AP42 Section:	11.3
Reference:	22
Title:	Exhaust Emission Sampling, Acme Brick Company, Sealy, TX, Armstrong Environmental Inc., Dallas, TX, June 21, 1991.

AP-42 Section 11.3
Reference 22
Report Sect. 4
Reference 17

Exhaust Emission Sampling
Acme Brick Company
Sealy, TX
June 18, 1991
Armstrong Environmental, Inc.
Project W-1059-91

27-396

Report Prepared For:
Mr. Dick Ethier
Acme Brick Company
P.O. Box 397
Sealy, TX 77474

Report Prepared June 21, 1991 By:
Armstrong Environmental, Inc.
4747 Irving Blvd. Suite 204
Dallas, Texas 75356
(214) 631-0021

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ACME BRICK
Since 1891

July 1, 1991

RECEIVED
JUL 3 1991
REGION 7
TEXAS AIR CONTROL BOARD

R7-396

Randy Hamilton
Texas Air Control Board
Permits Division
6330 Hwy 290 E
Austin, Tx. 78723

Dear Mr. Hamilton:

This is the test that was done by Armstrong Environmental, Inc. in regard to our permit R-9540.

If you have any questions, please call.

Sincerely,

R. Ethier
Regional Engineer

Wally Chrystal
Plant Manager

cc: Jodena Henneke
Region 7

ACME BRICK COMPANY
A Division of Justin Industries, Inc.
P.O. BOX 397 — SEALY, TEXAS 77474 — TEL: 409/885-4124

CONTACT REPORT--MRI Project No. 4602-01

From: Brian Shrager, Environmental Engineering Department

Date of Contact: April 19, 1995

Contacted by: Telephone

Company/Agency: Acme Brick Company

Telephone Number: (817) 382-3573

Person(s) Contacted/Title(s)

Mike Vickers

CONTACT SUMMARY: Mr. Vickers was contacted to obtain production rates for the 6/18/91 emission test conducted at Acme Brick in Sealy, Texas. The report stated that 16 cars per day were being produced, but did not include the number of bricks per car or the weight of a fired brick. Mr. Vickers stated that the fired bricks weighed 4 pounds each, and that each kiln car carried 14,400 bricks. These data will be used to determine the tons per hour of fired brick produced during the test. In addition, Mr. Vickers stated that the kiln scrubber is a packed bed tower that uses 1/8" to 3/8" limestone as the scrubbing media.

TABLE OF CONTENTS

I. INTRODUCTION

A series of tests were performed on the Kiln exhaust stack and the Dryer Room exhaust stack at the Acme Brick facility in Sealy, TX on June 18, 1991.

The purpose of this test series was to determine compliance with the Special Provisions of Permit R-9540.

Testing was conducted following procedures detailed in Title 40: Code of Federal Regulations (40:CFR).

Sampling was performed by Richard Taylor, Jerry Salinas, Larry Whicher, Tom Armstrong and Matt Taylor of Armstrong Environmental, Inc. using four NAPP Model 31 sampling trains.

Sampling was performed over a seven hour period.

Submitted by:
Armstrong Environmental, Inc.

Richard Taylor @S

Richard Taylor
Project Manager

RT/os

II. SUMMARY

A series of tests were performed on the Kiln exhaust and the Dryer Room exhaust at the Acme Brick facility in Sealy, TX on June 18, 1991.

Sampling was performed following procedures detailed in Title 40: Code of Federal Regulations.

Results of this test series are summarized in Tables 1 and 2.

Witnessing the test series was Mike Vance of the Texas Air Control Board.

The emission rates for Sulfur Dioxide, Hydrogen Fluoride, and Particulate Matter in lbs/hr. are as follows:

KILN EXHAUST STACK

RUN #	POLLUTANT	EMISSIONS, lb/hr	ALLOWABLE
1	Particulate	4.107	7.3
	HF	0.0675	0.6
	SO2	12.14	28.4
2	Particulate	4.241	7.3
	HF	0.0762	0.6
	SO2	12.56	28.4
3	Particulate	4.903	7.3
	HF	0.0846	0.6
	SO2	12.47	28.4
Average	Particulate	4.417	7.3
	HF	0.0761	0.6
	SO2	12.37	28.4

DRYER ROOM EXHAUST STACK

RUN #	POLLUTANT	EMISSIONS, lbs/hr	ALLOWABLE
1	SO2	0.4261	0.6
	HF	<0.0107	0.3
2	SO2	0.4445	0.6
	HF	<0.0113	0.3
3	SO2	0.5140	0.6
	HF	<0.0134	0.3
Average	SO2	0.4615	0.6
	HF	<0.0118	0.3

Opacity readings were taken for three hours on the Kiln exhaust during the test repetitions. No visible emissions were detected.

Test results indicate that these two sources are in compliance according to the Special Provisions of Permit number R-9540.

SUMMARY OF EMISSIONS TEST DATA

TABLE: 1
PLANT: Acme Brick
LOCATION: Kiln Exhaust
OPERATOR: R. Taylor, J. Salinas
TEST DATE: June 18, 1991

REPETITION:	1	2	3
STACK GAS			
Temperature, F	281.2	282.5	281.3
Velocity, fps	66.41	65.86	66.43
Volume Flow, acfm	48005	47607	48024
scfm	31391	31225	31527
scfh	1883483	1873479	1891614
Moisture, %	8.142	7.705	7.770
CO2, %	3.0	4.0	3.0
O2, %	18.0	18.0	18.5
SAMPLE			
Start Time, hrs:min	9:55am	11:42am	1:08pm
Finish Time, hrs:min	9:59am	12:45pm	2:10pm
Volume, scf	29.367	29.319	29.614
Isokinetic Ratio %	97.33	97.68	97.72
SULFUR DIOXIDE			
Sample Weight, mg	86.24	89.53	88.98
Concentration, ppm	38.94	40.49	39.81
Emissions, lb/hr	12.14	12.56	12.47
HYDROGEN FLUORIDE			
Sample Weight, mg	0.2472	0.2775	0.2956
Concentration, ppm	0.6934	0.7869	0.8650
Emissions, lbs/hr	0.0675	0.0762	0.0846
Particulate			
Sample Weight, mg	29.04	30.10	34.81
Concentration, gr/scf	0.0153	0.0158	0.0181
Emissions, lbs/hr	4.107	4.241	4.903
OPACITY			
Highest 6 min. Ave.	0	0	0

SUMMARY OF EMISSIONS TEST DATA

TABLE: 2
PLANT: Acme Brick
LOCATION: Dryer Stack
OPERATOR: L. Whicher, T. Armstrong
TEST DATE: June 18, 1991

REPETITION:	1	2	3
STACK GAS			
Temperature, F	105.8	108.5	108.5
Velocity, fps	57.71	56.39	56.95
Volume Flow, acfm	67975	66414	67078
scfm	59860	58696	57914
scfh	3591585	3521744	3474850
Moisture, %	5.292	4.544	6.748
CO2, %	0	0	0
O2, %	21	21	21
SAMPLE			
Start Time, hrs:min	8:50am	9:53am	10:55am
Finish Time, hrs:min	9:20am	10:23am	11:25am
Volume, scf	15.450	14.522	12.389
SULFUR DIOXIDE			
Sample Weight, mg	0.824	0.824	0.824
Concentration, ppm	0.7167	0.7625	0.8938
Emissions, lb/hr	0.4261	0.4445	0.5140
HYDROGEN FLUORIDE			
Sample Weight, mg	<0.0212	<0.0213	<0.0216
Concentration, ppm	<0.0579	<0.0622	<0.0744
Emissions, lbs/hr	<0.0107	<0.0113	<0.0134

GENERAL PROVISIONS

R-9540

1. Equivalency of Methods - It shall be the responsibility of the holder of this permit to demonstrate or otherwise justify the equivalency of emission control methods, sampling or other emission testing methods and monitoring methods proposed as alternatives to methods indicated in the provisions of this permit. Alternative methods shall be applied for in writing and shall be reviewed and approved by the Executive Director prior to their use in fulfilling any requirements of this permit.

2. Sampling Requirements - If sampling of stacks or process vents is required, the holder of this permit must contact the Quality Assurance Division of the Texas Air Control Board (TACB) prior to sampling to obtain the proper data forms and procedures. The holder of this permit is also responsible for providing sampling facilities and conducting the sampling operations at his own expense.

3. Appeal - This permit may be appealed pursuant to Rule 103.81 of the Procedural Rules of the TACB and Section 382.032 of the Texas Clean Air Act. Failure to take such appeal constitutes acceptance by the applicant of all terms of the permit.

4. Construction Progress - Start of construction, construction interruptions exceeding 45 days and completion of construction shall be reported to the appropriate regional office of the TACB not later than 10 working days after occurrence of the event. This provision shall not apply to operating permits.

5. Recordkeeping - Information and data concerning production, operating hours, sampling and monitoring data, if applicable, fuel type and fuel sulfur content, if applicable, shall be maintained in a file at the plant site and made available at the request of personnel from the TACB or any local air pollution control program having jurisdiction. The file shall be retained for at least two years following the date that the information or data is obtained.

6. Maintenance of Emission Control - The facilities covered by this permit shall not be operated unless all air pollution emission capture equipment and abatement equipment are maintained in good working order and operating properly during normal facility operations.

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SPECIAL PROVISIONS

R-9540

1. This permit covers only those sources of emissions listed in the attached table entitled "Emission Sources - Maximum Allowable Emission Rates," and those sources are limited to the emission limits and other conditions specified in that attached table.

2. Fuel fired in the brick manufacturing facility is limited to pipeline quality natural gas. Use of any other fuel will require a modification to this permit.

3. Emission from the kiln stack shall not exceed 5 percent opacity as determined by EPA Reference Method 9. The occurrence of visible emissions so determined shall also be considered a violation of the hourly particulate matter (PM) mass emission limit of Special Provision No. 1.

4. The holder of this permit shall perform stack sampling and other testing as required to establish the actual pattern and quantities of air contaminants being emitted into the atmosphere from the kiln and dryer stacks. Sampling shall be conducted in accordance with appropriate procedures of the TACB Sampling Procedures Manual and EPA Reference Method 9 for opacity.

   The holder of this permit is responsible for providing sampling and testing facilities and conducting the sampling and testing operation at his expense.

   A. The TACB Regional Office in Houston shall be contacted as soon as testing is scheduled but not less than 45 days prior to sampling to schedule a pretest meeting.

      The notice shall include:

      1. Date for pretest meeting.
      2. Date sampling will occur.
      3. Name of firm conducting sampling.
      4. Type of sampling equipment to be used.
      5. Method or procedure to be used in sampling.

      The purpose of the pretest meeting is to review the necessary sampling and testing procedures, to provide the proper data forms for recording pertinent data and to review the format procedures for submitting the test reports.

      A written proposed description of any deviation from sampling procedures specified in permit

provision or TACB or EPA sampling procedures shall be made available to the TACB at or prior to the pretest meeting. The Regional Director or the Director of the Quality Assurance Division may approve or disapprove of any deviation from specified sampling procedures. Requests to waive testing for any pollutant specified in B or C of this provision shall be submitted to the TACB Permits Program.

B. Air contaminants to be tested for from the kiln exhaust stack include (but are not limited to) HF, SO_2 and PM.

C. Air contaminants to be tested for from the dryer room exhaust include (but are not limited to) HF and SO_2.

D. Sampling shall occur within 60 days after achieving the new maximum production rate of 16 cars/day, but no later than 180 days after initial startup of the kiln following the completion of construction on the plant expansion. If the normal production rate exceeds by more than 10 percent the rate maintained during sampling, the company must notify the Regional Director in Houston and the TACB may require additional sampling to demonstrate continued compliance with the emission limits of this permit.

E. Two copies of the sampling report shall be forwarded to the TACB within 30 days after sampling is completed. Sampling reports shall follow the format requirements of Chapter 14 of the TACB Sampling Procedures Manual. The reports shall be distributed as follows:

One copy to the TACB Regional Office in Houston.
One copy to the Permits Program, TACB Austin Office.

5. Hydrogen fluoride shall be sampled at the exit of the dry scrubber. The use of stain tube indicators or a portable analyzer specifically designed for measuring HF concentration in ppmv is acceptable for this evaluation. Any other method approved by the Regional Director or the Quality Assurance Division is also acceptable. A hot air probe or equivalent should be used with stain tubes to prevent introduction of error in results becuase of high stack temperatures. With stain tubes, three readings should be averaged to obtain one result. Commencing upon initial startup of the dry scrubber, sampling shall be conducted on a weekly basis and shall

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continue at this frequency for the first month of operation. Then, if these results consistently indicate scrubber outlet HF concentrations less than 7 ppmv (4 ppmv at maximum kiln air flow), the sampling shall be performed at least monthly. These measurements will be used as an indicator of compliance. If the measured concentration is above 7 ppm HF, the TACB shall be notified as soon as practical and additional testing may be required.

6. Kiln exhaust shall be routed through the scrubber during all periods of kiln operation. Any bypassing of the scrubber or scrubber malfunction that may cause excessive emissions shall be reported to the Houston Regional Office as soon as practical, but not later than one week after such occurrence. Each report shall include a discussion of the conditions that necessitated the bypassing or caused the malfunction. If a full bed of limestone is not maintained, HF emission sampling shall be conducted daily during the period until the supply is replenished.

7. The following information shall be made and maintained by the source for a period of two years on a rolling retention basis and shall be made available on request to representatives of the TACB or EPA or any local air pollution control program having jurisdiction:

   A. The results of all HF emission indication tests of the scrubber exhaust.

   B. Any period of kiln operation during which the scrubber is bypassed.

   C. Limestone consumption of the dry scrubber.

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

R-9540

This table lists the maximum allowable emission rates and all sources of air contaminants on the applicant's property covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

AIR CONTAMINANTS DATA

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates* #/hr	Emission Rates* TPY
1	Kiln Exhaust Stack w/ Dry Scrubber	SO2 (4)	28.4	68.9
		HF (4)	0.6	2.5
		PM	7.3	32.0
		CO	1.2	5.2
		VOC	0.2	0.8
		NOx	3.5	15.5
2	Dryer Room Exhaust	SO2	0.6	2.7
		HF	0.3	1.4

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.
(2) Specific point source name.
(3) VOC - volatile organic compounds as defined in General Rule 101.1
NOx - total oxides of nitrogen
SO2 - sulfur dioxide
PM - particulate matter as defined in General Rule 101.1
CO - carbon monoxide
(4) Hourly rates derive from highest one-hour emission rate measured; annual rates derive from average of three one-hour emission rate measurements.

* Emission rates are based on and the facilities are limited by the following maximum operating schedule:

Hrs/day 24 Days/week 7 Weeks/year 52 or Hrs/year 8760

DRAFT

Company Name Acme Brick TACB Account No. _____

City Sealy County Austin TACB Region 7

Testing required by: TACB

TACB Permit No. R 9540 PSD Permit No. _____ NSPS Subpart _____

(INCLUDE A COPY OF PERMIT SPECIAL PROVISIONS)

Source Tested Kiln Exhaust Stack TACB E. I. Point No. 1

Stack Height 72 ft. Stack Diameter 47 inches

SAMPLING PORTS LOCATION:

Downstream Distance to Obstruction 19 ft. Upstream Distance to Obstruction 22.5 ft.

Checked for cyclonic flow? X Yes ___ No Cyclonic flow present? ___ Yes X No

(INCLUDE A DRAWING OF STACK SHOWING SAMPLING PORTS & MEASUREMENTS)

Design Operating Rate _____ Maximum Operating Rate 16 cars/day

Normal Operating Rate _____ Operating Schedule 8760 hrs/day

TACB Test Observer Mike Vance

Company Name Acme Brick TACB Account No. _____

City Sealy County Austin TACB Region 7

Testing required by: TACB

TACB Permit No. R 9540 PSD Permit No. _____ NSPS Subpart _____

(INCLUDE A COPY OF PERMIT SPECIAL PROVISIONS)

Source Tested Dryer Room Exhaust TACB E. I. Point No. 2

Stack Height 65 ft. Stack Diameter 60 inches

SAMPLING PORTS LOCATION:

Downstream Distance to Obstruction 23 ft. Upstream Distance to Obstruction 40 ft.

Checked for cyclonic flow? X Yes ___ No Cyclonic flow present? ___ Yes X No

(INCLUDE A DRAWING OF STACK SHOWING SAMPLING PORTS & MEASUREMENTS)

Design Operating Rate _____ Maximum Operating Rate 16 cars/day

Normal Operating Rate _____ Operating Schedule 8760 hrs/year

TACB Test Observer Mike Vance

FIGURE I

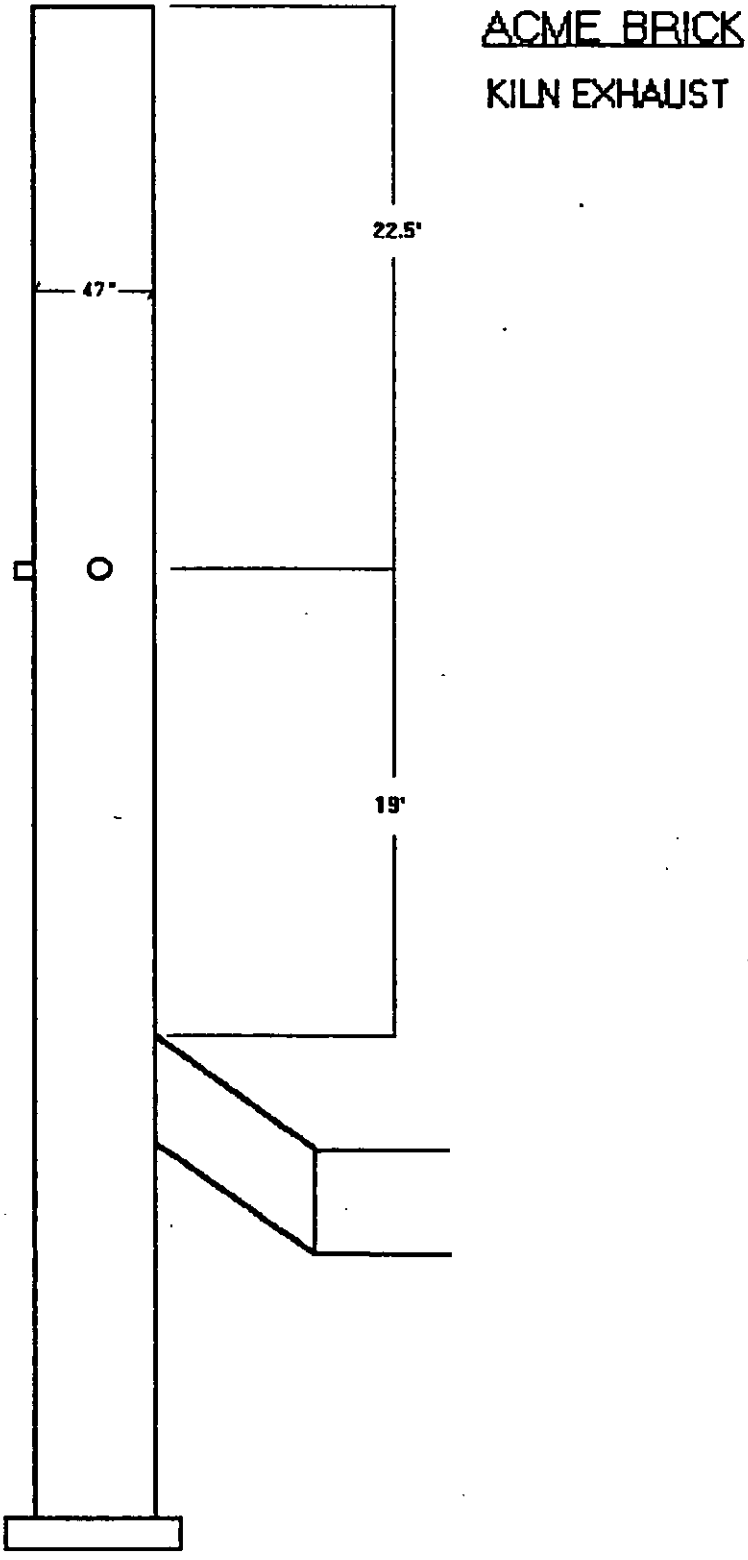
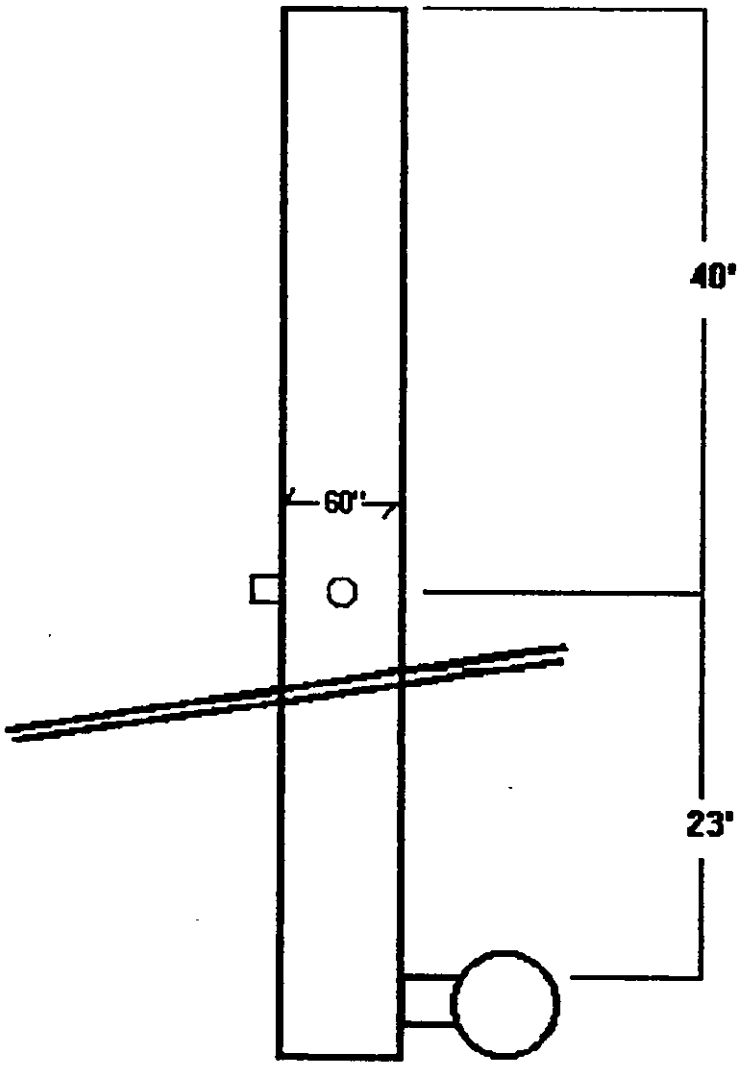


FIGURE II



ACME BRICK

DRYER STACK

Pollutant Sampled: PM KILN Exhaust

	Run No.	Run No.	Run No.	Run No.	Results
Date Sampled	6/18/91	6/18/91	6/18/91		
Time	9:55am 10:59am	11:42am 12:45pm	1:08pm 2:10pm		
No. of Points Sampled	24	24	24		
Operating/Feed Rate	16 cars/day	16 cars/day	16 cars/day		16 cars/day
% Operating Rate (Maximum)	100	100	100		100
Stack Temperature	281.2	282.5	281.3		281.7
Stack Flow Rate (DSCFM)	31391	31225	31527		31381
Percent Moisture	8.142	7.705	7.770		7.872
Percent Oxygen	18	18	18.5		18.17
Percent Carbon Dioxide	3	4	3		3.333
Percent Isokinetic	97.33	97.68	97.72		97.577
Excess Air	630.3	694.4	831.3		718.8
Pollutant Concentration $gr/_{scf}$	0.0153	0.0158	0.0181		0.0164
Mass Emission Rate, Lbs/hr	4.107	4.241	4.903		4.417
Emissions (NSPS Units)	--------	--------	----------		----------
TACB Permit Allowable Rate	7.3 lbs/hr	7.3 lbs/hr	7.3 lbs/hr		7.3 lbs/hr
NSPS Allowable Emissions	--------	--------	----------		----------
Regulation Allowable Rate	--------	--------	----------		----------
TACB Regulation No.	--------	--------	----------		----------

	Pre	Date	Post
Dry Gas Meter Calibrated	6/11/91		6/19/91
Pitot Tube Calibrated		6/19/91	
Nozzle Calibrated		6/18/91	

Pollutant Sampled: HF KILN EXHAUST

	Run No.	Run No.	Run No.	Run No.	Results
Date Sampled	6/18/91	6/18/91	6/18/91		
Time	9:55am / 10:25am	11:42am / 12:12pm	1:08pm / 1:38pm		
No. of Points Sampled	1	1	1		
Operating/Feed Rate	16 cars/day	16 cars/day	16 cars/day		16 cars/day
% Operating Rate (Maximum)	100	100	100		100
Stack Temperature	281.2	282.5	281.3		281.7
Stack Flow Rate (DSCFM)	31291	31225	31527		31381
Percent Moisture	8.142	7.705	7.770		7.872
Percent Oxygen	18	18	18.5		18.17
Percent Carbon Dioxide	3	4	3		3.333
Percent Isokinetic	-------	-------	-------		-------
Excess Air	630.3	694.4	831.8		718.8
Pollutant Concentration, PPM	0.6934	0.7869	0.8650		0.7816
Mass Emission Rate, Lbs/hr	0.0675	0.0762	0.0846		0.0761
Emissions (NSPS Units)	-------	-------	-------		-------
TACB Permit Allowable Rate	0.6	0.6	0.6		0.6
NSPS Allowable Emissions	-------	-------	-------		-------
Regulation Allowable Rate	-------	-------	-------		-------
TACB Regulation No.	-------	-------	-------		-------

	Pre Date	Post
Dry Gas Meter Calibrated	6/13/91	6/19/91
Pitot Tube Calibrated	6/19/91	
Nozzle Calibrated	6/18/91	

Pollutant Sampled: SO_2 KILN EXHAUST

	Run No.	Run No.	Run No.	Run No.	Results
Date Sampled	6/18/91	6/18/91	6/18/91		
Time	9:55am 10:59am	11:42am 12:45pm	1:08pm 2:10pm		
No. of Points Sampled	24	24	24		
Operating/Feed Rate	16 cars/day	16 cars/day	16 cars/day		16 cars/day
% Operating Rate (Maximum)	100	100	100		100
Stack Temperature	281.2	282.5	281.3		281.7
Stack Flow Rate (DSCFM)	31391	31225	31527		31381
Percent Moisture	8.142	7.705	7.770		7.872
Percent Oxygen	18	18	18.5		18.17
Percent Carbon Dioxide	3	4	3		3.333
Percent Isokinetic	97.33	97.68	97.72		97.577
Excess Air	630.3	694.4	831.8		718.8
Pollutant Concentration, PPM	38.94	10.49	39.81		39.75
Mass Emission Rate, Lbs/hr	12.14	12.56	12.47		12.37
Emissions (NSPS Units)	----------	----------	----------		----------
TACB Permit Allowable Rate	28.4	28.4	28.4		28.4
NSPS Allowable Emissions	----------	----------	----------		----------
Regulation Allowable Rate	----------	----------	----------		----------
TACB Regulation No.	----------	----------	----------		----------

	Pre	Date	Post
Dry Gas Meter Calibrated	6/11/91		6/19/91
Pitot Tube Calibrated		6/19/91	
Nozzle Calibrated		6/18/91	

Pollutant Sampled: DRYER STACK SO_2

	Run No.	Run No.	Run No.	Run No.	Results
Date Sampled	6/18/91	6/18/91	6/18/91		
Time	8:50am 9:20am	9:53am 10:23am	10:55am 11:25am		
No. of Points Sampled	16	16	16		
Operating/Feed Rate	16 cars/day	16 cars/day	16 cars/day		16 cars/day
% Operating Rate (Maximum)	100	100	100		100
Stack Temperature	105.8	108.5	108.5		107.6
Stack Flow Rate (DSCFM)	59860	58696	57914		58823
Percent Moisture	5.292	4.544	6.748		5.528
Percent Oxygen	21	21	21		21
Percent Carbon Dioxide	0	0	0		0
Percent Isokinetic	-------	-------	-------		-------
Excess Air	-------	-------	-------		-------
Pollutant Concentration, PPM	0.7167	0.7625	0.8938		0.791
Mass Emission Rate, Lbs/hr	0.4261	0.4445	0.5140		0.4615
Emissions (NSPS Units)	-------	-------	-------		-------
TACB Permit Allowable Rate	0.6	0.6	0.6		0.6
NSPS Allowable Emissions	-------	-------	-------		-------
Regulation Allowable Rate	-------	-------	-------		-------
TACB Regulation No.	-------	-------	-------		-------

	Pre	Date	Post
Dry Gas Meter Calibrated	6/11/91		6/19.91
Pitot Tube Calibrated		6/19/91	
Nozzle Calibrated		6/18/91	

Pollutant Sampled: DRYER STACK HF

	Run No.	Run No.	Run No.	Run No.	Results
Date Sampled	6/18/91	6/18/91	6/18/91		
Time	8:50am 9:20am	9:53am 10:23am	10:55am 11:25am		
No. of Points Sampled	16	16	16		
Operating/Feed Rate	16 cars/day	16 cars/day	16 cars/day		16 cars/day
% Operating Rate (Maximum)	100	100	100		100
Stack Temperature	105.8	108.5	108.5		107.6
Stack Flow Rate (DSCFM)	59860	58696	57914		58823
Percent Moisture	5.292	4.544	6.748		5.528
Percent Oxygen	21	21	21		21
Percent Carbon Dioxide	0	0	0		0
Percent Isokinetic	-------	----------	----------		----------
Excess Air	----------	----------	----------		----------
Pollutant Concentration, PPM	<0.0579	<0.0622	<0.0744		<0.065
Mass Emission Rate, Lbs/hr	<0.0107	<0.0113	<0.0134		<0.0118
Emissions (NSPS Units)	-------	--------	-------		-------
TACB Permit Allowable Rate	0.3	0.3	0.3		0.3
NSPS Allowable Emissions	-------	-------	-------		-------
Regulation Allowable Rate	--------	--------	--------		--------
TACB Regulation No.	---------	--------	--------		--------

	Pre Date	Post
Dry Gas Meter Calibrated	6/10/91	6/19/91
Pitot Tube Calibrated	6/19/91	
Nozzle Calibrated	6/18/91	

III. PROCEDURES

The procedure for emissions sampling followed USEPA test methods as detailed in Title 40: Code of Federal Regulations. The following methods were used:

Method	Title
1	Sample and Velocity Traverses from Stationary Sources
2	Determination of Stack Gas Velocity and Volumetric Flow (Type S Pitot)
3	Gas Analysis for CO2, O2, Excess Air and Dry Molecular Weight
4	Determination of Moisture Content in Stack Gas
5	Determination of Particulate Emissions from Stationary Sources
6	Determination of Sulfur Dioxide Emissions from Stationary Sources
9	Visual Determination of the Opacity of Emissions from Stationary Sources

CO2 and O2 were determined using a Fyrite analyzer

Hydrogen Fluoride was determined following Method 13 ; Flouride in Stack Gases in the Texas Air Control Board's Laboratory Methods Manual.

SO2 and particulate testing was conducted on the Kiln exhaust stack for 2.5 minutes at each of 24 points, 12 points per traverse using a 60 inch glass lined sampling probe with a 0.1883 inch ID stainless steel nozzle and a Napp Model 31 Method 5 sampling train. Hydrogen Fluoride was conducted on the Kiln exhaust using a seperate sampling train with a 36 inch stainless steel probe with a 0.5 inch stainless steel nozzle positioned in the middle of the stack pulling at a constant rate for 30 minutes.

Hydrogen flouride and SO2 sampling was conducted on the Dryer Room exhaust stack using two seperate sampling trains pulling at a constant rate for 30 minutes. A five foot stainless steel sampling probe with a 0.4375 inch ID nozzle was used for HF sampling and a five foot glass lined probe with a 0.5 inch ID sampling nozzle was used for SO2 sampling. A 16 point velocity traverse was taken prior to each test run.

APPENDIX A

ACME BRICK
KILN EX.
6/18/91
Repetition # 1

SAMPLE VOLUME, STANDARD CUBIC FEET
(((H/13.6) / TM) * Y * VM * 17.64 = 29.36731

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET
VLC * 0.04707 = 2.602971

FRACTIONAL MOISTURE CONTENT
VWSTD / (VMSTD + VWSTD) = 8.141846E-02

PARTICULATE CONCENTRATION, GR/SCF DB
(MN/VMSTD) * 0.01543 = 1.525803E-02

PARTICULATE CONCENTRATION, LBS/SCF DB
(MN/VMSTD) * 2.205^-06 = 2.180425E-06

MOLECULAR WEIGHT OF STACK GAS, DRY BASIS
(CO2 * .44) + (O2 * .32) + ((N2 + CO) * .28) = 29.2

MOLECULAR WEIGHT OF STACK GAS, WET BASIS
(MD * (1 - BWS)) + (18 * BWS) = 28.28811

STACK PRESSURE, INCHES OF MERCURY
(SP / 13.6) + PBAR = 29.8603

STACK GAS VELOCITY, FPS
(SQR(((TS + 460) / MS) / PS)) * CP * DP * 85.49 = 66.4077

STACK GAS VOLUME, ACFM
V * AS * 60 = 48004.8

STACK GAS VOLUME, SCFH
(((528*PBAR)/(TS+460)/29.92)) *AS*V*(1-BWS) * 3600 = 1883483

PARTICULATE EMISSIONS, LBS/HR
CS * QS = 4.106793

ISOKINETIC RATIO, %
((VMSTD/17.64)+(.002669*VLC))/AN/V/PS/T*(TS+460)*1.667 = 97.32756

EXCESS AIR = 630.2523

ACME BRICK
KILN EX.
6/18/91
Repetition # 1

PRESSURE DROP ACROSS ORIFICE, H = .8745
METER CO-EFFICIENT, Y = .968129
METER TEMPERATURE, TM = 100.77
BAROMETRIC PRESSURE, PBAR = 29.9
GAS METER VOLUME, VM = 32.182
LIQUID COLLECTED, VLC = 55.3
PARTICULATE SAMPLE WEIGHT, MN = 29.04
STATIC PRESSURE, SP = -.54
STACK TEMPERATURE, TS = 281.2
PITOT CO-EFFICIENT, CP = .84
SQUARE ROOT OF DELTA P, DP = .9872
AREA OF STACK, AS = 12.048
TEST DURATION, T = 60
AREA OF NOZZLE, AN = 1.933872E-04
CO2 % = 3
O2 % = 18
CO % = 0

ACME BRICK
KILN EX.
6/18/91
Repetition # 2

SAMPLE VOLUME, STANDARD CUBIC FEET
(((H/13.6) / TM) * Y * VM * 17.64 = 29.31967

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET
VLC * 0.04707 = 2.44764

FRACTIONAL MOISTURE CONTENT
VWSTD / (VMSTD + VWSTD) = 7.704903E-02

PARTICULATE CONCENTRATION, GR/SCF DB
(MN/VMSTD) * 0.01543 = 1.584067E-02

PARTICULATE CONCENTRATION, LBS/SCF DB
(MN/VMSTD) * 2.205^-06 = 2.263686E-06

MOLECULAR WEIGHT OF STACK GAS, DRY BASIS
(CO2 * .44) + (O2 * .32) + ((N2 + CO) * .28) = 29.36

MOLECULAR WEIGHT OF STACK GAS, WET BASIS
(MD * (1 - BWS)) + (18 * BWS) = 28.48473

STACK PRESSURE, INCHES OF MERCURY
(SP / 13.6) + PBAR = 29.86287

STACK GAS VELOCITY, FPS
(SQR(((TS + 460) / MS) / PS)) * CP * DP * 85.49 = 65.85755

STACK GAS VOLUME, ACFM
V * AS * 60 = 47607.11

STACK GAS VOLUME, SCFH
(((528*PBAR)/(TS+460)/29.92)) *AS*V*(1-BWS) * 3600 = 1873479

PARTICULATE EMISSIONS, LBS/HR
CS * QS = 4.240967

ISOKINETIC RATIO, %
((VMSTD/17.64)+(.002669*VLC))/AN/V/PS/T*(TS+460)*1.667 = 97.68002

EXCESS AIR = 694.4447

ACME BRICK
KILN EX.
6/18/91
Repetition # 2

PRESSURE DROP ACROSS ORIFICE, H = .8829
METER CO-EFFICIENT, Y = .968129
METER TEMPERATURE, TM = 104.66
BAROMETRIC PRESSURE, PBAR = 29.9
GAS METER VOLUME, VM = 32.352
LIQUID COLLECTED, VLC = 52
PARTICULATE SAMPLE WEIGHT, MN = 30.1
STATIC PRESSURE, SP = -.505
STACK TEMPERATURE, TS = 282.5
PITOT CO-EFFICIENT, CP = .84
SQUARE ROOT OF DELTA P, DP = .9816
AREA OF STACK, AS = 12.048
TEST DURATION, T = 60
AREA OF NOZZLE, AN = 1.933872E-04
CO2 % = 4
O2 % = 18
CO % = 0

ACME BRICK
KILN EX.
6/18/91
Repetition # 3

SAMPLE VOLUME, STANDARD CUBIC FEET
(((H/13.6) / TM) * Y * VM * 17.64 = 29.61394

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET
VLC * 0.04707 = 2.49471

FRACTIONAL MOISTURE CONTENT
VWSTD / (VMSTD + VWSTD) = 7.769588E-02

PARTICULATE CONCENTRATION, GR/SCF DB
(MN/VMSTD) * 0.01543 = 1.813735E-02

PARTICULATE CONCENTRATION, LBS/SCF DB
(MN/VMSTD) * 2.205^-06 = 2.591889E-06

MOLECULAR WEIGHT OF STACK GAS, DRY BASIS
(CO2 * .44) + (O2 * .32) + ((N2 + CO) * .28) = 29.22

MOLECULAR WEIGHT OF STACK GAS, WET BASIS
(MD * (1 - BWS)) + (18 * BWS) = 28.34825

STACK PRESSURE, INCHES OF MERCURY
(SP / 13.6) + PBAR = 29.86176

STACK GAS VELOCITY, FPS
(SQR(((TS + 460) / MS) / PS)) * CP * DP * 85.49 = 66.43415

STACK GAS VOLUME, ACFM
V * AS * 60 = 48023.92

STACK GAS VOLUME, SCFH
(((528*PBAR)/(TS+460)/29.92)) *AS*V*(1-BWS) * 3600 = 1891614

PARTICULATE EMISSIONS, LBS/HR
CS * QS = 4.902853

ISOKINETIC RATIO, %
((VMSTD/17.64)+(.002669*VLC))/AN/V/PS/T*(TS+460)*1.667 = 97.7182

EXCESS AIR = 831.8349

ACME BRICK
KILN EX.
6/18/91
Repetition # 3

PRESSURE DROP ACROSS ORIFICE, H = .9071
METER CO-EFFICIENT, Y = .968129
METER TEMPERATURE, TM = 102.4
BAROMETRIC PRESSURE, PBAR = 29.9
GAS METER VOLUME, VM = 32.544
LIQUID COLLECTED, VLC = 53
PARTICULATE SAMPLE WEIGHT, MN = 34.81
STATIC PRESSURE, SP = -.52
STACK TEMPERATURE, TS = 281.3
PITOT CO-EFFICIENT, CP = .84
SQUARE ROOT OF DELTA P, DP = .9886
AREA OF STACK, AS = 12.048
TEST DURATION, T = 60
AREA OF NOZZLE, AN = 1.933872E-04
CO2 % = 3
O2 % = 18.5
CO % = 0

ACME BRICK
DRYER STACK
REPETION # 1
6/18/91

MOLECULAR WEIGHT OF STACK GAS, DRY BASIS, MD
(.44 * %CO2) + (.32 * % O2) + (.28 * (N2 + CO)) = 28.84

MOLECULAR WEIGHT OF STACK GAS, WET BASIS, MS
MD * (1 - BWS) + (18 * BWS) = 28.2664

STACK GAS PRESSURE, IN HG, PS
PBAR + (STATIC/13.6) = 29.81177

STACK GAS VELOCITY, FPS
85.49 * CP * (SQR P(TS / (PS * MS))) = 57.7135

VOLUME FLOW RATE, ACFM
60 * AS * VS = 67974.95

VOLUME FLOW RATE, SCFH
3600 * (1 - BWS) * VS * AS * ((528 * PBAR) / (TS * 29.92)) = 3591585

%CO2 = 0
%O2 = 21
%CO = 0
%N2 = 79
STACK TEMPERATURE, F = 105.8
SQUARE ROOT OF DELTA P = .9808
STATIC PRESSURE, IN H2O = -1.2
BAROMETRIC PRESSURE, IN HG = 29.9
PERCENT WATER VAPOR (BWS * 100) = 5.2915
AREA OF STACK, SQUARE FT. = 19.63
PITOT CO-EFFICIENT, CP = .84

ACME BRICK
DRYER STACK
REPETION # 2
6/18/91

MOLECULAR WEIGHT OF STACK GAS, DRY BASIS, MD
(.44 * %CO2) + (.32 * % O2) + (.28 * (N2 + CO)) = 28.84

MOLECULAR WEIGHT OF STACK GAS, WET BASIS, MS
MD * (1 - BWS) + (18 * BWS) = 28.34748

STACK GAS PRESSURE, IN HG, PS
PBAR + (STATIC/13.6) = 29.82647

STACK GAS VELOCITY, FPS
85.49 * CP * (SQR P(TS / (PS * MS))) = 56.38788

VOLUME FLOW RATE, ACFM
60 * AS * VS = 66413.65

VOLUME FLOW RATE, SCFH
3600 * (1 - BWS) * VS * AS * ((528 * PBAR) / (TS * 29.92)) = 3521744

%CO2 = 0
%O2 = 21
%CO = 0
%N2 = 79
STACK TEMPERATURE, F = 108.5
SQUARE ROOT OF DELTA P = .9576
STATIC PRESSURE, IN H2O = -1
BAROMETRIC PRESSURE, IN HG = 29.9
PERCENT WATER VAPOR (BWS * 100) = 4.5435
AREA OF STACK, SQUARE FT. = 19.63
PITOT CO-EFFICIENT, CP = .84

ACME BRICK
DRYER STACK
REPETION # 3
6/18/91

MOLECULAR WEIGHT OF STACK GAS, DRY BASIS, MD
(.44 * %CO2) + (.32 * % O2) + (.28 * (N2 + CO)) = 28.84

MOLECULAR WEIGHT OF STACK GAS, WET BASIS, MS
MD * (1 - BWS) + (18 * BWS) = 28.10852

STACK GAS PRESSURE, IN HG, PS
PBAR + (STATIC/13.6) = 29.82647

STACK GAS VELOCITY, FPS
85.49 * CP * (SQR P(TS / (PS * MS))) = 56.95231

VOLUME FLOW RATE, ACFM
60 * AS * VS = 67078.43

VOLUME FLOW RATE, SCFH
3600 * (1 - BWS) * VS * AS * ((528 * PBAR) / (TS * 29.92)) = 3474850

%CO2 = 0
%O2 = 21
%CO = 0
%N2 = 79
STACK TEMPERATURE, F = 108.5
SQUARE ROOT OF DELTA P = .9631
STATIC PRESSURE, IN H2O = -1
BAROMETRIC PRESSURE, IN HG = 29.9
PERCENT WATER VAPOR (BWS * 100) = 6.748
AREA OF STACK, SQUARE FT. = 19.63
PITOT CO-EFFICIENT, CP = .84

APPENDIX B

SO2 Data Reduction

ACME BRICK
KILN EX.
6/18/91
Repetition 1

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 29.36731 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = 2.602971 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 8.141846 %

SO2 concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 6.475201E-06 LBS/SCF

SO2 Concentration, ppm
(385.2 / MW) * LBS/SCF = 38.93611 PPM

Delta H, H = .8745 Inches H2O
Meter Temperature = 100.77 F
Barometric Pressure, PBAR = 29.9 inches HG
Meter Volume, VM = 32.182 CU. FT.
Meter Co-efficient, Y = .968129
Liquid collected, VLC = 55.3 MLS
Sample weight, MN = 86.24 MG
SO2 Molecular Weight = 64.06

HF Data Reduction

ACME BRICK
KILN EX.
6/18/91
Repetition 1

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 15.13946 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = .9978841 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 6.183695 %

HF concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 3.600366E-08 LBS/SCF

HF Concentration, ppm
(385.2 / MW) * LBS/SCF = .6934305 PPM

Delta H, H = 1 Inches H2O
Meter Temperature = 95.67 F
Barometric Pressure, PBAR = 29.9 inches HG
Meter Volume, VM = 16.409 CU. FT.
Meter Co-efficient, Y = .969636
Liquid collected, VLC = 21.2 MLS
Sample weight, MN = .2472 MG
HF Molecular Weight = 20

SO2 Data Reduction

ACME BRICK
KILN EX.
6/18/91
Repetition 2

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 29.31967 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = 2.44764 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 7.704903 %

SO2 concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 6.733149E-06 LBS/SCF

SO2 Concentration, ppm
(385.2 / MW) * LBS/SCF = 40.48718 PPM

Delta H, H = .8829 Inches H2O
Meter Temperature = 104.66 F
Barometric Pressure, PBAR = 29.9 inches HG
Meter Volume, VM = 32.352 CU. FT.
Meter Co-efficient, Y = .968129
Liquid collected, VLC = 52 MLS
Sample weight, MN = 89.53 MG
SO2 Molecular Weight = 64.06

4.

HF Data Reduction

ACME BRICK
KILN EX.
6/18/91
Repetition 2

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 14.97613 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = 1.275597 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 7.848991 %

HF concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 4.085751E-08 LBS/SCF

HF Concentration, ppm
(385.2 / MW) * LBS/SCF = .7869156 PPM

Delta H, H = 1 Inches H2O
Meter Temperature = 108.2 F
Barometric Pressure, PBAR = 29.9 inches HG
Meter Volume, VM = 16.598 CU. FT.
Meter Co-efficient, Y = .969636
Liquid collected, VLC = 27.1 MLS
Sample weight, MN = .2775 MG
HF Molecular Weight = 20

SO2 Data Reduction

ACME BRICK
KILN EX.
6/18/91
Repetition 3

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 29.63291 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = 2.49471 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 7.765 %

SO2 concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 6.621047E-06 LBS/SCF

SO2 Concentration, ppm
(385.2 / MW) * LBS/SCF = 39.8131 PPM

Delta H, H = .9071 Inches H2O
Meter Temperature = 102.04 F
Barometric Pressure, PBAR = 29.9 inches HG
Meter Volume, VM = 32.544 CU. FT.
Meter Co-efficient, Y = .968129
Liquid collected, VLC = 53 MLS
Sample weight, MN = 88.98001 MG
SO2 Molecular Weight = 64.06

HF Data Reduction

ACME BRICK
KILN EX.
6/18/91
Repetition 3

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 14.5132 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = 1.073196 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 6.885466 %

HF concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 4.491071E-08 LBS/SCF

HF Concentration, ppm
(385.2 / MW) * LBS/SCF = .8649802 PPM

Delta H, H = 1 Inches H2O
Meter Temperature = 112.83 F
Barometric Pressure, PBAR = 29.9 inches HG
Meter Volume, VM = 16.216 CU. FT.
Meter Co-efficient, Y = .969636
Liquid collected, VLC = 22.8 MLS
Sample weight, MN = .2956 MG
HF Molecular Weight = 20

SO2 Data Reduction

ACME BRICK
DRYER STACK
6/18/91
Repetition 2

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 14.32813 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = .513063 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 3.45702 %

SO2 concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 1.268079E-07 LBS/SCF

SO2 Concentration, ppm
(385.2 / MW) * LBS/SCF = .7625103 PPM

Delta H, H = .8333 Inches H2O
Meter Temperature = 113.2 F
Barometric Pressure, PBAR = 29.5 inches HG
Meter Volume, VM = 15.6 CU. FT.
Meter Co-efficient, Y = 1.0096
Liquid collected, VLC = 10.9 MLS
Sample weight, MN = .824 MG
SO2 Molecular Weight = 64.06

4.

HF Data Reduction

ACME BRICK
DRYER STACK
6/18/91
Repetition 1

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 15.54716 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = .795483 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 4.867531 %

HF concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 3.006724E-09 LBS/SCF

HF Concentration, ppm
(385.2 / MW) * LBS/SCF = <5.790949E-02 PPM

Delta H, H = 1 Inches H2O
Meter Temperature = 112.8 F
Barometric Pressure, PBAR = 29.5 inches HG
Meter Volume, VM = 16.885 CU. FT.
Meter Co-efficient, Y = 1.011
Liquid collected, VLC = 16.9 MLS
Sample weight, MN = <.0212 MG
HF Molecular Weight = 20

< .0167 lb/hr

SO2 Data Reduction

ACME BRICK
DRYER STACK
6/18/91
Repetition 1

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 15.24389 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = .9366929 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 5.788995 %

SO2 concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 1.191901E-07 LBS/SCF

SO2 Concentration, ppm
(385.2 / MW) * LBS/SCF = .7167033 PPM

Delta H, H = .85 Inches H2O
Meter Temperature = 105.9 F
Barometric Pressure, PBAR = 29.5 inches HG
Meter Volume, VM = 16.385 CU. FT.
Meter Co-efficient, Y = 1.0096
Liquid collected, VLC = 19.9 MLS
Sample weight, MN = .824 MG
SO2 Molecular Weight = 64.06

HF Data Reduction

ACME BRICK
DRYER STACK
6/18/91
Repetition 2

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 14.54473 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = .875502 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 5.677621 %

HF concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 3.229109E-09 LBS/SCF

HF Concentration, ppm
(385.2 / MW) * LBS/SCF = 6.219264E-02 PPM

Delta H, H = .95 Inches H2O
Meter Temperature = 118.7 F
Barometric Pressure, PBAR = 29.5 inches HG
Meter Volume, VM = 15.961 CU. FT.
Meter Co-efficient, Y = 1.011
Liquid collected, VLC = 18.6 MLS
Sample weight, MN = .0213 MG
HF Molecular Weight = 20

SO2 Data Reduction

ACME BRICK
DRYER STACK
6/18/91
Repetition 3

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 12.22401 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = .866088 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 6.616358 %

SO2 concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 1.486353E-07 LBS/SCF

SO2 Concentration, ppm
(385.2 / MW) * LBS/SCF = .8937609 PPM

Delta H, H = .8667 Inches H2O
Meter Temperature = 124.7 F
Barometric Pressure, PBAR = 29.5 inches HG
Meter Volume, VM = 13.575 CU. FT.
Meter Co-efficient, Y = 1.0096
Liquid collected, VLC = 18.4 MLS
Sample weight, MN = .824 MG
SO2 Molecular Weight = 64.06

HF Data Reduction

ACME BRICK
DRYER STACK
6/18/91
Repetition 3

Volume of sample, VM STD
(((H / 13.6) + PBAR) / (TM + 460) * Y * VM * 17.64 = 12.32624 DSCF

Volume of water vapor, VWSTD
VLC * 0.04707 = .922572 SCFH

Fractional moisture content, %
VWSTD / (VMSTD + VWSTD) = 6.963431 %

HF concentration, lbs/scf
(MN / VMSTD) * 2.205 ^ 10-6 = 3.863951E-08 LBS/SCF

HF Concentration, ppm
(385.2 / MW) * LBS/SCF = .744197 PPM

Delta H, H = .9667 Inches H2O
Meter Temperature = 128.8 F
Barometric Pressure, PBAR = 29.5 inches HG
Meter Volume, VM = 13.762 CU. FT.
Meter Co-efficient, Y = 1.011
Liquid collected, VLC = 19.6 MLS
Sample weight, MN = .216 MG
HF Molecular Weight = 20

PARTICULATE ANALYTICAL DATA FORM

Company: Acme Brick Run Number: 1 PW

Location: KILN EX Density(Pa): .7852

Date: 6/18/91

Liquid Level Marked? ✓

Blank Concentration(Ca) _____

Rinse Volume(Vaw) 95 ml

Residue in Rinse (Wa) = Ca·Vaw·Pa _____

Date of Weighing 6/19/91 Gross Wt. 99923.1

Date of Weighing 6/20/91 Gross Wt. 99923.1

Average Gross Wt. 99923.1

Less Blank Residue (Wa) 0

Tare Wt. 99901.5 mg

Weight of Particulate in Acetone Rinse 21.6

Date of Weighing 6/19/91 Gross Filter Weight 472.08

Date of Weighing 6-20-91 Gross Filter Weight 472.10

Average Gross Wt. 472.09

Filter Tare Wt. 464.65

Weight of Particulate on Filter 7.44

Total Weight of Particulate 29.04 mg.

PARTICULATE ANALYTICAL DATA FORM

Company: Acme Brick Run Number: 2 PW

Location: Kiln Ex Density(Pa): .7852

Date: 6/18/91

Liquid Level Marked? ✓

Blank Concentration(Ca) _____

Rinse Volume(Vaw) 100 ml

Residue in Rinse (Wa) = Ca·Vaw·Pa _____

Date of Weighing 6/19/91 Gross Wt. 97238.5

Date of Weighing 6-20-91 Gross Wt. 97238.5

Average Gross Wt. _____

Less Blank Residue (Wa) 0

Tare Wt. 97217.8 mg

Weight of Particulate in Acetone Rinse 20.7

Date of Weighing 6/19/91 Gross Filter Weight 475.48

Date of Weighing 6-20-91 Gross Filter Weight 475.46

Average Gross Wt. 475.47

Filter Tare Wt. 466.07

Weight of Particulate on Filter 9.4

Total Weight of Particulate 30.1 mg

PARTICULATE ANALYTICAL DATA FORM

Company: Acme Brick Run Number: 3 - PM

Location: Kiln Ex Density(Pa): .7852

Date: 6/18/91

Liquid Level Marked? /

Blank Concentration(Ca) _____

Rinse Volume(Vaw) 125 ml

Residue in Rinse (Wa) = Ca·Vaw·Pa _____

Date of Weighing 6/19/91 Gross Wt. 102615.2

Date of Weighing 6-20-91 Gross Wt. 102615.0

Average Gross Wt. 102615.1

Less Blank Residue (Wa) 0

Tare Wt. 102586.6

Weight of Particulate in Acetone Rinse 28.5

Date of Weighing 6/19/91 Gross Filter Weight 470.23

Date of Weighing 6-20-91 Gross Filter Weight 470.23

Average Gross Wt. 470.23

Filter Tare Wt. 463.92

Weight of Particulate on Filter 6.31

Total Weight of Particulate 34.81

ACETONE BLANK ANALYTICAL DATA FORM

PLANT: Acme Brick
SAMPLE LOCATION: Kiln Ex
LIQUID LEVEL MARKED? ✓
BLANK VOLUME (Pa): 100 ml

DATE OF WEIGHING 6/19/91 GROSS WEIGHT 101727.5
DATE OF WEIGHING 6-20-91 GROSS WEIGHT 101727.5
AVERAGE GROSS WEIGHT
TARE WEIGHT 101727.5 mg
WEIGHT OF BLANK (ma) 0

$$Ca = \frac{ma}{Va\ Pa} = \underline{\quad 0 \quad} \text{ mg/g}$$

Note: In no case should a blank residue greater than 0.01 mg/g or 0.001% of the blank weight be subtracted from the sample weight.

ACME
Silica Gel (Weights)

Kiln Ex Particulate + SO_2 TRAIN
R1 211.3
R2 206.0
R3 205.0

Kiln Ex HF TRAIN
R1 205.2
R2 205.1
R3 202.8

Dryer Stack SO_2
R1 203.9
R2 202.9
R3 203.4

Dryer Stack HF
R1 204.9
R2 203.6
R3 203.6

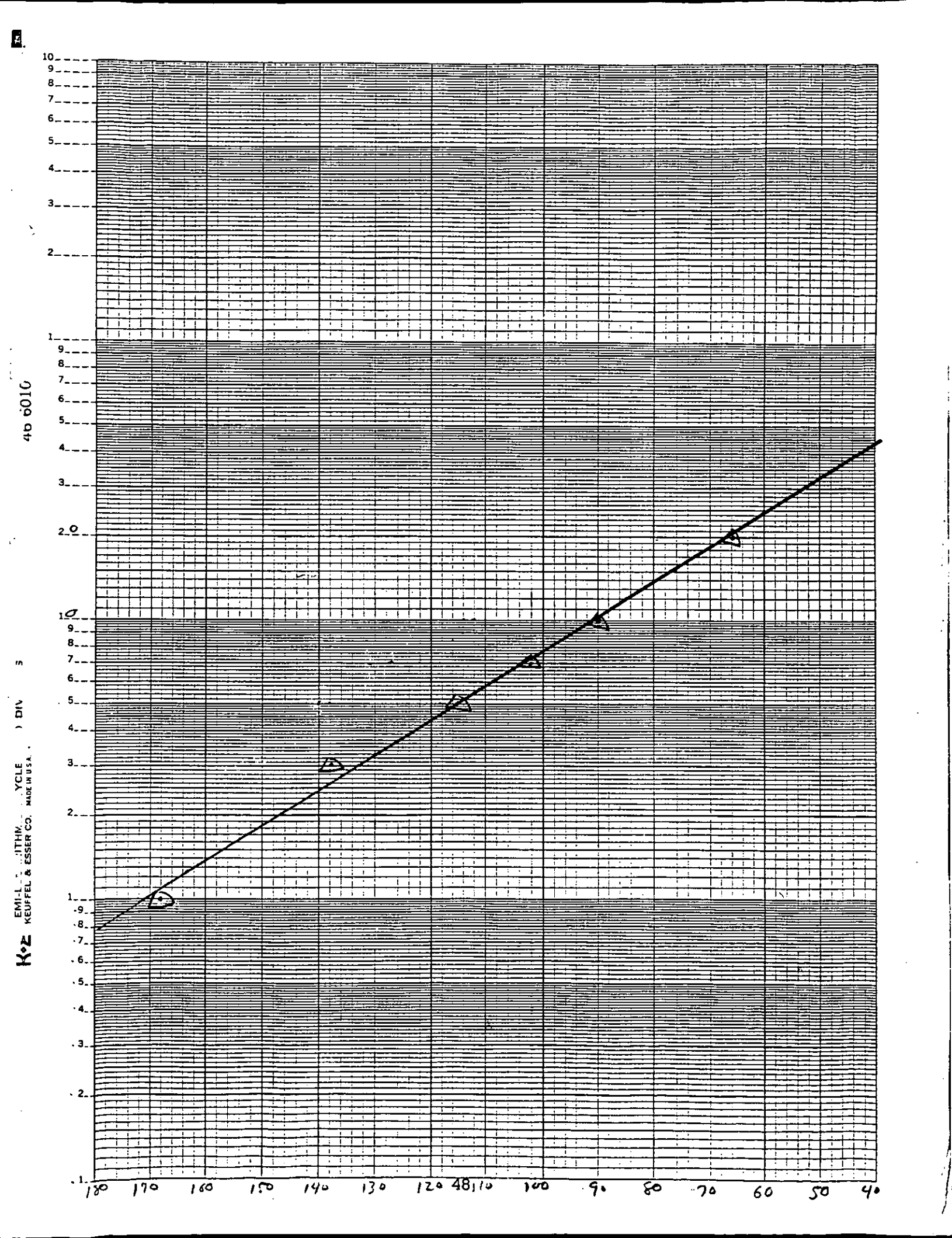
Acme Brick

TEST DATE: 6/18/91 HF ANALYSIS LAB DATE: 6/20/91

STANDARD	mV Reading
BLANK	200
1 mg/ml	+68 3
3 mg/ml	+135
5 mg/ml	+115
7 mg/ml	-102
10 mg/ml	-90 65

LOCATION	Sample	volume	mv	mg/ml	Total mg
Kiln EX	$R_1 I_1$	216	164	1.2	0.2472
	$R_1 I_2$	200	200	0	0
	$R_2 I_1$	222	163	1.25	0.2775
	$R_2 I_2$	200	199	0	<0
	$R_3 I_1$	219	161	1.35	0.2956
	$R_3 I_2$	201	199	0	0
	$R_1 I_1$	212	187	<.1	<.0212
	$R_1 I_2$	200	199	<0	0
	$R_2 I_1$	213	195	<.1	<.0213
	$R_2 I_2$	202	199	<0	0
	$R_3 I_1$	216	197	<.1	<.0216
	$R_3 I_2$	200	200	0	0

MW 20


10
9
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.2
.1
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
48
KEUFFEL & ESSER CO. MADE IN U.S.A.

Acme Brick

TEST DATE 6-18-91 — SO_2 TITRATIONS — Lab Date 6-20-91

SAMPLE	TITER	AVG	Normality of $Ba(ClO_4)_2$
.1N H_2SO_4	9.8, 9.7, 9.7	9.73	0.0103
BLANK	0, 0, 0	0	

Location	SAMPLE	TITER	Avg	Vol_s	Vol_a	Total mg	
Kiln Ex	$R_I I_I$	5.1, 5.0, 5.0	5.033	250	5	82.94	> 86.24
"	$R_I I_{II}$	.2, .2, .2	.2	250	5	3.296	
"	$R_{II} I_I$	.51, .52, .51	5.133	250	5	84.59	> 89.53
"	$R_{II} I_{II}$	.3, .3, .3	.3	250	5	4.944	
"	$R_{III} I_I$	5.0, 5.1, 5.1	6.033	250	5	82.94	> 88.98
"	$R_{III} I_{II}$	.3, .4, .4	.3667	250	5	6.043	
						Avg: 88.25	
Dryer STACK	$R_I I_I$	.05, .05, .05	.05	250	5	0.824	
	$R_I I_{II}$	0, 0, 0,	0	250	5	0	
	$R_{II} I_I$	.05, .05, .05	.05	250	5	0.824	
	$R_{II} I_{II}$	0, 0, 0	0	250	5	0	
	$R_{III} I_I$	.05, .05, .05	.05	250	5	0.824	
	$R_{III} I_{II}$	0, 0, 0	0	250	5	0	
						Avg = 0.824	

$$\text{Normality of } Ba[ClO_4]_2 = \frac{\text{Vol } H_2SO_4 \times \text{Normality } H_2SO_4}{\text{Vol } Ba[ClO_4]_2}$$

$$mg\,SO_2 = \frac{\text{Vol } Ba[ClO_4]_2 \times \text{Normality } Ba[ClO_4]_2 \times (32) \times Vol_s}{Vol_a}$$

MW 64.058

APPENDIX C

PARTICULATE FIELD DATA

PLANT: ACME
DATE: 5/18/94
REPETITION: 1

LOCATION: KILN EX
OPERATOR: RT
STACK #:
SAMPLE BOX #: SO2 + PbHL
METER BOX #: 6
AMBIENT TEMPERATURE:
BAROMETRIC PRESSURE: 29.9
ASSUMED MOISTURE: 8%
PROBE LENGHT: 5'
NOZZLE DIAMETER: .188 .188 .188 .188 .1883 .000193 4
STACK DIAMETER: 4
METER H : 1.684047
C FACTOR: .86
METER CO-EFFICIENT: .968/.97

IMPINGERS

	Initial	Final
#1:	200 w/ 5% H_2O_2	218
#2:	200	226
#3:		
#4:	200 g 56	211.3
#5:		
		55.3

COMMENTS:

CO_2 3% O_2 18%

FILTER TARE:

PRE-TEST LEAK CHECK
Meter: .001 Cu. ft. 15 in. HG
Pitots: ✓ in. H2O

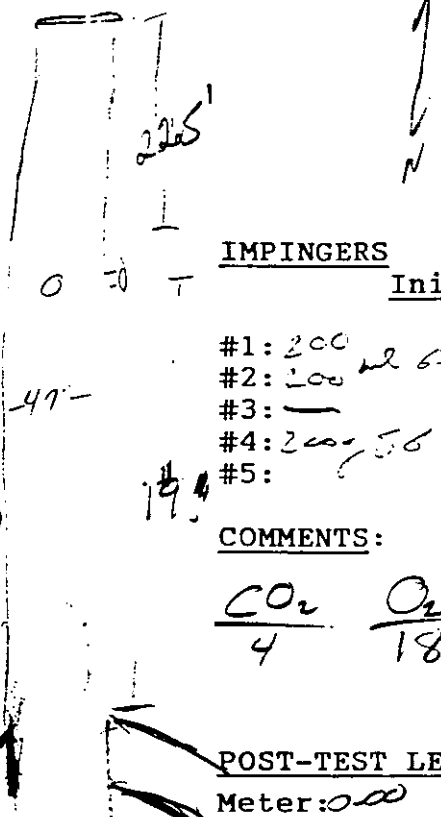
POST-TEST LEAK CHECK
Meter: 0.005 Cu. ft. 10 in. HG
Pitots ✓ in. H2O

#	Θ	STATIC PRES.	Ts °F	ΔP	√ΔP	ΔH	Vm FT.³	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUM (IN Hg)
1	935		285	1		.9	38.079	91	91	250	76	4
2			280	1.2		1.0	19.4	95	90	250	75	4
3			285	1.2		1.0	20.9	98	90	250	75	4
4		-.52	281	1.3		1.1	22.4	102	92	250	75	4
5			282	1.3		1.1	23.9	103	93	251	75	4
6			281	1.25		1.0	25.15	104	94	251	75	4
7			282	1.1		1.0	26.19	104	95	250	75	4
8			282	.99		.8	27.3	105	95	252	75	4
9			282	.75		.6	28.7	105	96	251	75	4
10			280	.68		.6	30.9	105	96	251	76	3
11			280	.61		.5	32.0	107	96	251	76	3
12			279	.47		.4	33.0	108	97	251	76	3
1			276	1.1		1	33.746	99	98	252	76	3
2			276	1.05		.9	35.4	103	97	250	76	3
3			278	1.2		1.1	36.8	105	97	251	76	3
4			281	1.3		1.2	38.3	106	97	251	76	3
5		-.56	282	1.3		1.2	39.9	107	98	251	75	4
6			283	1.3		1.2	41.4	107	99	251	75	4
7			284	1.2		1.1	43.0	108	100	252	74	4
8			284	1.05		.9	44.5	110	101	253	75	4
9			284	.85		.77	45.9	111	102	253	75	4
10			282	.7		.6	47.15	111	102	252	74	3
11			281	.55		.5	48.3	111	102	252	74	3
12			279	.47		.42	49.3	111	103	252	74	3
							50.492					
AV			281.2		.9872	.8945	32.1121		100.77			

PARTICULATE FIELD DATA

PLANT: [illegible]
DATE: [illegible]
REPETITION: 2

LOCATION: [illegible]
OPERATOR: [illegible]
STACK #: —
SAMPLE BOX #: SO_2 + Partic
METER BOX #: 6
AMBIENT TEMPERATURE: 70
BAROMETRIC PRESSURE: 29.7
ASSUMED MOISTURE: 22
PROBE LENGHT: 5'
NOZZLE DIAMETER: .188, .187, .188, .183
STACK DIAMETER: 47"
METER H : 1.684047
C FACTOR: .[illegible]
METER CO-EFFICIENT: .968290



IMPINGERS

	Initial	Final
#1:	200 ml 6% CO_2	242
#2:	200 ml 6% CO_2	204
#3:	—	206.0
#4:	200 ml 5%	52
#5:		

COMMENTS:

$\frac{CO_2}{4}$ $\frac{O_2}{18}$

FILTER TARE:

PRE-TEST LEAK CHECK
Meter: 6.005 Cu. ft. 15 in. HG
Pitots: ✓ in. H20

POST-TEST LEAK CHECK
Meter: 000 Cu. ft. 6 in. HG
Pitots ✓ in. H20

#	θ	STATIC PRES.	Ts °F	ΔP	√ΔP	ΔH	Vm FT.³	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUM (IN Hg)
1	11:42		282	1.1		1	65.000	96	73	250	72	3
2			283	1.2		1.1	52.4	78	93	249	72	2
3			283	1.2		1.1	53.9	99	93	250	73	2
4			280	1.1		1	55.4	100	94	250	72	2
5			282	1.3		1.1	56.9	103	94	251	72	3
6			283	1.3		1.2	58.4	103	94	251	72	4
7		-.51	283	1.1		1	60.0	104	95	251	72	3
8			283	.85		.76	61.4	105	95	250	72	3
9			285	.82		.73	62.7	106	96	249	72	3
10			283	.65		.5	63.9	106	96	251	72	2
11			281	.55		.3	65.0	106	97	250	71	2
12			281	.55		.5	66.0	106	97	250	72	2
1			281	1.0		.9	67.096	100	98	250	73	2
2			282	1.1		1	69.5	105	98	251	72	2
3			283	1.2		1	69.9	107	98	251	72	2
4			284	1.2		1.1	71.4	108	96	251	72	2
5		-.5	283	1.2		1.1	72.4	107	98	250	72	2
6			282	1.3		1.2	74.4	107	98	249	73	2
7			283	1.15		1.0	76.0	107	98	250	73	2
8			281	1		.9	77.4	107	98	251	73	2
9			283	.87		.8	78.5	108	99	251	73	2
10			282	.75		.7	80.1	108	98	250	73	2
11			282	.63		.6	81.2	108	99	250	73	2
12			282	.47		.4	82.3	108	99	250	73	2
	12:43						83.352					
ΔV			282.5		.9816	.8829	32.352		104.66			

PARTICULATE FIELD DATA

PLANT: ACME
DATE: 6/18
REPETITION: 3

LOCATION: KILN EX
OPERATOR: ET
STACK #:
SAMPLE BOX #:
METER BOX #: 6
AMBIENT TEMPERATURE: 95
BAROMETRIC PRESSURE: 29.9
ASSUMED MOISTURE: 22
PROBE LENGHT: 5'
NOZZLE DIAMETER: .1883
STACK DIAMETER: 4 7
METER H : 1.684047
C FACTOR: .84
METER CO-EFFICIENT: .9881294

IMPINGERS

	Initial	Final
#1:	200 ml	242
#2:	200 ml	206
#3:		205.0
#4:		
#5:		53

COMMENTS:

CO2 3 O2 18.5

FILTER TARE:

PRE-TEST LEAK CHECK
Meter: 0.00 Cu. ft. 15 in. HG
Pitots: ✓ in. H20

POST-TEST LEAK CHECK
Meter: 0.00 Cu. ft. 5 in. HG
Pitots ✓ in. H20

#	θ	STATIC PRES.	Ts °F	ΔP	√ΔP	ΔH	Vm FT.3	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUM (IN Hg)
1	1.08		282	1.1		1	684.195	94	94	250	74	2
2			282	1.3		1.1	95.6		94	250	72	2
3			282	1.5		1.2	87.2	101	94	250	72	2
4			283	1.3		1.2	98.8	102	95	251	72	2
5			282	1.3		1.2	10.3	104	95	251	72	2
6		-.52	282	1.3		1.12	21.8	105	97	251	72	2
7			282	1.1		1	33.45	106	96	251	72	2
8			282	.85		.8	43.6	106	97	251	72	2
9			282	.73		.7	96.1	107	98	252	72	2
10			282	.6		.5	97.3	107	99	254	72	2
11			282	.55		.5	98.4	107	99	254	72	2
12			278	.45		.4	99.2	108	100	253	72	2
1			282	.10		.9	700.327	102	100	253	72	2
2			282	1.1		1	1.7	105	100	252	72	1
3			282	1.2		1.1	3.1	106	100	251	72	2
4			283	1.2		1.1	4.6	107	99	250	72	2
5		-.52	284	1.3		1.2	6.1	108	100	250	72	2
6			282	1.2		1.1	7.7	108	100	250	72	2
7			281	1.1		1	9.2	109	101	250	72	2
8			279	1		.9	10.6	109	100	251	73	1
9			280	.91		.9	12.6	109	101	251	73	2
10			278	.81		.7	13.3	109	101	251	72	2
11			278	.65		.6	14.2	109	101	251	72	1
12			278	.56		.5	15.7	110	101	251	72	1
							1.439					
ΔV			1281.3		.9886	.9011	132.544		102.04			

12.19

PARTICULATE FIELD DATA

PLANT: Acme
DATE: 6-18-91
REPETITION: 1

LOCATION: Exhaust Kiln
OPERATOR: JS
STACK #: -
SAMPLE BOX #: 2
METER BOX #: 3
AMBIENT TEMPERATURE: 75
BAROMETRIC PRESSURE: 1014
ASSUMED MOISTURE: 8%
PROBE LENGHT: 3'
NOZZLE DIAMETER: ½"
STACK DIAMETER: 47"
METER H : 1.69379
C FACTOR: .84
METER CO-EFFICIENT: .969636

FILTER TARE: Paper

PRE-TEST LEAK CHECK
Meter: 0.00 Cu. ft. 15 in. HG
Pitots: ✓ in. H2O

IMPINGERS

	Initial	Final
#1:	200 NAOH	216
#2:	200 NAOH	200
#3:	-	205.2
#4:	200grms S.G	21.2
#5:	-	

COMMENTS:

CO_2 3% O_2 18%

POST-TEST LEAK CHECK
Meter: Cu. ft. in. HG
Pitots in. H2O

#	θ	STATIC PRES.	Ts °F	ΔP	√ΔP	ΔH	Vm FT.3	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUM (IN Hg)
1	9:54		281			1.0	637.439	88	86	-	60	4
2			282			1.0	640.2	101	86	-	60	4
3			280			1.0	642.8	105	88	-	60	4
4			281			1.0	645.3	105	90	-	60	4
5			281			1.0	647.9	107	90	-	60	4
6			283			1.0	650.7	109	93	-	60	4
							653.848					
									95.67			
							16.969					
Δ												

PARTICULATE FIELD DATA

PLANT: Acme
DATE: 6-18-91
REPETITION: 2

LOCATION: Kiln Exhaust
OPERATOR: JS
STACK #:
SAMPLE BOX #: 2
METER BOX #: 3
AMBIENT TEMPERATURE: 80°
BAROMETRIC PRESSURE: 1014
ASSUMED MOISTURE: 8%
PROBE LENGHT: 3'
NOZZLE DIAMETER: ½"
STACK DIAMETER: 47"
METER H : 1.69379
C FACTOR: .84
METER CO-EFFICIENT: .969636

IMPINGERS

	Initial	Final
#1:	200 mls NaCl	222
#2:	200 ml NaOH	206
#3:	–	205.1
#4:	200 S.G	27.1
#5:	–	

COMMENTS:

CO_2 4% O_2 20%

FILTER TARE:

PRE-TEST LEAK CHECK

Meter: Cu. ft. in. HG
Pitots: in. H20

POST-TEST LEAK CHECK

Meter: Cu. ft. in. HG
Pitots in. H20

#	Θ	STATIC PRES.	Ts °F	ΔP	√ΔP	ΔH	Vm FT.3	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUM (IN Hg)
1	11:42		280			1.0	658.402	102	97	–	60	3
2	/		281			1.0	661.1	111	98	–	60	3
3			281			1.0	664.2	116	103	–	60	3
4			282			1.0	666.9	118	105	–	60	3
5			281			1.0	669.6	120	104	–	60	3
6			282			1.0	672.7	119	105	–	60	3
							675.000					
									108.2			
							16.598					
AV												

PARTICULATE FIELD DATA

PLANT: Acme Brick
DATE: 6/18/91
REPETITION: 3

LOCATION: Kiln Ex
OPERATOR: JS
STACK #:
SAMPLE BOX #: HF
METER BOX #: 3
AMBIENT TEMPERATURE: 90
BAROMETRIC PRESSURE: 29.5
ASSUMED MOISTURE: 8%
PROBE LENGHT: 9'
NOZZLE DIAMETER: .5
STACK DIAMETER: 97"
METER H : 1.69379
C FACTOR: .84
METER CO-EFFICIENT: .969831

IMPINGERS

	Initial	Final
#1:	200 ml	219
#2:	200 ml	201
#3:		
#4:	200g	56
#5:		
		202.8
		22.8

COMMENTS:

CO2 4%

O2 18.5%

FILTER TARE:

PRE-TEST LEAK CHECK

Meter: 0.00 Cu. ft. 15 in. HG
Pitots: ✓ in. H20

POST-TEST LEAK CHECK

Meter: 0.00 Cu. ft. 10 in. HG
Pitots ✓ in. H20

#	θ	STATIC PRES.	Ts °F	ΔP	√ΔP	ΔH	Vm FT.3	Tm INLET	Tm OUTLET	OVEN TEMP	IMP OUTLET TEMP.	VACUUR (IN Hg)
1	1.01		283			1.0	675.179	110	108		60	3
2			281			1.0	677.9	119	107		60	3
3			285			1.0	680.7	120	106		60	3
4			282			1.0	683.21	121	105		60	3
5			280			1.0	685.9	122	107		60	3
6			281			1.0	688.7	122	107		60	3
							691.391					
									112.83			
							16.216					
Δv												

PARTICULATE FIELD DATA

PLANT: Acme, Scaly
DATE: 6/18/91
REPETITION: 1

LOCATION: Dryer
OPERATOR: TA
STACK #: HF Sampling Train
SAMPLE BOX #: 1
METER BOX #: 4
AMBIENT TEMPERATURE: 92
BAROMETRIC PRESSURE: 29.9
ASSUMED MOISTURE: 3%
PROBE LENGTH: 60"
NOZZLE IDAMETER: 7/16
STACK DIAMETER: 60" 13.5" Nipple
METER H : 1.624
C FACTOR: .84
METER CO-EFFICIENT: 1.011

FILTER TARE: NA

PRE-TEST LEAK CHECK
Meter: 0.01 cu. ft. 16 in. HG
Pitots: ✓ in. H2O
✓

IMPINGERS

	Initial	R#1 Final	R#2 Final	R#3 Final
#1:	200 NaOH	212	213	214
#2:	200 NaOH	200	202	200
#3:	0	0	0	0
#4:	200 SG	204.9	203.6	203.6
#5:		16.9	13.6	19.6

COMMENTS

	CO_2	O_2
R_1	0	21
R_2	0	21
R_3	0	21

Leak check
R1 0.01 @ 4
R2 0.00 @ 2.0
R2 0.00 @ 2.0

POST-TEST LEAK CHECK
Meter: cu.ft. in. HG
Pitots: in. H2O

P #	θ	STATIC PRES.	Ts °F	ΔP	√ΔP	ΔH	Vm FT.3	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUR (IN Hg)
R#1 1	8:52	-1.2	102	.85		1.0	183.470	107	104	251	61	2.0
2			99	.85		1.0	87.1	117	103	246	62	2.0
3			103	.85		1.0	90.0	120	105	248	62	2.0
4			102	.85		1.0	92.7	123	105	249	63	2.0
5			106	.85		1.0	95.5	126	108	248	63	2.0
6			107	.85		1.0	98.1	127	109	245	64	2.0
						(1.0)	200.355		(112.8)			
							1.355					
R#2 1	9:53		109	.9		1.0	201.655	110	107	250	62	2.0
2			107	.9		1.0	4.7	121	107	250	62	2.0
3			108	.9		1.0	7.5	127	110	247	63	2.0
4			108	.8		.9	10.4	131	114	244	64	2.0
5			108	.8		.9	12.5	131	115	243	64	2.0
6			109	.8		.9	15.0	134	117	242	65	2.0
						(.95)	17.616		(118.7)			
							15.961					
R 3 1	10:55		108	.9		1.0	618.762	120	120	242	63	2.0
2			110	.9		1.0	21.5	133	121	247	64	2.0
3			109	.9		1.0	24.2	137	121	244	64	2.0
4			107	.9		1.0	26.9	139	122	246	64	2.0
5			107	.8		0.9	29.7	139	126	245	65	2.0
10			111	.8		0.9	32.4	140	127	240	65	2.0
	11:34					.9667						
							13.762		(128.8)			
AV												

PARTICULATE FIELD DATA

PLANT: Acme
DATE: 6-18-91
REPETITION: 1

LOCATION: ACME, Seely, Tx
OPERATOR: LW, TA
STACK #: Dryer
SAMPLE BOX #: 6
METER BOX #: 1
AMBIENT TEMPERATURE: 92
BAROMETRIC PRESSURE: 29.9 (29.915)
ASSUMED MOISTURE: 3%
PROBE LENGHT: 5'
NOZZLE DIAMETER: ½"
STACK DIAMETER: 60"
METER H : 1.74377
C FACTOR: .84
METER CO-EFFICIENT: 1.00960

SO_2 Train

IMPINGERS

	Initial	Final
#1:	200 mls 6% H_2O_2	213
#2:	200 mls 6% H_2O_2	203
#3:	—	—
#4:	200 gr SG	203.9
#5:		
		19.9

COMMENTS:

CO_2	O_2
0	21

FILTER TARE: .46227

PRE-TEST LEAK CHECK
Meter: .016 Cu. ft. 18 in. HG
Pitots: ✓ in. H2O

POST-TEST LEAK CHECK
Meter: 0.010 Cu. ft. 15 in. HG
Pitots ✓ in. H2O

#	Θ	STATIC PRES.	Ts °F	Traverse ΔP	RUN VAP Ts/ΔP (Of Run)	ΔH	Vm FT.3	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUM (IN Hg)
A 1	8:50	-1.2	108	1.10	102/.85	.85	654.240	95	95	240	66	2.0
2			108	1.15	103/.85	.85	57.1	107	98	265	66	2.0
3			108	1.10	104/.85	.85	60.2	113	98	261	65	2.0
4			108	1.05	101/.85	.85	62.9	117	100	261	65	2.0
5			108	.95	108/.85	.85	65.8	119	101	254	65	2.0
6			108	.92	107/.85	.85	68.4	124	104	252	66	2.0
7			108	.75			670.625					
8			108	.68								
B 1			108	.78								
2			103	.80								
3			104	.90								
4			104	1.05								
5			103	1.00								
6			103	1.05								
7			103	1.10								
8			101	1.10								
AV			105.8		98/.85	.85	16.385		105.9			

PARTICULATE FIELD DATA

PLANT: Acme
DATE: 6-18-91
REPETITION: 2

LOCATION: Sealy, Tx
OPERATOR: LW, TM
STACK #: Dryer Ex
SAMPLE BOX #: 6
METER BOX #: 1
AMBIENT TEMPERATURE: 94
BAROMETRIC PRESSURE: 29.9
ASSUMED MOISTURE: 3%
PROBE LENGHT: 60"
NOZZLE DIAMETER: ½"
STACK DIAMETER: 60"
METER H : 1.74377
C FACTOR: .84
METER CO-EFFICIENT: 1.00960

SO_2 Train
4.5435

IMPINGERS

	Initial	Final
#1: 200 mls 6% H_2O_2		208 mls
#2: 200 mls 6% H_2O_2		200
#3:		
#4: 200 gr S.G.		202.9
#5:		10.9

COMMENTS:

CO_2	O_2
0	21

FILTER TARE: Same Run 1

Traverse @ 9:45

PRE-TEST LEAK CHECK
Meter: 0.005 Cu. ft. 8 in. HG
Pitots: ✓ in. H20

POST-TEST LEAK CHECK
Meter: 0.001 Cu. ft. 5 in. HG
Pitots ✓ in. H20

Run 2

#	Θ	STATIC PRES.	Ts °F	Traverse ΔP	$\sqrt{\Delta P}$ Ts/ΔP	ΔH	Vm FT.3	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUR (IN Hg)
A1	9:53	-1.0	108	.75	109/.9	.9	672.510	99	100	268	63	2
2			108	.82	107/.9	.9	75.2	118	101	273	63	2
3			108	.85	106/.8	.8	77.9	125	103	272	63	2
4			108	.95	106/.8	.8	80.6	130	105	257	64	2
5			108	1.30	107/.8	.8	82.8	128	108	248	65	2
6			108	1.20	107/.8	.8	85.4	132	109	255	65	2
7			108	.75			688.110					
8			108	.65								
B1			110	1.10								
2			110	1.1								
3			108	1.1								
4			109	1.0								
5			108	.95								
6			109	.85								
7			109	.75								
8			109	.7								
Av			108.5		.9576	.8332	15.6		113.2			

Port cut 2 min

PARTICULATE FIELD DATA

PLANT: Acme
DATE: 6-18-91
REPETITION: 3

LOCATION: Scaly, Tx
OPERATOR: LW, TA
STACK #: Dryer Ex.
SAMPLE BOX #: 6
METER BOX #: 1
AMBIENT TEMPERATURE: 94
BAROMETRIC PRESSURE: 29.9
ASSUMED MOISTURE: 3% 6.748
PROBE LENGHT: 60"
NOZZLE DIAMETER: 1/2"
STACK DIAMETER: 60"
METER H : 1.74377
C FACTOR: .84
METER CO-EFFICIENT: 1.00960

SO_2 Train

IMPINGERS

	Initial	Final
#1:	200 mls 6% H_2O_2	213
#2:	200 mls 6% H_2O_2	202
#3:	——	0
#4:	200 gr SG.	203.4
#5:		18.4

COMMENTS:

$\frac{CO_2}{0}$ $\frac{O_2}{21}$

Traverse taken 10:50 am

FILTER TARE: Same Run 1

PRE-TEST LEAK CHECK
Meter: 0.018 Cu. ft. 13 in. HG
Pitots: ✓ in. H20

POST-TEST LEAK CHECK
Meter: 0.005 Cu. ft. 4 in. HG
Pitots ✓ in. H20

Traverse Run

	Θ	STATIC PRES.	Ts °F	Traverse ΔP	Vm Ts / ΔH	ΔH	Vm FT.³	Tm INLET	Tm OUTLET	OVEN TEMP.	IMP OUTLET TEMP.	VACUUM (IN Hg)
A1	10:55	-1.0	110	1.10	108 / 1.9	-90	688.525	111	113	246	62	2.0
2			110	1.10	107 / 1.9	.90	91.0	129	115	262	63	2.0
3	11:05		110	1.15	105 / 1.9	.90	93.9	134	115	261	64	2.0
4			110	1.0	104 / 1.9	.90	96.8	138	116	256	64	2.0
5	11:15		110	.95	104 / .8	.80	99.2	143	118	240	65	2.0
6			108	.85	107 / .8	.80	702.1	140	124	247	65	2.0
7	11:34		108	.75								
8			108	.70								
B1			107	.95								
2			107	.9								
3			108	1.0								
4			108	.95								
5			108	1.10								
6			108	1.05								
7			108	.80								
8			108	.60								
Av			108.5		.963	.8667	13.5757		124.7			

APPENDIX D

VISIBLE EMISSION OBSERVATION FORM

No. R1 Pg 1

COMPANY NAME: Acme Brick	
STREET ADDRESS: 562 Porter-Santa Fe RD	
CITY: Sealy	STATE: TX ZIP: 77474
PHONE (KEY CONTACT): (409) - 885-4124	SOURCE ID NUMBER: R-9540-

PROCESS EQUIPMENT: Kiln Exhaust	OPERATING MODE: Full Load-16 Cars
CONTROL EQUIPMENT: Hydrogen Scrubber	OPERATING MODE: Full Load

DESCRIBE EMISSION POINT: 70' high gray Black stack 47" Diameter

HEIGHT ABOVE GROUND LEVEL: 70'	HEIGHT RELATIVE TO OBSERVER: Start 70' End
DISTANCE FROM OBSERVER: Start 1220' End	DIRECTION FROM OBSERVER: Start Due West End

DESCRIBE EMISSIONS: Start Not visible Emissions End

EMISSION COLOR: Start — End	IF WATER DROPLET PLUME: Attached ☐ Detached ☐

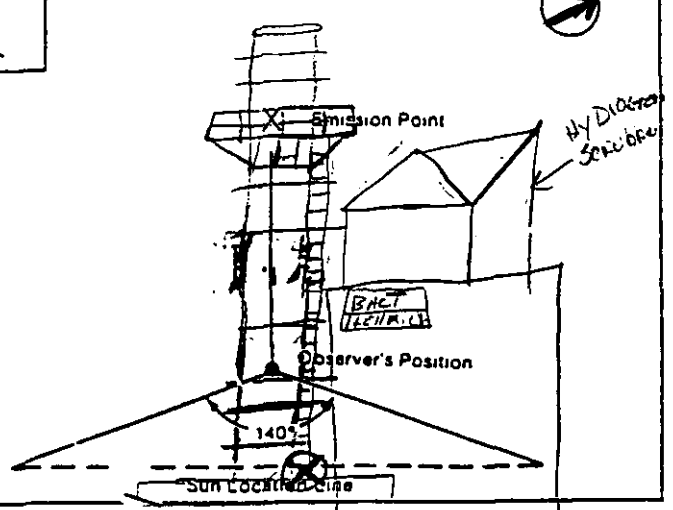
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start ONE Diameter Above End

DESCRIBE PLUME BACKGROUND: Start SKY End

BACKGROUND COLOR: Start Blue End	SKY CONDITIONS: Start Prtly Cloudy End	
WIND SPEED: Start 3-5 mph End	WIND DIRECTION: Start South End	
AMBIENT TEMP: Start 80° End	WET BULB TEMP	RH, percent

SOURCE LAYOUT SKETCH — Draw North Arrow

Stack with Plume
Sun
Wind



ADDITIONAL INFORMATION

60

OBSERVATION DATE	START TIME	END TIME
6-18-91	10:00	10:30

SEC / MIN	0	15	30	45	COMMENTS
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2	0	0	0	0	
3	0	0	0	0	
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20	—	—	—	—	
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27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): Matt Taylor	
OBSERVER'S SIGNATURE: Matt Taylor	DATE: 6-18-91
ORGANIZATION: Armstrong Environmental	
CERTIFIED BY: TACB	DATE: 4-19-91

CONTINUED ON VEO FORM NUMBER

VISIBLE EMISSION OBSERVATION FORM

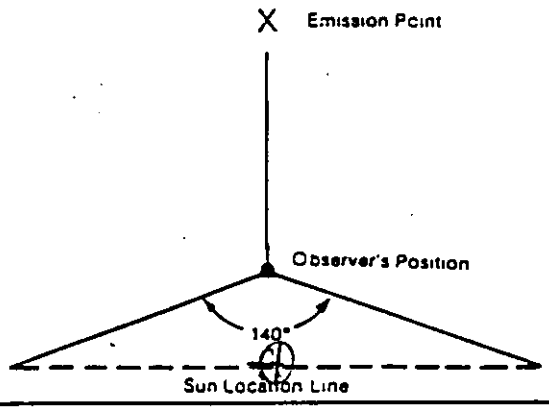
No. R1 P1-2

COMPANY NAME	ACME Brick
STREET ADDRESS	562 Peter-SAN FELIPE ROAD
CITY	Sealy
STATE	TX
ZIP	77474
PHONE (KEY CONTACT)	(409) 885-4124
SOURCE ID NUMBER	R-9540
PROCESS EQUIPMENT	KILN Exhaust
OPERATING MODE	Full Capacity
CONTROL EQUIPMENT	Hydrogen Scrubber
OPERATING MODE	Full Load
DESCRIBE EMISSION POINT	70' High Gray Black Stack
HEIGHT ABOVE GROUND LEVEL	70'
HEIGHT RELATIVE TO OBSERVER	Start 70' End —
DISTANCE FROM OBSERVER	Start 120' End —
DIRECTION FROM OBSERVER	Start W End —
DESCRIBE EMISSIONS	Start — End —
EMISSION COLOR	Start — End —
IF WATER DROPLET PLUME	Attached ☐ — Detached ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	Start ONE Stack Diameter End
DESCRIBE PLUME BACKGROUND	Start End
BACKGROUND COLOR	Start End
SKY CONDITIONS	Start End
WIND SPEED	Start End
WIND DIRECTION	Start End
AMBIENT TEMP	Start End
WET BULB TEMP	
RH, percent	

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH

Draw North Arrow



OBSERVATION DATE	START TIME	END TIME
6-18-91	10:30 -	11:00

SEC / MIN	0	15	30	45	COMMENTS
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6	0	0	0	0	
7	0	0	0	0	
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25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT)	Matt Taylor
OBSERVER'S SIGNATURE	Matt Taylor
DATE	6-18-91
ORGANIZATION	Armstrong Engr.
CERTIFIED BY	TACB
DATE	4-19-91
ADDITIONAL INFORMATION	
CONTINUED ON VEO FORM NUMBER	

VISIBLE EMISSION OBSERVATION FORM

No. R3 Pg 1

COMPANY NAME: ACME Brick

STREET ADDRESS: 562 Peter - SanFelipe Rd

CITY: Sealy | STATE: TX | ZIP: 77474

PHONE (KEY CONTACT): 409 885-4124 | SOURCE ID NUMBER: R-9540

PROCESS EQUIPMENT: Kiln Ex | OPERATING MODE: Full

CONTROL EQUIPMENT: Hydrotherm Scrubber | OPERATING MODE: Full

DESCRIBE EMISSION POINT: 70' high black stack

HEIGHT ABOVE GROUND LEVEL: 70' | HEIGHT RELATIVE TO OBSERVER: Start 70' End

DISTANCE FROM OBSERVER: Start 75' End | DIRECTION FROM OBSERVER: Start NE End

DESCRIBE EMISSIONS: Start — End —

EMISSION COLOR: Start — End — | IF WATER DROPLET PLUME: Attached ☐ — Detached ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start 1 Diameter Above End —

DESCRIBE PLUME BACKGROUND: Start Sky End —

BACKGROUND COLOR: Start Blue End | SKY CONDITIONS: Start Partly Cloudy End

WIND SPEED: Start 10 MPH End | WIND DIRECTION: Start SE End

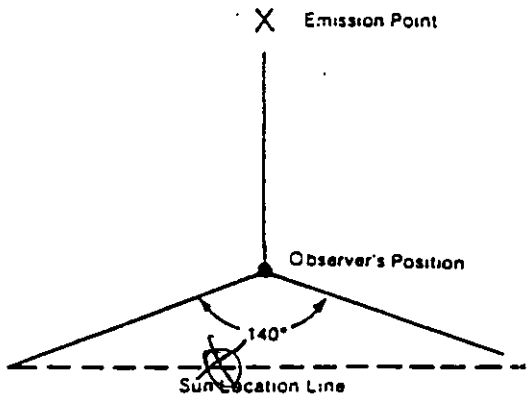
AMBIENT TEMP: Start 90° End 94° | WET BULB TEMP | RH, percent

Stack with Plume ⊂

Sun ⊕

Wind →

SOURCE LAYOUT SKETCH — Draw North Arrow (1)



ADDITIONAL INFORMATION

62

OBSERVATION DATE | START TIME: 1:08 PM | END TIME

SEC / MIN	0	15	30	45	COMMENTS
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3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): MATT TAYLOR

OBSERVER'S SIGNATURE: Matt Taylor | DATE: 6-18-91

ORGANIZATION: Air Pollution Env.

CERTIFIED BY: TACB | DATE: 6-19-91

CONTINUED ON VEO FORM NUMBER

VISIBLE EMISSION OBSERVATION FORM

No. R3PG2

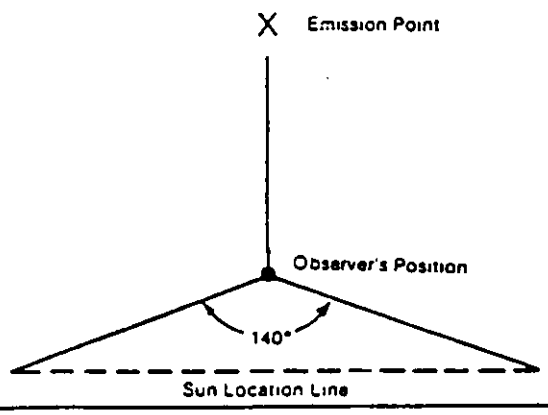
COMPANY NAME: ACME Brick	
STREET ADDRESS: 562 Peter San Filipe	
CITY: Seguin	STATE: TX — ZIP: 78474
PHONE (KEY CONTACT): 409-885-4124	SOURCE ID NUMBER: R-9540
PROCESS EQUIPMENT: Kiln Exhaust	OPERATING MODE: Full
CONTROL EQUIPMENT: Hydrotech Scrubber	OPERATING MODE: Full
DESCRIBE EMISSION POINT	
HEIGHT ABOVE GROUND LEVEL	HEIGHT RELATIVE TO OBSERVER: Start / End
DISTANCE FROM OBSERVER: Start / End	DIRECTION FROM OBSERVER: Start / End

DESCRIBE EMISSIONS: Start / End	
EMISSION COLOR: Start / End	IF WATER DROPLET PLUME: Attached ☐ Detached ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start / End	

DESCRIBE PLUME BACKGROUND: Start / End		
BACKGROUND COLOR: Start / End	SKY CONDITIONS: Start / End	
WIND SPEED: Start / End	WIND DIRECTION: Start / End	
AMBIENT TEMP: Start / End	WET BULB TEMP	RH, percent

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH — Draw North Arrow



OBSERVATION DATE	START TIME	END TIME
		2:08

SEC / MIN	0	15	30	45	COMMENTS
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25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT)	
OBSERVER'S SIGNATURE	DATE
ORGANIZATION	
CERTIFIED BY	DATE
CONTINUED ON VEO FORM NUMBER	

ADDITIONAL INFORMATION

VISIBLE EMISSION OBSERVATION FORM

No. R2 Pg 2

COMPANY NAME: Acme Brick

STREET ADDRESS: 562 Peter Sanfelippo RD

CITY: Seguin | STATE: TX | ZIP: 77474

PHONE (KEY CONTACT): (409) - 885-4124 | SOURCE ID NUMBER: R-9540

PROCESS EQUIPMENT: Kiln Exhaust | OPERATING MODE: Full

CONTROL EQUIPMENT: Hydrogen Scrubber | OPERATING MODE: Full

DESCRIBE EMISSION POINT

HEIGHT ABOVE GROUND LEVEL | HEIGHT RELATIVE TO OBSERVER: Start End

DISTANCE FROM OBSERVER: Start End | DIRECTION FROM OBSERVER: Start End

DESCRIBE EMISSIONS: Start End

EMISSION COLOR: Start End | IF WATER DROPLET PLUME: Attached [ ] Detached [ ]

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start End

DESCRIBE PLUME BACKGROUND: Start End

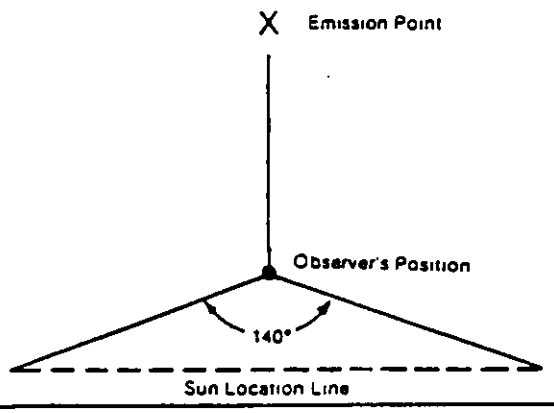
BACKGROUND COLOR: Start End | SKY CONDITIONS: Start End

WIND SPEED: Start End | WIND DIRECTION: Start End

AMBIENT TEMP: Start End | WET BULB TEMP | RH, percent

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH — Draw North Arrow



ADDITIONAL INFORMATION

64

OBSERVATION DATE | START TIME | END TIME

SEC / MIN	0	15	30	45	COMMENTS
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4	0	0	0	0	
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6	0	0	0	0	
7	0	0	0	0	
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25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): MATT TAYLOR

OBSERVER'S SIGNATURE: Matt Taylor | DATE: 6-18-91

ORGANIZATION: Ametech, Env.

CERTIFIED BY: TALB | DATE: 4-19-91

CONTINUED ON VEO FORM NUMBER

VISIBLE EMISSION OBSERVATION FORM

No. R2 Pg 1

COMPANY NAME: ACME Brick

STREET ADDRESS: 562 Peter SanFelipe RD

CITY: Sealy | STATE: TX | ZIP: 77474

PHONE (KEY CONTACT): (409) 885-4124 | SOURCE ID NUMBER: R9640

PROCESS EQUIPMENT: Kiln Exhaust | OPERATING MODE: Full

CONTROL EQUIPMENT: Hydrosonic Scrubber | OPERATING MODE: Full

DESCRIBE EMISSION POINT: Big Black Stack

HEIGHT ABOVE GROUND LEVEL: 70' | HEIGHT RELATIVE TO OBSERVER: Start 70' End

DISTANCE FROM OBSERVER: Start 100' End | DIRECTION FROM OBSERVER: Start NW End —

DESCRIBE EMISSIONS: Start — End

EMISSION COLOR: Start — End | IF WATER DROPLET PLUME: Attached [ ] Detached [ ]

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start Stack Diameter End —

DESCRIBE PLUME BACKGROUND: Start SKY End

BACKGROUND COLOR: Start End | SKY CONDITIONS: Start Partly Cloudy End

WIND SPEED: Start 5 End | WIND DIRECTION: Start SE End

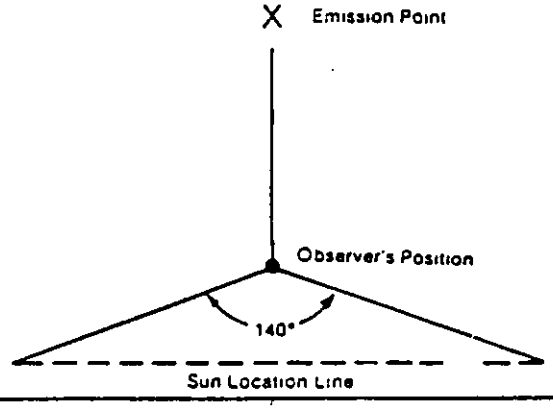
AMBIENT TEMP: Start End | WET BULB TEMP | RH, percent

Stack with Plume —

Sun +

Wind →

SOURCE LAYOUT SKETCH — Draw North Arrow



ADDITIONAL INFORMATION

65

OBSERVATION DATE: 6-18-91 | START TIME: 11:46 AM | END TIME

MIN \ SEC	0	15	30	45	COMMENTS
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5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
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25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): MATT TAYLOR

OBSERVER'S SIGNATURE: [signature] | DATE: 6-18-91

ORGANIZATION: [illegible]

CERTIFIED BY: TACB | DATE: 4-19-91

CONTINUED ON VEO FORM NUMBER

APPENDIX E

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

LABORATORY TESTS RESULTS
03/25/91

JOB NUMBER: 911502 CUSTOMER: Acme Brick ATTN: Ken Thompson

CLIENT I.D.....:
DATE SAMPLED.....: 02/25/91
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: LPG 1-25-91 thru 2-25-91

LABORATORY I.D...: 911502-0001
DATE RECEIVED....: 03/21/91
TIME RECEIVED....: 13:24
REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Analysis of Natural Gas		*1		GC	11/13/90	
Carbon Dioxide	1.94	0.01	Mol %	ASTM D-1945		
Nitrogen	0.56	0.01	Mol %	ASTM D-1945		
Methane	92.52	0.01	Mol %	ASTM D-1945		
Ethane	3.67	0.01	Mol %	ASTM D-1945		
Propane	0.74	0.01	Mol %	ASTM D-1945		
Isobutane	0.13	0.01	Mol %	ASTM D-1945		
N-Butane	0.13	0.01	Mol %	ASTM D-1945		
Isopentane	0.07	0.01	Mol %	ASTM D-1945		
N-Pentane	0.05	0.01	Mol %	ASTM D-1945		
Hexanes Plus	0.18	0.01	Mol %	ASTM D-1945		
Total	100.00	0.01	Mol %			
Ethane Plus	1.386	0.001	GPM			
Propane Plus	0.409	0.001	GPM			
Butane plus	0.207	0.001	GPM			
Specific Gravity	0.6110	0	(Air = 1.000)	ASTM D-3588		
Gross Heating Value, Dry	1040	0	BTU	ASTM D-3588		
Gross Heating Value, Wet	1022	0	BTU	ASTM D-3588		
Pressure Base	14.65	0	psia			

APPROVED BY: Layshet

P. O. Box 34282
Houston, TX 77234-4282
(713) 943-9776

3 pushes per
12 hours/day

ACME BRICK COMPANY
SEALY, TEXAS

TIME: 12:50:54 DATE: 6/18/91

	KET	KEP	UCP	G0	G1	G2	G3	G4	G5	G6	G7	G8	RC	RCB	ECP	HAS	MUB
SETPOINT:	170	0%	.1799	1730	1825	1920	1970	2000	2005	2013	2013	1920	1460	1460	30%	99	85
ACTUAL:	158	83%	.1756	1723	1826	1919	1970	2001	2005	2010	2009	1921	1498	1496	30%	36	109

DAMPER POSITIONS:	KED	DCD	CAB	HAS	ECD	MUB
	83%	70%	20%	99%	30%	0%

PUSH SCHEDULE: 30: 0 FLASH: OFF FLASH NUMBER: 0 AUTO UPDATE: OFF

CONTROL MODE: KED= AUTO KEDF= MAN. ECD= MAN. MUB= AUTO

COMMENTS:.....

.....

79

RECORDER # 1 READINGS

****

COMM ERROR WITH PEX

CHANNEL NO. 1 106
CHANNEL NO. 2 104
CHANNEL NO. 3 103
CHANNEL NO. 4 0
CHANNEL NO. 5 108
CHANNEL NO. 6 121
CHANNEL NO. 7 120
CHANNEL NO. 8 133
CHANNEL NO. 9 171
CHANNEL NO. 10 814
CHANNEL NO. 11 948
CHANNEL NO. 12 1006
CHANNEL NO. 13 1111
CHANNEL NO. 14 1200
CHANNEL NO. 15 1296
CHANNEL NO. 16 1433
CHANNEL NO. 17 621
CHANNEL NO. 18 1454
CHANNEL NO. 19 1470
CHANNEL NO. 20 1389
CHANNEL NO. 21 1236
CHANNEL NO. 22 1141
CHANNEL NO. 23 165
CHANNEL NO. 24 192
CHANNEL NO. 25 228
CHANNEL NO. 26 153
CHANNEL NO. 27 3
CHANNEL NO. 28 216
CHANNEL NO. 29 196
CHANNEL NO. 30 0

RECORDER # 2 READINGS

****

COMM ERROR WITH PEX

CHANNEL NO. 1 154	CHANNEL NO. 2 191	CHANNEL NO. 3 84
CHANNEL NO. 4 211	CHANNEL NO. 5 240	CHANNEL NO. 6 13
CHANNEL NO. 7 72	CHANNEL NO. 8 24	CHANNEL NO. 9 61
CHANNEL NO. 10 102	CHANNEL NO. 11 1601	CHANNEL NO. 12 137
CHANNEL NO. 13 530	CHANNEL NO. 14 798	CHANNEL NO. 15 1997
CHANNEL NO. 16 1987	CHANNEL NO. 17 2008	CHANNEL NO. 18 2015
CHANNEL NO. 19 2018	CHANNEL NO. 20 1992	CHANNEL NO. 21 1960
CHANNEL NO. 22 2009	CHANNEL NO. 23 2043	CHANNEL NO. 24 2025
CHANNEL NO. 25 2035	CHANNEL NO. 26 2030	CHANNEL NO. 27 2009
CHANNEL NO. 28 2008	CHANNEL NO. 29 1950	CHANNEL NO. 30 1871

13:11:01DISTURBANCE
MAKE-UP BURNER PILOT LIGHT OUT
PREHEAT FLAME OUT

13:11:55DISTURBANCE
MAKE-UP BURNER PILOT LIGHT OUT
MAKE-UP BURNER OVER-TEMP.

APPENDIX F

METER BOX CALIBRATION SUMMARY

METER BOX # 6
6-11-91
BAROMETRIC PRESSURE = 29.7

DELTA H = .5 VW = 5 TW = 80.5
VD = 5.215 TD = 82.5 TIME = 11.083 TEST METER Y = .998
METER BOX Y = .9592084
METER BOX H = 1.412014

DELTA H = 1 VW = 5 TW = 80.75
VD = 5.262 TD = 87.25 TIME = 8.616999 TEST METER Y = 1.003
METER BOX Y = .9621338
METER BOX H = 1.693878

DELTA H = 1.5 VW = 10 TW = 81
VD = 10.648 TD = 92.5 TIME = 14.25 TEST METER Y = 1.003
METER BOX Y = .958425
METER BOX H = 1.72221

DELTA H = 2 VW = 10 TW = 81.5
VD = 10.475 TD = 97.25 TIME = 12.433 TEST METER Y = 1.002
METER BOX Y = .9795356
METER BOX H = 1.736327

DELTA H = 3 VW = 10 TW = 82.25
VD = 10.484 TD = 99.25 TIME = 10.217 TEST METER Y = .997
METER BOX Y = .9735558
METER BOX H = 1.757373

DELTA H = 4 VW = 10 TW = 82.5
VD = 10.441 TD = 100.5 TIME = 8.917 TEST METER Y = .996
METER BOX Y = .9759184
METER BOX H = 1.782478

AVERAGE Y = .9681294
AVERAGE H = 1.684047

Meter Box Calibration

Dry Gas Meter #: 6
Calibrated by: AB
Date: 6-11-91
Barometric Pressure: 29.7

Orifice ΔH	Test Meter Volume V_w	Dry Gas Meter Volume V_d	Temperature				Time θ	γ	ΔH@
			Test Meter T_w	Dry Gas Meter					
				Inlet T_{di}	Outlet T_{do}	Ave T_d			
0.5	5.0	5.215	80.5	80/89	79/82	82.5	11.053	.998	
1.0	5.0	5.262	80.75	84/97	83/85	87.25	8.617	1.003	
1.5	10.0	10.648	81.0	90/103	87/90	92.5	14.250	1.003	
2.0	10.0	10.475	81.5	97/107	91/94	97.25	12.433	1.002	
3.0	10.0	10.484	82.25	98/109	95/95	99.25	10.317	.997	
4.0	10.0	10.441	82.5	100/110	96/06	100.5	8.917	.996	

$$\gamma = \frac{V_w P_{bar} (T_d + 460)}{V_d (P_{bar} + \frac{\Delta H}{13.6}) (T_w + 460)}$$

$$\Delta H@ = \frac{0.0317 \Delta H}{P_{bar}(T_d + 460)} \left[\frac{(T_w + 460)\ \theta}{V_w} \right]^2$$

P_{bar} = Barometric Pressure

DRY GAS METER #: 6

DATE: 6-11-91 Pbar 29.7

ΔH	VW	TW	VD	TDT	TDO	ΔTD	θ
.5 (5ft³)	224.000	81/80	560.575	80	79		
	219.000	81/80	555.660	89	82		
	5.000	80.5	5.215			82.5	11.083
1.0 (5ft³)	229.000	81/80	566.137	84	83		
	224.000	82/80	560.575	97	85		
	5.000	80.75	5.262			87.25	8.617
1.5 (10ft³)	239.000	82/80	576.785	90	87		
	229.000	82/80	566.137	103	90		
	10.000	81	10.648			92.5	14.258
2.0 (10ft³)	249.000	82/80	587.260	97	91		
	239.000	83/81	576.785	107	94		
	10.000	81.5	10.475			97.25	12.433
3.0 (10ft³)	259.000	83/81	597.744	94	95		
	249.000	83/82	587.260	109	95		
	10.000	82.25	10.484			99.25	10.217
4.0 (10ft³)	269.000	83/82	608.185	100	96		
	259.000	83/82	597.744	110	96		
	10.000	82.5	10.441			100.5	8.917

MMMMETER BOX CALIBRATION SUMMARY 2

METER BOX # 1
6/10/91
BAROMETRIC PRESSURE = 29.7

DELTA H = .5 VW = 5 TW = 83.5
VD = 4.995 TD = 87.3 TIME = 11.81 TEST METER Y = .998
METER BOX Y = 1.00474
METER BOX H = 1.606965

DELTA H = 1 VW = 5 TW = 84
VD = 5.052 TD = 93.8 TIME = 8.68 TEST METER Y = 1.003
METER BOX Y = 1.008063
METER BOX H = 1.718886

DELTA H = 1.5 VW = 10 TW = 84.5
VD = 10.196 TD = 100.8 TIME = 14.55 TEST METER Y = 1.003
METER BOX Y = 1.009419
METER BOX H = 1.791876

DELTA H = 2 VW = 10 TW = 84.8
VD = 10.28 TD = 106.8 TIME = 12.58 TEST METER Y = 1.002
METER BOX Y = 1.009072
METER BOX H = 1.769043

DELTA H = 3 VW = 10 TW = 85
VD = 10.241 TD = 110 TIME = 10.36 TEST METER Y = .997
METER BOX Y = 1.010689
METER BOX H = 1.79086

DELTA H = 4 VW = 10 TW = 85.8
VD = 10.2 TD = 113.3 TIME = 8.97 TEST METER Y = .996
METER BOX Y = 1.015612
METER BOX H = 1.784978

AVERAGE Y = 1.009599
AVERAGE H = 1.743768

Meter Box Calibration

Dry Gas Meter #: 1
Calibrated by: Larry Whicker
Date: 6-10-91
Barometric Pressure: 29.7

Orifice ΔH	Test Meter Volume V_w	Dry Gas Meter Volume V_d	Temperature				Time θ	γ	ΔH@
			Test Meter T_w	Dry Gas Meter					
				Inlet T_{di}	Outlet T_{do}	Ave T_d			
0.5	5.000	4.995	83.5	83/99	82/94	87.3	11.81	.990	
1.0	5.000	5.052	84.0	91/111	84/89	93.8	8.68	1.007	
1.5	10.000	10.196	84.5	101/113	88/96	100.8	14.55	1.003	
2.0	10.000	10.280	84.8	106/125	95/101	106.8	12.58	1.002	
3.0	10.000	10.241	85.0	109/123	99/104	110.0	10.36	.997	
4.0	10.000	10.200	85.8	115/130	102/106	113.3	8.97	.991	

$$\gamma = \frac{V_w P_{bar} (T_d + 460)}{V_d (P_{bar} + \frac{\Delta H}{13.6}) (T_w + 460)}$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{P_{bar}(T_d + 460)} \left[\frac{(T_w + 460)\ \theta}{V_w} \right]^2$$

P_{bar} = Barometric Pressure

DRY GAS METER #: 1

DATE: 6-10-91

Pbar 29.7

ΔH	VW	TW	VD	TDT	TDO	ΔTD	Θ
.5 (5ft³)	174.000	84/83	399.295	83	83		
	169.000	84/83	394.300	99	84		
	5.000	83.5	4.995			87.3	11.81
1.0 (5ft³)	179.000	84/83	404.347	91	84		
	174.000	85/84	399.295	111	89		
	5.000	84.0	5.052			93.8	8.68
1.5 (10ft³)	189.000	85/84	414.543	101	88		
	179.000	85/84	404.347	118	96		
	10.000	84.5	10.196			98.3	14.55
2.0 (10ft³)	199.000	85/84	424.823	106	95		
	189.000	85/85	414.543	125	101		
	10.000	84.8	10.280			106.8	12.53
3.0 (10ft³)	209.000	85/84	435.064	109	99		
	199.000	86/85	424.823	128	104		
	10.000	85.0	10.241			110.0	10.36
4.0 (10ft³)	219.000	86/85	445.264	115	102		
	209.000	86/86	435.064	130	106		
	10.000	85.8	10.200			113.3	8.97

METER BOX CALIBRATION SUMMARY

METER BOX # 3
6 13 91
BAROMETRIC PRESSURE = 29.7

DELTA H = .5 VW = 5 TW = 87.25
VD = 5.44 TD = 98.5 TIME = 11.811 TEST METER Y = .998
METER BOX Y = .9349788
METER BOX H = 1.596815

DELTA H = 1 VW = 5 TW = 87.25
VD = 5.375 TD = 103.5 TIME = 8.791001 TEST METER Y = 1.003
METER BOX Y = .9583557
METER BOX H = 1.753546

DELTA H = 1.5 VW = 10 TW = 87.75
VD = 10.65 TD = 107.75 TIME = 14.455 TEST METER Y = 1.003
METER BOX Y = .9725598
METER BOX H = 1.767819

DELTA H = 2 VW = 10 TW = 88.5
VD = 10.57 TD = 113.5 TIME = 12.18 TEST METER Y = 1.002
METER BOX Y = .9862896
METER BOX H = 1.661297

DELTA H = 3 VW = 10 TW = 89.25
VD = 10.501 TD = 113.5 TIME = 10.01 TEST METER Y = .997
METER BOX Y = .9840431
METER BOX H = 1.687715

DELTA H = 4 VW = 10 TW = 89.5
VD = 10.445 TD = 111.25 TIME = 8.668 TEST METER Y = .996
METER BOX Y = .9815892
METER BOX H = 1.695547

AVERAGE Y = .969636
AVERAGE H = 1.69379

Meter Box Calibration

Dry Gas Meter #: 3
Calibrated by: L. Whichev
Date: 6-13-91
Barometric Pressure: 29.7

Orifice ΔH	Test Meter Volume V_w	Dry Gas Meter Volume V_d	Temperature				Time θ	γ	ΔH@
			Test Meter T_w	Dry Gas Meter					
				Inlet T_{di}	Outlet T_{do}	Ave T_d			
.5	5.000	5.44	87.25	97/112	90/95	98.5	11.811	.998	
1.0	5.000	5.375	87.25	108/114	95/97	103.5	8.791	1.003	
1.5	10.000	10.65	87.75	107/124	85/95	107.75	14.455	1.003	
2.0	10.000	10.57	89.5	116/126	101/111	113.5	12.18	1.002	
3.0	10.000	10.501	89.25	116/129	101/102	113.5	10.01	.997	
4.0	10.000	10.445	89.5	117/124	102/102	111.25	8.668	.996	

$$\gamma = \frac{V_w P_{bar} (T_d + 460)}{V_d \left(P_{bar} + \frac{\Delta H}{13.6}\right) (T_w + 460)}$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{P_{bar}(T_d + 460)} \left[\frac{(T_w + 460)\ \theta}{V_w} \right]^2$$

P_{bar} = Barometric Pressure

DRY GAS METER #: 3

DATE: 6-13-91

Pbar 29.7

ΔH	VW	TW	VD	TDT	TDO	ΔTD	Θ
.5 (5ft³)	437.000	88/87	588.120	97	90		
	432.000	88/86	582.680	112	95		
	5.000	87.25	5.44		→	98.5	11.811
1.0 (5ft³)							
	442.000	88/86	593.495	108	95		
	437.000	88/87	588.120	114	97		
	5.000	87.25	5.375		→	103.5	8.791
1.5 (10ft³)							
	452.000	88/87	604.145	107	95		
	442.000	88/88	593.495	124	105		
	10.000	87.75	10.65		→	107.75	14.455
2.0 (10ft³)							
	462.000	88/88	614.715	116	101		
	452.000	88/90	604.145	126	111		
	10.000	88.5	10.57		→	113.5	12.18
3.0 (10ft³)							
	472.000	88/90	625.216	116	102		
	462.000	89/90	614.715	129	107		
	10.000	89.25	10.501		→	113.5	10.01
4.0 (10ft³)							
	482.000	89/90	635.661	117	102		
	472.000	89/90	625.216	124	102		
	10.000	89.5	10.445		→	111.25	8.668

METER BOX CALIBRATION SUMMARY
METER BOX # 4
6-11-91
BAROMETRIC PRESSURE = 29.7

DELTA H = .5 VW = 5 TW = 83.75
VD = 5.049 TD = 88.5 TIME = 11.751 TEST METER Y = .998
METER BOX Y = .9957156
METER BOX H = 1.588929

DELTA H = 1 VW = 5 TW = 84
VD = 5.051 TD = 95.5 TIME = 8.467 TEST METER Y = 1.003
METER BOX Y = 1.011358
METER BOX H = 1.630556

DELTA H = 1.5 VW = 10 TW = 84
VD = 10.17 TD = 101.5 TIME = 13.881 TEST METER Y = 1.003
METER BOX Y = 1.014194
METER BOX H = 1.625862

DELTA H = 2 VW = 10 TW = 84
VD = 10.234 TD = 105.75 TIME = 12.165 TEST METER Y = 1.002
METER BOX Y = 1.013218
METER BOX H = 1.652457

DELTA H = 3 VW = 10 TW = 84
VD = 10.186 TD = 107.75 TIME = 10.065 TEST METER Y = .997
METER BOX Y = 1.013996
METER BOX H = 1.6908

DELTA H = 4 VW = 10 TW = 84.25
VD = 10.134 TD = 109.75 TIME = 8.383001 TEST METER Y = .996
METER BOX Y = 1.01879
METER BOX H = 1.559819

AVERAGE Y = 1.011212
AVERAGE H = 1.624737

Meter Box Calibration

Dry Gas Meter #: 4
Calibrated by: AB
Date: 6-11-91
Barometric Pressure: 29.7

Orifice ΔH	Test Meter Volume V_w	Dry Gas Meter Volume V_d	Temperature				Time θ	Y	ΔH@
			Test Meter T_w	Dry Gas Meter Inlet T_{di}	Dry Gas Meter Outlet T_{do}	Dry Gas Meter Ave T_d			
0.5	5	5.049	83.75	87/103	83/87	88.5	11.751	0.998	
1.0	5	5.051	84	93/109	85/92	95.5	8.467	1.003	
1.5	10	10.170	84	99/115	93/99	101.5	13.881	1.003	
2.0	10	10.234	84	104/119	96/102	105.75	12.165	1.003	
3.0	10	10.186	84	107/120	100/104	107.75	10.065	0.997	
4.0	10	10.134	84.25	109/122	102/105	109.75	8.383	0.996	

$$Y = \frac{V_w P_{bar} (T_d + 460)}{V_d (P_{bar} + \frac{\Delta H}{13.6}) (T_w + 460)}$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{P_{bar}(T_d + 460)} \left[\frac{(T_w + 460)\ \theta}{V_w} \right]^2$$

P_{bar} = Barometric Pressure

DRY GAS METER #: 4

DATE: 6-11-91 Pbar 29.7

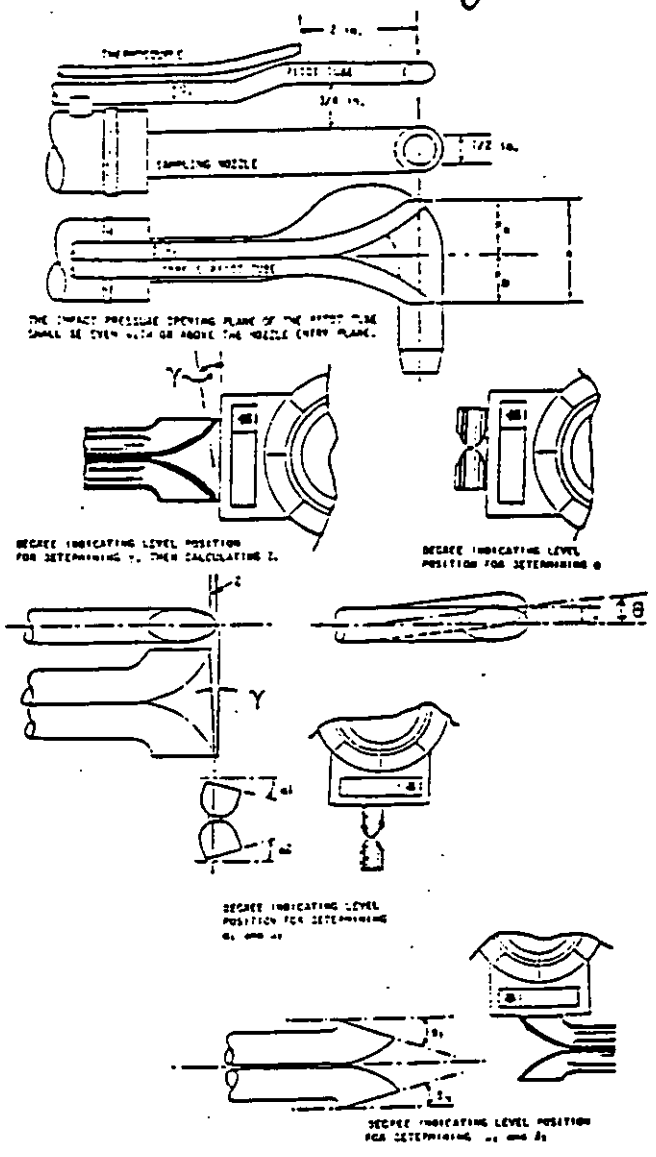
ΔH	VW	TW	VD	TDT	TDO	ΔTD	Θ
.5 (5ft³)	324.000	84/83	131.769	82	83		
	319.000	84/84	126.720	102	87		
	5.000	83.5	5.049			88.5	11.751
1.0 (5ft³)	329.000	84/84	126.570	93	88		
	324.000	84/84	131.769	109	92		
	5.000	84	5.051			95.5	8.467
1.5 (10ft³)	339.000	84/84	146.990	99	93		
	329.000	84/84	126.820	115	99		
	10.000	84	10.170			101.5	13.881
2.0 (10ft³)	349.000	84/84	157.224	104	98		
	339.000	84/84	146.990	119	102		
	10.000	84	10.234			105.75	12.165
3.0 (10ft³)	359.000	84/84	167.410	107	100		
	349.000	84/84	157.224	120	104		
	10.000	84	10.186			107.75	10.065
4.0 (10ft³)	369.000	84/84	177.544	109	102		
	359.000	85/84	167.410	123	105		
	10.000	84.75	10.134			109.75	4.383

PITOT TUBE INSPECTION DATA SHEET

Company Name: Armstrong Env.

Pre-sample Date 6-7-91

Post Sample Date 6/19/91



Yes	level?	Yes
No	obstructions?	No
No	damaged?	No
0°	$-10° < \alpha_1 < +10°$	0°
0°	$-10° < \alpha_2 < +10°$	0°
2°	$-5° < \beta_1 < +5°$	2°
2°	$-5° < \beta_2 < +5°$	2°
3°	γ	3°
1°	θ	1°
5/8 (.625")	A	.625
.313	$1.05\ D_t < P_a < 1.5\ D_t$ (.2625 / .375)	.313
.313	$1.05\ D_t < P_b < 1.5\ D_t$	.313
1/4"	$3/16" \leq D_t \leq 3/8"$	1/4
.03275	$A \tan \gamma < 0.125"$	.03275
.0191	$A \tan \theta < 0.03125"$	.0191
✓	$P_a = P_b \pm 0.063"$	✓

Comments: _____

Pitot tube/probe number 5' stainless meets or exceeds all specifications criteria and/or applicable design features* and is hereby assigned a pitot tube calibration factor of 0.84.

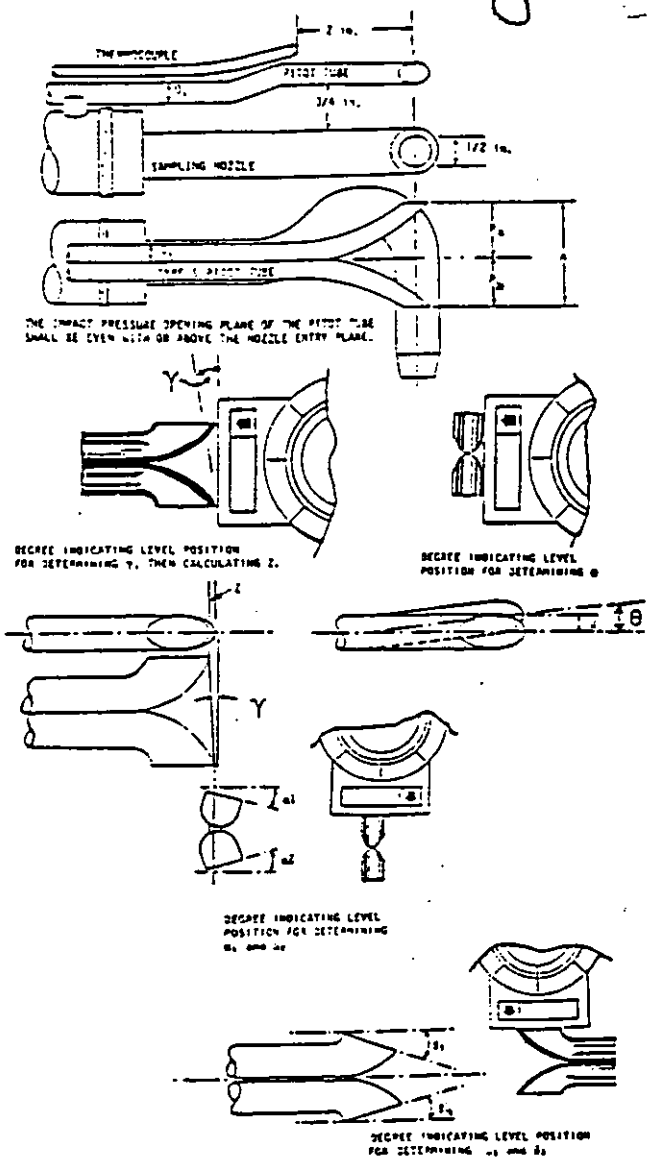
Signature _____

Date 6/7/91

*See 40 CFR 60, Vol. 42, No. 160, Method 2. Verify the minimum 2 inch setback of the thermocouple and the minimum 3/4 inch separation between the pitot tube and the nozzle as shown at the top of this page.

PITOT TUBE INSPECTION DATA SHEET

Company Name: Armstrong Environmental — Pre-sample Date 6/15/91 — Post Sample Date 6/19/91 RT



✓	level?	✓
N/A	obstructions?	N/A
NO	damaged?	NO
4°	$-10° < \alpha_1 < +10°$	4°
3°	$-10° < \alpha_2 < +10°$	3°
1°	$-5° < \beta_1 < +5°$	2°
-3°	$-5° < \beta_2 < +5°$	-2°
3°	γ	2°
1°	θ	2°
.687	A	.686
.345	$1.05\ D_t < P_a < 1.5\ D_t$	.345
.342	$1.05\ D_t < P_b < 1.5\ D_t$	.341
1/4"	$3/16" \leq D_t \leq 3/8"$	1/4"
.036	$A \tan \gamma < 0.125"$	.024
.012	$A \tan \theta < 0.03125"$	.024
.05	$P_a = P_b \pm 0.063"$	.05

Comments: 8' Glass lined Probe

Pitot tube/probe number 6 meets or exceeds all specifications criteria and/or applicable design features* and is hereby assigned a pitot tube calibration factor of 0.84.

Signature [signature]

Date 6/15/91

*See 40 CFR 60, Vol. 42, No. 160, Method 2. Verify the minimum 2 inch setback of the thermocouple and the minimum 3/4 inch separation between the pitot tube and the nozzle as shown at the top of this page.

POST METER BOX CALIBRATION SUMMARY
6/19/91
METER BOX # 4

BAROMETRIC PRESSURE = 29.7

DELTA H 1 VW = 10 TW = 90
VD = 10.181 TD = 102.25 TIME = 17.15 TEST METER Y = 1.003
METER BOX Y = 1.004624
METER BOX H = 1.68899

DELTA H 1 VW = 10 TW = 90
VD = 10.315 TD = 110.5 TIME = 17.03 TEST METER Y = 1.003
METER BOX Y = 1.006122
METER BOX H = 1.641353

DELTA H 1 VW = 10 TW = 90
VD = 10.375 TD = 114.5 TIME = 17 TEST METER Y = 1.003
METER BOX Y = 1.007317
METER BOX H = 1.624187

AVERAGE Y = 1.006021
AVERAGE H = 1.65151

Post-Test
Meter Box Calibration

Dry Gas Meter #: 4
Calibrated by: MT
Date: 6-19-91
Barometric Pressure: 29.7

Orifice ΔH	Test Meter Volume V_w	Dry Gas Meter Volume V_d	Temperature				Time θ	Y	ΔH@
			Test Meter T_w	Dry Gas Meter					
				Inlet T_{di}	Outlet T_{do}	Ave T_d			
1.0	10	10.181	90	99/119	91/100	[illegible]	17.15	1.003	
1.0	10	10.315	90	108/126	101/107	110.5	17.03	1.003	
1.0	10	10.375	90	111/129	107/111	114.5	17.00	1.003	

$$Y = \frac{V_w P_{bar} (T_d + 460)}{V_d (P_{bar} + \frac{\Delta H}{13.6}) (T_w + 460)}$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{P_{bar}(T_d + 460)} \left[\frac{(T_w + 460)\ \theta}{V_w} \right]^2$$

P_{bar} = Barometric Pressure

DRY GAS METER #: 4

DATE: 6-19-91

ΔH	VW	TW	VD	TDT	TDO	ΔTD	θ
1.0 (10ft^3)	582.000	90/90	256.611	99	91		
	572.000	90/90	246.430	119	100		
	10	90	10.181		102.25		17.15
1.0 (10ft^3)	592.000	90/90	266.926	108	101		
	582.000	90/90	256.611	126	107		
	10	90	10.315		110.5		17.03
1.0 (10ft^3)	602.000	90/90	277.301	111	107		
	592.000	90/90	266.926	129	111		
	10	90	10.375		114.5		17.00

POST METER BOX CALIBRATION SUMMARY
METER BOX # 6
6/17/91
BAROMETRIC PRESSURE = 29.7

DELTA H 1 VW = 10 TW = 87
VD = 10.58 TD = 92.75 TIME = 16.83 TEST METER Y = 1.003
METER BOX Y = .9556146
METER BOX H = 1.636503

DELTA H 1 VW = 10 TW = 87.75
VD = 10.637 TD = 99.75 TIME = 16.96 TEST METER Y = 1.003
METER BOX Y = .9612129
METER BOX H = 1.645603

DELTA H 1 VW = 10 TW = 88.5
VD = 10.723 TD = 104.25 TIME = 17.06 TEST METER Y = 1.003
METER BOX Y = .9598551
METER BOX H = 1.656314

AVERAGE Y = .9588942
AVERAGE H = 1.64614

Post-Test
Meter Box Calibration

Dry Gas Meter #: 6
Calibrated by: MT
Date: 6-19-91
Barometric Pressure: 29.7

Orifice ΔH	Test Meter Volume V_w	Dry Gas Meter Volume V_d	Temperature				Time θ	Y	ΔH@
			Test Meter T_w	Dry Gas Meter Inlet T_{di}	Dry Gas Meter Outlet T_{do}	Dry Gas Meter Ave T_d			
1.0	10	10.58	87	89/104	96/92	92.75	16.83	1.003	
1.0	10	10.637	87.75	96/111	94/98	99.75	16.96	1.003	
1.0	10	10.723	89.5	103/113	99/102	104.25	17.06	1.003	

$$Y = \frac{V_w P_{bar} (T_d + 460)}{V_d (P_{bar} + \frac{\Delta H}{13.6}) (T_w + 460)}$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{P_{bar}} \left[\frac{(T_w + 460)\ \theta}{V_w} \right]^2$$

P_{bar} = Barometric Pressure

DRY GAS METER #: 6

DATE: 6-19-91

ΔH	VW	TW	VD	TDT	TDO	ΔTD	θ
1.0 ($10ft^3$)	522.000	87/86	730.649	89	86		
	512.000	88/87	720.069	104	92		
	10	87	10.58		92.75		16.83
1.0 ($10ft^3$)	532.000	43/87	730.649	96	94		
	522.000	88/88	741.286	111	98		
	10	87.75	10.637		99.75		16.96
1.0 ($10ft^3$)	542.000	88/88	752.009	103	99		
	532.000	45/89	741.286	112	102		
	10	88.5	10.723		104.25		17.06

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POST METER BOX CALIBRATION SUMMARY

METER BOX # 3
6/19/91
BAROMETRIC PRESSURE = 29.7

DELTA H 1 VW = 10 TW = 88
VD = 10.728 TD = 98.5 TIME = 18.16 TEST METER Y = 1.003
METER BOX Y = .9504973
METER BOX H = 1.892659

DELTA H 1 VW = 10 TW = 88.5
VD = 10.601 TD = 105.5 TIME = 18.01 TEST METER Y = 1.003
METER BOX Y = .9730522
METER BOX H = 1.841836

DELTA H 1 VW = 10 TW = 89.75
VD = 10.601 TD = 98.25 TIME = 17.96 TEST METER Y = 1.003
METER BOX Y = .9583931
METER BOX H = 1.863877

AVERAGE Y = .9606476
AVERAGE H = 1.866124

Post-Test
Meter Box Calibration

Dry Gas Meter #: 3
Calibrated by: mT
Date: 6-19-91
Barometric Pressure: 29.7

Orifice ΔH	Test Meter Volume V_w	Dry Gas Meter Volume V_d	Temperature				Time θ	Y	ΔH@
			Test Meter T_w	Dry Gas Meter					
				Inlet T_{di}	Outlet T_{do}	Ave T_d			
1.0	10	10.728	88	94/115	87/96	98.5	18.16	1.003	
1.0	10	10.656	88.5	107/119	96/105	105.5	18.01	1.003	
1.0	10	10.601	89.75	91/115	91/96	98.25	17.96	1.003	

$$Y = \frac{V_w P_{bar} (T_d + 460)}{V_d (P_{bar} + \frac{\Delta H}{13.6}) (T_w + 460)}$$

$$\Delta H@ = \frac{0.0317 \Delta H}{P_{bar}(T_d + 460)} \left[\frac{(T_w + 460)\ \theta}{V_w}\right]^2$$

P_{bar} = Barometric Pressure

DRY GAS METER #: 3

DATE: 6-19-91

ΔH	VW	TW	VD	TDT	TDO	ΔTD	θ
1.0 ($10ft^3$)	552.000	88/88	706.192	94	89		
	542.000	88/88	695.464	115	96		
	10	88	10.728		98.5		18.16
1.0 ($10ft^3$)	562.000	88/88	716.848	107	96		
	552.000	89/89	706.192	119	100		
	10	88.5	10.656		105.5		18.01
1.0 ($10ft^3$)	572.000	90/89	727.449	91	91		
	562.000	90/90	716.848	115	96		
	10	89.75	10.601		98.25		17.96

POST METER BOX CALIBRATION SUMMARY

METER BOX # 1
6/19/91
BAROMETRIC PRESSURE = 29.7

DELTA H 1 VW = 10 TW = 90
VD = 10.4 TD = 103 TIME = 17.76 TEST METER Y = 1.003
METER BOX Y = .9847805
METER BOX H = 1.808863

DELTA H 1 VW = 10 TW = 90
VD = 10.635 TD = 115.5 TIME = 17.58 TEST METER Y = 1.003
METER BOX Y = .9844014
METER BOX H = 1.733886

DELTA H 1 VW = 10 TW = 90
VD = 10.731 TD = 118.5 TIME = 17.68 TEST METER Y = 1.003
METER BOX Y = .9806805
METER BOX H = 1.744574

AVERAGE Y = .9832874
AVERAGE H = 1.762441

Post-Test
Meter Box Calibration

Dry Gas Meter #: 1

Calibrated by: MT

Date: 6-19-91

Barometric Pressure: 29.7

Orifice ΔH	Test Meter Volume V_w	Dry Gas Meter Volume V_d	Temperature				Time θ	Y	ΔH@
			Test Meter T_w	Dry Gas Meter Inlet T_{di}	Dry Gas Meter Outlet T_{do}	Dry Gas Meter Ave T_d			
1.0	10	10.4	90	101/122	90/99	103	17.76	1.003	
1.0	10	10.636	90	115/132	105/110	115.5	17.58	1.003	
1.0	10	10.731	90	121/133	108/112	118.5	17.68	1.003	

$$Y = \frac{V_w P_{bar} (T_d + 460)}{V_d (P_{bar} + \frac{\Delta H}{13.6}) (T_w + 460)}$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{P_{bar}(T_d + 460)} \left[\frac{(T_w + 460)\ \theta}{V_w}\right]^2$$

P_{bar} = Barometric Pressure

DRY GAS METER #: 1

DATE: 6-19-91

P-BAR 29.7

ΔH	VW	TW	VD	TDT	TDO	ΔTD	θ
1.0 ($10ft^3$)	610.000	90/90	721.401	101	90		
	600.000	90/90	711.001	122	99		
	10	90	10.4		103		17.76
1.0 ($10ft^3$)	625.000	90/90	742.155	115	105		
	615.000	91/90	731.520	132	110		
	10	90	10.635		115.5		17.58
1.0 ($10ft^3$)	635.000	90/90	752.886	121	108		
	625.000	90/90	742.155	133	112		
	10	90	10.731		118.5		17.68

APPENDIX G

Armstrong Environmental, Inc.

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RESUME OF : Richard Taylor

EDUCATION : Southwest Texas State University
B.S. Environmental Studies
San Marcos, Texas

PROFESSIONAL EXPERIENCE :

February, 1991 - Present	Project Manager Armstrong Environmental, Inc. Dallas, Texas
April, 1988 - February, 1991	Project Manager Turner Engineering, Inc. Dallas, Texas
January, 1988 - April, 1988	Assistant Manager Better Buys Sport Shoes Weatherford, Texas
September, 1987 - January, 1988	Substitute Teacher Cedar Hill I.S.D. Cedar Hill, Texas

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RESUME OF: Larry Whicher

EDUCATION:

B.S. Geology Western New Mexico University, Silver City, NM

PROFESSIONAL EXPERIENCE:

January, 1991 - Present	Project Manager Armstrong Environmental, Inc. Dallas, Texas
April, 1988 - January, 1991	Project Manager Turner Engineering, Inc. Dallas, Texas
February, 1987 - April 1988	Electronic Distribution Lex Electronics Dallas, Texas
February 1986 - November 1986	Office Manager Amerex Rent-A-Car Dallas, Texas

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RESUME OF : Jerry Salinas

EDUCATION : Sunset High School, June 1988

PROFESSIONAL EXPERIENCE :

February, 1991 - Present	Technician Armstrong Environmental, Inc. Dallas, Texas
August, 1988 - February, 1991	Technician Turner Engineering, Inc. Dallas, Texas
March, 1984 - August, 1988	Service Assistant Stevens Park Golf Course Dallas, Texas

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RESUME OF: Matthew A. Taylor

EDUCATION: Cedar Hill High School

PROFFESSIONAL EXPRIENCE:

February, 1991 - Present	Technician Armstrong Environmental, Inc. Dallas, Texas
August, 1990 - February, 1991	Technician Turner Engineering, Inc. Dallas, Texas
November, 1988 - July, 1990	Lab Technician Dixico, Inc. Dallas, Texas

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RESUME OF: Thomas Armstrong

EDUCATION:

College of Dupage, Glen Ellyn, Illinois

PROFESSIONAL EXPERIENCE:

February, 1991 - Present	President Armstrong Environmental, Inc. Dallas, Texas
April, 1984 - February, 1991	Vice-President Turner Engineering, Inc. Dallas, TX
1976 - 1984	Project Manager The Almega Corporation Bensenville, Illinois
1975 - 1976	Environmental Specialist Particle Data Labs, Ltd. Elmhurst, Illinois

Mr. Armstrong has 15 years experience in performing field and laboratory analysis of air pollutants. Mr. Armstrong has tested for air pollutants in a variety of industries, including chemical, steel food, power generation, pharmaceutical, ceramics, petrochemical, and cement. Mr. Armstrong has performed ambient and stack tests for particulate, SOx, NOx, hydrocarbons, TRS and others using virtually all current test methods and procedures.