.00263 (86112524)	0.00183 (86091024)
300.0	0.01645 (86031024)	0.01278 (86112824)	0.00826 (86030924)	0.00375 (86030924)	0.00213 (86031024)
310.0	0.02338 (86031924)	0.01975 (86031924)	0.01238 (86031924)	0.00505 (86031924)	0.00289 (86031924)
320.0	0.02154 (86122324)	0.01675 (86031924)	0.01014 (86031924)	0.00403 (86122324)	0.00225 (86031924)
330.0	0.02632 (86020524)	0.02111 (86122324)	0.01367 (86122324)	0.00568 (86020524)	0.00328 (86122324)
340.0	0.01418 (86031424)	0.01181 (86031424)	0.00757 (86031424)	0.00310 (86032024)	0.00192 (86032024)
350.0	0.00820 (86032024)	0.00738 (86032024)	0.00475 (86032024)	0.00226 (86072924)	0.00150 (86052124)
360.0	0.00615 (86020824)	0.00517 (86020824)	0.00326 (86020824)	0.00182 (86122424)	0.00132 (86082024)

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE 2ND HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

*** NETWORK ID: POL1 ; NETWORK TYPE: GRIDPOLR ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

DIRECTION (DEGREES)	DISTANCE (METERS) 1000.00
10.0	0.00156 (86060724)
20.0	0.00112 (86073024)
30.0	0.00143 (86011024)
40.0	0.00162 (86081924)
50.0	0.00135 (86022324)
60.0	0.00095c(86062124)
70.0	0.00087 (86022324)
80.0	0.00105 (86040824)
90.0	0.00131 (86041624)
100.0	0.00122 (86041724)
110.0	0.00182 (86012724)
120.0	0.00159 (86041624)
130.0	0.00185 (86042224)
140.0	0.00165 (86050924)
150.0	0.00162 (86012824)
160.0	0.00192 (86122124)
170.0	0.00121c(86012424)
180.0	0.00129 (86011524)
190.0	0.00097 (86013124)
200.0	0.00085 (86012324)
210.0	0.00099 (86032824)
220.0	0.00141 (86101924)
230.0	0.00256 (86060424)
240.0	0.00276 (86091924)
250.0	0.00225 (86071724)
260.0	0.00241 (86110724)
270.0	0.00258 (86092524)
280.0	0.00287 (86050624)
290.0	0.00206 (86071224)
300.0	0.00237c(86062524)
310.0	0.00294 (86031924)
320.0	0.00223 (86031924)
330.0	0.00321 (86122324)
340.0	0.00198 (86032024)
350.0	0.00170 (86072924)
360.0	0.00130 (86082024)

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE MAXIMUM 50 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

** CONC OF SO2 IN MICROGRAMS/M**3 **

RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,	YR)	OF TYPE	RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,	YR)	OF TYPE
1.	0.06369	(86030116) AT (	76.60,	-64.28)	GP	26.	0.03668	(86122324) AT (	-100.00,	173.21)	GP
2.	0.05707	(86030124) AT (	86.60,	-50.00)	GP	27.	0.03665	(86031916) AT (	-153.21,	128.56)	GP
3.	0.05199	(86032208) AT (	64.28,	-76.60)	GP	28.	0.03627	(86031008) AT (	-86.60,	50.00)	GP
4.	0.04719	(86121416) AT (	-93.97,	-34.20)	GP	29.	0.03608	(86020416) AT (	-64.28,	76.60)	GP
5.	0.04655	(86020516) AT (	-50.00,	86.60)	GP	30.	0.03605	(86030116) AT (	64.28,	-76.60)	GP
6.	0.04633	(86031316) AT (	-76.60,	64.28)	GP	31.	0.03580	(86050616) AT (	-100.00,	0.00)	GP
7.	0.04628	(86011716) AT (	-98.48,	17.36)	GP	32.	0.03558	(86030924) AT (	-98.48,	17.36)	GP
8.	0.04582	(86031916) AT (	-76.60,	64.28)	GP	33.	0.03555	(86022816) AT (	128.56,	153.21)	GP
9.	0.04557	(86122324) AT (	-50.00,	86.60)	GP	34.	0.03517	(86031316) AT (	-153.21,	128.56)	GP
10.	0.04442	(86030124) AT (	173.21,	-100.00)	GP	35.	0.03503	(86031324) AT (	-64.28,	76.60)	GP
11.	0.04393	(86022816) AT (	64.28,	76.60)	GP	36.	0.03455	(86012624) AT (	76.60,	-64.28)	GP
12.	0.04376	(86030916) AT (	-86.60,	50.00)	GP	37.	0.03423	(86122316) AT (	-50.00,	86.60)	GP
13.	0.04361	(86030116) AT (	153.21,	-128.56)	GP	38.	0.03398	(86051016) AT (	-76.60,	-64.28)	GP
14.	0.04212	(86110816) AT (	-98.48,	-17.36)	GP	39.	0.03387	(86032508) AT (	-86.60,	-50.00)	GP
15.	0.04104	(86032208) AT (	128.56,	-153.21)	GP	40.	0.03375	(86032116) AT (	34.20,	-93.97)	GP
16.	0.04056	(86032216) AT (	34.20,	-93.97)	GP	41.	0.03352	(86051016) AT (	-93.97,	-34.20)	GP
17.	0.04014	(86032516) AT (	-86.60,	-50.00)	GP	42.	0.03336	(86110816) AT (	-196.96,	-34.73)	GP
18.	0.03984	(86030916) AT (	-98.48,	17.36)	GP	43.	0.03318	(86030916) AT (	-173.21,	100.00)	GP
19.	0.03901	(86122324) AT (	-64.28,	76.60)	GP	44.	0.03261	(86110816) AT (	-93.97,	-34.20)	GP
20.	0.03868	(86122316) AT (	-76.60,	64.28)	GP	45.	0.03259	(86032216) AT (	68.40,	-187.94)	GP
21.	0.03830	(86121416) AT (	-187.94,	-68.40)	GP	46.	0.03235	(86050616) AT (	-98.48,	17.36)	GP
22.	0.03829	(86031216) AT (	-50.00,	86.60)	GP	47.	0.03190	(86121116) AT (	-50.00,	86.60)	GP
23.	0.03751	(86020516) AT (	-100.00,	173.21)	GP	48.	0.03182	(86120624) AT (	-76.60,	-64.28)	GP
24.	0.03728	(86011716) AT (	-196.96,	34.73)	GP	49.	0.03168	(86032224) AT (	0.00,	-100.00)	GP
25.	0.03689	(86032416) AT (	-76.60,	-64.28)	GP	50.	0.03164	(86031216) AT (	-100.00,	173.21)	GP

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE MAXIMUM 50 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): 1 ,

** CONC OF SO2 IN MICROGRAMS/M**3 **

RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE			RANK	CONC	(YYMMDDHH) AT	RECEPTOR (XR,YR) OF TYPE		
1.	0.03397	(86030924) AT (	-98.48,	17.36)	GP	26.	0.02070	(86050624) AT (	-100.00,	0.00)	GP
2.	0.02968	(86032524) AT (	-86.60,	-50.00)	GP	27.	0.02059	(86031924) AT (	-64.28,	76.60)	GP
3.	0.02961	(86030124) AT (	86.60,	-50.00)	GP	28.	0.01984	(86011724) AT (	-196.96,	34.73)	GP
4.	0.02903	(86031324) AT (	-76.60,	64.28)	GP	29.	0.01975	(86031924) AT (	-153.21,	128.56)	GP
5.	0.02808	(86030124) AT (	76.60,	-64.28)	GP	30.	0.01973	(86121424) AT (	-187.94,	-68.40)	GP
6.	0.02730	(86030924) AT (	-196.96,	34.73)	GP	31.	0.01964	(86110724) AT (	-98.48,	-17.36)	GP
7.	0.02660	(86122324) AT (	-50.00,	86.60)	GP	32.	0.01929	(86030124) AT (	153.21,	-128.56)	GP
8.	0.02632	(86020524) AT (	-50.00,	86.60)	GP	33.	0.01908	(86121424) AT (	-173.21,	-100.00)	GP
9.	0.02611	(86031324) AT (	-64.28,	76.60)	GP	34.	0.01893	(86010924) AT (	-93.97,	-34.20)	GP
10.	0.02505	(86110824) AT (	-98.48,	-17.36)	GP	35.	0.01874	(86032224) AT (	128.56,	-153.21)	GP
11.	0.02435	(86032224) AT (	64.28,	-76.60)	GP	36.	0.01870	(86050624) AT (	-196.96,	34.73)	GP
12.	0.02433	(86032524) AT (	-173.21,	-100.00)	GP	37.	0.01795	(86110824) AT (	-93.97,	-34.20)	GP
13.	0.02415	(86121424) AT (	-93.97,	-34.20)	GP	38.	0.01764	(86032124) AT (	34.20,	-93.97)	GP
14.	0.02338	(86031924) AT (	-76.60,	64.28)	GP	39.	0.01761	(86030924) AT (	-295.44,	52.09)	GP
15.	0.02328	(86011724) AT (	-98.48,	17.36)	GP	40.	0.01755	(86050624) AT (	-200.00,	0.00)	GP
16.	0.02313	(86031324) AT (	-153.21,	128.56)	GP	41.	0.01738	(86032424) AT (	-153.21,	-128.56)	GP
17.	0.02311	(86020524) AT (	-100.00,	173.21)	GP	42.	0.01734	(86051024) AT (	-76.60,	-64.28)	GP
18.	0.02232	(86050624) AT (	-98.48,	17.36)	GP	43.	0.01732	(86032224) AT (	34.20,	-93.97)	GP
19.	0.02211	(86121424) AT (	-86.60,	-50.00)	GP	44.	0.01726	(86110724) AT (	-196.96,	-34.73)	GP
20.	0.02210	(86030124) AT (	173.21,	-100.00)	GP	45.	0.01705	(86032524) AT (	-93.97,	-34.20)	GP
21.	0.02187	(86032424) AT (	-76.60,	-64.28)	GP	46.	0.01684	(86030924) AT (	-86.60,	50.00)	GP
22.	0.02154	(86122324) AT (	-64.28,	76.60)	GP	47.	0.01675	(86031924) AT (	-128.56,	153.21)	GP
23.	0.02112	(86110824) AT (	-196.96,	-34.73)	GP	48.	0.01664	(86030124) AT (	64.28,	-76.60)	GP
24.	0.02111	(86122324) AT (	-100.00,	173.21)	GP	49.	0.01645	(86031024) AT (	-86.60,	50.00)	GP
25.	0.02086	(86031324) AT (	-128.56,	153.21)	GP	50.	0.01637	(86111424) AT (	-86.60,	-50.00)	GP

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.00186 AT (	-100.00,	0.00,	0.00,	0.00)	GP	POL1
	2ND HIGHEST VALUE IS	0.00175 AT (	-98.48,	17.36,	0.00,	0.00)	GP	POL1
	3RD HIGHEST VALUE IS	0.00174 AT (	-200.00,	0.00,	0.00,	0.00)	GP	POL1
	4TH HIGHEST VALUE IS	0.00169 AT (	-93.97,	-34.20,	0.00,	0.00)	GP	POL1
	5TH HIGHEST VALUE IS	0.00164 AT (	-98.48,	-17.36,	0.00,	0.00)	GP	POL1
	6TH HIGHEST VALUE IS	0.00158 AT (	-196.96,	34.73,	0.00,	0.00)	GP	POL1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.06369	ON 86030116: AT (	76.60,	-64.28,	0.00,	0.00)	GP	POL1
	HIGH 2ND HIGH VALUE IS	0.04582	ON 86031916: AT (	-76.60,	64.28,	0.00,	0.00)	GP	POL1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.03397	ON 86030924: AT (	-98.48,	17.36,	0.00,	0.00)	GP	POL1
	HIGH 2ND HIGH VALUE IS	0.02632	ON 86020524: AT (	-50.00,	86.60,	0.00,	0.00)	GP	POL1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** MODELING OPTIONS USED: CONC RURAL FLAT DFAULT

*** Message Summary For ISC2 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 116 Informational Message(s)

A Total of 116 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST2 Finishes Successfully ***
****

BEST AVAILABLE COPY

KOOGLER & A

ENVIRONMENT

4014 NW THIRTE

GAINESVILLE, FI

904/377-5822

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

DISTRICT ROUTING SLIP

TO: Isidore Goldman DATE: 4-13-93

			CC TO.
	PENSACOLA	**Northwest District**	
	PANAMA CITY	Northwest District Branch Office	
	TALLAHASSEE	Northwest District Branch Office	
	TAMPA	**Southwest District**	
	ORLANDO	**Central Florida District**	
	MELBOURNE	Central Florida District Branch Office	
	JACKSONVILLE	**Northeast District**	
	GAINESVILLE	Northeast District Branch Office	
	FORT MYERS	**South Florida District**	
	PUNTA GORDA	South Florida District Branch Office	
	MARATHON	South Florida District Branch Office	
X	WEST PALM BEACH	**Southeast Florida District**	
	PORT ST. LUCIE	Southeast Florida District Branch Office	

Reply Optional ☐ Date Due: ______ Reply Required ☑ Date Due: 5-10-93 Info Only ☐

COMMENTS:

Please submit comments by 5-10-93 to Bruce Mitchell. Hubos,

P.S. Supplement to the 1/27-29/93 test results.

FROM: C. H. Fancy TEL: SC/278-1344

VED

993

ment

Mr. Bruc
Florida
Enviro
Division
Twin Tow
2600 Bla
Tallahas

Subject:

Dear Mr.

Mike Va
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controlled with an electrostatic precipitator and the gases from both kilns discharge through a common stack. The results of the particulate matter emission measurements show emission rates of 19.37 pounds per hour under baseline conditions and 39.32 pounds per hour under WTDF/coal firing conditions. The difference in emissions, as we discussed with you, are normal day-to-day fluctuations in particulate matter emissions from the kilns. To demonstrate this fact, we reviewed compliance particulate matter test data from the two cement kilns for the past five years (1988-1992). These data are summarized in Table 1.

BEST AVAILABLE COPY

KOOGLER &
ENVIRONMEN
4014 NW THIR
GAINESVILLE,
904/377-5822

Department of Environmental Regulation

Routing and Transmittal Slip

To: (Name, Office, Location)

1. Patrick Wong
2. DERM
3.
4.

Remarks:

Please submit comments by 5-10-93 to Bruce Mitchell.

Thanks,

P.S. Supplement to the 1/27-29/93 test results.

From:	Date
C. H. Fancy	4-13-93
	Phone SC/278-1344

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Mr. Bruc
Florida
Enviro
Division
Twin Tow
2600 Bla
Tallahas

Subject:

Dear Mr.

Mike Var
March 31
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controlled with an electrostatic precipitator and the gases from both kilns discharge through a common stack. The results of the particulate matter emission measurements show emission rates of 19.37 pounds per hour under baseline conditions and 39.32 pounds per hour under WTDF/coal firing conditions. The difference in emissions, as we discussed with you, are normal day-to-day fluctuations in particulate matter emissions from the kilns. To demonstrate this fact, we reviewed compliance particulate matter test data from the two cement kilns for the past five years (1988-1992). These data are summarized in Table 1.

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 • FAX 377-7158

RECEIVED

APR 14 1993

Division of Air
Resources Management

KA 263-92-01

April 6, 1993

Mr. Tom Tittle
Florida Department of
Environmental Regulation
Southeast Florida District
1900 S. Congress Avenue
West Palm Beach, Florida 33406

Subject: TDF Emission Measurement Reports
Rinker Materials Corporation
Miami, Florida

Dear Mr. Tittle:

Enclosed are two reports describing the results of TDF testing at Rinker Materials Corporation in Miami, Florida on January 27-29, 1993. These reports are entitled:

Comparison of Particulate Matter, Metals, Carbon Monoxide, Total Hydrocarbons, Benzene, Sulfur Dioxide and Nitrogen Oxides Emission Rates and Plant Operating Conditions Under Coal and Coal/TDF Firing Conditions, and

Summary of Particulate Matter, Sulfur Dioxide, Total Hydrocarbons, Carbon Monoxide, Nitrogen Oxides, Metals and Benzene Emission Rates; Baseline and Coal/TDF Firing Conditions.

If you have any questions concerning the enclosed reports, please do not hesitate to give me a call.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler/mab

John B. Koogler, Ph.D., P.E.

JBK:mab

c: Mr. Michael Vardeman, Rinker Materials Corporation

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 ▪ FAX 377-7158

KA 263-92-01

April 6, 1993

Mr. Art Bolivar
Dade Environmental
Resources Management
801 S.W. 3rd Avenue
Miami, Fl 33130

Subject: TDF Emission Measurement Reports
Rinker Materials Corporation
Miami, Florida

Dear Mr. Bolivar:

Enclosed are two reports describing the results of TDF testing at Rinker Materials Corporation in Miami, Florida on January 27-29, 1993. These reports are entitled:

> Comparison of Particulate Matter, Metals, Carbon Monoxide, Total Hydrocarbons, Benzene, Sulfur Dioxide and Nitrogen Oxides Emission Rates and Plant Operating Conditions Under Coal and Coal/TDF Firing Conditions, and

> Summary of Particulate Matter, Sulfur Dioxide, Total Hydrocarbons, Carbon Monoxide, Nitrogen Oxides, Metals and Benzene Emission Rates; Baseline and Coal/TDF Firing Conditions.

If you have any questions concerning the enclosed reports, please do not hesitate to give me a call.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler /MAB

John B. Koogler, Ph.D., P.E.

JBK:mab

c: Mr. Michael Vardeman, Rinker Materials Corporation

RECEIVED

MAR 3 1 1993

Division of Air
Resources Management

COMPARISON OF PARTICULATE MATTER, METALS, CARBON MONOXIDE, TOTAL HYDROCARBONS, BENZENE, SULFUR DIOXIDE AND NITROGEN OXIDES EMISSION RATES AND PLANT OPERATING CONDITIONS UNDER COAL AND COAL/TDF FIRING CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

JANUARY 27-29, 1993

4-13-93

Spoke w Koogler's office: sending cover letters of the 1/27-29/93 tests to (1) Art Bolivar w DERM, and (2) Tom Tittle w SED.

RB

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 N.W. 13TH STREET
GAINESVILLE, FL 32609
(904) 377-5822

KOOGLER & ASSOCIATES

TABLE OF CONTENTS

KOOGLER & ASSOCIATES

To the best of my knowledge, all applicable field and analytical procedures comply with Florida Department of Environmental Regulation requirements and all test data and plant operating data are true and correct.

John B. Koogler, PH.D., P.E.

State of Florida
Registration No. 12925

3/30/93

Date

SEAL

KOOGLER & ASSOCIATES

1.0 SUMMARY

Rinker Materials Corporation (Rinker) operates a two-kiln wet process Portland cement plant in Dade County, southwest of Pembroke Pines. The plant is permitted under Florida Department of Environmental Regulation (FDER) Air Operating Permit A013-172954 and presently operates at a permitted kiln feed rate of 55 tons per hour (dry) per kiln for each kiln. Both kilns are normally fired with coal at an average heat input rate of about 200 MMBTU per hour and both kilns discharge through a common stack.

Rinker applied to FDER for approval to burn whole-tire derived fuel (TDF) as a supplemental heat source in the No. 1 cement kiln. On July 6, 1992, FDER issued an amendment to the referenced permit authorizing performance tests on the cement plant while using TDF to supply up to 40 percent of the heat input to the kiln.

During the period January 27-29, 1993, tests were conducted to evaluate plant operations and to measure air pollutant emissions from the plant while the No. 1 kiln was operating under baseline conditions (100 percent coal) and with whole-tire TDF supplying approximately 30 percent of the heat input to the kiln. During both sets of tests, Kiln No. 2 operated normally with 100 percent of the heat input supplied with coal. Tests were conducted with coal/TDF fuel during the period 1041-1730 on January 27, 1993. Following the completion of these tests, TDF firing terminated and both kilns were operated with coal providing 100 percent of the heat input. After a period of approximately 44 hours for the No. 1 Kiln to reach equilibrium, the baseline tests were conducted during the period 1352 to 1904 hours on January 29, 1993.

During the two test periods, the operations of the two kilns were consistent. Kiln oxygen levels, kiln temperatures and gas flow rates were within ranges normally encountered. Overall the combined emission rate of particulate matter, total hydrocarbons, nitrogen oxides, sulfur dioxide and carbon monoxide decreased from 1959 pounds per hour under baseline conditions to 1464 pounds per hour under coal/TDF conditions. The major reduction was in nitrogen oxides emissions. The testing demonstrates that the use of TDF to supply approximately 30 percent of the heat input to the No. 1 kiln has minimal affect on kiln operations and results in an overall reduction in air pollutant emissions.

In the following section, the results of emission measurements made under TDF/coal and baseline conditions are compared.

2.0 PLANT OPERATING CONDITIONS

The plant operating conditions that were monitored during the coal test periods were documented in the FDER approved Test Protocol. Plant operating parameters monitored during the baseline and TDF periods are summarized in Tables 1 and 2. A comparison of these data demonstrate that both kilns were operating under similar conditions during both test periods. The feed rate to both kilns and the clinker production rates were within the normal range of plant operations during the two test periods. During the baseline period, 100 percent of the heat input to Kiln No. 1 (177.9 MMBTU/hr) was provided with coal. During the coal/TDF test period, coal provided about 70.1 percent of the heat input to Kiln No. 1 (141.4 MMBTU/hr) and TDF provided the remaining 29.9 percent (60.3 MMBTU/hr). Kiln No. 2 operated under normal conditions with coal providing 100 percent of the heat input during both the baseline and coal/TDF tests.

Clinker and raw feed analyses for the baseline and TDF test periods are included in the Appendix.

TABLE 1

PLANT OPERATING PARAMETERS

BASELINE TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

	Run 1	Run 2	Run 3
Kiln No. 1			
Process weight, TPH	59.2	58.2	58.9
Coal rate, TPH	6.55	6.57	6.53
Heat input, BTU/hr	177.9	178.4	177.4
Clinker rate, TPH	36.1	35.5	35.9
Feed end temperature	270	272	280
Feed end oxygen	0.4	0.3	0.4
Kiln No. 2			
Process weight, TPH	59.1	58.2	57.9
Coal rate, TPH	6.47	6.41	6.40
Heat input, BTU/hr	175.7	174.1	173.8
Clinker rate, TPH	36.0	35.5	35.3
Feed end temperature	385	373	375
Feed end oxygen	2.5	2.6	2.6

TABLE 2

PLANT OPERATING PARAMETERS

TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

	Run 1	Run 2	Run 3
Kiln No. 1			
Process weight, TPH	56.2	55.2	55.4
Coal rate, TPH	5.60	5.52	5.55
Tire feed rate, tires/hr(1)	185.0	183.2	184.2
Heat Input, BTU/hr			
Coal	142.5	140.5	141.3
TDF	60.6	60.0	60.3
Total	203.1	200.5	201.6
Clinker rate, TPH	34.3	33.7	33.8
Feed end temperature	415	425	425
Feed end oxygen	2.4	2.5	3.1
Kiln No. 2			
Process weight, TPH	55.5	55.7	55.1
Coal rate, TPH	7.59	7.45	7.72
Heat Input, BTU/hr	193.2	189.6	196.5
Clinker rate, TPH	34.0	34.1	33.7
Feed end temperature	390	396	388
Feed end oxygen	2.3	2.1	1.8

(1) Tire weight averages 20 pounds/tire

3.0 PARTICULATE MATTER EMISSION COMPARISON

Particulate matter emission rates were measured during the baseline period on January 29, 1993, and during the coal/TDF firing period on January 27, 1993. Under both sets of operating conditions, the particulate matter emission rate was well below the permitted emission rate of 66 pounds per hour for the two kiln operation and within the range of particulate matter emissions measured from the kilns on other occasions.

The data presented in Table 3 show an average emission rate of 39.32 pounds per hour during the coal/ TDF period and an emission rate of 19.37 pounds per hour during the baseline period. Both of these emission rates are within the range of particulate matter emissions observed during previous tests. The apparent increase under coal/TDF conditions is most likely related to the higher gas flow rate measured under these conditions.

TABLE 3

COMPARISON OF PARTICULATE MATTER EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

PM

Run	Baseline lb/hr	TDF lb/hr
1	19.54	40.50
2	19.41	38.96
3	19.16	38.51
Mean	19.37	39.32
S var	0.04	1.09
n	3.00	3.00
Pooled est	0.75	
t stat.	32.56	
t' (95% C.I.)	2.13	
Difference is significant		

KOOGLER & ASSOCIATES

4.0 METALS EMISSION RATES

The emission rates of antimony, arsenic, beryllium, cadmium, total chromium, copper, lead, mercury, nickel, selenium, silver, and zinc were measured with the EPA multi-metals train (EPA SW846-0012). The measurements under baseline operating conditions were made on January 29, 1993, and the measurements under coal/TDF conditions were made on January 27, 1993. The emission rates measured under the two sets of conditions are summarized in the following table:

Metal	Baseline Average Emissions (lb/hr)	TDF Average Emissions (lb/hr)
Date	January 29, 1993	January 27, 1993
Chromium	0.0111	0.0084
Copper	0.0015	0.0064*
Lead	0.0171	0.0291*
Mercury	0.0092	0.0108
Nickel	0.0026	0.0036
Zinc	0.7359*	0.3297

*Significantly greater

A statistical comparison of these data (Tables 5A-5F) demonstrate there is no difference in the emission rates of chromium, mercury and nickel. Statistically however, the emission rate of copper and lead measured under coal/TDF conditions was significantly different than the emission rate measured under the baseline firing conditions. In all probability, the apparent increase in copper and lead emissions was due to the higher stack gas flow rate measured under coal/TDF conditions.

The emission rate of zinc under coal/TDF conditions was significantly less than the emission rate measured under baseline conditions. This could be the result of variability in an unusually high background level of zinc in the filters used with the multi-metals sampling train.

Stack gas concentrations of antimony, arsenic, beryllium, cadmium, selenium, and silver were below the detection limit under both the TDF and baseline conditions. It can only be concluded that the emission rates of these metals are not significant under either set of operating conditions.

It can be concluded that the use of TDF to supply approximately 30 percent of the heat input to the No. 1 cement kiln probably has no effect on metals emissions. The apparent increase in the emission rate of some metals was in all probability, due to the higher stack gas flow rates experienced during the coal/TDF tests (see Sections 2.0 and 3.0). There are no permit limits on the emission rates of any metal.

TABLE 5A

COMPARISON OF CHROMIUM EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Chromium

Run	Baseline lb/hr	TDF lb/hr
1	0.0035	0.0084
2	0.0136	0.0106
3	0.0161	0.0053
Mean	0.0111	0.0081
S var	0.00	0.00
n	3.00	3.00
Pooled est	0.01	
t stat.	0.72	
t' (95% C.I.)	2.13	
Difference is not significant		

KOOGLER & ASSOCIATES

TABLE 5B

COMPARISON OF COPPER EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Copper

Run	Baseline lb/hr	TDF lb/hr
1	0.0009	0.0080
2	0.0008	0.0074
3	0.0028	0.0038
Mean	0.0015	0.0064
S var	0.00	0.00
n	3.00	3.00
Pooled est	0.00	
t stat.	3.35	
t' (95% C.I.)	2.13	
Difference is significant		

KOOGLER & ASSOCIATES

TABLE 5C

COMPARISON OF LEAD EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Lead

Run	Baseline lb/hr	TDF lb/hr
1	0.0156	0.0304
2	0.0177	0.0268
3	0.0181	0.0301
Mean	0.0171	0.0291
S var	0.00	0.00
n	3.00	3.00
Pooled est	0.00	
t stat.	8.61	
t' (95% C.I.)	2.13	
Difference is significant		

KOOGLER & ASSOCIATES

TABLE 5D

COMPARISON OF MERCURY EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Mercury

Run	Baseline lb/hr	TDF lb/hr
1	0.0172	0.0114
2	0.0056	0.0136
3	0.0047	0.0073
Mean	0.0092	0.0108
S var	0.0000	0.0000
n	3	3
Pooled est	0.0054	
t stat.	0.361	
t' (95% C.I.)	2.130	
Difference is not significant		

KOOGLER & ASSOCIATES

TABLE 5E

COMPARISON OF NICKEL EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Nickel

Run	Baseline lb/hr	TDF lb/hr
1	0.0009	0.0047
2	0.0029	0.0042
3	0.0040	0.0019
Mean	0.0026	0.0036
S var	0.0000	0.0000
n	3	3
Pooled est	0.0015	
t stat.	0.799	
t' (95% C.I.)	2.130	
Difference is not significant		

KOOGLER & ASSOCIATES

TABLE 5F

COMPARISON OF ZINC EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Zinc

Run	Baseline lb/hr	TDF lb/hr
1	0.8902	0.0535
2	0.6006	0.4871
3	0.7168	0.4485
Mean	0.7359	0.3297
S var	0.02	0.06
n	3.00	3.00
Pooled est	0.20	
t stat.	2.51	
t' (95% C.I.)	2.13	
Difference is significant		

KOOGLER & ASSOCIATES

5.0 TOTAL HYDROCARBONS

The total hydrocarbon concentration in the stack gas of the plant was measured for a 10 hour period under baseline conditions and for a 10 hour period under coal/TDF firing conditions using EPA Method 25A as described in 40CFR60, Appendix A. The average emission rate under baseline conditions was 11.50 pounds per hour while the average emission rate under coal/TDF firing conditions was 14.13 pounds per hour. The difference in the emission rates is not statistically significant (Table 6). It can be concluded that the use of TDF does not affect total hydrocarbon emissions from the plant.

TABLE 6

COMPARISON OF TOTAL HYDROCARBONS EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Method 25A
THC

Run	Baseline lb/hr	TDF lb/hr
1	11.30	10.20
2	12.20	14.40
3	11.00	17.80
Mean	11.50	14.13
S var	0.39	14.49
n	3.00	3.00
Pooled est	2.73	
t stat.	1.18	
t' (95% C.I.)	2.13	
Difference is not significant		

KOOGLER & ASSOCIATES

6.0 NITROGEN OXIDES

The nitrogen oxides concentration in the stack gas from the plant was measured for a 10 hour period under baseline conditions and for a 10 hour period under coal/TDF firing conditions. The method of sampling was EPA Method 7E, 40CFR60, Appendix A. The mass emission rates were calculated using stack gas flow rates measured during each day of monitoring.

These data, summarized in Table 7, show an average nitrogen oxides emission rate under baseline conditions of 1182 pounds per hour and an average emission rate of 926 pounds per hour under coal/TDF firing conditions. Statistically, there is no significant difference in these emission rates. Thus, it can be concluded that the use of TDF in the cement plant does not affect nitrogen oxides emissions from the plant.

TABLE 7

COMPARISON OF NITROGEN OXIDES EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Method 7E
NOx

Run	Baseline lb/hr	TDF lb/hr
1	883.00	1033.00
2	1233.00	913.00
3	1431.00	832.00
Mean	1182.33	926.00
S var	77001.33	10227.00
n	3.00	3.00
Pooled est	208.84	
t stat.	1.50	
t' (95% C.I.)	2.13	
Difference is not significant		

7.0 SULFUR DIOXIDE

The sulfur dioxide concentration in the stack gas from the cement plant was measured for an eight hour period under baseline conditions and for an eight hour period under coal/TDF firing conditions. The method of sampling was EPA Method 6C, 40CFR60, Appendix A. The mass emission rates were calculated using stack gas flow rates measured each day of monitoring. The data are summarized in Table 8A and show an average sulfur dioxide emission rate under baseline conditions of 320 pounds per hour and an average emission rate of 249 pounds per hour under coal/TDF firing conditions.

In addition, sulfur dioxide was measured using EPA Method 6, 40CFR60, Appendix A. These data are summarized in Table 8B and show an average sulfur dioxide emission rate under baseline conditions of 380 pounds per hour and an average emission rate of 326 pounds per hour under TDF/coal firing conditions.

Statistically, there is no significant difference in either set of emission rates. Thus, it can be concluded that the use of TDF in the cement plant does not affect sulfur dioxide emissions from the Rinker cement plant.

TABLE 8A

COMPARISON OF SULFUR DIOXIDE EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Method 6C
SO2

Run	Baseline lb/hr	TDF lb/hr
1	286.00	186.00
2	342.00	183.00
3	333.00	378.00
Mean	320.33	249.00
S var	904.33	12483.00
n	3.00	3.00
Pooled est	81.81	
t stat.	1.07	
t' (95% C.I.)	2.13	
Difference is not significant		

TABLE 8B

COMPARISON OF SULFUR DIOXIDE EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Method 6
SO2

Run	Baseline lb/hr	TDF lb/hr
1	378.21	248.64
2	395.74	276.66
3	365.18	452.43
Mean	379.71	325.91
S var	235.17	12201.76
n	3.00	3.00
Pooled est	78.86	
t stat.	0.84	
t' (95% C.I.)	2.13	
Difference is not significant		

KOOGLER & ASSOCIATES

8.0 CARBON MONOXIDE

The carbon monoxide concentration in the stack gas was continuously monitored for a 10 hour period during baseline conditions and a 10 hour period during coal/TDF firing conditions. The carbon monoxide concentration was monitored in accordance with EPA Method 10, 40CFR60, Appendix A. The mass emission rates of carbon monoxide were calculated using stack gas flow rates measured during each day of monitoring.

The carbon monoxide emission data summarized in Table 9 show an emission rate of 426 pounds per hour under baseline conditions and an emission rate of 235 pounds per hour under coal/TDF firing conditions. Statistically, the carbon monoxide emission rate under coal/TDF firing conditions is significantly less than the emission rate measured under baseline conditions.

TABLE 9

COMPARISON OF CARBON MONOXIDE EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Method 10
CO

Run	Baseline lb/hr	TDF lb/hr
1	464.00	198.00
2	435.00	247.00
3	379.00	259.00
Mean	426.00	234.67
S var	1867.00	1044.33
n	3.00	3.00
Pooled est	38.15	
t stat.	6.14	
t' (95% C.I.)	2.13	
Difference is significant		

KOOGLER & ASSOCIATES

9.0 BENZENE

The emission rate of benzene was measured under both baseline and coal/TDF firing conditions using the VOST system as described in EPA Method M-0300. This method is also an equivalent EPA Method 18, 40CFR60, Appendix A. The mass emission rates of benzene were calculated using stack gas flow rates measured during each day of monitoring.

The benzene emission data summarized in Table 10 show an emission rate of 0.0196 pounds per hour under baseline conditions and an emission rate of 0.0695 pounds per hour under coal/TDF firing conditions. Statistically, the benzene emission rate under coal/TDF firing conditions is significantly greater than the emission rate measured under baseline conditions.

TABLE 10

COMPARISON OF BENZENE EMISSION RATE

BASELINE AND TDF TEST CONDITIONS

RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

Benzene

Run	Baseline lb/hr	TDF lb/hr
1	0.0116	0.0838
2	0.0217	0.0679
3	0.0255	0.0578
Mean	0.0196	0.0698
S var	0.0001	0.0002
n	3	3
Pooled est	0.0106	
t stat.	5.821	
t' (95% C.I.)	2.130	
Difference is significant		

KOOGLER & ASSOCIATES

10.0 STACK GAS FLOW TEMPERATURE AND MOISTURE

The stack gas flow rate temperature and moisture were measured during three test runs under baseline conditions and three test runs under coal/TDF firing conditions. The stack gas flow rate averaged 120,109 dscfm under baseline conditions and 130,377 dscfm under coal/TDF firing conditions. The stack gas temperature averaged 274°F under baseline conditions and 329°F under TDF conditions and the stack gas moisture ranged from 31.4 percent under baseline conditions to 32.1 percent under coal/TDF firing conditions. Although there are differences in the stack gas flow rates, temperatures and moistures, all of the stack gas parameters are within ranges normally observed. It should be noted that these stack gas parameters represent the operation of two kilns.

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 ▪ FAX 377-7158

KA 263-92-02

May 21, 1993

Mr. Bruce Mitchell
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RECEIVED
DER - MAIL ROOM
1993 MAY 24 AM 11:13

Subject: Amendment to Operation Permit No. A013-172954 to Burn Whole Tires in Combination with Coal
Rinker Materials Corporation
Miami, Florida

Dear Mr. Mitchell:

This letter is to request an amendment to Rinker's air construction permit for Kiln No. 1 to allow the continuous burning of whole tires in combination with coal, in accordance with the terms of the agreement with FDER dated December 14, 1992 (copy attached).

It is our understanding that an operating permit amendment fee is not necessary per Rule 17-213.210, FAC; however, the requested amendment to the air construction permit will require a $250.00 fee. A check in this amount is attached hereto.

If you have any questions concerning this request, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler wa

John B. Koogler, Ph.D., P.E.

JBK:PAR:wa
Enc.

c: Mr. Mike Vardeman, Rinker

001031

Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

December 16, 1992

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. James S. Jenkins III
Vice President-Cement Operations
Rinker Materials Corporation
Post Office Box 650679
Miami, Florida 33265-0679

Dear Mr. Jenkins:

Re: Amendment to Operation Permit No. AO 13-172954 to Allow 45 Days of Additional Time to Conduct Performance Test(s) on the Facility's No. 1 Cement Kiln While Burning Whole Tires in Combination with Coal

The Department has reviewed the request that Rinker Materials Corporation (RMC) provided on October 22, 1992, requesting 45 days of additional time to conduct tests on the No. 1 cement kiln for various pollutants, which were previously established in an amendment authorization to conduct performance tests issued July 14, 1992; also, an amendment was issued on September 8, 1992, requiring testing for the pollutant, benzene. We have also considered the Department's legal authority to allow you to conduct the requested performance test(s). Paragraph 403.061(15), Florida Statutes (F.S.), authorizes the Department to consult with any person proposing to construct, install, or otherwise acquire a pollution control device or system concerning the efficacy of such device or system, or the pollution problem which may be related to the source, device, or system. Paragraph 403.061(16), F.S., authorizes the Department to encourage voluntary cooperation by persons in order to achieve the purposes of the state environmental control act. Paragraph 403.061(18), F.S., authorizes the Department to encourage and conduct studies, investigations, and research relating to the causes and control of pollution. Florida Administrative Code (F.A.C.) Rule 17-210.700(5) authorizes the Department to consider variations in industrial equipment and make allowances for excess emissions that provide practical regulatory controls consistent with the public interest.

In accordance with the provisions of Paragraphs 403.061(15), (16) and (18), F.S., F.A.C. Rule 17-210.700(5), and F.A.C. Chapters 17-2, 17-210 thru 17-297, and 17-4, you are hereby granted 45 days of additional time to conduct tests on the No. 1 cement kiln for various pollutant, which were previously established in an amendment authorization to conduct performance tests issued on July 14, 1992; also, an amendment was issued on September 8, 1992, requiring testing for the pollutant benzene. The project will take place at the permittee's facility located in Miami, Dade County, Florida.

o Attachments (See Attachment Section) are incorporated.

The Department has relied on the information referenced in the Attachments and conversations with representatives of the RMC, the Southeast District, and the Dade County Department of Environmental Resources Management in authorizing this letter amendment to the air operation permit, No. AO 13-172954.

A copy of this letter and its Attachments must be attached to the air operation permit, No. AO 13-172954, and shall become a part of the permit.

Issued this 14th day
of December, 1992

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Howard L. Rhodes for
Carol M. Browner
Secretary

CMB/bm

Attachments

cc: S. Brooks, SED
P. Wong, DERM
J. Koogler, Ph.D., P.E., K&A
B. Mitchell, NPS
J. Harper, EPA
D. Beason, Esq., DER
M. Vardeman, RMC

Attachment Section

1. Dr. John B. Koogler's letter with Enclosure dated April 15, 1992.
2. Mr. C. H. Fancy's letter dated April 24, 1992.
3. Dr. John B. Koogler's letter with Enclosure received May 7, 1992.
4. 40 CFR (July, 1991 version).
5. Ms. Jewell A. Harper's letter dated April 9, 1990.
6. Intent to Issue package dated May 21, 1992.
7. Mr. Michael D. Vardeman's letter received June 22, 1992.
8. Final Determination and Letter of Authorization dated July 14, 1992.
9. Mr. Howard L. Rhodes's letter dated September 8, 1992.
10. Dr. John B. Koogler's letter and processing fee received October 22, 1992.
11. Intent to Issue package dated November 3, 1992.
12. Mr. Michael D. Vardeman's letter and Public Notice received November 20, 1992.
13. Final Determination dated December 16, 1992.

Attachment 12

BEST AVAILABLE COPY

CSR Rinker Materia

November 16, 1992

Rinker Materials Corporation
1200 N.W. 137th Avenue
Miami, FL 33182

P.O. Box 650679
Miami, FL 33265-0679

Facsimile (305) 223-5403
Telephone (305) 221-7645

FLORIDA DEPARTMENT OF AIR REGULATION
Att: Clair Fancy, Director
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Notice of Intent to Issue

Dear Mr. Fancy:

Enclosed is the notarized Notice of Intent to Issue published November 9, 1992 for the amendment to AO 13-172954.

If I can be of any further assistance please contact me at 1-305-221-7645.

Very truly yours,

Michael D. Vardeman
Manager Materials Substitution

MDV:lg

cc: Stephanie Brooks, FDER - West Palm Beach
Isidore Goldman, FDER - West Palm Beach
Bruce Mitchell, FDER, Tallahassee
Pat Wong, Dade County Environmental Resource Management

MIAMI REVIEW

Published Daily except Saturday, Sunday and Legal Holidays

Miami, Dade County, Florida.

STATE OF FLORIDA
COUNTY OF DADE:

Before the undersigned authority personally appeared Octelma V. Ferbeyre, who on oath says that she is the Supervisor of Legal Advertising of the Miami Review, a daily (except Saturday, Sunday and Legal Holidays) newspaper, published at Miami in Dade County, Florida; that the attached copy of advertisement, being a Legal Advertisement of Notice in the matter of

STATE OF FLORIDA
NOTICE OF INTENT TO ISSUE
AMENDMENT TO AO 13-172954
RINKER MATERIALS CORPORATION

X X X

in the .... Court,

was published in said newspaper in the issues of

November 9, 1992

Affiant further says that the said Miami Review is a newspaper published at Miami in said Dade County, Florida, and that the said newspaper has heretofore been continuously published in said Dade County, Florida, each day (except Saturday, Sunday and Legal Holidays) and has been entered as second class mail matter at the post office in Miami in said Dade County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Sworn to and subscribed before me this

9th day of November, A.D. 19 92

(SEAL)

Octelma V. Ferbeyre personally known to me.

OFFICIAL NOTARY SEAL
CRISTINA INGELMO
COMMISSION NO. CC101051
MY COMMISSION EXP. APR. 5,1995

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL REGULATION
NOTICE OF INTENT TO ISSUE
AMENDMENT TO AO 13-172954

The Department of Environmental Regulation hereby gives notice of its intent to issue a permit amendment to Rinker Materials Corporation (RMC), Post Office Box 650679, Miami, Florida 33265-0679, to allow 45 days of additional time to conduct performance tests on the facility's No. 1 cement kiln for various pollutant emissions, which were previously established in the amendment authorization to conduct performance tests issued July 14, 1992; also, an amendment was issued on September 8, 1992, requiring testing for the pollutant, benzene. The additional time is being recommended for approval because of the time lost due to the effects of Hurricane Andrew. The proposed project will occur at the applicant's facility located at 1200 Northwest 137th Avenue in Miami, Dade County, Florida. The Department is issuing this Intent to Issue for the reasons stated in the proposed letter amendment to air operation permit, No. AO 13-172954.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information:

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by Petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the applications have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate at a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application is available for public inspection during business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Regulation
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Department of Environmental Regulation
Southeast District Office
1900 S. Congress Avenue, Suite A
West Palm Beach, Florida 33406

Dade County Department of Environmental Resources Management
801 S.W. 3rd Avenue, 2nd Floor
Miami, Florida 33130

Any person may send written comments on the proposed action to Mr. Preston Lewis at the Department's Tallahassee address. All comments received within 14 days of the publication of this notice will be considered in the Department's final determination.

11/9 92-4-110910M

Attachment 13

Final Determination

The operation permit amendment application package has been reviewed by the Department. Public Notice of the Department's Intent to Issue was published in the MIAMI REVIEW on November 9, 1992. The Intent to Issue was distributed on November 3, 1992, and available for public inspection at the Department's Southeast District office, the Department's Bureau of Air Regulation office, and the Dade County's Department of Environmental Resources Management office.

There were no comments received during the public notice period. Therefore, it is recommended that the operation permit amendment be issued as drafted.

KOOGLER & ASSOCIATES
4014 N.W. 13TH ST. 377-5822
GAINESVILLE, FL 32609

6787

[redacted] Branch 320

5/21 1993

PAY TO THE ORDER OF Florida Department of Environmental Regulation $ 250.00

Two Hundred Fifty 00/100 DOLLARS

FIRST UNION First Union National Bank of Florida Gainesville, Florida 32601

FOR Permit A013-172954 Amendment

[redacted]

Mr. Bruce Mitchell
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RECEIVED
DER - MAIL ROOM
1993 MAY 24 AM 11:13

Subject: Amendment to Operation Permit No. A013-172954 to Burn Whole Tires in Combination with Coal
Rinker Materials Corporation
Miami, Florida

Dear Mr. Mitchell:

This letter is to request an amendment to Rinker's air construction permit for Kiln No. 1 to allow the continuous burning of whole tires in combination with coal, in accordance with the terms of the agreement with FDER dated December 14, 1992 (copy attached).

It is our understanding that an operating permit amendment fee is not necessary per Rule 17-213.210, FAC; however, the requested amendment to the air construction permit will require a $250.00 fee. A check in this amount is attached hereto.

If you have any questions concerning this request, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler wa

John B. Koogler, Ph.D., P.E.

JBK:PAR:wa
Enc.

c: Mr. Mike Vardeman, Rinker

001031

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 ▪ FAX 377-7158

RECEIVED
MAY 20 1993
Division of Air
Resources Management

KA 263-92-02

May 19, 1993

Mr. Bruce Mitchell
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Amendment to Operation Permit No. A013-172954 to Burn Whole Tires in Combination with Coal
Rinker Materials Corporation
Miami, Florida

Dear Mr. Mitchell:

This letter is to request an amendment to Permit No. A013-172954 to allow the burning of whole tires in combination with coal, in accordance with the terms of the agreement with FDER dated December 14, 1992.

It is our understanding that a permit amendment fee is not necessary per Rule 17-213.210, FAC.

If you have any questions concerning this request, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler wa

John B. Koogler, Ph.D., P.E.

JBK:PAR:wa

c: Mr. Mike Vardeman, Rinker

METROPOLITAN DADE COUNTY, FLORIDA

METRO-DADE

DERM

ENVIRONMENTAL RESOURCES MANAGEMENT
33 S.W. 2nd AVENUE
MIAMI, FLORIDA 33130-1540
(305) 372-6789

May 13, 1993

Mr. Bruce Mitchell
State of Florida DER
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Benzene Emissions From Tire Burning at Rinker Materials Cement Plant

Attached for your review are the input data and results obtained from the computer screening model TSCREEN2 utilized to calculate the concentration of benzene emissions from the Rinker facility in Dade County when tires are burnt in kiln #1.

The results show that the maximum ambient concentration of benzene expected, 0.0049 ug/m**3 , is well below the State of Florida No-Threat Levels which are 7.2 ug/m**3 for TWA 24 hours and 0.12 ug/m**3 TWA annual concentrations. DERM therefore does not anticipate any detrimental effects to the local air quality or to the public health.

If you have any questions on the above, please call Mr. Frank Echanique of my staff at (305) 372-6943.

Sincerely,

H. Patrick Wong, Chief
Air Section

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MAY 19 1993

Division of Air
Resources Management

benzene Rinker

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05-12-93
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 *** SCREEN-1.2 MODEL RUN ***
 *** VERSION DATED  91/10 ***

BENZENE 5/12/93

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =    POINT
   EMISSION RATE (G/S)        =    .2522E-02
   STACK HEIGHT (M)           =    41.75
   STK INSIDE DIAM (M)        =     4.57
   STK EXIT VELOCITY (M/S)=        7.6200
   STK GAS EXIT TEMP (K)  =       408.00
   AMBIENT AIR TEMP (K)   =       293.00
   RECEPTOR HEIGHT (M)    =          .00
   IOPT (1=URB,2=RUR)     =        2
   BUILDING HEIGHT (M)    =          .00
   MIN HORIZ BLDG DIM (M) =          .00
   MAX HORIZ BLDG DIM (M) =          .00
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     *** SUMMARY OF SCREEN MODEL RESULTS ***
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CALCULATION PROCEDURE	MAX CONC (UG/M**3)	MAX CONC (PPM)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	.4959E-02	0.000002	1091.	0.

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** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
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BUOY. FLUX =   109.97 M**4/S**3;   MOM. FLUX =   217.72 M**4/S**2.

*** FULL METEOROLOGY ***

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*** SCREEN AUTOMATED DISTANCES ***
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*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
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DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
50.	.5968E-17	5	1.0	1.6	5000.0	162.3	18.3	18.1	NO
100.	.7614E-07	5	1.0	1.6	5000.0	162.3	29.3	28.8	NO
200.	.8205E-05	5	1.0	1.6	5000.0	162.3	36.3	35.0	NO
300.	.1989E-04	3	10.0	11.5	3200.0	90.4	35.3	22.0	NO
400.	.3582E-03	1	3.0	3.3	960.0	237.6	99.4	79.7	NO
500.	.1926E-02	1	3.0	3.3	960.0	237.6	120.5	112.6	NO
600.	.3589E-02	1	3.0	3.3	960.0	237.6	140.9	161.0	NO
700.	.3814E-02	1	3.0	3.3	960.0	237.6	161.0	219.6	NO
800.	.3501E-02	3	10.0	11.5	3200.0	90.4	85.7	52.4	NO
900.	.4136E-02	1	1.0	1.1	630.4	629.4	253.7	400.1	NO
1000.	.4802E-02	1	1.0	1.1	630.4	629.4	267.9	483.9	NO

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1100.	.4958E-02	1	1.0	1.1	630.4	629.4	282.3	580.1	NO
1200.	.4834E-02	1	1.0	1.1	630.4	629.4	297.1	688.4	NO
1300.	.4626E-02	1	1.0	1.1	630.4	629.4	312.0	808.5	NO
1400.	.4416E-02	1	1.0	1.1	630.4	629.4	327.0	940.3	NO
1500.	.4220E-02	1	1.0	1.1	630.4	629.4	342.2	1083.7	NO
1600.	.4040E-02	1	1.0	1.1	630.4	629.4	357.4	1238.7	NO
1700.	.3875E-02	1	1.0	1.1	630.4	629.4	372.7	1405.4	NO
1800.	.3721E-02	1	1.0	1.1	630.4	629.4	388.0	1583.7	NO
1900.	.3580E-02	1	1.0	1.1	630.4	629.4	403.4	1773.7	NO
2000.	.3448E-02	1	1.0	1.1	630.4	629.4	418.8	1975.4	NO
2100.	.3326E-02	1	1.0	1.1	630.4	629.4	434.1	2188.8	NO
2200.	.3213E-02	1	1.0	1.1	630.4	629.4	449.5	2414.0	NO
2300.	.3107E-02	1	1.0	1.1	630.4	629.4	464.8	2651.1	NO
2400.	.3007E-02	1	1.0	1.1	630.4	629.4	480.2	2900.0	NO
2500.	.2915E-02	1	1.0	1.1	630.4	629.4	495.5	3160.9	NO
2600.	.2827E-02	1	1.0	1.1	630.4	629.4	510.8	3433.7	NO
2700.	.2745E-02	1	1.0	1.1	630.4	629.4	526.0	3718.6	NO
2800.	.2668E-02	1	1.0	1.1	630.4	629.4	541.2	4015.6	NO
2900.	.2595E-02	1	1.0	1.1	630.4	629.4	556.4	4324.7	NO
3000.	.2526E-02	1	1.0	1.1	630.4	629.4	571.6	4645.9	NO
3500.	.2497E-02	2	1.0	1.1	630.4	629.4	498.0	463.5	NO
4000.	.2445E-02	2	1.0	1.1	630.4	629.4	553.4	527.6	NO
4500.	.2313E-02	2	1.0	1.1	630.4	629.4	608.5	593.4	NO
5000.	.2158E-02	2	1.0	1.1	630.4	629.4	663.1	660.6	NO
5500.	.2008E-02	2	1.0	1.1	630.4	629.4	717.3	729.0	NO
6000.	.1872E-02	2	1.0	1.1	630.4	629.4	771.0	798.3	NO
6500.	.1946E-02	5	1.0	1.6	5000.0	162.3	279.1	72.3	NO
7000.	.2042E-02	5	1.0	1.6	5000.0	162.3	297.9	74.5	NO
7500.	.2124E-02	5	1.0	1.6	5000.0	162.3	316.7	76.6	NO
8000.	.2191E-02	5	1.0	1.6	5000.0	162.3	335.2	78.6	NO
8500.	.2247E-02	5	1.0	1.6	5000.0	162.3	353.7	80.6	NO
9000.	.2292E-02	5	1.0	1.6	5000.0	162.3	372.0	82.5	NO
9500.	.2327E-02	5	1.0	1.6	5000.0	162.3	390.3	84.4	NO
10000.	.2354E-02	5	1.0	1.6	5000.0	162.3	408.4	86.2	NO
15000.	.2289E-02	5	1.0	1.6	5000.0	162.3	584.4	101.6	NO
20000.	.2070E-02	5	1.0	1.6	5000.0	162.3	753.1	114.6	NO
25000.	.1817E-02	5	1.0	1.6	5000.0	162.3	916.3	123.8	NO
30000.	.1610E-02	5	1.0	1.6	5000.0	162.3	1075.1	131.9	NO
40000.	.1301E-02	5	1.0	1.6	5000.0	162.3	1382.2	146.0	NO
50000.	.1106E-02	6	1.0	2.2	5000.0	132.7	1117.7	83.3	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 50. M:

1091.	.4959E-02	1	1.0	1.1	630.4	629.4	280.9	570.0	NO

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DIST      = DISTANCE FROM THE SOURCE
CONC      = MAXIMUM GROUND LEVEL CONCENTRATION
STAB      = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M      = WIND SPEED AT THE 10-M LEVEL
USTK      = WIND SPEED AT STACK HEIGHT
MIX HT    = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
SIGMA Y = LATERAL DISPERSION PARAMETER
SIGMA Z = VERTICAL DISPERSION PARAMETER
DWASH     = BUILDING DOWNWASH:
            DWASH=   MEANS NO CALC MADE (CONC = 0.0)
            DWASH=NO MEANS NO BUILDING DOWNWASH USED
            DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
            DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
            DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB
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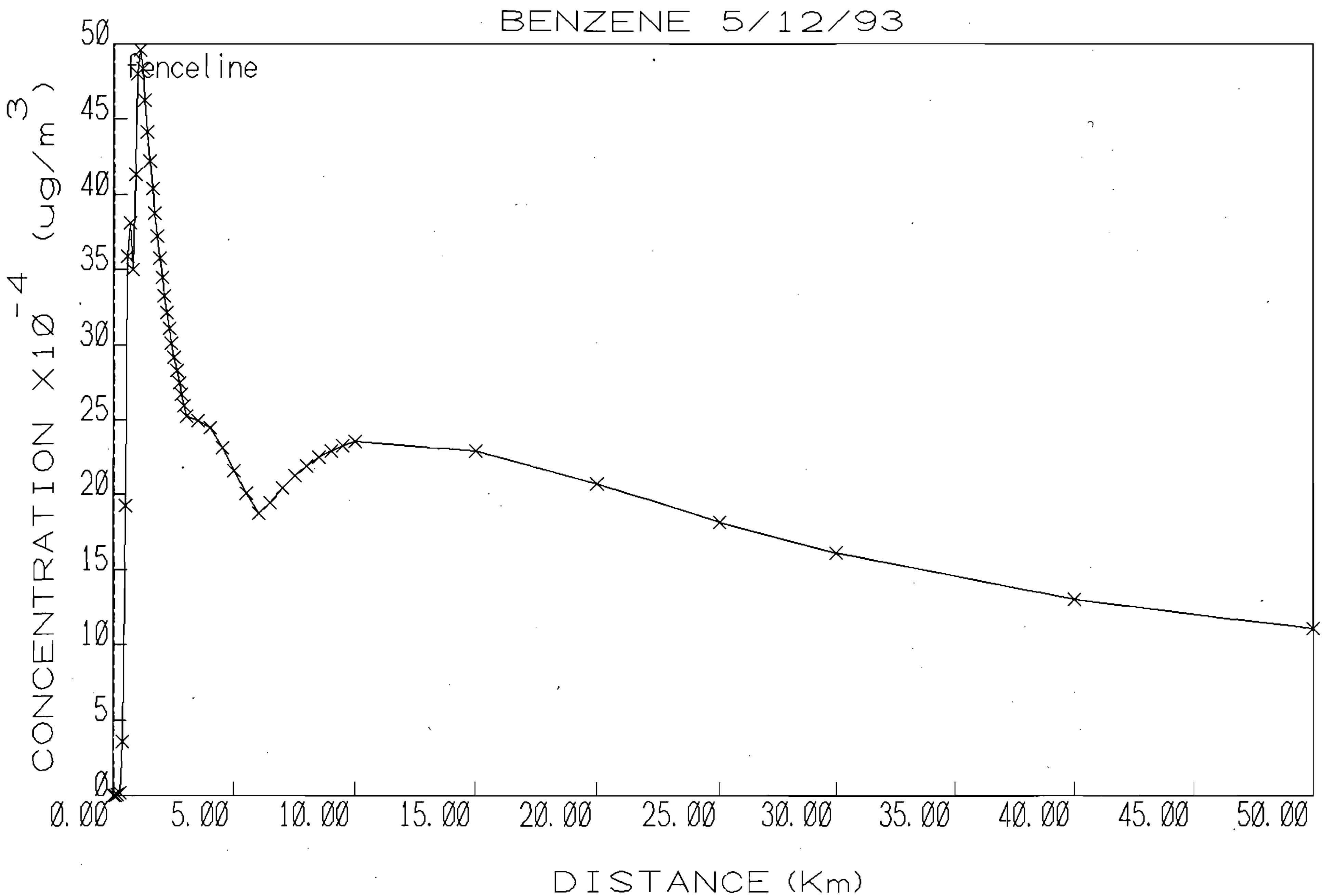

Maximum concentration 4.959E-003 ug/cubic m at 1.091 Km (Automated Distances)