AP-42 Section 11.6
Reference 27
Report Sect. 4
Reference 20

Source category: Portland Cement
Plant name : Lehigh Portland Cement Company
Test date : 2/17 - 2/18/83
Process : dry

Date: 01/11/93
Location: Mason City, IO
Ref. No.: 20

Basis for process rate : feed

Source	Type of control	Pollutant	Run No.	Emission rate, lb/hr	Process rate, ton/hr	Emission factor		Volumetric flow rate, DSCFM	Concen %
						kg/Mg	lb/ton		
clinker cooler	fabric filter	BASED ON FEED RATE							
		filt. PM	1	2.71	136.4	0.00993	0.01987		
		filt. PM	2	1.03	139.2	0.00370	0.00740		
		filt. PM	3	0.98	138.1	0.00355	0.00710		
					AVERAG	0.0057	0.0115	RATING:	B
		CO2	1	124	136.4	0.454	0.909	60,400	0.03
		CO2	2	123	139.2	0.441	0.882	59,800	0.03
		CO2	3	124	138.1	0.449	0.897	60,400	0.03
					AVERAG	0.448	0.896	RATING:	B

Notes: 1. Data on kiln not useable due to lack of clarity and combined APCD's in parallel.

Interpoll Inc.
4500 Ball Road N.E.
Blaine, Minnesota 55014

Telephone (612) 786-6020
Telex 297095

RESULTS OF THE FEBRUARY 17 AND 18, 1983 NSPS PARTICULATE EMISSION COMPLIANCE TEST ON THE NO. 8 KILN AT THE LEHIGH PORTLAND CEMENT PLANT IN MASON CITY, IOWA

Submitted to:

LEHIGH PORTLAND CEMENT COMPANY
P. O. Box 1068
Mason City, Iowa 50401

Attention: Mr. James Powell

Approved by:

Wave Lin for

Perry Lonnes, Ph.D.
President

Report Number 3-1466
March 22, 1983

TABLE OF CONTENTS

ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (°F)	degrees Fahrenheit
DIA.	diameter
FT/SEC	feet per second
GPM	gallons per minute
GR/ACF	grains per actual cubic foot
GR/DSCF	grains per dry standard cubic foot
g	gram
HP	horsepower
HRS	hours
IN.	inches
IN. HG.	inches of mercury
IN. WC.	inches of water
LB	pound
LB/DSCF	pounds per dry standard cubic foot
LB/HR	pounds per hour
LB/10^6BTU	pounds per million British Thermal Units heat input
LB/MMBTU	pounds per million British Thermal Units heat input
MW	megawatt
mg/DSCM	milligrams per dry standard cubic meter
microns (μm)	micrometer
MIN.	minutes
ohm-cm	ohm-centimeter
PPH	pounds per hour
PPM	parts per million
PSI	pounds per square inch
SQ. FT.	square feet
v/v	percent by volume
w/w	percent by weight

Standard conditions are defined as 68^oF (20^oC) and 29.92 in. of mercury pressure.

1 INTRODUCTION

On February 17 and 18, 1983, Interpoll Inc. personnel conducted an NSPS particulate emission test on the No. 8 Cement Kiln at the Lehigh Portland Cement Company Plant in Mason City, Iowa. On-site testing was performed by a four-man team under the direction of J. Stock. Coordination between testing activities and plant operation was provided by Bill Volk of Lehigh. The test was witnessed by Bill Youngquist and Gregg Cunningham of the Iowa Department of Environmental Quality (DEQ).

The No. 8 Cement Kiln is a continuous rotary kiln with a rated capacity of 130 TONS/HR. Particulates entrained in the process are collected by a baghouse and a Wheelabrator-Frye electrostatic precipitator operated in parallel. Feed to the No. 8 Kiln during the emission test remained essentially constant throughout the emission test. The approximate feed composition (by weight) was 78.6% limestone, 16.0% silica clay, 0.3% iron, 5.1% sand and 0.1% water. 87.4% of the feed passed a 200 mesh sieve. The feed rate ranged from 132 to 138 TONS/HR for the emission compliance test. The kiln was coal fired during the test.

Evaluations were conducted in accordance with EPA Methods 1-5, CFR title 40, Part 60, Appendix A (Revised July 1, 1982). The selection of the appropriate nozzle diameter required for isokinetic sampling was made based on the results of a previous test on the same unit. An Interpoll sampling train which meets or exceeds specifications in the above-cited reference was used to extract representative particulate samples by means of a heated glass-lined probe on the No. 8 Cooler Stack and the No. 7 and 11 Baghouse Outlets and a teflon-lined probe on the Main Stack (due to the large stack diameter).

An integrated flue gas sample was extracted simultaneously with each particulate sample using a specially designed gas sampling system. Integrated flue gas samples were collected in 44-liter Tedlar

bags. After sampling was complete, the bags were sealed and returned to the laboratory for Orsat analysis. The integrity of the sample bags was insured by reading the oxygen content of the bag in the field immediately after sampling and again in the laboratory immediately prior to Orsat analysis using a Teledyne 320P oxygen analyzer.

Testing on the No. 8 Kiln Clinker Cooler was conducted from four test ports oriented at 90 degrees on the stack. These ports are located approximately five diameters downstream of the breeching inlet of the eight-foot radial steel stack. The test ports are approximately 10.5 feet upstream of the stack outlet. A 32-point traverse was used to extract samples. Each traverse point was sampled 2.5 minutes to give a total sampling time of 80 minutes per run.

Exhaust gas streams from the No. 1, 2, 3 and 4 Baghouses on the No. 8 Kiln are combined in a common plenum and vented to the atmosphere by means of a 28-foot long, four-foot diameter radial steel stack. Two test ports located approximately 12 feet from a 45 degree elbow were used to extract particulate samples. The test ports are approximately 16 feet below the top of the stack. A 44-point traverse was used to collect particulate samples. Each traverse point was sampled two minutes to give a total sampling time of 88 minutes per run.

The stacks on the No. 7 and 11 Baghouses are identical and rest directly on top of the I.D. fans. Two ports oriented at approximately 120 degrees were used to collect representative particulate samples. The test ports are approximately six diameters downstream of the I.D. fan outlet and four diameters upstream of the stack outlet. A 24-point traverse was utilized on both sources to extract particulate samples. Each traverse point was sampled 2.5 minutes to give a total sampling time of 60 minutes per run.

Testing on the No. 8 Kiln Main Stack was conducted from two test ports oriented at 90 degrees on the stack and located more than two diameters upstream of the stack outlet and more than eight diameters

downstream of the last directional change in the stack (see Appendix B). A 12-point traverse was used to extract particulate samples. Each traverse point was sampled five minutes to give a total sampling time of 60 minutes per run.

The important results of the tests are summarized in Section 2. Detailed results are presented in Section 3. Results of preliminary measurements, field data and all other supporting information are presented in the appendices.

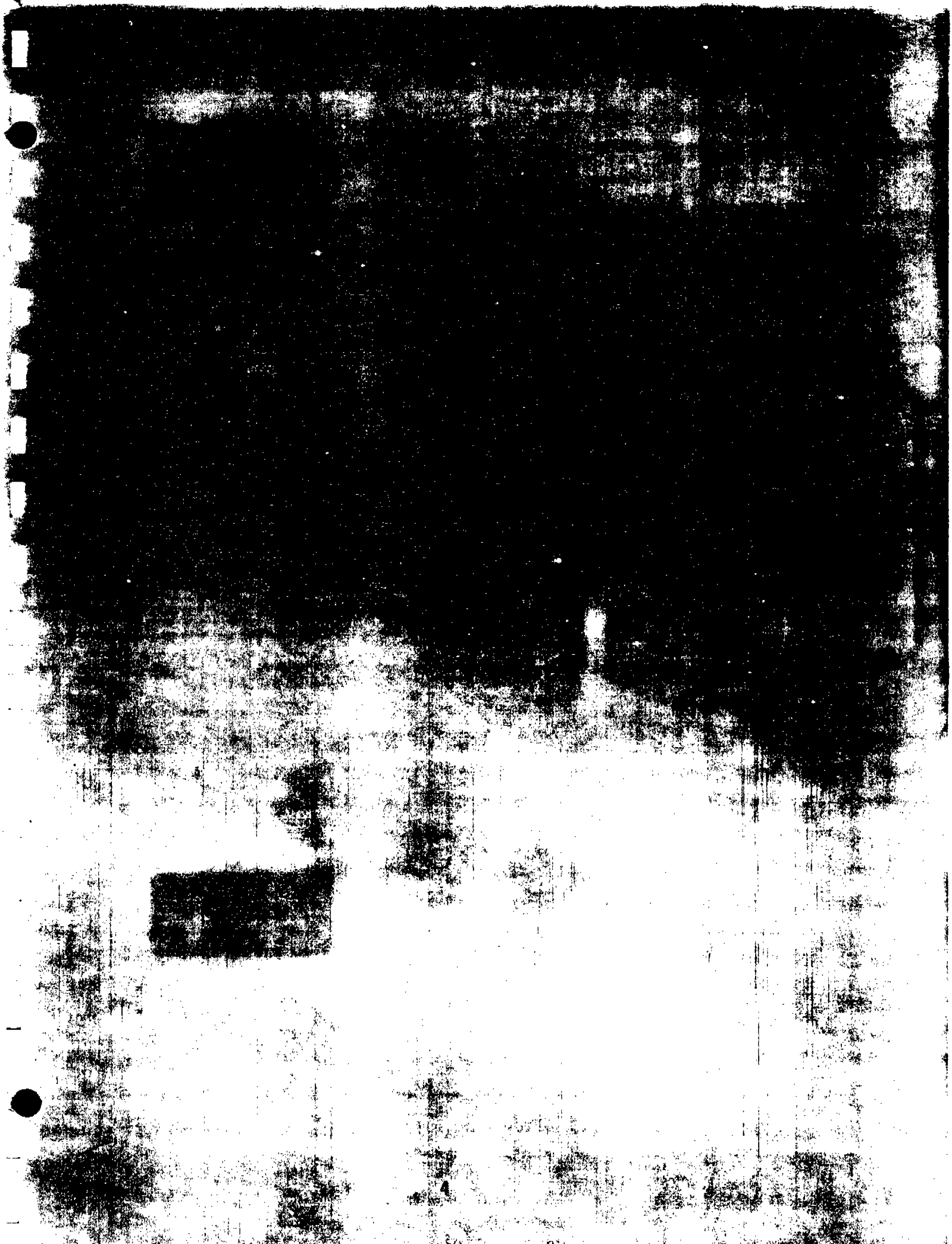


Table 5. Summary of the Results
Kiln Cooler Stack and
Clinker Production Rate

	Kiln Cooler Stack
Time of test (HRS)	1000-1200
Volumetric flow rate	
ACTUAL (ACFM)	
STANDARD (DSCFM)	
Kiln feed rate (TONS/HR)	
Approximate Feed Composition (% by weight)	
Limestone	
Silica Sand	
Water	
Sand	
Iron	
Gas temperature (DEG-F)	
Moisture content (% v/v)	
Gas composition (% v/v, dry)	
Oxygen	
Carbon Dioxide	
Nitrogen	
Particulate (GR/ACF)	
STANDARD (GR/DSCF)	

Table 2. Summary of the Results of the [illegible]
Main Stack and the [illegible]
Mason City, Iowa.

		Main Stack				
Time of test (HRS)		1000/110[illegible]				
Volumetric flow						
ACTUAL (ACFM)		135000				
STANDARD (DSCFM)		[illegible]				
Kiln feed rate (TONS/HR)		[illegible]				
Approximate Feed Composition (% by weight):						
Limestone		78.6				
Silica Clay		16.0				
Water		0.1				
Sand		5.1				
Iron		0.3				
Gas temperature (DEG-F)	Avg. 274	257		31[illegible]		295
Moisture content (% v/v)	22.1	18.00		8.0[illegible]		8.44
Gas composition (% v/v, dry)						
carbon dioxide		27.00		[illegible]		2.74
oxygen		6.00		1[illegible]		18.26
nitrogen		67.00		[illegible]		79.00
Oxygen analyzer (% v/v, dry)		6.19		[illegible]		17.70
Isokinetic variation (%)		102.1		1[illegible]		100.3
Particulate mass flow (LB/HR)		38.2		[illegible]		[illegible]
Particulate concentration						
ACTUAL (GR/ACF)		[illegible]		[illegible]		[illegible]
STANDARD (GR/DSCF)		[illegible]		[illegible]		[illegible]

Table 3. Summary of the Results of the [redacted] Main Stack and the No. 11 [redacted] Magnesia [redacted].

	Main Stack
Time of test (HRS)	[redacted]
Volumetric flow	
ACTUAL (ACFM)	[redacted]
STANDARD (DSCFM)	[redacted]
Kiln feed rate (TONS/HR)	[redacted]
Approximate Feed Composition (% by weight):	
Limestone	[redacted]
Silica Clay	[redacted]
Water	[redacted]
Sandrock	[redacted]
Iron	[redacted]
Gas Temperature (DEG-F)	[redacted]
Moisture content (% v/v)	[redacted]
Gas composition (% v/v, dry)	
carbon dioxide	[redacted]
oxygen	[redacted]
nitrogen	[redacted]
Oxygen analyzer [redacted]	[redacted]
Orsat:	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition (Orsat and moisture) results are presented first, followed by the computer printout of particulate emission data. Preliminary measurements including traverse point description are given in Appendices A and B.

The results have been calculated on a DEC PDP-11 Computer using standard Fortran programs. EPA-published equations have been used as the basis of the calculation techniques in these programs. It should be noted in interpreting these results that the particulate emission rates have been calculated by both the "concentration x flow" and the "ratio of areas" methods and the average reported. The average is the best estimate of the true value, since the bias introduced by anisokinetic sampling is approximately equal but of opposite sign in the two calculation techniques and thus cancels in the average.

3.1 Results of Orsat and Moisture Analysis

Test No. 1
No. 8 Kiln Cooler Stack

Results of Orsat & Moisture Analysis -- Methods 3 & 4 (% v/v)

	Run 1	Run 2	Run 3
Date of run	02/17/83	02/17/83	02/17/83
Dry basis (orsat)			
carbon dioxide	.03	.03	.03
oxygen	20.90	20.90	20.90
carbon monoxide	.00	.00	.00
nitrogen	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide	.03	.03	.03
oxygen	20.34	20.39	20.36
carbon monoxide	.00	.00	.00
nitrogen	76.93	77.14	77.03
Moisture content	2.70	2.44	2.58
Dry molecular weight	28.84	28.84	28.84
Wet molecular weight	28.55	28.58	28.56
Specific gravity (relative to air)	.9861	.9871	.9866
Teledyne oxygen analyzer (velocity & time weighted avg.)	20.90	20.90	20.90
F0	.00	.00	.00

Test No. 1
No. 1-4 Baghouse Outlet

Results of Orsat & Moisture Analysis -- Methods 3 & 4 (% v/v)

	Run 1	Run 2	Run 3
Date of run	02/17/83	02/17/83	02/17/83
Dry basis (orsat)			
carbon dioxide	3.40	4.00	4.00
oxygen	17.60	17.60	17.40
carbon monoxide	.00	.00	.00
nitrogen	79.00	78.40	78.60
Wet basis (orsat)			
carbon dioxide	3.09	3.61	3.65
oxygen	15.97	15.91	15.88
carbon monoxide	.00	.00	.00
nitrogen	71.67	70.85	71.75
Moisture content	9.28	9.63	8.72
Dry molecular weight	29.25	29.34	29.34
Wet molecular weight	28.20	28.25	28.35
Specific gravity (relative to air)	.9742	.9759	.9792
Teledyne oxygen analyzer (velocity & time weighted avg.)	17.09	17.18	17.15
FO	.97	.82	.88

Test No. 2
No. 8 Main Stack

Results of Orsat & Moisture Analysis -- Methods 3 & 4 (% v/v)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Dry basis (orsat)			
carbon dioxide	27.00	27.40	27.60
oxygen	6.00	6.60	5.90
carbon monoxide	.00	.00	.00
nitrogen	67.00	66.00	66.50
Wet basis (orsat)			
carbon dioxide	22.14	22.23	22.44
oxygen	4.92	5.35	4.80
carbon monoxide	.00	.00	.00
nitrogen	54.94	53.54	54.06
Moisture content	18.00	18.88	18.71
Dry molecular weight	32.56	32.65	32.65
Wet molecular weight	29.94	29.89	29.91
Specific gravity (relative to air)	1.0342	1.0322	1.0332
Teledyne oxygen analyzer (velocity & time weighted avg.)	6.19	6.15	6.19
FO	.55	.52	.54

Test No. 2
No. 7 Baghouse Outlet

Results of Orsat & Moisture Analysis -- Methods 3 & 4 (% v/v)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Dry basis (orsat)			
carbon dioxide	3.60	2.80	2.74
oxygen	17.60	18.40	18.26
carbon monoxide	.00	.00	.00
nitrogen	78.80	78.80	79.00
Wet basis (orsat)			
carbon dioxide	3.31	2.55	2.51
oxygen	16.18	16.74	16.72
carbon monoxide	.00	.00	.00
nitrogen	72.43	71.67	72.34
Moisture content	8.08	9.05	8.44
Dry molecular weight	29.28	29.18	29.17
Wet molecular weight	28.37	28.17	28.23
Specific gravity (relative to air)	.9799	.9731	.9750
Teledyne oxygen analyzer (velocity & time weighted avg.)	17.41	18.25	17.70
FO	.92	.89	.96

Test No. 3
No. 8 Main Stack

Results of Orsat & Moisture Analysis -- Methods 3 & 4 (% v/v)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Dry basis (orsat)			
carbon dioxide	27.40	27.00	27.60
oxygen	6.60	7.00	6.40
carbon monoxide	.00	.00	.00
nitrogen	66.00	66.00	66.00
Wet basis (orsat)			
carbon dioxide	22.36	22.19	22.66
oxygen	5.39	5.75	5.26
carbon monoxide	.00	.00	.00
nitrogen	53.87	54.24	54.20
Moisture content	18.39	17.82	17.89
Dry molecular weight	32.65	32.60	32.67
Wet molecular weight	29.95	30.00	30.05
Specific gravity (relative to air)	1.0347	1.0362	1.0379
Teledyne oxygen analyzer (velocity & time weighted avg.)	6.15	6.23	6.17
FO	.52	.51	.53

Test No. 3
No. 11 Baghouse Outlet

Results of Orsat & Moisture Analysis -- Methods 3 & 4 (% v/v)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Dry basis (orsat)			
carbon dioxide	3.19	3.55	3.01
oxygen	17.80	17.89	18.12
carbon monoxide	.00	.00	.00
nitrogen	79.01	78.56	78.87
Wet basis (orsat)			
carbon dioxide	2.91	3.25	2.75
oxygen	16.21	16.36	16.57
carbon monoxide	.00	.00	.00
nitrogen	71.95	71.84	72.11
Moisture content	8.93	8.56	8.57
Dry molecular weight	29.22	29.28	29.21
Wet molecular weight	28.22	28.32	28.25
Specific gravity (relative to air)	.9748	.9782	.9757
Teledyne oxygen analyzer (velocity & time weighted avg.)	17.53	17.36	17.43
FO	.97	.85	.92

3.2 Results of Particulate Loading Determinations

Test No. 1
No. 8 Kiln Cooler Stack

Results of Particulate Loading Determinations -- Method 5(BE)

	Run 1	Run 2	Run 3
Date of run	02/17/83	02/17/83	02/17/83
Time run start/end (HRS)	1000/1123	1220/1350	1425/1550
Pitot tube coefficient	.853	.853	.853
Water in sample			
condensate (ml)	18.0	14.0	13.0
silica sel (srams)	11.0	13.0	16.0
Total particulate material collected (srams) *	.0167	.0066	.0063
Meter correction coefficient	1.0014	1.0014	1.0014
Volume throush sas meter			
at meter conditions...(CF)	49.30	51.03	51.46
standard conditions..(SCF)	49.20	50.81	51.60
Total samplins time (MIN)	80.0	80.0	80.0
Nozzle diameter (IN)	.310	.310	.310
Average stack sas temperature during determination (DEG-F)	193	214	214
Volumetric flow			
actual.....(CFM)	79960	81488	82386
standard.....(DSCFM)	60398	59801	60440
Isokinetic variation (%)	97.6	101.8	102.3
Particle concentration			
actual.....(GR/ACF)	.0040	.0015	.0014
dry standard.....(GR/DSCF)	.0052	.0020	.0019
Particle mass flow (LB/HR)	2.71	1.03	.98

* Dry Catch Only

Test No. 1
No. 1-4 Baghouse Outlet

Results of Particulate Loading Determinations -- Method 5(BE)

	Run 1	Run 2	Run 3
Date of run	02/17/83	02/17/83	02/17/83
Time run start/end (HRS)	1000/1132	1225/1356	1425/1557
Pitot tube coefficient	.857	.857	.857
Water in sample			
condensate (ml)	115.0	118.0	112.0
silica gel (grams)	47.0	44.0	31.5
Total particulate material collected (grams) *	.1582	.1389	.1536
Meter correction coefficient	1.0014	1.0014	1.0014
Volume through gas meter			
at meter conditions...(CF)	74.18	73.18	72.95
standard conditions..(SCF)	74.58	71.61	70.74
Total sampling time (MIN)	88.0	88.0	88.0
Nozzle diameter (IN)	.254	.254	.254
Average stack gas temperature during determination (DEG-F)	320	335	343
Volumetric flow			
actual.....(CFM)	53031	52229	52013
standard.....(DSCFM)	31342	30179	30035
Isokinetic variation (%)	96.8	96.5	95.8
Particle concentration			
actual.....(GR/ACF)	.0194	.0174	.0194
dry standard.....(GR/DSCF)	.0327	.0299	.0335
Particle mass flow (LB/HR)	8.79	7.74	8.63

* Dry Catch Only

Test No. 2
No. 8 Main Stack

Results of Particulate Loading Determinations -- Method 5(BE)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Time run start/end (HRS)	1000/1101	1138/1239	1336/1437
Pitot tube coefficient	.856	.856	.856
Water in sample			
condensate (ml)	175.0	182.0	186.0
silica gel (grams)	16.0	21.1	18.9
Total particulate material collected (grams) *	.1538	.1524	.1634
Meter correction coefficient	1.0014	1.0014	1.0014
Volume through gas meter			
at meter conditions...(CF)	41.86	42.12	43.39
standard conditions..(SCF)	40.96	41.09	41.92
Total sampling time (MIN)	60.0	60.0	60.0
Nozzle diameter (IN)	.246	.246	.246
Average stack gas temperature during determination (DEG-F)	257	256	257
Volumetric flow			
actual.....(CFM)	135110	135648	137246
standard.....(DSCFM)	76997	76584	77505
Isokinetic variation (%)	102.1	102.9	103.8
Particle concentration			
actual.....(GR/ACF)	.0332	.0324	.0341
dry standard.....(GR/DSCF)	.0579	.0572	.0601
Particle mass flow (LB/HR)	38.24	37.57	39.96

* Dry Catch Only

Test No. 2
No. 7 Baghouse Outlet

Results of Particulate Loading Determinations -- Method 5(BE)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Time run start/end (HRS)	1000/1101	1138/1238	1336/1438
Pitot tube coefficient	.848	.848	.848
Water in sample			
condensate (ml)	61.0	40.0	66.0
silica gel (grams)	9.0	20.0	20.0
Total particulate material collected (grams) *	.0102	.0192	.0211
Meter correction coefficient	1.0014	1.0014	1.0014
Volume through gas meter			
at meter conditions...(CF)	38.15	29.45	46.10
standard conditions..(SCF)	37.47	28.41	43.96
Total sampling time (MIN)	60.0	60.0	60.0
Nozzle diameter (IN)	.188	.188	.254
Average stack gas temperature during determination (DEG-F)	317	308	295
Volumetric flow			
actual.....(CFM)	19582	14685	12253
standard.....(DSCFM)	11687	8774	7503
Isokinetic variation (%)	100.2	101.2	100.3
Particle concentration			
actual.....(GR/ACF)	.0025	.0063	.0046
dry standard.....(GR/DSCF)	.0042	.0104	.0074
Particle mass flow (LB/HR)	.42	.78	.48

* Dry Catch Only

Test No. 3
No. 8 Main Stack

Results of Particulate Loading Determinations -- Method 5(BE)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Time run start/end (HRS)	1527/1628	1644/1746	1800/1902
Pitot tube coefficient	.856	.856	.856
Water in sample			
condensate (ml)	177.0	173.0	180.0
silica gel (grams)	21.6	18.7	14.1
Total particulate material collected (grams) *	.1440	.1702	.1573
Meter correction coefficient	1.0014	1.0014	1.0014
Volume through gas meter			
at meter conditions...(CF)	42.85	42.31	42.27
standard conditions..(SCF)	41.50	41.62	41.95
Total sampling time (MIN)	60.0	60.0	60.0
Nozzle diameter (IN)	.246	.246	.246
Average stack gas temperature during determination (DEG-F)	260	260	251
Volumetric flow			
actual.....(CFM)	136094	136441	135109
standard.....(DSCFM)	76800	77531	77755
Isokinetic variation (%)	103.7	103.0	103.5
Particle concentration			
actual.....(GR/ACF)	.0303	.0360	.0334
dry standard.....(GR/DSCF)	.0535	.0631	.0579
Particle mass flow (LB/HR)	35.24	41.93	38.56

* Dry Catch Only

Test No. 3
No. 11 Baghouse Outlet

Results of Particulate Loading Determinations -- Method 5(BE)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Time run start/end (HRS)	1527/1631	1644/1746	1800/1803
Pitot tube coefficient	.848	.848	.848
Water in sample			
condensate (ml)	86.0	96.0	76.0
silica gel (grams)	25.0	17.0	[illegible]
Total particulate material collected (grams) *	.2226	.1924	.2064 [illegible]
Meter correction coefficient	1.0014	1.0014	1.0014
Volume through gas meter			
at meter conditions...(CF)	55.74	59.27	49.97
standard conditions..(SCF)	53.30	56.86	48.20
Total sampling time (MIN)	60.0	60.0	60.0
Nozzle diameter (IN)	.254	.254	.254
Average stack gas temperature during determination (DEG-F)	289	272	279
Volumetric flow			
actual.....(CFM)	14691	15201	13065
standard.....(DSCFM)	9011	9585	8156
Isokinetic variation (%)	101.2	101.5	101.1
Particle concentration			
actual.....(GR/ACF)	.0397	.0331	.0414
dry standard.....(GR/DSCF)	.0644	.0522	.0661
Particle mass flow (LB/HR)	4.98	4.29	4.62

* Dry Catch Only

Test No. 3
No. 11 Baghouse Outlet

Results of Particulate Loading Determinations -- Method 5(BE)

	Run 1	Run 2	Run 3
Date of run	02/18/83	02/18/83	02/18/83
Time run start/end (HRS)	1527/1631	1644/1746	1800/1803
Pitot tube coefficient	.848	.848	.848
Water in sample			
condensate (ml)	86.0	96.0	76.0
silica gel (grams)	25.0	17.0	20.0
Total particulate material collected (grams) *	.2226	.1924	.2064
Meter correction coefficient	1.0014	1.0014	1.0014
Volume through gas meter			
at meter conditions...(CF)	55.74	59.27	49.97
standard conditions..(SCF)	53.30	56.86	48.20
Total sampling time (MIN)	60.0	60.0	60.0
Nozzle diameter (IN)	.254	.254	.254
Average stack gas temperature during determination (DEG-F)	289	272	279
Volumetric flow			
actual.....(CFM)	14691	15201	13065
standard.....(DSCFM)	9011	9585	8156
Isokinetic variation (%)	101.2	101.5	101.1
Particle concentration			
actual.....(GR/ACF)	.0397	.0331	.0414
dry standard.....(GR/DSCF)	.0644	.0522	.0660
Particle mass flow (LB/HR)	4.98	4.29	4.62

* Dry Catch Only

APPENDIX A

RESULTS OF PRELIMINARY MEASUREMENTS

Test No. 1
No. 8 Kiln Cooler Stack

Results of Flow Determination -- Method 2

Time and date	0900 hrs, 02/17/83
Barometric pressure (uncompensated, in. Hg)	28.80
Pitot tube coefficient	.853
Number of sampling ports	4
Total number of points sampled	32
Duct or stack diameter (IN)	96.0
Cross sectional area (SQ FT)	50.26
Direction of flow	vertical, up
Static pressure (IN WC)	-.300
Average gas temperature (DEG-F)	150
Absolute gas pressure (IN HG)	28.78
Average moisture content (% v/v)	2.57
Actual gas density (LB/ACF)	.062
Average linear velocity (FT/SEC)	24.9
(standard deviation, FT/SEC)	2.0
Volumetric flow	
actual (ACFM)	75213
dry standard (DSCFM)	60981
Mass flow of gas - wet (LB/HR)	278630

Test No. 1
No. 8 Kiln Cooler Stack

Appendix A -- Point Velocity and Temperature Data

Port/Point	Gas Temperature (DEG-F)	Linear Velocity (FPS/SEC)
A/ 1	150	24.3
A/ 2	150	25.9
A/ 3	150	25.1
A/ 4	150	25.1
A/ 5	150	25.9
A/ 6	150	27.4
A/ 7	150	23.5
A/ 8	150	22.7
B/ 1	150	25.1
B/ 2	150	26.7
B/ 3	150	27.4
B/ 4	150	27.4
B/ 5	150	30.8
B/ 6	150	28.1
B/ 7	150	25.1
B/ 8	150	24.3
C/ 1	150	21.8
C/ 2	150	23.5
C/ 3	150	25.1
C/ 4	150	25.1
C/ 5	150	26.7
C/ 6	150	25.9
C/ 7	150	25.1
C/ 8	150	24.3
D/ 1	150	22.7
D/ 2	150	22.7
D/ 3	150	21.8
D/ 4	150	23.5
D/ 5	150	23.5
D/ 6	150	23.5
D/ 7	150	24.3
D/ 8	150	23.5

Test No. 2
No. 8 Main Stack

Results of Flow Determination -- Method 2

Time and date	1000 [illegible]
Barometric pressure (uncorrected)	[illegible]
Pitot tube coefficient	[illegible]
Number of sampling ports	[illegible]
Total number of points sampled	[illegible]
Duct or stack diameter (IN)	[illegible]
Cross sectional area (SQ FT)	[illegible]
Direction of flow	vertical, up
Static pressure (IN WC)	-.110
Average gas temperature (DEG-F)	257
Absolute gas pressure (IN HG)	28.25
Average moisture content (% v/v)	18.53
Actual gas density (LB/ACF)	.054
Average linear velocity (FT/SEC)	59.2
(standard deviation, FT/SEC)	1.9
Volumetric flow	
actual (ACFM)	135169
dry standard (DSCFM)	76535
Mass flow of gas - wet (LB/HR)	437934

Test No. 2
No. 9 Main Stack

Appendix A -- Point Velocity and Temperature Data

Port/Point	Gas Temperature (DEG-F)	Linear Velocity (FT/SEC)
A/ 1	256	56.3
A/ 2	256	56.3
A/ 3	256	60.6
A/ 4	257	59.5
A/ 5	259	60.3
A/ 6	260	58.5
B/ 1	256	58.3
B/ 2	256	58.3
B/ 3	257	58.3
B/ 4	256	61.7
B/ 5	258	62.5
B/ 6	258	60.3

Test No. 3
No. 8 Main Stack

Results of Flow Determination -- Method 2

Time and date	1527 hrs, 02/18/83
Barometric pressure (uncompensated, in. Hg)	28.26
Pitot tube coefficient	.855
Number of sampling ports	2
Total number of points sampled	12
Duct or stack diameter (IN)	83.5
Cross sectional area (SQ FT)	38.03
Direction of flow	vertical, up
Static pressure (IN WC)	-.110
Average gas temperature (DEG-F)	260
Absolute gas pressure (IN HG)	28.25
Average moisture content (% v/v)	18.03
Actual gas density (LB/ACF)	.054
Average linear velocity (FT/SEC)	59.6
(standard deviation, FT/SEC)	2.6
Volumetric flow	
actual (ACFM)	135989
dry standard (DSCFM)	77075
Mass flow of gas - wet (LB/HR)	439655

Test No. 3
No. 8 Main Stack

Appendix A -- Point Velocity and Temperature Data

Port/Point	Gas Temperature (DEG-F)	Linear Velocity (FT/SEC)
A/ 1	259	53.5
A/ 2	260	[illegible].4
A/ 3	262	60.4
A/ 4	262	61.9
A/ 5	261	62.2
A/ 6	262	62.2
B/ 1	259	56.4
B/ 2	261	58.4
B/ 3	261	60.3
B/ 4	261	60.3
B/ 5	262	61.9
B/ 6	259	59.8

Test No. 1
No. 1-4 Baghouse Outlet

Results of Flow Determination -- Method 2

Time and date	1000 hrs, 02/17/83
Barometric pressure (uncompensated, in. Hg)	28.83
Pitot tube coefficient	.857
Number of sampling ports	2
Total number of points sampled	44
Duct or stack diameter (IN)	48.0
Cross sectional area (SQ FT)	12.57
Direction of flow	vertical, up
Static pressure (IN WC)	.030
Average gas temperature (DEG-F)	320
Absolute gas pressure (IN HG)	28.83
Average moisture content (% v/v)	9.21
Actual gas density (LB/ACF)	.048
Average linear velocity (FT/SEC)	70.3
(standard deviation, FT/SEC)	9.9
Volumetric flow	
actual (ACFM)	52970
dry standard (DSCFM)	31330
Mass flow of gas - wet (LB/HR)	152033

Test No. 1
No. 1-4 Baghouse Outlet

Appendix A -- Point Velocity and Temperature Data

Port/Point	Gas Temperature (DEG-F)	Linear Velocity (FT/SEC)
A/ 1	280	74.9
A/ 2	294	73.9
A/ 3	321	78.5
A/ 4	319	78.4
A/ 5	324	70.0
A/ 6	324	70.0
A/ 7	338	67.6
A/ 8	325	46.6
A/ 9	321	78.5
A/10	311	76.0
A/11	307	81.0
A/12	302	77.6
A/13	313	71.3
A/14	311	63.7
A/15	344	63.0
A/16	340	66.9
A/17	340	76.1
A/18	340	79.5
A/19	330	82.2
A/20	333	88.5
A/21	340	82.7
A/22	341	51.3
B/ 1	300	70.7
B/ 2	330	75.6
B/ 3	337	82.6
B/ 4	346	86.2
B/ 5	346	72.8
B/ 6	341	68.9
B/ 7	345	69.0
B/ 8	345	69.0
B/ 9	295	77.2
B/10	287	76.8
B/11	310	81.2
B/12	310	71.2
B/13	315	65.8
B/14	315	57.6
B/15	310	57.4
B/16	311	59.6

Test No. 1
No. 1-4 Baghouse Outlet

Appendix A -- Point Velocity and Temperature Data

Port/Point	Gas Temperature (DEG-F)	Linear Velocity (FT/SEC)
B/17	[illegible]	38.5
B/18	[illegible]	[illegible]
B/19	[illegible]	37.6
B/20	[illegible]	39.9
B/21	[illegible]	35.5
B/22	[illegible]	38.0

Test No. 2
No. 7 Baghouse Outlet

Results of Flow Determination -- Method 2

Time and date	1000 hrs, 02/18/83
Barometric pressure (uncompensated, in Hg)	28.61
Pitot tube coefficient	.848
Number of sampling ports	2
Total number of points sampled	24
Duct or stack diameter (IN)	25.8
Cross sectional area (SQ FT)	3.62
Direction of flow	vertical, down
Static pressure (IN WC)	.300
Average gas temperature (DEG-F)	317
Absolute gas pressure (IN HG)	28.63
Average moisture content (% v/v)	8.52
Actual gas density (LB/ACF)	.048
Average linear velocity (FT/SEC)	90.4
(standard deviation, FT/SEC)	11.1
Volumetric flow	
actual (ACFM)	19624
dry standard (DSCFM)	11656
Mass flow of gas - wet (LB/HR)	56115

Test No. 2
No. 7 Baghouse Outlet

Appendix A -- Point Velocity and Temperature Data

Port/Point	Gas Temperature (DEG-F)	Linear Velocity (FT/SEC)
A/ 1	310	[illegible]
A/ 2	318	[illegible]
A/ 3	318	[illegible]
A/ 4	318	[illegible]
A/ 5	318	[illegible]
A/ 6	319	100.6
A/ 7	318	76.3
A/ 8	318	100.6
A/ 9	322	100.8
A/10	322	100.8
A/11	322	105.8
A/12	325	106.0
B/ 1	310	67.9
B/ 2	313	77.7
B/ 3	315	88.4
B/ 4	318	92.7
B/ 5	318	92.7
B/ 6	318	65.2
B/ 7	318	84.1
B/ 8	318	88.5
B/ 9	318	88.5
B/10	318	92.7
B/11	318	92.7
B/12	318	94.1

Test No. 3
No. 11 Baghouse Outlet

Results of Flow Determination -- Method 2

Time and date	1527 hrs, 02/18/83
Barometric pressure (uncompensated, in. Hg)	28.61
Pitot tube coefficient	.848
Number of sampling ports	2
Total number of points sampled	24
Duct or stack diameter (IN)	25.8
Cross sectional area (SQ FT)	3.62
Direction of flow	vertical, up
Static pressure (IN WC)	.300
Average gas temperature (DEG-F)	289
Absolute gas pressure (IN HG)	28.63
Average moisture content (% v/v)	8.69
Actual gas density (LB/ACF)	.049
Average linear velocity (FT/SEC)	67.8
(standard deviation, FT/SEC)	5.3
Volumetric flow	
actual (ACFM)	14714
dry standard (DSCFM)	9049
Mass flow of gas - wet (LB/HR)	43652

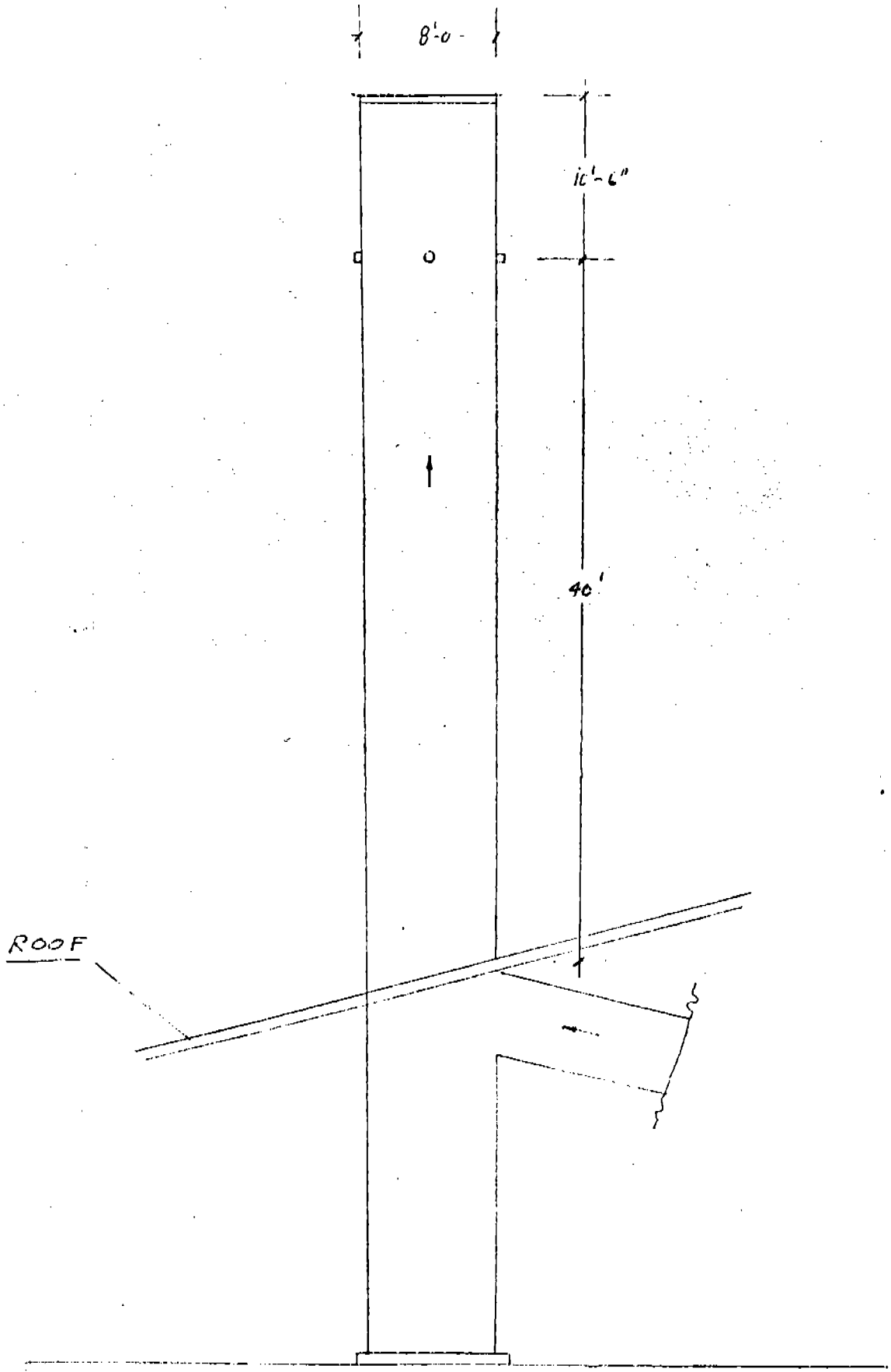
Test No. 3
No. 11 Baghouse Outlet

Appendix A -- Point Velocity and Temperature Data

Port/Point	Gas Temperature (DEG-F)	Linear Velocity (FT/SEC)
A/ 1	290	[illegible]
A/ 2	289	66.2
A/ 3	290	66.2
A/ 4	290	[illegible]
A/ 5	289	[illegible]
A/ 6	288	[illegible]
A/ 7	286	67.9
A/ 8	284	69.5
A/ 9	283	71.2
A/10	290	69.8
A/11	291	69.9
A/12	290	62.4
B/ 1	288	57.5
B/ 2	288	57.5
B/ 3	289	63.2
B/ 4	293	66.4
B/ 5	294	73.4
B/ 6	292	79.7
B/ 7	290	73.2
B/ 8	290	73.2
B/ 9	292	68.1
B/10	291	68.1
B/11	290	66.2
B/12	300	60.9

APPENDIX B

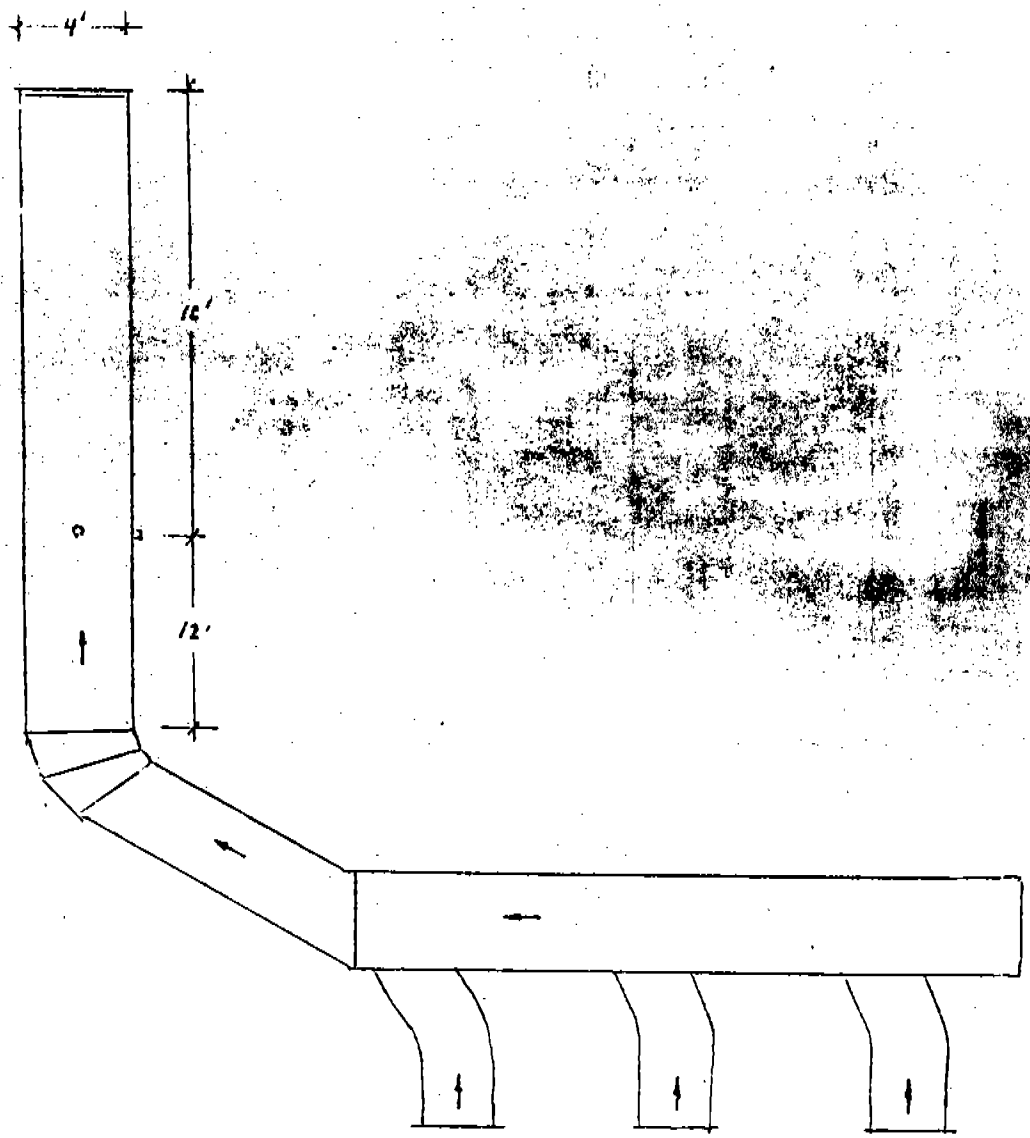
LOCATION OF TEST PORTS AND TRAVERSE POINTS



NO 8 KILN CLINKER COOLER

STACK

NOT TO SCALE



TWO TEST PORTS @ 90°

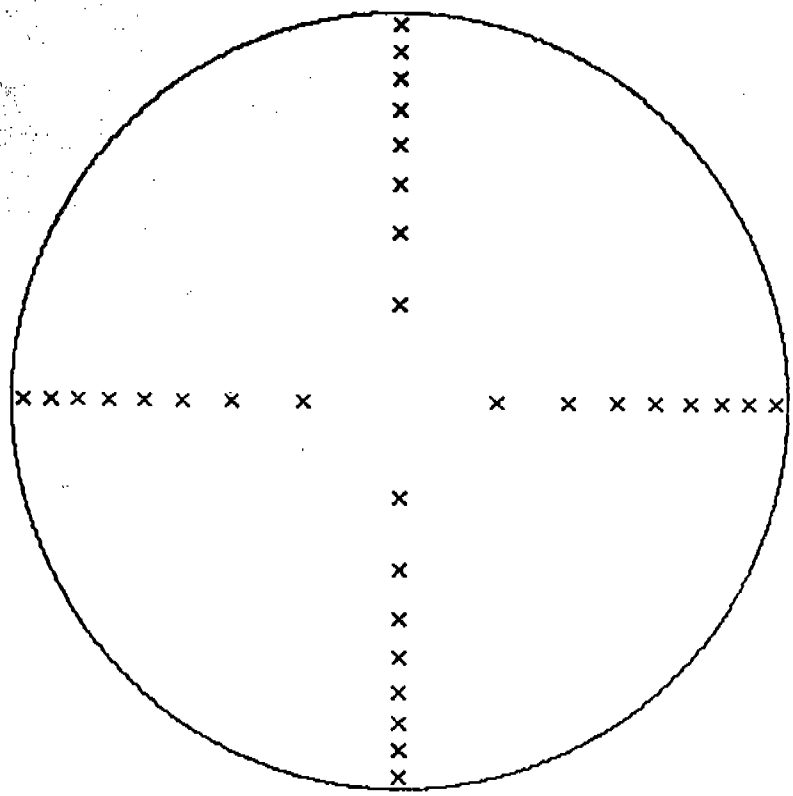
FLOW GEOMETRY NO 2 3 & 4 BAGHOUSE TEST SITE

JOB: LEHIGH PORTLAND CEMENT
INTERPOLL REPORT NO. 3-1466
APPENDIX B

LOCATION OF TRAVERSE POINTS

TEST NO. 1

LOCATION - NO.8 KILN COOLER STACK



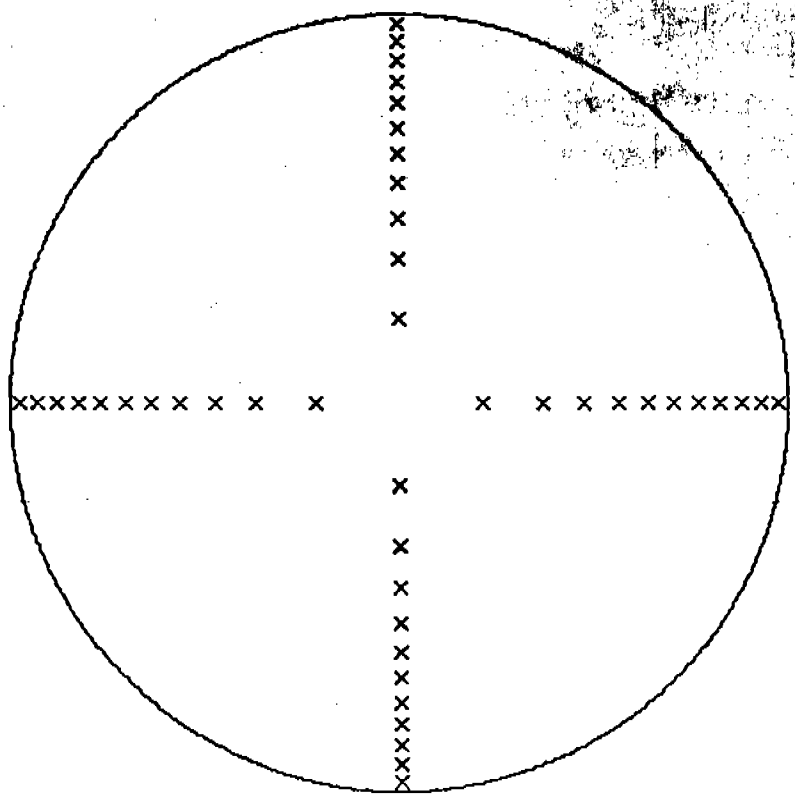
DIAMETER (IN.)	96.0
NUMBER OF PORTS	4
NUMBER OF POINTS TRAVERSED	32

JOB: LEHIGH PORTLAND CEMENT
INTERPOLL REPORT NO. 3-1466
APPENDIX B

LOCATION OF TRAVERSE POINTS

TEST NO. 1

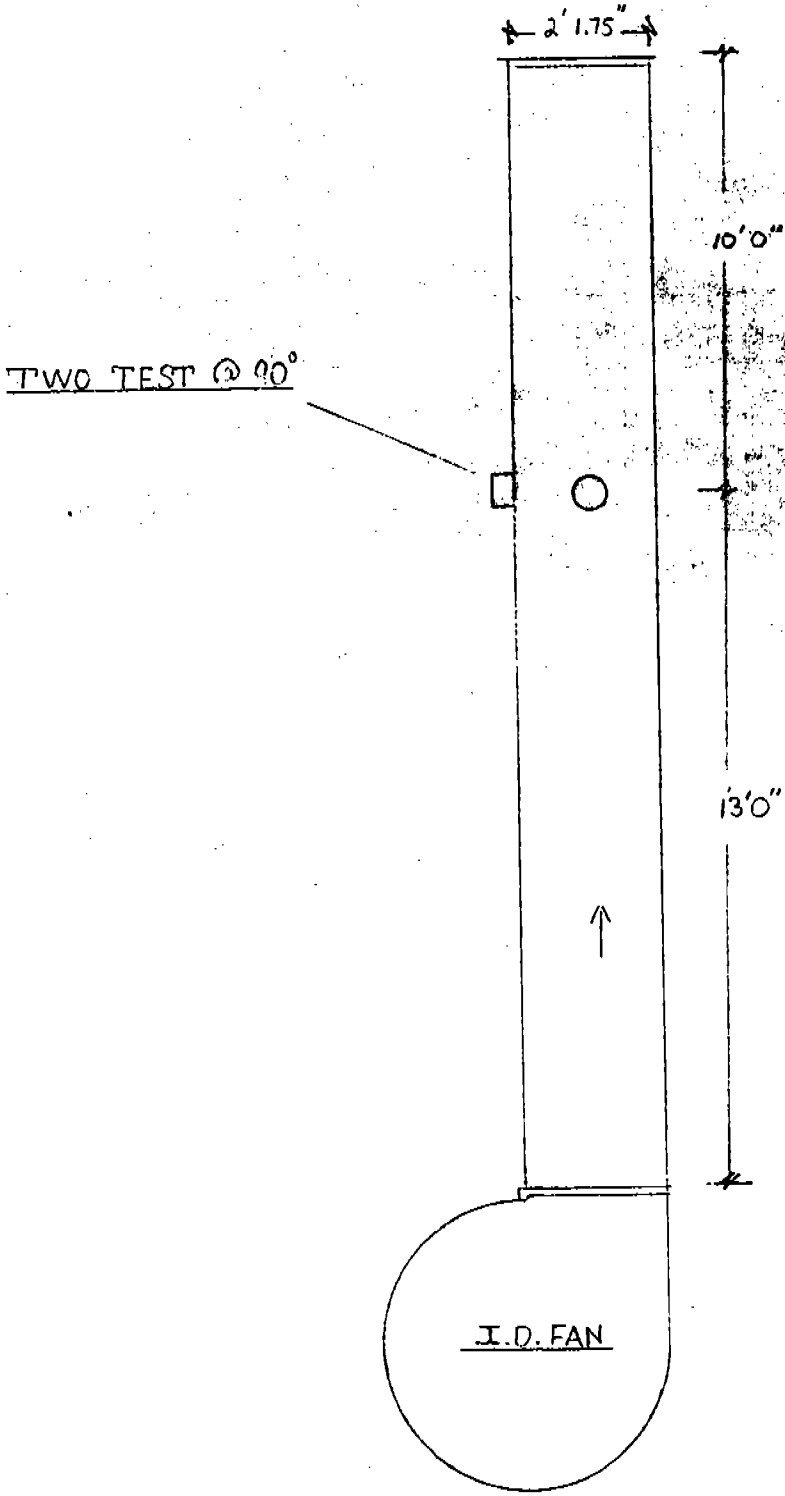
LOCATION - NO.1,2,3&4 BAGHOUSE OUTLET



DIAMETER (IN.)	48.0
NUMBER OF PORTS	2
NUMBER OF POINTS TRAVERSED	44

LEHIGH CEMENT COMPANY

NO. 7 & 11 BAGHOUSE OUTLETS (STACKS)



NOT TO SCALE

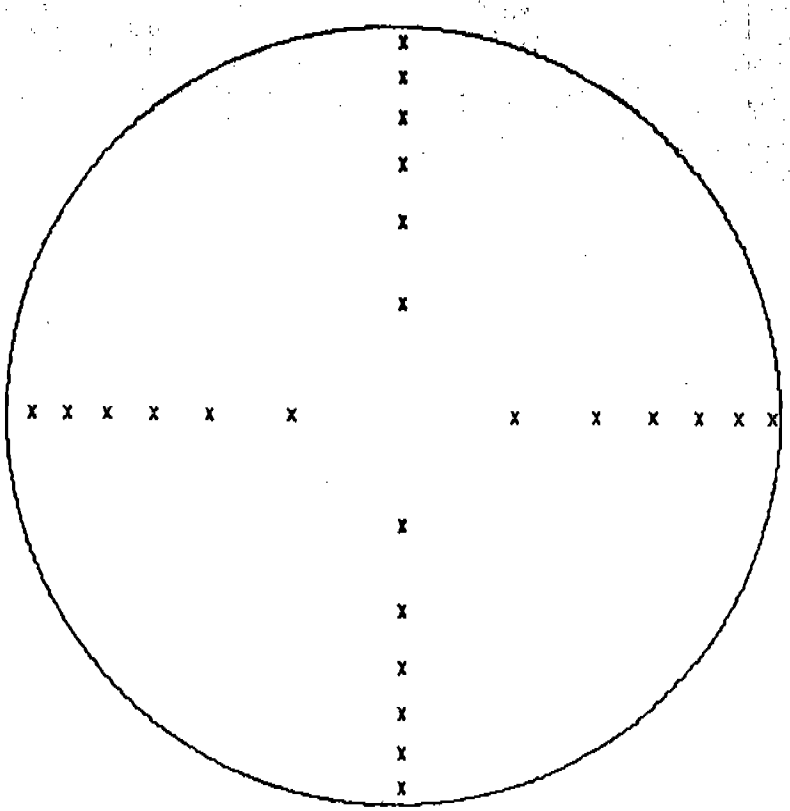
D.V.H. 8/82

INTERPOLL REPORT NO. 3-1466
LEHIGH PORTLAND CEMENT COMPANY
APPENDIX B

LOCATION OF TRAVERSE POINTS

TEST NO. 2

LOCATION - NO. 7 BAGHOUSE OUTLET

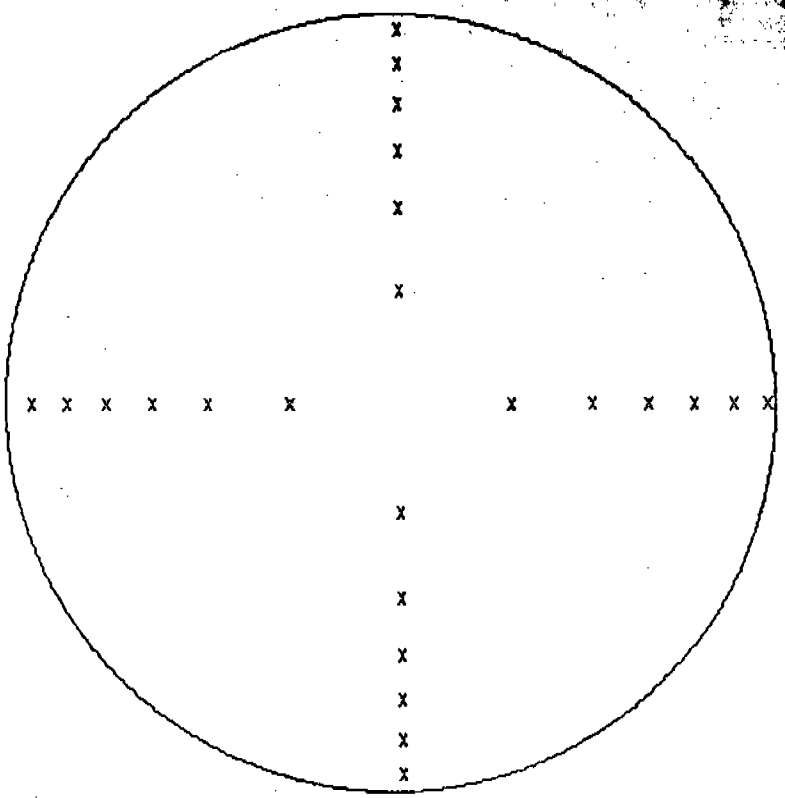


DIAMETER (IN.)	25.8
NUMBER OF PORTS	2
NUMBER OF POINTS TRAVERSED	24

LOCATION OF TRAVERSE POINTS

TEST NO. 3

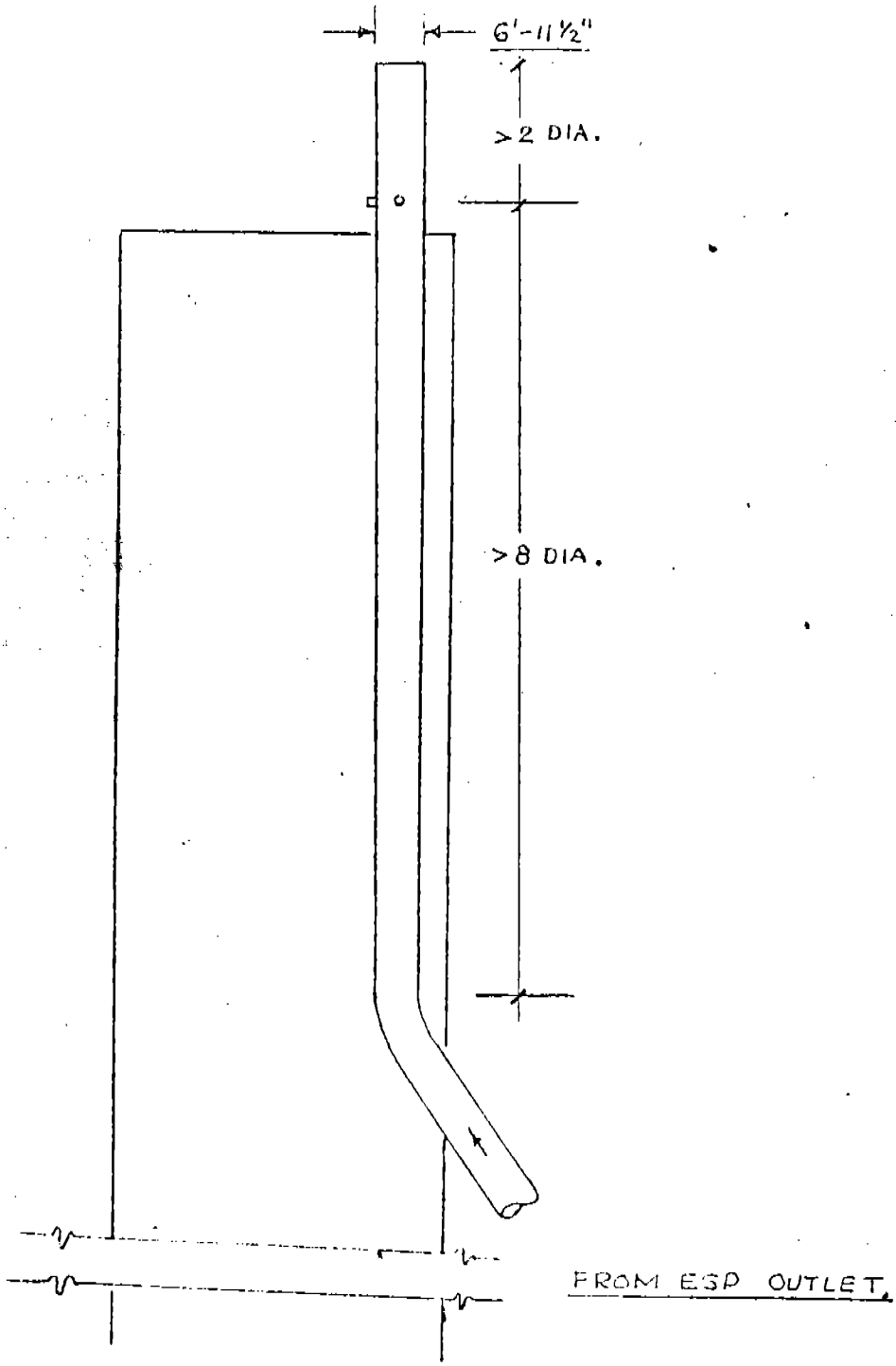
LOCATION - NO. // BAGHOUSE OUTLET



DIAMETER (IN.)	25.8
NUMBER OF PORTS	2
NUMBER OF POINTS TRAVERSED	24

LEHIGH PORTLAND CEMENT CO.

NOT TO SCALE



NO 8 KILN STACK

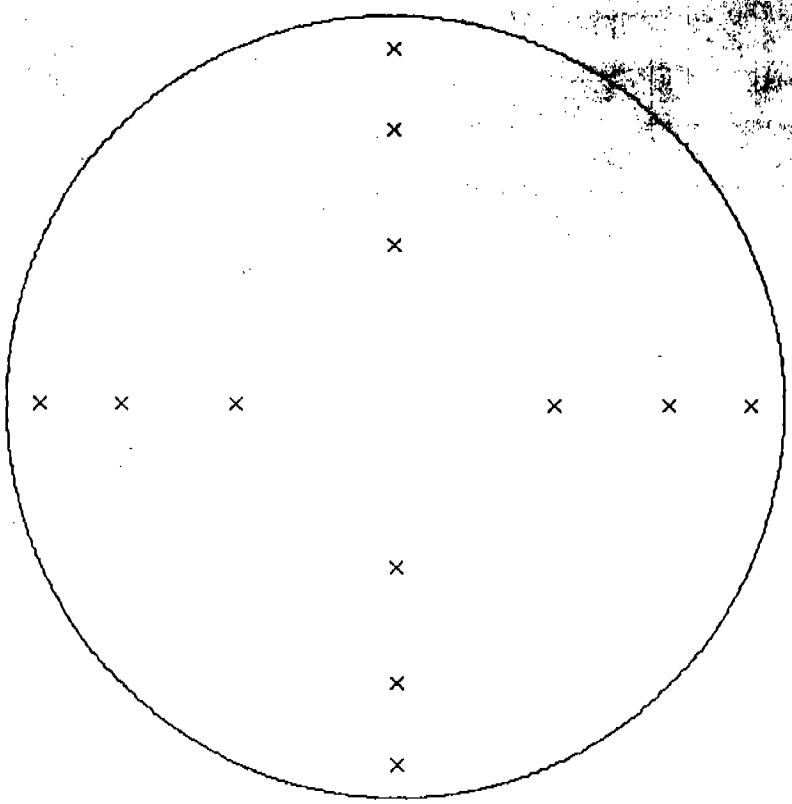
LP 9/80

JOB: LEHIGH PORTLAND CEMENT CO.
INTERPOLL REPORT NO. 3-1466
APPENDIX B

LOCATION OF TRAVERSE POINTS

TEST NO. 2 & 3

LOCATION - NO. 8 KILN - STACK



DIAMETER (IN.)	83.5
NUMBER OF PORTS	2
NUMBER OF POINTS TRAVERSED	12

APPENDIX C

FIELD DATE SHEETS

KILN COOLER STACK

TEST NO. 1

Preliminary Data – Method 2

— Interpoll Inc. —

Job Lehigh Cement

Source No 8 Kiln Cooler Stack Date 2-17-83

Test No. 1 Run No. 1

Stack dimensions: 96 in.

Dry bulb ____ °F Wet bulb ____ °F

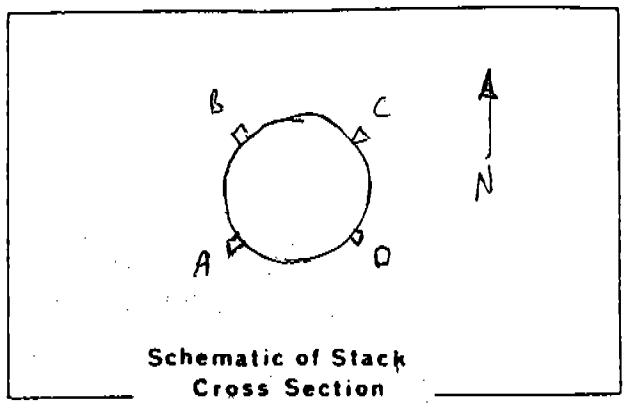
Rel. hum. ____ % B_{wo} 3 %

Barometric pressure (P_b) 28.80 in. Hg

Static pressure (P_g) -.30 in. WC ____ in. Hg

Operators J Stock + S Olson

Pitot No. 6 C_p .853 Port Length 4"



Schematic of Stack Cross Section

Traverse Point No.	Distance from Stack wall	Distance from End of Port	(0900) Velocity Head (in. WC)	Temperature (°F)
A-1 / 0-1	1.54	5 1/2	.15 / .13	
2 2	4.70	8 3/4	.17 / .13	
3 3	8.16	12 1/8	.16 / .12	
4 4	12	16	.16 / .14	
5 5	16.22	20 1/4	.17 / .14	
6 6	21.12	25 1/8	.19 / .14	
7 7	27.17	31 1/8	.14 / .15	
8 8	36	40	.13 / .14	
B-1			.16 .13	
2			.18	
3			.19	
4			.19	
5			.24	
6			.20	
7			.16	
8			.15	
C-1			.12	
2			.14	
3			.16	
4			.16	
5			.18	
6			.17	
7			.16	
8			.15	
25				avg. .150

S-0034 R

Sample Log Sheet

Job Lehigh Cement

Unit and Sampling Location No 8 Kiln Cooler Stack

Date 2-17-83 Test 1 Run 1

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☒

posttest: 0 cfm at 5.2 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
Filter # 3413			
PW			
Wet Catch			
Total (M_n)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	104	100	4
2	102	100	2
3	12	0	2
Orlevite	1247	1236	11
Total (M_{wo})			29 g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 2 Bag No. 1

Bag Material Tedlon Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.
1000			
	400		
	↓		
1123	↓		

Operator Jeff Hack 320-P Reading 20.9 % v/v

S-0046R

EPA METHOD 5 - Field Data Sheet

Job Lehigh / No 8 Kiln Operators JS & SO Pitot No. 6 C_p .853

Source No 8 Kiln Cooler Stack Sampling Train No. 8 $\Delta H_@$ 1.76 Bar. Press. 24.80 in.Hg. B_{wo} 6 %

Date 2-17-85 Test 1 Run 1 Gasmeter coeff. .9978 Amb. Temp. 35°F Nozzle No. 9-3 Nozzle Dia. .310 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1000)	(857.07)										
A-8	2.5	858.64	.16	1.10	157 864	2.0	150	260	260	20.9	50	40
7	5	860.24	.16	1.10	157 021		150				54	40
6	7.5	861.85	.18	1.38	163 183		180				54	40
5	10	863.41	.17	1.30	156 329		190				56	40
4	12.5	864.96	.17	1.30	156 495		198				56	40
3	15	866.51	.17	1.30	156 651	2.2	198		261		56	40
2	17.5	868.08	.17	1.30	156 801		197				56	40
1	20	869.53	.15	1.05	146 953		195				58	42
B-8	22.5	871.15	.19	1.33	164 117	2.5	196				58	42
7	25	872.89	.21	1.47	173 290		199				58	42
6	27.5	874.54	.19	1.33	164 454		198				60	44
5	30	876.33	.22	1.54	177 631		198				60	44
4	32.5	878.08	.22	1.54	177 808	2.8	198				60	44
3	35	879.79	.21	1.47	173 981		198				60	44
2	37.5	881.50	.20	1.40	169 150		198				60	44
1	40	883.01	.16	1.12	151 301		197				60	44
C-8	42.5	884.53	.16	1.12	151 451	2.1	197				60	46
7	45	886.10	.18	1.26	160 611		198				60	46
6	47.5	887.75	.19	1.33	164 775		198				60	46
5	50	889.27	.16	1.12	151 926		197				60	46
4	52.5	890.77	.16	1.12	151 077		197				60	46
3	55	892.21	.14	.98	141 218	1.9	198				60	46
2	57.5	893.58	.14	.98	141 359		198				60	46
1	60	895.00	.14	.98	141 500		198				60	46

Job Lehigh Operators JS-SO Pitot No. _____ C_p _____

Source No. 8 Kiln Cooler Stack Sampling Train No. _____ $\Delta H_@$ _____ Bar. Press. _____ in.Hg, B_{wo} _____ %

Date 2-17-83 Test 1 Run 1 Gasmeter coeff. _____ Amb. Temp. _____ °F Nozzle No. _____ Nozzle Dia. _____ in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	( )	(895.00)			5.00							
D-8	62.5	896.41	.14	.98	141 641		198	260	265	20.9	60	46
7	65	897.91	.16	1.12	151 792		198				60	46
6	67.5	899.31	.14	.98	141 933	1.9	198				60	46
5	70	900.70	.14	.98	141 074		198				60	46
4	72.5	902.12	.14	.98	141 215		198				60	46
3	75	903.54	.14	.98	141 356		198				60	46
2	77.5	904.97	.14	.98	141 497		198				60	46
1	80	906.37	.14	.98	141 638							
	(1123)											
	Θ = 80	V_m = 49.30		$\overline{\Delta H}$ = 1.18								$\overline{T_m}$ = 51.28

C-5

49.03

S-0037R

Sample Log Sheet

Job: Lehigh No 8 Kiln

Unit and Sampling Location: No 8 Kiln Cooler Stack

Date: 2-17-83 Test: 1 Run: 2

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) [x]
posttest: 0 cfm at 6 in. Hg. (vac.)

Particulate Sample Type and Number	Weights Final	Tare	Difference
Filter # 3421			
PW			
Wet Catch			
Total (Mn)	//////	//////	g

Impinger [x] Condenser [ ]

Impinger Number	Weights Final	Tare	Difference
1	104	100	4
2	106	100	6
3	4	0	4
Drierite	1332	1319	13
Total (Mwo)	//////	//////	27 g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 2 Bag No. 2

Bag Material: Tedlar Bag Volume: 44 L

Pretest leak check: 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.
1220	//////		
	400		
	↓		
1355			

Operator: [signature] 320-P Reading: 20.9 % v/v

Job: Lehigh No. 8
Source: No 8 Kiln Cooler
Date: 2-17-83

Traverse Point No.	Sampling Time (min)
	(1220)
D-8	2.5
7	5
6	7.5
5	10
4	12.5
3	15
2	17.5
1	20
C-8	22.5
7	25
6	27.5
5	30
4	32.5
3	35
2	37.5
1	40
B-8	42.5
7	45
6	47.5
5	50
4	52.5
3	55
2	57.5
1	60

stopped 10 min. (at B-8)

Job: Lehigh No. 8 Kiln
Source: No. 8 Kiln Cooler St
Date: 2-17-83 Test: 1 Run

Traverse Point No.	Sampling Time (min)	Sample Volume (ft3)	Velo He (in.)
	( )	(945.31)	
A-8	62.5	946.90	
7	65	948.48	
6	67.5	950.04	
5	70	951.63	
4	72.5	953.20	
3	75	954.78	
2	77.5	956.26	
1	80	957.73	
	(1350)		
	θ=80	Vm=51.03	

Sample Log Sheet

Job Lehigh / No. 8 Kiln

Unit and Sampling Location No. 8 Kiln Cooler Stack

Date 2-17-83 Test 1 Run 3

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☒

posttest: 0 cfm at 6 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
Filter # 3457			
PW			
Wet Catch			
Total (Mn)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	106	100	6
2	105	100	5
3	2	0	2
Orsat H2O	1328	1312	16
Total (M_{wo})			29 g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 2 Bag No. 3

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.
1425			
	400		
1550			

Operator [signature] 320-P Reading 20.9 % v/v

S-0046R

NO. 1-4 BAGHOUSE OUTLET

TEST NO. 1

17	17	40.99	44°		
18	18	42.43	45 1/2°		
19	19	43.82	47 7/8"		
20	20	45.12	48 1/8"		
21	21	46.32	49 3/4"		
22	22	47.47	50°		
25					avg.

Sample Log Sheet

Job LEHIGH No 8 KILN

Unit and Sampling Location NO 1-4 BH STACK

Date 2-17-83 Test 1 Run 1

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☒
posttest: 0 cfm at 10 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER # 3312			
PW			
Total (Mn)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	165	100	65
2	150	100	50
3	0	0	
Desiccant	1322	1275	47
Total (M_{wo})			162 g

Integrated Flue Gas Sampling Data

FG Train No. 4 Box No. 3 Bag No. 1

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.
1002			
	400		
1130	↓		

Operator P. LOUNES 320-P Reading _____ % v/v

Job Lehigh No 8 KILN Operators PL & CM Pitot No. 10 C_p .857

Source No 1-4 BH Stack Sampling Train No. 7 $\Delta H_@$ 1.29 Bar. Press. 28.82 in.Hg. B_{wo} 10.5 %

Date 2-17-83 Test 1 Run 1 Gasmeter coeff. 1.0014 Amb. Temp. 30 °F Nozzle No. 7-2 Nozzle Dia. .254 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6	
	(1000)	(312.60)											
A-22	2	313.79	.50 ◇	1.14	1.17 / 3.77	4	341	250	258	16.8	35	35	
21	4	315.68	1.3 ◇	2.86	1.89 / 5.66	8	340			16.8	35	35	
20	6	317.70	1.5	3.3	2.04 / 7.70		333			16.7	34	34	
19	8	319.61	1.3	2.76	1.91 / 9.61	8.3	330			16.8	34	32	
18	10	321.51	1.2	2.56	1.82 / 1.43	7.8	340	258	260	16.8	34	32	
17	12	323.16	1.1	2.35	1.74 / 3.17	7.4	340			16.8	34	32	
16	14	324.71	.85	1.81	1.53 / 4.70	6.0	340			16.8	33	32	
15	16	326.16	.75	1.60	1.44 / 6.14	5.0	344			17.2	33	32	
14	18	327.66	.80	1.70	1.51 / 7.65	6.3	311	252	259	17.1	33	32	
13	20	329.34	1.0 ◇	2.13	1.69 / 9.34	6.7	313			17.2	32	31	
12	22	331.19	1.2	2.56	1.87 / 1.21	7.9	302			17.1	32	31	
11	24	333.12	1.3	2.76	1.93 / 3.14		307			17.3	32	31	
10	26	334.99	1.2	2.56	1.85 / 4.99		311	255	260	17.2	30	30	
9	28	336.83	1.2 ◇	2.56	1.84 / 6.83		324			17.1	34	33	
8	30	337.94	.42 ◇	.89	1.09 / 7.92	3.5	325			16.8	37	35	SUN CAME OUT
7	32	339.49	.87	1.85	1.55 / 9.47		338			17.2	41	38	
6	34	341.11	.95	2.02	1.64 / 1.11	6.0	324	252	263	17.2	46	43	
5	36	342.74	.95	2.02	2.75	6.2	324			16.8	50	47	
4	38	344.63	1.2	2.56	1.90 / 4.65	8.2	319			16.7	55	50	
3	40	346.53	1.2	2.60	1.90 / 6.55		321			16.7	60	51	
2	42	348.41	1.1	2.51	1.85 / 8.40	8.0	294	249	260	16.8	62	51	
1	44	350.04	.85	1.94	1.64 / .04	6.2	280			16.9	61	52	
B-22	46	351.29	.60 ◇	1.14	1.23 / 1.27	4.0	300			17.1	59	52	
21	48	353.61	.60	1.37	1.34 / 2.61		320			17.2	60	52	

C-15

EPA Method 5 Field Data Sheet

Job Lehigh No8 KILN — Operators _____ — Pitot No. _____ C_p _____

Source No 1-4 BH Stack — Sampling Train No. _____ $\Delta H_@$ _____ — Bar. Press. _____ in.Hg. B_{wo} _____ %

Date 2-17-83 Test 1 Run 1 — Gasmeter coeff. _____ Amb. Temp. _____ °F — Nozzle No. _____ Nozzle Dia. _____ in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	( )	( )			2.47							
B-20	50	354.05	.70	1.60	1.95 4.06		320			17.1	62	52
19	52	355.70	.90	2.05	1.65 5.71	6.5	311	251	259	17.1	62	52
18	54	357.36	.90	2.05	7.36	6.5	311			17.2	63	52
17	56	358.84	.70	1.60	1.46 8.82	5.3	308			17.3	63	53
16	58	360.30	.70 ◇	1.60	0.28		311			17.5	63	53
15	60	361.70	.65	1.48	1.40 1.68	4.8	310	249	253	17.8	64	53
14	62	363.08	.65	1.48	3.08		315			17.5	64	53
13	64	364.66	.85	1.87	1.60 4.68	6.0	315			17.5	64	54
12	66	366.40	1.0	2.28	1.74 6.42		310			17.3	66	54
11	68	368.43	1.3	2.86	2.03 8.45	9.0	310	253	260	17.2	66	54
10	70	370.46	1.2	2.74	1.98 0.43		287			17.2	67	55
9	72	372.39	1.2 ◇	2.74	2.41	9.0	295			17.2	67	55
8	74	374.07	.90 ◇	2.16	1.65 4.06		345			17.2	68	56
7	76	375.71	.90	2.16	5.71	7.6	345	251	259	17.2	68	56
6	78	377.36	.90 ◇	2.16	7.36		341			17.2	68	56
5	80	379.12	1.0	2.2	1.74 9.10	6.6	346			17.2	68	56
4	82	381.15	1.4	3.19	2.04 1.16		346			17.2	70	57
3	84	383.13	1.3	2.96	1.99 3.15	9.1	337			16.8	71	58
2	86	384.99	1.1	2.53	1.84 4.99	8.2	330			17.2	72	59
1	88	386.78	1.0	2.3	1.79 6.78		300			17.2	71	59
	(1132)											
	G=88	V_m=74.18		$\overline{\Delta H}$=							$\overline{t_m}$	

C-16

S-0037R

Sample Log Sheet

Job Lehigh No 8 KILN

Unit and Sampling Location No 1-4 BH Stack

Date 2-17-83 Test 1 Run 2

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☑
posttest: 0 cfm at 11 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER # 3328			
PW			
Total (M_n)			g

Impinger ☑ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	186	100	86
2	132	100	32
3	0	0	
Desiccant	1395	1351	44
Total (M_{wo})			162 g

Integrated Flue Gas Sampling Data

FG Train No. 4 Box No. 3 Bag No. 2

Bag Material Tedlar Bag Volume 44 L

Pretest leak check _____ cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.
1228			
	400		
	↓		
1355			

Operator P. LONNES 320-P Reading _____ % v/v

EPA Method 5 Field Data Sheet

Job Lehigh No 8 KILN Operators PL & CM Pitot No. 10 C_p .857

Source No 1-4 BH Stack Sampling Train No. 7 $\Delta H_@$ 1.79 Bar. Press. 28.82 in.Hg. B_{wo} ___ %

Date 2-17-83 Test 1 Run 2 Gasmeter coeff. 1.0014 Amb. Temp. ___ °F Nozzle No. 7-2 Nozzle Dia. .254 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in.WC)	Orifice Meter (in.WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1225)	(387.0)										
B-22	2	388.19	.45 ◇	1.03	1.17 8.17	3.7	338	250	255	17.2	55	55
21	4	389.75	.82	1.87	1.C 9.77	5.2	319			17.2	56	56
20	C	391.28	.75	1.73	1.53 1.30	5.0	318			17.3	58	56
19	8	392.88	.82	1.90	1.C 2.90	5.4	317			17.3	59	56
18	10	394.47	.80	1.84	1.58 4.48	5.7	319	250	251	17.5	60	56
17	12	395.79	.55 ◇	1.32	1.29 5.77	4.2	340			17.5	62	56
16	14	397.14	.60	1.38	1.31 7.13	4.0	326			17.4	62	56
15	16	398.56	.65	1.5	1.43 8.56	4.7	317			17.3	64	56
14	18	399.98	.65 ◇	1.5	9.99		317			17.2	65	56
13	20	401.60	.85	1.96	1.63 1.62		320	255	259	17.3	66	56
12	22	403.32	.95	2.19	1.72 3.34		319			17.3	67	56
11	24	405.09	1.0	2.35	1.76 5.10	9.0	328			17.2	67	56
10	26	406.88	1.0	2.35	6.86		338			17.1	67	57
9	28	408.64	1.0	2.35	8.62		355	251	262	17.2	67	58
8	30	410.40	1.0	2.35	0.38		347			17.3	67	58
7	32	412.17	1.0 ◇	2.35	2.14	6.8	333			17.4	67	58
C	34	414.05	1.2	2.76	1.90 4.04		346			17.1	68	59
5	36	416.09	1.4	3.22	2.05 6.09	9.5	353	252	263	16.8	68	59
4	38	417.98	1.2	2.76	1.90 7.99	8.0	350			17.1	68	59
3	40	419.82	1.1	2.53	1.83 9.82		342			17.1	68	59
2	42	421.50	.90	2.07	1.67 1.49	6.3	320			17.3	67	60
1	44	422.92	.65	1.50	1.43 2.92		310	259	260	17.5	67	60
A-22	46	424.85	1.2 ◇	2.76	1.96 4.88	8.0	300			17.3	64	60
21	48	426.98	1.4	3.22	2.10 6.98		310			17.2	65	60

C-18

EPA Method 5 Field Data Sheet

Job Lehigh No 8 KILN Operators _____ Pitot No. _____ C_p _____

Source No 1-4 BH Stack Sampling Train No. _____ $\Delta H_@$ _____ Bar. Press. _____ in.Hg. B_{wo} _____ %

Date 2-17-83 Test 1 Run 2 Gasmeter coeff. _____ Amb. Temp. _____ °F Nozzle No. _____ Nozzle Dia. _____ in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	( )	( )										
A 20	50	429.09	1.5	3.45	2.11 9.09		359			17.2	68	60
19	52	431.08	1.3	2.99	1.97 1.04	8.8	358			17.1	68	60
18	54	433.04	1.3	2.99	3.03	8.8	352			16.9	68	60
17	56	434.60	.80	1.84	1.54 4.57		358	260	261	17.2	68	60
16	58	436.05	.75	1.73	1.49 6.05	5.2	368			17.3	69	60
15	60	437.63	.80	1.84	1.56 7.61	5.2	341			17.2	69	60
14	62	439.28	.90	2.07	1.65 9.26	6.3	340			17.2	70	61
13	64	441.10	1.1	2.53	1.83 1.09	7.4	341			17.1	70	62
12	66	448.93	1.1	2.53	2.92		340	249	256	17.2	70	62
11	68	444.76	1.1	2.53	4.75		333			17.3	70	62
10	70	446.58	1.1	2.53	6.58	7.3	335			17.3	70	62
9	72	447.65	.36	.83	1.04 7.62		354			17.1	70	63
8	74	449.19	.80	1.84	1.54 9.16	5.5	361	243	251	17.3	70	63
7	76	450.80	.85	1.96	1.61 0.77	5.7	334			17.3	71	64
6	78	452.45	.90	2.07	1.65 2.42		336			17.2	71	64
5	80	454.18	1.0	2.3	1.74 4.16	6.8	345			16.8	72	63
4	82	455.91	1.6	2.3	5.9	6.8	351	255	255	16.8	72	63
3	84	457.59	.95	2.19	1.69 7.59	6.0	352			17.0	72	63
2	86	459.22	.85	1.96	1.61 9.2	6.0	310			16.9	72	64
1	88	460.18	.30	.69	.58 0.18		305					
	(1356)											
	θ=88	V_m = 73.18										

C-19

S-0037R

Sample Log Sheet

Job Lehigh No 8 KILN

Unit and Sampling Location No 1-4 BH Stack

Date 2-17-83 Test 1 Run 3

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☑

posttest: 0 cfm at 12 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER # 3349			
PW			
Total (M_n)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	181	100	81
2	126	100	26
3	5	0	5
Desiccant	1267	1235.5	31.5
Total (M_{wo})			143.5 g

Integrated Flue Gas Sampling Data

FG Train No. 4 Box No. 3 Bag No. 3

Bag Material Tedlar Bag Volume 44 L

Pretest leak check _____ cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.
	400		

Operator P. CONNES 320-P Reading 17.2 % v/v

EPA Method 5 Field Data Sheet

Job Lehigh No 8 KILN Operators R.L. & C.M. Pitot No. 10 C_p .857

Source No 1-4 BN Stack Sampling Train No. 7 ΔH_a 1.79 Bar. Press. 28.82 in.Hg. B_{wo} 10.5 %

Date 2-17-83 Test 1 Run 3 Gasmeter coeff. 1.0014 Amb. Temp. ___ °F Nozzle No. 7-2 Nozzle Dia. .254 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1425)	(460.40)										
B-22	2	462.37	1.3	2.99	1.97 2.37		356	243	260	17.2	63	62
21	4	464.19	1.1	2.53	1.80 4.17	7.1	364			17.2	64	62
20	6	466.07	1.2	2.76	1.89 6.06		351			16.8	66	63
19	8	468.02	1.3	3.00	8.63	8.0	348			16.8	66	63
18	10	470.07	1.4	3.23	2.05 0.10		346	251	259	16.8	67	63
17	12	472.12	1.4	3.23	2.15		358			16.7	68	63
16	14	474.04	1.2	2.76	4.04		356			16.8	68	63
15	16	475.95	1.2	2.76	5.93		358			17.0	68	63
14	18	477.43	.75	1.73	1.50 7.43	5.2	354	249	254	16.8	69	63
13	20	479.03	.85	1.96	1.58 9.01		363			17.3	70	63
12	22	480.68	.90	2.07	1.67 0.69		326			17.3	70	64
11	24	482.41	1.0	2.3	1.75 2.43	6.7	330			17.5	70	64
10	26	484.34	1.2	2.76	1.93 4.36		324	247	248	17.5	71	65
9	28	486.32	1.3	3.00	6.33	8.6	321			17.3	72	64
8	30	488.15	1.1	2.53	1.8 8.13	7.3	336			17.4	72	65
7	32	489.88	1.0	2.3	1.75 9.88		346			17.3	72	65
6	34	491.05	.45	1.04	1.17 1.05		341			17.2	72	65
5	36	492.54	.75	1.73	1.49 2.54		351	251	250	17.4	72	65
4	38	494.06	.75	1.73	4.03	5.3	345			17.3	72	65
3	40	495.55	.75	1.73	5.52		345			17.2	72	65
2	42	497.17	.90	2.07	7.19	5.2	310			17.2	72	65
1	44	498.83	.85	1.96	8.83		310			17.3	72	65
A-22	46	500.20	.60	1.38	1.36 0.19		330			17.6	70	65
21	48	501.32	.41	.94	1.11 1.30	3.6	356			17.3	70	65

C-21

EPA Method 5 Field Data Sheet

Job Lehigh No 8 KILN — Operators _____ — Pitot No. _____ C_p _____

Source No 1-4 BH Stack — Sampling Train No. _____ $\Delta H_@$ _____ — Bar. Press. _____ in.Hg. B_{wo} _____ %

Date 2-17-83 Test 1 Run 3 — Gasmeter coeff. _____ Amb. Temp. _____ °F — Nozzle No. _____ Nozzle Dia. _____ in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (in Hg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	( )	( )			1.30							
A-20	50	502.58	.53	1.22	1.26 2.56	3.8	346	263	261	17.2	71	65
19	52	503.84	.53	1.22	3.82	4.0	344			17.2	72	65
18	54	505.48	.91	2.09	1.66 5.48		344			17.2	72	65
17	56	507.21	1.0	2.3	1.74 7.22	6.8	340			17.2	72	66
16	58	508.89	.91	2.09	8.85	6.3	340	258	260	17.2	73	66
15	60	510.56	.91	2.09	0.54	6.3	341			17.2	72	66
14	62	511.68	.40	.92	1.11 1.65	3.5	335			16.8	72	66
13	64	512.96	.50	1.15	1.24 2.89		358			17.3	73	66
12	66	514.28	.62	1.43	1.38 4.27	4.7	358			17.3	73	66
11	68	515.68	.62	1.43	5.65		324	253	261	17.3	74	66
10	70	517.53	1.1	2.53	1.89 7.53		330			17.2	74	66
9	72	519.54	1.3	3.00	2.03 9.56		335			17.2	74	66
8	74	521.49	1.2	2.76	1.94 1.50	9.0	347			17.1	74	66
7	76	523.34	1.1	2.53	1.86 3.36		347	259	255	17.1	74	66
6	78	524.92	.80 ◇	1.84	1.58 4.94	5.8	352			17.2	74	66
5	80	526.34	.65 ◇	1.50	1.41 6.35	4.8	363			17.2	74	66
4	82	527.87	.75 ◇	1.73	1.53 7.88		347			17.2	74	66
3	84	529.42	.75	1.73	9.41	5.5	351	263	259	17.0	74	66
2	86	531.42	1.3	3.00	2.01 1.42		356			16.8	74	66
1	88	533.35	1.2	2.76	1.94 3.36		347			17.0	74	66
	(1557)											
	$\theta = 88$	$V_m = 72.95$										

C-22

MAIN STACK

TEST NOS. 2 & 3

Preliminary Data — Method 2

— Interpoll Inc. —

Job Lehigh - No.8 Kiln

Source No.8 Main stack Date 2-18-83

Test No. 2 Run No. 1

Stack dimensions: ~~142~~ 83 1/2" in.

Dry bulb 346 °F Wet bulb 142 °F

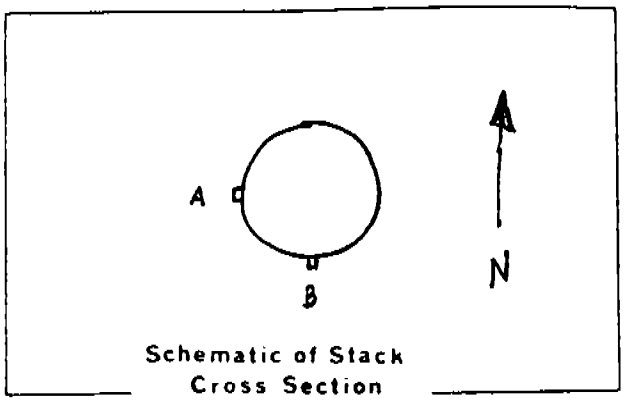
Rel. hum. ____ % B_{wo} ____ %

Barometric pressure (P_b) ____ in. Hg

Static pressure (P_g) -.09 in. WC ____ in. Hg

Operators J. Stack + S. Olson

Pitot No. 20 C_p .856 Port Length 3"



Schematic of Stack Cross Section

Traverse Point No.	Distance from Stack wall	Distance from End of Port	( ) Velocity Head (in. WC)	Temperature (°F)
A - 1	3.67	6 5/8		
2	12.19	15 1/4		
3	24.72	27 3/4		
4	58.78	61 3/4		
5	71.31	74 3/8		
6	79.83	82 7/8		
B - 1				
2				
3				
4				
5				
6				
25				avg.

Sample Log Sheet

Job Lehigh / No. 8 Kiln

Unit and Sampling Location No. 8 Kiln Mainstack

Date 2-18-87 Test 2 Run 1

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☒
posttest: 0 cfm at 6 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
Filter # 3442			
PW			
Wet Catch			
Total (Mn)			9

Impinger • ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	272	100	172
2	100	100	0
3	3	0	3
Drierite	1750	1734	16
Total (M_{wo})			191 g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 2 Bag No. 1

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.

Operator J. Stock 320-P Reading 6.3 % v/v

Job Lehigh / No 8 Kiln Operators JS + SO Pitot No. 20 C_p .856

Source No 8 Mainstack Sampling Train No. 8 $\Delta H_@$ 1.76 Bar. Press. 28.26 in.Hg. B_{wo} 20 %

Date 2-18-83 Test 2 Run 1 Gasmeter coeff. .9978 Amb. Temp. °F Nozzle No. 4-2 Nozzle Dia. .246 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in.WC)	Orifice Meter (in.WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1000)	(10.16)										
A-6	5	13.56	.75	1.65	343 359		260	260	250	6.2	54	44
5	10	17.15	.80	1.76	355 714	3.0	259			6.2	58	46
4	15	20.65	.78	1.72	350 064		257			6.3	58	46
3	20	24.21	.81	1.78	357 421		256			6.3	58	46
2	25	27.55	.70	1.54	338 753		256			6.2	58	46
1	30	30.85	.70	1.54	338 093	2.9	256			6.2	58	46
B-6	35	34.39	.80	1.76	355 448		258			6.3	58	46
5	40	38.07	.86	1.89	368 807		258			6.0	59	46
4	45	41.73	.84	1.85	365 172	3.3	256			6.0	60	48
3	50	45.19	.75	1.65	343 516		257			6.2	60	48
2	55	48.60	.75	1.65	343 859		256			6.2	60	48
1	60	52.02	.75	1.65	343 202		256			6.2	60	48
	(1101)											
	θ=60	V_m=41.86		$\overline{\Delta H}$=1.70								$\overline{t_m}$=52.42

106.36
2.20

40.77

C-26

S-0037R

Sample Log Sheet

Job Lehigh / No. 8 Kiln

Unit and Sampling Location No 8 Mainstack

Date 2-18-83 Test 2 Run 2

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☒
posttest: 0 cfm at 6 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
Filter # 3440			
PW			
Wet Catch			
Total (M_n)			g

Impinger • ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	238	100	138
2	140	100	40
3	4	0	4
Drierite	1371.1	1350	21.1
Total (M_{wo})			203.1 g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 2 Bag No. 2

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.
1138			
	400		
1239			

Operator JHowe 320-P Reading 6.2 % v/v

EPA Method 5 Field Data Sheet

Job Lehigh / No 8 Kiln Operators JS + SO Pitot No. 20 C_p .856

Source No 8 Mainstack Sampling Train No. 8 $\Delta H_@$ 1.76 Bar. Press. 28.26 in.Hg. B_{wo} 18 %

Date 2-18-83 Test 2 Run 2 Gasmeter coeff. .9978 Amb. Temp. ___ °F Nozzle No. 4-2 Nozzle Dia. .247 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1139)	(52.30)										
B-6	5	55.91	.82	1.80	359 589	3.0	258	260	250	6.4	56	48
5	10	59.48	.82	1.80	359 9.48		256			6.1	58	48
4	15	63.11	.84	1.85	365 313		256			6.1	60	48
3	20	66.68	.80	1.76	356 669		258			6.1	60	48
2	25	70.14	.75	1.65	349 083	3.1	257			6.2	60	48
1	30	73.38	.65	1.43	321 334		255			6.2	60	49
A-6	35	76.78	.75	1.65	344 678		256			6.2	60	48
5	40	80.33	.80	1.76	356 034		256			6.2	60	48
4	45	83.87	.80	1.76	356 390		256			6.1	60	48
3	50	87.44	.80	1.76	356 746	3.3	255			6.1	60	50
2	55	90.97	.78	1.72	351 097		255			6.1	60	50
1	60	94.42	.75	1.65	344 441		255			6.0	60	50
	(1239)											
	θ = 60	V_m = 42.12		$\overline{\Delta H}$ = 1.72								$\overline{t_m}$ = 55.00

C-28

S-0037R

Sample Log Sheet

Job Lehigh / No. 8 Kiln

Unit and Sampling Location No 8 Mainstack

Date 2-18-83 Test 2 Run 3

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☒
posttest: 0 cfm at 5.6 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
Filter # 3443			
PW			
Wet Catch			
Total (Mn)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	242	100	142
2	140	100	40
3	4	0	4
Drierite		1340	1358.9
Total (M_{wo})			g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 2 Bag No. 3

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.
1336			
	400		
1430			

Operator J Hawks 320-P Reading 6.2 % v/v

Job Lehigh / No. 8 Kiln Operators JS + SO Pitot No. 20 C_p .856

Source No 8 Mainstack Sampling Train No. 8 $\Delta H_@$ 1.76 Bar. Press. 28.26 in.Hg. B_{wo} 19 %

Date 2-18-83 Test 2 Run 3 Gasmeter coeff. .9978 Amb. Temp. 45°F Nozzle No. 4-2 Nozzle Dia. .246 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in.WC)	Orifice Meter (in.WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1336)	(94.70)										
B-6	5	98.19	.75	1.65	350 920		260	260	265	6.3	60	50
5	10	101.94	.85	1.91	374 194	3.2	256			6.3	66	52
4	15	105.68	.85	1.91	374 368		258			6.2	66	52
3	20	109.33	.80	1.80	366 950		258			6.2	66	52
2	25	112.94	.80	1.80	362 292		258			6.2	66	52
1	30	116.42	.75	1.65	350 642		257			6.2	66	52
A-6	35	120.16	.85	1.91	374 016	3.4	257			6.2	66	52
5	40	123.93	.88	1.98	380 396		258			6.2	66	54
4	45	127.75	.88	1.98	380 776		258			6.1	66	54
3	50	131.27	.75	1.65	350 126	3.2	258			6.1	66	54
2	55	134.86	.77	1.73	355 481		256			6.1	66	54
1	60	138.09	.65	1.46	327 708		255			6.3	66	54
	(1437)											
	Θ=60	V_m=43.39		$\overline{\Delta H}$=1.79								$\overline{t_m}$=59.08

10P.45 C-30

Sample Log Sheet

Job Lehigh / No. 8 Kiln

Unit and Sampling Location No 8 Mamstac 2

Date 2-18-87 Test 3 Run 1

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☒

posttest: 0 cfm at 7 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
Filter # 3444			
Probe			
Back Catch			
Total (M_n)			g

Impinger • ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	221	100	121
2	115	100	50
3	6	0	6
Drierite	1405.3	1384	21.3
Total (M_{wo})			198.3 g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 6 Bag No. 1

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.
1527			
	400		
	↓		
1629			

Operator [signature] 320-P Reading 6.1 % v/v

Job Lehigh / No. 8 Kiln Operators JS + SO Pitot No. 20 C_p .856

Source No. 8 Mainstack Sampling Train No. 9 $\Delta H_@$ 1.96 Bar. Press. 29.26 in.Hg. B_{wo} 20 %

Date 2-18-83 Test 3 Run 1 Gasmeter coeff. .9978 Amb. Temp. 32 °F Nozzle No. 4-2 Nozzle Dia. .246 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (in Hg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1527)	(158.40)										
A-6	5	142.11	.85	1.91	374 214	3.2	262	260	265	6.0	60	52
5	10	145.81	.85	1.91	374 518		261			6.2	62	52
4	15	149.55	.84	1.89	370 958		262			6.2	64	52
3	20	153.22	.80	1.80	361 319	3.6	262			6.2	64	52
2	25	156.70	.75	1.69	350 609		260			6.4	64	52
1	30	159.90	.63	1.42	338 989		259			6.3	64	52
B-6	35	163.46	.78	1.76	356 345		259			6.3	64	52
5	40	167.15	.84	1.89	370 715	3.9	262			6.2	64	52
4	45	170.77	.80	1.80	361 076		261			6.0	64	52
3	50	174.37	.80	1.80	361 437		261			6.0	64	52
2	55	177.86	.75	1.69	350 787		261			6.0	64	52
1	60	181.25	.70	1.58	339 125		259			6.0	64	52
	(1628)											
	Θ = 60	V_m = 42.85		$\overline{\Delta H}$ = 1.76								$\overline{T_m}$ = 57.75

108.45

C-32

S-0037R

Sample Log Sheet

Job Lehigh / No. 8 Kiln

Unit and Sampling Location No. 8 Mainstack

Date 2-18-83 Test 3 Run 2

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☑

posttest: 0 cfm at 5 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
Filter 3445			
PW			
Wash Catch			
Total (M_n)			

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	226	100	126
2	143	100	43
3	4	0	4
Drierite	1377.6	1358.9	18.7
Total (M_{wo})			191.70 g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 6 Bag No. 2

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.
1044			
	400		
1746			

Operator J Stock 320-P Reading 6.2 % v/v

EPA Method 5 Field Data Sheet

Job Lehigh / No. 8 Kiln Operators JS + SD Pitot No. =0 C_p .856

Source No. 8 Mainstack Sampling Train No. 8 Bar. Press. 29.26 in.Hg. B_{wo} 18 %

Date 2-18-83 Test 3 Run 2 Gasmeter coeff. .9971 Amb. Temp. [illegible] Nozzle No. 4-2 Nozzle Dia. .246 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1644)	(181.50)										
B-6	5	185.60	.75	1.69	350 500	2.8	260	260	265	6.4	56	50
5	10	188.49	.75	1.69	350 550		261			6.3	56	50
4	15	192.16	.85	1.87	365 215		261			6.3	56	50
3	20	195.79	.85	1.87	365 580		261			6.3	56	50
2	25	199.35	.80	1.76	355 935	3.2	264			6.2	54	46
1	30	202.68	.70	1.54	333 268		264			6.1	54	46
A-6	35	206.31	.85	1.87	365 633		262			6.1	54	46
5	40	209.97	.85	1.87	365 998		264			6.3	52	42
4	45	213.62	.85	1.87	365 363		262			6.2	52	42
3	50	217.18	.80	1.76	355 718	5.4	262			6.2	52	42
2	55	220.51	.70	1.54	333 051		256			6.2	52	42
1	60	223.81	.70	1.54	333 331		252			6.1	52	42
	(1746)											
	θ = 60	V_m = 42.31		$\overline{\Delta H}$ = 1.74								$\overline{t_m}$ = 50.0

106.36

C34

Sample Log Sheet

Job Lehigh / No. 8 Kiln

Unit and Sampling Location No. 8 Mainstack

Date 2-18-83 Test 3 Run 3

Sample Train: Leak check pretest : < 0.02 cfm at 19 in. Hg. (vac) ☒

posttest: 0 cfm at 6 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
Filter			
PW			
Wet Catch			
Total (M_n)			

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	234	100	134
2	142	100	42
3	4	0	4
Orientite	1419.4	1405.3	14.1
Total (M_{wo})			194.1 g

Integrated Flue Gas Sampling Data

FG Train No. B-1 Box No. 6 Bag No. 3

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 1

Time	cc/min.	Time	cc/min.
	400		
	↓		

Operator [signature] 320-P Reading _____ % v/v

S-9946R

Method 5 Field Data Sheet

Job Lehigh / No. 8 Kiln Operators JS + SO Pitot No. 20 C_p .856

Source No. 8 Mainstack Sampling Train No. 8 $\Delta H_@$ 1.76 Bar. Press. 29.26 in.Hg. B_{wo} 20 %

Date 2-18-82 Test 3 Run 3 Gasmeter coeff. .9978 Amb. Temp. 36 °F Nozzle No. 4-2 Nozzle Dia. .246 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (in Hg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1800)	(224.00)										
A-6	5	227.64	.85	1.87	368 768		250	260	260	6.3	50	40
5	10	231.35	.85	1.87	368 136		250			6.2	50	40
4	15	234.95	.82	1.80	361 497	3.2	252			6.4	50	40
3	20	238.47	.78	1.72	357 850		252			6.4	50	42
2	25	241.84	.70	1.54	334 184		252			6.1	50	42
1	30	245.06	.65	1.43	322 506		251			6.2	50	42
B-6	35	248.50	.78	1.72	353 850	3.3	249			6.1	50	40
5	40	252.01	.78	1.72	353 203		249			6.1	50	40
4	45	255.56	.80	1.76	355 558		252			6.4	50	40
3	50	259.26	.85	1.87	368 926		252			5.9	50	40
2	55	262.94	.85	1.87	368 294	3.5	252			5.9	50	40
1	60	266.27	.70	1.54	334 628		252			6.1	50	40
	(1902)											
	Θ = 60	V_m = 42.97		$\overline{\Delta H}$ 1.73								$\overline{t_m}$ 45.25

C-36

NO. 7 BAGHOUSE OUTLET

TEST NO. 2

Preliminary Data — Method 2

— Interpoll Inc. —

Job Lehigh No 8 KILN

Source No 7 Baghouse Stack Date 2-18-83

Test No. 2 Run No. 1

Stack dimensions: 25 3/4 in.

Dry bulb ____ °F Wet bulb ____ °F

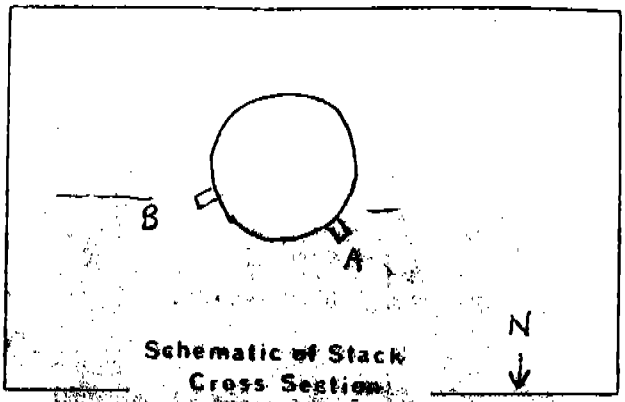
Rel. hum. ____ % B_{wo} ____ %

Barometric pressure (P_b) ____ in. Hg

Static pressure (P_g) -.3 in. WC ____ in. Hg

Operators P. LONNES C.M.

Pitot No. 23 C_p .846 Port Length ____



Schematic of Stack Cross Section

Traverse Point No.	Distance from Stack wall	Distance from End of Port	Velocity Head (in. WG)	Temperature (°F)
A-1	.84	6		
2	1.73	7 1/4		
3	3.04	8 1/2		
4	4.56	10		
5	6.44	12		
6	9.17	14 5/8		
7	16.58	22 1/8		
8	19.31	24 7/8		
9	21.19	26 5/8		
10	22.71	28 1/4		
11	24.02	29 1/2		
12	25.21	30 3/4		
25				avg.

Sample Log Sheet

Job Lehigh No3 KILN

Unit and Sampling Location No 7 BH Stack

Date 2-18-75 Test 2 Run 1

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☒

posttest: 0 cfm at 6 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER # 3368			
PW			
Total (M_p)			g.

Impinger • ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	143	100	43
2	118	100	18
3	0	0	0
Desiccant	1319	1310	9
Total (M_{wo})			70 g

Integrated Flue Gas Sampling Data

FG Train No. B-4 Box No. 1 Bag No. 1

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.
	400		

Operator P. LONNES 320-P Reading _____ % v/v

S-0046R

EPA Method 5 Field Data Sheet

Job Lehigh No 8 KILN Operators P. LOWNES E. MANSON Pitot No. 23 C_p .848

Source No 7 Baghouse Stack Sampling Train No. 7 $\Delta H_@$ 1.99 Bar. Press. 28.61 in.Hg. B_{wo} 8 %

Date 2-18-83 Test 2 Run 1 Gasmeter coeff. 1.0014 Amb. Temp. ___ °F Nozzle No. 7-1 Nozzle Dia. .188 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in.WC)	Orifice Meter (in.WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1000)	(533.80)										
A-12	2.5	535.63	2.2	1.76	1.83 / 5.63	5.8	325	276	260	17.2	48	45
11	5	537.46	2.2	1.76	7.46		322			17.2	50	45
10	7.5	539.26	2.2	1.76	9.26	6.6	322			17.2	52	46
9	10	541.01	2.0	1.6	1.75 / 1.01	5.7	323			17.2	54	46
8	12.5	542.76	2.0	1.6	2.76		318	276	260	17.2	56	46
7	15	544.16	1.15	.86	1.33 / 4.09	3.5	318			16.2	56	47
6	17.5	545.86	2.0	1.5	1.75 / 5.84	5.0	319			17.3	60	47
5	20	547.57	1.9	1.39	1.71 / 7.55		318			17.3	60	48
4	22.5	549.19	1.75	1.26	1.64 / 9.19		318		263	17.3	62	48
3	25	550.80	1.70	1.22	1.62 / 0.81	4.3	315			17.3	62	48
2	27.5	552.32	1.45	1.06	1.51 / 2.32	4.2	316			17.3	63	49
1	30	553.75	1.25	.93	1.41 / 3.73		310			17.3	64	50
B-12	2.5	555.37	1.75	1.30	1.66 / 5.39		318			17.3	63	51
11	5	557.02	1.70	1.26	1.63 / 7.02	4.8				17.4	65	52
10	7.5	558.67	1.70	1.28	1.65 / 8.68					17.3	65	52
9	10	560.27	1.55	1.16	1.59 / 0.28					17.3	66	52
8	12.5	561.84	1.55	1.16	1.57	4.8				17.3	67	53
7	15	563.33	1.40	1.05	1.49 / 3.31					17.3	67	54
6	17.5	564.47	.84	.62	1.14 / 4.45					19.8	67	54
5	20	566.12	1.70	1.26						17.5	68	54
4	22.5	567.75	1.70	1.26	1.63					17.3	66	54
3	25	569.35	1.55	1.16	1.58 / 3.35	4.4			263	17.3	69	55
2	27.5	570.74	1.20	.90	1.39 / 0.74		311			17.2	68	56
1	30	571.95	.92	.69	1.22 / 1.96		310			17.8	68	56

temp. exclusion ≥ 260

C-40

θ = 60 (1101) V_m = 38.15

S-0037R

Sample Log Sheet

Job LENIGN No 8 KILN

Unit and Sampling Location No 7 BN STACK

Date 2-18-89 Test 2 Run 2

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☑

posttest: _____ cfm at ___ in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER #3369			
PW			
Total (M_n)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	132	100	32
2	108	100	8
3	0	0	0
Desiccant	1206	1186	20
Total (M_{wo})			60 g

Integrated Flue Gas Sampling Data

FG Train No. B-4 Box No. 1 Bag No. _____

Bag Material Tedlar Bag Volume 44 L

Pretest leak check _____ cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.
	46		
	↓		

Operator P. LONNES 320-P Reading _____ % v/v

S-0046R

EPA Method 5 - Field Data Sheet

Job Lehigh NO8 KILN Operators PL & CM Pitot No. 23 C_p .848

Source NO 7 BH STACK Sampling Train No. 7 $\Delta H_@$ 1.27 Bar. Press 28.61 in.Hg. B_{wo} 8 %

Date 2-18-83 Test 2 Run 2 Gasmeter coeff. 1.0014 Amb. Temp. °F Nozzle No. 7-1 Nozzle Dia. .188 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in. WC)	Orifice Meter (in. WC)	ΔV (mcf)	Vac. (in Hg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1138)	(582.80)										
A-12	2.5	584.08	.91	.68	1.22 4.10		300	260	258	17.5	66	59
11	5	585.37	1.00	.75	1.27 5.37		310			18.7	69	59
10	7.5	586.78	1.2	.90	1.39 6.76	3.5	310			18.3	70	59
9	10	588.17	1.2	.90	8.15		308			18.2	70	59
8	12.5	589.50	1.1	.83	1.33 9.48	3.2	308	260	257	18.1	70	59
7	15	590.78	1.0	.76	1.25 0.74		308			18.1	70	60
6	17.5	592.06	1.0	.76	2.04		312			18.1	70	60
5	20	593.32	1.0	.76	3.32	2.9	312			18.0	70	60
4	22.5	594.35	.62 1.0	.47	1.01 4.33	2.4	308 ↓270	260	251	19.0 19.6 ↑	69	60
3	25	595.67	1.05	.80	1.32 5.65		308			17.8	70	60
2	27.5	596.85	.85	.64	1.18 6.83		308			18.0	70	60
1	30	597.87	.65	.49	1.04 7.27		305			18.0	70	60
A-12	32.5	598.98	.72	.54	1.09 8.96	2.4	30		252	18.3	68	60
11	35	600.06	.72	.54	.05		31			18.4	68	60
10	37.5	601.16	.72	.53	1.14		31			18.5	69	60
9	40	602.40	.95	.70	1.25 2.39		31			18.6	70	60
8	42.5	603.71	1.05	.78	3.71	3.0	310			18.3	70	60
7	45	605.02	1.05	.78	5.03		310			18.3	70	60
6	47.5	606.30	1.0	.75	1.28 6.31		307			18.3	70	60
5	50	607.52	.88	.65	1.21 7.52		30			18.3	70	60
4	52.5	608.67	.81	.60	1.15 8.67	2.9	3			19.0	70	60
3	55	609.84	.81	.60	9.84					18.1	70	60
2	57.5	610.99	.81	.60	1.15 0.99		31			19.3	70	61
1	60	612.25	1.0	.72	2.25		305			18.0	70	61

θ = 60 (1139) V_m = 29.45

Sample Log Sheet

Job Lehigh No 8 KILN

Unit and Sampling Location No 7 Baghouse Stack

Date 2-18-83 Test 2 Run 3

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☑

posttest: 0 cfm at 7 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER # 3370			
PW			
Total (M_n)			

Impinger • ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	150	100	50
2	116	100	16
3	0	0	0
Desiccant	1333	1313	20
Total (M_{wo})			86 g

Integrated Flue Gas Sampling Data

FG Train No. B-4 Box No. 1 Bag No. _____

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.
	400		
	↓		

Operator P. LONNES 320-P Reading _____ % v/v

S-0046R

EPA Method 5 Field Data Sheet

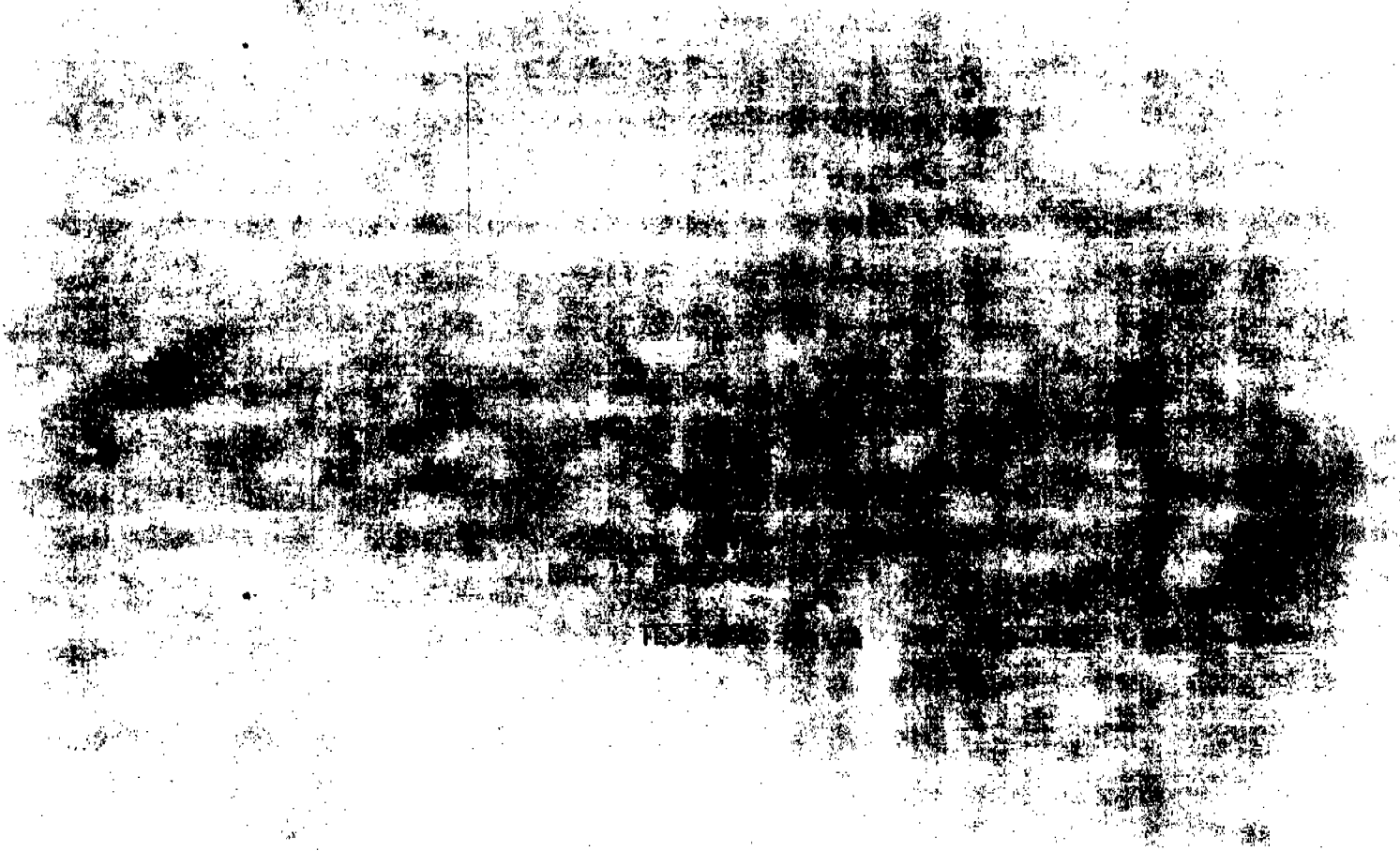
Job Lehigh No 8 KILN Operators PL & CM Pitot No. 23 C_p .848

Source No 4 BH STACK Sampling Train No. 7 $\Delta H_@$ [illegible] Barometer 28.61 in.Hg. B_{wo} 8 %

Date 2-18-83 Test 2 Run 3 Gasmeter coeff. 1.0014 Amb. Temp. [illegible] °F Nozzle No. 7-2 Nozzle Dia. .254 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in.WC)	Orifice Meter (in.WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1336)	(612.40)										
A-12	2.5	613.91	.40	1.07	1.49 3.89	3.5	310	257	261	17.8	65	63
11	5	615.56	.50	1.34	1.69 5.58	4.0	295			17.5	72	63
10	7.5	617.34	.55	1.47	1.76 7.34	4.1	300			17.7	74	63
9	10	619.20	.60 ◇	1.60	1.87 9.21	4.7	280			18.3 [20]	76	64
8	12.5	621.34	.82	2.20	2.14 1.35	6.2	307	249	251	17.7	77	64
7	15	623.59	.88	2.40	2.24 3.59	7.8	293			17.4	79	65
6	17.5	625.66	.77	2.1	2.09 5.68		295			17.3	79	65
5	20	627.74	.75	2.06	2.06 7.74	6.0	298			17.3	79	65
4	22.5	629.80	.75	2.06	2.06 9.80		295	250	250	17.4	79	66
3	25	631.70	.65	1.79	1.92 1.72	5.3	295			17.5	80	67
2	27.5	633.65	.65	1.79	3.64		292			17.6	80	67
1	30	635.78	.80	2.2	2.14 5.78	6.4	296			17.7	80	67
A-12	32.5	637.83	.72	1.98	2.03 7.81		293	244	259	17.5	78	67
11	35	639.94	.80	2.2	2.14 9.95	6.2	295			17.6	80	67
10	37.5	642.21	.90	2.5	2.26 2.21		295			17.6	80	67
9	40	644.35	.80	2.2	2.14 4.35	6.3	296			17.6	81	68
8	42.5	646.50	.80	2.2	6.49	6.3	296			17.6	80	68
7	45	648.02	.40 ◇	1.07	1.51 8.00		298	244	260	18 [20]	80	68
6	47.5	649.93	.65 ◇	1.79	1.92 9.92	5.2	298			17.8	80	68
5	50	651.35	.35	.96	1.41 1.33		293			18.1	80	69
4	52.5	652.76	.35 ◇	.96	1.74	3.3	293			18.6	80	69
3	55	654.87	.80	2.2	2.14 4.88	6.0	293	252	260	17.7	80	69
2	57.5	656.91	.72	1.98	2.03 6.91	5.8	292			18.3	80	69
1	60	658.50	.45	1.24	1.60 8.51		293			17.7	80	70

(1438) V_m = 46.10



Preliminary Data — Method 2

— Interpoll Inc. —

Job LEHIGH NO. 8 KILN

Source NO 11 BAGHOUSE STACK Date 2-18-83

Test No. 2 Run No. _____

Stack dimensions: 25 3/4" in.

Dry bulb _____ °F Wet bulb _____ °F

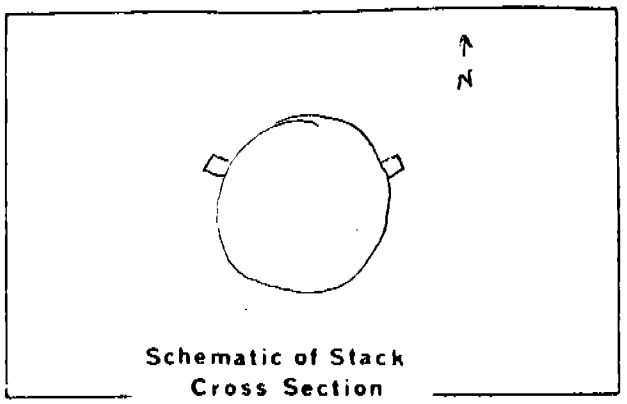
Rel. hum. _____ % B_{wo} _____ %

Barometric pressure (P_b) _____ in. Hg

Static pressure (P_g) _____ in. WC _____ in. Hg

Operators P. LONNES C. MANSON

Pitot No. _____ C_p _____ Port Length 6 1/4"



Schematic of Stack Cross Section

Traverse Point No.	Distance from Stack wall	Distance from End of Port	Velocity Head (in. WC)	Temperature (°F)
A1	.54	6 3/4"		
2	1.73	8"		
3	3.04	9 1/4"		
4	4.56	10 3/4"		
5	6.49	12 3/4"		
6	9.17	15 3/8"		
7	16.58	22 3/4"		
8	19.31	25 1/2"		
9	21.19	27 3/8"		
10	22.71	29"		
11	24.02	30 1/4"		
12	25.21	31 1/2"		
B1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
25				avg.

Sample Log Sheet

Job Lehigh No 8 KILN

Unit and Sampling Location No 11 BH Stack

Date 2-18-83 Test 3 Run 1

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☑

posttest: _____ cfm at ___ in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER # 3365			
PW			
Total (M_n)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	160	100	60
2	126	100	26
3	0	0	0
Desiccant	1313	1288	
Total (M_{wo})			g

Integrated Flue Gas Sampling Data

FG Train No. B-4 Box No. 1 Bag No. _____

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.
	40 cc.		
	↓		

Operator P. Lonnes 320-P Reading _____ % v/v

S-0046R

EPA Method 5 Field Data Sheet

Job Lehigh No 8 KILN Operators P.L. & CM Pitot No. 23 C_p .848

Source No 11 BH STACK Sampling Train No. 7 ΔH_2 1.78 Bar. Press. 28.61 in.Hg. B_{wo} 8 %

Date 2-18-83 Test 3 Run 1 Gasmeter coeff. 1.0014 Amb. Temp. ___ °F Nozzle No. 7-2 Nozzle Dia. .254 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in.WC)	Orifice Meter (in.WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	%oxygen 4 (% v/v)	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
	(1527)	(658.70)										
B-12	2.5	660.75	.75	2.06	2.06 0.76		300	261	253	17.5	68	65
11	5	663.60	.90	2.48	2.82 3.02	7.1	290			17.3	73	65
10	7.5	665.32	.95	2.61	2.33 5.35	7.8	291			17.4	75	66
9	10	667.66	.95	2.61	7.68	8.1	297			17.8	76	66
8	12.5	670.16	1.1 ◇	3.08	2.51 0.19	9.3	296	263	260	17.5	76	66
7	15	672.68	1.1	3.08	2.70	9.5	290			17.4	77	66
6	17.5	675.40	1.3	3.64	2.73 5.43	11.7	297			17.6	77	66
5	20	677.93	1.1	3.08	2.51 7.94	9.9	294			17.6	77	66
4	22.5	680.20	.90	2.48	0.20		293	262	260	17.5	77	66
3	25	682.39	.82	2.30	2.17 2.37		289			17.6	77	66
2	27.5	684.35	.68 ◇ 1.05	1.88	1.98 4.35	6.0	288			18.5 ↑17.7	78	67
1	30	686.33	.68	1.88	6.33		285			17.6	78	67
A-12	32.5	688.48	.80	2.24	2.14 8.47	6.8	298		267	17.6	78	67
11	35	690.87	1.0	2.8	2.39 0.86	8.3	291			17.3	78	67
10	37.5	693.27	1.0	2.8	3.25		290			17.3	78	67
9	40	695.72	1.05	2.94	2.46 5.71		283			17.2	78	67
8	42.5	698.13	1.0	2.8	2.39 8.1	8.3	284			17.3	79	68
7	45	700.45	.95 ◇ 1.1	2.61	0.43					17.3 ↑18.6	79	68
6	47.5	703.08	1.2	3.36	2.63 3.06					17.4	80	68
5	50	705.40	.95	2.61	2.33 5.39	7.8	289			17.5	80	68
4	52.5	707.68	.90	2.48	2.26 7.65		290	263	259	17.4	80	68
3	55	709.93	.90	2.48	2.25 9.90					17.3	79	68
2	57.5	712.18	.90	2.48	2.24 2.14	7.8				17.3	79	68
1	60	714.44	.90	2.48	4.43		290			17.4	78	68

θ = 60 (1631) V_m = 55.74

— Interpoll Inc —

S-0037R

C-48

Sample Log Sheet

Job Lehigh No 8 KILN

Unit and Sampling Location No 11 BH STACK

Date 2-18-93 Test 3 Run 2

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☑

posttest: 0 cfm at 13 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER # 3366			
PW			
Total (M_n)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	172	100	72
2	124	100	24
3	0	0	0
Desiccant	1356	1339	17
Total (M_{wo})			g

Integrated Flue Gas Sampling Data

FG Train No. B-4 Box No. 1 Bag No. _____

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.
	400		
	↓		

Operator P. CONNES 320-P Reading 17.2 % v/v

EPA Method 5 Field Data Sheet

Job Lehigh No 8 KILN Operators P.L & CM Pitot No. 23 C_p .848

Source No 11 BH Stack Sampling Train No. 7 Bar. Press 28.61 in.Hg. B_{wo} ____ %

Date 2-18-83 Test 3 Run 2 Gasmeter coeff. 1.0014 Amb. Temp. ____ °F Nozzle No. 7-2 Nozzle Dia. .254 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in.WC)	Orifice Meter (in.WC)	ΔV (mcf)	Vac. (inHg)	Stack Temp (°F) 1	Probe Temp (°F) 2	Oven Temp (°F) 3	Oxygen (% v/v) 4	Gasmeter temp IN (°F) 5	Gasmeter temp OUT (°F) 6
---	(1644)	(714.60)										
B-12	2.5	716.68	.75	2.1	2.07 6.67	5.5	292	258	260	17.8	73	66
11	5	718.84	.81	2.27	2.15 8.82		298			17.8	75	67
10	7.5	721.37	1.1	3.08	2.58 1.40		150			17.3	76	67
9	10	724.07	1.2	3.36	2.69 4.09	9.5	298			17.2	77	67
8	12.5	726.63	1.1	3.08	2.56 6.65	9.0	260	258	268	17.3	77	67
7	15	729.08	1.0	2.9	2.44 9.09		262			17.2	76	66
6	17.5	731.47	.95	2.7	2.37 1.46	7.8	268			17.2	76	66
5	20	733.90	1.0	2.9	2.90					17.3	76	66
4	22.5	736.32	1.0	2.9	6.34	8.5	2		0	17.3	76	66
3	25	738.78	1.0	2.9	8.78		2			17.2	76	66
2	27.5	741.22	1.0	2.9	1.22		2			17.2	76	66
1	30	743.52	.90	2.54	2.30 3.67	7.2	2			17.2	76	66
A-12	32.5	746.21	1.2	3.4	6.21					17.2	76	66
11	35	748.9	1.2	3.4	8.9					17.2	75	66
10	37.5	751.59	1.2	3.4	1.59					17.2	75	66
9	40	753.36	.58 .52	1.46	1.74 3.33					17.2	75	66
8	42.5	756.27	1.5	4.3	2.95 6.28	13			12	17.2	76	66
7	45	759.16	1.4	3.92	2.85 9.13	10				17.2	76	66
6	47.5	761.68	1.1	3.08	2.53 1.66					17.2	74	66
5	50	764.27	1.1	3.08	4.24					17.2	74	66
4	52.5	766.74	1.1	3.08	6.72					17.1	74	66
3	55	769.17	1.0	2.8	2.41 9.18	6.5				17.2	75	66
2	57.5	771.61	1.0	2.8	1.59					17.7	75	66
1	60	773.87	.90	2.54	3.89		278			18.0	75	66

(1746) V_m = 59.27

Sample Log Sheet

Job Lehigh No8 KILN

Unit and Sampling Location No 11 BH STACK

Date 2-18-83 Test 3 Run 3

Sample Train: Leak check pretest : < 0.02 cfm at 15 in. Hg. (vac.) ☑
posttest: 0 cfm at 13 in. Hg. (vac.)

Particulate Sample Type and Number	Weights		
	Final	Tare	Difference
FILTER # 3367			
PW			
Total (M_n)			g

Impinger ☒ Condenser ☐

Impinger Number	Weights		
	Final	Tare	Difference
1	160	100	60
2	116	100	16
3	0	0	0
Desiccant	1226	1206	20
Total (M_{wo})			g

Integrated Flue Gas Sampling Data

FG Train No. B-4 Box No. 1 Bag No. _____

Bag Material Tedlar Bag Volume 44 L

Pretest leak check 0 cc/min at 15 in. Hg. 320-P No. 4

Time	cc/min.	Time	cc/min.

Operator D. LONNES 320-P Reading _____ % v/v

S-0046R

EPA Method 5 Field Data Sheet

Job Lehigh No 8 KILN Operators PL & CM Pitot No. 23 C_p .848

Source No 11 BH STACK Sampling Train No. 7 $\Delta H_@$ ____ Bar. Press. 29.61 in.Hg. B_{wo} ____ %

Date 2-18-83 Test 3 Run 3 Gasmeter coeff. 1.0014 Amb. Temp. ____ °F Nozzle No. 7A Nozzle Dia. .254 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (ft^3)	Velocity Head (in.WC)	Orifice Meter (in.WC)	ΔV (mcf)	Vac. (inHg)	1 Stack Temp (°F)	2 Probe Temp (°F)	3 Oven Temp (°F)	4 Oxygen (% v/v)	Gasmeter temp 5 IN (°F)	Gasmeter temp 6 OUT (°F)
	(1800)	(774.10)										
B-12	2.5	775.82	.50 ◇	1.4	1.69 5.79		290	250	250	17.8	65	64
11	5	778.65	1.4	3.92	2.83 8.62	11.3	288	—	—	17.7	68	64
10	7.5	781.28	1.2	3.36	2.64 1.26		280			17.2	69	63
9	10	783.81	1.1	3.08	2.53 3.79		280			17.2	70	63
8	12.5	786.23	1.0	2.8	2.41 6.20		280	250	263	17.2	71	63
7	15	788.63	1.0	2.8	8.61		281			17.2	71	63
6	17.5	791.04	1.0	2.8	1.02	8.0	282			17.2	72	63
5	20	793.32	.90 ◇	2.5	2.28 3.30		281			18.3	72	63
4	22.5	796.13	1.4	3.92	2.83 6.13		280	247	260	17.7	72	63
3	25	798.80	1.2	3.36	2.64 8.77	10	278			17.2	72	63
2	27.5	801.05	.90	2.5	2.28 1.05		280			17.1	72	63
1	30	803.32	.90	2.5	3.33		280			17.0	72	63
A-12	32.5	805.05	.50 ◇	1.4	1.69 5.02	4.2	280	[illegible]	263	17.2	70	63
11	35	806.35	.30 ◇	.84	1.31 6.33		280			18.0	72	63
10	37.5	808.33	.70	1.96	2.66 8.33	5.0	283			15.7	72	63
9	40	810.33	.70	1.96	0.33		280			17.8	72	62
8	42.5	812.36	.70	1.96	2.33	5.3	283			17.8	72	62
7	45	814.39	.75	2.11	2.07 4.40		[illegible]			17.8	72	62
6	47.5	816.32	.65	1.8	1.93 6.33		[illegible]			17.8	72	62
5	50	817.96	.45	1.26	1.61 7.94	3.8	272			18.0	72	62
4	52.5	819.03	.20	.56	1.07 9.01		273		272	17.7	72	62
3	55	820.72	.50	1.4	1.68 0.70		[illegible]			17.7	72	62
2	57.5	822.39	.50	1.4	2.39		[illegible]			17.3	72	62
1	60	824.07	.50	1.4	4.08	4.0	275			17.3	72	62

θ = 60 (1203) V_m = 49.97

APPENDIX B

LABORATORY DATA SHEETS

SAMPLE DEPOSITION SHEET

1. No 8 Kiln Cooler
2. No 1, 2, 3 & 4 BH outlet
3. No 8 Mainstack
4. No 7 BH outlet
5. No 11 BH outlet

Job LeHigh Cement / No 8 Kiln Site

Team Leader Jeff Stock Priority ASAP

Date Submitted 2-21-83

Test No(s). 6 Number of Runs Completed 18

No. of Samples	Type of Sample	Analysis Required	Date Analyzed	Other Information or Special Instructions
18	Probe Wash	☒ As per EPA 5 ☐ _____		use no water
18	Filter: ☒ 4" glass fiber ☐ Stainless steel ☐ ERC	☒ As per EPA 5 ☐ _____		use no water
18	Wet Catch	☒ Organic ☒ Inorganic ☐ SO_2 Other: _____		
18	Orsat			
0	SO_2			
0	NO_x			
0	Fuel Sample			

Source Information

1) Type of source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☒ Other Cement Kiln

2) Fuel: ☑ Coal ☐ Wood ☐ Gas ☐ Oil ☐ Other _____

3) Is sample combustible? ☑ No ☒ Yes

4) Does sample need special desiccating? ☒ No ☐ Yes If yes, explain _____

5) Is particle size analysis required ☒ No ☐ Yes If yes, how many run(s)? _____
run preference _____

S-278R

EPA METHOD 3

LABORATORY REPORT

SUMMARY OF ORSAT DATA

Job: Lehigh Cement
Sampling Location: No. 8 Kiln Cooler Stack
Sampling Date: 2-17-83
Analysis Date:
Technician:

Laboratory Client No. 1000
Batch No. 255
Date Received 2-21-83

Sample No. TEST NO. AND DATE	RUN NO.	INTEGRATED BAG					ANALYZER
2-17-83	1						
2-17-83	2		2092				
384a 2-17-83	3	0	2089				

EPA METHOD 3

LABORATORY REPORT

SUMMARY OF ORSAT DATA

Job: Lehigh Cement
Sampling Location: No. 1-4 B.H. Stack
Sampling Date: 2-17-83
Analysis Date:
Technician:

Laboratory Client No. 1000
Batch No. 255
Date Received 2-21-83

Sample No. TEST NO. AND DATE	RUN NO.	RESULTS						
		INTEGRATED (BAG)			GRAB (BULB)			O_2 ANALYZER
		% CO_2	% O_2	% CO	% CO_2	% O_2	% CO	% O_2
3844 1 2-17-83	1	3.4	17.6					(17.2)f (17.6)L
3848 1 2-17-83	2	4.0	17.6					(17.2)f (17.6)L
3852 1 2-17-83	3	4.0	17.4					(17.2)f (17.4)L

Form #L-200 R

EPA METHOD 3

LABORATORY REPORT

SUMMARY OF ORSAT DATA

Job: Lehigh Cement
Sampling Location: No 8 Main Stack
Sampling Date: 2-18-83
Analysis Date:
Technician:

Laboratory Client No 1000
Batch No 255
Date Received 2-21-83

TEST NO. AND DATE	RUN NO.	RESULTS						
		INTEGRATED (BAG) Box 2			GRAB (BULB)			ANALYZER
		% CO_2	% O_2	% CO	% CO_2	% O_2	% CO	% O_2
3856 2-18-83	1	27.0	6.0					
3860 2-18-83	2	27.4	6.6					
3864 2-19-83	3	27.6	5.9					

Form #L-200 R

EPA METHOD 3

LABORATORY REPORT

SUMMARY OF ORSAT DATA

Job: LaFarge Cement
Sampling Location: No 8 Mainstack
Sampling Date: 2-18-83
Analysis Date:
Technician:

Laboratory client No 100
Batch No 255
Date received 2-21-83

Sample No TEST NO. AND DATE	RUN NO.	INTEGRATED (BAG) Box C			GRAB			ANALYSIS
		% CO_2	% O_2	% CO	% CO_2	% O_2	% CO	% N_2
3884 3 2-18-83	1	27.4	6.6					
3884 3 2-18-83	2	27.8	7.0					
3884 3 2-18-83	3	27.6	6.4					

Form #L-200 R

EPA METHOD 3

LABORATORY REPORT

SUMMARY OF ORSAT DATA

Job: Lehigh Cement
Sampling Location: No. 7 Baghouse Stack
Sampling Date: 2-18-83
Analysis Date:
Technician:

Laboratory Client No. 1000
Batch No. 255
Date Received 2-21-83

Sample No. TEST NO. AND DATE	RUN NO.	RESULTS						
		INTEGRATED (BAG) Box #1			GRAB (BULB)			O_2 ANALYZER
		% CO_2	% O_2	% CO	% CO_2	% O_2	% CO	% O_2
3868 2 2-18-83	1	3.60	17.6					(17.5)f (17.6)L
3872 2 2-18-83	2	2.80	18.4					(18.0)f (18.4)L
3876 2 2-18-83	3	2.74	18.26					

Form #L-200 R

LABORATORY REPORT

SUMMARY OF ORGAT DATA

Job: [redacted]
Sample [redacted] Unit No. 11 R.H. Stack
Sample [redacted] 2-18-83
Analyst [redacted]
Technique [redacted]

Laboratory Chrom No. 1000
Batch No. 255
Date Received 2-21-83

(EPA Method 5) Probe Wash
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory Client No. 1000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-21-83
Technician RCW

3829 **interpoll**

Job Lehigh / Kiln #8 Date 2-17-83
City/State Mason City, IA J/N
Source No 8 Kiln Cooler Stack
Test Site
Sample type PW Tech JS
Remarks: Test/Run 1/1
of

Special Handling Required
Sample No. 3829
Evaporating Dish No. 301
Volume of acetone 95 cc
E. Dish Tare Wt. 84.2300 g
E. Dish + Sample Wt. 84.2494 g
Comments

(2)

3833 **interpoll**

Job Lehigh Kiln #8 Date 2-17-83
City/State Mason City, IA. J/N
Source #8 Kiln Cooler Stack
Test Site
Sample type PW Tech JS
Remarks: Test/Run 1/2
of

Special Handling Required
Sample No. 3833
Evaporating Dish No. 304
Volume of acetone 115 cc
E. Dish Tare Wt. 84.2986 g
E. Dish + Sample Wt. 84.3046 g
Comments

(3)

3837 **interpoll**

Job Lehigh, #8 Kiln Date 2-17-83
City/State Mason City, IA J/N
Source #8 Kiln Cooler Stack
Test Site
Sample type PW Tech JS
Remarks: Test/Run 1/3
of

Special Handling Required
Sample No. 3837
Evaporating Dish No. 305
Volume of acetone 95 cc
E. Dish Tare Wt. 84.0597 g
E. Dish + Sample Wt. 84.0649 g
Comments

RESULTS:

1	2	3
.0194	.0060	.0052

L-0185/Y

(EPA Method 5) Filter
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory Client No. Code
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-21-83
Technician RCV

(1)

interpoll

Job Lehigh Kiln #8 Date 2-12-83
City/State Mason City Ia J/N
Source #8 Kiln Cooler
Test Site Stack
Sample type Tech J.S.
Remarks: Test/Run 1/1
of

Special Handling Required
Sample No. 3836
Filter No. 3413
Filter Type 4"G
Filter Tare Wt.
Filter + Sample Wt.
Comments

(2)

interpoll

Job Lehigh Kiln #8 Date 2-12-83
City/State Mason City Ia J/N
Source #8 Kiln Cooler
Test Site Stack
Sample type Tech J.S.
Remarks: Test/Run 1/2
of

Filter No. 3412
Filter Type 4"G
Filter Tare Wt. 0.68995
Filter + Sample Wt. 0.69795
Comments white cooler

(3)

interpoll

Job Lehigh Kiln #8 Date 2-12-83
City/State Mason City Ia J/N
Source #8 Kiln Cooler
Test Site Stack
Sample type Tech J.S.
Remarks: Test/Run 1/3
of

Special Handling Required
Sample No. 3838
Filter No. 3457
Filter Type 4"G
Filter Tare Wt. 0.68995
Filter + Sample Wt. 0.69108
Comments white cooler

RESULTS:

1	D-9	2	3
-.0017		.0006	.0011
.0167		.0066	.0063

catch/blue organic/inorganic

L-0186/R

(EPA Method 5) Probe Wash
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory client No. 1000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-21-93
Technician RCW

(1)

3841 **interpoll**

Job Lehigh No 8 KILN Date 2-17-83
City/State J/N
Source No 1-4 BH
Test Site STACK
Sample type PW Tech RL
Remarks: Test/Run 1/2
1 of 1

Special Handling Required
Sample No. 3841
Evaporating Dish No. F4
Volume of acetone 125 cc
E. Dish Tare Wt. 84.3842 g
E. Dish + Sample Wt. 84.4994 g
Comments

(2)

3845 **interpoll**

Job Lehigh No 8 KILN Date 2-17-83
City/State J/N
Source No 1-4 BH
Test Site STACK
Sample type PW Tech RL
Remarks: Test/Run 1/2
1 of 1

Special Handling Required
Sample No. 3845
Evaporating Dish No. F3
Volume of acetone 125 cc
E. Dish Tare Wt. 84.3174 g
E. Dish + Sample Wt. 84.4214 g
Comments

(3)

3849 **interpoll** 2-17-83

Job Lehigh No 8 KILN Date
City/State J/N
Source No 1-4 BH
Test Site Stack
Sample type PW Tech RL DL
Remarks: Test/Run 1/2 1/3
1 of 1

Special Handling Required
Sample No. 3849
Evaporating Dish No. 307
Volume of acetone 125 cc
E. Dish Tare Wt. 82.6345 g
E. Dish + Sample Wt. 82.7423 g
Comments

RESULTS:

1	2	3
0.1149	.1040	.1078

L-0185/Y

(EPA Method 5) Filter
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory Client No. 1000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-21-83
Technician RCV

---

(1)

interpoll

Job Lehigh #8 Kiln
City/State
Source No 1 - 4 BH
Test Site Stack
Sample type
Remarks:

Date 2-17-83
J/N
Tech P.L.
Test/Run 1/1
1 of 1

Special Handling Required
Sample No. 3842
Filter No. 3312
Filter Type 4"G
Filter Tare Wt. 0.68479
Filter + Sample Wt. 0.72824
Comments Very Lt. Creme color

---

(2)

interpoll

Job Lehigh #8 Kiln
City/State
Source No 1 - 4 BH
Test Site Stack
Sample type
Remarks:

Date 2-17-83
J/N
Tech P.L.
Test/Run 1/2
1 of 1

Special Handling Required
Sample No. 3846
Filter No. 3328
Filter Type 4" G
Filter Tare Wt. 0.66210
Filter + Sample Wt. 0.69697
Comments Very Lt. Creme color

---

(3)

interpoll

Job Lehigh #8 Kiln
City/State
Source No 1 - 4 BH
Test Site Stack
Sample type
Remarks:

Date 2-17-83
J/N
Tech P.L.
Test/Run 1/3
1 of 1

Special Handling Required
Sample No. 3850
Filter No. 3349
Filter Type 4"G
Filter Tare Wt. 0.72494
Filter + Sample Wt. 0.77071
Comments Very Lt. Creme color

RESULTS:

1	D-11	2		3
.0435		.0349		.0458
.1582		1389		1536

(EPA Method 5) Filter
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory Client No. 1000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-21-83
Technician RaV

(1)

interpoll

Job Lehigh
City/State Mason City Ia
Source # 8 Main Stack
Test Site
Sample type
Remarks:

Date 2-18-83
J/N
Tech
Test/Run
of

Special Handling Required
Sample No. 3854
Filter No. 3442
Filter Type
Filter Tare Wt. .69710
.69673
Filter
Filter + Sample Wt.
Comments

(2)

Job Lehigh
City/State
Source # 8 Main Stack
Test Site
Sample type
Remarks:

Date 2-18-83
J/N
Tech T.S.
Test/Run 2/2
of

Filter
Filter + Sample Wt.
Comments Tan color

(3)

interpoll

Job Lehigh
City/State Mason City Ia
Source # 8 Main Stack
Test Site
Sample type
Remarks:

Date 2-18-83
J/N
Tech T.S.
Test/Run 2/3
of

Special Handling Required
Sample No. 3862
Filter No. 3443
Filter Type #16
Filter Tare Wt. 0.68652
Filter + Sample Wt. 0.74626
Comments Tan color

RESULTS:

1	2	3
.0590	.0594	.0597

Filterable Inorganic	.1538	D-1	.1524		.1634

L-0186/8

(EPA Method 5) Probe Wash
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory client No. 1000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-22-83
Technician RCV

1

3877

interpoll

Job Lehigh Date 2-18-83
City/State Mason City, IA. J/N
Source #4 Main Stack
Test Site
Sample type PW Tech JJ
Remarks: Test/Run 3/1
of

Special Handling Required
Sample No. 3877
Evaporating Dish No. 206
Volume of acetone 95 c
E. Dish Tare Wt. 76.7460 g
E. Dish + Sample Wt. 76.8230 g
Comments

2

3881

interpoll

Job LeHigh Date 2-18-83
City/State Mason City, IA. J/N
Source #4 Main Stack
Test Site
Sample type PW Tech JJ
Remarks: Test/Run 3/2
of

Special Handling Required
Sample No. 3881
Evaporating Dish No. 507
Volume of acetone 105 c
E. Dish Tare Wt. 74.5800 g
E. Dish + Sample Wt. 74.6830 g
Comments Wt rechecked OK

3

3885

interpoll

Job Le High Date 2-18-83
City/State Mason City, IA J/N
Source #4 Main Stack
Test Site
Sample type PW. Tech JJ
Remarks: Test/Run 3/3
of

Special Handling Required
Sample No. 3885
Evaporating Dish No. 508
Volume of acetone 95 c
E. Dish Tare Wt. 74.1076 g
E. Dish + Sample Wt. 74.1960 g
Comments

RESULTS:

1	2	3
.0770	.1030	.0884

L-0185/Y

(EPA Method 5) Filter
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory Client No. 1000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-21-83
Technician RdV

(1)

interpoll

Job Lehigh — Date 2-18-83
City/State — J/N
Source No 8 Kiln
Test Site Mainstack
Sample type — Tech J.S.
Remarks: — Test/Run 1/1
of

Special Handling Required
Sample No. 3878
Filter No. 3444
Filter Type 4"G
Filter Tare Wt. 0.6[illegible]96
Filter + Sample Wt. 0.[illegible]93
Comments Tan color

(2)

interpoll

Job Lehigh — Date 2-18-83
City/State — J/N
Source No 8 Kiln
Test Site Mainstack
Sample type — Tech J.S
Remarks: — Test/Run 2/2
of

Special Handling Required
Sample No. 3879
Filter No. 3445
Filter Type 4"G
Filter Tare Wt. 0.[illegible]
Filter + Sample Wt. 0.[illegible]70
Comments Tan color

(3)

interpoll

Job Lehigh — Date 2-18-83
City/State — J/N
Source No 8 Kiln
Test Site Mainstack
Sample type — Tech J.S.
Remarks: — Test/Run 3/3
of

Special Handling Required
Sample No. 3886
Filter No. 3409
Filter Type 4"G
Filter Tare Wt. 0.68696
Filter + Sample Wt. 0.75583
Comments Tan color

RESULTS:

	1	D-15	2		3
	.0670		.0672		.0689
Filter organic & inorganic	.1440		.1702		.1573

L-0186/P

(EPA Method 5) Probe Wash
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory client no. 1000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-22-83
Technician RCJ

1

3885

interpoll

Job Lehigh No 8 KILN Date 2-18-83
City/State J/N
Source No 7 BH
Test Site STACK
Sample type PW Tech PL
Remarks: Test/Run 2/1
1 of 1

Special Handling Required
Sample No. 3885
Evaporating Dish No. 204
Volume of acetone 115 c
E. Dish Tare Wt. 77.8435 g
E. Dish + Sample Wt. 77.8488 g
Comments

2

3869

interpoll

Job Lehigh No8 KILN Date 2-18-83
City/State J/N
Source No 7 BH
Test Site STACK
Sample type PW Tech PL
Remarks: Test/Run 2/2
1 of 1

Special Handling Required
Sample No. 3869
Evaporating Dish No. 205
Volume of acetone 115 c
E. Dish Tare Wt. 77.8315 g
E. Dish + Sample Wt. 77.8346 g
Comments

3

3873

interpoll

Job Lehigh No 8 KILN Date 2-18-83
City/State J/N
Source No 7 BH #
Test Site STACK
Sample type PW Tech PL
Remarks: Test/Run 2/3
1 of 1

Special Handling Required
Sample No. 3873
Evaporating Dish No. 604
Volume of acetone 115 c
E. Dish Tare Wt. 74.8745 g
E. Dish + Sample Wt. 74.8902 g
Comments

RESULTS:

1	2	3
.0145	.0131	.0157

(EPA Method 5) Filter
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory Client No. 100
Batch No. 255
Date Received 2-21-83

Date of Analysis 1-21-83
Technician RLV

---

(1)

interpoll

Job Lehigh No 8 Kiln Date 2-18-83
City/State ____ J/N ____
Source No 7 Baghouse
Test Site Stack
Sample type ____ Tech RL
Remarks: Test/Run 3/1
1 of 1

Special Handling Required ____
Sample No. 3866
Filter No. 3368
Filter Type 4"G
Filter Tare Wt. 0.73791
Filter + Sample Wt. 0.74219 (2)
Comments Very Lt Tan

---

(2)

interpoll

Job Lehigh No 8 Kiln Date 2-18-83
City/State ____ J/N ____
Source No 7 Baghouse
Test Site Stack
Sample type ____ Tech RL
Remarks: Test/Run 3/2
1 of 1

Special Handling Required ____
Sample No. 3870
Filter No. 3369
Filter Type 4"G
Filter Tare Wt. 0.74253
Filter + Sample Wt. 0.74860 (2)
Comments Very Lt Tan

---

(3)

interpoll

Job Lehigh No 8 Kiln Date 2-18-83
City/State ____ J/N ____
Source No 7 Baghouse
Test Site Stack
Sample type ____ Tech RL
Remarks: Test/Run 3/3
1 of 1

Special Handling Required ____
Sample No. 3874
Filter No. 3370
Filter Type 4"G
Filter Tare Wt. 0.75049
Filter + Sample Wt 0.75592 (2)
Comments Very Lt Tan

RESULTS:

1	D-17	2	3
.0043		.0061	.0054

Dry Catch Only
Catch plus organic & inorganic: .0102 | .0192 | .0211

L-0186/P

(EPA Method 5) Probe Wash
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory client No. 1000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-22-83
Technician Ref

interpoll

1

3889
Job Lehigh No 8 KILN
City/State
Source No 11 BH
Test Site STACK
Sample type PW
Remarks:
Date 2-18-83
J/N
Tech PL
Test/Run
of

Special Handling Required
Sample No. 3889
Evaporating Dish No. 203
Volume of acetone 85 c
E. Dish Tare Wt. 84.8815 g
E. Dish + Sample Wt. 84.8905 g

interpoll

2

3890
Job Lehigh No 8 KILN
City/State
Source No 11 BH
Test Site STACK
Sample type PW
Remarks:
Date 2-18-83
J/N
Tech PL
Test/Run 3/2
1 of 1

Special Handling Required
Sample No. 3890
Evaporating Dish No. 202
Volume of acetone 85 c
E. Dish Tare Wt. 71.0261 g
E. Dish + Sample Wt. 71.1600 g
Comments

interpoll

3

3891
Job Lehigh No 8 Kiln
City/State
Source No 11 BH
Test Site STACK
Sample type PW
Remarks:
Date 2-18-83
J/N
Tech PL
Test/Run 3/3
1 of 1

Special Handling Required
Sample No. 3891
Evaporating Dish No. 603
Volume of acetone 105 c
E. Dish Tare Wt. 74.7321 g
E. Dish + Sample Wt. 74.8987 g
Comments

RESULTS:

1	2	3
0.1690	0.1339	.1666

L-0185/Y

(EPA Method 5) Filter
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Laboratory Client No. 0000
Batch No. 255
Date Received 2-21-83

Date of Analysis 2-21-83
Technician RAV

1

interpoll

Job Lehigh No 8 Kiln Date 2-18-83
City/State _____ J/N _____
Source No 11 B/H
Test Site Stack
Sample type _____ Tech P.L.
Remarks: Test/Run 3/1
1 of 1

Special Handling Required _____
Sample No. 3890
Filter No. 3365
Filter Type 4"G
Filter Tare Wt. 0.74556
Filter + Sample Wt. 0.79919 (1/2)
Comments white color

2

interpoll

Job Lehigh No 8 Kiln Date 2-18-83
City/State _____ J/N _____
Source No 11 B.H.
Test Site Stack
Sample type _____ Tech P.L.
Remarks: Test/Run 3/2
1 of 1

Special Handling Required _____
Sample No. 3894
Filter No. 3366
Filter Type 4"G
Filter Tare Wt. 0.74273
Filter + Sample Wt. 0.80125 (2)
Comments white color

3

interpoll

Job Lehigh No 8 Kiln Date 2-18-83
City/State _____ J/N _____
Source No 11 B/H
Test Site Stack
Sample type _____ Tech P.L.
Remarks: Test/Run 3/3
1 of 1

Special Handling Required _____
Sample No. 3898
Filter No. 3367
Filter Type 4"G
Filter Tare Wt. 0.74909
Filter + Sample Wt. 0.78888 (2)
Comments white color

RESULTS:

1	2	3
.0536	.0585	.0398

D-19

Dry Catch Only
Particulate plus organics & Inorganics

.2226	.1924	.2044

APPENDIX E

IOWA DEQ AIR POLLUTION
CONTROL EQUIPMENT OPERATING DATA SHEETS

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO Location MASON CITY, IA

Source Type COOLER BAGHOUSE Rated Production 130 TPH (FEED)

Date 17FEB83 Time 1000 - 1123 Actual Production 136.4

Air Flow Data _____ Run No. 1

Mechanical Collector:

Tube Diameter ___ in. No. of Tubes ___. Design Δp. ___ in. H_2O @ Gas Temp. ___ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (kV)		

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse: PULSE-JET

Pressure-Positive _____ ~~Negative~~ X. No Compartments 4.

Type Cleaning COMP. AIR PULSE. Clean Cycle N/A min.

Avg. Baghouse Δp -1.35 in H_2O. Δp Range -4/+4 in. H_2O.

Fan: Rated H.P. 500. Operating Volts 500. Operating Amps 175.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K. W. VOLK

Signature: _____

Title/Position: PLANT ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA

Source Type BAGHOUSE 1-2-3-4 Rated Production 130 TPH (FEED)

Date 17 FEB 88 Time 1000 - 1123 Actual Production 136.4

Air Flow Data Run No. 1

Mechanical Collector:

Tube Diameter ___ in. No. of Tubes ___. Design Δp. ___ in. H_2O @ Gas Temp. ___ F.

Observed Δp ___ in H_2O. Design cfm/tube @ Observed Δp ___ @ ___ °F.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Electrostatic Precipitator:

Field	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spark Rate (per min.)

Scrubber:

Type ___. Δp (across scrubber) ___ in. H_2O.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Liquid Circulation Rate ___ gal/min. % Make-up ___. Blowdown ___ gpm.

Scrubbing Water Change Interval ___.

Settling Tank Cleaning Interval ___.

Baghouse:

Pressure-Positive ___ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -7.94 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 54.3.

Cyclone:

Type ___. Δp ___ in. H_2O. Diameter ___.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Person Responsible for Data: R. WOLK

Signature: [signature]

Title/Position: KIW ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

[illegible] DEPARTMENT OF [illegible]

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

[illegible] Lehigh Cement Co. Location Mason City, IA

Type Cooler Baghouse Rated Production 130 TPH (Feed)

Feb 83 Time 1220-[illegible] Actual Production 139.2

[illegible]

g:

[illegible]

ed H.P._______. Operating Volts_______ [illegible]

Circulation Rate_______gal/min. % Make-up_______. [illegible]

ng Water Change Interval_______

g Tank Cleaning Interval_______

g:

e-Positive_______ ~~Negative~~ PULSE-JET X. No Compartments 4.

eaning COMP. AIR PULSE. Clean Cycle N/A min.

ghouse Δp -1.41 in. H_2O. Δp Range -4/44 in. H_2O.

ated H.P. 500. Operating Volts 500. Operating Amps 183.

:

_______. Δp_______in. H_2O. Diameter_______.

ed H.P._______. Operating Volts_______. Operating Amps_______.

Person Responsible for Data: K.W. Volk

Signature: [signature]

Title/Position: Kiln Engineer

*s of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LETTER WHEAT Co. Location MASON CITY, IA

Source Type [redacted] 1-2-3-4 Rated Production 130 TPH (FEED)

Date 1/[redacted]/88 12.20 - 1356 Actual Production 139.2

Air Flow Rate: _____ Run No. 2

[redacted]

[redacted] and No. of Tubes ____. Design Δp. ____ in. H_2O @ Gas Temp. ____ F.

[redacted] in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Operating Volts _____. Operating Amps _____.

[redacted]

[redacted]	Secondary Voltage (kV)	Secondary Current (ma)	Spark Rate (per min.)

[redacted]

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -7.93 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 53.3.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K.W. YOCK

Signature: KWYoc

Title/Position: KILN ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO Location MASON CITY, IA

Source Type COOLER BAGHOUSE Rated Production 130 TPH (FEED)

Date 17 FEB 83 Time 1425-1556 Actual Production 138.1

Air Flow Data _____ Run No. 3

Mechanical Collector:

Tube Diameter ____ in. No. of Tubes ____. Design Δp. ____ in. H_2O @ Gas Temp. ____ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Spark Rate per min.

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive PULSE-JET ~~Negative~~ X. No Compartments 4.

Type Cleaning COMP. AIR PULSE. Clean Cycle N/A min.

Avg. Baghouse Δp -1.53 in H_2O. Δp Range -4/+4 in. H_2O.

Fan: Rated H.P. 500. Operating Volts 500. Operating Amps 195.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K.W. VOLK

Signature: [signature]

Title/Position: PLANT ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA

Source Type BAGHOUSE 1-2-3-4 Rated Production 130 TPH (FEED)

Date 17 FEB 83 Time 1425-1556 Actual Production 138.1

Air Flow Data Run No. 3

Mechanical Collector:

Tube Diameter ___ in. No. of Tubes ___. Design Δp ___ in. H_2O @ Gas Temp. ___ F.

Observed Δp ___ in H_2O. Design cfm/tube @ Observed Δp ___ @ ___ °F.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage	Secondary Current	Spark Rate per min.

Scrubber:

Type ___. Δp (across scrubber) ___ in. H_2O.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Liquid Circulation Rate ___ gal/min. % Make-up ___. Blowdown ___ gpm.

Scrubbing Water Change Interval ___.

Settling Tank Cleaning Interval ___.

Baghouse:

Pressure-Positive ___ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -8.23 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 53.4.

Cyclone:

Type ___. Δp ___ in. H_2O. Diameter ___.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Person Responsible for Data: K.W. VOCK

Signature: KWV

Title/Position: KIW ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA.

Source Type #8 PRECIPITATOR Rated Production 130 TPH (FEED)

Date 18FEB83 Time 1000-1103 Actual Production 134.1

Air Flow Data _____ Run No. 1

Mechanical Collector:

Tube Diameter ____ in. No. of Tubes ____. Design Δp. ____ in. H_2O @ Gas Temp. ____ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spark Rate (per min.)
1	480	172	60	107	0
2	437	200	56	120	0

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative _____. No Compartments _____.

Type Cleaning _____. Clean Cycle _____ min.

Avg. Baghouse Δp _____ in H_2O. Δp Range _____ in. H_2O.

Fan: Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K.G. VOCK

Signature: [signature]

Title/Position: KILN EXAMINER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA

Source Type BAGHOUSE #7 Rated Production 130 TPH (FEED)

Date 18 FEB 83 Time 1000 - 1103 Actual Production 134.1

Air Flow Data _____ Run No. 1

Mechanical Collector:

Tube Diameter ____ in. No. of Tubes ____. Design Δp ____ in. H_2O @ Gas Temp. ____ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)		Spark Rate (per min.)

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -10.8 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 53.5.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K. W. VOCK

Signature: [signature]

Title/Position: PLANT ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA.

Source Type #8 PRECIPITATOR Rated Production 130 TPH (FEED)

Date 10/20/83 Time 1138-1239 Actual Production 132.9

Air Flow Data _____ Run No. 2

Mechanical Collector:

Tube Diameter ___ in. No. of Tubes ___. Design Δp. ___ in. H_2O @ Gas Temp. ___ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spark Rate (per min.)
1	475	175	60	1080	0
2	440	200	56	1200	0

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative _____. No Compartments _____.

Type Cleaning _____. Clean Cycle _____ min.

Avg. Baghouse Δp _____ in H_2O. Δp Range _____ in. H_2O.

Fan: Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K.W. VOLK

Signature: _____

Title/Position: MILL ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA

Source Type BAGHOUSE #7 Rated Production 130 TPH (FEED)

Date 1/6/83 Time 1136-1239 Actual Production 132.9

Air Flow Data Run No: 2

Mechanical Collector:

Tube Diameter ___ in. No. of Tubes ___. Design Δp: ___ in. H_2O @ Gas Temp. ___ F.

Observed Δp ___ in H_2O. Design cfm/tube @ Observed Δp ___ @ ___ °F.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary

Scrubber:

Type ___. Δp (across scrubber) ___ in. H_2O.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Liquid Circulation Rate ___ gal/min. % Make-up ___. Blowdown ___ gpm.

Scrubbing Water Change Interval ___.

Settling Tank Cleaning Interval ___.

Baghouse:

Pressure-Positive ___ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -9.2 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 53.

Cyclone:

Type ___. Δp ___ in. H_2O. Diameter ___.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Person Responsible for Data: R.W. YOCK

Signature: [signature]

Title/Position: PLANT ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

IGH CENTOUT CO. Location MASON CITY, IA.

pe HB PRECIPITATOR Rated Production 130 TPH (FEED)

OB83 Time 1336-1437 Actual Production 132.9

Run No. 3

Data

al Collector:

eter ___ in. No. of Tubes ___. Design Δp. ___ in. H_2O @ Gas Temp. ___ F.

Δp ___ in H_2O. Design cfm/tube @ Observed Δp ___ @ ___ °F.

i H.P. ___. Operating Volts ___. Operating Amps ___.

tatic Precipitator:

	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spark Rate (per min.)
ELD NO 1	475	173	59	1077	0
2	440	200	56	1201	0

:

. Δp (across scrubber) ___ in. H_2O.

ed H.P. ___. Operating Volts ___. Operating Amps ___.

Circulation Rate ___ gal/min. % Make-up ___. Blowdown ___ gpm.

ng Water Change Interval ___.

g Tank Cleaning Interval ___.

e:

e-Positive ___ Negative ___. No Compartments ___.

eaning ___. Clean Cycle ___ min.

ghouse Δp ___ in H_2O. Δp Range ___ in. H_2O.

ated H.P. ___. Operating Volts ___. Operating Amps ___.

:

___. Δp ___ in. H_2O. Diameter ___.

ted H.P. ___. Operating Volts ___. Operating Amps ___.

Person Responsible for Data: K. W. VOLK

Signature:

Title/Position: MILL ENGINEER

es of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA

Source Type BAGHOUSE #7 Rated Production 130 TPH (FEED)

Date 18 Feb 83 Time 1336 - 1437 Actual Production 132.9

Air Flow Data _____ Run No. 3

Mechanical Collector:

Tube Diameter ___ in. No. of Tubes ___. Design Δp. ___ in. H_2O @ Gas Temp. ___ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spar... (per ...)

Scrubber:

Type _____. Δp (across scrubber) _____ in H_2O

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -10.8 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 50.5.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K.W. VOLK

Signature: _____

Title/Position: PLANT ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA.

Source Type #B PRECIPITATOR Rated Production 130 TPH (FEED)

Date 18 FEB 83 Time 1527 - 1631 Actual Production 132.2

Air Flow Data _____ Run No. 4

Mechanical Collector:

Tube Diameter ____ in. No. of Tubes ____. Design Δp ____ in. H_2O @ Gas Temp. ____ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (kV)	Secondary (illegible)	Spark (illegible)
1	472	176	58	120	21
2	433	196	56	120	

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative _____. No Compartments _____.

Type Cleaning _____. Clean Cycle _____ min.

Avg. Baghouse Δp _____ in H_2O. Δp Range _____ in. H_2O.

Fan: Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K.W. Vock

Signature: _____

Title/Position: Kiln Engineer

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA

Source Type BAGHOUSE #11 Rated Production 130 TPH (FEED)

Date 8/10/83 Time 1527-1631 Actual Production 132.2

Air Flow Data _____ Run No. 4

Mechanical Collector:

Tube Diameter ___ in. No. of Tubes ___. Design Δp. ___ in. H_2O @ Gas Temp. ___ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spark Rate (per min.)

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -8.1 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 50.5.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K.W. YOCK

Signature: _____

Title/Position: KIW ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA.

Source Type #8 PRECIPITATOR Rated Production 130 TPH (FEED)

Date 1860883 Time 1644-1746 Actual Production 133.4

Air Flow Data _____ Run No. 5

Mechanical Collector:

Tube Diameter ____ in. No. of Tubes ____. Design Δp ____ in. H_2O @ Gas Temp. ____ F.

Observed Δp _____ in H_2O. Design cfm/tube @ _____ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary [illegible]	Secondary [illegible]	Spark [illegible]
A	474	178			
B	427	198			

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative _____. No Compartments _____.

Type Cleaning _____. Clean Cycle _____ min.

Avg. Baghouse Δp _____ in H_2O. Δp Range _____ in. H_2O.

Fan: Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K. W. Vock

Signature: _____

Title/Position: KILN OPERATOR

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA

Source Type BAGHOUSE #11 Rated Production 130 TPH (FEED)

Date 18 FEB 93 Time 1644-1746 Actual Production 133.4

Air Flow Data _____ Run No. 5

Mechanical Collector:

Tube Diameter ____ in. No. of Tubes ____. Design Δp. ____ in. H_2O @ Gas Temp. ____ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field Number	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spark Rate (per min.)

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -7.4 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 52.5.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K.W. VOLK

Signature: _____

Title/Position: KILN ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA.

Source Type #B PRECIPITATOR Rated Production 130 TPH (FEED)

Date 10/03/83 Time 1800-1902 Actual Production 132.1

Air Flow Data _____ Run No. 6

Mechanical Collector:

Tube Diameter ____ in. No. of Tubes ____. Design Δp. ____ in. H_2O @ Gas Temp. ____ F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spark Rate (per min.)
1	475	170	56	[illegible]	[illegible]
2	425	200	54	235	[illegible]

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____.

Settling Tank Cleaning Interval _____.

Baghouse:

Pressure-Positive _____ Negative _____. No Compartments _____.

Type Cleaning _____. Clean Cycle _____ min.

Avg. Baghouse Δp _____ in H_2O. Δp Range _____ in. H_2O.

Fan: Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Cyclone:

Type _____. Δp _____ in. H_2O. Diameter _____.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Person Responsible for Data: K. Wayne Vock

Signature: [signature]

Title/Position: Kiln Engineer

*Averages of operating data taken during actual test run unless requested otherwise.

IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant LEHIGH CEMENT CO. Location MASON CITY, IA

Source Type BAGHOUSE #11 Rated Production 130 TPH (FEED)

Date 18 FEB 83 Time 1800-1902 Actual Production 132.1

Air Flow Data Run No. 6

Mechanical Collector:

Tube Diameter ___ in. No. of Tubes ___. Design Δp ___ in. H_2O @ Gas Temp. ___ F.

Observed Δp ___ in H_2O. Design cfm/tube @ Observed Δp ___ @ ___ °F.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (kV)	Secondary Current (mA)

Scrubber:

Type ___. Δp (across scrubber) ___

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Liquid Circulation Rate ___ gal/min. % Make-up ___. Blowdown ___ gpm.

Scrubbing Water Change Interval ___.

Settling Tank Cleaning Interval ___.

Baghouse:

Pressure-Positive ___ Negative X. No Compartments 11.

Type Cleaning REVERSE AIR. Clean Cycle 1/4 min.

Avg. Baghouse Δp -8.0 in H_2O. Δp Range +8/-12 in. H_2O.

Fan: Rated H.P. 75. Operating Volts 575. Operating Amps 52.0.

Cyclone:

Type ___. Δp ___ in. H_2O. Diameter ___.

Fan Rated H.P. ___. Operating Volts ___. Operating Amps ___.

Person Responsible for Data: K.W. VOLK

Signature: K Volk

Title/Position: PLANT ENGINEER

*Averages of operating data taken during actual test run unless requested otherwise.

APPENDIX F

IOWA DEQ CEMENT PLANT
OPERATING DATA SHEETS

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 1

Kiln No. 8 Date 17 FEB 83

Type of Kiln: _____ Wet X Dry

Kiln Diameter [illegible] ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Design) 130 tons/hr.

Approximate Kiln Speed at Above Rate 1.5 rev./hr.

Historical Average Kiln Feed Rate [illegible] 97 tons/hr.

Historical Maximum Kiln Feed [illegible] tons/hr.

[illegible]

Anticipated [illegible]

[illegible]

Gas [illegible]

Approximate Feed Composition During Test Run by Weight

Limestone [illegible] %

Silica [illegible] %

Alumina [illegible] %

Water (wet) [illegible] %

(Other) SAND 5.1 %

IRON 0.3

Feed Size: 87.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 136.4 tons/hr.

Kiln Speed 123 RPH

Fuel _____ Coal X Oil _____ Gas _____

Insufflation in Progress: Yes _____ No X

Person Responsible for Data K.W. VOLK

Signature [signature]

Title/Position KILN ENGINEER

DEQ 9/76

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 2

Kiln No. 8 Date 17 FEB 83

Type of Kiln: _____ Wet X Dry

Kiln Diameter 13.0 ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Rating) 130 tons/hr.

Approximate Kiln Speed at Above Rating 150 rev./hr.

Historical Average Kiln Feed Rate (1979 TO DATE) 97 tons/hr.

Historical Maximum Kiln Feed Rate 135 tons/hr.

Insufflation Capability: Yes _____ No X

Anticipated Fuel Usage: Coal X % of time.
Oil _____ % of time.
Gas _____ % of time.

Approximate Feed Composition During Test Run by Weight

Limestone 78.6 %
Silica Clay 16.0 %
Alumina N/A %
Water (wet) 0.1 %
(Other) SAND 5.1 %
IRON 0.3

Feed Size: 87.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 139.2 tons/hr.

Kiln Speed 129 RPH

Fuel _____ Coal X Oil _____ Gas _____

Insufflation in Progress: Yes _____ No X

Person Responsible for Data K.W. VOLK

Signature _____

Title/Position KILN OPERATOR

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 3

Kiln No. 8 Date 17 FEB 83

Type of Kiln: _____ Wet X Dry

Kiln Diameter 13.0 ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Rating) 130 tons/hr.

Approximate Kiln Speed at Above Rating 150 rev./hr.

Historical Average Kiln Feed Rate (1979 TO MAR) 91 tons/hr.

Historical Maximum Kiln Feed Rate 135 tons/hr.

Insufflation Capability: Yes _____ No X

Anticipated Fuel Usage: Coal X % of time.

Oil _____ % of time.

Gas _____ % of time.

Approximate Feed Composition During Test Run by Weight

Limestone 76.2 %

Silica Clay 16.0 %

Alumina N/A %

Water (wet) 0.1 %

(Other) SAND 5.1 %

IRON 0.3

Feed Size: 87.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 138.1 tons/hr.

Kiln Speed 131 RPH

Fuel _____ Coal X Oil _____ Gas _____

Insufflation in Progress: Yes _____ No X

Person Responsible for Data K.W. VOLK

Signature K.W. Volk

Title/Position KILN ENGINEER

DEQ 9/76

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 1

Kiln No. 8 Date 18 FEB 83

Type of Kiln: ____ Wet X Dry

Kiln Diameter 13.0 ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Rating) 130 tons/hr.

Approximate Kiln Speed at Above Rating 150 rev./hr.

Historical Average Kiln Feed Rate (1979 BASIS) 97 tons/hr.

Historical Maximum Kiln Feed Rate 135 tons/hr.

Insufflation Capability: Yes ____

Anticipated Fuel Usage: Coal X

Oil ____

Gas ____

Approximate Feed Composition During Test Run by Weight

Limestone 78.6 %

Silica Clay 16.0 %

Alumina N/A %

Water (wet) 0.1 %

(Other) SAND 5.1 %

IRON 0.3

Feed Size: 87.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 134.1 tons/hr.

Kiln Speed 132 RPH

Fuel ____ Coal X Oil ____ Gas ____

Insufflation in Progress: Yes ____ No X

Person Responsible for Data R.W. VOLK

Signature [signature]

Title/Position KILN ENGINEER

DEQ 9/76

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 2

Kiln No. 8 Date 18 FEB 83

Type of Kiln: ____ Wet X Dry

Kiln Diameter 13.0 ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Rating) 130 tons/hr.

Approximate Kiln Speed at Above Rating 150 rev./hr.

Historical Average Kiln Feed Rate (1979 TO DATE) 97 tons/hr.

Historical Maximum Kiln Feed Rate 135 tons/hr.

Insufflation Capability: Yes ____ No X

Anticipated Fuel Usage: Coal X % of time.

Oil ____ % of time.

Gas ____ % of time.

Approximate Feed Composition During Test Run by Weight

Limestone 78.6 %

Silica Clay 16.0 %

Alumina N/A %

Water (wet) 0.1 %

(Other) SAND 5.1 %

IRON 0.3

Feed Size: 87.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 132.9 tons/hr.

Kiln Speed 132 RPH

Fuel ____ Coal X Oil ____ Gas ____

Insufflation in Progress: Yes ____ No X

Person Responsible for Data R.W. VOLK

Signature [signature]

Title/Position KILN ENGINEER

DEQ 9/76

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 3

Kiln No. 8 Date 18 Feb 83

Type of Kiln: Wet ____ Dry X

Kiln Diameter 12 ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Rating) 132 tons/hr.

Approximate Kiln Speed at Above Rating 132 rev./hr.

Historical Average Kiln Feed Rate [illegible] tons/hr.

Historical Maximum Kiln Feed Rate [illegible] tons/hr.

Insufflation Capability: Yes [illegible]

Anticipated Fuel Usage: Coal X

Oil ____

Gas ____

Approximate Feed Composition During Test Run by Weight

Limestone 76 %

Silica Clay 16 %

Alumina N/A %

Water (wet) 0.1 %

(Other) SAND 5.1 %

IRON 0.3

Feed Size: 87.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 132.9 tons/hr.

Kiln Speed 132 RPH

Fuel ____ Coal X Oil ____ Gas ____

Insufflation in Progress: Yes ____ No X

Person Responsible for Data R. W. Volk

Signature [signature]

Title/Position Kiln Engineer

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 4

Kiln No. 8 Date 18 FEB 83

Type of Kiln: ____ Wet X Dry

Kiln Diameter 13.0 ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Rating) 130 tons/hr.

Approximate Kiln Speed at Above Rating 150 rev./hr.

Historical Average Kiln Feed Rate (1979 TO DATE) 97 tons/hr.

Historical Maximum Kiln Feed Rate 135 tons/hr.

Insufflation Capability: Yes ____ No X

Anticipated Fuel Usage: Coal X % of time.
Oil ____ % of time.
Gas ____ % of time.

Approximate Feed Composition During Test Run by Weight

Limestone 78.6 %
Silica Clay 16.0 %
Alumina N/A %
Water (wet) 0.1 %
(Other) SAND 5.1 %
IRON 0.3

Feed Size: 82.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 132.2 tons/hr.

Kiln Speed 138 RPH

Fuel ____ Coal X Oil ____ Gas ____

Insufflation in Progress: Yes ____ No X

Person Responsible for Data K.W. VOLK

Signature [signature]

Title/Position KILN ENGINEER

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 5

Kiln No. 8 Date 18 FEB 83

Type of Kiln: _____ Wet X Dry

Kiln Diameter 13.0 ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Rating) 130 tons/hr.

Approximate Kiln Speed at Above Rating 150 rev./hr.

Historical Average Kiln Feed Rate (1979 TO DATE) 97 tons/hr.

Historical Maximum Kiln Feed Rate 135 tons/hr.

Insufflation Capability: Yes _____ No X

Anticipated Fuel Usage: Coal X % of time.
Oil _____ % of time.
Gas _____ % of time.

Approximate Feed Composition During Test Run by Weight

Limestone 78.6 %
Silica Clay 16.0 %
Alumina N/A %
Water (wet) 0.1 %
(Other) SAND 5.1 %
IRON 0.3

Feed Size: 87.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 133.4 tons/hr.

Kiln Speed 138 RPH

Fuel _____ Coal X Oil _____ Gas _____

Insufflation in Progress: Yes _____ No X

Person Responsible for Data K.W. VOLK

Signature _____

Title/Position KILN ENGINEER

DEQ 9/76

PARTICULATE EMISSIONS TEST REPORT
CEMENT PLANT OPERATING DATA

Owner LEHIGH PORTLAND CEMENT CO. Run No. 6

Kiln No. 8 Date 18 FEB 83

Type of Kiln: _____ Wet X Dry

Kiln Diameter 13.0 ft.

Maximum Continuous Kiln Feed Rate (Manufacturer's Rating) 130 tons/hr.

Approximate Kiln Speed at Above Rating 150 rev./hr.

Historical Average Kiln Feed Rate (1979 TO DATE) 97 tons/hr.

Historical Maximum Kiln Feed Rate 135 tons/hr.

Insufflation Capability: Yes _____ No X

Anticipated Fuel Usage: Coal X % of time.
Oil _____ % of time.
Gas _____ % of time.

Approximate Feed Composition During Test Run by Weight

Limestone 78.6 %
Silica Clay 16.0 %
Alumina N/A %
Water (wet) 0.1 %
(Other) SAND 5.1 %
IRON 0.3

Feed Size: 87.4 % passing 200 mesh sieve.

KILN OPERATION DURING RUN (AVERAGED)

Kiln Feed Rate 132.1 tons/hr.

Kiln Speed 126 RPH

Fuel _____ Coal X Oil _____ Gas _____

Insufflation in Progress: Yes _____ No X

Person Responsible for Data R.W. VOLK

Signature [signature]

Title/Position KILN OPERATOR

APPENDIX G

PROCEDURES

Particulate Loadings and Emission Rates

The particulate emission rates were determined per EPA Methods 1-5, CFR title 40, Part 60, Appendix A (Revised July 1, 1982). In this procedure, a preliminary velocity profile of the gases in the flue is obtained by means of a temperature and velocity traverse. On the basis of these values, sampling nozzles of appropriate diameter are selected to allow isokinetic sampling, a necessary prerequisite for obtaining a representative sample.

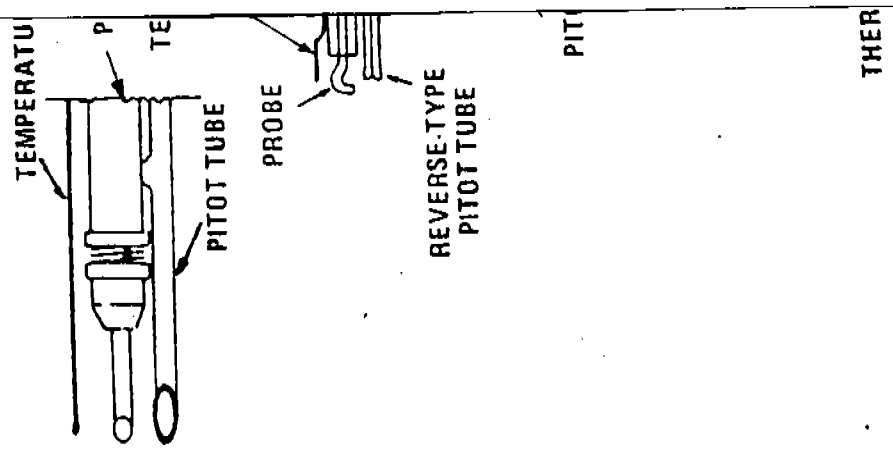
The sampling train consists of a heated glass-lined sampling probe equipped with a Type S pitot and a thermocouple. The probe is attached to a sampling module which houses the all-glass in-line filter holder in a temperature controlled oven. In addition, the sampling module houses the impinger case and a Drierite drying column. The sampling module is connected by means of an umbilical cord to the control module which houses the dry test gasmeter, the calibrated orifice, a leakless pump, two calibrated manometers, and all controls required for operating the sampling train.

Particulate samples were collected as follows: The sample gas was drawn in through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter. The particulates were removed at this point and collected on the filter. The gases then passed through an ice-cooled impinger train and a desiccant-packed drying column which quantitatively absorb all moisture from the sample gas stream after which the sample gas passes through the pump and the dry test gasmeter which integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides instantaneous flow rate data.

A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each site such that an isokinetic sampling condition prevails. Nomographs are used to aid in the rapid determination of the sampling rate.

After sampling is complete, the filter is removed and placed in a clean container. The nozzle and inlet side of the filter holder are quantitatively washed with acetone and the washings are stored in a second container. A brush is often used in the cleaning step to help dislodge deposits. The samples are returned to the laboratory where they are logged in and analyzed. The volume of the acetone rinse ("probe wash") is noted and then the rinse is quantitatively transferred to a tared 120 cc porcelain evaporating dish and the acetone evaporated off at 97-105 °F. This temperature is used to prevent condensation of atmospheric moisture due to the cooling effect induced by the evaporation of acetone. The acetone-free sample is then transferred to an oven and dried at 105 °C for 30 minutes, cooled in a desiccator over Drierite, and then weighed to the nearest .01 mg. The filter sample is quantitatively transferred to a 6-inch watch glass and dried in an oven at 105 °C for two hours. The filter and watch glass are then cooled in a desiccator and the filter weighed to the nearest .01 mg. All weighings are performed in a balance room where the relative humidity is hydrostatted to less than 50% relative humidity. Microscopic examination of the samples is performed if any unusual characteristics are observed. The weight of the acetone rinse is corrected for the acetone blank. The Drierite column is weighed on-site and the water collected by Drierite is added to the condensate so that the total amount of absorbed water may be ascertained.

Integrated flue gas samples for Orsat analysis were collected simultaneously from the stack and from the breeching at the inlet to the wet scrubber. The samples were collected in 44-liter Tedlar or teflon gas sampling bags at a constant flow rate throughout each particulate run. The bags were then returned to the laboratory and analyzed by Orsat analysis. Standard commercially prepared solutions were used in the Orsat analyzer (sat. KOH for carbon dioxide and reduced methylene blue for oxygen). In addition to the above, the oxygen content of the flue gas was measured at each traverse during the particulate determinations using a Teledyne Model 320P-4 Portable Oxygen Analyzer to sample the effluent from the Method 5 train.



APPENDIX H

CALCULATION EQUATIONS

$$\dot{m}_a = 60 \rho_s A$$

$$\dot{m}_g = \frac{4.995\, Q_{s,d}\, G_f}{1 - B_{ws}}$$

$$RH^* = 100\, [vp_{@wb} - 0.000364\, P_s\, (T_{db} - T_{wb})]/vp_{@db}$$

$$B^*_{ws} = RH(vp_{@db})/P_s$$

$$\rho = \frac{4.585 \times 10^{-2}\, P_s M_s}{T_s\ (avg)}$$

*Alternate equations for calculating moisture content from wet bulb and dry

CALCULATION EQUATIONS

METHOD 2

$$\bar{V}_s = 85.48\, C_p \left(\sqrt{\Delta p}\right)_{avg} \sqrt{\frac{T_{s(avg)}}{P_s M_s}}$$

$$Q_{s,d} = 60(1 - B_{ws})\, \bar{V}_s\, A \left[\frac{528}{T_{s(avg)}}\right] \left[\frac{P_s}{29.92}\right]$$

$$Q_a = 60\, \bar{V}_s\, A$$

$$\dot{m}_g = \frac{4.995\, Q_{s,d}\, G_d}{1 - B_{ws}}$$

$$RH^* = 100\left[vp_{twb} - 0.000364\, P_s\, (T_{db} - T_{wb})\right]/vp_{tdb}$$

$$B^*_{ws} = RH(vp_{tdb})/P_s$$

$$\rho = \frac{4.585 \times 10^{-2}\, P_s M_s}{T_{s\,(avg)}}$$

*Alternate equations for calculating moisture content from wet bulb and dry bulb data.

CALCULATION EQUATIONS

METHOD 3

$$\%EA = \frac{100(\%O_2 - 0.5\%\ CO)}{0.264\%\ N_2 - \%O_2 + 0.5\%\ CO}$$

$$M_d = 0.44(\%CO_2) + 0.32$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

METHOD 5

$$V_{m(std)} = 17.65\ V_m\ \gamma\ \left[\frac{P_{bar} + \overline{\Delta H}/13.6}{T_{m(avg)}}\right]$$

$$V_{w(std)} = 0.0472\ V_{lc}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$= 0.0944\ \left[\frac{T_{s(avg)}\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1 - B_{ws})}\right]$$

$$C_s = \frac{15.43\ M_p}{V_{m(std)}}$$

$$C_a = \frac{272.3\ M_p\ P_s}{T_{s(avg)}\ \left[V_{w(std)} + V_{m(std)}\right]}$$

$$(\dot{m}_p)_1 = 8.5714 \times 10^{-3}\ C_s\ Q_{s;d}$$

$$(\dot{m}_p)_2 = \frac{1.3228 \times 10^{-1}\ M_p\ A}{\theta\ A_n}$$

$$\dot{m}_p = \frac{(\dot{m}_p)_1 + (\dot{m}_p)_2}{2}$$

SYMBOLS

A	=	Cross sectional area of stack, SQ. FT.
A_n	=	Cross sectional area of nozzle, SQ. FT.
B_{ws}	=	Water vapor in gas stream, proportion by volume
C_p	=	Pitot tube coefficient, dimensionless
C_a	=	Concentration of particulate matter in stack gas, GR/ACF
C_s	=	Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions
EA	=	Excess air, percent by volume
γ	=	Dry test meter correction factor, dimensionless
G_d	=	Specific gravity (relative to air), dimensionless
I	=	Isokinetic variation, percent by volume
M_d	=	Molecular weight of stack gas, dry basis, g/g - mole.
$\dot{m}_g$	=	Mass flow of wet flue gas, LB/HR
$\dot{m}_p$	=	Particulate mass flow, LB/HR
M_s	=	Molecular weight of stack gas, wet basis, g/g, mole.
M_p	=	Total amount of particulate matter collected, g
P_{bar}	=	Atmospheric pressure, IN. HG (uncompensated)
P_g	=	Stack static gas pressure, IN. W.C.
P_{std}	=	Standard absolute pressure, 29.92 IN. HG

Q_a = Actual volumetric stack gas flow rate, ACFM

$Q_{s,d}$ = Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM

RH = Relative humidity, %

T_{db} = Dry bulb temperature of stack gas, °R

T_{wb} = Wet bulb temperature of stack gas, °R

$T_{m(avg)}$ = Absolute average dry gas meter

$T_{s(avg)}$ = Absolute average

T_{std} = Standard absolu

θ = Total sampling

V_{lc} = Total volume of liquid collected

ml

V_m = Volume of gas sample as measured by dry gas meter,

$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF

$V_{w(std)}$ = Volume of water vapor in the gas sample corrected to standard conditions, SCF

$\bar{V}_s$ = Average actual stack gas velocity, FT/SEC

vp_{tdb} = Vapor pressure at T_{db}, IN. HG

vp_{twb} = Vapor pressure at T_{wb}, IN. HG

$\overline{\Delta H}$ = Average pressure differential across the orifice meter, IN. W.C.

ΔP = Velocity pressure of stack gas, IN. W.C.

γ = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

APPENDIX I

SAMPLING TRAIN CALIBRATION DATA

Environmental Report No. 3-1466
Lehigh Portland Cement Company
Mason City, Iowa

Meter Box Calibration Data Sheet

Date of Cal: February 15, 1983
Technician: J. Stock
Bar. Press.: 29.11

Meter Box No. 8
Wet Test Meter Ser. No. 64710
Dry Test Meter No. AL-20

Delta H Actual (in. WC)	Gas Volume Wet Test Meter	Cal. Index (%)	Diff. Wet Test Meter (in. WC)	Gas Volume Dry Test Meter Vde (cf)	Gas Volume Dry Test Meter Vdf (cf)	Gamma	Orifice Constant (in. WC)
0.50	4.0	99.90	0.01	825.83	829.94	[illegible]	1.744
0.90	5.0	99.90	0.02	819.67	824.80	[illegible]	1.695
1.40	16.0	99.90	0.04	767.12	782.97	1.00938	1.742
2.00	14.0	99.90	0.06	752.35	766.14	1.00704	1.787
3.00	14.0	99.91	0.09	832.00	846.3[illegible]	0.99747	1.809
5.00	10.0	99.91	0.13	807.43	817.6[illegible]	0.99856	1.799
						Average: 0.99774	1.763

Meter Box Calibration and Usage Data

Date of Report: February 18, 1983

Control Case No. 8 (Rockwell Dry Test Meter Serial No. 64710)

Date of Last Calibration: February 15, 1983
Calibration Technician: J. Stock
Wet Test Meter No.: American Meter AL-20

Date of Use	Job No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
February 17, 1983	3-1466	857.07	9.46	152.39	152.39
February 18, 1983	3-1466	10.16	138.09	127.93	280.32
February 18, 1983	3-1466	138.40	266.27	127.87	408.19

*Total volume through meter since last calibration

Interpoll Report No. 3-1466
Lehigh Portland Cement Company
Mason City, Iowa

Meter Box Calibration Data Sheet

Date of Cal: December 27, 1982
Technician: D. Stock
Bar. Press.: 29.12

Meter Box No. 7
Dry Test Meter Ser. No. 676477
Wet Test Meter No. AL-20

Delta H Actual (in. WC)	Gas Volume Wet Test Meter	Cal. Index (%)	Diff. Wet Test Meter (in. WC)	Gas Volume Dry Test Meter Vde (cf)	Gas Volume Dry Test Meter Vdf (cf)	Gas Temperature of Meters Tw (deg-F)	Gas Temperature of Meters Tdi (deg-F)	Gas Temperature of Meters Tdo (deg-F)	Time (min)	Meter Coef.	Orifice Constant (in. WC)
0.50	5.0	99.90	0.01	134.24	139.33	66	85	77	12.56	1.00729	1.763
0.92	9.0	99.90	0.02	171.33	180.43	66	89	77	16.68	1.00442	1.778
1.40	11.0	99.90	0.04	120.96	132.15	64	88	77	16.77	1.00715	1.807
2.00	16.0	99.90	0.06	100.48	116.76	64	90	77	20.61	0.99823	1.856
3.00	10.0	99.91	0.09	182.61	192.77	66	87	77	10.08	0.99831	1.849
5.00	10.0	99.91	0.12	193.78	203.97	66	87	77	8.03	0.99270	1.805
									Average:	1.00135	1.810

Meter Box Calibration and Usage Status

Date of Report: February 18, 1983

Control Case No. 7 (Rockwell Dry Test Meter Serial No. 676477)

Date of Last Calibration: December 27, 1982
Calibration Technician: D. Stock
Wet Test Meter No.: American Meter AL-20

Date of Use	Job No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
January 26, 1983	3-1446	204.42	[illegible]	107.29	107.29
February 17, 1983	3-1466	312.60	[illegible]	220.75	328.04
February 18, 1983	3-1466	533.80	[illegible]	124.70	452.74
February 18, 1983	3-1466	658.70	[illegible]	165.37	618.11

*Total volume through meter since last calibration

Pitot Tube Calibration
Data Sheet

Date of Cal: December 18, 1982 Pitot Tube Number 6
Technician: J. Stock

Direction A

U* (fps)	H std* (in. wc)	Actual H std (in. wc)	H s-type (in. wc)	Coeff
20	0.09	0.09	0.12	0.8660
40	0.37	0.37	0.52	0.8435
60	0.82	0.79	1.11	0.8436
80	1.46	1.45	2.00	0.8515
100	2.29	2.30	3.21	0.8465

Average Coefficient: 0.8502

Direction B

U* (fps)	H std* (in. wc)	Actual H std (in. wc)	H s-type (in. wc)	Coeff
20	0.09	0.10	0.13	0.8771
40	0.37	0.36	0.50	0.8485
60	0.82	0.83	1.12	0.8609
80	1.46	1.47	2.03	0.8510
100	2.29	2.31	3.23	0.8457

Average Coefficient: 0.8566

Overall Average Coefficient: 0.8534

* Nominal or Desired

Pitot Tube Calibration
Data Sheet

Date of Cal: December 18, 1982 Pitot Tube Number 20
Technician: J. Stock

Direction [illegible]

U* (fps)	H std* (in. wc)	Actual H [illegible] (in. wc)	H s-type (in. wc)	Coeff
20	0.09	[illegible]	[illegible]	[illegible]
40	0.37	[illegible]	[illegible]	[illegible]
60	0.82	[illegible]	[illegible]	[illegible]
80	1.46	1.45	[illegible]	[illegible]
100	2.29	2.30	3.19	0.8491

Average Coefficient: 0.8515

Direction B

U* (fps)	H std* (in. wc)	Actual H std (in. wc)	H s-type (in. wc)	Coeff
20	0.09	0.09	0.12	0.8660
40	0.37	0.38	0.53	0.8467
60	0.82	0.82	1.12	0.8557
80	1.46	1.45	2.00	0.8515
100	2.29	2.35	3.05	0.8778

Average Coefficient: 0.8595

Overall Average Coefficient: 0.8555

* Nominal or Desired

Pitot Tube Calibration
Data Sheet

Date of Cal: December 18, 1982 Pitot Tube Number 10
Technician: J. Stock

Direction A

U* (fps)	H std* (in. wc)	Actual H std (in. wc)	H s-type (in. wc)	Coeff
20	0.09	0.08	0.11	0.8528
40	0.37	0.40	0.53	0.8687
60	0.82	0.80	1.10	0.8528
80	1.46	1.50	2.00	0.8660
100	2.29	2.30	3.11	0.8600

Average Coefficient: 0.8601

Direction B

U* (fps)	H std* (in. wc)	Actual H std (in. wc)	H s-type (in. wc)	Coeff
20	0.09	0.08	0.11	0.8528
40	0.37	0.39	0.54	0.8498
60	0.82	0.80	1.10	0.8528
80	1.46	1.45	1.95	0.8623
100	2.29	2.20	3.05	0.8493

Average Coefficient: 0.8534

Overall Average Coefficient: 0.8567

* Nominal or Desired

Pitot Tube Calibration
Data Sheet

Date of Cal: January 18, 1985 Pitot Tube No. S-1
Technician: J. Stock

Direction A

U* (fps)	H std* (in. wc)	Actual H std (in. wc)	H s-type (in. wc)	Coeff
20	0.09			
40	0.37			
60	0.82			
80	1.46			
100	2.29			

Average Coefficient: 0.8485

Direction B

U* (fps)	H std* (in. wc)	Actual H std (in. wc)	H s-type (in. wc)	Coeff
20	0.09	0.08	0.11	0.8466
40	0.37	0.39	0.54	0.8498
60	0.82	0.80	1.11	0.8490
80	1.46	1.45	2.02	0.8472
100	2.29	2.25	3.12	0.8492

Average Coefficient: 0.8484

Overall Average Coefficient: 0.8484

* Nominal or Desired

Nozzle Cali
Data Sh

Technician: Jeff Gnagy

to nearest

Position	
1	0.248
2	0.246
3	0.247
4	0.245
5	0.246
Average:	0.246

Nozzle Calibration
Data Sheet

Date of Cal: February 17, 1983 Nozzle [illegible]
Technician: J. Stock

Nozzle measured by 3[illegible] representative [illegible] to nearest .0001 inch. Observed readings and [illegible]:

Position	Diameter (inches)
1	0.310
2	0.310
3	0.311
4	0.309
5	0.310
Average:	0.310

[redacted]

1	[illegible]
2	0.184
3	0.190
4	0.192
5	0.186
Average:	0.188

Nozzle Calibration
Data Sheet

Date of Cal: February 18, 1983 Nozzle Number 7.2
Technician: C. Manson

Nozzle rotated by 36 degree increments and diameter measured to nearest 0.001 inch. Observed readings and average:

Position	Diameter (inches)
1	0.254
2	0.254
3	0.255
4	0.253
5	0.254
Average:	0.254