AP42 Section:	11.3
Background Chapter	4
Reference:	30
Title:	*Emissions Survey for SO2, NOx, CO, HF, and PM-10 Emissions Conducted on Interstate Brick Company's Kiln No. 3 Scrubber, Located in West Jordan, Utah*, American Environmental Testing, Inc., Spanish Fork, UT, November 30, 1995.

30

AP-42 Section 11.3
Reference 30
Report Sect. 4
Reference 30

TEST REPORT

INTERSTATE BRICK COMPANY

TEST DATE: OCTOBER 31, 1995

REPORT DATE: NOVEMBER 30, 1995

"EMISSIONS SURVEY FOR SO_2, NO_x, CO, HF AND PM_{10} EMISSIONS CONDUCTED ON INTERSTATE BRICK COMPANY'S KILN NO. 3 SCRUBBER, LOCATED IN WEST JORDAN, UTAH"

Technical Director:

V. Brent Benson

CEM Supervisor:

J. Paul Benson

EPA 201A Supervisor:

Rick P. Hawkins

Technicians:

Todd B. Benson
Brian Briggs
JD Schiller
Brent Strong

Test Dates:

October 31, 1995

Submittal Date:

November 30, 1995

Prepared for: Mr. John Hewitt, Plant Manager

Interstate Brick Company
9780 South 5200 West
West Jordan, Utah 84088-5689

Prepared by: Mr. V. Brent Benson, Technical Director

American Environmental Testing, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660

INTERSTATE BRICK

9780 South 5200 West
West Jordan, Utah 84088
(801) 280-5200
(800) 233-8654
FAX (801) 280-5220

Date: 8/13/96

Brian Shrager
Environmental Engineer
Midwest Research Institute
Suite 350
401 Harison Oaks Boulevard
Cary, NC 27513-2412

RE: Information you requested in your letter of July 18, 1996 (includes: this letter, summary sheet, 2 test reports).

Dear Mr. Shrager:

Attached please find the information you requested.

Interstate Brick has two scrubbers in operation. A Medium efficiency wet scrubber and a high efficiency wet scrubber. The medium efficiency scrubber is attached to a top fired, 48 wide, 16 high, natural gas fired tunnel kiln (kiln no. 4). The high efficiency wet scrubber is attached to a top fired, 36 wide, 14 high, top fired, natural gas fired tunnel kiln (kiln no. 3). Both scrubbers use a soda ash/water solution as the reagent.

The medium efficiency scrubber consists of an rectangular, arched roofed, structure which looks similar to a greenhouse except that it is made of face brick. The gas follows a U-shaped path up one end and back down the other. A center separation wall in the middle and several baffle walls add residence time inside the scrubber. The gas is contacted by spray nozzels as it passes through the scrubber. The gasses then exit up an 80 ft. brick stack. The soda ash water solution is recirculated between the scrubber and a pond. Soda ash is added to the pond at a rate sufficient to hold pH 7.

The high efficiency scrubber is a FRP (fiberglass reinforced plastic) packed tower type with a 7' diameter, 11' long, horizontal, co-current quench section lined with carbon brick attached to it. The gas travels horizontally through the quench and is cooled from approximately 480 down to 130 deg. F. The gas then flows upwards through a 12' diameter vessel filled with 5' of random dump packing, thorough a fixed blade chevron style demister. The vessal then reduces down to a 5 ft. diameter, 30 ft. high stack. The scrubber and stack resemble a coke bottle in shape with an approximate height of 60'. The bottom of the scrubber vessal holds a reservoir of reagent that is recirculated through the packing and quench section. A soda ash water solution is added to the reservoir to neutralize pH.

Please do not use the test results for line 3 kiln inlet to scrubber done December 1994 because the flow rate was later found to have been in error. Please contact me if you have and further questions.

Sincerely,

John Hewitt, process engineer

Results of Stack Testing and percent sulfur and fluoride in clay mixes:

Kiln no. 4 Tested December 1994

	inlet (lb/hr.)	outlet (lb/hr.)	efficiency
PM10	not tested	8.75	n/a
HF	not tested	2.12	
SO2	68.68	11.82	82.7%
NOx	2.86	2.77	-.03%
CO	not tested	not tested	n/a

Kiln no. 3 Tested November 1995

	inlet (lb/hr.)	outlet (lb/hr.)	efficiency
PM10	1.53	1.61	-0.05%
HF	29.25	0.02	99.93%
SO2	25.8	0.07	99.72%
NOx	10.5	2.76	73.7%
CO	36.14	32.22	n/a

Mix	% of production	% sulfur in mix	% flouride in mix	weighted % sulfur	weighted % flouride
A	23.3%	0.0575%	0.1309%	0.0041%	0.0093%
B	18.7%	0.0220%	0.0946%	0.0016%	0.0067%
C	9.6%	0.0460%	0.0872%	0.0033%	0.0062%
D	9.3%	0.1580%	0.0765%	0.0112%	0.0054%
E	9.0%	0.1650%	0.1003%	0.0117%	0.0071%
F	8.3%	0.1560%	0.0916%	0.0111%	0.0065%
G	7.1%	0.0889%	0.1000%	0.0063%	0.0071%
H	6.1%	0.0780%	0.0684%	0.0055%	0.0049%
I	2.7%	0.1340%	0.1252%	0.0095%	0.0089%
J	2.5%	0.0320%	0.1261%	0.0023%	0.0090%
K	1.3%	0.0390%	0.0985%	0.0028%	0.0070%
L	0.9%	0.1450%	0.1113%	0.0103%	0.0079%
M	0.7%	0.0320%	0.0682%	0.0023%	0.0048%
N	0.6%	0.0660%	0.1206%	0.0047%	0.0086%
weighted % sulfur and flouride in brick				0.0866%	0.0994%

CERTIFICATION OF REPORT INTEGRITY

AMERICAN ENVIRONMENTAL TESTING COMPANY, INC. (AET) certifies:

1. That every effort was made to obtain accurate and representative data within the guidelines established by:

   A. The U.S. Environmental Protection Agency Code of Federal Regulations (CFR) Title 40, Chapter I, Part 60, Appendix "A", Methods 1-5 inclusive, Method 6C, Method 7E, Method 9, Method 10, Method 13B and Method 201A/202.

   B. The U.S. Environmental Protection Agency "Quality Assurance Handbook for Air Pollution Measurement Systems".

2. All of sampling and analysis performed for the compliance test reported herein were carried out by myself or under my supervision.

3. The results obtained are accurate and authentic.

Rick P. Hawkins
Method 201A Crew Supervisor

J. Paul Benson
CEM Crew Supervisor

I have reviewed all testing details and methods on which the results of this test are based. I find them to be accurate within the limits of the applicable methods.

V. Brent Benson
Technical Director

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APPENDICES

"EMISSIONS SURVEY FOR SO_2, NO_x, CO, HF AND PM_{10} EMISSIONS CONDUCTED ON INTERSTATE BRICK COMPANY'S KILN NO. 3 SCRUBBER, LOCATED IN WEST JORDAN, UTAH"

1.0 Introduction

1.1 Test Purpose

At the request of Interstate Brick Company's, Mr. John Hewitt, American Environmental Testing, Inc., (AET) conducted a series of Emissions Testing for sulfur dioxide (SO_2), oxides of nitrogen (NO_x), carbon monoxide (CO), hydrofluoric acid (HF) and PM_{10} emissions at Interstate Brick Company's West Jordan Facility. These tests were accomplished October 31, 1995. The individual sources and the emissions that were quantified are listed below:

Source	Emissions to be Tested
Kiln No. 3 Scrubber - Inlet	SO_2, NO_x, CO, HF & PM_{10}
Kiln No. 3 Scrubber - Outlet	SO_2, NO_x, CO, HF & PM_{10}

On October 27, 1994, The Utah Department of Environmental Quality (UDEQ) issued the Interstate Brick Company an "Approval Order" for their West Jordan Facility. A copy of the permit is attached as Appendix "A". In the permit, conditions were established for various pollutants emission levels and criteria were set for testing to verify compliance with these limitations.

The UDEQ set the following emission limits in the Approval Order for the Kiln No. 3 Scrubber:

Source	Pollutant	Emission Limitation
Kiln No. 3 Scrubber (Outlet)	PM_{10}	1.9 lbs/hr
	SO_2	17.0 lbs/hr
	NO_x	1.8 lbs/hr
	HF	1.5 lbs/hr

CO Emissions Testing is for Title V purposes only. There is no set emission limitation.

Because of excessively high temperatures in the Inlet of the No. 3 Scrubber and liquid droplets present in the gas stream of the Outlet of the No. 3 Scrubber at the sample port location. AET tested using EPA Method 5 and 202 to quantify particulate emissions (considering all particulate captured to be PM_{10}) at both locations.

Mr. Hewitt, requested that AET prepare a "Pretest Protocol" to submit to the UDEQ outlining the required tests. The protocol, without the calibration data is presented in Appendix "B".

AET performed Compliance Emissions Testing as set forth in the Code of Federal Regulations (CFR), Title 40, Chapter I, Part 60, Appendix "A". The following methods were used to conduct the emissions testing:

Method	1	-	" Sample and Velocity Traverses for Stationary Sources"
Method	2	-	" Determination of Stack Gas Velocity and Volumetric Flow Rate (type "S" pitot tube)"
Method	3	-	" Gas Analysis for Carbon Dioxide, Oxygen, Excess Air and Dry Molecular Weight"
Method	4	-	" Determination of Moisture Content in Stack Gases"
Method	5	-	"Determination of Particulate Emissions and Back-half Condensables from Stationary Sources"
Method	6C	-	" Determination of Sulfur Dioxide Emissions from Stationary Sources" (Instrumental Analyzer Procedures)
Method	7E	-	" Determination of Nitrogen Oxides Emissions from Stationary Sources" (Instrumental Analyzer Procedures)
Method	10	-	" Determination of Carbon Monoxide Emissions from Stationary Sources" (Instrumental Analyzer Procedures)
Method	13B	-	" Determination of Hydrofluoric Acid from Stationary Sources"
Method	202	-	"Determination of Condensables Particulate Emissions from Stationary Sources"

2.0 Summary of Results

2.1 PM_{10} Emissions (EPA 5/202)

The emissions data accumulated for PM_{10} emissions during the October 31, 1995 Compliance Testing is summarized in Table 2.1.1 for the Kiln No. 3 Scrubber Inlet and Table 2.1.2 for the Scrubber Outlet.

Table 2.1.1

(PM_{10} Emissions Summary)

Kiln No. 3 Scrubber Inlet

Test Run	DSCF Collected	Emissions Rates	
		lbs/hr	gr/dscf
1	40.3740	1.5714	0.0097
2	38.1693	1.5581	0.0099
3	37.2603	1.4645	0.0094
Average =	38.6012	1.5313	0.0097

Table 2.1.2

(PM_{10} Emissions Summary)

Kiln No. 3 Scrubber Outlet

Test Run	DSCF Collected	Emissions Rates	
		lbs/hr	gr/dscf
1	49.2786	1.5803	0.0103
2	45.2297	1.7841	0.0125
3	45.0035	1.4663	0.0102
Average =	45.5039	1.6102	0.0110

The average PM_{10} emission of 1.6 lbs/hr is 84.21% of the allowable ceiling level of 1.9 lbs/hr.

2.2 SO_2 Emissions (EPA 6C)

The emissions data accumulated for SO_2 emissions during the October 31, 1995 Compliance Testing is summarized in Table 2.2.1 for the Kiln No. 3 Scrubber Inlet and Table 2.2.2 for the Scrubber Outlet.

Table 2.2.1

(SO_2 Emissions Summary)

Kiln No. 3 Scrubber Inlet

Test Run	Emissions Rates	
	ppm	lbs/hr
1	125.63	23.628
2	147.92	27.036
3	148.33	26.731
Average =	140.63	25.799

Table 2.2.2

(SO_2 Emissions Summary)

Kiln No. 3 Scrubber Outlet

Test Run	Emissions Rates	
	ppm	lbs/hr
1	0.45	0.080
2	0.34	0.057
3	0.34	0.057
Average =	0.38	0.065

The average measured SO_2 emission concentration for the Kiln No. 3 Scrubber Outlet was 0.065 lbs/hr, which is 0.38% of the UDEQ permitted allowable ceiling of 17.0 lbs/hr.

2.3 NO_x Emissions (EPA 7E)

The emissions data accumulated for NO_x emissions during the October 31, 1995 Compliance Testing is summarized in Table 2.3.1 for the Kiln No. 3 Scrubber Inlet and Table 2.3.2 for the Scrubber Outlet.

Table 2.3.1

(NO_x Emissions Summary)

Kiln No. 3 Scrubber Inlet

Test Run	Emissions Rates	
	ppm	lbs/hr
1	79.07	10.697
2	77.52	10.191
3	82.06	10.637
Average =	79.55	10.508

Table 2.3.2

(NO_x Emissions Summary)

Kiln No. 3 Scrubber Outlet

Test Run	Emissions Rates	
	ppm	lbs/hr
1	23.40	3.00
2	19.54	2.34
3	24.58	2.95
Average =	22.51	2.76

The average measured NO_x emission concentration for the Kiln No. 3 Scrubber Outlet was 2.76 lbs/hr, which is 153.33% of the UDEQ permitted allowable ceiling of 1.8 lbs/hr

2.4 CO Emissions (EPA 10)

The emissions data accumulated for CO emissions during the October 31, 1995 Compliance Testing is summarized in Table 2.4.1 for the Kiln No. 3 Scrubber Inlet and Table 2.4.2 for the Scrubber Outlet.

Table 2.4.1

(CO Emissions Summary)

Kiln No. 3 Scrubber Inlet

Test Run	Emissions Rates	
	ppm	lbs/hr
1	455.62	37.581
2	445.38	35.700
3	444.65	35.142
Average =	448.55	36.141

Table 2.4.2

(CO Emissions Summary)

Kiln No. 3 Scrubber Outlet

Test Run	Emissions Rates	
	ppm	lbs/hr
1	461.14	36.045
2	409.35	29.884
3	420.32	30.735
Average =	430.27	32.221

There were no limitations set for CO Emissions by the UDEQ. Testing was for Title V purposes only.

2.5 HF Emissions (EPA 13B)

The emissions data accumulated for HF emissions during the October 31, 1995 Compliance Testing is summarized in Table 2.5.1 for the Kiln No. 3 Scrubber Inlet and Table 2.5.2 for the Scrubber Outlet.

Table 2.5.1

(HF Emissions Summary)

Kiln No. 3 Scrubber Inlet

Test Run	Emissions Rates	
	mg/dscf	lbs/hr
1	7.999	25.51
2	11.414	27.71
3	14.422	34.52
Average =	11.278	29.25

Table 2.5.2

(HF Emissions Summary)

Kiln No. 3 Scrubber Outlet

Test Run	Emissions Rates	
	mg/dscf	lbs/hr
1	0.00834	0.0198
2	0.00720	0.0160
3	0.00673	0.0149
Average =	0.00742	0.0169

The average measured HF emission concentration for the Kiln No. 3 Scrubber Outlet was 0.0169 lbs/hr, which is 1.13% of the UDEQ permitted allowable ceiling of 1.5 lbs/hr.

2.6 Visible Emission Opacity (VEO)

VEO's were taken simultaneously with each of the EPA Method 5/202 runs for the Kiln No. 3 Scrubber Outlet. Averages for the three (3) runs are given in Table 2.6.1.

Table 2.6.1

(Visible Emissions Opacity Summary)

Kiln No. 3 Scrubber Outlet

Test Run No.	%VEO
1	1.46
2	1.25
3	1.67
Average =	1.45

The average VEO reading of 1.45% for theKiln No. 3 Scrubber Outlet was 7.25% of *the allowable ADEQ ceiling level of ≤ 20%.*

3.0 Source Operations

3.1 General Plant Operations

The manufacture of brick and related products such as clay pipe, pottery and some types of refractory brick involves the mining, grinding, screening and blending of the raw materials, and the forming, cutting or shaping, drying or curing, and firing of the final product.

Surface clays and shales are mined in open pits. Most fine clays are found underground. After mining, the material is crushed to remove stones and is stirred before it passes onto screens for segregation by particle size.

To start the forming process, clay is mixed with water, usually in a pug mill. The three principal processes for forming brick are stiff mud, soft mud and dry press. In the stiff mud process, sufficient water is added to give the clay plasticity, and bricks are formed by forcing the clay through a die. Wire is used in separating bricks. All structural tile and most and most brick are formed by this process. The soft mud process is usually used with clay too wet for the stiff mud process. The clay is mixed with water to a moisture content of 20 to 30 percent, and the bricks are formed in molds. In the dry press process, clay is mixed with a small amount of water and formed in steel molds by applying pressure of 500 to 1500 pounds per square inch.

Wet clay units that have been formed are almost completely dried before firing, usually with waste heat from kilns. Many types of kilns are used for firing brick, but the most common are the downdraft periodic kiln and the tunnel kiln. The periodic kiln is a permanent brick structure with a number of fireholes where fuel enters the furnace. Hot gases from the fuel are drawn up over the bricks, down through then by underground flues, and out of the oven to the chimney. Although lower heat recovery makes this type less efficient than the tunnel kiln, the uniform temperature distribution leads to a good quality product.

Production Data during the testing period was given to AET by Interstate Brick Company and is attached as Appendix "C".

4.0 Sampling and Analysis Procedures

4.1 Emissions Testing

A. EPA Method 1; sample and velocity traverses for stationary sources.

Figure 4.1.1 is a diagram of the Kiln No. 3 Scrubber Inlet Stack. This reference method requires the tester, due to stack geometry, to sample for particulate and velocity at twenty (20) separate locations in the stack, five (5) per traverse, in four (4) separate ports. The location of these points relative to the stack are *given in Table* 4.1.2.

Figure 4.1.3 is a diagram of the Kiln No. 3 Scrubber Outlet Stack. The reference methods require the tester, due to the stack geometry, to sample for particulate *and velocity at twenty-four* (24) separate locations in the stack, twelve (12) per traverse, on diameter lines 90° apart from one another. The location of these points relative to the stack are given in Table 4.1.4.

B. EPA Method 3; for gas analysis of carbon dioxide, oxygen, excess air, and dry molecular weight.

This reference method requires that a gas sample be extracted from the stack for analysis concurrently with each of the runs. The integrated gas sample is then analyzed via an orsat for carbon monoxide, carbon dioxide and oxygen. The nitrogen value is obtained by difference.

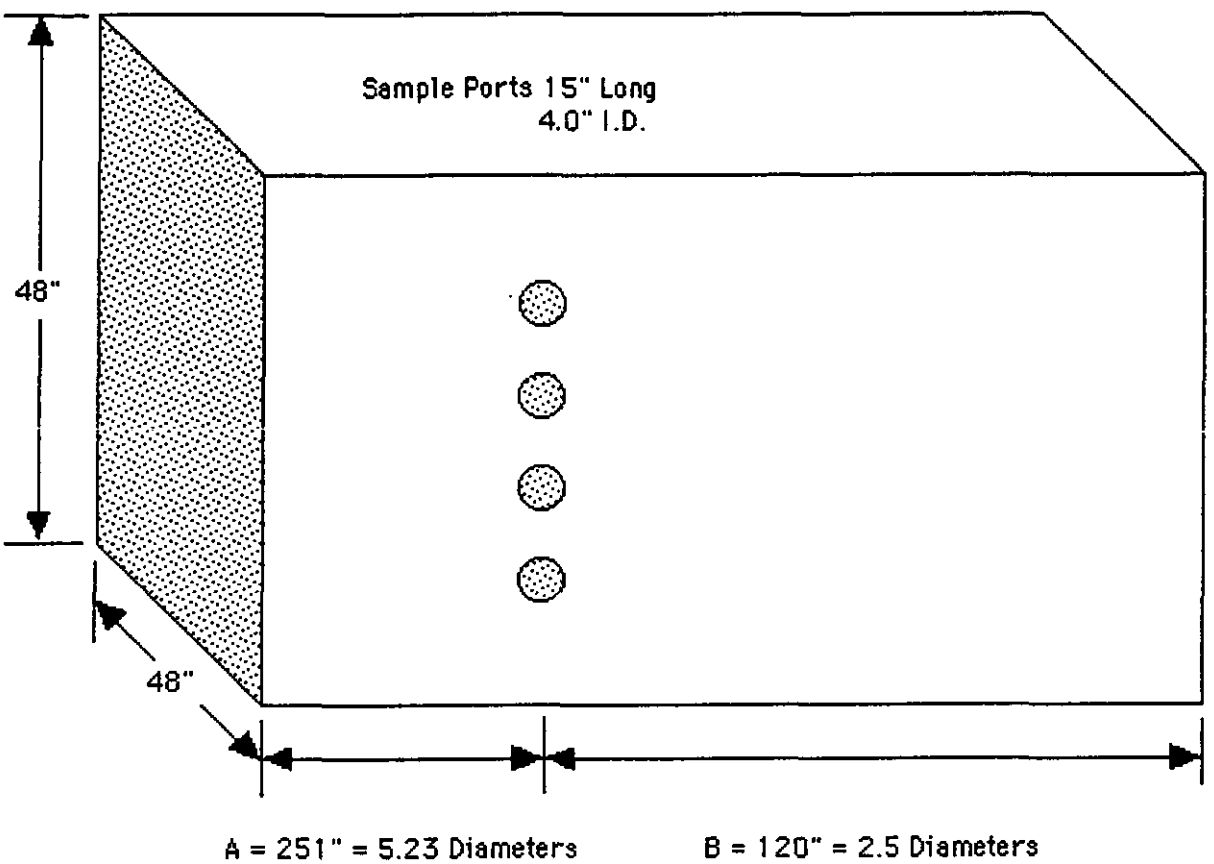
Results from these determinations are included in Appendix "D" with the field and laboratory data forms for each individual source.

C. EPA Method 2, 5 & 202 Combined; for the determination of velocity, particulate matter, PM_{10} emissions/back-half condensables and volumetric flow rate from stationary sources.

To evaluate compliance with the PM_{10} limitation specified in the "Approval Order", AET had to test using methodology consistent with the above referenced methods. Data from the three (3) separate runs, which constitute a single compliance test, are summarized in Table 4.1.5 for the Tunnel Kiln No. 3 Inlet and Table 4.1.6 for the Tunnel Kiln No. 4 Outlet.

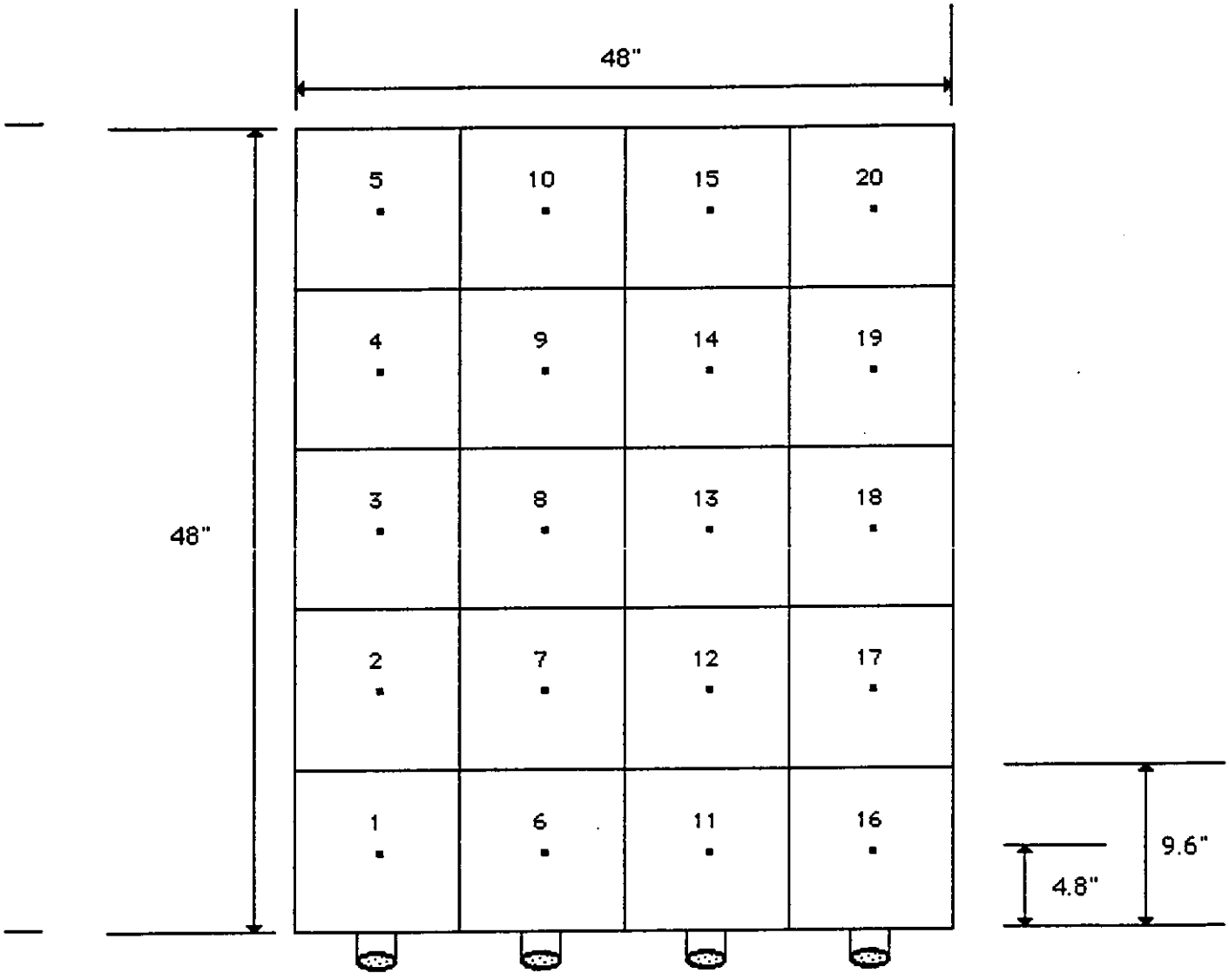
Interstate Brick Company's Kiln No. 3
Scrubber Inlet Stack Diagram

Figure 4.1.1



Interstate Brick Company's Kiln No. 3
Scrubber Inlet Traverse Point Locations

Table 4.1.2

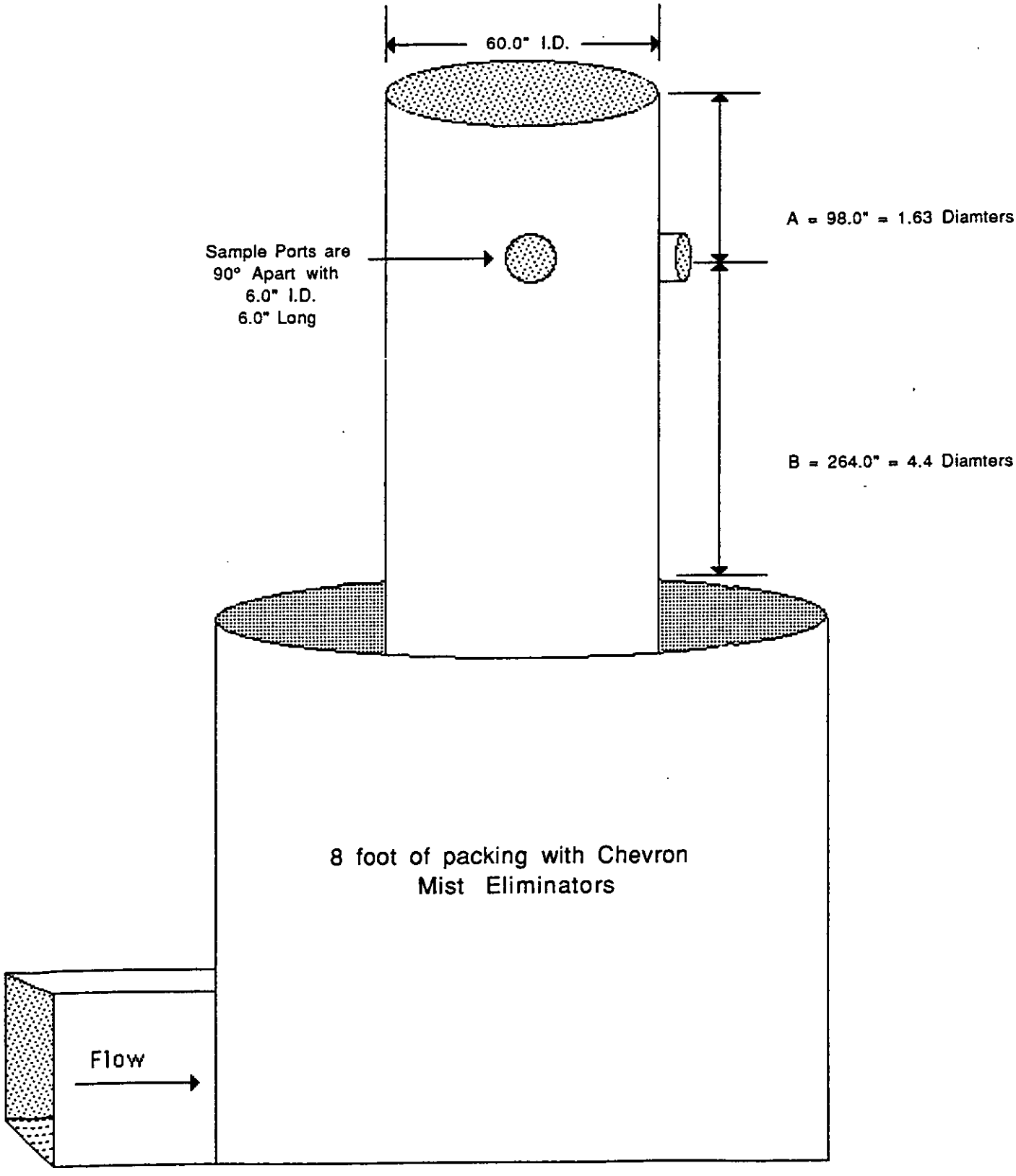


Sample Ports are 15" Long

Sample Point	Distance from outside of Port
1, 6, 11, 16	19.8" = 19 3/4"
2, 7, 12, 17	29.4" = 29 3/8"
3, 8, 13, 18	39.0" = 39"
4, 9, 14, 19	48.6" = 48 5/8"
5, 10, 15, 20	58.2" = 58 1/4"

Interstate Brick Company's Kiln No. 3
Scrubber Outlet Stack Diagram

Figure 4.1.3



AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
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Spanish Fork, Utah 84660

Table 4.1.4

TRAVERSE POINT CALCULATIONS

Plant: Interstate Brick Company
Date: 10/31/95
Sampling Location: Kiln #3 Scrubber Outlet
Inside of far wall to outside of port (distance, X) 66.0"
Inside of near wall to outside of port (distance, Y) 6.0"
Stack I.D. 60.0" = 19.63 ft squared

Traverse Point Number	Percent of Stack I.D.	Stack I.D. inches	Product of col. 2 &3 (to 1/8 in)	Distance Y	Traverse Point Location from outside of ports (sum of columns 4 & 5)
1 & 13	2.1	60	1.26	6.0"	7.26 = 7 1/4"
2 & 14	6.7	60	4.02	6.0"	10.02 = 10.0"
3 & 15	11.8	60	7.08	6.0"	13.08 = 13 1/8"
4 & 16	17.7	60	10.62	6.0"	16.62 = 16 5/8"
5 & 17	25	60	15	6.0"	21.0 = 21.0"
6 & 18	35.6	60	21.36	6.0"	27.36 = 27 3/8"
7 & 19	64.4	60	38.64	6.0"	44.64 = 44 5/8"
8 & 20	75	60	45	6.0"	51.0"
9 & 21	82.3	60	49.38	6.0"	55.38 = 55 3/8"
10 & 22	88.2	60	52.92	6.0"	58.92 = 58 7/8"
11 & 23	93.3	60	55.98	6.0"	61.98 = 62.0"
12 & 24	97.9	60	58.74	6.0"	64.74 = 64 3/4"

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TABLE 4.1.5
(FIELD AND LABORATORY DATA SUMMARY)

Plant: Interstate Brick
Source: Kiln #3 - Outlet
Type: EPA Method #5
Date: 10/31/95

Symbol	Description	Units	Test #1	Test #2	Test #3
Vm	Volume dry gas	Ft3	55.205	51.271	51.068
	sampled @ meter	Iso	59.069	54.860	54.643
	conditions				
Pb	Barometric Pre:	"Hg abs	25.42	25.35	25.32
ΔH	Average Pres	"H2O	1.8226	1.7546	1.7473
	drop across the				
	orifice meter				
Tm	Average gas	°R	540.33	545.15	545.06
	meter temp	°F	80.33	85.15	85.06
Yi	Meter Coefficient		1.07	1.07	1.07
Vw	Total H2O	ml	168.6	201.7	195.4
	collected, impingers				
	& silica gel				
CO2		%	5.1	5.1	4.9
O2		%	14.9	14.5	14.9
N2 + CO		%	80	80.4	80.2
Rn	Nozzle Dia.	in.	0.368	0.368	0.368
Ts	Stack Temp	°R	597.96	595.25	595.42
		°F	137.96	135.25	135.42
Sqr rt ΔP	Velocity head	"H2O	0.3459	0.3338	0.3333
	of stack gas				
Cp	Pitot Tube		0.8654	0.8654	0.8654
	Coefficient				
Ps	Static Pres	"H2O	-0.5	-0.5	-0.5
Pabs	Absolute Pres	"Hg	25.38	25.31	25.28
As	Area stack	Ft2	19.635	19.635	19.635
	Stack in inches		60	60	60
Tt	Net time	min.	72	72	72
	of test				
Mgp	Mn Total		32.9	36.5	29.8

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

TABLE 4.1.6
(FIELD AND LABORATORY DATA SUMMARY)

Plant: Interstate Brick
Source: Kiln #3 - Inlet
Type: EPA Method #5
Date: 10/31/95

Symbol	Description	Units	Test #1	Test #2	Test #3
Vm	Volume dry gas	Ft3	49.53	46.99	46.323
	sampled @ meter	Iso	48.787	46.285	45.628
	conditions				
Pb	Barometric Pre:	"Hg abs	25.41	25.34	25.3
ΔH	Average Pres	"H2O	1.5734	1.3724	1.3571
	drop across the				
	orifice meter				
Tm	Average gas	°R	544.1	544.2	548.68
	meter temp	°F	84.1	84.2	88.68
Yi	Meter Coefficient		0.985	0.985	0.985
Vw	Total H2O	ml	62.5	60.7	63.4
	collected, impingers				
	& silica gel				
CO2		%	3.5	3.7	3.4
O2		%	14.6	14.3	14.9
N2 + CO		%	81.9	82	81.7
Rn	Nozzle Dia.	in.	0.312	0.312	0.312
Ts	Stack Temp	°R	1006.15	993.45	1004.65
		°F	546.15	533.45	544.65
Sqr rt ΔP	Velocity head	"H2O	0.5395	0.5226	0.5205
	of stack gas				
Cp	Pitot Tube		0.8696	0.8696	0.8696
	Coefficient				
Ps	Static Pres	"H2O	-0.18	-0.18	-0.18
Pabs	Absolute Pres	"Hg	25.40	25.33	25.29
As	Area stack	Ft2	15.999	15.999	15.999
	Stack in inches		54.16	54.16	54.16
Tt	Net time	min.	60	60	60
	of test				
Mgp	Mn Total		25.4	24.5	22.8

The original laboratory and field data accumulated at the test site are presented in Appendix "D". Orsat and laboratory weight forms are hand written on site as the data is generated.

Particulate (PM_{10}) and velocity measurements, required in the applicable reference methods, are generated in the field by computer. These forms are also included in Appendix "D" for each of the three (3) runs that comprise a compliance test. Compliance criteria is calculated using computer and hand-written field forms and are summarized in Table 4.1.7 for the Tunnel Kiln No. 3 Inlet and Table 4.1.8 for the Tunnel Kiln No. 4 Outlet.

A copy of the example calculations are attached as Appendix "E".

Figure 4.1.9 is a schematic of the sample train used to obtain the field data. A stainless steel probe liner was used for the testing. The glass fiber filters used in the train are 99.95% efficient on 0.3 micron particles and have no organic binders (Andersen P-3710). These filters are tared before use and after the test to determine particulate loading. Filter weights and particulate in the acetone washes of the glassware and probe ahead of the filter constitute the total particulate catch. The probe and filter are kept at 248°F ± 25° during sampling.

Moisture in the stack gases is collected by keeping the impingers in the sample train below 68°F with an ice bath. The "back-half" of the moisture sampling train contained the following impingers:

Impinger Number	Contents	Amount	Parameter Collected
1	Deionized Water	100 ml	Moisture
2	Deionized Water	100 ml	Moisture
3	Empty	- - - - - - -	Moisture
4	Silica Gel	@200 g	Moisture

Prior to doing the EPA Method 5 /202 tests, AET ran a pretest cyclonic flow determination in the exhaust stacks per EPA Method 2 criteria. Sources are testable if the average flow rate varies less than 20° from parallel to the vertical stack. The average Angle (°) was found to be 1.91° for the Kiln No. 3 Scrubber Outlet. The Field Form for cyclonic flow is included in Appendix "D" with the Field and Laboratory Data.

On all tests for PM_{10} Emissions, the sampling train was leak-checked at the nozzle at 15 inches of vacuum (Hg), and the reading recorded on the computer forms. This was done to predetermine the possibility of a diluted sample. After each test is complete AET conducts a final leak check to insure sample integrity. Those values are also included in the computer printouts. Before and after each test, the pitot tube lines were checked for leaks under both a vacuum and pressure. The lines were also checked for clearance and the manometer was zeroed before each test. These leak checks are shown on the computer forms for each run in Appendix "D".

D. EPA Method 6C, 7E and 10; for SO_2, NO_x and CO emissions from stationary sources (Instrumental Analysis Procedures).

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

TABLE 4.1.7
(CALCULATED COMPLIANCE CRITERIA)

Plant: Interstate Brick
Source: Kiln #3 - Intlet
Type: EPA Method #5
Date: 10/31/95

SYMBOL	DESCRIPTION	UNITS	Test #1	Test #2	Test #3
Vm std	Volume dry gas	dscfm	0.6729	0.6362	0.6210
	sampled @ standard	dscf	40.374	38.1693	37.2603
	Conditions				
Vw gas	Volume water vapor collected @ standard conditions	scf	2.9419	2.8571	2.9842
Bws	Proportion by volume of water vapor in gas stream dimensionless		0.0679	0.0696	0.0742
Md	Dry molecular weight	lb/lb mole	29.144	29.164	29.14
Ms	Wet molecular weight	lb/lb mole	28.3871	28.3865	28.3139
Vs	Stack gas velocity	ft/sec	47.3805	45.6738	45.8357
Qs	Volumetric flow rate dry basis standard conditions	ft3/hr	1.133 x E +6	1.1011 x E +6	1.0856 x E +6
Iso	Isokinetic variation	%	107.424	104.5039	103.4652
Cs	Conc. Particulat matter in stack gas dry basis	lb/scf	6.2912 x E -4	6.4188 x E -4	6.1191 x E -4
Emr	Emission rate *	lbs/dscf	1.3869 x E -6	1.4151 x E -6	1.349 x E -6
		gr/dscf	0.0097	0.0099	0.0094
		lbs/hr	1.5714	1.5581	1.4645
	NOx	lbs/hr	10.07	10.191	10.637
	CO	lbs/hr	37.581	35.7	35.142
	SO2	lbs/hr	23.628	27.036	26.731
	HF	lbs/hr	25.51	27.71	34.52

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

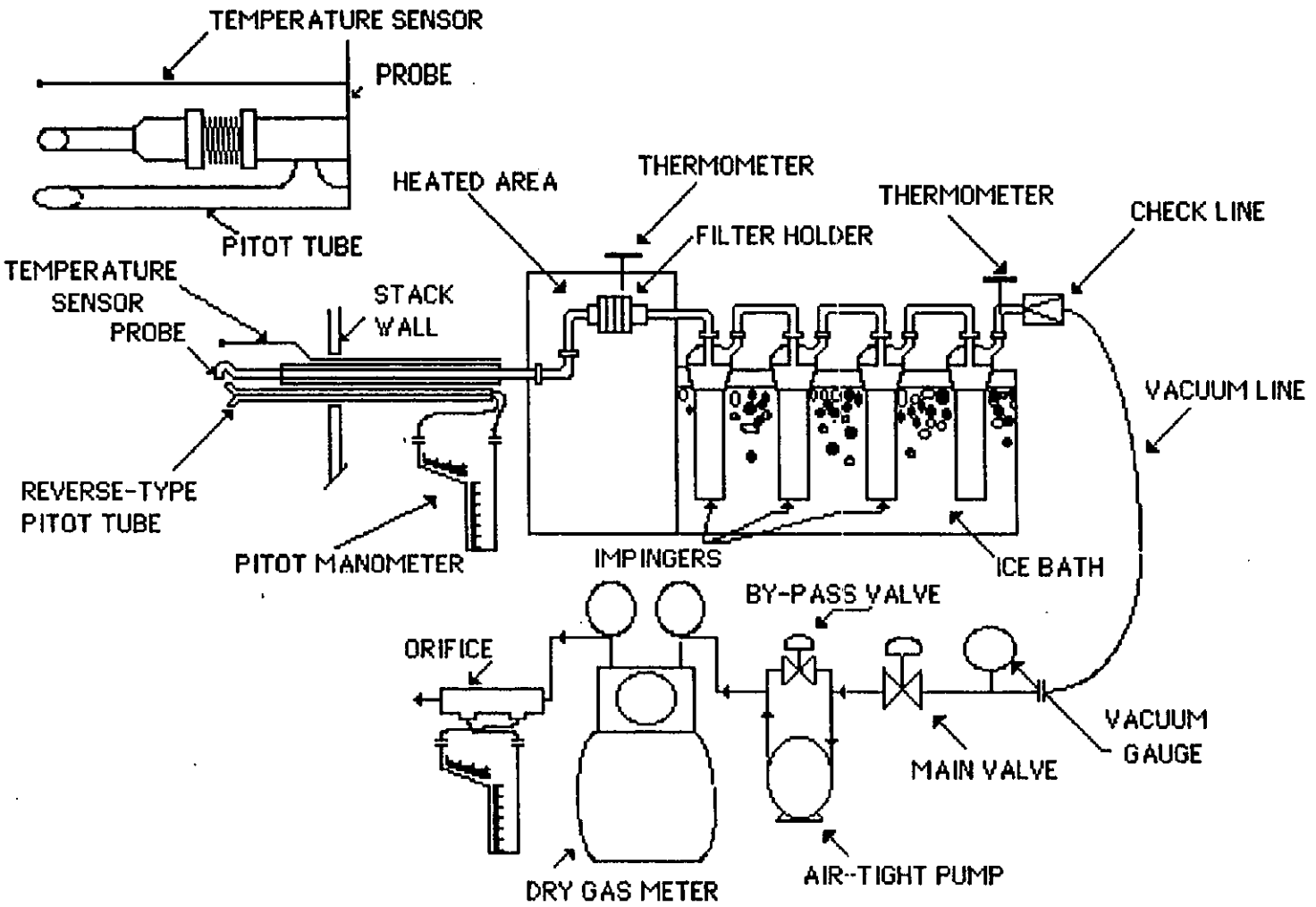
TABLE 4.1.8
(CALCULATED COMPLIANCE CRITERIA)

Plant: Interstate Brick
Source: Kiln #3 - Outlet
Type: EPA Method #5
Date: 10/31/95

SYMBOL	DESCRIPTION	UNITS	Test #1	Test #2	Test #3
Vm std	Volume dry gas	dscfm	0.6844	0.6282	0.6250
	sampled @ standard	dscf	49.2786	45.2297	45.0035
	Conditions				
Vw gas	Volume water vapor collected @ standard conditions	scf	7.936	9.494	9.1975
Bws	Proportion by volume of water vapor in gas stream dimensionless		0.1387	0.1735	0.1697
Md	Dry molecular weight	lb/lb mole	29.412	29.396	29.38
Ms	Wet molecular weight	lb/lb mole	27.8291	27.4189	27.4489
Vs	Stack gas velocity	ft/sec	23.5423	22.8724	22.8384
Qs	Volumetric flow rate dry basis standard conditions	ft3/hr	1.0737 x E +6	1.0028 x E +6	1.0044 x E +6
Iso	Isokinetic variation	%	101.7164	99.9607	99.2984
Cs	Conc. Particulate matter in stack gas dry basis	lb/scf	6.6763 x E -4	8.0699 x E -4	6.6217 x E -4
Emr	Emission rate *	lbs/dscf	1.4719 x E -6	1.7791 x E -6	1.4598 x E -6
		gr/dscf	0.0103	0.0125	0.0102
		lbs/hr	1.5803	1.7841	1.4663
	NOx	lbs/hr	3	2.34	2.948
	CO	lbs/hr	36.045	29.884	30.735
	SO2	lbs/hr	0.08	0.057	0.057
	HF	lbs/hr	0.0198	0.016	0.0149

Figure 4.1.9

EPA Method 5 Sample Train



The sample train used to extract and condition the stack gases for SO_2, NO_x and CO analysis is shown in Figure 4.1.10. SO_2 concentration is measured using a TECO 40A SO_2 analyzer. A TECO 10A NO_x analyzer is used to determine the concentration of NO_x and CO emissions were determined by using a TECO Model 48 Gas Filter Correlation (GFC) CO Analyzer. Three each 30 minute tests were run for SO_2, NO_x and CO emissions. Individual data-logger sheets for each run are included in Appendix "F". AET's CEM readings taken every minute for 30 minutes are included in Appendix "G".

E. EPA Method 9; for visible emissions opacity.

During each of the EPA Method 5/202 runs on the Kiln No. 3 Scrubber Outlet, AET had a certified VEO reader compile VEO's every fifteen (15) seconds for six (6.0) minutes.

Field VEO forms and the readers current certification cards are included as Appendix "H".

F. EPA Method 13B for the determination of hydrofluoric acid (HF) emissions from stationary sources as specified in Federal and State regulations.

Particulate and gaseous hydrofluoric acid are extracted from the stack isokinetically using a modified EPA Method 5 sample train. Total fluoride is determined on the filter, probe and prefilter glassware and in the back-half impinger water using a specific ion electrode.

5.0 Quality Control/Quality Assurance

5.1 Compliance Testing

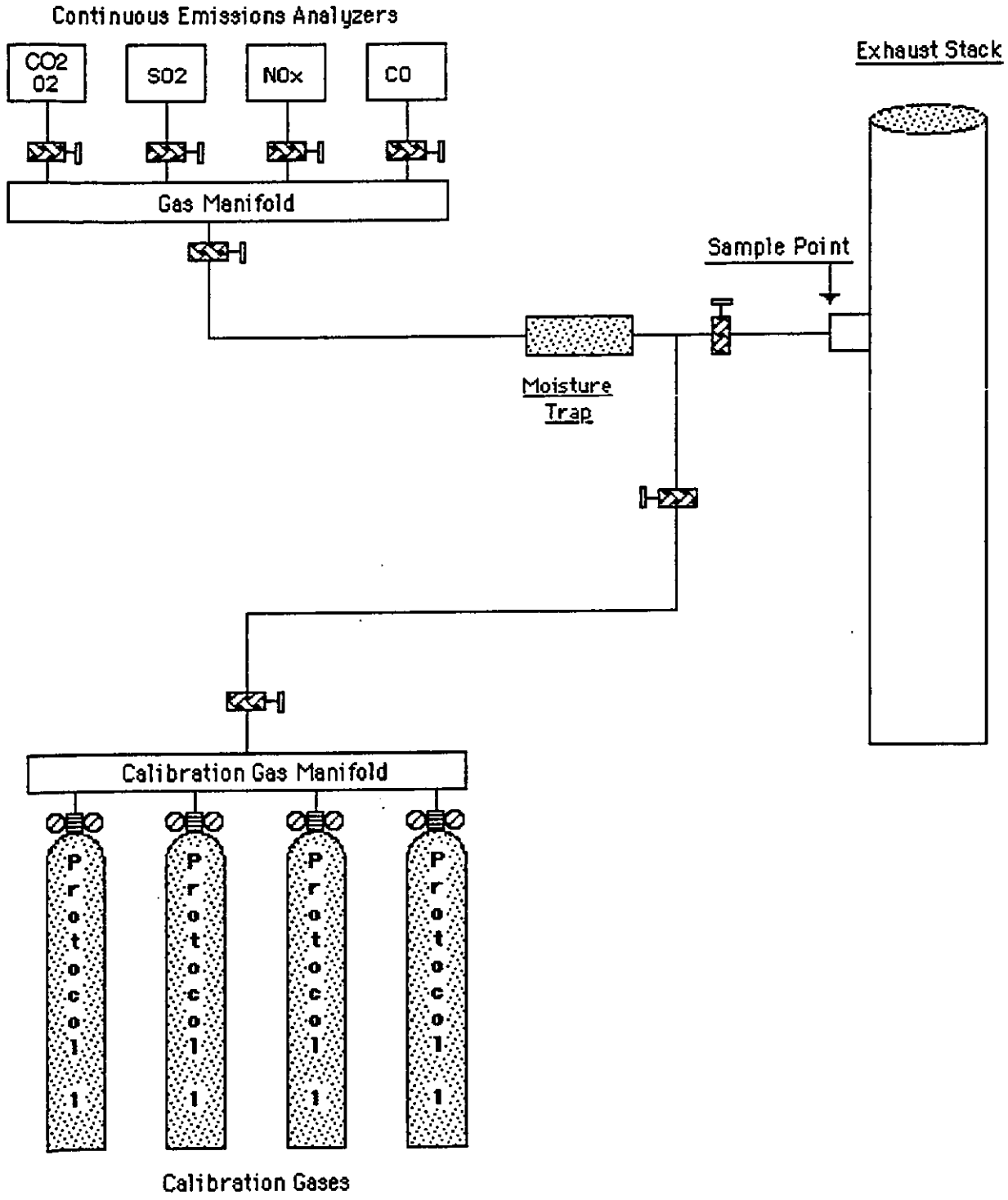
Specific items used in the EPA approved sample trains require pretest and post-test calibrations. The frequency of the calibrations and guidelines for procedural items are delineated in the EPA's "Quality Assurance Handbook for Air Pollution Measurement Systems".

For EPA Methods 1-5/202, 6C, 7E, 10 and 13B, the quality assurance guidelines are intended to insure that the SO_2, NO_x, CO, HF and PM_{10} emissions are quantified in a manner consistent with the most stringent sampling criteria possible. AET testing personnel are thoroughly trained in all aspects of the EPA required QA/QC guidelines. The crew supervisor has certified at the front of this report that the test crew adhered to those guidelines in the regulations applicable to the compliance testing at Interstate Brick Company's West Jordan, Facility. There were no deviations from prescribed methodology reported by the supervisor.

Calibrations for the sample nozzle, pitot tube, thermocouples, orifice, filter balance and dry gas meter used to extract the sample at an constant sampling rate are attached as Appendix "I".

CEM Sample Train

Figure 4.1.10



The main quality criteria that AET is required to fulfill for the EPA 5/202 emissions testing is as follows:

Kiln No. 3 Scrubber Inlet

1. Isokinetic Sampling Rate = 100 ± 10.0%

AET Run Number	Sampling Rate
1	107.43
2	104.50
3	103.47
Average =	105.13

2. Sampling Volume = > 31.8 DSCF

AET Run Number	Sample Volume (DSCF)
1	40.37
2	38.17
3	37.26
Average =	38.60

All of the compliance test quality assurance criteria was achieved for this set of tests.

Kiln No. 3 Scrubber Outlet

1. Isokinetic Sampling Rate = 100 ± 10.0%

AET Run Number	Sampling Rate
1	101.72
2	99.96
3	99.30
Average =	100.33

2. Sampling Volume = > 31.8 DSCF

AET Run Number	Sample Volume (DSCF)
1	49.28
2	45.23
3	45.00
Average =	46.50

All of the compliance test quality assurance criteria was achieved for this set of tests.

The CEM sample train was also leak checked prior to testing the Enterprise Engines. The standards used for these tests conformed to EPA "Protocol 1" quality. Those certifications are included in Appendix "I".

The main quality assurance criteria for EPA Method 6C requires that the following items are met:

Kiln No. 3 Scrubber Inlet

1. EPA Protocol 1 gas standards consisting of sulfur dioxide in nitrogen in the following ranges for the span value of 0 to 100 ppm:

   a. Zero gas (< 0.1 ppm SO2).

      AET had a zero gas of purified N_2 that was < 0.1 ppm SO2.

   b. Mid-level calibration gas with a sulfur dioxide concentration equivalent to 40 to 60 percent of the span value.

      AET's mid-level calibration gas was 54.5 ppm, which was in the acceptable range.

   c. High-level calibration gas with a sulfur dioxide concentration equivalent to 80 to 100 percent of the span value.

      AET's high-level calibration gas was 88.4 which was in the acceptable range.

   The calibration gas certificates of analysis are included in Appendix "I".

2. Measurement System Performance Specifications

   During the SO2 tests AET's measurement system is required to meet the following criteria:

   a. Zero drift for each run should be ≤ 3.0% of the span value.

      Run No. 1 - 0.06
      Run No. 2 - 0.13
      Run No. 3 - 0.03

   b. Calibration drift should be ≤ 3.0% of the span value.

      Zero Gas - 0.10
      Mid-Level Gas - 0.20
      High-Level Gas - 0.03

c. Calibration bias error for each run should be ≤ 5.0% of the calibration gas value.

Run No. 1 - -0.95
Run No. 2 - -1.11
Run No. 3 - -0.93

AET met these conditions for the tests. These results are included in Appendix "I".

Kiln No. 3 Scrubber Outlet

1. EPA Protocol 1 gas standards consisting of sulfur dioxide in nitrogen in the following ranges for the span value of 0 to 100 ppm:

   a. Zero gas (< 0.1 ppm SO2).

      AET had a zero gas of purified N_2 that was < 0.1 ppm SO2.

   b. Mid-level calibration gas with a sulfur dioxide concentration equivalent to 40 to 60 percent of the span value.

      AET's mid-level calibration gas was 54.5 ppm, which was in the acceptable range.

   c. High-level calibration gas with a sulfur dioxide concentration equivalent to 80 to 100 percent of the span value.

      AET's high-level calibration gas was 88.4 which was in the acceptable range.

   The calibration gas certificates of analysis are included in Appendix "I".

2. Measurement System Performance Specifications

   During the SO2 tests AET's measurement system is required to meet the following criteria:

   a. Zero drift for each run should be ≤ 3.0% of the span value.

      Run No. 1 - 0.10
      Run No. 2 - 0.10
      Run No. 3 - 0.20

   b. Calibration drift should be ≤ 3.0% of the span value.

      Zero Gas - 0.10
      Mid-Level Gas - 0.60
      High-Level Gas - 0.20

c. Calibration bias error for each run should be ≤ 5.0% of the calibration gas value.

Run No. 1 - 0.20
Run No. 2 - -0.30
Run No. 3 - 0.10

AET met these conditions for the tests. These results are included in Appendix "I".

The main quality assurance criteria for EPA Method 7E requires that the following items are met:

Kiln No. 3 Scrubber Inlet

1. EPA Protocol 1 gas standards consisting of nitrogen oxide in nitrogen in the following ranges for the span value of 0 to 1000 ppm:

   a. Zero gas (< 0.1 ppm NOx).

      AET had a zero gas of purified N_2 that was < 0.1 ppm NOx.

   b. Mid-level calibration gas with a nitrogen oxide concentration equivalent to 40 to 60 percent of the span value.

      AET's mid-level calibration gas was 525.5 ppm, which was in the acceptable range.

   c. High-level calibration gas with a nitrogen oxide concentration equivalent to 80 to 100 percent of the span value.

      AET's high-level calibration gas was 899.5 which was in the acceptable range.

   The calibration gas certificates of analysis are included in Appendix "I".

2. Measurement System Performance Specifications

   During the NOx tests AET's measurement system is required to meet the following criteria:

   a. Zero drift for each run should be ≤ 3.0% of the span value.

      Run No. 1 - 0.04
      Run No. 2 - 0.02
      Run No. 3 - 0.01

   b. Calibration drift should be ≤ 3.0% of the span value.

      Zero Gas - 0.00
      Mid-Level Gas - 1.00
      High-Level Gas - 0.06

c. Calibration bias error for each run should be ≤ 5.0% of the calibration gas value.

Run No. 1 - -1.04
Run No. 2 - -1.23
Run No. 3 - -1.48

AET met these conditions for the tests. These results are included in Appendix "I".

Kiln No. 3 Scrubber Outlet

1. EPA Protocol 1 gas standards consisting of nitrogen oxide in nitrogen in the following ranges for the span value of 0 to 100 ppm:

   a. Zero gas (< 0.1 ppm NOx).

      AET had a zero gas of purified N_2 that was < 0.1 ppm NOx.

   b. Mid-level calibration gas with a nitrogen oxide concentration equivalent to 40 to 60 percent of the span value.

      AET's mid-level calibration gas was 53.4 ppm, which was in the acceptable range.

   c. High-level calibration gas with a nitrogen oxide concentration equivalent to 80 to 100 percent of the span value.

      AET's high-level calibration gas was 87.3 which was in the acceptable range.

   The calibration gas certificates of analysis are included in Appendix "I".

2. Measurement System Performance Specifications

   During the NOx tests AET's measurement system is required to meet the following criteria:

   a. Zero drift for each run should be ≤ 3.0% of the span value.

      Run No. 1 - 0.30
      Run No. 2 - 0.50
      Run No. 3 - 0.60

   b. Calibration drift should be ≤ 3.0% of the span value.

      Zero Gas - 0.20
      Mid-Level Gas - 0.20
      High-Level Gas - 0.10

c. Calibration bias error for each run should be ≤ 5.0% of the calibration gas value.

Run No. 1 - 0.50
Run No. 2 - 0.50
Run No. 3 - 0.40

AET met these conditions for the tests. These results are included in Appendix "I".

The main quality assurance criteria for EPA Method 10 testing requires that the following items are met:

Kiln No. 3 Scrubber Inlet

1. EPA Protocol 1 gas standards consisting of carbon monoxide (CO) in nitrogen in the following ranges for the span value of 0 to 1000 ppm.

a. Zero gas (< 0.1 ppm CO).

AET used a zero gas of purified N2 that is <0.1 ppm CO.

b. Mid-level calibration gas with a carbon monoxide concentration equivalent to approximately 30 percent of the span value.

AET's mid-level calibration gas was 324.0.

c. High-level calibration gas with a carbon monoxide concentration equivalent to approximately 60 percent of the span value.

AET's high-level calibration gases was 646.8 ppm.

a. Zero drift for each run should be ≤ 3.0% of the span value; they were as follows:

Run No. 1 - 0.07
Run No. 2 - 0.04
Run No. 3 - 0.04

b. *Calibration drift for each test should be* ≤ 3.0% of the span value; they were as follows:

Zero Gas - 0.00
Mid-Level Gas - 0.21
High-Level Gas - 0.05

c. Calibration bias error for each run should be ≤ 5.0% of the calibration gas value; they were as follows:

Run No. 1	-	0.27
Run No. 2	-	-0.20
Run No. 3	-	-1.43

AET met these conditions for the tests. These results are included in Appendix "I".

Kiln No. 3 Scrubber Outlet

1. EPA Protocol 1 gas standards consisting of carbon monoxide (CO) in nitrogen in the following ranges for the span value of 0 to 1000 ppm.

a. Zero gas (< 0.1 ppm CO).

AET used a zero gas of purified N2 that is <0.1 ppm CO.

b. Mid-level calibration gas with a carbon monoxide concentration equivalent to *approximately 30 percent of the span value.*

AET's mid-level calibration gas was 324.0.

c. High-level calibration gas with a carbon monoxide concentration equivalent to approximately 60 percent of the span value.

AET's high-level calibration gases was 646.8 ppm.

a. Zero drift for each run should be ≤ 3.0% of the span value; they were as follows:

Run No. 1	-	0.09
Run No. 2	-	0.00
Run No. 3	-	0.00

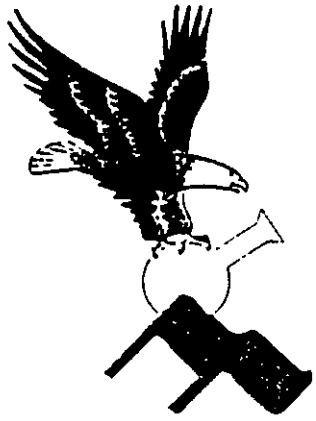
b. Calibration drift for each test should be ≤ 3.0% of the span value; they were as follows:

Zero Gas	-	0.01
Mid-Level Gas	-	0.03
High-Level Gas	-	0.09

c. Calibration bias error for each run should be ≤ 5.0% of the calibration gas value; they were as follows:

Run No. 1	-	0.49
Run No. 2	-	0.05
Run No. 3	-	0.09

AET met these conditions for the tests. These results are included in Appendix "I".



Appendix "A"

(Approval Order)

American Environmental Testing Company Inc.

Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3354

Salt Lake City, Utah
801-266-7111

Appendix "A"

(Approval Order)

STATE OF UTAH

Department of Environmental Quality

Division of Air Quality

INTENT TO APPROVE TUNNEL KILN #4

Prepared By: Nando Meli, Engineer

INTENT TO APPROVE NUMBER

DAQE-947-94

Date: October 27, 1994

Source

INTERSTATE BRICK COMPANY

Russell A. Roberts
Executive Secretary
Utah Air Quality Board

Abstract

Interstate Brick is required by the PM_{10} SIP to reduce SO_2 emissions to meet Reasonable Available Control Technology (RACT). The Approval Order contains new emission limitations which have been determined to meet RACT. Interstate Brick has also proposed an increase in fluoride emissions for Kiln #4, the only kiln which had a fluoride emission limit. Modeling of overall fluoride emissions has been performed which demonstrates compliance with the threshold limit values set for fluoride. Corresponding emission limits for fluoride from each kiln are contained in the Approval Order. Previously unidentified emissions from existing baghouses, which have been determined to meet Best Available Control Technology (BACT) requirements, are contained in the Approval Order with associated emission/operating limitations.

The Notice of Intent for the above-referenced project has been evaluated and has been found to be consistent with the requirements of the Utah Air Conservation Rules (UACR) and the Utah Air Conservation Act. However, air pollution producing sources and/or their air control facilities may not be constructed, installed, established, or modified prior to the issuance of an Approval Order (AO) by the Executive Secretary of the Utah Air Quality Board.

The Division of Air Quality has determined that a public comment period is not required for your particular project referenced above. Unless you have comments which would require changes, the AO for this project will be based upon the following conditions:

General Conditions:

1. This AO applies to the following company:

   Interstate Brick
   9780 South 5200 West
   West Jordan, Utah 84084

   The equipment listed below in this AO shall be operated at the following location:

   PLANT LOCATION:

   Universal Transverse Mercator (UTM) Coordinate System: 4,491.5 km North, 413.5 km East

2. Definitions of terms, abbreviations, and references used in this AO conform to those used in the UACR, Utah Administrative Codes (UAC), and Series 40 of the Code of Federal Regulations (40 CFR). These definitions take precedence unless specifically defined otherwise herein.

3. Interstate Brick shall operate the brick manufacturing facility according to the information submitted in the Notices of Intent dated November 30, 1992, December 1993, June 7, 1994, and additional information dated September 22, 1994, and according to requirements listed in this AO.

4. Regardless of any inconsistency between conditions of this AO and Section IX.H.2.b.U and Section IX.H.2, this AO shall take precedence as provided by R307-1-3.2.4, UAC.

5. A copy of this AO shall be posted on site. The AO shall be available to the employees who operate the air emission producing equipment. These employees shall receive instruction as to their responsibilities in operating the equipment according to all of the relevant conditions listed below.

6. The approved installations shall consist of the following equipment:

   A. Tunnel Kiln #1

   B. Tunnel Kiln #3

   C. Tunnel Kiln #4

   D. Grizzly Hopper

   E. Primary Crusher

   F. Secondary Crusher/Grinding

   G. Screens

   H. Two Lime Silos

   I. Clay Storage Piles

   J. Miscellaneous Diesel Equipment

   K. Line 3 Baghouse - Micro Pulsaire*

   L. Line 4 Baghouse - Micro Pulsaire*

   * Or Equivalent

7. This AO shall replace the AO dated October 20, 1980.

8. Interstate Brick shall rebuild the scrubber or design a new scrubbing system for Kiln #3. If the scrubber is rebuilt, the scrubber shall be rebuilt as described in the Notice of Intent dated December 10, 1993. Should the scrubber require replacement, or modifications other than those described as "Alternative A" in the December 10, 1993, Notice of Intent, Interstate Brick shall submit complete design specifications including operating parameters and proposed emission limitations for approval prior to construction. In no case shall emissions of any pollutant from a newly designed scrubbing system exceed emission limitations listed in this AO as final limits.

Interstate Brick shall modify the scrubber for Kiln #4 as proposed in the Notice of Intent dated November 30, 1992. In addition, Interstate Brick shall operate the scrubber for Kiln #4 using soda ash in the scrubbing solution until modifications to the scrubber for Kiln #3 are complete and stack testing on the scrubber for Kiln #3 demonstrates that the scrubber is meeting the emission limits listed in this AO.

Limitations and Tests Procedures

9. Emissions to the atmosphere from the indicated emission point shall not exceed the following rates and concentrations:

A. Scrubber Emissions - Tunnel Kiln #1:

Pollutant	Transition Limits (to October 1, 1995)	Final Limits
PM_{10} (annual average)*	Shall not operate	1.9 lb/hr
SO_2 (1-hr average)		17.0 lb/hr
SO_x (annual average)		14.0 lb/hr
NO_x		1.8 lb/hr
HF (1-hr average)		4.5 lb/hr
HF (annual average)		1.5 lb/hr

B. Scrubber Emissions - Tunnel Kiln #3:

Pollutant	Transition Limits (to October 1, 1995)	Final Limits
PM_{10} (annual average)*	3.6 lb/hr	1.9 lb/hr
SO_2 (1-hr average)	105.0 lb/hr	17.0 lb/hr
SO_x (annual average)	36.8 lb/hr	14.0 lb/hr
NO_x	1.8 lb/hr	1.8 lb/hr
HF (1-hr average)	10.5 lb/hr	4.5 lb/hr
HF (annual average)	3.5 lb/hr	1.5 lb/hr

C. Scrubber Emissions - Tunnel Kiln #4

Pollutant	Transition Limits (to October 1, 1995)	Final Limits
PM_{10} (annual average)*	12.3 lb/hr	12.3 lb/hr
SO_2 (1-hr average)	51.0 lb/hr	77.0 lb/hr
SO_x (annual average)	18.0 lb/hr	27.0 lb/hr
NO_x	2.6 lb/hr	2.6 lb/hr
HF (1-hr average)	5.7 lb/hr	7.2 lb/hr
HF (annual average)	1.9 lb/hr	2.4 lb/hr

* PM_{10} emission rates expressed as annual averages above for the scrubbers for Kilns #1, #2, and #3 shall be demonstrated through an 8-hr stack test. Should PM_{10} emissions test at a higher rate than the limits expressed above, Interstate Brick shall provide documentation which demonstrates that the limits are being met, on an annual average basis, within 30 days of the date of the stack test. The method provided in the documentation shall be verifiable.

D. Primary Crusher Baghouse Vent

PM_{10}	0.49 lbs/hr	0.016 grains/dscf

E. Line 3 Baghouse

PM_{10}	0.37 lbs/hr	0.016 grains/dscf

F. Line 4 Baghouse

PM_{10}	0.67 lbs/hr	0.016 grains/dscf

10. Stack testing to show compliance with the emission limitations stated in the above condition (excluding annual average emission rates for SO_x and HF, but including annual average emission rates for PM_{10}) shall be performed as specified below:

Emission Point	Pollutant	Testing	Test Status	Frequency
Scrubber, Kiln #1	PM_{10}	***	@	
	SO_2	***	%	
	NO_x	***	@	
	HF	***	%	

Scrubber, Kiln #3	PM_{10}	**	@
	SO_2	**	%
	NO_x	**	@
	HF	**	%
Scrubber, Tunnel Kiln #4	PM_{10}	**	@
	SO_2	**	%
	NO_x	**	@
	HF	**	%
Primary Crusher Baghouse	PM_{10}	**	@
Line 3 Baghouse	PM_{10}	**	@
Line 4 Baghouse	PM_{10}	**	@

Testing Status (To be applied above)

** Initial compliance testing is required. The initial test shall be completed by December 1, 1994, to show compliance with emissions limits listed during the transition period.

An additional initial test shall be completed to show compliance with emission limits listed as final limits. Testing to show compliance with the final emission limits shall be completed by November 1, 1995

*** Initial compliance testing is required within 30 days of start-up of Tunnel Kiln #1.

@ Test if directed by the Executive Secretary. Tests may be required if the source is suspected to be in violation with other conditions of this AO.

Test every year

% Test every three years

A. Notification

The applicant shall provide a notification of the test date at least 30 days before the test. A pretest conference shall be held if directed by the Executive Secretary. It shall be held at least 15 days before the test between the owner/operator, the tester, and the Executive Secretary. The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, and Occupational Safety and Health Administration (OSHA) or Mine Safety and Health Administration (MSHA) approvable access shall be provided to the test location.

B. PM_{10}

For stacks in which no liquid drops are present, the following methods shall be used: 40 CFR 51, Appendix M, Methods 201 or 201a. The back half condensibles shall also be tested using the method specified by the Executive Secretary. All particulate captured shall be considered PM_{10}.

For stacks in which liquid drops are present, methods to eliminate the liquid drops should be explored. If no reasonable method to eliminate the drops exists, then the following methods shall be used: 40 CFR 60, Appendix A, Method 5, 5a, 5d, or 5e as appropriate. The back half condensibles shall also be tested using the method specified by the Executive Secretary. The portion of the front half of the catch considered PM_{10} shall be based on information in AP-42, Appendix C or other data acceptable to the Executive Secretary.

The back half condensibles shall not be used for compliance demonstration but shall be used for inventory purposes.

Compliance testing of PM_{10} emissions for Kilns #1, #2, and #3 shall be conducted over an eight hour time period.

C. Sample Location

40 CFR 60. Appendix A, Method 1

D. Volumetric Flow Rate

40 CFR 60, Appendix A, Method 2

E. Sulfur Dioxide (SO_2)

40 CFR 60, Appendix A, Method 6, 6A, 6B or 6C

F. Nitrogen Oxides (NO_x)

40 CFR 60, Appendix A, Method 7, 7A, 7B, 7C, 7D or 7E

G. Hydroflouric Acid (HF)

The test method shall be submitted for approval or may be assigned by the Executive Secretary.

H. Calculations

To determine mass emission rates (lbs/hr, etc.), the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric flow rate and any necessary conversion factors determined by the Executive Secretary to give the results in the specified units of the emission limitation.

I. New Source Operation

For a new source/emission point (Line 4 and Line 5 baghouses), the production rate during all compliance testing shall be no less than 90% of the production rate listed in this AO. If the maximum AO allowable production rate has not been achieved at the time of the test, the following procedure shall be followed:

1) Testing shall be at no less than 90% of the production rate achieved to date.

2) If the test is passed, the new maximum allowable production rate shall be 110% of the tested achieved rate. This new allowable maximum production rate shall remain in affect until successfully tested at a higher rate.

3) The owner/operator shall request a higher production rate when necessary. Testing at no less than 90% of the higher rate shall be conducted. A new maximum production rate (110% of the new rate) will then be allowed if the test is successful. This process may be repeated until the maximum AO production rate is achieved.

J. Existing Source Operation

For an existing source/emission point, the production rate during all compliance testing shall be no less than 90% of the maximum production achieved in the previous three (3) years.

11. Compliance with annual average limitations listed in condition #9 shall be determined through a method of mass balance. Interstate Brick shall submit a mass balance method of determining annual emissions to the Executive Secretary for approval no later than December 1, 1994. The plan shall include:

A. Proposed test methods and test frequency for determining the weight of the elemental sulfur and fluorine contained in the clays used to manufacture brick

B. Proposed test methods and test frequency for determining the weight of the elemental sulfur and fluorine contained in the finished product

C. A method of determining scrubber efficiencies as an annual average

D. Calculation method of determining annual emissions of SO_2 and HF which will demonstrate compliance with the annual average emission rate(s) listed in condition #9 of this AO

12. The following limits shall not be exceed without prior approval in accordance with R307-1-3.1, UAC.

A. Production/Consumption limits

i) Raw Clay Consumption

120 tons/hr
1,051,200 tons/year

ii) 512,582 tons of brick produced per 12-month period, plantwide

B. Tunnel Kiln #1

Annual production limit of bricks included in 12.A.ii above

Note: Interstate Brick is not operating Tunnel Kiln #1 as of the date of this AO and it is not allowed to operate during the transition period (to 10/1/95). The scrubber for Kiln #1 requires rebuilding and modifications to meet the emission limits contained in condition #9. Interstate Brick shall submit a complete description of proposed modifications to the scrubber for Tunnel Kiln #1, and receive approval from the Executive Secretary, prior to construction.

C. Tunnel Kiln #3

Annual production limit of bricks included in 12.A.ii above

D. Tunnel Kiln #4

Annual production limit of bricks included in 12.A.ii above

E. Line 3 Baghouse

6,240 hours per year

F. Line 4 Baghouse

6,240 hours per year

Compliance with the annual limitations shall be determined on a rolling 12-month total. The owner/operator shall calculate a new 12-month total based on the first day of each month using data from the previous 12 months. Records of consumption/production shall be kept for all periods when the plant is in operation. Records of

consumption/production, including rolling 12-month totals shall be made available to the Executive Secretary or his representative upon request, and shall include a period of two years ending with the date of the request. The records shall be kept on a daily basis. Hours of operation shall be determined by supervisor monitoring and maintaining of an operations log.

13. Visible emissions from the following emission points shall not exceed the following values:

A. All crushers - 15% opacity
B. All screens - 10% opacity
C. All conveyor transfer points - 10% opacity
D. All baghouses - 10% opacity
E. All other points - 20% opacity

Opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9. Visible emissions from mobile sources and intermittent sources shall use procedures similar to Method 9, but the requirement for observations to be made at 15-second intervals over a six-minute period shall not apply.

14. The moisture content of the clay shall be maintained at an average of no less than 4.0% by weight. The silt content of the clay shall be no greater than an average of 18.0% by weight. The moisture content and the silt content shall be tested if directed by the Executive Secretary using the appropriate ASTM method.

15. The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary.

Fuels

16. The owner/operator shall use only natural gas as a fuel and propane as a backup fuel in the kilns. If any other fuel is to be used, an AO shall be required in accordance with R307-1-3.1, UAC.

Modeling

17. This source has been modeled for fluoride emissions prior to issuance of this AO. Interstate Brick shall submit an analysis using parameters measured during the initial stack test for each scrubber. The analysis shall include parameters measured as compared with the parameters used in the modeling exercise completed. Critical parameters to be included in the analysis are as follows:

A. Exhaust exit temperature

B. Exhaust exit velocity/flow

C. Fluoride emission rate

The results of the analysis shall be used to determine the applicability of the modeling completed. Additional modeling shall be performed if directed by the Executive Secretary.

Monitoring

18. Interstate Brick shall install, calibrate, maintain, and operate a monitoring device for the continuous measurement of the change in pressure of the gas stream through each scrubber. The monitoring device must be certified by the manufacturer. The monitoring device shall be accurate within plus or minus one inch of water gauge and must be calibrated on an annual basis according to the manufacturer's instructions. Continuous recording for the monitoring device is not required. However, daily records of readings shall be maintained and dates of calibrations shall be recorded.

Interstate Brick shall measure and record the pressure drop during each compliance stack test of each scrubber. The pressure drop measured during the most recent compliance stack test shall be the minimum (-10%) of that required during all operating periods.

19. Interstate Brick shall install, calibrate, maintain, and operate a monitoring device for the continuous measurement of the scrubbing liquid flow rate to the scrubber. The monitoring device must be certified by the manufacturer. Accuracy shall be within plus or minus five percent of the design scrubbing liquid flow rate. Calibration shall be on an annual basis according to the manufacturer's instructions. Continuous recording for the monitoring device is not required. However, daily records of readings shall be maintained and dates of calibrations shall be recorded.

Interstate Brick shall measure and record the scrubbing liquid flow rate during each compliance stack test on each scrubber. The scrubbing liquid flow rate measured during the most recent compliance stack test shall be the minimum (-10%) of that required during all operating periods.

20. Interstate Brick shall measure the pH of the scrubbing solution for each scrubber on a daily basis. The measuring device must be certified by the manufacturer as being accurate to plus or minus 5%. The measuring device shall be calibrated on a monthly basis.

Interstate Brick shall measure and record the pH of the scrubbing liquid, and the type of neutralizer (hydrated lime, soda ash, etc.) during each compliance stack test of each scrubber. The pH measured during the latest compliance stack test shall be the minimum pH (-5%) of the scrubbing solution during all operating periods. The neutralizer used during the most recent compliance stack test shall be that required during all operating periods.

Records & Miscellaneous

21. All installations and facilities authorized by this AO shall be adequately and properly maintained. All pollution control vendor recommended equipment shall be installed,

maintained, and operated. Instructions from the vendor or established maintenance practices that maximize pollution control shall be used. All necessary equipment control and operating devices, such as pressure gauges, amp meters, volt meters, flow rate indicators, temperature gauges, continuous emission monitors (CEMs), etc., shall be installed and operated properly and easily accessible to compliance inspectors. A copy of all manufacturers' operating instruction for pollution control equipment and pollution emitting equipment shall be kept on site. These instructions shall be available to all employees who operate the equipment and shall be made available to compliance inspectors upon their request.

22. All records referenced in this AO or in applicable NSPS or NESHAP, which are required to be kept by the owner/operator, shall be made available to the Executive Secretary or his representative upon request. Examples of records to be kept at this source shall include the following as applicable:

    A. Production rate/operating hour limitations (Condition number 12)
    B. Scrubber operating parameters (Condition numbers 18, 19, and 20)
    C. Unavoidable Breakdown Reports (Condition number 24)
    D. Emergency episodes (Condition number 25)

23. The owner/operator shall comply with R307-1-3.5, UAC. This rule addresses emission inventory reporting requirements.

24. The owner/operator shall comply with R307-1-4.7, UAC. This rule addresses unavoidable breakdown reporting requirements. The owner/operator shall calculate/estimate the excess emissions whenever a breakdown occurs. The total of excess emissions shall be reported to the Executive Secretary as directed for each calendar year.

25. The owner/operator shall submit to the Executive Secretary an emergency episode plan within 60 days of the date of this AO. The plan shall identify what control/production measures the owner/operator shall implement when an emergency episode is declared by the Executive Director of the Department of Environmental Quality. Specific control/production measures shall be outlined for all three levels (Alert, Warning, Emergency). The values for the various levels are listed in R307-1-5, UAC. The emergency plan shall be approved by the Executive Secretary.

Any future modifications to the equipment approved by this order must also be approved in accordance with R307-1-3.1.1, UAC.

This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including the UACR.

Annual emissions for this source, the entire plant, are currently calculated at the following values:

Pollutant	Total Emissions tons/year
TSP	112.1
PM_{10}	88.8
SO_2	240.9
NO_x	65.7
CO	27.2
VOC	0.8
HF	23.7

These calculations are for the purposes of determining the applicability of Prevention of Significant Deterioration (PSD) and nonattainment area major source requirements of the UACR. They are not to be used for purposes of determining compliance.

In accordance with the requirements of Title V of the 1990 Clean Air Act, the following pollutants may be subject to an operating permit fee. Both the fee rate and the class of pollutants are subject to change by state, the federal agencies, or both.

Pollutant	Total Emissions Tons/Year
PM_{10}	88.8
SO_2	240.9
NO_x	65.7
VOC	0.8
HF	23.7

The Division of Air Quality is authorized to charge a fee for reimbursement of the actual costs incurred in the issuance of an AO. Unless you have comments which would require additional work, the fee for this AO will be $4,625.00. An invoice is attached. Your AO can be issued as soon as payment is received.

Sincerely,

Lynn R. Menlove, Manager
New Source Review Section

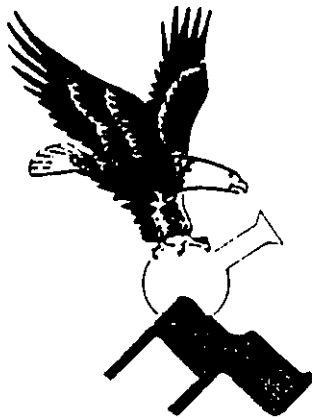
Interstate Brick Company
Tunnel Kiln #4
Salt Lake County - CDS A1 NA Toxics TitleVMajor

Filing Fee		$ 0.00
Review Engineer	64.00 hours @ $50.00/hr	$ 3,200.00
Modeler	28.50 hours @ $50.00/hr	$ 1,425.00
Computer Fee		$ 0.00
Notice To Paper		$ 0.00
Travel	0.0 miles @ $0.23/mile	$ 0.00
Total Charges		$ 4,625.00
Amount Paid to Date		$ 0.00
Balance Due		$ 4,625.00

Please remit a copy of this invoice with your payment.

Please send payment to:

Utah Division of Air Quality
1950 West North Temple
Salt Lake City, Utah 84114-8420
(801) 536-4000



Appendix "B"

(AET Pretest Protocol)

American Environmental Testing Company Inc.

Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3354

Salt Lake City, Utah
801-266-7111

Appendix "B"

(AET Pretest Protocol)

AMERICAN ENVIRONMENTAL TESTING COMPANY, INC.

565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

Pre-test Information Form & Attachments

SOURCE INFORMATION September 29, 1995

Facility Name: Interstate Brick Company

Units to be Tested: 1. No. 3 Brick Kiln Scrubber Inlet
2. No. 3 Brick Kiln Scrubber Outlet

Mailing Address: 9780 South 5200 West, West Jordan, Utah 84088-5689

Plant Address: Same as above

Phone: (801) 280-5200

Plant Contact: Mr. John Hewitt, Plant Manager

Test Date: October 31, 1995

CONTRACTOR OR TEST FIRM

Name: American Environmental Testing, Company, Inc.

Address: 565 South Birch Drive, Spanish Fork, Utah, 84660

Phone: (801) 266-7111

Contact: V. Brent Benson, Technical Director

SOURCE TEST SUMMARY

Methodology	Parameter Determined	Units to Tested
EPA Method 1	Location of Sample & Velocity Traverses from Stationary Sources	Inlet & Outlet
EPA Method 2	Stack Gas Velocity and Flow Rate from Stationary Sources	Inlet & Outlet

EPA Method 3	Gas Analysis for Carbon Dioxide Oxygen, Excess Air & Dry Molecular Weight of Stack Gases	Inlet & Outlet
EPA Method 4	Moisture Content in Stack Gases	Inlet & Outlet
EPA Method 5	Particulate Emissions from Stationary Sources	Inlet & Outlet
EPA Method 6C	Sulfur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)	Inlet & Outlet
EPA Method 7E	Oxides of Nitrogen Emissions from Stationary Sources (Instrumental Analyzer Procedure)	Inlet & Outlet
EPA Method 10	Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)	Inlet & Outlet
EPA Method 13B	Total Fluoride Emissions from Stationary Sources (Specific Ion Electrode Method)	Inlet & Outlet
EPA Method 202	Back-Half Condensable Emissions from Stationary Sources	Inlet & Outlet

SAMPLE TRAIN AND ANALYSIS INFORMATION

Interstate Brick company is currently operating under the Utah Department of Environmental Quality (UDEQ) "Intent to Approve Number DAQE-947-94" which requires that particulate testing be accomplished using EPA Method 201A; unless liquid drops are present in the gas stream. If this is found to be the case, EPA Method 5/202 will be used to substitute for EPA Method 201A. The back half condensables shall be tested using the method specified by the Executive Secretary (EPA Method 202).

An EPA Method 201A sample train will be employed to perform the above referenced PM_{10} testing. The sampling device used is a Cyclone I of the SRI/EPA five-stage series cyclone. This device provides a 10 micron size cut at a flow rate of approximately 0.5 dscfm; the precise flow rate depends on local stack conditions. A glass or teflon probe liner will be used and maintained at a temperature of 248° ± 25°F for the duration of the test. The filter holder will also be kept at a temperature of 248° ± 25°F. The first two (2) impingers will contain 100 mls of distilled water, the third impinger will be left empty, and the fourth will contain a known amount of silica gel. All impingers will be weighed before and after each test to determine the moisture content of the gases. The impinger bath will be maintained at a temperature lower that

68°F to condense the moisture. The back-half impinger solutions will be evaporated and weighed or extracted with methylene chloride and evaporated and weighed as per EPA Method 202 depending on the pH of the solution. Pitot tubes and the meter system will be leak checked before and after sampling. Figure I is a schematic of the EPA Method 201A sample train to be used.

The glass filters will be of binderless variety (Anderson Smellers P-2710 + 99.95% efficient on 0.3 microns particulate). The nozzle, cyclone, and outside of the turn around cup will be washed with AR grade acetone and be considered to be larger than PM_{10}. The inside of the turn around cup, the stem leading down to the filter and the filter holder itself will be washed with AR grade acetone. This catch, along with the filter will be used for the particulate emissions calculations for PM_{10}.

EPA Method 13B will be used to determine the hydrofluoric acid (HF) emissions from stationary sources as specified in Federal and State regulations. Particulate and gaseous hydrofluoric acid are extracted from the stack isokinetically using a modified EPA Method 5 sample train. Total fluoride is determined on the filter, probe and prefilter glassware and in the back-half impinger water using a specific ion electrode.

EPA Methods 6C, 7E & 10 are instrumental methods. The sample train incorporates taking a sample line from the stack, conditioning the sample, and finally running it through the analyzers. Figure II is a schematic of the analyzer sample train, showing both sample line locations and calibration line locations. Variations to this schematic will be made according to each method. The mass emission calculations for SO_2, NO_x & CO will use the flow rate (DSCFH) derived from each of the EPA Method 201A/202 tests respectfully.

CEMS Gas Standards for Determination of Compliance

The main quality assurance criteria for EPA Methods 6C, 7E and 10 requires that the following items are met:

1. EPA Protocol 1 gas standards consisting of sulfur dioxide (SO_2) in nitrogen in the following ranges for the span value of 0 to 1000 ppm:

   a. Zero gas (< 0.1 ppm SO2).

      AET had a zero gas of purified N_2 that was < 0.1 ppm SO2.

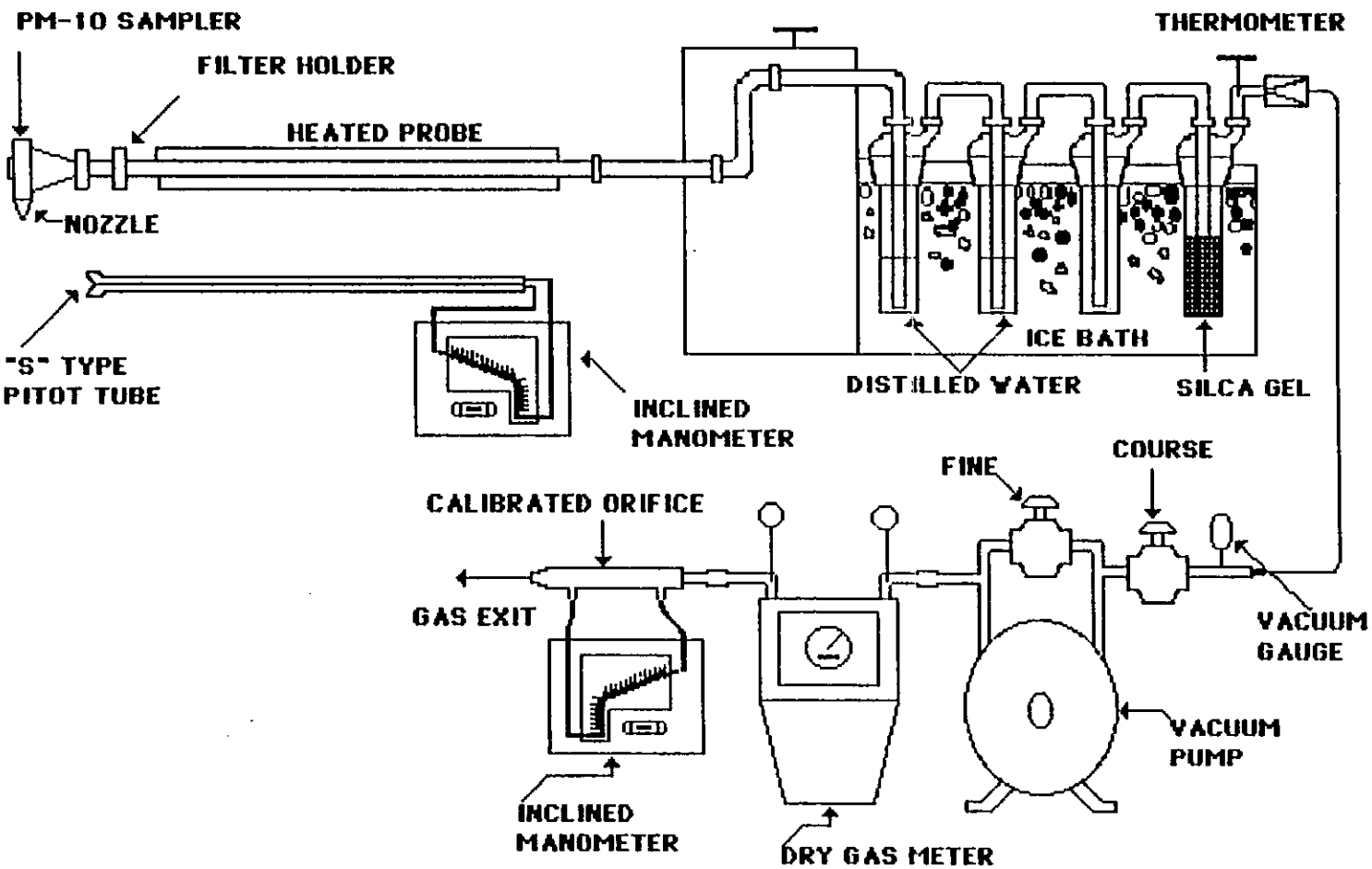
   b. Mid-level calibration gas with a sulfur dioxide concentration equivalent to 40 to 60 percent of the span value.
      AET's mid-level calibration gas will be 514.6 ppm, which is in the acceptable range.

   c. High-level calibration gas with a sulfur dioxide concentration equivalent to 80 to 100 percent of the span value.

      AET's high-level calibration gas will be 901.6 which is in the acceptable range.

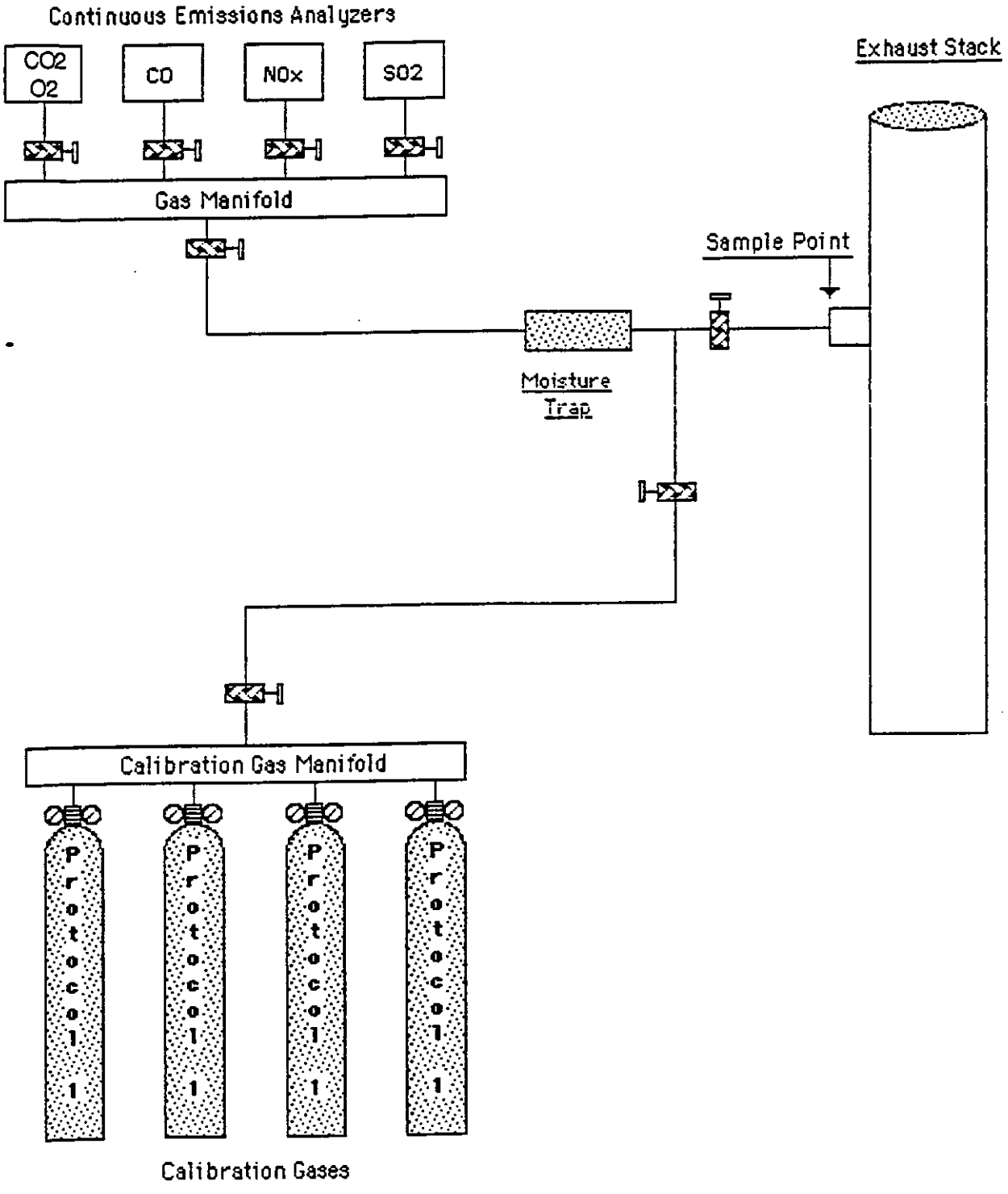
Figure I

EPA Method 201A Sample Train



CEM Sample Train

Figure II



2. EPA Protocol 1 gas standards consisting of carbon monoxide (CO) in nitrogen in the following ranges for the span value of 0 to 100 ppm.

   a. Zero gas (< 0.1 ppm CO).

      AET will use a zero gas of purified N2 that is <0.1 ppm CO.

   b. Mid-level calibration gas with a carbon monoxide concentration equivalent to approximately 30 percent of the span value.

      AET's mid-level calibration gas will be 32.4.

   c. High-level calibration gas with a carbon monoxide concentration equivalent to approximately 60 percent of the span value.

      AET's high-level calibration gases will be 62.7 ppm.

3. EPA *Protocol 1 gas standards consisting of nitrogen oxide* (NO_x) in nitrogen in the following ranges for the span value of 0 to 100 ppm:

   a. *Zero gas* (< 0.1 ppm NO_x).

      AET has a zero gas of purified N_2 that is < 0.1 ppm NOx.

   b. Mid-level calibration gas with a nitrogen oxide concentration equivalent to 40 to 60 percent of the span value.
      AET's mid-level calibration gas will be 53.4 ppm, which is in the acceptable range.

   c. High-level calibration gas with a nitrogen oxide concentration equivalent to 80 to 100 percent of the span value.

      AET's high-level calibration gas will be 86.8 ppm which is in the acceptable range.

4. Measurement System Performance Specifications

   During the SO_2, NO_x and CO tests, AET's measurement system is required to meet the following criteria:

   a. Zero drift ≤ to 3.0% of the span value.

   b. Calibration drift ≤ 3.0% of the span value.

   c. Calibration bias error has to be ≤ 5.0% of the calibration gas value.

   These conditions will be met.

Current calibration gas certificates of analysis for SO_2, NO_x and CO are included in Appendix "A". All standards to be employed for the tests will have current certifications.

CALIBRATION DATA

The EPA and State agencies require various calibrations for specific equipment used during testing. The current calibration data is included in Appendix "A". A sample of all field data forms will be made available at the job site.

PROCESS DESCRIPTION AND POLLUTION CONTROL EQUIPMENT

The manufacture of brick and related products such as clay pipe, pottery and some types of refractory brick involves the mining, grinding, screening and blending of the raw materials, and the forming, cutting or shaping, drying or curing, and firing of the final product.

Surface clays and shales are mined in open pits. Most fine clays are found underground. After mining, the material is crushed to remove stones and is stirred before it passes onto screens for segregation by particle size.

To start the forming process, clay is mixed with water, usually in a pug mill. The three principal processes for forming brick are stiff mud, soft mud and dry press. In the stiff mud process, sufficient water is added to give the clay plasticity, and bricks are formed by forcing the clay through a die. Wire is used in separating bricks. All structural tile and most and most brick are formed by this process. The soft mud process is usually used with clay too wet for the stiff mud process. The clay is mixed with water to a moisture content of 20 to 30 percent, and the bricks are formed in molds. In the dry press process, clay is mixed with a small amount of water and formed in steel molds by applying pressure of 500 to 1500 pounds per square inch.

Wet clay units that have been formed are almost completely dried before firing, usually with waste heat from kilns. Many types of kilns are used for firing brick, but the most common are the downdraft periodic kiln and the tunnel kiln. The periodic kiln is a permanent brick structure with a number of fireholes where fuel enters the furnace. Hot gases from the fuel are drawn up over the bricks, down through then by underground flues, and out of the oven to the chimney. Although lower heat recovery makes this type less efficient than the tunnel kiln, the uniform temperature distribution leads to a good quality product.

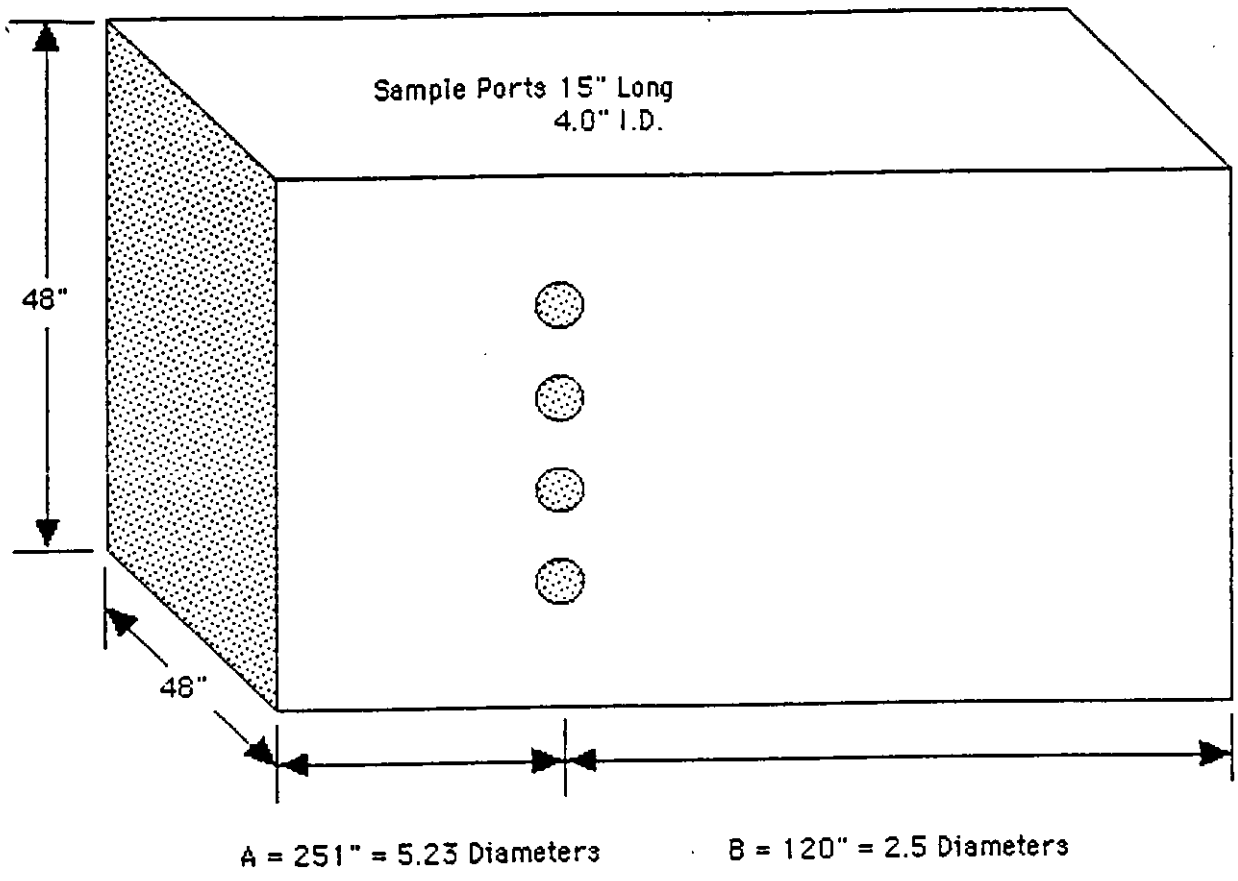
STACK SCHEMATIC AND TRAVERSE POINT LOCATIONS

Attached are the schematics showing plan and elevation of ducting and stack arrangements including sample port positions relative to upstream and downstream disturbances. Also included are cross-sectional sketches of the stack at the sampling locations.

1. Figure III is a drawing of the Kiln No. 3 Scrubber Inlet.
2. Figure IV is a drawing of the Kiln No. 3 Scrubber Outlet.
3. Traverse point locations for the Kiln No. 3 Scrubber Inlet are listed in Table I.
4. Traverse point locations for the Kiln No. 3 Scrubber Outlet are listed in Table II.

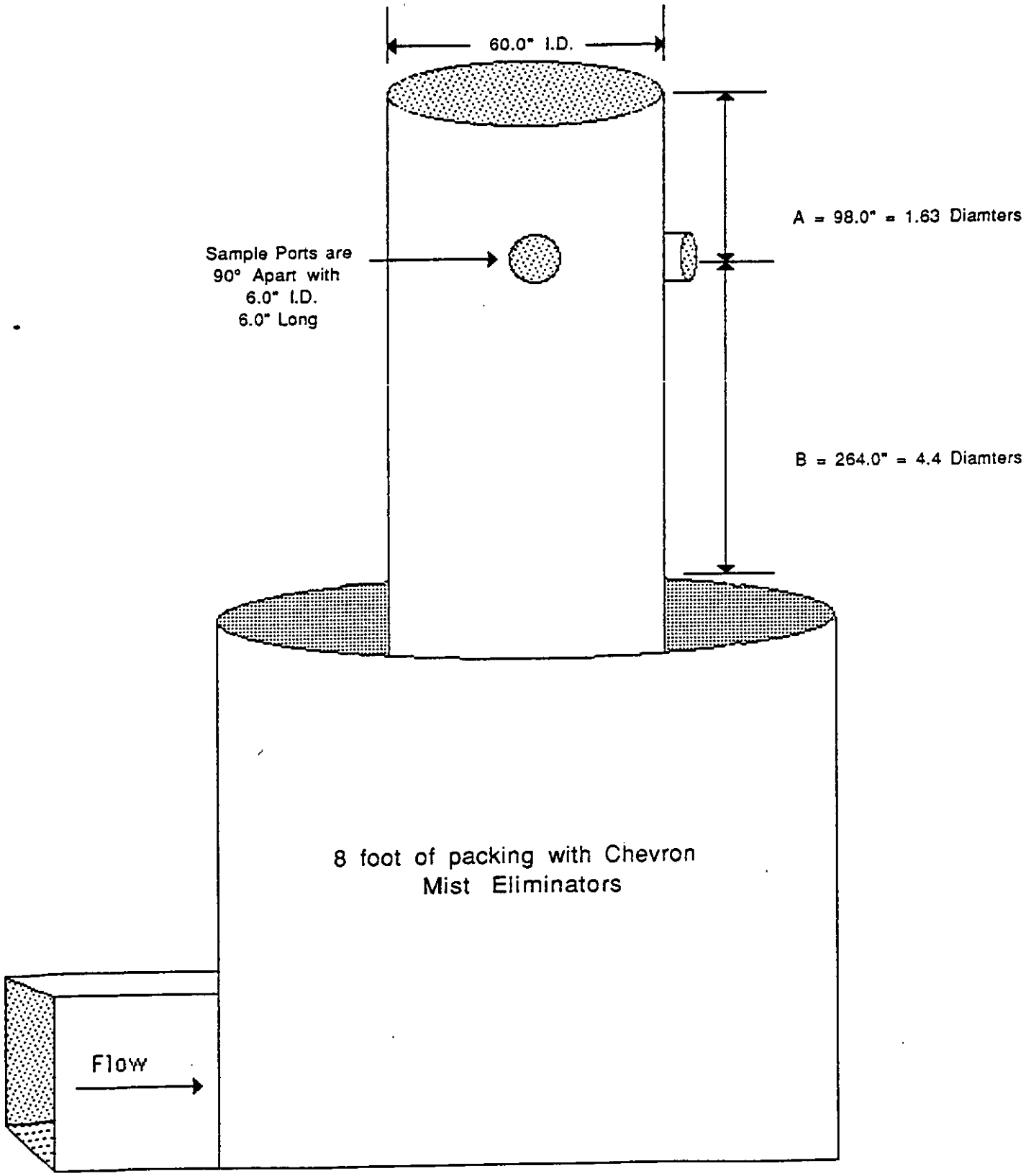
Interstate Brick Company's Kiln No. 3
Scrubber Inlet Stack Diagram

Figure III



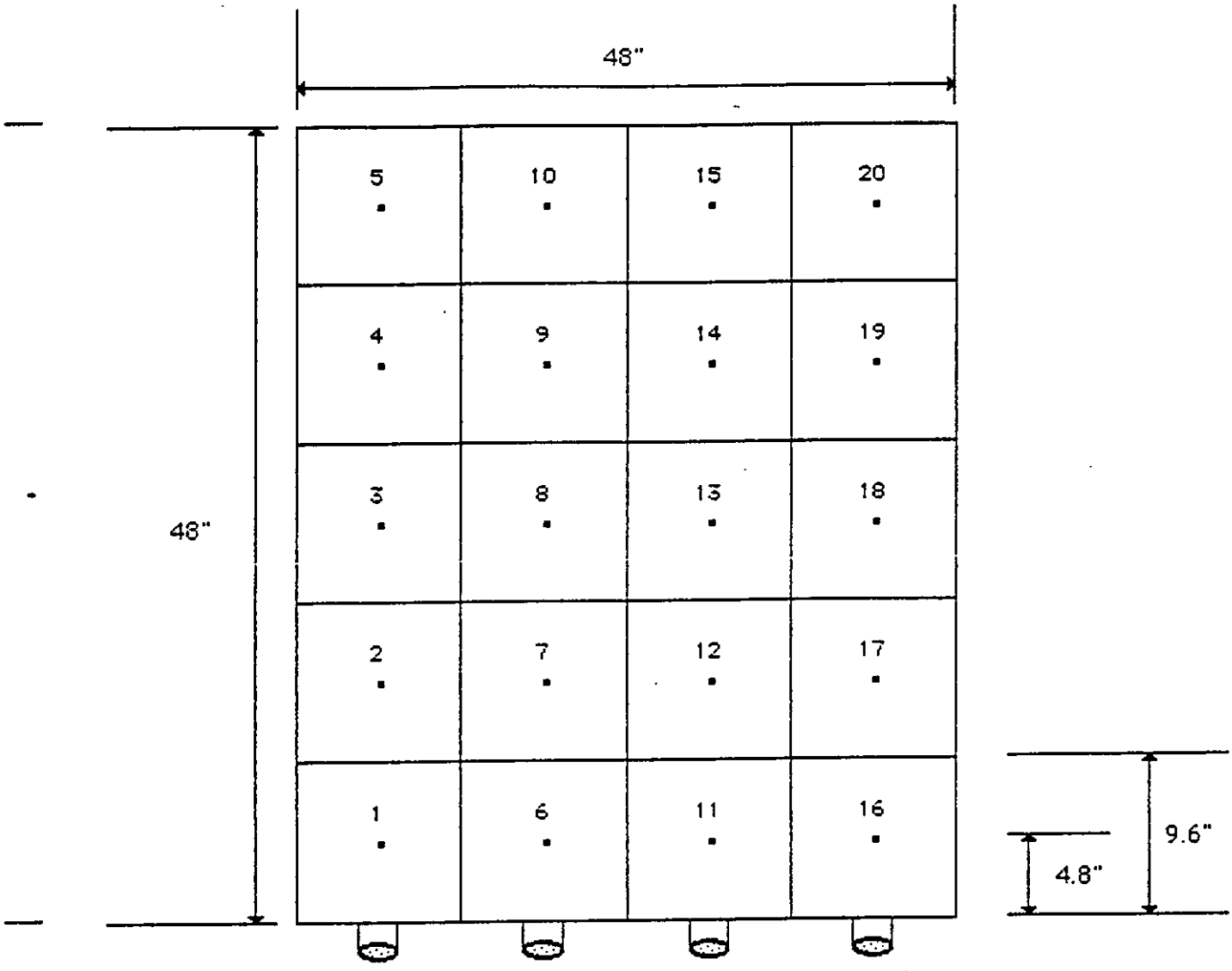
Interstate Brick Company's Kiln No. 3
Scrubber Outlet Stack Diagram

Figure IV



Interstate Brick Company's Kiln No. 3
Scrubber Inlet Traverse Point Locations

Table I



Sample Ports are 15" Long

Sample Point	Distance from outside of Port
1, 6, 11, 16	19.8" = 19 3/4"
2, 7, 12, 17	29.4" = 29 3/8"
3, 8, 13, 18	39.0" = 39"
4, 9, 14, 19	48.6" = 48 5/8"
5, 10, 15, 20	58.2" = 58 1/4"

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

Table II

TRAVERSE POINT CALCULATIONS

Plant: Interstate Brick Company
Date: 10/31/95
Sampling Location: Kiln #3 Scrubber Outlet
Inside of far wall to outside of port (distance, X) 66.0"
Inside of near wall to outside of port (distance, Y) 6.0"
Stack I.D. 60.0" = 19.63 ft squared

Traverse Point Number	Percent of Stack I.D.	Stack I.D. inches	Product of col. 2 &3 (to 1/8 in)	Distance Y	Traverse Point Location from outside of ports (sum of columns 4 & 5)
1 & 13	2.1	60	1.26	6.0"	7.26 = 7 1/4"
2 & 14	6.7	60	4.02	6.0"	10.02 = 10.0"
3 & 15	11.8	60	7.08	6.0"	13.08 = 13 1/8"
4 & 16	17.7	60	10.62	6.0"	16.62 = 16 5/8"
5 & 17	25	60	15	6.0"	21.0 = 21.0"
6 & 18	35.6	60	21.36	6.0"	27.36 = 27 3/8"
7 & 19	64.4	60	38.64	6.0"	44.64 = 44 5/8"
8 & 20	75	60	45	6.0"	51.0"
9 & 21	82.3	60	49.38	6.0"	55.38 = 55 3/8"
10 & 22	88.2	60	52.92	6.0"	58.92 = 58 7/8"
11 & 23	93.3	60	55.98	6.0"	61.98 = 62.0"
12 & 24	97.9	60	58.74	6.0"	64.74 = 64 3/4"

SAFETY CONSIDERATIONS AND OTHER REQUIREMENTS

All testing stations will be accessible from OSHA approved scaffolding or platforms. AET will require 4 - 120V, 20 amp, 1Ø circuits to be provided by Interstate Brick Company in order to perform the emissions tests.

PROPOSED TESTING OUTLINE

A. Each of the Methods 201A/202 tests will be approximately 60 minutes.

B. Nozzle diameter will be selected after pretest data is collected.

C. EPA Method 3, will be used to determine the dry molecular weight of the gas stream. The gas analysis will be conducted at the job site using an Orsat.

D. The moisture content and particulate concentration of the gas stream will be measured by using EPA Method 2-201A/202. The impingers will be weighed at the job site. 31.8 DSCFH will be collected at a rate greater than 0.531 dscfm if Method 5/202 replaces 201A/202.

E. An "S" Type Pitot Tube will be used to measure the velocity of the gas stream using EPA Method 2 (if the stack is 12" inches or greater). An inclined manometer will be used to measure the velocity head. The first mark on the manometer is 0.01 inches of water column from the zero mark. Current pitot tube and meter calibrations are attached in Appendix "A" with the Calibration Data.

F. Barometric pressure will be measured at the stack sampling position via an aneroid barometer.

G. The cross over piece located between the filter and probe will be modified to receive a thermocouple to determine the temperature of the gases leaving the probe.

H. SO_2 emissions will be determined via EPA Method 6C using a TECO Model 40 Pulsed Fluorescence Analyzer. Three each 30 minute tests will be run for SO_2 emissions.

I. NO_x emissions will be determined via EPA Method 7E using a TECO Model 10 AR Chemiluminescent NO/NO_x Analyzer. Three each 30 minute tests will be run for NO_x emissions.

J. CO emissions will be determined via EPA Method 10 using a TECO Model 48 Gas Filter Correlation (GFC) CO Analyzer. Three each 30 minute tests will be run for CO emissions.

K. A data-logger will be used to record the test data for each of the three SO_2, NO_x and CO emissions tests with 30 separate readings for each run at one minute intervals .

Appendix "A"

(Calibration Data)

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/22/95	25.54	RAC #145-569

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
0.985	1.812	VBB - RBB	0.99497

Orifice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	4.85	5	70 71	0.03676	68
1.00	4.81	5	70 71	0.07353	68
1.50	9.711	10	70 71	0.11029	68
2.00	9.683	10	69 70	0.14706	68
3.00	9.458	10	69 70	0.22059	67
4.00	9.469	10	70 71	0.29412	68

Dry Gas Meter Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
71 72	75 76	73.50	11.14	0.9738	1.7109
72 74	78 80	76.00	8.09	0.9689	1.8262
76 79	85 89	82.25	12.89	0.9880	1.6865
83 85	96 100	91.00	11.55	0.9996	1.7870
87 89	107 109	98.00	9.57	0.9879	1.8975
91 92	113 114	102.50	8.46	0.9923	1.9642
				Average Yi 0.985	Average ΔH 1.812

American Environmental Testing Company, Inc.
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Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/2/95	25.62	UT 790-484

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
0.985	1.719	BAL - GEJ	0.99497

Orifice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	4.84	5	72 72	0.03676	71
1.00	4.88	5	73 73	0.07353	72
1.50	9.62	10	73 73	0.11029	70
2.00	9.72	10	74 73	0.14706	73
3.00	9.79	10	73 73	0.22059	73
4.00	9.78	10	74 74	0.29412	74

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
70	77	74.25	11.23	0.9676	1.7578
71	79				
71	83	78.25	8.15	0.9797	1.8147
72	87				
73	92	84.25	12.54	0.9787	1.6277
74	98				
75	100	88.00	11.08	0.9887	1.6670
75	102				
76	104	91.25	9.05	0.9988	1.6347
78	107				
79	108	94.25	8.25	0.9985	1.8120
81	109				
				Average Yi	Average ΔH
				0.985	1.719

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Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/22/95	25.54	RAC #2824

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
0.910	1.630	VBB - RBB	0.99497

Orfice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	4.57	5	69 69	0.03676	69
1.00	4.58	5	70 69	0.07353	69.5
1.50	8.91	10	70 70	0.11029	70
2.00	8.901	10	71 70	0.14706	70.5
3.00	8.84	10	69 70	0.22059	69.5
4.00	8.829	10	71 70	0.29412	70.5

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
71 70	70 71	70.50	9.88	0.9107	1.5301
71 72	77 78	74.50	7.19	0.9174	1.6045
74 76	87 92	82.25	11.83	0.9031	1.7002
78 80	96 98	88.00	10.09	0.9096	1.6382
82 84	101 102	92.25	8.324	0.9095	1.6762
86 88	104 103	95.25	7.104	0.9090	1.6292
				Average Yi 0.910	Average ΔH 1.630

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Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/2/95	25.61	CR #(097)

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
1.070	1.883	VBB - JPB	0.99497

Orifice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	5.42	5	70 70	0.03676	70
1.00	5.517	5	71 71	0.07353	71
1.50	10.64	10	72 72	0.11029	72
2.00	10.71	10	73 73	0.14706	73
3.00	10.84	10	73 73	0.22059	73
4.00	10.88	10	74 74	0.29412	74

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
70 70	69 70	69.75	12.75	1.0765	1.8160
71 71	70 71	70.75	9.18	1.0942	1.8207
71 72	72 72	71.75	14.71	1.0536	1.8889
71 72	72 73	72.00	12.96	1.0575	1.9358
72 72	73 73	72.50	10.9	1.0683	2.0031
73 73	74 74	73.50	9.05	1.0692	1.8310
				Average Yi 1.070	Average ΔH 1.883

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 8' - A

Date: 9/2//95

Calibrated By: RBB - tbb

"A" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.3	0.4	0.8660	-0.00117
2	0.3	0.4	0.8660	-0.00117
3	0.31	0.41	0.8695	0.00234
		Average:	0.8672	

"B" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.31	0.41	0.8695	-0.00243
2	0.3	0.4	0.8660	-0.00594
3	0.31	0.4	0.8803	0.00837
		Average:	0.8720	

A & B Average = 0.8696

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 8' - B Date:9/20/95

Calibrated By: RB RH

"A" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.29	0.4	0.8515	0.00068
2	0.285	0.395	0.8494	-0.00136
3	0.29	0.4	0.8515	0.00068
		Average:	0.8508	

"B" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.29	0.39	0.8623	0.00612
2	0.285	0.395	0.8494	-0.00677
3	0.29	0.395	0.8568	0.00065
		Average:	0.8562	

A & B Average = 0.8535

American Environmental Testing Company, Inc.
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Pitot Tube Calibration Form

Pitot Tube Identification Number: 8' - C

Date: 9/20/95

Calibrated By: RB RH

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.26	0.36	0.8498	0.00156
2	0.25	0.35	0.8452	-0.00312
3	0.26	0.36	0.8498	0.00156
		Average:	0.8483	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.255	0.355	0.8475	-0.00228
2	0.26	0.36	0.8498	0.00002
3	0.265	0.365	0.8521	0.00226
		Average:	0.8498	

A & B Average = 0.8490

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 11' - A

Date: 9/29/95

Calibrated By: TBB-VBB

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.36	0.51	0.8402	0.00194
2	0.36	0.515	0.8361	-0.00215
3	0.355	0.505	0.8384	0.00021
		Average:	0.8382	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.365	0.52	0.8378	-0.00168
2	0.37	0.525	0.8395	0.00001
3	0.375	0.53	0.8412	0.00167
		Average:	0.8395	

A & B Average = 0.8389

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 11' - B 9/2/95

Calibrated By: TBB - JPB

"A" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.31	0.45	0.8300	0.00142
2	0.31	0.45	0.8300	0.00142
3	0.3	0.44	0.8257	-0.00285
		Average:	0.8286	

"B" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.3	0.44	0.8257	0.00165
2	0.3	0.45	0.8165	-0.00757
3	0.31	0.45	0.8300	0.00592
		Average:	0.8241	

A & B Average = 0.8263

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 6' - A

Date: 9/2/95

Calibrated By: VBB - tbb

"A" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.31	0.47	0.8121	-0.00290
2	0.32	0.48	0.8165	0.00145
3	0.32	0.48	0.8165	0.00145
		Average:	0.8150	

"B" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.32	0.48	0.8165	0.00558
2	0.32	0.49	0.8081	-0.00279
3	0.32	0.49	0.8081	-0.00279
		Average:	0.8109	

A & B Average = 0.8130

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 6' - B

Date: 9/2/95

Calibrated By: VBB - rbb

"A" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.31	0.43	0.8491	0.00000
2	0.31	0.43	0.8491	0.00000
3	0.31	0.43	0.8491	0.00000
		Average:	0.8491	

"B" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.32	0.45	0.8433	-0.00722
2	0.31	0.43	0.8491	-0.00142
3	0.31	0.42	0.8591	0.00863
		Average:	0.8505	

A & B Average = 0.8498

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 6' - T

Date: 9/28/95

Calibrated By: RBB - JPB

"A" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.29	0.42	0.8309	-0.00288
2	0.3	0.43	0.8353	0.00144
3	0.3	0.43	0.8353	0.00144
		Average:	0.8338	

"B" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.295	0.43	0.8283	-0.00306
2	0.3	0.435	0.8305	-0.00088
3	0.3	0.43	0.8353	0.00393
		Average:	0.8313	

A & B Average = 0.8326

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 6' - Q

Date: 9/30/95

Calibrated By: VBB - JDS

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.28	0.37	0.8699	0.00072
2	0.28	0.375	0.8641	-0.00510
3	0.29	0.38	0.8736	0.00439
		Average:	0.8692	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.28	0.375	0.8641	0.00256
2	0.28	0.38	0.8584	-0.00314
3	0.275	0.37	0.8621	0.00058
		Average:	0.8615	

A & B Average = 0.8654

American Environmental Testing Company, Inc.
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Pitot Tube Calibration Form

Pitot Tube Identification Number: 4' - A

Date: 9/2/95

Calibrated By: VBB - rbb

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.3	0.47	0.7989	-0.00288
2	0.3	0.47	0.7989	-0.00288
3	0.3	0.46	0.8076	0.00576
		Average:	0.8018	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.31	0.47	0.8121	0.00440
2	0.3	0.47	0.7989	-0.00880
3	0.31	0.47	0.8121	0.00440
		Average:	0.8077	

A & B Average = 0.8048

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 4' - B

Date: 9/30/95

Calibrated By: VBB-TBB

"A" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.36	0.475	0.8706	-0.00062
2	0.355	0.46	0.8785	0.00730
3	0.355	0.475	0.8645	-0.00668
		Average:	0.8712	

"B" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.365	0.485	0.8675	0.00596
2	0.36	0.49	0.8571	-0.00441
3	0.355	0.48	0.8600	-0.00156
		Average:	0.8615	

A & B Average = 0.8664

American Environmental Testing Company, Inc.
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Pitot Tube Calibration Form

Pitot Tube Identification Number: 4' - C Date: 9/30/95

Calibrated By: VB RBB

"A" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.36	0.495	0.8528	-0.00053
2	0.365	0.5	0.8544	0.00107
3	0.36	0.495	0.8528	-0.00053
		Average:	0.8533	

"B" Side Calibration

Run Number	P std cm H20 (inches H20)	P s cm H20 (inches H20)	Cp (S)	Deviation
1	0.36	0.5	0.8485	-0.00087
2	0.355	0.495	0.8469	-0.00254
3	0.36	0.495	0.8528	0.00341
		Average:	0.8494	

A & B Average = 0.8514

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 4' - T

Date: 9/30/95

Calibrated By: JPB - JPH

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.37	0.49	0.8690	0.00053
2	0.38	0.5	0.8718	0.00334
3	0.37	0.495	0.8646	-0.00387
		Average:	0.8684	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.365	0.48	0.8720	0.00055
2	0.37	0.49	0.8690	-0.00251
3	0.37	0.485	0.8734	0.00196
		Average:	0.8715	

A & B Average = 0.8700

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
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Stack Temperature Sensor Calibration Form

Thermocouple Number: #1 Digital -# 2 Omega

Date: 3/3/95

Barometric Pressure: 25.73

Calibrated By: JDS - RPH

Reference: ERTCO - Mg - Glass

	Reference Point Number	Source a (specify)	Reference Thermometer Temperature °F	Thermocouple Potentiometer Temperature °F	Temperature Difference b %
	a)	Ice Water	34	35	-0.33
#1	b)	Hot H20	140	141	-0.24
Digital	c)	Boiling H20	215	214	0.20
	d)	Warm Oil	254	255	-0.19
	e)	Hot Oil	398	396	0.30
	f)	Boiling Oil	398	401	-0.45
	a)	Ice Water	35	36	-0.32
#2	b)	Hot H20	146	148	-0.48
Omega	c)	Boiling H20	204	202	0.42
	d)	Warm Oil	233	235	-0.40
	e)	Hot Oil	378	375	0.46
	f)	Boiling Oil	372	370	0.31

a Type of calibration system used.

b $\frac{\text{(reference temp. °C + 273) - (test thermometer temp. °C + 273)}}{\text{reference temperature °C + 273}} * 100 < 1.5\%$

American Environmental Testing Company, Inc.
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Sample Box Temperature Sensor Calibration Form

Sample Box Number: CR#1A - UT #1A - RAC #1A-RAC #2A

Date: 3/3/95

Barometric Pressure: 25.59

Calibrated By: VBB - JPB

Reference: ERTCO - 10S - SNBS

	Reference Point Number	Source a (specify)	Reference Thermometer Temperature °F	Thermocouple Potentiometer Temperature °F	Temperature Difference b %
	3	Oven On	250	251	-0.19
CR	4	Oven On	244	247	-0.58
#1A	2	Oven On	236	234	0.39
	1	Cold H20	54	55	-0.31
	8	Oven On	57	56	0.30
	7	Oven On	59	58	0.30
	3	Oven On	247	246	0.19
UTA	4	Oven On	243	244	-0.19
#1A	2	Oven On	239	240	-0.20
	1	Cold H20	46	47	-0.31
	8	Oven On	55	57	-0.61
	7	Oven On	61	60	0.30
	3	Oven On	244	243	0.19
RAC	4	Oven On	254	255	-0.19
#1A	2	Oven On	236	237	-0.20
	1	Cold H20	56	57	-0.30
	8	Oven On	60	61	-0.30
	7	Oven On	63	62	0.30
	3	Oven On	241	244	-0.58
RAC	4	Oven On	244	241	0.58
#2A	2	Oven On	20	240	-75.09
	1	Cold H20	54	55	-0.31
	8	Oven On	53	55	-0.61
	7	Oven On	61	60	0.30

a Type of calibration system used.

b $\frac{\text{(reference temp. °C + 273) - (test thermometer temp. °C + 273)}}{\text{reference temperature °C + 273}} \cdot 100 < 1.5\%$

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
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Balance Calibration Data Form

Balance Name: Ohaus GA - 200 S2 (Analytical) Number : 1292

Balance Name: Mettler - BB - 3000 (Top Loader) Number : K6888

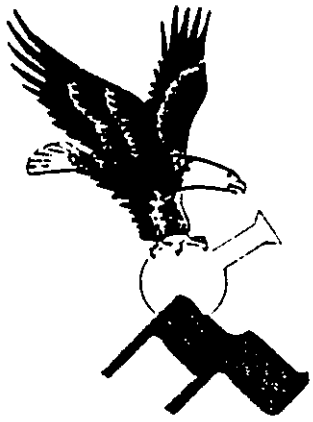
Classification of Standard Weights: Type "S" W.B.S. Analyst: JDS

A 200 S Ohaus GA - 200 S2

Date	0.500 g	1.0000 g	10.0000 g	50.0000 g	100.0000 g
3/2/94	0.500	1.0001	10.0001	50.0002	100.0002
9/6/94	0.500	1.0000	10.0001	50.0001	100.0001
3/3/95	0.5000	1.0000	10.0000	50.0000	100.0000
9/22/95	0.50001	0.9999	10.0001	49.9998	

U 3600 Mettler - BB - 3000

Date	0.500 g	1.0000 g	10.0000 g	50.0000 g	100.0000 g
3/2/94	0.5	1.0	10.0	50.1	100.1
9/6/94	0.5010	1.0001	10.0000	50.0001	100.0000
3/3/95	0.5000	1.0001	10.0000	50.0000	100.0001



Appendix "C"

(Production Data)

American Environmental Testing Company Inc.

Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3354

Salt Lake City, Utah
801-266-7111

Appendix "C"

(Production Data)

INTERSTATE BRICK
9780 South 5200 West
West Jordan, Utah 84088-5689
(801) 280-5200
800/233-8654 (NAT'L)
800/233-1244 (UTAH)
(801) 280-5220 FAX

Fax Transmission

no. pages including this page:

To: Brent Benson, American Environmental Testing
Fax no./phone no.: 491-9111, 266-7111
Date: 10/15/95

From: John Hewitt, 280-5287
CC:

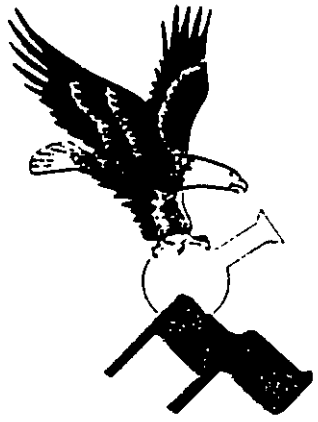
Subject: Interstate Brick Production on Kiln 3 for compliance testing 10/31/95.

For the compliance test the kiln speed was increased to 18 cars per day, the current maximum production rate of the kiln. During the test the fired ware loading on the kiln was 26,468 lb/hr. of fired ware (18 cars/day x 3.89lb/brick x 9072 brick/car x 1 day/24 hr.). The stack testing was therefore done at 100% production of the kiln.

The type of brick going through the kiln during the test was: **Zinfandel**, Mountain Red Mix, Advantage size and **Canyon Rose**, Canyon Rose Mix, Advantage size.

On Monday 10/30/95 the kiln put out a total of 15 cars of fired brick (increasing the push rate from 11 to 16 cars over the 24 hr. period from 7:15 a.m. to 7:15 a.m.) On Tuesday 10/30/95 at 7:15am the push rate was increased from 16 to 18 cars per day. This rate was maintained until from 7:15am until 8:35 p.m. at which time all testing was completed. After the testing was completed the kiln push rate was lowered to 16 cars per day. On Wednesday 11/1/95 the rate was dropped to 10 cars per day.

The maximum capacity of the kiln (at present without modification) in terms of kiln cars per day is 18. Due to business conditions and brick sales the plant has been reduced from a 2 shift to a 1 shift operation in terms of manufacturing brick to be fired. As a result the kiln has been slowed to an 11 kiln car per day production rate. Barring any unforeseen production problems, at this time the kiln maintains an 11 cars per day push rate and outputs 11 cars per day.



Appendix "D"

(Field & Laboratory Data)

American Environmental Testing Company Inc.

Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3354

Salt Lake City, Utah
801-266-7111

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

PARTICULATE FIELD DATA FORMAT

1	Plant	Interstate Brick
2	City	West Jordan
3	Location	#3 Kiln Inlet Stack
4	Operator	Rick Hawkins
5	Date	10/31-95
6	Stack Diameter (in)	54.16
7	Sample Box Number	UT #1
8	Meter Box Number	UT 790-484
9	Meter ^H@	1.719
10	Meter Calibration, Y	0.985
11	Pitot Tube, Cp	0.8696
12	Probe Length (ft)	8'-A
13	Probe Liner Material	Stainless
14	Probe Heater Setting (°F)	248
15	Ambient Temperature (°F)	55
16	Barometeric Press., Pb (in Hg)	25.41
17	Assumed Moisture (%)	3
18	Static Pressure, Ps (in H2O)	-0.18
19	C Factor	0
20	Reference ^P (in H2O)	0.3
21	Nozzle Identification Number	5/16-#0
22	Nozzle Diameter (in)	0.312
23	Thermometer Number	1-A
24	Pretest Leak Rate (CFM)	0.0050
25	Leak Check Vacuum (in H2O)	19.5
26	Filter Number	I -1
27	Gas Analysis	
28	CO (%)	0
29	CO2 (%)	3.50
30	O2 (%)	14.60
31	N2 (%)	81.90

PRETEST CALCULATIONS

NOZZLE DIAMETER

Dn = 0.312

constant	0.0357
Qm	0.75
Pb(in HG)	25.41
Pgm(in H2O)	-0.18
Pm	25.3968
Cp	0.8696
Tm(°F)	80
Tm(°R)	540
Bwm	0
Bws	0.03
Ts(°F)	550
Ts(°R)	1010
Mds	29.144
Ms	28.8097
Pb(in HG)	25.41
Pgs(in H2O)	-0.18
Ps	25.3968
(^P)avg	0.3

Dn = 0.2992

PRETEST DATA

Cp	0.8696
Imp V(H2O)(ml)	67.5000
Gel H2O(g)	12.0000
V(H2O)(ml)	127.8000
Vm(acf)	49.2300
^h avg	0.2000
Vwc	6.0155
Vmc	40.2742

Bws = 0.1300

ISOKINETIC ^H

^H = 0.9297

constant	849.8000
^H@	1.0000
Mds	29.1440
Mm	29.1440
K	3.0989
^P	0.3000

^H = 0.9297

Sample Point	Meter Temperature Outlet (°F)	Meter Temperature Inlet (°F)	Stack Temp Ts (°F)	Gas Volume Vm (ft3)	Gas Volume difference (ft3)
starting				920.352	
1	66	66	535	922.58	2.23
2	67	77	537	924.96	2.38
3	66	81	538	927.5	2.54
4	69	89	539	930.16	2.66
5	67	91	540	932.53	2.37
6	69	79	532	934.71	2.18
7	70	89	537	937.3	2.59
8	71	97	545	939.99	2.69
9	72	103	551	942.64	2.65
10	73	106	551	945.03	2.39
11	76	82	540	947.34	2.31
12	75	89	555	949.71	2.37
13	76	98	556	952.2	2.49
14	77	105	556	954.85	2.65
15	78	112	560	957.59	2.74
16	80	85	549	959.82	2.23
17	81	99	556	962.12	2.30
18	82	106	555	964.65	2.53
19	83	110	549	967.26	2.61
20	84	118	542	969.882	2.62
avg °F		84.10	546.15		
avg °R		544.10	1006.15		
total =				49.5300	49.53
average =	74.10	94.10	546.15		
Sample Point	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Stack Temp (°F) T	Gas Volume Vm	Gas Volume Vm

Velocity Head ^Ps (in H2O)	Pressure Diff ^H (in H2O)	Sqrt ^Ps	Sampling Time (min)	Clock Time (24 hrs)	Vacuum (in Hg)
				1320	
0.24	1.26	0.4899	3	1323	1.2
0.28	1.49	0.5292	3	1326	1.4
0.31	1.65	0.5568	3	1329	1.6
0.33	1.77	0.5745	3	1332	1.7
0.29	1.56	0.5385	3	1335	1.5
0.25	1.34	0.5000	3	1340	1.2
0.31	1.67	0.5568	3	1343	1.6
0.33	1.78	0.5745	3	1346	1.7
0.32	1.73	0.5657	3	1349	1.7
0.26	1.41	0.5099	3	1352	1.5
0.26	1.40	0.5099	3	1355	1.5
0.27	1.44	0.5196	3	1358	1.5
0.3	1.61	0.5477	3	1401	1.8
0.33	1.78	0.5745	3	1404	1.8
0.35	1.90	0.5916	3	1407	2
0.24	1.28	0.4899	3	1410	1.7
0.25	1.35	0.5000	3	1413	1.8
0.29	1.58	0.5385	3	1416	2
0.31	1.70	0.5568	3	1419	2.1
0.32	1.78	0.5657	3	1422	2.2

			60	60	
0.2920	1.5734	0.5395	3	1369	1.67
Velocity Head ^Ps	Pressure Diff ^H	Sqrt ^Ps	Sampling Time	Clock Time	Vacuum

Probe Temperature Exit (°F)	Filter Temperature (°F)	Impinger Temperature Outlet (°F)	Vs	Point to Point Isokinetics
247	245	50	42.7860	109.14
250	253	47	46.2606	106.97
252	259	46	48.7002	108.32
256	258	45	50.2718	108.99
250	262	44	47.1502	103.58
252	264	44	43.6024	103.03
250	260	44	48.6758	109.25
248	268	46	50.4226	109.60
250	266	46	49.8007	109.30
250	268	47	44.8897	108.90
247	261	48	44.6449	106.57
246	258	48	45.8353	107.55
244	259	50	48.3384	106.39
249	256	51	50.6978	107.27
251	259	51	52.3141	107.22
253	266	52	43.0860	106.88
255	265	52	44.1267	107.03
250	267	51	47.5025	108.59
252	264	51	48.9679	107.61
247	260	51	49.5785	105.26

249.95 Probe Exit Temperature (°F)	249.95 Filter Temperature (°F)	48.20 Outlet Impinger Temperature (°F)

POST TEST CALCULATION

VOLUME DRY GAS
Vm(std) = 40.3740

VOLUME H2O VAPOR
Vw(std) = 2.9419

MOISTURE CONTENT
Bws = 0.0679

Vm 49.5300
Vm(std) = 40.3740

Vic(mls) 62.5
Vw(std) = 2.9419

MOL WT DRY STACK GASES

Mds = 29.1440

STACK VELOCITY
Vs = 47.3805

DRY STACK FLOW RATE
Q(std) = 1.1330E+6

Kp 85.49

MOL WT WET STACK GASES
Vs = 47.3805

Mws = 28.3871

ISOKINETIC CALCULATION

An = 5.3093E-4

% ISO = 107.4240

PARTICULATE CONCENTRATION
Cs = 6.2912E-4

Mn 25.4
Cs = 6.2912E-4
lbs/dscf = 1.3869E-6
grains/dscf = 0.0097
lbs/hr = 1.5714

NOx
PPM = 79.07
lbs/hr = 10.697

CO
PPM = 455.62
lbs/hr = 37.581

SO2
PPM = 125.63
lbs/hr = 23.628

HF
mg/dscf = 7.999
lbs/hr = 25.51

Initial Leak Check Rate
Finish 919.859
Start 919.854
Rate = 0.0050
Vac. = 19.5

Pitot Tubes
A = OK
B = OK

Final Leak Check Rate
Finish 970.021
Start 970.015
Rate = 0.0060
Vac. = 17.8

Pitot Tubes
99
B = OK

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

LABORATORY DATA
EPA Method 5

Company: Interstate Brick Run Number: #1 compliance

Sampling Location: #3 Inlet kiln Date: 10-31-95

Moisture Collected

	Initial Weight	Final Weight	Weight Gain
Impinger 1	536.7	581.5	44.8
Impinger 2	592.4	601.5	9.1
Impinger 3	504.0	505.2	1.2
Impinger 4	632.8	640.2	7.4

Total Gain = 62.5

Particulate Collected

Front - Half Analysis (Nozzle, Probe, Filter and Oven Glassware)

1. Filter Final Weight 0.6283
2. Filter Tare Weight 0.6147 I-1
3. Total Filter Weight 0.0136
4. Particulate caught in nozzle, probe and glassware 0.0100
5. Total Front - Half Catch 0.0236

Back - Half Analysis (Impingers, and Connecting Glassware)

1. Particulate caught in impingers evaporated down at less than 120° F. 1.8

Total Particulate Catch (Sum of Front and Back - Half Catches)

25.4 mg

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

Company: Interstate Brick Date: 10/31/95

Source: #3 Inlet kiln Run Number: #1

ORSAT ANALYSIS

(Average of 3 analyses each)

Test Number	Volume Percent - Dry			
	Nitrogen	Oxygen	Carbon Dixoide	Carbon Monoxide
	~~Not~~ 81.9	14.6	3.5	<0.1
	~~Not~~ 81.9	14.6	3.5	<0.1
	~~Not~~ 81.9	14.6	3.5	<0.1
Average	~~Not~~ 81.9	14.6%	3.5%	<0.1

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

PARTICULATE FIELD DATA FORMAT

1	Plant	Interstate Brick
2	City	West Jordan
3	Location	#3 Kiln Inlet Stack Run #2
4	Operator	Rick Hawkins
5	Date	10/31-95
6	Stack Diameter (in)	54.16
7	Sample Box Number	UT #1
8	Meter Box Number	UT 790-484
9	Meter ^H@	1.719
10	Meter Calibration, Y	0.985
11	Pitot Tube, Cp	0.8696
12	Probe Length (ft)	8'-A
13	Probe Liner Material	Stainless
14	Probe Heater Setting (°F)	248
15	Ambient Temperature (°F)	48
16	Barometeric Press., Pb (in Hg)	25.34
17	Assumed Moisture (%)	8
18	Static Pressure, Ps (in H2O)	-0.18
19	C Factor	0
20	Reference ^P (in H2O)	0.3
21	Nozzle Identification Number	5/16-#0
22	Nozzle Diameter (in)	0.312
23	Thermometer Number	1-A
24	Pretest Leak Rate (CFM)	0.0050
25	Leak Check Vacuum (in H2O)	18.5
26	Filter Number	I-2
27	Gas Analysis	
28	CO (%)	0
29	CO2 (%)	3.70
30	O2 (%)	14.30
31	N2 (%)	82.00

PRETEST CALCULATIONS

NOZZLE DIAMETER

Dn = 0.312

constant	0.0357
Qm	0.75
Pb(in HG)	25.34
Pgm(in H2O)	-0.18
Pm	25.3268
Cp	0.8696
Tm(°F)	80
Tm(°R)	540
Bwm	0
Bws	0.08
Ts(°F)	550
Ts(°R)	1010
Mds	29.164
Ms	28.2709
Pb(in HG)	25.34
Pgs(in H2O)	-0.18
Ps	25.3268
(^P)avg	0.3

Dn = 0.2977

PRETEST DATA

Cp	0.8696
Imp V(H2O)(ml)	67.5000
Gel H2O(g)	12.0000
V(H2O)(ml)	127.8000
Vm(acf)	49.2300
^h avg	0.2000
Vwc	6.0155
Vmc	40.1633

Bws = 0.1303

ISOKINETIC ^H

^H = 0.8528

constant	849.8000
^H@	1.0000
Mds	29.1640
Mm	29.1640
K	2.8427
^P	0.3000

^H = 0.8528

Sample Point	Meter Temperature Outlet (°F)	Meter Temperature Inlet (°F)	Stack Temp Ts (°F)	Gas Volume Vm (ft3)	Gas Volume difference (ft3)
starting				970.852	
1	69	69	542	973.03	2.18
2	69	76	547	975.29	2.26
3	70	84	550	977.62	2.33
4	70	89	549	980.06	2.44
5	70	94	550	982.28	2.22
6	71	85	544	984.47	2.19
7	71	92	544	986.86	2.39
8	72	103	552	989.32	2.46
9	72	109	551	991.73	2.41
10	72	114	538	993.98	2.25
11	74	85	505	996.35	2.37
12	73	91	509	998.65	2.30
13	74	95	512	1001.09	2.44
14	75	104	513	1003.66	2.57
15	76	109	518	1006.2	2.54
16	78	91	522	1008.5	2.30
17	77	95	526	1010.75	2.25
18	78	98	525	1013	2.25
19	78	105	536	1015.44	2.44
20	78	113	536	1017.842	2.40
avg °F		84.20	533.45		
avg °R		544.20	993.45		
total =				46.9900	46.99
average =	73.35	95.05	533.45		
Sample Point	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Stack Temp (°F) T	Gas Volume Vm	Gas Volume Vm

Velocity Head ^Ps (in H2O)	Pressure Diff ^H (in H2O)	Sqrt ^Ps	Sampling Time (min)	Clock Time (24 hrs)	Vacuum (in Hg)
				1630	
0.23	1.11	0.4796	3	1633	1.9
0.25	1.21	0.5000	3	1636	2
0.28	1.36	0.5292	3	1639	2.1
0.31	1.51	0.5568	3	1642	2.2
0.25	1.23	0.5000	3	1645	2
0.24	1.17	0.4899	3	1650	1.9
0.29	1.43	0.5385	3	1653	2.1
0.32	1.58	0.5657	3	1656	2.2
0.29	1.44	0.5385	3	1659	2.1
0.24	1.21	0.4899	3	1702	2
0.26	1.33	0.5099	3	1706	2.2
0.25	1.28	0.5000	3	1709	2.1
0.29	1.48	0.5385	3	1712	2.4
0.33	1.70	0.5745	3	1715	2.6
0.32	1.65	0.5657	3	1718	2.6
0.24	1.22	0.4899	3	1722	2.2
0.24	1.21	0.4899	3	1725	2.2
0.28	1.42	0.5292	3	1728	2.4
0.3	1.52	0.5477	3	1731	2.5
0.27	1.38	0.5196	3	1734	2.4

			60	60	
0.2740	1.3724	0.5226	3	1685.75	2.21
Velocity Head ^Ps	Pressure Diff ^H	Sqrt ^Ps	Sampling Time	Clock Time	Vacuum

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Balance Calibration Data Form

Balance Name: Satorius - A 200 S (Analytical) Number : 35120053

Balance Name: Satorius - U3600 (Top Loader) Number : 35120087

Classification of Standard Weights: Type "S" W.B.S. Analyst: JPB - RH

A 200 S

Date	0.500 g	1.0000 g	10.0000 g	50.0000 g	100.0000 g
3/2/94	0.500	0.9999	10.0001	50.0001	100.0001
9/6/94	0.5000	1.0000	10.0000	50.0001	100.0000
3/3/95	0.5000	1.0001	10.0001	50.0001	100.0001
9/2/95	0.5	1.0001	10	50	

U 3600

Date	0.500 g	1.0000 g	10.0000 g	50.0000 g	100.0000 g
3/2/94	0.5000	1.0000	10.0000	50.0001	100.1000
9/6/94	0.501	1.0010	10.0000	50.0001	100.0001
3/3/95	0.5000	1.00	10.00	50.00	100.00

SO-CAL Airgas

SPECIALTY GAS DIVISION
11711 S. Alameda Street
Los Angeles, CA 90059
(213) 564-5711

ANALYTICAL REPORT - PRODUCT CERTIFICATION

TO: Mountain Airgas

DATE: 31 Jan 1994

P.O. NO: 005422

EPA Protocol Procedure G-1

CYLINDER NO.	CONSTITUENTS CONCENTRATION:	NOMINAL	ACTUAL
CC104478	Nitric Oxide	50.0 PPM	53.1 PPM
	NOX		53.4 PPM
	Nitrogen	Balance	Balance

CERTIFICATION PERIOD (months): 24
EXPIRATION DATE: January 31, 1996
Cylinder Pressure: 2000 psig
Do not use below 150 psig

ANALYST
William L. Vernon

SO-CAL Airgas

SPECIALTY GAS DIVISION
11711 S. Alameda Street
Los Angeles, CA 90059
(213) 564-5711

ANALYTICAL REPORT - PRODUCT CERTIFICATION

TO: Mountain Airgas

DATE: 31 Jan 1994

P.O. NO. 005422

EPA Protocol Procedure G-1

CYLINDER NO.	CONSTITUENTS CONCENTRATION:	NOMINAL	ACTUAL
CC10514	Sulfur Dioxide	850 PPM	901.6 PPM
	Nitrogen	Balance	Balance

CERTIFICATION PERIOD (months): 36
EXPIRATION DATE: January 31, 1997
Cylinder Pressure: 2000 psig
Do not use below 150 psig

William L. Vernon

ANALYST

William L. Vernon

SO-CAL Airgas

SPECIALTY GAS DIVISION
11711 S. Alameda Street
Los Angeles, CA 90059
(213) 564-5711

ANALYTICAL REPORT - PRODUCT CERTIFICATION

TO: Mountain Airgas

DATE: 31 Jan 1994

P.O. NO: 005422

EPA Protocol Procedure G-1

CYLINDER NO.	CONSTITUENTS CONCENTRATION:	NOMINAL	ACTUAL
CC104484	Sulfur Dioxide	500 PPM	514.6 PPM
	Nitrogen	Balance	Balance

CERTIFICATION PERIOD (months): 36
EXPIRATION DATE: January 31, 1997
Cylinder Pressure: 2000 psig
Do not use below 150 psig

William L. Vernon

ANALYST

William L. Vernon

SO-CAL Airgas

SPECIALTY GAS DIVISION
11711 S. Alameda Street
Los Angeles, CA 90059
(213) 564-5711

ANALYTICAL REPORT - PRODUCT CERTIFICATION

TO: Mountain Airgas

DATE: 31 Jan 1994

P.O. NO: 005422

EPA Protocol Procedure G-1

CYLINDER NO.	CONSTITUENTS CONCENTRATION:	NOMINAL	ACTUAL
CC104461	Nitric Oxide	85.0 PPM	86.8 PPM
	NOX		87.3 PPM
	Nitrogen	Balance	Balance

CERTIFICATION PERIOD (months): 24
EXPIRATION DATE: January 31, 1996
Cylinder Pressure: 2000 psig
Do not use below 150 psig

William L. Vernon

ANALYST

William L. Vernon

SO-CAL Airgas

SPECIAL TY GAS DIVISION
1171 1 S. Alameda Street
Los, Angeles, CA 90059
(213) 564-5711

ANALYTICAL REPORT - PRODUCT CERTIFICATION

TO: Mountain Airgas

DATE: 31 Jan 1994

P.O. NO: 005422 -

EPA Protocol Procedure G-1

CYLINDER NO.	CONSTITUENTS CONCENTRATION:	NOMINAL	ACTUAL
CC15584	Carbon Monoxide	60.0 PPM	62.7 PPM
	Nitrogen	Balance	Balance

CERTIFICATION PERIOD (months): 36
EXPIRATION DATE: January 31, 1997
Cylinder Pressure: 2000 psig
Do not use below 150 psig

William L. Vernon
ANALYST

William L. Vernon

SO-CAL Airgas

SPECIALTY GAS DIVISION
11711 S. Alameda Street
Los Angeles, CA 90059
(213) 564-5711

ANALYTICAL REPORT - PRODUCT CERTIFICATION

TO: Mountain Airgas

DATE: 31 Jan 1994

P.O. NO: 005422

EPA Protocol Procedure G-1

CYLINDER NO.	CONSTITUENTS CONCENTRATION:	NOMINAL	ACTUAL
CC15577	Carbon Monoxide	30.0 PPM	32.4 PPM
	Nitrogen	Balance	Balance

CERTIFICATION PERIOD (months): 36
EXPIRATION DATE: January 31, 1997
Cylinder Pressure: 2000 psig
Do not use below 150 psig

William L. Vernon
ANALYST

William L. Vernon

Probe Temperature Exit (°F)	Filter Temperature (°F)	Impinger Temperature Outlet (°F)	Vs	Point to Point Isokinetics
248	251	45	42.0908	108.78
251	256	46	43.9920	107.90
247	256	48	46.6260	104.50
250	260	48	49.0360	103.54
247	264	49	44.0575	104.42
244	267	50	43.0389	105.53
248	262	50	47.3102	104.22
256	260	51	49.8947	101.52
256	262	48	47.4748	103.85
259	256	49	42.9101	105.38
249	259	47	43.9177	107.34
249	258	47	43.1540	105.98
250	261	48	46.5501	104.16
252	261	47	49.6824	102.09
250	258	47	49.0494	102.20
244	261	45	42.5648	108.41
250	259	46	42.6514	106.00
252	262	46	46.0454	97.80
254	266	46	47.9269	102.46
256	265	47	45.4674	105.56

250.6 Probe Exit Temperature (°F)	250.6 Filter Temperature (°F)	47.50 Outlet Impinger Temperature (°F)

POST TEST CALCULATION

VOLUME DRY GAS
Vm(std) = 38.1693

VOLUME H2O VAPOR
Vw(std) = 2.8571

MOISTURE CONTENT
Bws = 0.0696

Vm 46.9900
Vm(std) = 38.1693

Vic(mls) 60.7
Vw(std) = 2.8571

MOL WT DRY STACK GASES

Mds = 29.1640

STACK VELOCITY
Vs = 45.6738

Kp 85.49
Vs = 45.6738

DRY STACK FLOW RATE

Q(std) = 1.1011E+6

MOL WT WET STACK GASES

Mws = 28.3865

ISOKINETIC CALCULATION

An = 5.3093E-4

% ISO = 104.5039

PARTICULATE CONCENTRATION

Cs = 6.4188E-4

Mn 24.5
Cs = 6.4188E-4
lbs/dscf = 1.4151E-6
grains/dscf = 0.0099
lbs/hr = 1.5581

NOx
PPM = 77.52
lbs/hr = 10.191

CO
PPM = 445.38
lbs/hr = 35.700

SO2
PPM = 147.92
lbs/hr = 27.036

HF
mg/dscf = 11.414
lbs/hr = 27.71

Initial Leak Check Rate
Finish 970.528
Start 970.523
Rate = 0.0050
Vac. = 18.5

Pitot Tubes
A = OK
B = OK

Final Leak Check Rate
Finish 1017.995
Start 1017.988
Rate = 0.0070
Vac. = 18.6

Pitot Tubes
99
B = OK

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(801) 266-7111

LABORATORY DATA
EPA Method 5

Company: Interstate Brick Run Number: #2 compliance

Sampling Location: #3 Kiln Inlet Date: 10-31-95

Moisture Collected

	Initial Weight	Final Weight	Weight Gain
Impinger 1	536.8	578.8	42
Impinger 2	589.8	600.9	11.1
Impinger 3	505.1	506.7	1.6
Impinger 4	640.2	646.2	6

Total Gain = 60.7

Particulate Collected

Front - Half Analysis (Nozzle, Probe, Filter and Oven Glassware)

1. Filter Final Weight 0.6331
2. Filter Tare Weight 0.6157 I-2
3. Total Filter Weight 0.0174
4. Particulate caught in nozzle, probe and glassware 0.0058
5. Total Front - Half Catch 0.0232 23.2 mg

Back - Half Analysis (Impingers, and Connecting Glassware)

1. Particulate caught in impingers evaporated down at less than 120° F. 1.3

Total Particulate Catch (Sum of Front and Back - Half Catches)

24.5 mg

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PARTICULATE FIELD DATA FORMAT

1	Plant	Interstate Brick
2	City	West Jordan
3	Location	#3 Kiln Inlet Stack Run #3
4	Operator	Rick Hawkins
5	Date	10/31-95
6	Stack Diameter (in)	54.16
7	Sample Box Number	UT #1
8	Meter Box Number	UT 790-484
9	Meter ^H@	1.719
10	Meter Calibration, Y	0.985
11	Pitot Tube, Cp	0.8696
12	Probe Length (ft)	8'-A
13	Probe Liner Material	Stainless
14	Probe Heater Setting (°F)	248
15	Ambient Temperature (°F)	44
16	Barometeric Press., Pb (in Hg)	25.3
17	Assumed Moisture (%)	8
18	Static Pressure, Ps (in H2O)	-0.18
19	C Factor	0
20	Reference ^P (in H2O)	0.3
21	Nozzle Identification Number	5/16-#0
22	Nozzle Diameter (in)	0.312
23	Thermometer Number	1-A
24	Pretest Leak Rate (CFM)	0.0060
25	Leak Check Vacuum (in H2O)	19.2
26	Filter Number	I - 3
27	Gas Analysis	
28	CO (%)	0
29	CO2 (%)	3.40
30	O2 (%)	14.90
31	N2 (%)	81.70

PRETEST CALCULATIONS

NOZZLE DIAMETER

Dn = 0.312

constant	0.0357
Qm	0.75
Pb(in HG)	25.3
Pgm(in H2O)	-0.18
Pm	25.2868
Cp	0.8696
Tm(°F)	80
Tm(°R)	540
Bwm	0
Bws	0.08
Ts(°F)	550
Ts(°R)	1010
Mds	29.14
Ms	28.2488
Pb(in HG)	25.3
Pgs(in H2O)	-0.18
Ps	25.2868
(^P)avg	0.3

Dn = 0.2975

PRETEST DATA

Cp	0.8696
Imp V(H2O)(ml)	67.5000
Gel H2O(g)	12.0000
V(H2O)(ml)	127.8000
Vm(acf)	49.2300
^h avg	0.2000
Vwc	6.0155
Vmc	40.0999

Bws = 0.1304

ISOKINETIC ^H

^H = 0.8528

constant	849.8000
^H@	1.0000
Mds	29.1400
Mm	29.1400
K	2.8426
^P	0.3000

^H = 0.8528

Sample Point	Meter Temperature Outlet (°F)	Meter Temperature Inlet (°F)	Stack Temp Ts (°F)	Gas Volume Vm (ft3)	Gas Volume difference (ft3)
starting				18.727	
1	70	70	510	20.87	2.14
2	71	76	515	23.04	2.17
3	71	81	542	25.42	2.38
4	71	90	555	27.82	2.40
5	72	95	559	30.08	2.26
6	74	85	545	32.2	2.12
7	73	92	558	34.51	2.31
8	73	99	560	36.96	2.45
9	74	108	557	39.4	2.44
10	75	114	560	41.5	2.10
11	78	100	520	43.77	2.27
12	77	107	532	46.13	2.36
13	77	111	540	48.54	2.41
14	78	115	542	51.06	2.52
15	78	120	550	53.53	2.47
16	79	100	542	55.72	2.19
17	80	110	544	57.96	2.24
18	81	115	550	60.33	2.37
19	81	121	552	62.79	2.46
20	81	124	560	65.05	2.26
avg °F		88.68	544.65		
avg °R		548.67	1004.65		
total =				46.3230	46.32
average =	75.70	101.65	544.65		
Sample Point	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Stack Temp (°F) T	Gas Volume Vm	Gas Volume Vm

Velocity Head ^Ps (in H2O)	Pressure Diff ^H (in H2O)	Sqrt ^Ps	Sampling Time (min)	Clock Time (24 hrs)	Vacuum (in Hg)
				1900	
0.22	1.10	0.4690	3	1903	2
0.24	1.20	0.4899	3	1906	2.1
0.29	1.42	0.5385	3	1909	2.4
0.3	1.46	0.5477	3	1912	2.5
0.26	1.27	0.5099	3	1915	2.4
0.22	1.08	0.4690	3	1920	2.2
0.28	1.36	0.5292	3	1923	2.4
0.32	1.56	0.5657	3	1926	2.6
0.3	1.48	0.5477	3	1929	2.5
0.21	1.04	0.4583	3	1932	2.4
0.25	1.28	0.5000	3	1936	2.6
0.27	1.37	0.5196	3	1939	2.7
0.3	1.52	0.5477	3	1942	2.8
0.32	1.62	0.5657	3	1945	2.8
0.3	1.52	0.5477	3	1948	2.7
0.23	1.15	0.4796	3	1951	2.5
0.25	1.26	0.5000	3	1954	2.5
0.29	1.46	0.5385	3	1957	2.7
0.31	1.57	0.5568	3	2000	2.8
0.28	1.41	0.5292	3	2003	2.6

			60	60	
0.2720	1.3571	0.5205	3	1937.5	2.51
Velocity Head ^Ps	Pressure Diff ^H	Sqrt ^Ps	Sampling Time	Clock Time	Vacuum

Probe Temperature Exit (°F)	Filter Temperature (°F)	Impinger Temperature Outlet (°F)	Vs	Point to Point Isokinetics
247	251	48	40.5868	107.71
250	256	47	42.5007	104.09
252	265	47	47.3610	104.89
250	264	46	48.4821	103.87
255	266	46	45.2233	104.68
249	264	45	41.3126	106.68
248	260	45	46.9074	103.25
244	259	45	50.1953	101.98
245	257	46	48.5299	103.84
248	255	48	40.6628	106.23
251	258	49	43.4882	104.18
257	261	50	45.4701	104.35
255	260	50	48.1226	101.20
254	266	51	49.7504	102.17
254	267	51	48.3626	103.38
253	265	52	42.1780	105.83
250	259	54	44.0175	103.00
254	260	54	47.5497	101.04
251	260	52	49.2107	101.06
257	261	51	46.9534	97.80

251.2 Probe Exit Temperature (°F)	251.2 Filter Temperature (°F)	48.85 Outlet Impinger Temperature (°F)

POST TEST CALCULATION

VOLUME DRY GAS
Vm(std) = 37.2603

VOLUME H2O VAPOR
Vw(std) = 2.9842

MOISTURE CONTENT
Bws = 0.0742

Vm 46.3230
Vm(std) = 37.2603

Vic(mls) 63.4
Vw(std) = 2.9842

MOL WT DRY STACK GASE
Mds = 29.1400

STACK VELOCITY
Vs = 45.8357

Kp 85.49
Vs = 45.8357

DRY STACK FLOW RATE
Q(std) = 1.0856E+6

MOL WT WET STACK GASE
Mws = 28.3139

ISOKINETIC CALCULATION
An = 5.3093E-4
% ISO = 103.4652

PARTICULATE CONCENTRATION
Cs = 6.1191E-4

Mn 22.8
Cs = 6.1191E-4
lbs/dscf = 1.3490E-6
grains/dscf = 0.0094
lbs/hr = 1.4645

NOx
PPM = 82.06
lbs/hr = 10.637

CO
PPM = 444.65
lbs/hr = 35.142

SO2
PPM = 148.33
lbs/hr = 26.731

HF
mg/dscf = 14.422
lbs/hr = 34.52

Initial Leak Check Rate
Finish 18.361
Start 18.355
Rate = 0.0060
Vac. = 19.2

Pitot Tubes
A = OK
B = OK

Final Leak Check Rate
Finish 65.167
Start 65.162
Rate = 0.0050
Vac. = 18.6

Pitot Tubes
99
B = OK

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LABORATORY DATA
EPA Method 5

Company: Interstate Brick Run Number: #3 emplace

Sampling Location: #3 Kiln Inlet Date: 10-31-95

Moisture Collected

	Initial Weight	Final Weight	Weight Gain
Impinger 1	537.5	578.0	40.5
Impinger 2	585.9	600.6	14.7
Impinger 3	507.4	509.8	2.4
Impinger 4	645.8	651.6	5.8
		Total Gain =	63.4

Particulate Collected

Front - Half Analysis (Nozzle, Probe, Filter and Oven Glassware)

1. Filter Final Weight 0.7207
2. Filter Tare Weight 0.7067 I-3
3. Total Filter Weight 0.0140
4. Particulate caught in nozzle, probe and glassware 0.0071
5. Total Front - Half Catch 0.0211

Back - Half Analysis (Impingers, and Connecting Glassware)

1. Particulate caught in impingers evaporated down at less than 120° F. 1.7

Total Particulate Catch (Sum of Front and Back - Half Catches)

22.8 g

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POST TEST BACK HALF EVAPORATION

COMPANY: Intermountain Brick

SOURCE: #3 Kiln Inlet Stack

DATE: 11-6-95

ACETONE BLANK		WATER BLANK	
Volume of Liquic	250 ml	Volume of Liquic	
Final Weight	106.5155	Final Weight	
Tare Weight	106.8156	Tare Weight	
Residue	0.0001	Residue	

RUN #1		RUN #1	
Volume of Liquic	250 mls	Volume of Liquic	
Color	Clear	Color	
Final Weight	106 5928	Final Weight	
Tare Weight	106 5827	Tare Weight	
Residue & Blank	0.0101	Residue & Blank	
- Blank	0.0001	- Blank	
Residue	~~0.0100~~ 0.0100 (10.0 mg)	Residue	

RUN #2		RUN #2	
Volume of Liquic	250 mls	Volume of Liquic	
Color	Clear	Color	
Final Weight	107.1401	Final Weight	
Tare Weight	107.1342	Tare Weight	
Residue & Blank	0.0059	Residue & Blank	
- Blank	0.0001	- Blank	
Residue	0.0058 (5.8 mg)	Residue	

RUN #3		RUN #3	
Volume of Liquic	250 mls	Volume of Liquic	
Color	Clear	Color	
Final Weight	107.2516	Final Weight	
Tare Weight	107.2444	Tare Weight	
Residue & Blank	0.0072	Residue & Blank	
- Blank	0.0001	- Blank	
Residue	0.0071 (7.1 mg)	Residue	

American Environmental Testing Company, Inc.

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Company: Interstate Brick Date: 10/31/95

Source: #3 Inlet Kiln Run Number: #3

ORSAT ANALYSIS

(Average of 3 analyses each)

Test Number	Volume Percent - Dry			
	Nitrogen	Oxygen	Carbon Dixoide	Carbon Monoxide
	81.7	14.9	3.4	<0.1
	81.7	14.9	3.4	<0.1
	81.7	14.9	3.4	<0.1
Average	81.7	14.9	3.4	<0.1

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POST TEST BACK HALF EVAPORATION

COMPANY: Interstate Brick
SOURCE: #3 Kiln Inlet Stack
DATE: 11-6-95

CONTAINER #1 METHYLENE CHLORIDE		CONTAINER #2 DISTILLED WATER	
BLANK		BLANK	
Volume of Liqui	200 mls	Volume of Liqui	500 mls
Final Weigh	107.1367	Final Weigh	187.5214
Tare Weight	107.1367	Tare Weight	187.5212
Residue	0.0000	Residue	0.0002
RUN #1		RUN #1	
Volume of Liqui	200 mls	Volume of Liqui	500 mls
Color	Clear	Color	Clear
Final Weigh	106.1455	Final Weigh	187.2881
Tare Weight	106.1441	Tare Weight	187.2875
Residue & Blanl	0.0014	Residue & Blanl	0.0006
- Blank	0.0	- Blank	0.0002
Residue	0.0014 (1.4mg)	Residue	0.0004 (0.4mg)
RUN #2		RUN #2	
Volume of Liqui	200 mls	Volume of Liqui	500 mls
Color	Clear	Color	Clear
Final Weigh	107.3435	Final Weigh	187.2155
Tare Weight	107.3428	Tare Weight	187.2147
Residue & Blanl	0.0007	Residue & Blanl	0.0008
- Blank	0.0	- Blank	0.0002
Residue	0.0007 (0.7mg)	Residue	0.0006 (0.6mg)
RUN #3		RUN #3	
Volume of Liqui	200 mls	Volume of Liqui	500 mls
Color	Clear	Color	Clear
Final Weigh	106.8539	Final Weigh	187.4530
Tare Weight	106.8529	Tare Weight	187.4521
Residue & Blanl	0.0010	Residue & Blanl	0.0009
- Blank	0.0	- Blank	0.0002
Residue	0.0010 (1.0mg)	Residue	0.0007 (0.7mg)

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
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PARTICULATE FIELD DATA FORMAT

1	Plant	Interstate Brick Company
2	City	West Jordan, Utah
3	Location	No. 3 Brick Kiln Outlet #1 Run
4	Operator	Todd Benson
5	Date	10/31-95
6	Stack Diameter (in)	60
7	Sample Box Number	CR-Box
8	Meter Box Number	CR#(097)
9	Meter ^H@	1.883
10	Meter Calibration, Y	1.07
11	Pitot Tube, Cp	0.8654
12	Probe Length (ft)	6'-Q
13	Probe Liner Material	Glass
14	Probe Heater Setting (°F)	248
15	Ambient Temperature (°F)	55
16	Barometeric Press., Pb (in Hg)	25.42
17	Assumed Moisture (%)	15
18	Static Pressure, Ps (in H2O)	-0.5
19	C Factor	0
20	Reference ^P (in H2O)	0.115
21	Nozzle Identification Number	3/8"6
22	Nozzle Diameter (in)	0.368
23	Thermometer Number	1-A
24	Pretest Leak Rate (CFM)	0.0080
25	Leak Check Vacuum (in H2O)	20.8
26	Filter Number	K-1
27	Gas Analysis	
28	CO (%)	0
29	CO2 (%)	5.10
30	O2 (%)	14.90
31	N2 (%)	80.00

PRETEST CALCULATIONS

NOZZLE DIAMETER

Dn = 0.368

constant	0.0357
Qm	0.75
Pb(in HG)	25.42
Pgm(in H2O)	-0.5
Pm	25.3832
Cp	0.8654
Tm(°F)	85
Tm(°R)	545
Bwm	0
Bws	0.15
Ts(°F)	145
Ts(°R)	605
Mds	29.412
Ms	27.7002
Pb(in HG)	25.42
Pgs(in H2O)	-0.5
Ps	25.3832
(^P)avg	0.115

Dn = 0.3307

PRETEST DATA

Cp	0.8654
Imp V(H2O)(ml)	67.5000
Gel H2O(g)	12.0000
V(H2O)(ml)	127.8000
Vm(acf)	49.2300
^h avg	0.2000
Vwc	6.0155
Vmc	43.3653

Bws = 0.1218

ISOKINETIC ^H

^H = 0.9276

constant	849.8000
^H@	1.0000
Mds	29.4120
Mm	29.4120
K	8.0661
^P	0.1150

^H = 0.9276

Sample Point	Meter Temperature Outlet (°F)	Meter Temperature Inlet (°F)	Stack Temp Ts (°F)	Gas Volume Vm (ft3)	Gas Volume difference (ft3)
starting				854.615	
1	77	77	139	856.851	2.24
2	77	78	140	859.09	2.24
3	78	78	139	861.515	2.42
4	78	78	140	863.95	2.44
5	79	78	141	866.267	2.32
6	79	78	139	868.402	2.14
7	79	79	140	870.674	2.27
8	80	79	140	872.94	2.27
9	80	79	140	875.341	2.40
10	81	79	140	877.628	2.29
11	81	79	140	880.028	2.40
12	82	79	140	882.318	2.29
13	83	80	140	884.365	2.05
14	80	78	138	886.502	2.14
15	82	80	139	888.901	2.40
16	82	80	135	891.298	2.40
17	82	80	134	893.623	2.33
18	83	80	133	895.931	2.31
19	83	81	134	898.236	2.31
20	83	81	135	900.531	2.29
21	84	81	136	902.85	2.32
22	85	82	137	905.213	2.36
23	85	82	136	907.542	2.33
24	85	82	136	909.82.	2.28
avg °F		80.33	137.96		
avg °R		540.33	597.96		
total =				55.2050	55.20
average =	81.17	79.50	137.96		
Sample Point	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Stack Temp (°F) T	Gas Volume Vm	Gas Volume Vm

Velocity Head ^Ps (in H2O)	Pressure Diff ^H (in H2O)	Sqrt ^Ps	Sampling Time (min)	Clock Time (24 hrs)	Vacuum (in Hg)
				1320	
0.11	1.66	0.3317	3	1323	2.1
0.115	1.73	0.3391	3	1326	2.1
0.12	1.81	0.3464	3	1329	2.2
0.12	1.81	0.3464	3	1332	2.2
0.12	1.81	0.3464	3	1335	2.2
0.11	1.66	0.3317	3	1338	2.3
0.125	1.89	0.3536	3	1341	2.3
0.12	1.82	0.3464	3	1344	2.3
0.125	1.89	0.3536	3	1347	2.4
0.12	1.82	0.3464	3	1350	2.4
0.13	1.97	0.3606	3	1353	2.4
0.12	1.82	0.3464	3	1356	2.4
0.1	1.52	0.3162	3	1408	2.6
0.11	1.67	0.3317	3	1411	2.6
0.14	2.13	0.3742	3	1414	2.6
0.13	1.99	0.3606	3	1417	2.7
0.12	1.84	0.3464	3	1420	2.7
0.12	1.84	0.3464	3	1423	2.7
0.12	1.84	0.3464	3	1426	2.7
0.125	1.92	0.3536	3	1429	2.8
0.12	1.84	0.3464	3	1432	2.8
0.125	1.92	0.3536	3	1435	2.8
0.13	2.00	0.3606	3	1438	2.8
0.1	1.54	0.3162	3	1441	2.9

Velocity Head ^Ps	Pressure Diff ^H	Sqrt ^Ps	Sampling Time	Clock Time	Vacuum
			72	72	
0.1198	1.8226	0.3459	3	1382	2.50

Probe Temperature Exit (°F)	Filter Temperature (°F)	Impinger Temperature Outlet (°F)	Vs	Point to Point Isokinetics
232	234	40	22.5953	103.71
234	236	40	23.1224	101.59
237	238	43	23.6001	107.56
236	240	43	23.6198	108.09
234	236	43	23.6394	102.85
233	236	43	22.5953	98.79
232	235	44	24.1068	98.68
234	237	44	23.6198	100.35
235	238	44	24.1068	104.20
236	240	44	23.6198	101.20
237	240	45	24.5842	102.07
235	239	45	23.6198	101.25
233	238	45	21.5618	98.91
231	234	42	22.5765	98.72
232	233	42	25.4910	98.12
234	234	42	24.4816	101.36
235	236	42	23.5014	102.21
236	238	43	23.4816	101.29
238	241	43	23.5014	101.17
237	241	43	24.0062	98.79
235	240	43	23.5409	101.87
234	239	44	24.0465	101.65
233	237	44	24.5021	98.18
231	235	44	21.4898	109.36

234.33 Probe Exit Temperature (°F)	234.33 Filter Temperature (°F)	43.12 Outlet Impinger Temperature (°F)

POST TEST CALCULATION

VOLUME DRY GAS
Vm(std) = 49.2786

VOLUME H2O VAPOR
Vw(std) = 7.9360

MOISTURE CONTENT
Bws = 0.1387

Vm 55.2050
Vm(std) = 49.2786

Vic(mls) 168.6
Vw(std) = 7.9360

MOL WT DRY STACK GASES
Mds = 29.4120

STACK VELOCITY
Vs = 23.5423

Kp 85.49
Vs = 23.5423

DRY STACK FLOW RATE
Q(std) = 1.0737E+6

MOL WT WET STACK GASES
Mws = 27.8291

ISOKINETIC CALCULATION
An = 7.3862E-4

% ISO = 101.7164

PARTICULATE CONCENTRATION
Cs = 6.6763E-4

Mn 32.9
Cs = 6.6763E-4
lbs/dscf = 1.4719E-6
grains/dscf = 0.0103
lbs/hr = 1.5803

NOx
PPM = 23.4
lbs/hr = 3.000

CO
PPM = 461.14
lbs/hr = 36.045

SO2
PPM = 0.45
lbs/hr = 0.080

HF
mg/dscf = 0.00834
lbs/hr = 0.0198

Initial Leak Check Rate
Finish 854.499
Start 854.491
Rate = 0.0080
Vac. = 20.8

Pitot Tubes
A = OK
B = OK

Final Leak Check Rate
Finish 909.889
Start 909.882
Rate = 0.0070
Vac. = 19.5

Pitot Tubes
A = OK
B = OK

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

LABORATORY DATA
EPA Method 5

Company: Interstate Brick Run Number: #1 comp

Sampling Location: #3 Kiln Outlet Stack Date: 10/31-95

Moisture Collected

	Initial Weight	Final Weight	Weight Gain
Impinger 1	595.4	706.0	110.6
Impinger 2	606.2	659.6	53.4
Impinger 3	470.9	471.3	0.4
Impinger 4	792.9	797.1	4.2

Total Gain = 168.6

Particulate Collected

Front - Half Analysis (Nozzle, Probe, Filter and Oven Glassware)

1. Filter Final Weight 0.6507
2. Filter Tare Weight 0.6306 F-1
3. Total Filter Weight 0.0201
4. Particulate caught in nozzle, probe and glassware 0.0122
5. Total Front - Half Catch 0.0323

Back - Half Analysis (Impingers, and Connecting Glassware)

1. Particulate caught in impingers evaporated down at less than 120° F. 0.6

Total Particulate Catch (Sum of Front and Back - Half Catches)

32.9

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

Company: Interstate Brick Date: 10-31-95

Source: #3 Kiln Outlet Stack Run Number: #1 compliance

ORSAT ANALYSIS

(Average of 3 analyses each)

Test Number	Volume Percent - Dry			
	Nitrogen	Oxygen	Carbon Dixoide	Carbon Monoxide
#1	80.0	14.9	5.1	<0.1
#2	80.0	14.9	5.1	<0.1
#3	80.0	14.9	5.1	<0.1
Average	80.0 %	14.9 %	5.1 %	<0.1

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

PARTICULATE FIELD DATA FORMAT

1	Plant	Interstate Brick Company
2	City	West Jordan, Utah
3	Location	No. 3 Brick Kiln Outlet #2 Run
4	Operator	Todd Benson
5	Date	10/31-95
6	Stack Diameter (in)	60
7	Sample Box Number	CR-Box
8	Meter Box Number	CR#(097)
9	Meter ^H@	1.883
10	Meter Calibration, Y	1.07
11	Pitot Tube, Cp	0.8654
12	Probe Length (ft)	6'-Q
13	Probe Liner Material	Glass
14	Probe Heater Setting (°F)	248
15	Ambient Temperature (°F)	55
16	Barometeric Press., Pb (in Hg)	25.35
17	Assumed Moisture (%)	14
18	Static Pressure, Ps (in H2O)	-0.5
19	C Factor	0
20	Reference ^P (in H2O)	0.115
21	Nozzle Identification Number	3/8"6
22	Nozzle Diameter (in)	0.368
23	Thermometer Number	1-A
24	Pretest Leak Rate (CFM)	0.0060
25	Leak Check Vacuum (in H2O)	20
26	Filter Number	K-2
27	Gas Analysis	
28	CO (%)	0
29	CO2 (%)	5.10
30	O2 (%)	14.50
31	N2 (%)	80.40

American Environmental Testing Company, Inc.
565 South Birch Drive
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(801) 266-7111

Company: Interstate Brick Date: 10/31/95

Source: #3 Inlet Kiln Run Number: #2

ORSAT ANALYSIS

(Average of 3 analyses each)

Test Number	Volume Percent - Dry			
	Nitrogen	Oxygen	Carbon Dixoide	Carbon Monoxide
	82	14.3	3.7	<0.1
	82	14.3	3.7	<0.1
	82	14.3	3.7	<0.1
Average	82	14.3%	3.7%	<0.1

PRETEST CALCULATIONS

NOZZLE DIAMETER

Dn = 0.368

constant	0.0357
Qm	0.75
Pb(in HG)	25.35
Pgm(in H2O)	-0.5
Pm	25.3132
Cp	0.8654
Tm(°F)	85
Tm(°R)	545
Bwm	0
Bws	0.14
Ts(°F)	145
Ts(°R)	605
Mds	29.396
Ms	27.8006
Pb(in HG)	25.35
Pgs(in H2O)	-0.5
Ps	25.3132
(^P)avg	0.115

Dn = 0.3307

PRETEST DATA

Cp	0.8654
Imp V(H2O)(ml)	67.5000
Gel H2O(g)	12.0000
V(H2O)(ml)	127.8000
Vm(acf)	49.2300
^h avg	0.2000
Vwc	6.0155
Vmc	43.2460

Bws = 0.1221

ISOKINETIC ^H

^H = 0.9456

constant	849.8000
^H@	1.0000
Mds	29.3960
Mm	29.3960
K	8.2227
^P	0.1150

^H = 0.9456

Sample Point	Meter Temperature Outlet (°F)	Meter Temperature Inlet (°F)	Stack Temp Ts (°F)	Gas Volume Vm (ft3)	Gas Volume difference (ft3)
starting				910.205	
1	85	84	137	912.111	1.91
2	84	85	135	914.129	2.02
3	85	85	138	916.375	2.25
4	86	85	132	918.523	2.15
5	85	85	136	920.641	2.12
6	85	85	137	922.702	2.06
7	86	85	138	924.965	2.26
8	86	85	133	927.198	2.23
9	86	85	133	929.416	2.22
10	85	84	133	931.597	2.18
11	85	85	134	933.663	2.07
12	85	85	134	935.851	2.19
13	86	85	135	938.076	2.22
14	84	83	136	940.122	2.05
15	85	83	135	942.237	2.11
16	85	84	135	944.401	2.16
17	85	84	134	946.619	2.22
18	86	85	135	948.764	2.14
19	86	85	135	950.815	2.05
20	86	85	136	952.905	2.09
21	87	85	136	955.033	2.13
22	87	85	137	957.202	2.17
23	87	86	136	959.34	2.14
24	86	86	136	961.476	2.14
avg °F		85.15	135.25		
avg °R		545.15	595.25		
total =				51.2710	51.27
average =	85.54	84.75	135.25		
Sample Point	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Stack Temp (°F) T	Gas Volume Vm	Gas Volume Vm

Velocity Head ^Ps (in H2O)	Pressure Diff ^H (in H2O)	Sqrt ^Ps	Sampling Time (min)	Clock Time (24 hrs)	Vacuum (in Hg)
				1630	
0.099	1.55	0.3146	3	1633	2.2
0.1	1.57	0.3162	3	1636	2.2
0.13	2.03	0.3606	3	1639	2.5
0.11	1.74	0.3317	3	1642	2.5
0.11	1.73	0.3317	3	1645	2.6
0.1	1.57	0.3162	3	1648	2.6
0.13	2.04	0.3606	3	1651	2.6
0.12	1.89	0.3464	3	1654	2.6
0.12	1.89	0.3464	3	1657	2.7
0.115	1.81	0.3391	3	1700	2.8
0.1	1.57	0.3162	3	1703	2.8
0.12	1.89	0.3464	3	1706	2.9
0.12	1.89	0.3464	3	1715	3.1
0.1	1.57	0.3162	3	1718	3.1
0.11	1.73	0.3317	3	1721	3.1
0.115	1.81	0.3391	3	1724	3.2
0.12	1.89	0.3464	3	1727	3.2
0.11	1.73	0.3317	3	1730	3.2
0.1	1.57	0.3162	3	1733	3.3
0.105	1.65	0.3240	3	1736	3.4
0.11	1.73	0.3317	3	1739	3.4
0.115	1.81	0.3391	3	1742	3.5
0.11	1.73	0.3317	3	1745	3.5
0.11	1.73	0.3317	3	1748	3.5

Velocity Head ^Ps	Pressure Diff ^H	Sqrt ^Ps	Sampling Time	Clock Time	Vacuum
			72	72	
0.1116	1.7546	0.3338	3	1695.5	2.94

Probe Temperature Exit (°F)	Filter Temperature (°F)	Impinger Temperature Outlet (°F)	Vs	Point to Point Isokinetics
239	240	39	21.5893	94.81
241	241	39	21.6617	99.72
238	239	40	24.7603	97.62
236	238	40	22.6616	100.83
235	238	40	22.7380	99.83
236	239	40	21.6980	101.93
239	241	41	24.7603	98.28
240	242	41	23.6892	100.48
242	244	42	23.6892	99.81
244	245	42	23.1905	100.38
242	244	42	21.6435	101.92
239	241	43	23.7092	98.61
234	235	43	23.7292	100.29
233	235	43	21.6799	101.34
234	236	44	22.7189	99.76
236	239	45	23.2295	99.77
238	240	45	23.7092	100.04
240	241	45	22.7189	100.94
241	242	46	21.6617	101.19
242	244	47	22.2152	100.73
239	241	47	22.7380	100.15
238	239	47	23.2686	99.94
237	238	48	22.7380	100.55
235	237	48	22.7380	100.53

238.25 Probe Exit Temperature (°F)	238.25 Filter Temperature (°F)	43.21 Outlet Impinger Temperature (°F)

POST TEST CALCULATION

VOLUME DRY GAS
Vm(std) = 45.2297

VOLUME H2O VAPOR
Vw(std) = 9.4940

MOISTURE CONTENT
Bws = 0.1735

Vm 51.2710
Vm(std) = 45.2297

Vic(mls) 201.7
Vw(std) = 9.4940

MOL WT DRY STACK GASES
Mds = 29.3960

STACK VELOCITY
Vs = 22.8724

DRY STACK FLOW RATE
Q(std) = 1.0028E+6

Kp 85.49
Vs = 22.8724

MOL WT WET STACK GASES
Mws = 27.4189

ISOKINETIC CALCULATION
An = 7.3862E-4

% ISO = 99.9607

PARTICULATE CONCENTRATION
Cs = 8.0699E-4

Mn 36.5
Cs = 8.0699E-4
lbs/dscf = 1.7791E-6
grains/dscf = 0.0125
lbs/hr = 1.7841

NOx
PPM = 19.54
lbs/hr = 2.340

CO
PPM = 409.35
lbs/hr = 29.884

SO2
PPM = 0.34
lbs/hr = 0.057

HF
mg/dscf = 0.0072
lbs/hr = 0.016

Initial Leak Check Rate
Finish 910.148
Start 910.142
Rate = 0.0060
Vac. = 20

Pitot Tubes
A = OK
B = OK

Final Leak Check Rate
Finish 961.799
Start 961.792
Rate = 0.0070
Vac. = 19.1

Pitot Tubes
A = OK
B = OK

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

LABORATORY DATA
EPA Method 5

Company: Interstate Brick Run Number: #2 compliance

Sampling Location: #3 kiln Outlet Stack Date: 10/31-95

Moisture Collected

	Initial Weight	Final Weight	Weight Gain
Impinger 1	598.4	766.4	168.0
Impinger 2	603.7	625.6	21.9
Impinger 3	471.3	473.4	2.1
Impinger 4	797.0	806.7	9.7

Total Gain = 201.7

Particulate Collected

Front - Half Analysis (Nozzle, Probe, Filter and Oven Glassware)

1. Filter Final Weight 0.6318
2. Filter Tare Weight 0.6054 K-2
3. Total Filter Weight 0.0264
4. Particulate caught in nozzle, probe and glassware 0.0094
5. Total Front - Half Catch 0.0358

Back - Half Analysis (Impingers, and Connecting Glassware)

1. Particulate caught in impingers evaporated down at less than 120° F. 0.7

Total Particulate Catch (Sum of Front and Back - Half Catches)

36.5 mg

American Environmental Testing Company, Inc.

565 South Birch Drive

Spanish Fork, Utah 84660

(801) 266-7111

Company: Interstate Brick Date: 10-31-95

Source: #3 Kiln Outlet Stack Run Number: #2 comp.

ORSAT ANALYSIS

(Average of 3 analyses each)

Test Number	Volume Percent - Dry			
	Nitrogen	Oxygen	Carbon Dixoide	Carbon Monoxide
#1	80.4	14.5	5.1	<0.1
#2	80.4	14.5	5.1	<0.1
#3	80.4	14.5	5.1	<0.1
Average	80.4%	14.5%	5.1%	<0.1

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

PARTICULATE FIELD DATA FORMAT

1	Plant	Interstate Brick Company
2	City	West Jordan, Utah
3	Location	No. 3 Brick Kiln Outlet #3 Run
4	Operator	Todd Benson
5	Date	10/31-95
6	Stack Diameter (in)	60
7	Sample Box Number	CR-Box
8	Meter Box Number	CR#(097)
9	Meter ^H@	1.883
10	Meter Calibration, Y	1.07
11	Pitot Tube, Cp	0.8654
12	Probe Length (ft)	6'-Q
13	Probe Liner Material	Glass
14	Probe Heater Setting (°F)	248
15	Ambient Temperature (°F)	55
16	Barometeric Press., Pb (in Hg)	25.32
17	Assumed Moisture (%)	14
18	Static Pressure, Ps (in H2O)	-0.5
19	C Factor	0
20	Reference ^P (in H2O)	0.115
21	Nozzle Identification Number	3/8"6
22	Nozzle Diameter (in)	0.368
23	Thermometer Number	1-A
24	Pretest Leak Rate (CFM)	0.0060
25	Leak Check Vacuum (in H2O)	20.2
26	Filter Number	K-3
27	Gas Analysis	
28	CO (%)	0
29	CO2 (%)	4.90
30	O2 (%)	14.90
31	N2 (%)	80.20

PRETEST CALCULATIONS

NOZZLE DIAMETER

Dn = 0.368

constant	0.0357
Qm	0.75
Pb(in HG)	25.32
Pgm(in H2O)	-0.5
Pm	25.2832
Cp	0.8654
Tm(°F)	85
Tm(°R)	545
Bwm	0
Bws	0.14
Ts(°F)	145
Ts(°R)	605
Mds	29.38
Ms	27.7868
Pb(in HG)	25.32
Pgs(in H2O)	-0.5
Ps	25.2832
(^P)avg	0.115

Dn = 0.3306

PRETEST DATA

Cp	0.8654
Imp V(H2O)(ml)	67.5000
Gel H2O(g)	12.0000
V(H2O)(ml)	127.8000
Vm(acf)	49.2300
^h avg	0.2000
Vwc	6.0155
Vmc	43.1948

Bws = 0.1222

ISOKINETIC ^H

^H = 0.9456

constant	849.8000
^H@	1.0000
Mds	29.3800
Mm	29.3800
K	8.2223
^P	0.1150

^H = 0.9456

Sample Point	Meter Temperature Outlet (°F)	Meter Temperature Inlet (°F)	Stack Temp Ts (°F)	Gas Volume Vm (ft3)	Gas Volume difference (ft3)
starting				962.016	
1	84	84	138	963.972	1.96
2	84	84	137	966.057	2.08
3	85	84	136	968.341	2.28
4	84	84	138	970.398	2.06
5	84	84	137	972.522	2.12
6	85	85	134	974.624	2.10
7	85	84	135	976.852	2.23
8	85	84	136	979.002	2.15
9	85	85	136	981.096	2.09
10	85	85	134	983.168	2.07
11	85	85	134	984.896	1.73
12	86	85	135	987.009	2.11
13	86	85	131	989.327	2.32
14	84	85	136	991.471	2.14
15	85	84	134	993.659	2.19
16	86	85	134	995.813	2.15
17	86	85	135	998.036	2.22
18	86	85	136	1000.102	2.07
19	86	85	135	1002.331	2.23
20	86	85	135	1004.464	2.13
21	86	85	135	1006.683	2.22
22	87	85	136	1008.836	2.15
23	87	85	136	1010.938	2.10
24	88	86	137	1013.084	2.15
avg °F		85.06	135.42		
avg °R		545.06	595.42		
total =				51.0680	51.07
average =	85.42	84.71	135.42		
Sample Point	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Stack Temp (°F) T	Gas Volume Vm	Gas Volume Vm

Velocity Head ^Ps (in H2O)	Pressure Diff ^H (in H2O)	Sqrt ^Ps	Sampling Time (min)	Clock Time (24 hrs)	Vacuum (in Hg)
				1900	
0.099	1.55	0.3146	3	1903	3.3
0.105	1.64	0.3240	3	1906	3.3
0.13	2.04	0.3606	3	1909	3.3
0.1	1.56	0.3162	3	1912	3.4
0.11	1.72	0.3317	3	1915	3.4
0.105	1.65	0.3240	3	1918	3.5
0.125	1.96	0.3536	3	1921	3.5
0.11	1.72	0.3317	3	1924	3.5
0.105	1.65	0.3240	3	1927	3.5
0.11	1.73	0.3317	3	1930	3.5
0.1	1.57	0.3162	3	1933	3.6
0.115	1.81	0.3391	3	1936	3.6
0.125	1.98	0.3536	3	1945	3.8
0.11	1.72	0.3317	3	1948	3.9
0.115	1.81	0.3391	3	1951	3.9
0.11	1.73	0.3317	3	1954	3.9
0.12	1.89	0.3464	3	1957	3.9
0.11	1.73	0.3317	3	2000	4.1
0.11	1.73	0.3317	3	2003	4.1
0.11	1.73	0.3317	3	2006	4.1
0.12	1.89	0.3464	3	2009	4.2
0.11	1.73	0.3317	3	2012	4.2
0.105	1.65	0.3240	3	2015	4.2
0.11	1.73	0.3317	3	2018	4.2

			72	72	
0.1112	1.7473	0.3333	3	1952.1666667	3.75
Velocity Head ^Ps	Pressure Diff ^H	Sqrt ^Ps	Sampling Time	Clock Time	Vacuum

Probe Temperature Exit (°F)	Filter Temperature (°F)	Impinger Temperature Outlet (°F)	Vs	Point to Point Isokinetics
236	239	38	21.6083	97.00
238	239	38	22.2349	100.34
240	241	39	24.7200	98.72
241	243	39	21.7172	101.51
241	242	39	22.7581	99.89
239	240	39	22.1790	100.76
238	238	39	24.2196	98.11
236	237	39	22.7391	100.95
234	235	39	22.2163	100.54
231	233	40	22.7009	97.05
230	233	40	21.6445	84.86
232	234	40	23.2306	96.82
237	242	42	24.1380	101.58
238	242	43	22.7391	100.67
239	243	43	23.2111	100.33
240	243	38	22.7009	100.82
238	240	39	23.7303	99.74
237	239	39	22.7391	96.86
235	237	39	22.7200	104.41
234	235	40	22.7200	99.92
236	236	40	23.7303	99.56
237	239	40	22.7391	100.86
238	240	40	22.2163	100.77
240	241	41	22.7581	100.47

236.88 Probe Exit Temperature (°F)	236.88 Filter Temperature (°F)	39.71 Outlet Impinger Temperature (°F)

POST TEST CALCULATION

VOLUME DRY GAS
Vm(std) = 45.0035

VOLUME H2O VAPOR
Vw(std) = 9.1975

MOISTURE CONTENT
Bws = 0.1697

Vm 51.0680
Vm(std) = 45.0035

Vic(mls) 195.4
Vw(std) = 9.1975

MOL WT DRY STACK GASES
Mds = 29.3800

STACK VELOCITY
Vs = 22.8384

Kp 85.49

DRY STACK FLOW RATE
Q(std) = 1.0044E+6

MOL WT WET STACK GASES
Mws = 27.4489

Vs = 22.8384

ISOKINETIC CALCULATION

An = 7.3862E-4

% ISO = 99.2984

PARTICULATE CONCENTRATION

Cs = 6.6217E-4

Mn 29.8
Cs = 6.6217E-4
lbs/dscf = 1.4598E-6
grains/dscf = 0.0102
lbs/hr = 1.4663

NOx
PPM = 24.58
lbs/hr = 2.948

CO
PPM = 420.32
lbs/hr = 30.735

SO2
PPM = 0.34
lbs/hr = 0.057

HF
mg/dscf = 0.00673
lbs/hr = 0.0149

Initial Leak Check Rate
Finish 961.901
Start 961.895
Rate = 0.0060
Vac. = 20.2

Pitot Tubes
A = OK
B = OK

Final Leak Check Rate
Finish 961.799
Start 961.792
Rate = 0.0070
Vac. = 19.1

Pitot Tubes
A = OK
B = OK

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

LABORATORY DATA
EPA Method 5

Company: Interstate Brick Run Number: #3 comp.

Sampling Location: #3 Kiln - Outlet Stk Date: 10/31-95

Moisture Collected

	Initial Weight	Final Weight	Weight Gain
Impinger 1	596.3	777.6	181.3
Impinger 2	608.4	617.1	8.7
Impinger 3	471.7	472.8	1.1
Impinger 4	806.7	811.0	4.3

Total Gain = 195.4

Particulate Collected

Front - Half Analysis (Nozzle, Probe, Filter and Oven Glassware)

1. Filter Final Weight 0.6226
2. Filter Tare Weight 0.6043 K-3
3. Total Filter Weight 0.0183
4. Particulate caught in nozzle, probe and glassware 0.0112
5. Total Front - Half Catch 0.0295

Back - Half Analysis (Impingers, and Connecting Glassware)

1. Particulate caught in impingers evaporated down at less than 120° F. 0.3

Total Particulate Catch (Sum of Front and Back - Half Catches)

29.8 mg

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

Company: Interstate Brick Date: 10-31-95

Source: #3 Kiln Outlet Stack Run Number: #3 compliance

ORSAT ANALYSIS

(Average of 3 analyses each)

Test Number	Volume Percent - Dry			
	Nitrogen	Oxygen	Carbon Dixoide	Carbon Monoxide
#1	80.2	14.9	4.9	<0.1
#2	80.2	14.9	4.9	<0.1
#3	80.2	14.9	4.9	<0.1
Average	80.2	14.9 %	4.9 %	<0.1

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED

565 So. Birch Drive 801-266-7111

Spanish Fork, Utah 84660

POST TEST BACK HALF EVAPORATION

COMPANY: Intermtn Brick

SOURCE: #7 kiln outlet Stack

DATE: 11-6 95

ACETONE BLANK		WATER BLANK	
Volume of Liquic	250 mls	Volume of Liquic	
Final Weight	106.8155	Final Weight	
Tare Weight	106.8156	Tare Weight	
Residue	0.0001	Residue	

RUN #1		RUN #1	
Volume of Liquic	250 mls	Volume of Liquic	
Color	Clear	Color	
Final Weight	107.3540	Final Weight	
Tare Weight	107.3417	Tare Weight	
Residue & Blank	0.0123	Residue & Blank	
- Blank	0.0001	- Blank	
Residue	0.0122 (12.2mg)	Residue	

RUN #2		RUN #2	
Volume of Liquic	250 mls	Volume of Liquic	
Color	Clear	Color	
Final Weight	106.7347	Final Weight	
Tare Weight	106.7252	Tare Weight	
Residue & Blank	0.0095	Residue & Blank	
- Blank	0.0001	- Blank	
Residue	0.0094 (9.4mg)	Residue	

RUN #3		RUN #3	
Volume of Liquic	250 mls	Volume of Liquic	
Color	Clear	Color	
Final Weight	106.8246	Final Weight	
Tare Weight	106.8133	Tare Weight	
Residue & Blank	0.0113	Residue & Blank	
- Blank	0.0001	- Blank	
Residue	0.0112 (11.2mg)	Residue	

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

POST TEST BACK HALF EVAPORATION

COMPANY: Interstate Brick
SOURCE: #3 Kiln Outlet Stack
DATE: 11-6-95

CONTAINER #1 METHYLENE CHLORIDE			CONTAINER #2 DISTILLED WATER		
BLANK			**BLANK**		
Volume of Liqui	200 ml		Volume of Liqui	500 ml	
Final Weigh	107.1367		Final Weigh	187.5214	
Tare Weight	107.1367		Tare Weight	187.5212	
Residue	0.0000		Residue	0.0002	
RUN #1			**RUN #1**		
Volume of Liqui	200 ml		Volume of Liqui	500 ml	
Color	Clear		Color	Clear	
Final Weigh	106.2450		Final Weigh	187.5169	
Tare Weight	106.2447		Tare Weight	187.5164	
Residue & Blani	0.0003		Residue & Blani	0.0005	
- Blank	0.0		- Blank	0.0002	
Residue	0.0003	0.3 mg	Residue	0.0003	0.3 mg
RUN #2			**RUN #2**		
Volume of Liqui	200 ml		Volume of Liqui	500 ml	
Color	Clear		Color	Clear	
Final Weigh	106.9144		Final Weigh	187.8598	
Tare Weight	106.9142		Tare Weight	187.8591	
Residue & Blani	0.0002		Residue & Blani	0.0007	
- Blank	0.0		- Blank	0.0002	
Residue	0.0002	0.2 mg	Residue	0.0005	0.5 mg
RUN #3			**RUN #3**		
Volume of Liqui	200 ml		Volume of Liqui	500 ml	
Color	Clear		Color	Clear	
Final Weigh	106.8530		Final Weigh	187.4331	
Tare Weight	106.8528		Tare Weight	187.4328	
Residue & Blani	0.0002		Residue & Blani	0.0003	
- Blank	0.0		- Blank	0.0002	
Residue	0.0002	0.2 mg	Residue	0.0001	0.1 mg

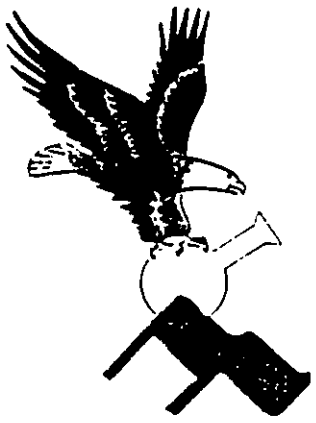
American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660

EPA Method 2 Cyclonic Flow Determination

Plant: Interstate Brick
Location: #3 Kiln Outlet Stack
Date: 10-31-95
Baro. Pressure: 25.42
Pitot Tube (Cp): 0.8654

Run No: #1 Pretest
Operator: T.B. R.B
Amb. Temp. °F: 55
Static Pressure: -0.5
Stack Dimensions: 60 inch ID

Traverse Point Number	Velocity head (ΔPs) In H2O	Stack Temperature °F	Cyclonic Flow Determination	
			ΔPs at 0° Reference	Angle which yields a null ΔP
1	0.11	140	0.03	4
2	0.12		0.04	4
3	0.115		0.02	3
4	0.12		0.0	0
5	0.12		0.0	0
6	0.12		0.0	0
7	0.11		0.0	0
8	0.12		0.01	1
9	0.11		0.01	1
10	0.12		0.02	3
11	0.13		0.02	3
12	0.14		0.01	2
13	0.12		0.02	3
14	0.12		0.02	4
15	0.11		0.01	2
16	0.12		0.0	0
17	0.13		0.0	0
18	0.12		0.01	2
19	0.11		0.01	1
20	0.12		0.0	0
21	0.12		0.02	3
22	0.13		0.03	4
23	0.12		0.02	-2
24	0.12	✓	0.02	4
				Total 46
			Average Angle:	1.91



Appendix "E"

(Emissions Calculations)

American Environmental Testing Company Inc.

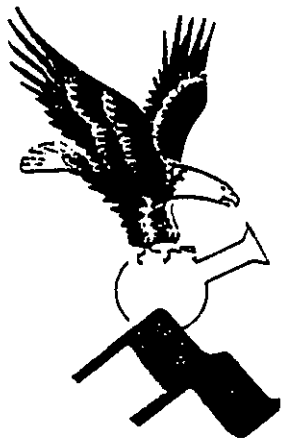
Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3354

Salt Lake City, Utah
801-266-7111

Appendix "E"

(Emissions Calculations)



American Environmental Testing Company, Inc.

565 South Birch Drive
Spanish Fork, Utah 84660
801-798-8553

Nomenclature for Particulate Calculations

Symbol	English Units	Metric Units	Description
A_s	in^2	m^2	Stack Area
C_{an}	gr/dscf*	g/dscm*	Particulate - probe, cyclone and filter
C_{ao}	gr/dscf*	g/dscm*	Particulate - total
C_{at}	gr/CF @ stack conditions	g/m^3	Particulate - probe, cylone and filter
C_{au}	gr/CF @ stack conditions	g/m^3	Particulate - total
C_{aw}	lbs/hr	kg/hr	Particulate - probe, cyclone and filter
C_{ax}	lbs/hr	kg/hr	Particulate - total
C_p			Pitot Tube Calibration Factor
D_n	in	m	Sampling Nozzle Diameter
%EA			Percent Excess Air at sampling point
g	32.2 ft/s^2	9.81 m/s^2	Acceleration of gravity
%I			Percent isokinetic
%M			Percent moisture in stack gas by Volume
M_d			Mole faction of dry gas

* 29.92 "Hg, 528°R (790 mm Hg, 20° C)

Symbol	English Units	Metric Units	Description
M_f	mg	mg	Particulate - probe, cyclone and filter
M_{H2O}	18 lb/lb-mole		Molecular Weight of Water
m_t	mg	mg	Particulate - total
MW	lb/lb-mole	g/g-mole	Molecular Weight of wet stack gas
MW_{air}	28.95 lb/lb-mole		Molecular Weight of air
MW_d	lb/lb-mole	g/g-mole	Molecular Weight of dry stack gas
P_b	"Hg Absolute	mm Hg	Barometric Pressure
P_m	"H20	mm H2O	Orifice Pressure Drop
P_s	"Hg Absolute	mm Hg	Stack Pressure
ΔP	"H20	mm H2o	Velocity Head of stack gas
P_{std}	"29.92 "Hg	760 mm Hg	Standard Barometric Pressure
Q_a	ACFM	m3/hr	Stack Gas Volume at Actual Stack condition
Q_s	DSCFM*	dscm/hr*	Stack Gas Volume at 29.92 "Hg, 528°R,dry
R	21.83 "Hg-ft3/lb-mole°R		Universal Gas Consant
T_m	°F	°C	Average Gas Meter Temperature
T_t	min	min	Net Time of test
T_s	°F	°C	Stack Temperature
T_{std}	528°R	293 K	Standard Temperature
V_m	ft^3	m^3	Volume of dry gas sampled at meter condtions
$V_m std$	dscf*	dscm*	Volume of dry gas sampled at standard conditions
V_s	fpm	m/sec	Stack velocity at stack conditions
V_w	ml	ml	Total water collected in impingers and silica gel

* 29.92 "Hg, 528°R (790 mm Hg, 20° C)

Symbol	English Units	Metric Units	Description
V_{wgas}	scf*	scm*	Volume of water vapor collected at standard conditions
ρ_{air}	0.0748 lbs/ft^3		Density ofAir
ρ_{H2O}	1 g/ml		Density of water
ρ_{man}	51.63 lbs/ft^3		Denisty of manometer oil

Standard Conditions: 29.92 "Hg, 68°F (760 mm Hg, 20° C)
* 29.92 "Hg, 528°R (760 mm Hg, 20° C)

Example Particulate Calculations

1. Volume of Dry Gas sampled at standard conditions.*

$$Vm\ std = Vm \left[\frac{Tstd}{Tm + 460}\right] \left[\frac{Pb + (Pm/13.6)}{Pstd}\right]$$

$$Vm\ std = 17.65 \times Vm \left[\frac{Pb + (Pm/13.6)}{Tm + 460}\right] = dscf$$

$$Vm\ std = dscf \times 0.028317 = dscm$$

2. Volume of water vapor collected at standard conditions.*

$$Vw\ gas = \frac{(Vw - gms\ SO2 - gms\ H2S)\ P\ H2O \times R \times Tstd}{P\ std \times M\ H2O \times 453.6}$$

$$Vw\ gas = 0.0472 \times (Vw - gms\ SO2 - gms\ H2S) = scf$$

$$Vw\ gas = scf \times 0.028317 = scm$$

3. Percent moisture in stack gas.

$$\%M = \left[\frac{Vw\ gas}{Vm\ std + Vw\ gas}\right] \times 100 = \%$$

4. Mole fraction of dry gas.

$$Md = \frac{100 - \%M}{100}$$

5. Average molecular weight of dry stack gas.

$$MW = \left[\frac{\%CO2 \times 44}{100}\right] + \left[\frac{\%O2 \times 32}{100}\right] + \left[\frac{\%N2 \times 28}{100}\right] + \left[\frac{\%CO \times 28}{100}\right] = \begin{matrix} lb/lb\text{-}mole \\ g/g\text{-}mole \end{matrix}$$

6. Molecular weight of stack gas.

$$MW = MWd \times Md + 184\ (1 - Md) = \frac{lb}{lb\text{-}mole} = g/g\text{-}mole$$

7. Percent excess air at sampling point.

$$\%EA = \frac{100\ (\%O2 - 0.5\%\ CO)}{0.265\ (\%N2) - (\%O2) + 0.5\ (\%CO)}$$

* 29.92 "Hg, 528°R (760 mm Hg, 20° C)

8. Stack pressure.

$$Ps = Pb + \left[\frac{\text{stack pressure "H2O}}{13.6}\right] = \text{"Hg Absolute}$$

$$Ps = \text{"Hg Absolute} \times 25.4 = \text{mm Hg}$$

9. Stack velocity at stack conditions.

$$Vs = Cp \times 60 \times \left[\frac{2g \times P\text{man} \times P\text{ std} \times MW\text{ air} \times (Ts + 460) \times \Delta Ps}{12 \times P\text{air} \times Ps \times MW \times T\text{ std}}\right] 1/2$$

$$Vs = 5123.8 \times Cp \times \left[\frac{(Ts + 460) \times \Delta Ps}{Ps \times MW}\right] 1/2 = \text{fpm}$$

$$Vs = \text{fpm} \times 0.00508 = \text{m/second}$$

10. Dry stack gas volume at standard conditions.*

$$Qs = \frac{1}{144} \times Vs \times As \times Md \times \frac{T\text{ std}}{Ts + 460} \times \frac{Ps}{P\text{ std}}$$

$$Qs = \frac{0.123 \times Vs \times As \times Md \times Ps}{Ts + 460} = \text{DSCFM}$$

$$Qs = \text{DSCFM} \times 1.6990 = \text{dscm/hr.}$$

11. Actual stack gas volume at stack conditions.

$$Qa = \frac{Vs \times As}{144} = \text{ACFM}$$

$$Qa = \text{ACFM} \times 1.6990 = m^3/hr$$

12. Percent isokinetic.

$$\%I = \frac{Vm\text{ std} \times (Ts + 460) \times P\text{ std} \times 100 \times 144}{Md \times T\text{ std} \times Ps \times Tt \times Vs \times \frac{\pi Dn^2}{4}}$$

$$\%I = \frac{1039 \times Vm\text{ std} \times (Ts + 460)}{Md \times Ps \times Tt \times Vs \times Dn^2}$$

* 29.92 "Hg, 528°R (760 mm Hg, 20° C)

13. Particulate - probe, cyclone and filter.

$$Can = \frac{mf}{Vm\ std} \times \frac{1\ gr}{64.8\ mg}$$

$$Can = 0.0154 \times \frac{mf}{Vm\ std} = gr/dscf^{*}$$

$$Can = gr/dscf \times 2.290 = g/dscm^{*}$$

14. Particulate total.

$$Cao = 0.0154 \times \frac{mt}{Vm\ std} = gr/dscf^{*}$$

$$Cao = gr/dscf \times 2.290 = g/dscm^{*}$$

15. Particulate - probe, cyclone and filter at stack conditions.

$$Cat = Can \times \frac{Ps}{Ps\ std} \times \frac{(T\ std)}{(Ts + 460)} \times Md$$

$$Cat = \frac{17.65 \times Can \times Ps \times Md}{Ts + 460} = gr/CF$$

$$Cat = gr/CF \times 2.290 = g/m^3$$

16. Particulate - total at stack conditions.

$$Cau = \frac{17.65 \times Cao \times Ps \times Md}{Ts + 460} = gr/CF$$

$$Cau = gr/CF \times 2.290 = g/m^3$$

17. Particulate - probe, cyclone and filter.

$$Caw = Can \times Qs \times \frac{60\ min}{1\ hr} \times \frac{1\ lb}{7000\ gr}$$

$$Caw = 0.00857 \times Can \times Qs = lbs/hr$$

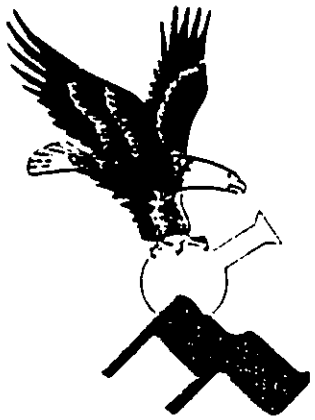
$$Caw = lbs/hr \times 0.4536 = kg/hr$$

18. Particulate - total.

$$Cax = 0.00857 \times Cao \times Qs = lbs/hr$$

$$Cax = lbs/hr \times 0.4536 = kg/hr$$

* 29.92 "Hg, 528°R (760 mm Hg, 20° C)



Appendix "F"

(Data-Logger Sheets)

American Environmental Testing Company Inc.

Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3354

Salt Lake City, Utah
801-266-7111

Appendix "F"

(Data-Logger Sheets)

10-31-95

1 = 0.1 PPM NOX 2 = 5992.5 PPM SO2 3 = 2.8 % O2

~~1-NOV-95~~ 12:25:50

4 = 31.1 PPM CO

1 = 0.4 PPM NOX 2 = 2676.2 PPM SO2 3 = 4.8 % O2

~~1-NOV-95~~ 12:26:50

4 = 38.1 PPM CO

1 = 0.3 PPM NOX 2 = 1279.2 PPM SO2 3 = 9.9 % O2

~~1-NOV-95~~ 12:27:50

3MAX = 21.9 % MIN = 0.1 % 4MAX = 28.6 PPM MIN = 0.2 PPM

1MAX = 0.5 PPM MIN = 0.2 PPM 2MAX = 830.5 PPM MIN = -340.3 PPM

~~1-NOV-95~~ 12:27:50

4 = 10.1 PPM CO

1 = 0.1 PPM NOX 2 = 0.1 PPM SO2 3 = 20.8 % O2

~~1-NOV-95~~ 12:28:50

wrong Date should be 10-31-95

RECORDER/DATA LOGGER VRS 5I

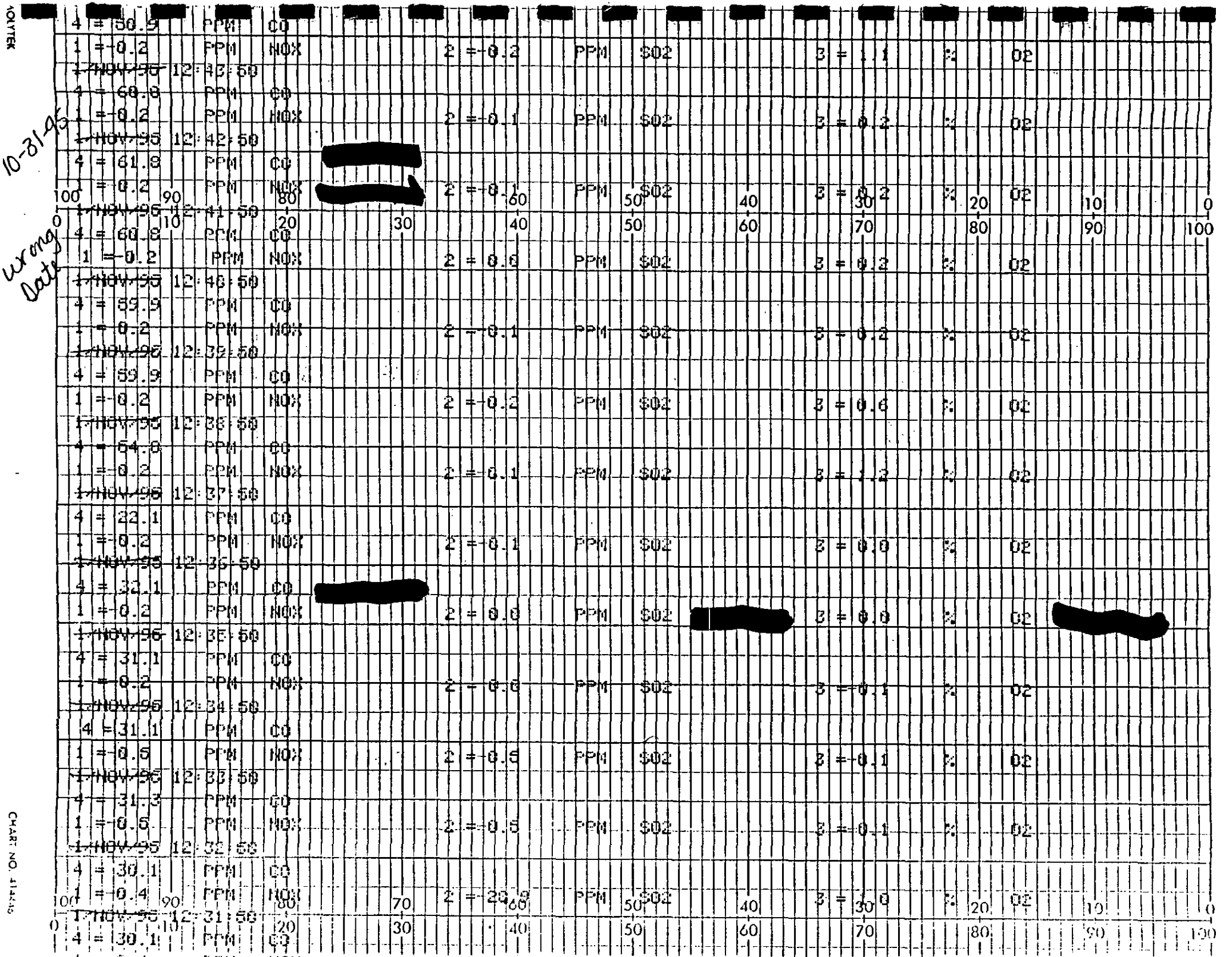
outlet #3 Kiln

Interstate Brick

100 90 80 70 60 50 40 30 20 10 0

0 10 20 30 40 50 60 70 80 90 100

PRINTED IN U.S.A.


4 = 50.9 PPM CO
1 = -0.2 PPM NOX
2 = -0.2 PPM $O2
3 = 1.1 % O2
1-NOV-96 12:43:50
4 = 60.8 PPM CO
1 = -0.2 PPM NOX
2 = -0.1 PPM $O2
3 = 0.2 % O2
1-NOV-96 12:42:50
4 = 61.8 PPM CO
1 = -0.2 PPM NOX
2 = -0.1 PPM $O2
3 = 0.2 % O2
1-NOV-96 12:41:50
4 = 60.8 PPM CO
1 = -0.2 PPM NOX
2 = 0.0 PPM $O2
3 = 0.2 % O2
1-NOV-96 12:40:50
4 = 59.9 PPM CO
1 = -0.2 PPM NOX
2 = -0.1 PPM $O2
3 = 0.2 % O2
1-NOV-96 12:39:50
4 = 59.9 PPM CO
1 = -0.2 PPM NOX
2 = -0.2 PPM $O2
3 = 0.6 % O2
1-NOV-96 12:38:50
4 = 54.8 PPM CO
1 = -0.2 PPM NOX
2 = -0.1 PPM $O2
3 = 1.2 % O2
1-NOV-96 12:37:50
4 = 22.1 PPM CO
1 = -0.2 PPM NOX
2 = -0.1 PPM $O2
3 = 0.0 % O2
1-NOV-96 12:36:50
4 = 33.1 PPM CO
1 = -0.2 PPM NOX
2 = 0.0 PPM $O2
3 = 0.0 % O2
1-NOV-96 12:35:50
4 = 31.1 PPM CO
1 = -0.2 PPM NOX
2 = 0.0 PPM $O2
3 = -0.1 % O2
1-NOV-96 12:34:50
4 = 31.1 PPM CO
1 = -0.5 PPM NOX
2 = -0.5 PPM $O2
3 = -0.1 % O2
1-NOV-96 12:33:50
4 = 31.3 PPM CO
1 = -0.5 PPM NOX
2 = -0.5 PPM $O2
3 = -0.1 % O2
1-NOV-96 12:32:50
4 = 30.1 PPM CO
1 = -0.4 PPM NOX
2 = -0.2 PPM $O2
3 = 0.0 % O2
1-NOV-96 12:31:50
4 = 30.1 PPM CO
10-31-96
wrong date
AQUATEK
CHART NO. 41446

1-[redacted]-95 58

4 = 1.1 PPM CO

1 = -0.1 PPM NOX 2 = -0.2 PPM SO2 3 = 11.8 % O2

1-NOV-95 12:57:59

4 = 1.1 PPM CO

1 = -0.1 PPM NOX 2 = -0.2 PPM SO2 3 = 11.3 % O2

1-NOV-95 12:55:59

4 = 1.1 PPM CO

1 = -0.1 PPM NOX 2 = -0.1 PPM SO2 3 = 11.7 % O2

1-NOV-95 12:53:59

4 = 1.1 PPM CO

1 = 0.0 PPM NOX 2 = -0.2 PPM SO2 3 = 5.9 % O2

1-NOV-95 12:54:59

4 = 1.1 PPM CO

1 = 0.1 PPM NOX 2 = -0.1 PPM SO2 3 = 5.2 % O2

1-NOV-95 12:53:56

4 = 0.2 PPM CO

1 = 0.5 PPM NOX 2 = 0.0 PPM SO2 3 = -1.7 % O2

1-NOV-95 12:52:59

4 = 0.2 PPM CO

1 = 81.2 PPM NOX [redacted] 2 = 3.3 PPM SO2 3 = -2.0 % O2

1-NOV-95 12:51:59

4 = 0.2 PPM CO

1 = 89.5 PPM NOX 2 = 1.7 PPM SO2 3 = 7.8 % O2

1-NOV-95 12:50:56

4 = 0.2 PPM CO

1 = 0.1 PPM NOX 2 = 0.1 PPM SO2 3 = 6.0 % O2

1-NOV-95 12:49:59

4 = 0.2 PPM CO

1 = 64.1 PPM NOX 2 = 2.6 PPM SO2 3 = -4.8 % O2

1-NOV-95 12:48:56

4 = 1.1 PPM CO

1 = 63.2 PPM NOX [redacted] 2 = 2.0 PPM SO2 3 = -4.7 % O2

1-NOV-95 12:47:59

4 = 1.1 PPM CO

1 = 61.9 PPM NOX 2 = 1.9 PPM SO2 3 = -4.0 % O2

1-NOV-95 12:46:59

4 = 0.2 PPM CO

1 = 44.8 PPM NOX 2 = 2.6 PPM SO2 3 = -2.9 % O2

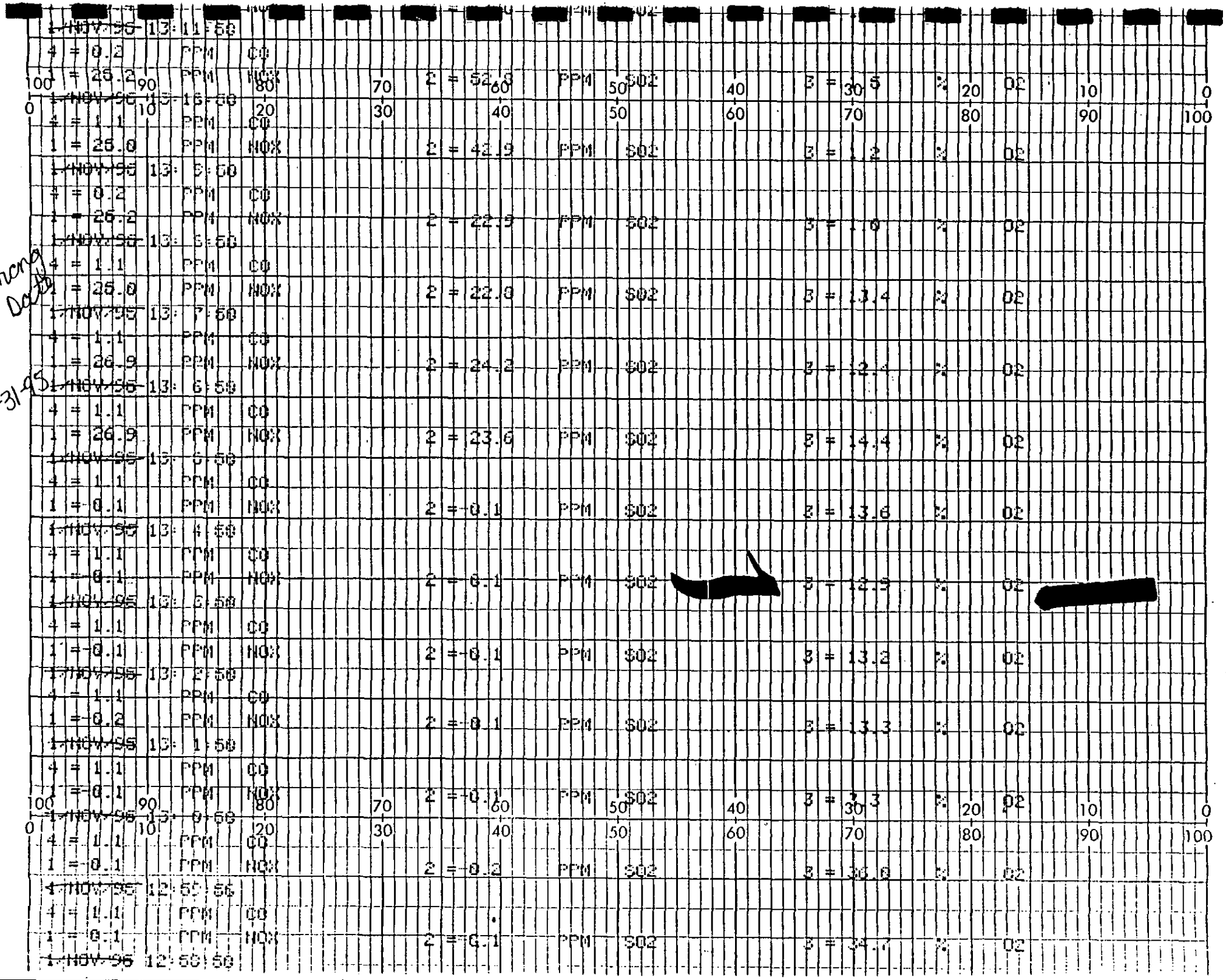
1-NOV-95 12:45:59

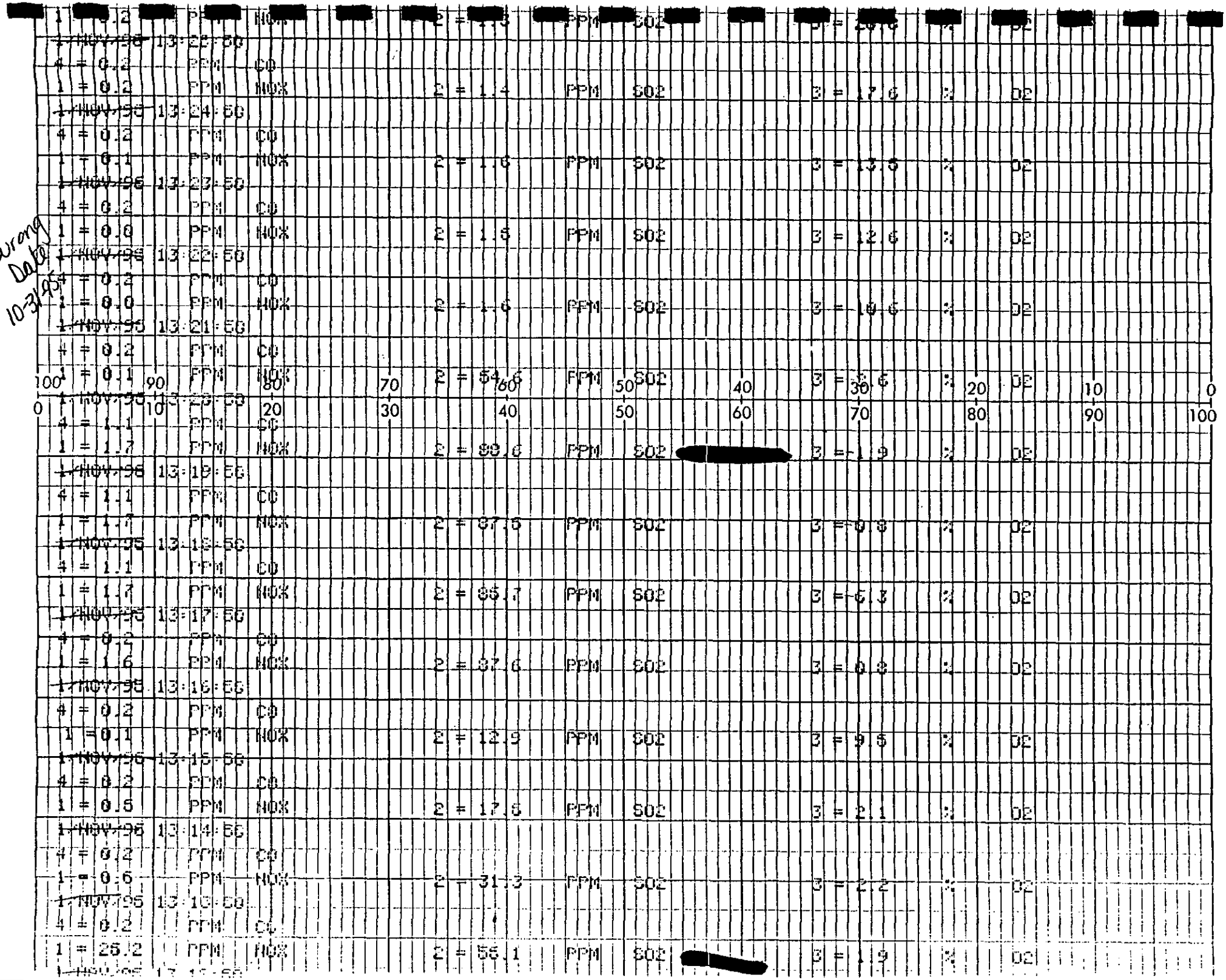
4 = 0.2 PPM CO

11-31-95 wrong Data

100 90 80 60 50 40 30 20 10 0

0 10 20 30 40 50 60 70 80 90 100


1-NOV-95 13:11:50
4 = 0.2 PPM CO
1 = 26.2 PPM NOX
2 = 52.8 PPM SO2
3 = 5 % O2
1-NOV-95 13:10:50
4 = 1.1 PPM CO
1 = 26.0 PPM NOX
2 = 42.9 PPM SO2
3 = 1.2 % O2
1-NOV-95 13: 9:50
4 = 0.2 PPM CO
1 = 26.2 PPM NOX
2 = 22.9 PPM SO2
3 = .6 % O2
1-NOV-95 13: 8:50
4 = 1.1 PPM CO
1 = 26.0 PPM NOX
2 = 22.0 PPM SO2
3 = 13.4 % O2
1-NOV-95 13: 7:50
4 = 1.1 PPM CO
1 = 26.9 PPM NOX
2 = 24.2 PPM SO2
3 = 12.4 % O2
1-NOV-95 13: 6:50
4 = 1.1 PPM CO
1 = 26.9 PPM NOX
2 = 23.6 PPM SO2
3 = 14.4 % O2
1-NOV-95 13: 5:50
4 = 1.1 PPM CO
1 = -0.1 PPM NOX
2 = -0.1 PPM SO2
3 = 13.6 % O2
1-NOV-95 13: 4:50
4 = 1.1 PPM CO
1 = -0.1 PPM NOX
2 = 0.1 PPM SO2
3 = 12.5 % O2
1-NOV-95 13: 3:50
4 = 1.1 PPM CO
1 = -0.1 PPM NOX
2 = -0.1 PPM SO2
3 = 13.2 % O2
1-NOV-95 13: 2:50
4 = 1.1 PPM CO
1 = -0.2 PPM NOX
2 = -0.1 PPM SO2
3 = 13.3 % O2
1-NOV-95 13: 1:50
4 = 1.1 PPM CO
1 = -0.1 PPM NOX
2 = -0.1 PPM SO2
3 = 13.3 % O2
1-NOV-95 13: 0:50
4 = 1.1 PPM CO
1 = -0.1 PPM NOX
2 = -0.2 PPM SO2
3 = 36.0 % O2
1-NOV-95 12:59:56
4 = 1.1 PPM CO
1 = 0.1 PPM NOX
2 = 0.1 PPM SO2
3 = 34.7 % O2
1-NOV-95 12:58:59
wrong Date
10-31-95


Wrong Date 10-31-95
1 = 0.2 PPM NOX
2 = 1.3 PPM SO2
3 = 20.9 % O2
1-NOV-95 13:25:50
4 = 0.2 PPM CO
1 = 0.2 PPM NOX
2 = 1.4 PPM SO2
3 = 17.6 % O2
1-NOV-95 13:24:50
4 = 0.2 PPM CO
1 = 0.1 PPM NOX
2 = 1.6 PPM SO2
3 = 13.6 % O2
1-NOV-95 13:23:50
4 = 0.2 PPM CO
1 = 0.0 PPM NOX
2 = 1.5 PPM SO2
3 = 12.6 % O2
1-NOV-95 13:22:50
4 = 0.2 PPM CO
1 = 0.0 PPM NOX
2 = 1.6 PPM SO2
3 = 10.6 % O2
1-NOV-95 13:21:50
4 = 0.2 PPM CO
1 = 0.1 PPM NOX
2 = 54.6 PPM SO2
3 = 3.6 % O2
1-NOV-95 13:20:50
4 = 1.1 PPM CO
1 = 1.7 PPM NOX
2 = 89.6 PPM SO2
3 = 1.9 % O2
1-NOV-95 13:19:50
4 = 1.1 PPM CO
1 = 1.7 PPM NOX
2 = 87.5 PPM SO2
3 = 0.8 % O2
1-NOV-95 13:18:50
4 = 1.1 PPM CO
1 = 1.7 PPM NOX
2 = 85.7 PPM SO2
3 = 0.3 % O2
1-NOV-95 13:17:50
4 = 0.2 PPM CO
1 = 1.6 PPM NOX
2 = 87.6 PPM SO2
3 = 0.0 % O2
1-NOV-95 13:16:50
4 = 0.2 PPM CO
1 = 0.1 PPM NOX
2 = 12.9 PPM SO2
3 = 9.5 % O2
1-NOV-95 13:15:50
4 = 0.2 PPM CO
1 = 0.6 PPM NOX
2 = 17.6 PPM SO2
3 = 2.1 % O2
1-NOV-95 13:14:50
4 = 0.2 PPM CO
1 = 0.6 PPM NOX
2 = 31.3 PPM SO2
3 = 2.2 % O2
1-NOV-95 13:13:50
4 = 0.2 PPM CO
1 = 25.2 PPM NOX
2 = 56.1 PPM SO2
3 = 1.9 % O2
1-NOV-95 13:12:50
100 90 80 70 60 50 40 30 20 10 0
0 10 20 30 40 50 60 70 80 90 100
PRINTED IN U.S.A.
MOTEK

1-NOV-95 10: 5:36
4 = 0.0 PPM CO
1 = 2.7 PPM NOX 2 = 67.8 PPM SO2 3 = 19.9 % O2
1-NOV-95 10: 4:36
4 = 0.0 PPM CO
1 = 0.4 PPM NOX 2 = 0.2 PPM SO2 3 = 20.9 % O2
1-NOV-95 10: 3:36
4 = 0.0 PPM CO
1 = 0.4 PPM NOX 2 = 0.3 PPM SO2 3 = 21.0 % O2
1-NOV-95 10: 2:36
4 = 0.0 PPM CO
1 = 0.4 PPM NOX 2 = 0.3 PPM SO2 3 = 20.9 % O2
1-NOV-95 10: 1:36
4 = 0.9 PPM CO
1 = 0.4 PPM NOX 2 = 0.2 PPM SO2 3 = 20.9 % O2
1-NOV-95 10: 0:36
4 = 0.9 PPM CO
1 = 0.4 PPM NOX 2 = 0.2 PPM SO2 3 = 20.9 % O2
1-NOV-95 10:59:36
4 = 0.9 PPM CO
1 = 0.4 PPM NOX 2 = 0.3 PPM SO2 3 = 20.9 % O2
1-NOV-95 10:58:36
3MAX = 47.8 % MIN = 5.6 % 4MAX = 2.1 PPM MIN = 0.0 PPM
1MAX = 27.5 PPM MIN = 0.2 PPM 2MAX = 131.4 PPM MIN = 0.3 PPM
1-NOV-95 10:55: 0
4 = 0.9 PPM CO
1 = 0.4 PPM NOX 2 = 0.2 PPM SO2 3 = 20.9 % O2
1-NOV-95 10: 5:36

100 90 80 70 60 50 40 30 20 10 0
0 10 20 30 40 50 60 70 80 90 100

11-1-95 Wrong Date

INITIAL BIAS Should be 10-31-95

4 = 1.1 PPM CO
1 = 0.2 PPM NOX 2 = 1.3 PPM SO2 3 = 20.9 % O2

[redacted] 1 [redacted] 2 [redacted] PP[redacted] NO[redacted] [redacted] 2 = [redacted] PPM [redacted] SO2 [redacted] 3 = [redacted]

1-NOV-95 16:15:36
4 = 60.6 PPM CO
1 = 0.2 PPM NOX 2 = 0.6 PPM SO2 3 = .6 % O2

1-NOV-95 16:16:36
4 = 60.6 PPM CO
1 = 0.2 PPM NOX 2 = 0.7 PPM SO2 3 = 2.1 % O2

1-NOV-95 16:17:36
4 = 59.7 PPM CO
1 = 0.2 PPM NOX 2 = 0.8 PPM SO2 3 = 2.7 % O2

1-NOV-95 16:18:36
4 = 60.7 PPM CO
1 = 0.2 PPM NOX 2 = 1.1 PPM SO2 3 = 2.5 % O2

1-NOV-95 16:19:36
4 = 35.0 PPM CO
1 = 0.2 PPM NOX 2 = 3.2 PPM SO2 3 = 0.1 % O2

wrong Date
0-31-95

1-NOV-95 16:14:36
4 = 0.0 PPM CO
1 = 3.2 PPM NOX 2 = 85.6 PPM SO2 3 = 0.1 % O2

1-NOV-95 16:13:36
4 = 0.0 PPM CO
1 = 2.8 PPM NOX 2 = 88.6 PPM SO2 3 = 0.0 % O2

1-NOV-95 16:12:36
4 = 0.0 PPM CO
1 = 2.7 PPM NOX 2 = 88.2 PPM SO2 3 = 0.0 % O2

1-NOV-95 16:11:36
4 = 0.0 PPM CO
1 = 2.7 PPM NOX 2 = 88.6 PPM SO2 3 = 0.0 % O2 [redacted]

1-NOV-95 16:10:36
4 = 0.0 PPM CO
1 = 2.7 PPM NOX 2 = 88.8 PPM SO2 [redacted] 3 = 0.2 % O2

1-NOV-95 16:9:36
4 = 0.0 PPM CO
1 = 2.7 PPM NOX 2 = 89.2 PPM SO2 3 = 0.1 % O2

1-NOV-95 16:8:36
4 = 0.0 PPM CO
1 = 2.8 PPM NOX 2 = 89.4 PPM SO2 3 = 1.1 % O2

1-NOV-95 16:7:36
4 = 0.0 PPM CO
1 = 2.8 PPM NOX 2 = 73.9 PPM SO2 3 = 1.5 % O2

1-NOV-95 16:6:36

MONITEK

1 = 23.[illegible] NOX 2 = 6.4 PPM SO2 3 = 14.2 % O2

31/OCT/95 15:59:53

3MAX = 23.4 % MIN = 3.1 % 4MAX = 498.9 PPM MIN = 0.0 PPM

1MAX = 124.2 PPM MIN = 0.1 PPM 2MAX = 90.4 PPM MIN = 0.1 PPM

31/OCT/95 15:59: 8

4 = 456.8 PPM CO

1 = 23.6 PPM NOX 2 = 6.4 PPM SO2 3 = 14.1 % O2

31/OCT/95 15:58:53

RUN #1 OUTLET #3 KILN

4 = 0.0 PPM CO

1 = 87.6 PPM NOX 2 = 5.3 PPM SO2 3 = 2.0 % O2

1-NOV-95 16:26:36

100 90 80 70 60 50 40 30 20 10 0

4 = 0.0 PPM CO

0 10 20 30 40 50 60 70 80 90 100

1 = 7.5 PPM NOX 2 = 5.1 PPM SO2 3 = 0.8 % O2

1-NOV-95 16:25:36

4 = 0.0 PPM CO

1 = 7.5 PPM NOX 2 = 4.0 PPM SO2 3 = 0.0 % O2

1-NOV-95 16:24:36

4 = 0.0 PPM CO

1 = 124.0 PPM NOX 2 = 4.8 PPM SO2 3 = 0.8 % O2

1-NOV-95 16:23:36

4 = 0.0 PPM CO

1 = 122.2 PPM NOX 2 = 2.6 PPM SO2 3 = 2.5 % O2

1-NOV-95 16:22:36

4 = 0.0 PPM CO

1 = 0.3 PPM NOX 2 = 2.0 PPM SO2 3 = 12.9 % O2

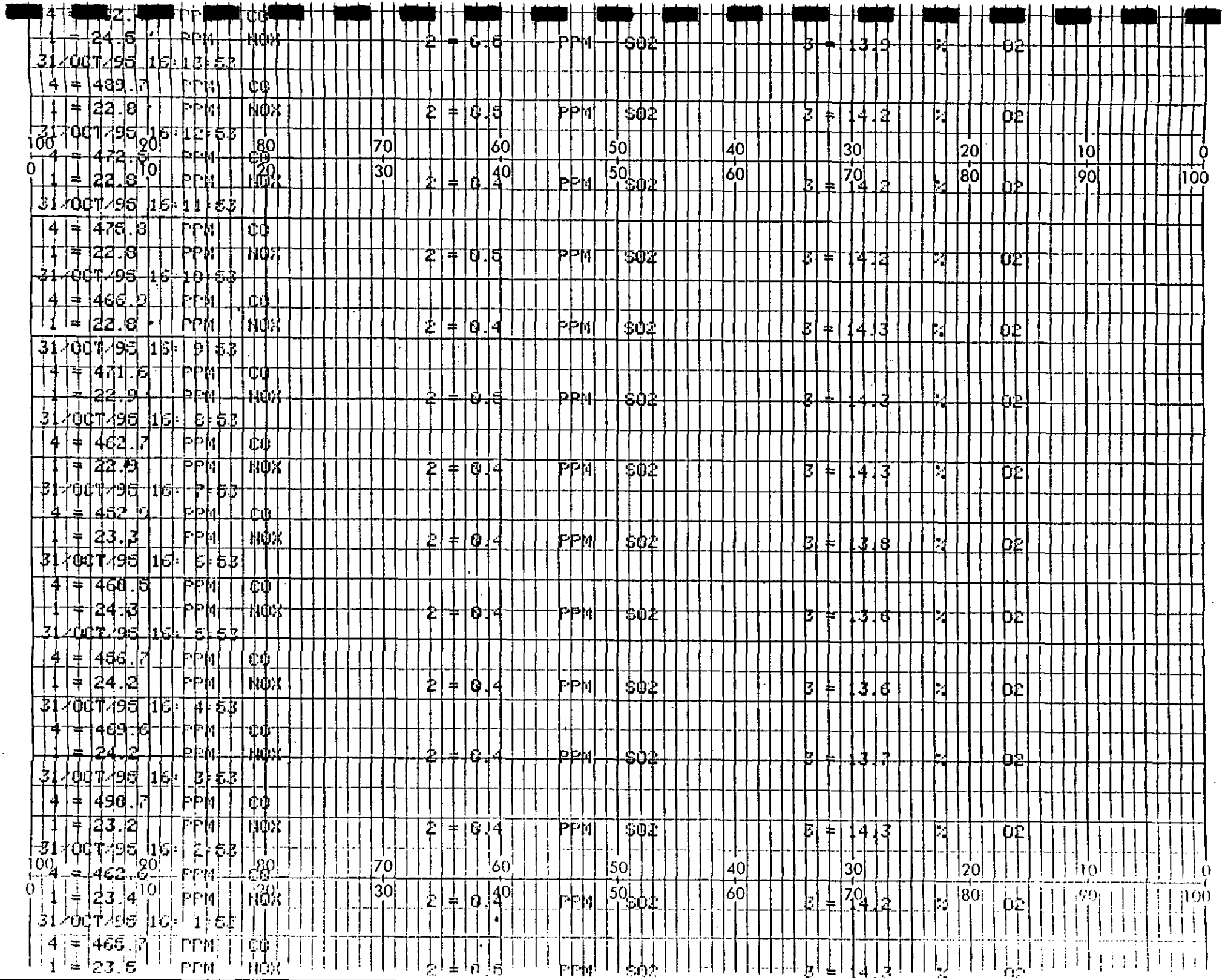
1-NOV-95 16:21:36

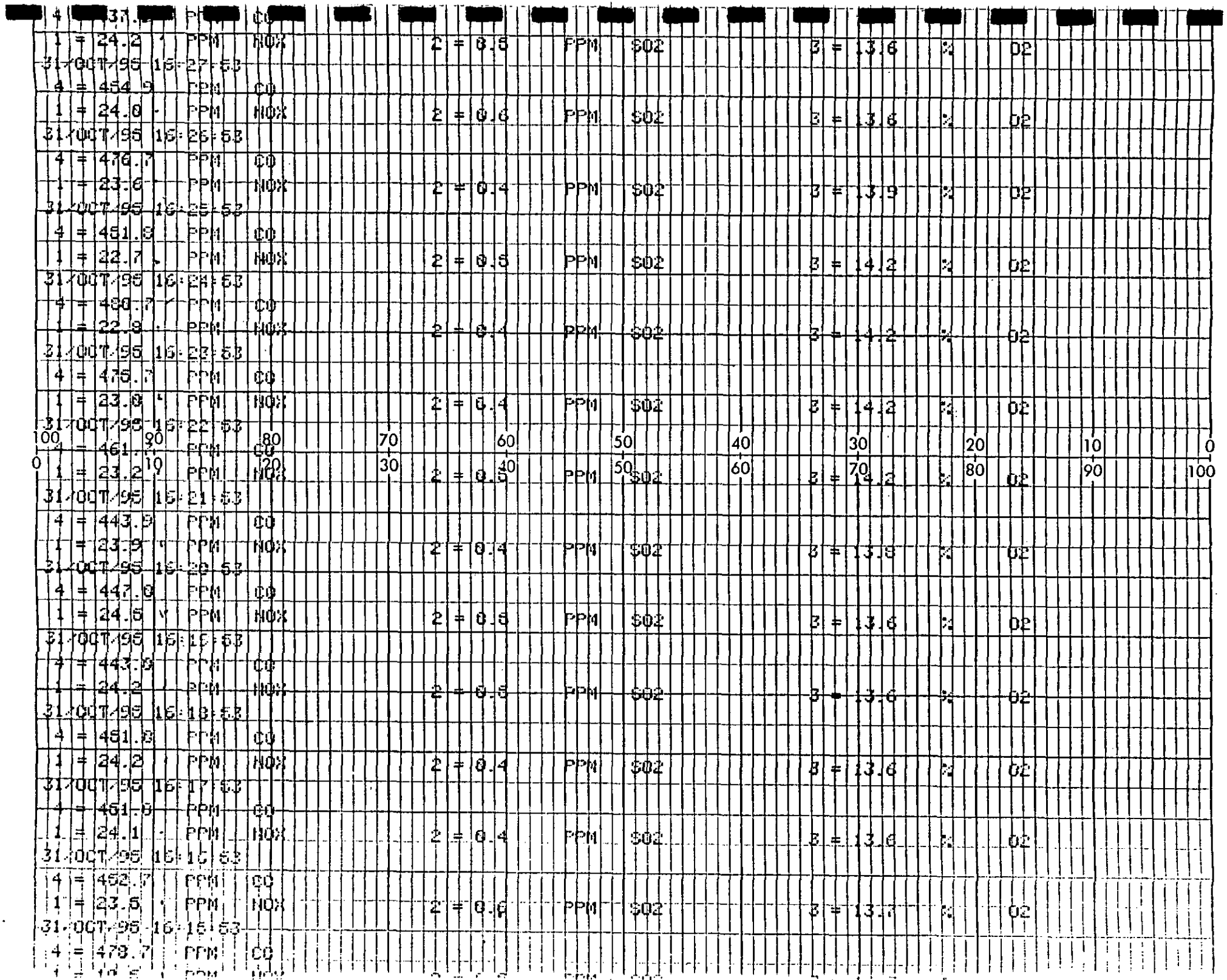
4 = 42.7 PPM CO

1 = 0.2 PPM NOX 2 = 6.5 PPM SO2 3 = 0.9 % O2

wrong Date Should be 10-31-95

CHART NO. 41446


4 = 22.1 PPM CO
1 = 24.6 PPM NOX
2 = 6.6 PPM SO2
3 = 13.9 % O2
31/OCT/95 16:13:53
4 = 489.3 PPM CO
1 = 22.8 PPM NOX
2 = 0.5 PPM SO2
3 = 14.2 % O2
31/OCT/95 16:12:53
4 = 472.5 PPM CO
1 = 22.8 PPM NOX
2 = 0.4 PPM SO2
3 = 14.2 % O2
31/OCT/95 16:11:53
4 = 476.3 PPM CO
1 = 22.8 PPM NOX
2 = 0.5 PPM SO2
3 = 14.2 % O2
31/OCT/95 16:10:53
4 = 466.9 PPM CO
1 = 22.8 PPM NOX
2 = 0.4 PPM SO2
3 = 14.3 % O2
31/OCT/95 16: 9:53
4 = 471.6 PPM CO
1 = 22.9 PPM NOX
2 = 0.5 PPM SO2
3 = 14.2 % O2
31/OCT/95 16: 8:53
4 = 462.7 PPM CO
1 = 22.9 PPM NOX
2 = 0.4 PPM SO2
3 = 14.3 % O2
31/OCT/95 16: 7:53
4 = 452.9 PPM CO
1 = 23.3 PPM NOX
2 = 0.4 PPM SO2
3 = 13.8 % O2
31/OCT/95 16: 6:53
4 = 460.5 PPM CO
1 = 24.3 PPM NOX
2 = 0.4 PPM SO2
3 = 13.6 % O2
31/OCT/95 16: 5:53
4 = 456.7 PPM CO
1 = 24.2 PPM NOX
2 = 0.4 PPM SO2
3 = 13.6 % O2
31/OCT/95 16: 4:53
4 = 469.6 PPM CO
1 = 24.2 PPM NOX
2 = 0.4 PPM SO2
3 = 13.7 % O2
31/OCT/95 16: 3:53
4 = 496.7 PPM CO
1 = 23.2 PPM NOX
2 = 0.4 PPM SO2
3 = 14.3 % O2
31/OCT/95 16: 2:53
4 = 462.6 PPM CO
1 = 23.4 PPM NOX
2 = 0.4 PPM SO2
3 = 14.2 % O2
31/OCT/95 16: 1:53
4 = 466.7 PPM CO
1 = 23.6 PPM NOX
2 = 0.5 PPM SO2
3 = 14.3 % O2
100 90 80 70 60 50 40 30 20 10 0
0 10 20 30 40 50 60 70 80 90 100
MOLYTEK


4 = 37. PPM CO
1 = 24.2 PPM NOX
2 = 0.5 PPM SO2
3 = 13.6 % O2
31-OCT-95 16:27:53
4 = 454.9 PPM CO
1 = 24.0 PPM NOX
2 = 0.6 PPM SO2
3 = 13.6 % O2
31-OCT-95 16:26:53
4 = 476.7 PPM CO
1 = 23.6 PPM NOX
2 = 0.4 PPM SO2
3 = 13.9 % O2
31-OCT-95 16:25:53
4 = 461.8 PPM CO
1 = 22.7 PPM NOX
2 = 0.5 PPM SO2
3 = 14.2 % O2
31-OCT-95 16:24:53
4 = 480.7 PPM CO
1 = 22.8 PPM NOX
2 = 0.4 PPM SO2
3 = 14.2 % O2
31-OCT-95 16:23:53
4 = 475.7 PPM CO
1 = 23.8 PPM NOX
2 = 0.4 PPM SO2
3 = 14.2 % O2
31-OCT-95 16:22:53
4 = 461.1 PPM CO
1 = 23.2 PPM NOX
2 = 0.5 PPM SO2
3 = 14.2 % O2
31-OCT-95 16:21:53
4 = 443.9 PPM CO
1 = 23.9 PPM NOX
2 = 0.4 PPM SO2
3 = 13.8 % O2
31-OCT-95 16:20:53
4 = 447.0 PPM CO
1 = 24.6 PPM NOX
2 = 0.5 PPM SO2
3 = 13.6 % O2
31-OCT-95 16:19:53
4 = 443.9 PPM CO
1 = 24.2 PPM NOX
2 = 0.5 PPM SO2
3 = 13.6 % O2
31-OCT-95 16:18:53
4 = 461.8 PPM CO
1 = 24.2 PPM NOX
2 = 0.4 PPM SO2
3 = 13.6 % O2
31-OCT-95 16:17:53
4 = 461.8 PPM CO
1 = 24.1 PPM NOX
2 = 0.4 PPM SO2
3 = 13.6 % O2
31-OCT-95 16:16:53
4 = 462.7 PPM CO
1 = 23.5 PPM NOX
2 = 0.6 PPM SO2
3 = 13.7 % O2
31-OCT-95 16:15:53
4 = 478.7 PPM CO
100 90 80 70 60 50 40 30 20 10 0
0 10 20 30 40 50 60 70 80 90 100

31/OCT/95 [illegible]

4 = 0.9 PPM CO
1 = 0.6 PPM NOX 2 = 0.4 PPM SO2 3 = 21.2 % O2
31/OCT/95 16:36:54
4 = 0.9 PPM CO
1 = 0.6 PPM NOX 2 = 0.3 PPM SO2 3 = 20.8 % O2
31/OCT/95 16:35:54
4 = 1.1 PPM CO
1 = 0.7 PPM NOX 2 = 0.3 PPM SO2 3 = 19.8 % O2
31/OCT/95 16:34:54
3MAX = 17.9 % MIN = 14.1 % 4MAX = 488.8 PPM MIN = 260.2 PPM
1MAX = 27.7 PPM MIN = 1.2 PPM 2MAX = 0.9 PPM MIN = 0.3 PPM
31/OCT/95 16:34:9
4 = 466.9 PPM CO
1 = 22.3 PPM NOX 2 = 0.4 PPM SO2 3 = 14.1 % O2
31/OCT/95 16:33:54

BIAS #1

4 = 472.7 PPM CO
1 = 22.6 PPM NOX 2 = 0.4 PPM SO2 3 = 14.2 % O2
31/OCT/95 16:32:53
4 = 478.8 PPM CO
1 = 22.7 PPM NOX 2 = 0.5 PPM SO2 3 = 14.2 % O2
31/OCT/95 16:31:53
4 = 469.9 PPM CO
1 = 22.7 PPM NOX 2 = 0.5 PPM SO2 3 = 14.2 % O2
31/OCT/95 16:30:53
3MAX = 14.4 % MIN = 13.5 % 4MAX = 494.8 PPM MIN = 399.8 PPM
1MAX = 24.8 PPM MIN = 17.9 PPM 2MAX = 0.7 PPM MIN = 0.3 PPM
31/OCT/95 16:30:0
4 = 461.6 PPM CO
1 = 23.0 PPM NOX 2 = 0.5 PPM SO2 3 = 14.1 % O2
31/OCT/95 16:29:53
4 = 453.9 PPM CO

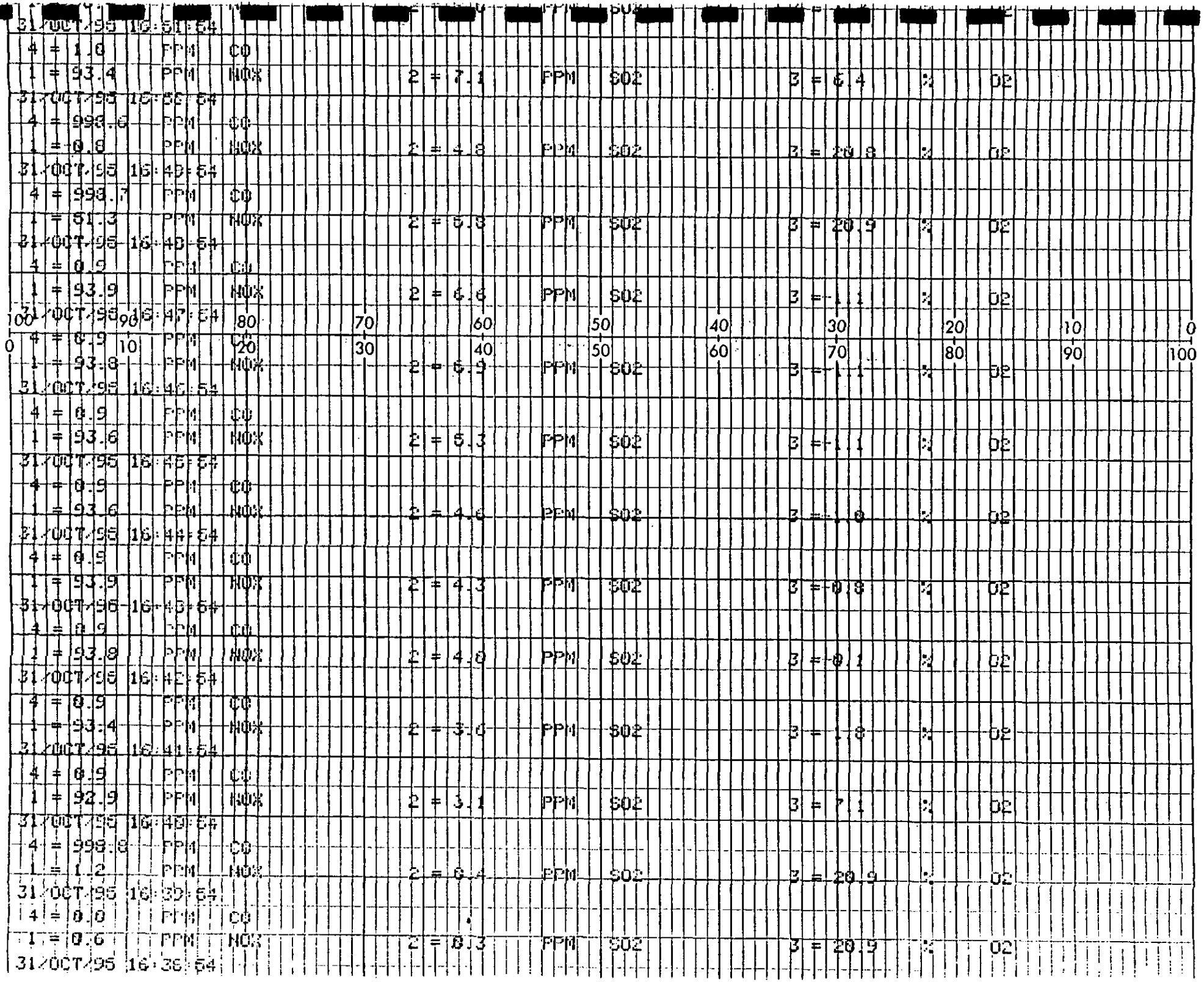


CHART NO. 414446

1 = [redacted] PPM MIN = 0.8 PPM MAX = 100.3 PPM MIN = 0.2 PPM

31/OCT/95 17: 5: 9
4 = 815.1 PPM CO
1 = 0.1 PPM NOX [redacted] 2 = 8.8 PPM SO2 3 = 0.7 % O2

31/OCT/95 17: 4:54
4 = 601.7 PPM CO
1 = 0.2 PPM NOX 2 = 9.8 PPM SO2 3 = 1.5 % O2

31/OCT/95 17: 3:54
4 = 0.9 PPM CO
1 = 1.8 PPM NOX 2 = 89.2 PPM SO2 3 = 1.1 % O2

31/OCT/95 17: 2:54
4 = 0.9 PPM CO
1 = 1.8 PPM NOX 2 = 88.8 PPM SO2 [redacted] 3 = 0.3 % O2

31/OCT/95 17: 1:54
4 = 0.8 PPM CO [redacted]
1 = 1.8 PPM NOX 2 = 87.1 PPM SO2 3 = 0.1 % O2

31/OCT/95 17: 0:54
4 = 0.9 PPM CO
1 = 1.8 PPM NOX 2 = 86.9 PPM SO2 3 = 0.2 % O2

31/OCT/95 16:59:54
4 = 0.9 PPM CO
1 = 2.2 PPM NOX 2 = 102.0 PPM SO2 3 = 0.6 % O2

31/OCT/95 16:58:54
4 = 0.9 PPM CO
1 = 2.3 PPM NOX 2 = 100.9 PPM SO2 3 = 1.9 % O2

31/OCT/95 16:57:54
4 = 1.0 PPM CO
1 = 0.9 PPM NOX 2 = 6.6 PPM SO2 3 = 12.7 % O2

31/OCT/95 16:56:54
4 = 0.9 PPM CO
1 = 1.3 PPM NOX 2 = 6.3 PPM SO2 3 = 0.3 % O2

31/OCT/95 16:55:54
4 = 0.9 PPM CO
1 = 87.7 PPM NOX [redacted] 2 = 10.8 PPM SO2 3 = 0.0 % O2 [redacted]

31/OCT/95 16:54:54
4 = 0.9 PPM CO
1 = 87.6 PPM NOX 2 = 10.8 PPM SO2 3 = 0.7 % O2

31/OCT/95 16:53:54
4 = 0.9 PPM CO
1 = 88.9 PPM NOX 2 = 9.6 PPM SO2 3 = 0.1 % O2

31/OCT/95 16:52:54

100 90 80 70 60 50 40 30 20 10 0
0 10 20 30 40 50 60 70 80 90 100

MOLYTEK

4 = 403.1 PPM CO
1 = 18.7 PPM NOX 2 = 0.3 PPM SO2 3 = 12.5 % O2
31/OCT/95 17:19:46
4 = 414.2 PPM CO
1 = 22.8 PPM NOX 2 = 0.4 PPM SO2 3 = 12.3 % O2
31/OCT/95 17:18:46
4 = 409.3 PPM CO
1 = 18.8 PPM NOX 2 = 0.4 PPM SO2 3 = 12.5 % O2
31/OCT/95 17:17:46
1MAX = 23.8 % MIN = -5.8 4MAX = 958.8 PPM MIN = 235.8 PPM
1MAX = 23.1 PPM MIN = 0.1 PPM 2MAX = 0.7 PPM MIN = 0.3 PPM
31/OCT/95 17:17:1
4 = 400.1 PPM CO
1 = 18.9 PPM NOX 2 = 0.4 PPM SO2 3 = 12.9 % O2
31/OCT/95 17:16:46

RUN #2

4 = 651.7 PPM CO
1 = 0.2 PPM NOX 2 = 0.6 PPM SO2 3 = 4.7 % O2
31/OCT/95 17:6:54
4 = 678.6 PPM CO
1 = 0.2 PPM NOX 2 = 0.6 PPM SO2 3 = 4.2 % O2
31/OCT/95 17:5:54
4 = 628.7 PPM CO
1 = 0.1 PPM NOX 2 = 0.5 PPM SO2 3 = 3.6 % O2
31/OCT/95 17:4:54
4 = 615.8 PPM CO
1 = 0.1 PPM NOX 2 = 0.6 PPM SO2 3 = 2.8 % O2
31/OCT/95 17:3:54
4 = 614.5 PPM CO
1 = 0.1 PPM NOX 2 = 0.5 PPM SO2 3 = 1.6 % O2

[redacted]/96 [redacted]

4 = 344.3 PPM CO
1 = 16.1 PPM NOX 2 = 0.3 PPM SO2 3 = 15.5 % O2

31/OCT/96 17:33:46
4 = 420.1 PPM CO
1 = 18.1 PPM NOX 2 = 0.4 PPM SO2 3 = 15.6 % O2

31/OCT/96 17:32:46
4 = 419.4 PPM CO
1 = 17.7 PPM NOX 2 = 0.3 PPM SO2 3 = 15.6 % O2

31/OCT/96 17:31:46
4 = 416.2 PPM CO
1 = 20.4 PPM NOX 2 = 0.3 PPM SO2 3 = 15.6 % O2

31/OCT/96 17:30:46
4 = 410.3 PPM CO
1 = 21.6 PPM NOX 2 = 0.3 PPM SO2 3 = 15.5 % O2

31/OCT/96 17:29:46
4 = 419.6 PPM CO
1 = 21.9 PPM NOX 2 = 0.4 PPM SO2 3 = 15.5 % O2

31/OCT/96 17:28:46
4 = 423.2 PPM CO
1 = 18.1 PPM NOX 2 = 0.3 PPM SO2 3 = 15.4 % O2

100 90 80 70 60 50 40 30 20 10 0

31/OCT/96 17:27:46
4 = 426.0 PPM CO
1 = 18.1 PPM NOX 2 = 0.3 PPM SO2 3 = 15.4 % O2

0 10 20 30 40 50 60 70 80 90 100

31/OCT/96 17:26:46
4 = 417.2 PPM CO
1 = 18.1 PPM NOX 2 = 0.3 PPM SO2 3 = 15.3 % O2

31/OCT/96 17:25:46
4 = 413.3 PPM CO
1 = 18.2 PPM NOX 2 = 0.3 PPM SO2 3 = 15.2 % O2

31/OCT/96 17:24:46
4 = 417.1 PPM CO
1 = 18.3 PPM NOX 2 = 0.3 PPM SO2 3 = 15.0 % O2

31/OCT/96 17:23:46
4 = 399.1 PPM CO
1 = 18.6 PPM NOX 2 = 0.4 PPM SO2 3 = 14.4 % O2

31/OCT/96 17:22:46
4 = 409.8 PPM CO
1 = 19.6 PPM NOX 2 = 0.4 PPM SO2 3 = 16.6 % O2

31/OCT/96 17:21:46
4 = 411.3 PPM CO

31/OCT/95 17:48:46
4 = 390.3 PPM CO
1 = 17.9 PPM NOX 2 = 0.4 PPM SO2 3 = 14.2 % O2

31/OCT/95 17:47:46
4 = 413.4 PPM CO
1 = 17.5 PPM NOX 2 = 0.3 PPM SO2 3 = 14.5 % O2

31/OCT/95 17:46:46
4 = 418.3 PPM CO
1 = 20.6 PPM NOX 2 = 0.3 PPM SO2 3 = 14.7 % O2

31/OCT/95 17:45:46
4 = 411.4 PPM CO
1 = 16.9 PPM NOX 2 = 0.4 PPM SO2 3 = 14.7 % O2

31/OCT/95 17:44:46
4 = 419.4 PPM CO
1 = 20.4 PPM NOX 2 = 0.4 PPM SO2 3 = 14.7 % O2

31/OCT/95 17:43:46
4 = 414.2 PPM CO
1 = 17.0 PPM NOX 2 = 0.4 PPM SO2 3 = 14.6 % O2

31/OCT/95 17:42:46
4 = 412.1 PPM CO
1 = 20.8 PPM NOX 2 = 0.3 PPM SO2 3 = 15.7 % O2

31/OCT/95 17:41:46
4 = 403.8 PPM CO
1 = 20.7 PPM NOX 2 = 0.3 PPM SO2 3 = 15.6 % O2

31/OCT/95 17:40:46
4 = 401.1 PPM CO
1 = 17.5 PPM NOX 2 = 0.3 PPM SO2 3 = 15.1 % O2

31/OCT/95 17:39:46
4 = 398.3 PPM CO
1 = 21.8 PPM NOX 2 = 0.3 PPM SO2 3 = 15.2 % O2

31/OCT/95 17:38:46
4 = 399.4 PPM CO
1 = 22.6 PPM NOX 2 = 0.3 PPM SO2 3 = 15.2 % O2

31/OCT/95 17:37:46
4 = 402.1 PPM CO
1 = 23.1 PPM NOX 2 = 0.3 PPM SO2 3 = 15.3 % O2

31/OCT/95 17:36:46
4 = 404.3 PPM CO
1 = 22.0 PPM NOX 2 = 0.4 PPM SO2 3 = 15.5 % O2

31/OCT/95 17:35:46

PART NO. 414446

PRINTED IN U.S.A.

4 = 446.0 PPM CO
1 = 0.3 PPM NOX 2 = 0.8 PPM SO2 3 = 5.5 % O2
31/OCT/95 16: 3:30
4 = 323.7 PPM CO
1 = 0.4 PPM NOX 2 = 0.3 PPM SO2 3 = 0.0 % O2
31/OCT/95 16: 2:30
4 = 446.7 PPM CO
1 = 0.2 PPM NOX 2 = 0.6 PPM SO2 3 = -0.4 % O2
31/OCT/95 16: 1:30
4 = 411.7 PPM CO
1 = 0.2 PPM NOX 2 = 0.5 PPM SO2 3 = 0.0 % O2
31/OCT/95 16: 0:30
4 = 349.7 PPM CO
1 = 0.2 PPM NOX 2 = 0.6 PPM SO2 3 = 5.4 % O2
31/OCT/95 17:59:30
4 = 349.4 PPM CO
1 = 0.3 PPM NOX 2 = 0.5 PPM SO2 3 = 8.5 % O2
31/OCT/95 17:58:30
4 = 333.1 PPM CO
1 = 0.6 PPM NOX 2 = 0.6 PPM SO2 3 = 19.4 % O2
31/OCT/95 17:57:30
4 = 0.0 PPM CO
1 = 0.6 PPM NOX 2 = 0.2 PPM SO2 3 = 20.9 % O2
31/OCT/95 17:56:30
4 = 0.0 PPM CO
1 = 0.7 PPM NOX 2 = 0.2 PPM SO2 3 = 20.9 % O2
31/OCT/95 17:55:30
3MAX = 22.1 % MIN = 14.6 % 4MAX = 403.3 PPM MIN = 0.0 PPM
1MAX = 21.9 PPM MIN = 0.7 PPM 2MAX = 0.5 PPM MIN = 0.2 PPM
31/OCT/95 17:55: 0
4 = 0.0 PPM CO
1 = 0.7 PPM NOX 2 = 0.2 PPM SO2 3 = 20.9 % O2
31/OCT/95 17:54:30

100 90 80 70 60 50 40 30 20 10 0
0 10 20 30 40 50 60 70 80 90 100

BIAS #2

31/OCT/95	18:18:30													
4 = 1.0		PPM	CO											
1 = 98.9		PPM	NOX			2 = 12.1		PPM	SO2			3 = 1.2	%	O2
31/OCT/95	18:17:30													
4 = 1.0		PPM	CO											
1 = 80.9		PPM	NOX			2 = 16.3		PPM	SO2			3 = 0.1	%	O2
31/OCT/95	18:16:30													
4 = 2.2		PPM	CO											
1 = 3.3		PPM	NOX			2 = 12.6		PPM	SO2			3 = 19.8	%	O2
31/OCT/95	18:15:30													
4 = 1.0		PPM	CO											
1 = 7.3		PPM	NOX			2 = 88.9		PPM	SO2			3 = 0.4	%	O2
31/OCT/95	18:14:30													
4 = 0.6		PPM	CO											
1 = 10.6		PPM	NOX			2 = 88.3		PPM	SO2			3 = 0.1	%	O2
31/OCT/95	18:13:30													
4 = 1.0		PPM	CO											
1 = 4.2		PPM	NOX			2 = 86.7		PPM	SO2			3 = 0.8	%	O2
31/OCT/95	18:12:30													
4 = 474.0		PPM	CO											
1 = 0.1		PPM	NOX			2 = 0.6		PPM	SO2			3 = 0.6	%	O2
31/OCT/95	18:11:30													
4 = 647.3		PPM	CO											
1 = 0.1		PPM	NOX			2 = 0.7		PPM	SO2			3 = 0.6	%	O2
31/OCT/95	18:10:30													
4 = 620.1		PPM	CO											
1 = 0.1		PPM	NOX			2 = 0.7		PPM	SO2			3 = 0.6	%	O2
31/OCT/95	18:9:30													
4 = 638.9		PPM	CO											
1 = 0.1		PPM	NOX			2 = 0.7		PPM	SO2			3 = 0.4	%	O2
31/OCT/95	18:8:30													
4 = 634.8		PPM	CO											
1 = 0.2		PPM	NOX			2 = 0.8		PPM	SO2			3 = 0.0	%	O2
31/OCT/95	18:7:30													
4 = 443.0		PPM	CO											
1 = 0.3		PPM	NOX			2 = 0.4		PPM	SO2			3 = 0.4	%	O2
31/OCT/95	18:6:30													
4 = 459.4		PPM	CO											
1 = 0.3		PPM	NOX			2 = 0.4		PPM	SO2			3 = 0.2	%	O2
31/OCT/95	18:5:30													

100 80 70 60 50 40 30 20 10 0

0 20 30 40 50 60 70 80 90 100

PRINTED IN U.S.A.

4 = 384.3 PPM CO

1 = 22.9 PPM NOX 2 = 0.4 PPM SO2 3 = 13.4 % O2

31/OCT/95 18:26:36

4 = 382.4 PPM CO

1 = 22.9 PPM NOX 2 = 0.4 PPM SO2 3 = 13.2 % O2

31/OCT/95 18:28:36

3MAX = 22.3 % MIN = 4.1 % 4MAX = 999.1 PPM MIN = 3.9 PPM

1MAX = 103.2 PPM MIN = 0.1 PPM 2MAX = 89.2 PPM MIN = 0.1 PPM

31/OCT/95 18:28: 0

4 = 397.3 PPM CO

1 = 21.7 PPM NOX 2 = 0.6 PPM SO2 3 = 13.7 % O2

31/OCT/95 18:27:36

RUN #3

4 = 126.9 PPM CO

1 = 28.6 PPM NOX 2 = 0.4 PPM SO2 3 = 15.4 % O2

31/OCT/95 18:25:30

4 = -1.7 PPM CO

1 = 2.5 PPM NOX 2 = 1.8 PPM SO2 3 = 14.3 % O2

31/OCT/95 18:24:30

4 = -1.0 PPM CO

1 = 72.5 PPM NOX 2 = 18.3 PPM SO2 3 = -4.0 % O2

31/OCT/95 18:23:30

4 = -1.0 PPM CO

1 = 97.7 PPM NOX [redacted] 2 = 17.6 PPM SO2 3 = -3.6 % O2

31/OCT/95 18:22:30

4 = -1.9 PPM CO

1 = 83.0 PPM NOX 2 = 16.6 PPM SO2 3 = -3.0 % O2

31/OCT/95 18:21:30

4 = -1.0 PPM CO

1 = 77.8 PPM NOX 2 = 15.6 PPM SO2 3 = -2.4 % O2

31/OCT/95 18:20:30

4 = -1.1 PPM CO

1 = 85.2 PPM NOX 2 = 14.6 PPM SO2 3 = -1.6 % O2

31/OCT/95 18:19:30

4 = 429.2 PPM CO

1 = 23.7 PPM NOX 2 = 0.3 PPM SO2 3 = 14.8 % O2

31/OCT/96 19:43:36

4 = 419.7 PPM CO

1 = 19.6 PPM NOX 2 = 0.3 PPM SO2 3 = 14.4 % O2

31/OCT/96 19:42:36

4 = 423.3 PPM CO

1 = 19.6 PPM NOX 2 = 0.3 PPM SO2 3 = 14.1 % O2

31/OCT/96 19:41:36

4 = 428.8 PPM CO

1 = 23.9 PPM NOX 2 = 0.4 PPM SO2 3 = 15.3 % O2

31/OCT/96 19:40:36

4 = 430.9 PPM CO

1 = 23.6 PPM NOX 2 = 0.4 PPM SO2 3 = 15.3 % O2

31/OCT/96 19:39:36

4 = 435.8 PPM CO

1 = 19.4 PPM NOX 2 = 0.3 PPM SO2 ~~3 = 40.2~~ % O2

Spike

31/OCT/96 19:38:36

4 = 406.5 PPM CO

1 = 19.8 PPM NOX 2 = 0.3 PPM SO2 3 = 15.6 % O2

31/OCT/96 19:37:36

4 = 396.2 PPM CO

1 = 19.9 PPM NOX 2 = 0.3 PPM SO2 3 = 35.6 % O2

31/OCT/96 19:36:36

4 = 403.2 PPM CO

1 = 20.2 PPM NOX 2 = 0.4 PPM SO2 3 = 15.0 % O2

31/OCT/96 19:35:36

4 = 410.4 PPM CO

1 = 20.4 PPM NOX 2 = 0.4 PPM SO2 3 = 14.9 % O2

31/OCT/96 19:34:36

4 = 386.2 PPM CO

1 = 22.3 PPM NOX 2 = 0.4 PPM SO2 3 = 14.0 % O2

31/OCT/96 19:33:36

4 = 364.8 PPM CO

1 = 22.2 PPM NOX 2 = 0.3 PPM SO2 3 = 14.0 % O2

31/OCT/96 19:32:36

4 = 373.6 PPM CO

1 = 23.1 PPM NOX 2 = 0.4 PPM SO2 3 = 13.1 % O2

31/OCT/96 19:31:36

4 = 386.4 PPM CO

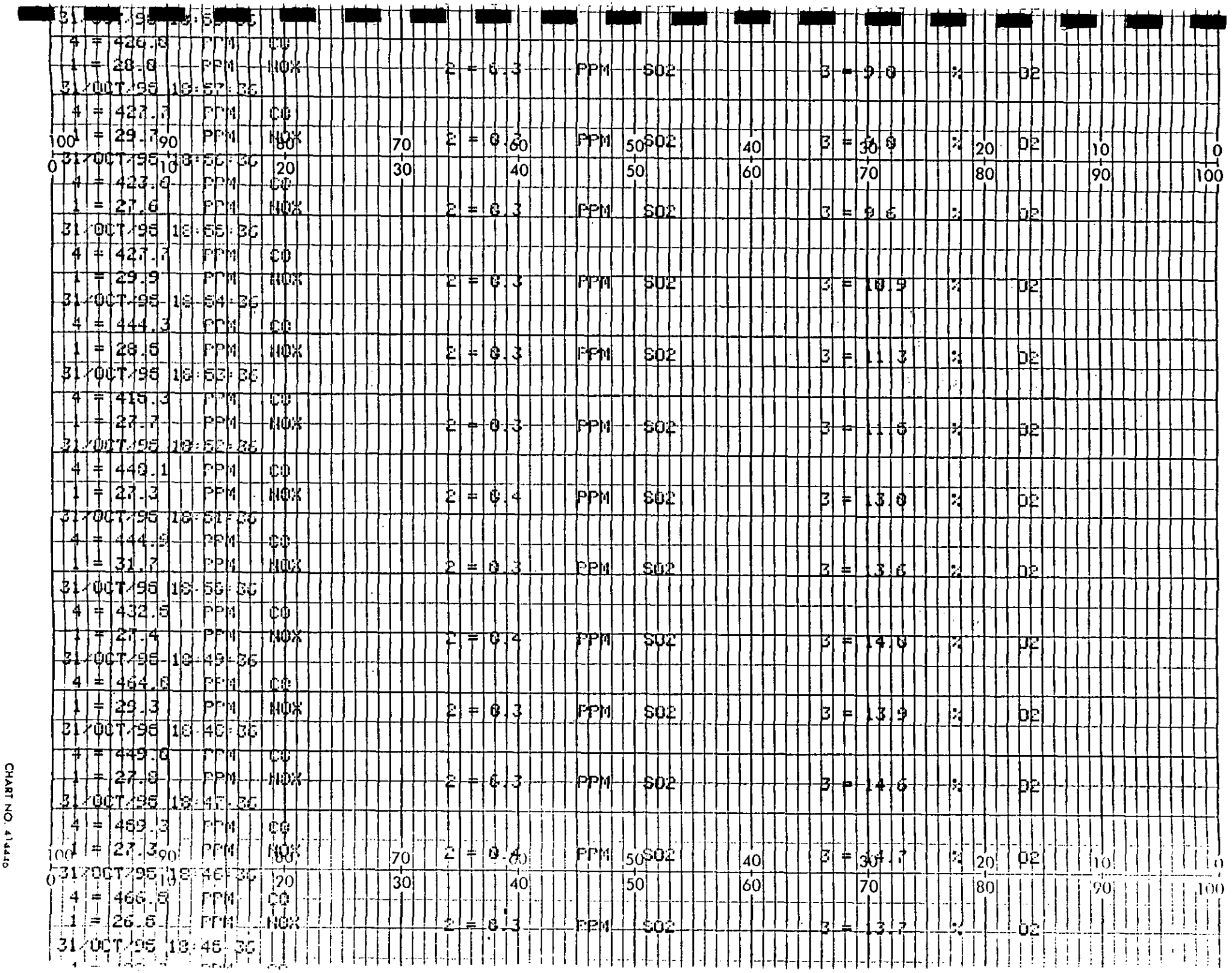
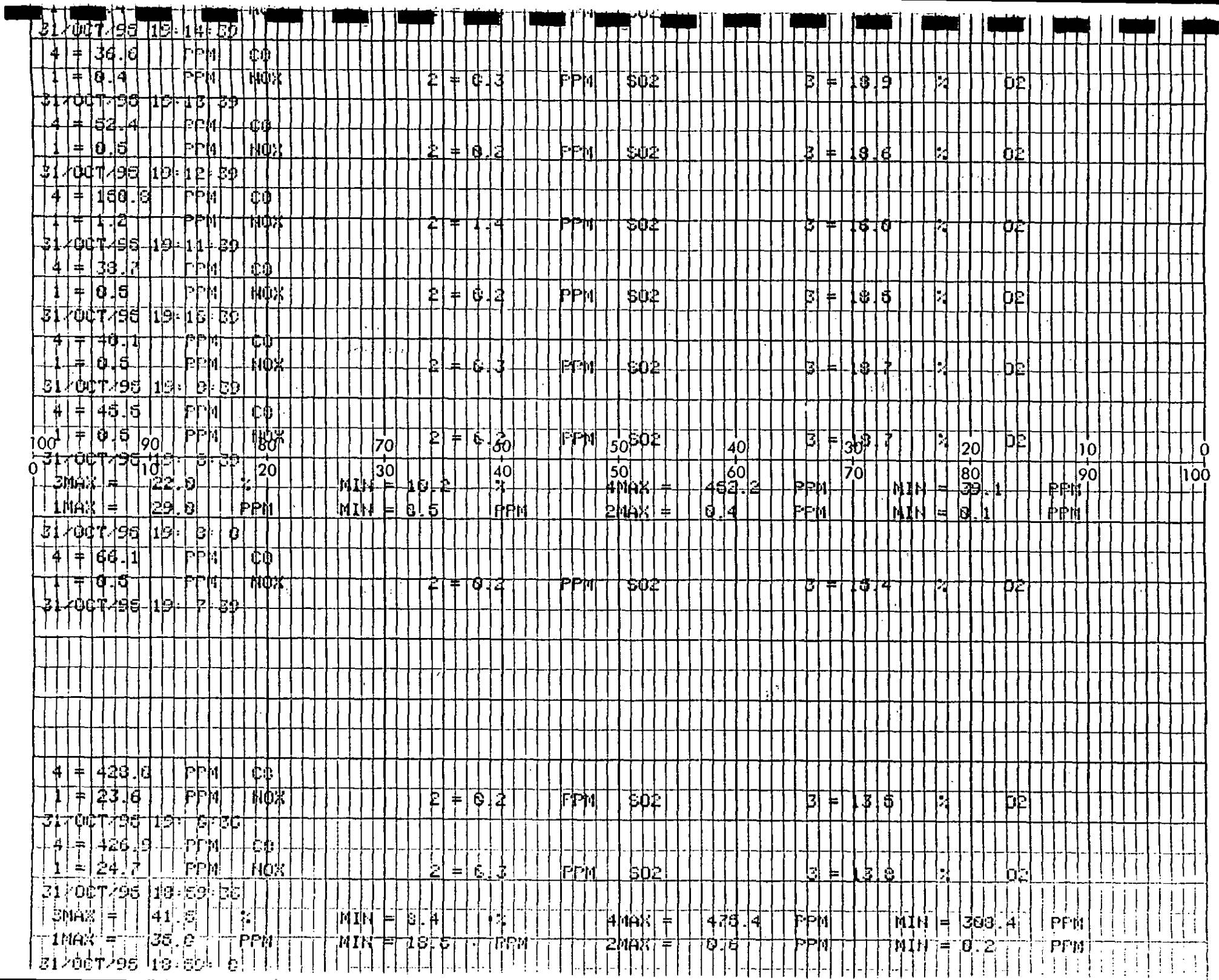


CHART NO. 41446


31/OCT/95 19:14:30
4 = 36.0 PPM CO
1 = 0.4 PPM NOX
2 = 0.3 PPM SO2
3 = 18.9 % O2
31/OCT/95 19:13:30
4 = 52.4 PPM CO
1 = 0.5 PPM NOX
2 = 0.2 PPM SO2
3 = 18.6 % O2
31/OCT/95 19:12:30
4 = 150.8 PPM CO
1 = 1.2 PPM NOX
2 = 1.4 PPM SO2
3 = 16.0 % O2
31/OCT/95 19:11:30
4 = 33.7 PPM CO
1 = 0.5 PPM NOX
2 = 0.2 PPM SO2
3 = 18.6 % O2
31/OCT/95 19:10:30
4 = 40.1 PPM CO
1 = 0.5 PPM NOX
2 = 0.3 PPM SO2
3 = 18.7 % O2
31/OCT/95 19: 9:30
4 = 45.5 PPM CO
1 = 0.5 PPM NOX
2 = 0.2 PPM SO2
3 = 18.7 % O2
31/OCT/95 19: 5:30
3MAX = 22.0 % MIN = 10.2 % 4MAX = 482.2 PPM MIN = 39.1 PPM
1MAX = 29.0 PPM MIN = 0.5 PPM 2MAX = 0.4 PPM MIN = 0.1 PPM
31/OCT/95 19: 3: 0
4 = 66.1 PPM CO
1 = 0.5 PPM NOX
2 = 0.4 PPM SO2
3 = 18.4 % O2
31/OCT/95 19: 2:30
4 = 423.0 PPM CO
1 = 23.6 PPM NOX
2 = 0.2 PPM SO2
3 = 13.5 % O2
31/OCT/95 19: 0:30
4 = 426.9 PPM CO
1 = 24.7 PPM NOX
2 = 0.3 PPM SO2
3 = 13.8 % O2
31/OCT/95 18:59:30
3MAX = 41.5 % MIN = 8.4 % 4MAX = 475.4 PPM MIN = 308.4 PPM
1MAX = 35.0 PPM MIN = 18.5 PPM 2MAX = 0.6 PPM MIN = 0.2 PPM
31/OCT/95 18:50: 0

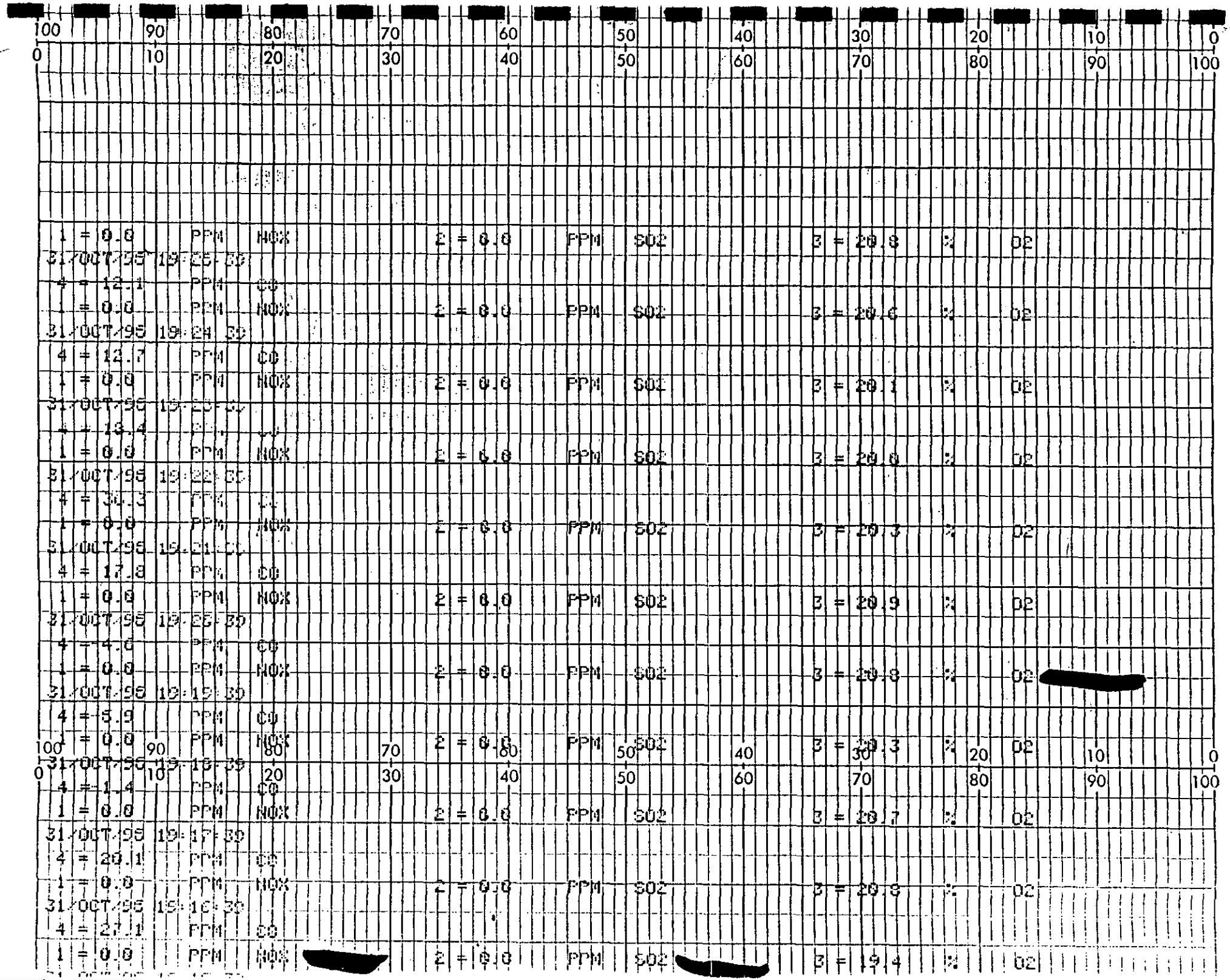


CHART NO. 414446

Company: Interstate Brick
Source: Kiln #3 Outlet
Span: 100

Date: 10/31-95
Sample Gas: NOx

Analyzer Calibration

Cylinder Value (ppm)	Analyzer Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	-0.2	0.20	0.20
53.4	53.2	0.20	0.20
87.3	87.2	0.10	0.10

System Calibration

Analyzer Response (ppm)	System Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
-0.2	0.4	0.60	0.60
na	na	0.00	0.00
87.2	87.6	0.40	0.40

Sample System Bias #1

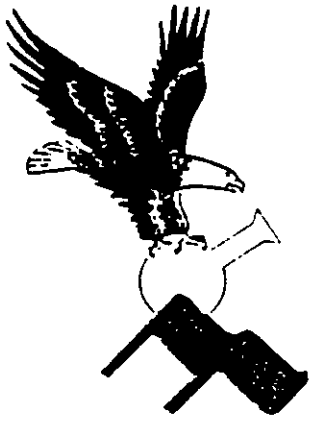
Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.2	0.4	0.60	0.1	0.30	0.30
87.2	87.6	0.40	87.7	0.50	0.10

Sample System Bias #2

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.2	0.1	0.30	0.6	0.80	0.50
87.2	87.7	0.50	87.7	0.50	0.00

Sample System Bias #3

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.2	0.6	0.80	0	0.20	0.60
87.2	87.7	0.50	87.6	0.40	0.10



Appendix "G"

(AET CEM Readings)

American Environmental Testing Company Inc.

Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3554

Salt Lake City, Utah
801-266-7111

Appendix "G"

(AET CEM Readings)

Run #1 Interstate Brick - Kiln #3 Outlet
Time 1551 Date 10/31/95

Minutes	NOx	CO	O2	SO2
1	23.5	472.5	14.2	0.4
2	23.5	465.7	14.3	0.5
3	23.4	462.6	14.2	0.4
4	23.2	490.7	14.3	0.4
5	24.2	469.6	13.7	0.4
6	24.2	456.7	13.6	0.4
7	24.3	460.5	13.6	0.4
8	23.3	452.9	13.8	0.4
9	22.9	462.7	14.3	0.4
10	22.9	471.6	14.3	0.5
11	22.8	466.9	14.3	0.4
12	22.8	475.8	14.2	0.5
13	22.8	472.5	14.2	0.4
14	22.8	489.7	14.2	0.5
15	24.5	402.4	13.9	0.6
16	19.5	478.7	14.3	0.5
17	23.5	452.7	13.7	0.6
18	24.1	451.8	13.6	0.4
19	24.2	451	13.6	0.4
20	24.2	443	13.6	0.5
21	24.5	447	13.6	0.5
22	23.9	443.9	13.8	0.4
23	23.2	461.7	14.2	0.5
24	23	475.7	14.2	0.4
25	22.8	480.7	14.2	0.4
26	22.7	451.8	14.2	0.5
27	23.6	476.7	13.9	0.4
28	24	454.9	13.6	0.6
29	24.2	437.9	13.6	0.5
30	23.6	453.9	13.6	0.4
				▯
Average =	23.40	461.14	13.96	0.45

Run #2 Interstate Brick - Kiln #3 Outlet

Time 1718 Date 10/31/95

Minutes	NOx	CO	O2	SO2
1	18.8	409.3	12.5	0.4
2	22.8	414.2	12.3	0.4
3	18.7	408.1	12.5	0.3
4	19.4	411.3	13.4	0.4
5	19.6	409.2	16.5	0.4
6	18.6	399.1	14.4	0.4
7	18.3	417.1	15	0.3
8	18.2	413.3	15.2	0.3
9	18.1	417.2	15.3	0.3
10	18.1	426	15.4	0.3
11	18.1	423.2	15.4	0.3
12	21.9	419	15.5	0.4
13	21.6	410.3	15.5	0.3
14	20.4	415.2	15.6	0.3
15	17.7	419.4	15.6	0.3
16	18.1	420.1	15.6	0.4
17	16.1	344.3	15.5	0.3
18	21	415.3	16	0.3
19	22	404.3	15.5	0.4
20	23.1	402.1	15.3	0.3
21	22.6	399.4	15.2	0.3
22	21.8	390.3	15.2	0.3
23	17.5	401.1	15.1	0.3
24	20.7	403	15.5	0.3
25	20.5	412.1	15.7	0.3
26	17	414.2	14.6	0.3
27	20.4	419.4	14.7	0.4
28	16.9	411.4	14.7	0.4
29	20.6	418.3	14.7	0.4
30	17.5	413.4	14.5	0.3
Average =	19.54	409.35	14.93	0.34

Run #3 Interstate Brick - Kiln #3 Outlet
Time 1828 Date 10/31/95

Minutes	NOx	CO	O2	SO2
1	22.9	382.4	13.2	0.4
2	22.9	384.3	13.4	0.4
3	23.4	385.4	13.6	0.4
4	23.1	373.5	13.1	0.4
5	22.2	364.8	14	0.3
6	22.3	386.2	14	0.4
7	20.4	410.4	14	0.4
8	20.2	403.2	16	0.4
9	19.9	396.2	15.6	0.3
10	19.8	406.9	16.6	0.3
11	19.4	435.8	18.3	0.3
12	23.6	436.9	15.3	0.4
13	23.9	428.8	14.1	0.4
14	19.5	423.3	14.4	0.3
15	19.6	418.7	14.8	0.3
16	23.7	429.2	14.4	0.3
17	21.8	422.7	13.7	0.4
18	26.5	466.5	14.7	0.3
19	27.3	459.3	14.6	0.4
20	27.8	449	13.9	0.3
21	29.3	464	14	0.3
22	27.4	432.5	13.6	0.4
23	31.7	444.9	13	0.3
24	27.3	440.1	11.5	0.4
25	27.7	415.3	11.3	0.3
26	28.5	444.3	10.9	0.3
27	29.9	427.7	9.6	0.3
28	27.6	423.6	9	0.3
29	29.7	427.7	9	0.3
30	28	426	10.1	0.3
Average =	24.58	420.32	13.46	0.34

Run #1 Interstate Brick - Kiln #3 Inlet
Time 1551 Date 10/31/95

Minutes	NOx	CO	O2	SO2
1	75.4	467.4	13.8	129.9
2	76.6	451.2	12.8	138.4
3	78.1	444.1	12.7	138.1
4	77.9	442.2	12.7	138.2
5	78.4	444.9	12.7	138.6
6	79.8	460.7	13.3	132
7	78.9	457	13.3	129.7
8	79.5	462	13.2	129.9
9	80.5	458.9	13.2	128
10	81	464.1	13.5	124.4
11	81.1	465.3	13.6	123.4
12	81.4	461	13.5	122.6
13	80.9	465.7	13.5	122.7
14	80.3	460.4	12.9	126.4
15	80.7	453	12.8	128.4
16	81.5	448.6	12.8	127.6
17	80.3	451.6	12.8	125.4
18	75.9	456.6	13.5	117.2
19	77.9	465.3	13.4	114.8
20	78.4	464.9	13.4	115
21	77.4	467.2	13.4	115.6
22	78.4	465.5	13.4	114.6
23	79.8	473.2	13.4	115
24	78.4	422.1	13.3	116.9
25	72.1	460.3	13.4	121.4
26	80.6	452.5	12.8	123.6
27	80.9	444.9	12.7	127
28	82.6	448.8	12.7	128
29	77.5	444.3	12.7	128.2
30	79.9	444.9	12.6	128
				0
Average =	79.07	455.62	13.13	125.63

Run #2 Interstate Brick - Kiln #3 Inlet

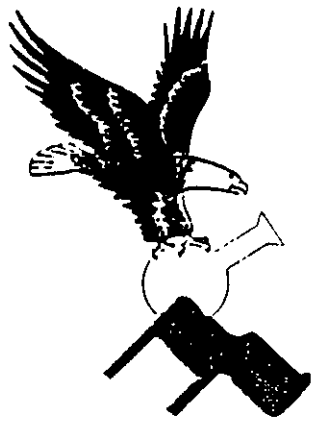
1718 Date 10/31/95

Minutes	NOx	CO	O2	SO2
1	79.9	449.9	13.8	146.6
2	80.6	447.2	12.6	146.1
3	80.6	451.2	12.6	145.9
4	79.5	449.9	12.4	146.3
5	79.2	440.4	12	152.1
6	78.8	437.6	12.1	152.3
7	80.5	448.2	12.5	147.1
8	78.1	451.4	14.2	146
9	77.4	450.4	14.1	146.4
10	77.1	450.5	14.1	146.4
11	78.8	452.2	14.1	145.9
12	79.3	451	14.2	145.4
13	78	454.3	14.1	145.7
14	78.5	447.4	14.1	145.4
15	78.3	446.8	14.1	145.3
16	78.3	447.7	14	145.5
17	71.8	400.9	14	146.4
18	76.6	452	14.6	139.3
19	78.9	487.6	13.7	145.3
20	79.5	429.1	13.5	150.6
21	77.9	431.5	13.5	153.2
22	75.7	430.7	13.5	153.2
23	76	434.3	13.5	156.1
24	75.9	443.8	14.1	150.6
25	73	437.4	13.9	148.2
26	75.6	452.7	14.2	149.3
27	75.8	446	14.2	148.8
28	75.7	448.3	14.2	148.7
29	76.4	449.6	14.2	148.4
30	73.8	441.4	13.8	151
Average =	77.52	445.38	13.66	147.92

Run #3 Interstate Brick - Kiln #3 Inlet

Time 1828 Date 10/31/95

Minutes	NOx	CO	O2	SO2
1	68.3	447.5	13.5	138.8
2	75.4	442.1	13.6	136.1
3	78	435.7	13.5	140.8
4	79.8	431.6	13.2	147.2
5	81.9	425.3	13.2	151.4
6	79.8	430.8	13.3	153.1
7	80.5	441.8	13.8	150.3
8	82.6	447	13.8	148.4
9	82	445.3	13.8	148.2
10	83.1	446.7	13.7	148.9
11	82.4	449.3	13.7	148.9
12	83.3	448.3	13.7	149.3
13	85.4	452.8	14	146.1
14	85	453.3	13.5	147.3
15	84.6	445	13.3	151
16	84.6	441.9	13.3	153.4
17	83.9	439.3	13.3	154.7
18	86.6	447	13.9	151.8
19	85.9	451.3	13.9	148.1
20	85.5	452.7	13.9	147.3
21	85.2	455.4	13.9	147.5
22	85.8	454.4	13.8	148
23	85.4	454.5	13.8	148
24	85.5	454.3	13.9	147.2
25	83.3	459.4	13.9	146.5
26	80.3	407.5	13.6	148
27	76	458	14.2	144.1
28	79.5	448.4	13.5	146.4
29	79.9	438	13.2	154.4
30	82.2	435	13.1	158.8
Average =	82.06	444.65	13.63	148.33



Appendix "H"

(VEO Readings & Certification Cards)

American Environmental Testing Company Inc.

Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3354

Salt Lake City, Utah
801-266-7111

Appendix "H"

(VEO Readings & Certification Cards)

American Environmental
Testing Company, Inc.
369 South Main Drive
Spanish Fork, Utah 84660
801-266-7111

Visible Emission Field Documentation

SOURCE NAME	Interstate Brick
LOCATION	9780 So. 5200 West
MAILING ADDRESS	↓
CITY	West Jordan
STATE & ZIP	Utah 84088
PHONE #	(801) 280-5200
SOURCE CONTACT	Mr. Lynn Hewitt
OBSERVATION DATE	10/31-95
START TIME	1234
STOP TIME	1340
PROCESS EQUIPMENT	Kiln #3 Wet Scrubber
FUEL TYPE	Natural Gas
OPERATING MODE	normal (100%)
CONTROL EQUIPMENT	Wet Scrubber
OPERATING MODE	+6" WC
DESCRIBE EMISSION POINT	Circular Stack
HEIGHT ABOVE GROUND LEVEL	@ 40'
HEIGHT RELATIVE TO OBSERVER	@ 34'
DISTANCE FROM OBSERVER	@ 150'
DIRECTION FROM OBSERVER	N-NE to Stack
DESCRIBE EMISSIONS	white plume
EMISSION COLOR	White
PLUME TYPE: CONTINUOUS ☒	FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☒	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☒
Point in the Plume at Which Opacity was Determined	@ 35' out - after steam dissipated
DESCRIBE BACKGROUND (Color, etc.)	Sky - Clear
SKY CONDITIONS AND COLOR	Partly Cloudy -
WIND DIRECTION	NW
WIND SPEED	@ 10mph
AMBIENT TEMPERATURE	@ 55°
WET BULB TEMP.	—
RH. percent	@ 80%

SEC MIN	0	15	30	45
1	5	0	0	5
2	0	5	0	0
3	0	0	5	0
4	0	0	0	0
5	5	0	0	5
6	0	0	0	5
7				
8				
9				
10				
11				
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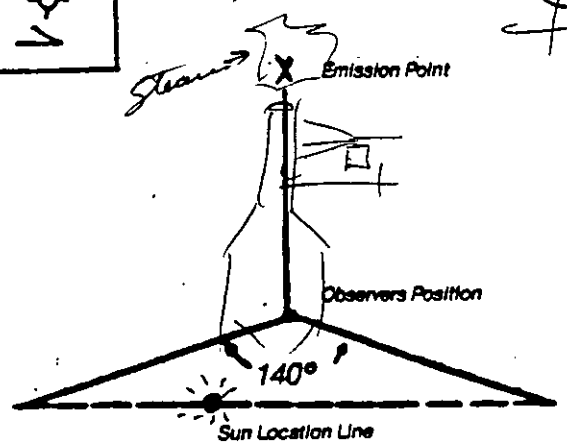
29				
30				

35/24 = 1.46% ✓20 ✓6.0bb

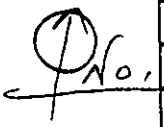
AVERAGE OPACITY FOR HIGHEST PERIOD

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH



Some-rain Draw North Arrow



COMMENTS (Describe Observation Point)

w/EPA 5 Test #4 for Compliance / Kiln #3 outlet.

OBSERVER'S NAME (Print): T. Brent Benson

OBSERVER'S SIGNATURE: [signature] DATE: 10/31-95

ORGANIZATION: American Environ. Testing Co, Inc.

CERTIFIED BY: UDEQ (Monty) DATE: 11/5/95

American Environmental
Testing Company, Inc.
Spanish Fork, Utah 84660
801-266-7111

Visible Emission Field Documentation

SOURCE NAME	Interstate Brick Co.
LOCATION	9750 So. 5200 West.
MAILING ADDRESS	
CITY	West Jordan
STATE & ZIP	Utah 84088
PHONE #	(801) 280-5200
SOURCE CONTACT	Mr. Tim Hewitt
OBSERVATION DATE	10/31-95
START TIME	1640
STOP TIME	1646
PROCESS EQUIPMENT	#3 Brick Kiln
FUEL TYPE	Nat. Gas
OPERATING MODE	100%
CONTROL EQUIPMENT	Wet Scrubber
OPERATING MODE	+6" WC
DESCRIBE EMISSION POINT	Circular Stack.
HEIGHT ABOVE GROUND LEVEL	@ 40'
HEIGHT RELATIVE TO OBSERVER	@ 34'
DISTANCE FROM OBSERVER	@ 150'
DIRECTION FROM OBSERVER	N.E. to Stack.
DESCRIBE EMISSIONS	White plume
EMISSION COLOR	White
PLUME TYPE: CONTINUOUS ☒	FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☐ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
Point in the Plume at Which Opacity was Determined	@ 25' above Stack (after steam)
DESCRIBE BACKGROUND (Color, etc.)	Sky -
SKY CONDITIONS AND COLOR	Hazy
WIND DIRECTION	NW
WIND SPEED	@ 10 mph
AMBIENT TEMPERATURE	@ 50° F
WET BULB TEMP.	—
RH. percent	@ 70 %

SEC / MIN	0	15	30	45
1	0	5	0	0
2	0	0	5	0
3	0	0	0	0
4	5	0	0	5
5	0	0	0	5
6	0	5	0	0
7				
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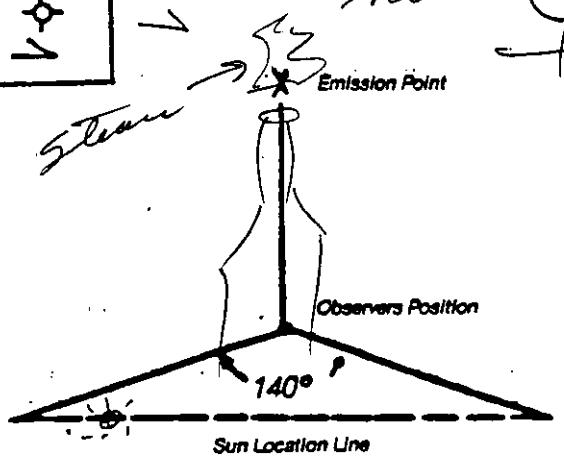
25				
26				
27				
28				
29				
30				

30/24 = 1.25% ✓20
10% VBB

AVERAGE OPACITY FOR HIGHEST PERIOD

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH



COMMENTS (Describe Observation Point)

w/EPA Test #2 test #2
for Compliance.
#3 Kiln Dedicated

OBSERVER'S NAME (Print)	J. Brent Dawson
OBSERVER'S SIGNATURE	
DATE	10/31-95
ORGANIZATION	Am. Environ. Testing Co., Inc.
CERTIFIED BY	MDQ (Koontz)
DATE	11/5-95

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork Utah 84660
801-266-7111

Visible Emission Field Documentation

SOURCE NAME	Interstate Brick Co.
LOCATION	9780 So. 5200 West
MAILING ADDRESS	"
CITY	West Jordan
STATE & ZIP	Utah 84088
PHONE #	(801) 280-5200
SOURCE CONTACT	Mr. John Hewitt
OBSERVATION DATE	10/31-95
START TIME	1900
STOP TIME	1906
PROCESS EQUIPMENT	#3 Brick Kiln
FUEL TYPE	Nat. Gas.
OPERATING MODE	100%
CONTROL EQUIPMENT	Wet Venturi Scrubber.
OPERATING MODE	+6" WC.
DESCRIBE EMISSION POINT	Circular Stack.
HEIGHT ABOVE GROUND LEVEL	@ 40'
HEIGHT RELATIVE TO OBSERVER	@ 34'
DISTANCE FROM OBSERVER	@ 170'
DIRECTION FROM OBSERVER	NE to Stack.
DESCRIBE EMISSIONS	White.
EMISSION COLOR	✓
PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☐ YES ☒	
IF WATER DROPLET PLUME: ATTACHED ☒ DETACHED ☐	
Point in the Plume at Which Opacity was Determined	@ 20' above stack (after steam)
DESCRIBE BACKGROUND (Color, etc.)	Sky - dark.
SKY CONDITIONS AND COLOR	getting dark.
WIND DIRECTION	NW
WIND SPEED	@ 10 mph
AMBIENT TEMPERATURE	45-50°F
WET BULB TEMP.	-
RH. percent	@ 80%

SEC / MIN	0	15	30	45
1	5	0	0	0
2	0	5	0	0
3	5	0	5	0
4	0	0	0	0
5	0	5	0	5
6	5	0	0	5
7				
8				
9				
10				
11				
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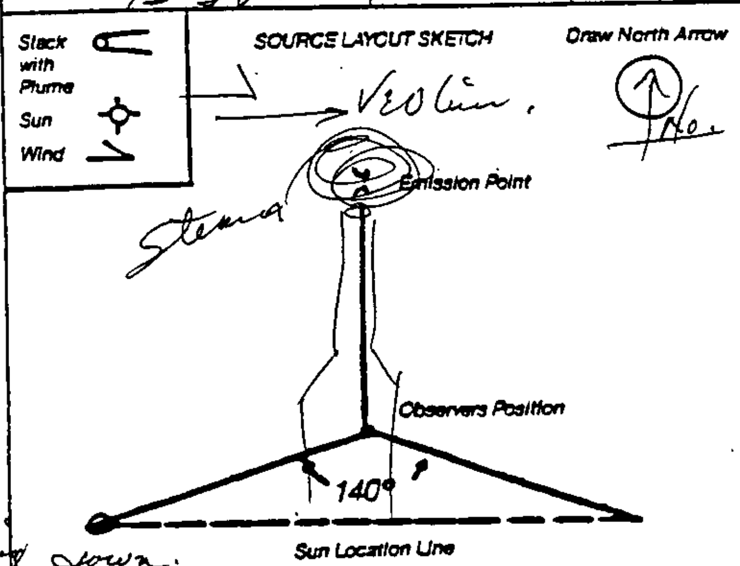
30				

prob. too dark to run correctly.

40/24 = 1.67% (avg) vs. 20%

but white against black sky wasn't too bad.



...ing down.

AVERAGE OPACITY FOR HIGHEST PERIOD

COMMENTS (Describe Observation Point)

W/ EPA Method 5 Test #3 for Compliance.

OBSERVER'S NAME (Print): V. Brent Pearson.

OBSERVER'S SIGNATURE: VBPearson

DATE: 10/31-95

ORGANIZATION: Am. Environ. Testing Co. Inc.

CERTIFIED BY: NDEQ (Koontz)

DATE: 11/5-95

STATE OF UTAH
DIVISION OF AIR QUALITY

This certifies that JD SCHILLER

has successfully completed the Visible Emissions Evaluation Course conducted by the Division of Air Quality and has met the minimum requirements necessary to evaluate visible emissions, according to EPA Method 9.

Director, Division of Air Quality

Valid until OCT 11 1995

STATE OF UTAH
DIVISION OF AIR QUALITY

This certifies that RICK HAWKINS

has successfully completed the Visible Emissions Evaluation Course conducted by the Division of Air Quality and has met the minimum requirements necessary to evaluate visible emissions, according to EPA Method 9.

Director, Division of Air Quality

Valid until OCT 11 1995

STATE OF UTAH
DIVISION OF AIR QUALITY

This certifies that TODD BENSON

has successfully completed the Visible Emissions Evaluation Course conducted by the Division of Air Quality and has met the minimum requirements necessary to evaluate visible emissions, according to EPA Method 9.

Director, Division of Air Quality

Valid until OCT 11 1995

STATE OF UTAH
DIVISION OF AIR QUALITY

This certifies that RYAN BENSON

has successfully completed the Visible Emissions Evaluation Course conducted by the Division of Air Quality and has met the minimum requirements necessary to evaluate visible emissions, according to EPA Method 9.

Director, Division of Air Quality

Valid until OCT 11 1995

CARL KOONTZ ASSOCIATES
of Nashville, Tennessee

This is to acknowledge that
V. BRENT BENSON
successfully participated in Visible Emissions training on May 5 1995
and is qualified to evaluate Visible Emissions for a period of six (6) months from the date of certification.

Carl Koontz
Instructor

STATE OF UTAH
DIVISION OF AIR QUALITY

This certifies that JOHN-PAUL HURST

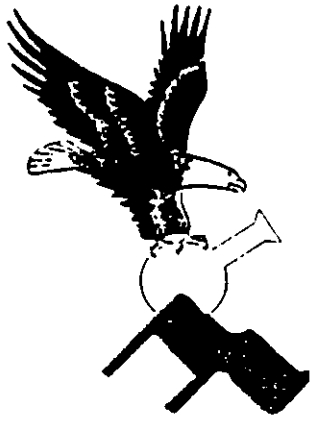
has successfully completed the Visible Emissions Evaluation Course conducted by the Division of Air Quality and has met the minimum requirements necessary to evaluate visible emissions, according to EPA Method 9.

Director, Division of Air Quality

Valid until OCT 11 1995

Appendix "I"

(Calibration Data)



Appendix "I"

(Calibration Data)

American Environmental Testing Company Inc.

Reno, Nevada
702-786-8553

Phoenix, Arizona
602-253-3354

Salt Lake City, Utah
801-266-7111

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

POSTTEST DRY GAS METER CALIBRATION DATA FORM
(English Units)

Date	Barometric Pressure	Meter Box Number	Plant
11/2-95	25.18	CR (097)	Interstate Brick West Valley, Utah

Calibrated By	Pretest Yi	Average Yi	Low Span	High Span
JPB	1.07	1.093	1.017	1.124

Orfice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
2.00	10.94	10	70 70	0.14706	70
2.00	10.97	10.01	71 71	0.14706	71
2.00	11.01	10	71 71	0.14706	71

Dry Gas Meter Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Dry Gas Meter Average (Td) °F	Time Ø Minutes	Yi
70	70	70.75	11.9	1.089
71	72			
71	72	71.50	11.95	1.091
71	72			
72	73	72.75	11.95	1.098
72	74			
				Average Yi
				1.093

Post Test Temperature Check

Reference: ERTCO Hg Thermometer

Meter Box: CR #1(097)

Sample Box: CR#1A

	Meter Box	Reference
Meter In:	71	71
Meter Out:	70	71

	Sample Box	Reference
Impinger In:	240	241
Impinger Out:	45	46
Oven:	244	244

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

POSTTEST DRY GAS METER CALIBRATION DATA FORM
(English Units)

Date	Barometric Pressure		Meter Box Number		Plant
11/2-95	25.18		UT #790-484		Interstate Brick West Valley, Utah
Calibrated By	**Pretest Yi**	**Average Yi**	**Low Span**	**High Span**	
JPB	0.985	0.991	0.936	1.034	

Orfice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
2.00	9.91	9.98	69 69	0.14706	69
2.00	9.94	10	69 70	0.14706	69.5
2.00	10.01	10.05	70 70	0.14706	70

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi
69	69	69.25	10.04	0.988
69	70			
70	71	70.75	10.05	0.991
70	72			
71	73	72.00	10.04	0.994
71	73			
				Average Yi
				0.991

Post Test Temperature Check

Reference: ERTCO Hg Thermometer

Meter Box: UT 790-484

Sample Box: UT #1A

	Meter Box	Reference		Sample Box	Reference
Meter In:	69	69	Impinger In:	235	235
Meter Out:	69	70	Impinger Out:	70	70
			Oven:	235	236

American Environmental Testing Company, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

Company: Interstate Brick Date: 10-31-95

Source: #3 inlet kiln Calibrated By: R.H.

NOZZLE CALIBRATION

Nozzle Identification Number	D_1 (in.)	D_2 (in.)	D_3 (in.)	ΔD (in.)	D average
#0 5/16"	.312	.312	.312	0.000	0.312
#0 5/16"	.312	.312	.312	0.000	0.312
#0 5/16	0.312	0.312	0.312	0.000	0.312

Where:

$D_{1,2,3}$ = Nozzle diameter measured on a different diameter, (in.).
Tolerance = measure within 0.001 inches (0.25 mm).

ΔD = Maximum difference in any two measurements, (in.).
Tolerance =0.004 inches (0.1 mm).

D average = Average of D_1, D_2, D_3.

American Environmental Testing Company, Inc.

565 South Birch Drive

Spanish Fork, Utah 84660

(801) 266-7111

Company: Interstate Brick Date: 10/31-95

Source: #3 Kiln - Outlet Calibrated By: JB.

NOZZLE CALIBRATION

Nozzle Identification Number	D_1 (in.)	D_2 (in.)	D_3 (in.)	ΔD (in.)	D average
Run #1	3/8 # 6	0.368	0.368	0.368	0.000	0.368
Run #2	3/8 # 6.	0.368	0.368	0.368	0.000	6.368
Run #3	3/8 #6	0.368	0.368	0.368	0.000	0.368

Where:

$D_{1,2,3}$ = Nozzle diameter measured on a different diameter, (in.).
Tolerance = measure within 0.001 inches (0.25 mm).

ΔD = Maximum difference in any two measurements, (in.).
Tolerance =0.004 inches (0.1 mm).

D average = Average of D_1, D_2, D_3.

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/2/95	25.62	UT 790-484

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
0.985	1.719	BAL - GEJ	0.99497

Orfice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	4.84	5	72 72	0.03676	71
1.00	4.88	5	73 73	0.07353	72
1.50	9.62	10	73 73	0.11029	70
2.00	9.72	10	74 73	0.14706	73
3.00	9.79	10	73 73	0.22059	73
4.00	9.78	10	74 74	0.29412	74

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
70 71	77 79	74.25	11.23	0.9676	1.7578
71 72	83 87	78.25	8.15	0.9797	1.8147
73 74	92 98	84.25	12.54	0.9787	1.6277
75 75	100 102	88.00	11.08	0.9887	1.6670
76 78	104 107	91.25	9.05	0.9988	1.6347
79 81	108 109	94.25	8.25	0.9985	1.8120
				Average Yi 0.985	Average ΔH 1.719

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork. Utah 84660
(801) 798-8553 (801) 266-7111

Pitot Tube Calibration Form

Pitot Tube Identification Number: 4' - B

Date: 9/30/95

Calibrated By: VBB-TBB

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.36	0.475	0.8706	-0.00062
2	0.355	0.46	0.8785	0.00730
3	0.355	0.475	0.8645	-0.00668
		Average:	0.8712	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.365	0.485	0.8675	0.00596
2	0.36	0.49	0.8571	-0.00441
3	0.355	0.48	0.8600	-0.00156
		Average:	0.8615	

A & B Average = 0.8664

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/22/95	25.54	RAC #145-569

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
0.985	1.812	VBB - RBB	0.99497

Orifice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	4.85	5	70 71	0.03676	68
1.00	4.81	5	70 71	0.07353	68
1.50	9.711	10	70 71	0.11029	68
2.00	9.683	10	69 70	0.14706	68
3.00	9.458	10	69 70	0.22059	67
4.00	9.469	10	70 71	0.29412	68

Dry Gas Meter Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Dry Gas Meter Average (Td) °F	Time Ø Minutes	Yi	ΔH
71	75	73.50	11.14	0.9738	1.7109
72	76				
72	78	76.00	8.09	0.9689	1.8262
74	80				
76	85	82.25	12.89	0.9880	1.6865
79	89				
83	96	91.00	11.55	0.9996	1.7870
85	100				
87	107	98.00	9.57	0.9879	1.8975
89	109				
91	113	102.50	8.46	0.9923	1.9642
92	114				
				Average Yi	Average ΔH
				0.985	1.812

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/22/95	25.54	RAC #2824

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
0.910	1.630	VBB - RBB	0.99497

Orfice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	4.57	5	69 69	0.03676	69
1.00	4.58	5	70 69	0.07353	69.5
1.50	8.91	10	70 70	0.11029	70
2.00	8.901	10	71 70	0.14706	70.5
3.00	8.34	10	69 70	0.22059	69.5
4.00	8.329	10	71 70	0.29412	70.5

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
71 70	70 71	70.50	9.88	0.9107	1.5301
71 72	77 78	74.50	7.19	0.9174	1.6045
74 76	87 92	82.25	11.83	0.9031	1.7002
78 80	96 98	88.00	10.09	0.9096	1.6382
82 84	101 102	92.25	8.324	0.9095	1.6762
86 88	104 103	95.25	7.104	0.9090	1.6292
				Average Yi 0.910	Average ΔH 1.630

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/2/95	25.61	CR #(097)

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
1.070	1.883	VBB - JPB	0.99497

Orifice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	5.42	5	70 70	0.03676	70
1.00	5.517	5	71 71	0.07353	71
1.50	10.64	10	72 72	0.11029	72
2.00	10.71	10	73 73	0.14706	73
3.00	10.84	10	73 73	0.22059	73
4.00	10.88	10	74 74	0.29412	74

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
70 70	69 70	69.75	12.75	1.0765	1.8160
71 71	70 71	70.75	9.18	1.0942	1.8207
71 72	72 72	71.75	14.71	1.0536	1.8889
71 72	72 73	72.00	12.96	1.0575	1.9358
72 72	73 73	72.50	10.9	1.0683	2.0031
73 73	74 74	73.50	9.05	1.0692	1.8310
				Average Yi 1.070	Average ΔH 1.883

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Pitot Tube Calibration Form

Pitot Tube Identification Number: 6' - A

Date: 9/2/95

Calibrated By: VBB - tbb

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.31	0.47	0.8121	-0.00290
2	0.32	0.48	0.8165	0.00145
3	0.32	0.48	0.8165	0.00145
		Average:	0.8150	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.32	0.48	0.8165	0.00558
2	0.32	0.49	0.8081	-0.00279
3	0.32	0.49	0.8081	-0.00279
		Average:	0.8109	

A & B Average = 0.8130

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Pitot Tube Calibration Form

Pitot Tube Identification Number: 6' - 6 Date: 9/2/95

Calibrated By: VBB - rbb

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.31	0.43	0.8491	0.00000
2	0.31	0.43	0.8491	0.00000
3	0.31	0.43	0.8491	0.00000
		Average:	0.8491	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.32	0.45	0.8433	-0.00722
2	0.31	0.43	0.8491	-0.00142
3	0.31	0.42	0.8591	0.00863
		Average:	0.8505	

A & B Average = 0.8498

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
(801) 798-8553 (801) 266-7111

Pitot Tube Calibration Form

Pitot Tube Identification Number: 6' - T

Date: 9/29/95

Calibrated By: RBB - JPS

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.29	0.42	0.8309	-0.00288
2	0.3	0.43	0.8353	0.00144
3	0.3	0.43	0.8353	0.00144
		Average:	0.8338	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.295	0.43	0.8283	-0.00306
2	0.3	0.435	0.8305	-0.00088
3	0.3	0.43	0.8353	0.00393
		Average:	0.8313	

A & B Average = 0.8326

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 6' - Q

Date: 9/30/95

Calibrated By: VBB - JDS

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.28	0.37	0.8699	0.00072
2	0.28	0.375	0.8641	-0.00510
3	0.29	0.38	0.8736	0.00439
		Average:	0.8692	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.28	0.375	0.8641	0.00256
2	0.28	0.38	0.8584	-0.00314
3	0.275	0.37	0.8621	0.00058
		Average:	0.8615	

A & B Average = 0.8654

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 4' - T

Date: 9/30/95

Calibrated By: JPS - JPH

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.37	0.49	0.8690	0.00053
2	0.38	0.5	0.8718	0.00334
3	0.37	0.495	0.8646	-0.00387
		Average:	0.8684	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.365	0.48	0.8720	0.00053
2	0.37	0.49	0.8690	-0.00251
3	0.37	0.485	0.8734	0.00196
		Average:	0.8715	

A & B Average = 0.8700

American Environmental Testing Company, Inc.
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Pitot Tube Calibration Form

Pitot Tube Identification Number: 8' - A

Date: 9/2//95

Calibrated By: RBB - tbb

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.3	0.4	0.8660	-0.00117
2	0.3	0.4	0.8660	-0.00117
3	0.31	0.41	0.8695	0.00234
		Average:	0.8672	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.31	0.41	0.8695	-0.00243
2	0.3	0.4	0.8660	-0.00594
3	0.31	0.4	0.8803	0.00837
		Average:	0.8720	

A & B Average = 0.8696

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 8' - B Date: 9/20/95

Calibrated By: RB RH

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.29	0.4	0.8515	0.00068
2	0.285	0.395	0.8494	-0.00136
3	0.29	0.4	0.8515	0.00068
		Average:	0.8508	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.29	0.39	0.8623	0.00612
2	0.285	0.395	0.8494	-0.00677
3	0.29	0.395	0.8568	0.00065
		Average:	0.8562	

A & B Average = 0.8535

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 8' - C

Date: 9/20/95

Calibrated By: RB RH

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.26	0.36	0.8498	0.00156
2	0.25	0.35	0.8452	-0.00312
3	0.26	0.36	0.8498	0.00156
		Average:	0.8483	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.255	0.355	0.8475	-0.00228
2	0.26	0.36	0.8498	0.00002
3	0.265	0.365	0.8521	0.00226
		Average:	0.8498	

A & B Average = 0.8490

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 11' - A

Date: 9/29/95

Calibrated By: TBB-VBB

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.36	0.51	0.8402	0.00194
2	0.36	0.515	0.8361	-0.00215
3	0.355	0.505	0.8384	0.00021
		Average:	0.8382	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.365	0.52	0.8378	-0.00168
2	0.37	0.525	0.8395	0.00001
3	0.375	0.53	0.8412	0.00167
		Average:	0.8395	

A & B Average = 0.8389

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 11' - B

9/2/95

Calibrated By: TBB - JPB

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.31	0.45	0.8300	0.00142
2	0.31	0.45	0.8300	0.00142
3	0.3	0.44	0.8257	-0.00285
		Average:	0.8286	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.3	0.44	0.8257	0.00165
2	0.3	0.45	0.8165	-0.00757
3	0.31	0.45	0.8300	0.00592
		Average:	0.8241	

A & B Average = 0.8263

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
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Meter Box Calibration Data Form

(English Units)

Date	Barometric Pressure	Meter Box Number
9/2/95	25.61	CR #(097)

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
1.070	1.883	VBB - JPB	0.99497

Orfice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	5.42	5	70 70	0.03676	70
1.00	5.517	5	71 71	0.07353	71
1.50	10.64	10	72 72	0.11029	72
2.00	10.71	10	73 73	0.14706	73
3.00	10.84	10	73 73	0.22059	73
4.00	10.88	10	74 74	0.29412	74

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
70 70	69 70	69.75	12.75	1.0765	1.8160
71 71	70 71	70.75	9.18	1.0942	1.8207
71 72	72 72	71.75	14.71	1.0536	1.8889
71 72	72 73	72.00	12.96	1.0575	1.9358
72 72	73 73	72.50	10.9	1.0683	2.0031
73 73	74 74	73.50	9.05	1.0692	1.8310
				Average Yi 1.070	Average ΔH 1.883

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 4' - A

Date: 9/2/95

Calibrated By: VBB - rbb

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.3	0.47	0.7989	-0.00288
2	0.3	0.47	0.7989	-0.00288
3	0.3	0.46	0.8076	0.00576
		Average:	0.8018	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.31	0.47	0.8121	0.00440
2	0.3	0.47	0.7989	-0.00880
3	0.31	0.47	0.8121	0.00440
		Average:	0.8077	

A & B Average = 0.8048

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Pitot Tube Calibration Form

Pitot Tube Identification Number: 4' - C

Date: 9/30/95

Calibrated By: VB RBB

"A" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.36	0.495	0.8528	-0.00053
2	0.365	0.5	0.8544	0.00107
3	0.36	0.495	0.8528	-0.00053
		Average:	0.8533	

"B" Side Calibration

Run Number	P std cm H2O (inches H2O)	P s cm H2O (inches H2O)	Cp (S)	Deviation
1	0.36	0.5	0.8485	-0.00087
2	0.355	0.495	0.8469	-0.00254
3	0.36	0.495	0.8528	0.00341
		Average:	0.8494	

A & B Average = 0.8514

American Environmental Testing Company, Inc.
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Stack Temperature Sensor Calibration Form

Thermocouple Number: #1 Digital -# 2 Omega

Date: 3/3/95

Barometric Pressure: 25.73

Calibrated By: JDS - RPH

Reference: ERTCO - Mg - Glass

	Reference Point Number	Source a (specify)	Reference Thermometer Temperature °F	Thermocouple Potentiometer Temperature °F	Temperature Difference b %
	a)	Ice Water	34	35	-0.33
#1	b)	Hot H2O	140	141	-0.24
Digital	c)	Boiling H2O	215	214	0.20
	d)	Warm Oil	254	255	-0.19
	e)	Hot Oil	398	396	0.30
	f)	Boiling Oil	398	401	-0.45
	a)	Ice Water	35	36	-0.32
#2	b)	Hot H2O	146	148	-0.48
Omega	c)	Boiling H2O	204	202	0.42
	d)	Warm Oil	233	235	-0.40
	e)	Hot Oil	378	375	0.46
	f)	Boiling Oil	372	370	0.31

a Type of calibration system used.

b $\frac{\text{(reference temp. °C + 273) - (test thermometer temp. °C + 273)}}{\text{reference temperature °C + 273}} \cdot 100 < 1.5\%$

American Environmental Testing Company, Inc.
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Sample Box Temperature Sensor Calibration Form

Sample Box Number: CR#1A - UT #1A - RAC #1A-RAC #2A

Date: 3/3/95

Barometric Pressure: 25.59

Calibrated By: VBB - JPB

Reference: ERTCO - 10S - SNBS

	Reference Point Number	Source a (specify)	Reference Thermometer Temperature °F	Thermocouple Potentiometer Temperature °F	Temperature Difference b %
	3	Oven On	250	251	-0.19
CR	4	Oven On	244	247	-0.58
#1A	2	Oven On	236	234	0.39
	1	Cold H2O	54	55	-0.31
	8	Oven On	57	56	0.30
	7	Oven On	59	58	0.30
	3	Oven On	247	246	0.19
UTA	4	Oven On	243	244	-0.19
#1A	2	Oven On	239	240	-0.20
	1	Cold H2O	46	47	-0.31
	8	Oven On	55	57	-0.61
	7	Oven On	61	60	0.30
	3	Oven On	244	243	0.19
RAC	4	Oven On	254	255	-0.19
#1A	2	Oven On	236	237	-0.20
	1	Cold H2O	56	57	-0.30
	8	Oven On	60	61	-0.30
	7	Oven On	63	62	0.30
	3	Oven On	241	244	-0.58
RAC	4	Oven On	244	241	0.58
#2A	2	Oven On	20	240	-75.09
	1	Cold H2O	54	55	-0.31
	8	Oven On	53	55	-0.61
	7	Oven On	61	60	0.30

a Type of calibration system used.

b $\frac{\text{(reference temp. °C + 273) - (test thermometer temp. °C + 273)}}{\text{reference temperature °C + 273}} * 100 < 1.5\%$

American Environmental Testing Company, Inc.
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Balance Calibration Data Form

Balance Name: Ohaus GA - 200 S2 (Analytical) Number: 1292

Balance Name: Mettler - BB - 3000 (Top Loader) Number: K6888

Classification of Standard Weights: Type "S" W.B.S. Analyst: JDS

A 200 S Ohaus GA - 200 S2

Date	0.500 g	1.0000 g	10.0000 g	50.0000 g	100.0000 g
3/2/94	0.500	1.0001	10.0001	50.0002	100.0002
9/6/94	0.500	1.0000	10.0001	50.0001	100.0001
3/3/95	0.5000	1.0000	10.0000	50.0000	100.0000
9/22/95	0.50001	0.9999	10.0001	49.9998	

U 3600 Mettler - BB - 3000

Date	0.500 g	1.0000 g	10.0000 g	50.0000 g	100.0000 g
3/2/94	0.5	1.0	10.0	50.1	100.1
9/6/94	0.5010	1.0001	10.0000	50.0001	100.0000
3/3/95	0.5000	1.0001	10.0000	50.0000	100.0001

American Environmental Testing Company, Inc.
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Balance Calibration Data Form

Balance Name: Satorius - A 200 S (Analytical) Number : 35120053

Balance Name: Satorius - U3600 (Top Loader) Number : 35120087

Classification of Standard Weights: Type "S" W.S.S. Analyst: JPB - RH

A 200 S

Date	0.500 g	1.0000 g	10.0000 g	50.0000 g	100.0000 g
3/2/94	0.500	0.9999	10.0001	50.0001	100.0001
9/6/94	0.5000	1.0000	10.0000	50.0001	100.0000
3/3/95	0.5000	1.0001	10.0001	50.0001	100.0001
9/2/95	0.5	1.0001	10	50	

U 3600

Date	0.500 g	1.0000 g	10.0000 g	50.0000 g	100.0000 g
3/2/94	0.5000	1.0000	10.0000	50.0001	100.1000
9/6/94	0.501	1.0010	10.0000	50.0001	100.0001
3/3/95	0.5000	1.00	10.00	50.00	100.00

American Environmental Testing Company, Inc.
565 South Birch Drive Spanish Fork, Utah 84660
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Meter Box Calibration Data Form
(English Units)

Date	Barometric Pressure	Meter Box Number
9/22/95	25.54	RAC #145-569

Average Yi	Average ΔH	Calibrated By	Std. Meter Yi
0.985	1.812	VBB - RBB	0.99497

Orifice Manometer Setting ΔH	Standard Meter (Vw) Ft3	Dry Gas Meter (Vd) Ft3	Wet Test Meter (Tw) °F	ΔH/13.6	Wet Test Meter Average Temp.
0.50	4.85	5	70 71	0.03676	68
1.00	4.81	5	70 71	0.07353	68
1.50	9.711	10	70 71	0.11029	68
2.00	9.683	10	69 70	0.14706	68
3.00	9.458	10	69 70	0.22059	67
4.00	9.469	10	70 71	0.29412	68

Inlet (Td i) °F	Dry Gas Meter Outlet (Td o) °F	Average (Td) °F	Time Ø Minutes	Yi	ΔH
71 72	75 76	73.50	11.14	0.9738	1.7109
72 74	78 80	76.00	8.09	0.9689	1.8262
76 79	85 89	82.25	12.89	0.9880	1.6865
83 85	96 100	91.00	11.55	0.9996	1.7870
87 89	107 109	98.00	9.57	0.9879	1.8975
91 92	113 114	102.50	8.46	0.9923	1.9642
				Average Yi 0.985	Average ΔH 1.812

Company: Interstate Brick
Source: Kiln #3 Inlet
Span: 1000

Date: 10/31-95
Sample Gas: NOx

Analyzer Calibration

Cylinder Value (ppm)	Analyzer Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	0	0.00	0.00
525.5	535.5	10.00	1.00
899.5	900.1	0.60	0.06

System Calibration

Analyzer Response (ppm)	System Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	-0.2	0.20	0.02
535.5	518.1	17.40	1.74
na	na	0.00	0.00

Sample System Bias #1

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
0	-0.2	-0.02	0.2	0.02	0.04
535.5	518.1	-1.74	525.1	-1.04	0.70

Sample System Bias #2

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
0	0.2	0.02	0.4	0.04	0.02
535.5	525.1	-1.04	523.2	-1.23	0.19

Sample System Bias #3

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
0	0.4	0.04	0.5	0.05	0.01
535.5	523.2	-1.23	520.7	-1.48	0.25

Company: Interstate Brick
Source: Kiln #3 Inlet
Span: 1000

Date: 10/31-95
Sample Gas: CO

Analyzer Calibration

Cylinder Value (ppm)	Analyzer Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	0	0.00	0.00
324.0	326.1	2.10	0.21
646.8	647.3	0.50	0.05

System Calibration

Analyzer Response (ppm)	System Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	1	1.00	0.10
326.1	325.8	0.30	0.03
na	na	0.00	0.00

Sample System Bias #1

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
0	1	0.10	0.3	0.03	0.07
326.1	325.8	-0.03	328.8	0.27	0.30

Sample System Bias #2

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
0	0.3	0.03	0.7	0.07	0.04
326.1	328.8	0.27	324.1	-0.20	0.47

Sample System Bias #3

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
0	0.7	0.07	0.3	0.03	0.04
326.1	324.1	-0.20	311.8	-1.43	1.23

Company: Interstate Brick
Source: Kiln #3 Inlet
Span: 1000

Date: 10/31-95
Sample Gas: SO2

Analyzer Calibration

Cylinder Value (ppm)	Analyzer Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	-1	1.00	0.10
514.6	516.6	2.00	0.20
901.6	901.3	0.30	0.03

System Calibration

Analyzer Response (ppm)	System Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
-1	-0.6	0.40	0.04
516.6	518.1	1.50	0.15
na	na	0.00	0.00

Sample System Bias #1

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-1	-0.6	0.04	0	0.10	0.06
516.6	518.1	0.15	507.1	-0.95	1.10

Sample System Bias #2

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-1	0	0.10	1.3	0.23	0.13
516.6	507.1	-0.95	505.5	-1.11	0.16

Sample System Bias #3

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-1	1.3	0.23	1.6	0.26	0.03
516.6	505.5	-1.11	507.3	-0.93	0.18

Company: Interstate Brick
Source: Kiln #3 Outlet
Span: 100

Date: 10/31-95
Sample Gas: SO2

Analyzer Calibration

Cylinder Value (ppm)	Analyzer Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	-0.1	0.10	0.10
54.5	55.1	0.60	0.60
88.4	88.6	0.20	0.20

System Calibration

Analyzer Response (ppm)	System Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
-0.1	0.2	0.30	0.30
na	na	0.00	0.00
88.6	88.8	0.20	0.20

Sample System Bias #1

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.1	0.2	0.30	0.3	0.40	0.10
88.6	88.8	0.20	88.8	0.20	0.00

Sample System Bias #2

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.1	0.3	0.40	0.2	0.30	0.10
88.6	88.8	0.20	88.3	-0.30	0.50

Sample System Bias #3

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.1	0.2	0.30	0	0.10	0.20
88.6	88.3	-0.30	88.7	0.10	0.40

Company: Interstate Brick
Source: Kiln #3 Outlet
Span: 1000

Date: 10/31-95
Sample Gas: CO

Analyzer Calibration

Cylinder Value (ppm)	Analyzer Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	-0.1	0.10	0.01
32.4	32.1	0.30	0.03
62.7	61.8	0.90	0.09

System Calibration

Analyzer Response (ppm)	System Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
-0.1	0.9	1.00	0.10
na	na	0.00	0.00
61.8	61.7	0.10	0.01

Sample System Bias #1

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.1	0.9	0.10	0	0.01	0.09
646.8	646.8	0.00	651.7	0.49	0.49

Sample System Bias #2

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.1	0	0.01	0	0.01	0.00
646.8	651.7	0.49	647.3	0.05	0.44

Sample System Bias #3

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.1	0	0.01	0	0.01	0.00
646.8	647.3	0.05	647.7	0.09	0.04

Company: Interstate Brick
Source: Kiln #3 Outlet
Span: 100

Date: 10/31-95
Sample Gas: NOx

Analyzer Calibration

Cylinder Value (ppm)	Analyzer Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
0	-0.2	0.20	0.20
53.4	53.2	0.20	0.20
87.3	87.2	0.10	0.10

System Calibration

Analyzer Response (ppm)	System Response (ppm)	Absolute Difference (ppm)	Difference (% of span)
-0.2	0.4	0.60	0.60
na	na	0.00	0.00
87.2	87.6	0.40	0.40

Sample System Bias #1

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.2	0.4	0.60	0.1	0.30	0.30
87.2	87.6	0.40	87.7	0.50	0.10

Sample System Bias #2

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.2	0.1	0.30	0.6	0.80	0.50
87.2	87.7	0.50	87.7	0.50	0.00

Sample System Bias #3

Analyzer Response (ppm)	System Calibration	Initial System Bias (% of span)	System Calibration	Final System Bias (% of span)	Drift (% of span)
-0.2	0.6	0.80	0	0.20	0.60
87.2	87.7	0.50	87.6	0.40	0.10