ADVANCED INDUSTRIAL RESOURCES

PERFORMANCE TEST REPORT
BAGHOUSE BH-750
LIMESTONE SYSTEM AT
FRANKLIN INDUSTRIAL MINERALS

PREPARED FOR:

FRANKLIN INDUSTRIAL MINERALS
1152 OLD HIGHWAY 31
ALABASTER, ALABAMA 35007

PREPARED BY:

ADVANCED INDUSTRIAL RESOURCES, LLC
5075 ROSWELL ROAD
ATLANTA, GEORGIA 30342

MAY 2000

LIST OF APPENDICES

1.0 INTRODUCTION

On May 11, 2000, Advanced Industrial Resources performed particulate matter and visible emissions testing at the Alabaster, Alabama facility of Franklin Industrial Minerals. The source tested was the Baghouse BH-750 Limestone System. The testing was conducted in order to determine compliance with applicable standards for pollutant emissions in accordance with the requirements of the Alabama Department of Environmental Management and as required by the *Code of Federal Regulations*, Title 40, Part 60.

2.0 TEST RESULTS

Detailed test results are presented in Appendix A. Please find below a summary of measured pollutant emissions and the conclusions of the performance testing.

Source	Average Measured Particulate Matter Emission Rate	Allowable Particulate Matter Emission Rate	Average Visual Opacity
	lbs/hr.	lbs/hr.	
Baghouse BH-750	0.2897	6.2	0%

Thus, it may be concluded that the above listed source complies with the given particulate matter and visual emission standards, as required by the Alabama Department of Environmental Management and as required by the *Code of Federal Regulations*, Title 40, Part 60.

Advanced Industrial Resources would like to express our appreciation to the Alabama Department of Environmental Management and to Mr. Jim Ruddel of Franklin Industrial Minerals for all their assistance with this test program

3.0 SOURCE DESCRIPTION

Franklin Industrial Minerals operates a limestone grinding and load-out facility in Alabaster, Alabama.

Limestone System with Baghouse BH-750 operates under Alabama permit number 411-0049-X002. The limestone is conveyed to screens for sizing. Oversized stones are crushed and conveyed back through the screens. Sized limestone is stored in six silos until loaded out as product. Baghouse BH-750 controls dust at various points in this system. The material throughput during the emission test was 21 TPH. The maximum rate as submitted with the permit application is 25 TPH. Baghouse BH-750 has two (2), sampling ports oriented ninety degrees to one another. Sampling locations for this stack are at least 2 diameters upstream and at least half a diameter downstream from the nearest flow disturbances, so 24 traverse points were used for sampling from this baghouse. Each repetition lasted a minimum of sixty (60) minutes and achieved a minimum sample volume of (30.1 dscf). Visual opacity readings were taken for a total of three hours during the PM emissions testing by Mr. Kenny Bryant, who was certified by the Georgia Environmental Protection Division in April 2000.

Process operation data from the date of testing is included in Appendix G.

4.0 Test Procedures

Performance testing for each source was conducted according to the methodology in the *Title 40 Code of Federal Regulations*, Part 60, Appendix A as applicable to particulate matter emitting sources. Specifically, Method 1 was used for the qualification of the location of sampling ports and for the determination of the number and positions of sampling points. Method 2 was used for the determination of the stack gas velocity and volumetric flow rate. Method 3 was used for the determination of the composition and dry molecular weight of the effluent stack gas. Method 5 was used for the determination of the emission rate of particulate matter from each source. Finally, Method 9 was used for the determination of visual opacity.

Prior to each test run, the sampling line was cleaned with acetone, and a labeled pre-tared glass-fiber filter was placed in the filter holder. The first two impingers were loaded with 100 mL each of water; the last impinger was loaded with 200 g of indicating silica gel; and the train was reassembled. After each test run, the filter was recovered and stored in a labeled petri dish, and the filter holder was rinsed with acetone into a labeled sample bottle. The nozzle and probe liner were brushed and rinsed with acetone, and the rinsing was added to the same sample bottle. Finally, the moisture collected in the impingers was measured, and the spent silica gel was stored in a labeled container. The final fluid level in the wash sample bottle was marked prior to shipment. All recovered filters and sample bottles were kept in a closed sample box until final laboratory analysis.

Laboratory reports and custody records are presented in Appendix E.

5.0 CALIBRATION PROCEDURES

PROBE NOZZLES

Probe nozzles are calibrated before each field use by measuring the internal diameter of the nozzle entrance orifice along three different diameters. Each diameter is measured to the nearest 0.001 inch, and all measurements are averaged. If the total variation of the three measurements exceeds 0.004", the nozzle shall be reshaped, sharpened, and recalibrated before further use.

PITOT TUBES

Before field use, each Type S pitot tube is examined in order to verify that the face planes of the tube are properly aligned, per Method 2 of *40 CFR 60*, App A. The external tubing diameter and base-to-face plane distances are measured in order to verify the use of 0.84 as the baseline (isolated) pitot coefficient. At this time the entire probe assembly (i.e., the sampling probe, nozzle, thermocouple, and pitot tube) is inspected in order to verify that its components meet the interference-free alignment specifications given in *40 CFR 60*, App A, Method 2. If the specifications are met, then the baseline pitot coefficient is used for the entire probe assembly.

After each field use, the face plane alignment of each pitot tube is checked. If any damage has occurred to the tube orifices, the tube shall be reshaped, realigned, and recalibrated before further use.

METERING SYSTEM

Before initial use, each dry gas meter (DGM) console is calibrated at five orifice settings according to Method 5 of *40 CFR 60*, App A. From the calibration data, calculations of the values of Y_m and $\Delta H_@$ are made, and an average of each set of values is obtained. The limit of total variation of Y_m values is $\pm$ 0.02, and the limit for $\Delta H_@$ values is $\pm$ 0.20.

After each field use, the calibration of the DGM console is checked by performing three calibration runs at a single intermediate orifice setting that is representative of the range used during field testing. The limit of acceptable relative variation from Y_m is 5.0%.

TEMPERATURE GAUGES

After each field use, the temperature measuring instruments on each sampling train are calibrated against standardized mercury-in-glass reference thermometers. The limit of acceptable variation between the absolute reference temperature and the absolute indicated temperature is 1.5%.

BAROMETER

The barometric pressure at the test site is determined by correcting for altitude the absolute (mean-sea-level) barometric pressure. The absolute barometric pressure is obtained throughout the test period from local weather authorities.

Calibration data sheets are presented in Appendix F

APPENDIX A

TEST RESULTS

Advanced Industrial Resources, LLC

Particulate Matter Test Results

Franklin Industrial Minerals
Alabaster, Alabama
BH-750

		Units	Run 1	Run 2	Run 3	Averages
Test Date			11-May-00	11-May-00	11-May-00	
P_m	Pressure of meter gases	inches Hg	29.56	29.79	29.54	29.63
P_s	Pressure of stack gases	inches Hg	29.35	29.45	29.45	29.42
$V_{m(std)}$	Volume of gas sample	dscf	55.82	69.82	65.41	63.68
$V_{w(std)}$	Volume of water vapor	scf	1.37	1.63	1.32	1.44
B_{ws}	Moisture in stack gas	dimensionless	0.024	0.023	0.020	0.022
M_d	Mol. Wt. Of gas at DGM	lb./lb.-mole	28.84	28.84	28.84	28.84
M_s	Mol. Wt. Of gas at stack	lb./lb.-mole	28.58	28.59	28.62	28.60
v_s	Velocity of stack gas	ft./sec	32.69	32.57	30.84	32.03
A_n	Area of nozzle	ft^2	0.000528	0.000668	0.000668	0.000621
A_s	Area of stack	ft^2	4.91	4.91	4.91	4.91
Q_a	Vol. Flow rate of actual gas	cfm	9,629	9,591	9,084	9,435
Q_{sd}	Vol. Flow rate of dry gas	dscfm	8,484	8,408	7,892	8,261
I	Isokinetic sampling ratio	percent	102.0	101.7	101.5	101.7
c_{PM}	Conc. Of PM in dry stack gas	mg/dscm	12.147	7.790	8.045	**9.327**
c_{PM}	Conc. Of PM in dry stack gas	gr/dscf	0.005305	0.003402	0.003513	**0.004073**
E_{PM}	Emission rate of PM	lb./hour	0.3860	0.2453	0.2378	**0.2897**
K_I	K-Factor	dimensionless	8.97	14.49	14.60	12.69

APPENDIX B

FIELD DATA REDUCTION

Advanced Industrial Resources, LLC

Compliance Data Reduction Sheet

Client:	ranklin Industrial Minera	**Console ID:**	C-001
Location:	Alabaster, Alabama	Y_m:	0.990
Source:	BH-750	$\Delta H_@$:	1.780
Test Team:	DJK, KB	C_p:	0.84
EPA Methods:	1, 2, 3, 5	**Analyte(s):**	Particulate Matter

		Units	Run 1	Run 2	Run 3
Test Date			11-May-00	11-May-00	11-May-00
Start Time			9:17AM	10:58AM	12:28PM
End Time			10:21AM	12:09PM	1:31PM
V_m	Volume of gas sample	dcf	58.613	74.124	70.458
V_{lc}	Volume of liquid collected	mL	28.9	34.4	27.9
Δp	Velocity head of stack gas	inches H_2O	0.32	0.31	0.28
$(\Delta p)^{1/2}$	Square root of velocity head	(inches H_2O)$^{1/2}$	0.550	0.547	0.515
ΔH	Pressure differential	inches H_2O	2.88	4.64	1.22
θ	Total sampling time	minutes	60.0	60.0	60.0
D_n	Diameter of nozzle	inches	0.311	0.350	0.350
D_s	Diameter of stack	inches	30.0	30.0	30.0
T_m	Temperature of meter	°R	542	553	556
T_s	Temperature of stack gas	°R	574	579	586
P_{bar}	Barometric pressure	inches Hg	29.35	29.45	29.45
p_g	Gauge pressure of stack gas	inches H_2O	0.00	0.00	0.00
% O_2	Percent O2 by volume	percent ($^v/_v$)	20.9	20.9	20.9
% CO_2	Percent CO2 by volume	percent ($^v/_v$)	0.0	0.0	0.0
% N_2	Percent N2 by volume	percent ($^v/_v$)	79.1	79.1	79.1
m_{PM}	Mass of particulate matter	mg	19.2	15.4	14.9

APPENDIX C

EXAMPLE CALCULATIONS AND NOMENCLATURE

EXAMPLE CALCULATIONS

$A_n = D_n \pi / 4$

$A_s = D_s \pi / 4$

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

$c_{PM} = (m_{PM} / V_{m(std)})\ (35.31466\ ft^3/m^3)$

$'c_{PM} = (m_{PM} / V_{m(std)})\ (0.015432\ gr./mg)$

$E_{PM} = (m_{PM} / V_{m(std)})\ Q_{sd}\ (60\ min/hr)\ (2.2046x10^{-6}\ lb./mg)$

$I = 100\ T_s\ (K_3\ V_{lc} + Y_m\ V_m\ P_m / T_m) / (60\ \theta\ v_s\ P_s\ A_n)$

where $K_3 = 0.002669$ (in. Hg ft^3) / (mL °R)

$K_I = [(2.0084x10^7\ \Delta H_@)\ A_n\ (1 - B_{ws})]^2\ (M_d / M_s)\ (T_m / T_s)\ (P_s / P_m)$

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_s = M_d\ (1 - B_{ws}) + M_w\ B_{ws}$

$P_m = P_{bar} + \Delta H / 13.6$

$P_s = P_{bar} + p_g / 13.6$

$Q_a = (60\ s/min)\ v_s\ A_s$

$Q_{sd} = (60\ s/min)\ (1 - B_{ws})\ v_s\ A_s\ (T_{std} / T_s)\ (P_s / P_{std})$

$T_m = t_m + 460°$

$T_s = t_s + 460°$

$V_{m(std)} = V_m\ Y_m\ (T_{std} / T_m)\ (P_m / P_{std})$

$V_{w(std)} = (V_{lc}\ \rho_w\ R\ T_{std}) / (M_w\ P_{std})$

$v_s = K_p\ C_p\ [\Delta p]^{1/2}\ [T_s / (P_s\ M_s)]^{1/2}$

NOMENCLATURE

Symbol	Units	Description
A_n	ft^2	Area of the nozzle
A_s	ft^2	Area of the stack
B_{ws}	dimensionless	Volume proportion of water in the stack gas stream
C_p	dimensionless	Type S pitot tube coefficient
c_{PM}	mg/dscm	Concentration of PM in dry stack gas, standardized
$'c_{PM}$	gr./dscf	Concentration of PM in dry stack gas, standardized
D_n	inches	Internal diameter of the nozzle at the entrance orifice
D_s	inches	Internal diameter of the stack at sampling location
ΔH	inches H_2O	Average pressure differential across the meter orifice
$\Delta H_@$	inches H_2O	Orifice pressure differential that corresponds to 0.75 cfm of air at 68 °F and 29.92 inches of Hg
Δp	inches H_2O	Velocity head of stack gas
E_{PM}	lb./hour	Emission rate of PM, time basis
I	percent	Isokinetic sampling ratio expressed as percentage
K_I	dimensionless	K-factor, ratio of ΔH to ΔP, ideal
K_p	$\frac{ft[(lb/lb\text{-}mol)(in.\ Hg)]^{1/2}}{s[(°R)(in.\ H_2O)]^{1/2}}$	Type S pitot tube constant, = 85.49
L_p	cfm	Measured post-test leakage rate of the sampling train
M_d	lb./lb.-mole	Molecular weight of gas at the DGM
M_s	lb./lb.-mole	Molecular weight of gas at the stack
M_w	lb./lb.-mole	Molecular weight of water, = 18.0
m_{PM}	mg	Mass of PM in the sample
P_{bar}	inches Hg	Barometric pressure at measurement site
P_{input}	tons/hour	Process dry mass input rate
p_g	inches H_2O	Gauge (static) pressure of stack gas
P_m	inches Hg	Absolute pressure of meter gases
P_s	inches Hg	Absolute pressure of stack gases
P_{std}	inches Hg	Standard absolute pressure = 29.92

NOMENCLATURE

Symbol	Units	Description
Q_a	cfm	Volumetric flow rate of actual stack gas
Q_{sd}	dscfm	Volumetric flow rate of dry stack gas, standardized
R	(in. Hg)(ft^3) / (lb-mole)(°R)	Ideal gas constant, = 21.85
ρ_w	lb/mL	Density of water, = 0.002201
ρ_a	g/mL	Density of acetone, = 0.7899
T_m	°R	Absolute temperature of dry gas meter
T_s	°R	Absolute temperature of stack gas
T_{std}	°R	Standard absolute temperature, = 528
t_m	°F	Temperature of DGM
t_s	°F	Temperature of stack gas
θ	minutes	Total sampling time
V_{lc}	mL	Total volume of liquid collected
V_m	dcf	Volume of gas sample as measured by the DGM
$V_{m(std)}$	dscf	Volume of gas sample as measured by the DGM, standardized
$V_{w(std)}$	scf	Volume of water vapor in the gas sample, standardized
v_s	ft./sec	Velocity of stack gas
Y_m	dimensionless	DGM calibration coefficient
Y_c	dimensionless	DGM calibration check value
Y_w	dimensionless	Reference (wet) gas meter calibration coefficient
% CO_2	percent	Percent CO_2 by volume, dry basis
% O_2	percent	Percent O_2 by volume, dry basis
% N_2	percent	Percent N_2 by volume, dry basis

APPENDIX D

RAW FIELD DATA

Advanced Industrial Resources, LLC

Particulate Matter Field Data Sheet

Client: FRANKLIN INDUSTRIAL MINERALS
Location: ALABASTER, AL
Source: BH-750
Test Team: DSK & KB
EPA Methods: 1, 2, 3, 5
D_s (in.): 30"
% O_2 20.9
% CO_2 0.0
Start Run: ~~8:17~~ AM 9:17
End Run: ~~9:21~~ AM 10:21
Run Number: 1

Test Date: 5/11/04
Console ID: C-001
Y_m / $\Delta H_@$: 0.990 / 1.780
Sampling Box ID: B-01
Probe Assembly ID: P3-01
D_n (in.): 0.311
Assumed B_{ws}:
P_{bar} (in. Hg):
p_g (in. H_2O): 0.0
Minutes/Point: 2.5
K-Factor: ~~9.5~~ 9.1

		Inches H_2O		Temperature Readings (°F)					
Point	Meter (dcf)	Δp	ΔH	t_s	Filter	Last Impinger	t_m Inlet	t_m Outlet	Vacuum (in. Hg)
1	0.000	0.44	4.00	110	255	55	77	77	5
2	2.85	0.45	4.10	110	255	57	77	77	5
3	5.74	0.46	4.19	110	256	58	77	77	5
4	8.75	0.48	4.37	111	255	60	78	78	6
5	11.81	0.46	4.19	111	255	61	79	79	6
6	14.83	0.41	3.73	111	254	61	80	80	5
7	17.65	0.28	2.54	112	251	61	80	80	4
8	20.03	0.25	2.28	112	252	60	81	81	3
9	22.26	0.24	2.18	112	253	59	81	81	3
10	24.45	0.23	2.09	113	253	58	82	82	3
11	26.57	0.23	2.09	113	256	58	82	82	3
12	28.70	0.23	2.09	113	258	59	83	83	3
				Change Ports					
13	30.837	0.14	1.27	114	261	62	83	83	2
14	32.51	0.15	1.37	114	256	56	83	83	2
15	34.22	0.15	1.37	115	257	56	83	83	2
16	35.95	0.14	1.27	115	256	57	83	83	2
17	37.62	0.16	1.46	115	257	56	84	84	2
18	39.30	0.22	2.00	116	257	57	84	84	3
19	41.32	0.39	3.55	116	256	57	85	85	5
20	43.96	0.44	4.00	117	256	58	85	85	5
21	46.94	0.45	4.10	117	257	59	86	86	6
22	49.99	0.44	4.00	118	256	59	87	87	5
23	52.84	0.42	3.82	118	256	59	87	87	5
24	55.73	0.42	3.82	118	256	59	88	88	5
End	58.613								

Moisture Collected (g)

	Initial	Final	Net
Body:	200	218	18
Silica Gel:	200.0	211	11
Gel Number:	1	Total:	29

Post-Run Leak Checks (dcfm @ "Hg)
Sampling Line: 0.001 @ 7"
Pitot A: ok
Pitot B: ok

Advanced Industrial Resources, LLC

Particulate Matter Field Data Sheet

Client: FRANKLIN INDUSTRIAL MINERALS
Location: ALABASTER, AL
Source: BH-750
Test Team: DSK KB
EPA Methods: 1, 2, 3, 5
D_s (in.): 30"
% O_2: 20.9
% CO_2: 0.0
Start Run: 10:58 AM
End Run: 12:09 PM
Run Number: 1

Test Date: 5/11/00
Console ID: C-001
Y_m / $\Delta H_@$: 0.990 / 1.780
Sampling Box ID: B-01
Probe Assembly ID: P3-01
D_n (in.): .350
Assumed B_{ws}:
P_{bar} (in. Hg):
p_g (in. H_2O): 0.0
Minutes/Point: 2.5
K-Factor: 14.9

		Inches H_2O		Temperature Readings (°F)					
Point	Meter (dcf)	Δp	ΔH	t_s	Filter	Last Impinger	t_m Inlet	t_m Outlet	Vacuum (in. Hg)
1	0.000	0.17	2.53	115	249	67	90	90	3
2	2.29	0.14	2.09	116	252	60	90	90	3
3	4.49	0.14	2.09	116	248	62	90	90	3
4	6.55	0.14	2.09	116	250	65	90	90	3
5	8.72	0.20	2.98	115	253	66	90	90	4
6	11.27	0.24	3.58	115	253	67	91	91	5
7	14.09	0.43	6.41	115	253	68	92	92	8
8	17.43	0.43	6.41	115	254	68	92	92	8
9	21.16	0.44	6.56	115	253	68	92	92	8
* 10	24.89	0.43	6.41	115	251	61	93	93	8
11	28.43	0.44	6.56	115	253	55	93	93	9
12	32.19	0.45	6.70	114	252	54	93	93	9
				Change Ports					
13	35.996	0.42	6.26	119	255	58	93	93	8
14	39.59	0.45	6.70	121	252	54	93	93	9
15	43.79	0.44	6.56	123	253	56	93	93	9
16	47.12	0.43	6.41	125	251	56	93	93	8
17	50.84	0.42	6.26	124	253	57	94	94	8
18	54.55	0.37	5.51	124	251	57	94	94	7
19	58.04	0.24	3.58	124	252	57	94	94	5
20	60.92	0.24	3.58	124	251	57	94	94	5
21	63.72	0.23	3.43	124	250	57	94	94	4
22	66.47	0.20	2.98	125	252	58	95	95	4
23	69.04	0.19	2.83	125	252	58	94	94	4
24	71.55	0.20	2.98	125	251	59	95	95	4
End	74.124								

Moisture Collected (g)

	Initial	Final	Net
Body:	200	222	22
Silica Gel:	200.0	225	12.5
Gel Number:	2	Total:	34.5

Post-Run Leak Checks (dcfm @ "Hg)

Sampling Line: 0.003 @ 10"
Pitot A: ok
Pitot B: ok

Advanced Industrial Resources, LLC

Particulate Matter Field Data Sheet

Client:	FRANKLIN MINERALS	**Test Date:**	5-4-00
Location:	ALABASTER AL	**Console ID:**	C-001
Source:	BH-750	**Y_m / $\Delta H_@$:**	0.990/1.780
Test Team:	DSK KB	**Sampling Box ID:**	B-01
EPA Methods:	1, 2, 3, 5	**Probe Assembly ID:**	P3-01
D_s (in.):	30"	**D_n (in.):**	350
% O_2	20.9	**Assumed B_{ws}:**	
% CO_2	0.0	**P_{bar} (in. Hg):**	
Start Run:	12:28 PM	**p_g (in. H_2O):**	0.0
End Run:	1:31 PM	**Minutes/Point:**	2.5
Run Number:	3	**K-Factor:**	14.9

		Inches H_2O		Temperature Readings (°F)					
Point	**Meter (dcf)**	**Δp**	**ΔH**	**t_s**	**Filter**	**Last Impinger**	**t_m Inlet**	**t_m Outlet**	**Vacuum (in. Hg)**
1	0.000	0.29	4.32	124	249	67	93	93	8
2	3.05	0.39	5.81	125	252	58	93	93	10
3		0.42	6.26	126	248	62	93	93	11
4	10.29	0.38	5.66	127	252	65	93	93	7
5	13.79	0.38	5.66	127	251	65	94	94	7
6	17.26	0.34	5.07	127	251	60	94	94	6
7	20.47	0.20	2.98	126	252	58	95	95	4
8		0.20	2.98	126	250	57	95	95	4
9	25.64	0.18	2.68	125	252	58	96	96	4
10	28.11	0.19	2.83	127	252	57	96	96	4
11	30.60	0.19	2.83	126	250	56	96	96	4
12	33.09	0.18	2.68	125	249	58	97	97	4
				Change Ports					
13	35.529	0.13	1.94	123	250	64	97	97	3
14	37.58	0.14	2.09	126	252	59	97	97	3
15	39.71	0.13	1.94	128	251	59	97	97	3
16	41.75	0.13	1.94	128	248	60	97	97	3
17	43.83	0.15	2.24	126	246	60	97	97	3
18	46.07	0.18	2.68	128	250	60	97	97	4
19	48.54	0.40	5.96	128	250	60	97	97	8
20	52.14	0.41	6.11	126	252	61	98	98	8
21	55.74	0.42	6.26	127	251	61	98	98	8
22	59.54	0.41	6.11	128	250	61	98	98	8
23	63.10	0.41	6.11	127	248	61	98	98	8
24	66.77	0.42	6.26	127	250	61	99	99	9
End	70.458								

Moisture Collected (g)

	Initial	Final	Net	
Body:	200	216	16	16
Silica Gel:	200.0	212	12	12
Gel Number:	3	**Total:**	28	

Post-Run Leak Checks (dcfm @ "Hg)

Sampling Line: 0.000 @ 12"

Pitot A: ok

Pitot B: ok

Advanced Industrial Resources, LLC

Particulate Matter Field Data Sheet

Client:	Franklin Industrial Minerals	**Test Date:**	May 11, 2000
Location:	Alabaster, Alabama	**Console ID:**	C-001
Source:	BH-750	**Y_m / $\Delta H_@$:**	0.990 / 1.780
Test Team:	DJK, KB	**Sampling Box ID:**	B-01
EPA Methods:	1, 2, 3, 5	**Probe Assembly ID:**	P3-01
D_s (in.):	30.0	**D_n (in.):**	0.311
% O_2	20.9	**Assumed B_{ws}:**	1.0
% CO_2	0.0	**P_{bar} (in. Hg):**	29.35
Start Run:	9:17AM	**p_g (in. H_2O):**	0.00
End Run:	10:21AM	**Minutes/Point:**	2.5
Run Number:	1	**K-Factor:**	9.1

		Inches H_2O			Temperature Readings (°F)				
Point	**Meter (dcf)**	**Δp**	**ΔH**	**$(\Delta p)^{1/2}$**	**t_s**	**Filter**	**Last Impinger**	**t_m Average**	**Vacuum (in. Hg)**
1	0.000	0.44	4.00	0.663	110	255	55	77	5
2	2.85	0.45	4.10	0.671	110	255	57	77	5
3	5.74	0.46	4.19	0.678	110	256	58	77	5
4	8.75	0.48	4.37	0.693	111	255	60	78	6
5	11.81	0.46	4.19	0.678	111	255	61	79	6
6	14.83	0.41	3.73	0.640	111	254	61	80	5
7	17.65	0.20	1.82	0.447	112	251	61	80	4
8	20.03	0.25	2.28	0.500	112	252	60	81	3
9	22.26	0.24	2.18	0.490	112	253	59	81	3
10	24.45	0.23	2.09	0.480	113	253	58	82	3
11	26.57	0.23	2.09	0.480	113	258	58	82	3
12	28.70	0.23	2.09	0.480	113	258	59	83	3
13	30.837	0.14	1.27	0.374	114	261	62	83	2
14	32.51	0.15	1.37	0.387	114	256	56	83	2
15	34.22	0.15	1.37	0.387	115	257	56	83	2
16	35.95	0.14	1.27	0.374	115	256	57	83	2
17	37.62	0.16	1.46	0.400	115	257	56	84	2
18	39.30	0.22	2.00	0.469	116	257	57	84	3
19	41.32	0.39	3.55	0.624	116	256	57	85	5
20	43.98	0.44	4.00	0.663	117	256	58	85	5
21	46.94	0.45	4.10	0.671	117	257	59	86	6
22	49.99	0.44	4.00	0.663	118	256	59	87	5
23	52.84	0.42	3.82	0.648	118	256	59	87	5
24	55.73	0.42	3.82	0.648	118	256	59	88	5
End	58.613								

Total Moisture Collected (mL): 29.0

System Leak Check (cfm): 0.001

Advanced Industrial Resources, LLC

Particulate Matter Field Data Sheet

Client:	Franklin Industrial Minerals	**Test Date:**	May 11, 2000
Location:	Alabaster, Alabama	**Console ID:**	C-001
Source:	BH-750	**Y_m / $\Delta H_@$:**	0.990 / 1.780
Test Team:	DJK, KB	**Sampling Box ID:**	B-01
EPA Methods:	1, 2, 3, 5	**Probe Assembly ID:**	P3-01
D_s (in.):	30.0	**D_n (in.):**	0.350
% O_2	20.9	**Assumed B_{ws}:**	1.0
% CO_2	0.0	**P_{bar} (in. Hg):**	29.45
Start Run:	10:58AM	**p_g (in. H_2O):**	0.00
End Run:	12:09PM	**Minutes/Point:**	2.5
Run Number:	2	**K-Factor:**	14.9

		Inches H_2O			Temperature Readings (°F)				
Point	**Meter (dcf)**	**Δp**	**ΔH**	**$(\Delta p)^{1/2}$**	**t_s**	**Filter**	**Last Impinger**	**t_m Average**	**Vacuum (in. Hg)**
1	0.000	0.17	2.53	0.412	115	249	67	90	3
2	2.29	0.14	2.09	0.374	116	252	60	90	3
3	4.43	0.14	2.09	0.374	116	248	62	90	3
4	6.55	0.14	2.09	0.374	115	250	65	90	3
5	8.72	0.20	2.98	0.447	115	253	66	90	4
6	11.27	0.24	3.58	0.490	115	253	67	91	5
7	14.09	0.43	6.41	0.656	115	253	68	92	8
8	17.43	0.43	6.41	0.656	115	254	68	92	8
9	21.16	0.44	6.56	0.663	115	253	68	92	8
10	24.89	0.43	6.41	0.656	115	251	61	93	8
11	28.43	0.44	6.56	0.663	115	253	55	93	9
12	32.19	0.45	6.71	0.671	114	252	54	93	9
13	35.996	0.42	6.26	0.648	119	255	58	93	8
14	39.59	0.45	6.71	0.671	121	252	54	93	9
15	43.39	0.44	6.56	0.663	123	253	56	93	9
16	47.12	0.43	6.41	0.656	125	251	56	93	8
17	50.84	0.42	6.26	0.648	124	253	57	94	8
18	54.55	0.37	5.51	0.608	124	251	57	94	7
19	58.04	0.24	3.58	0.490	124	252	57	94	5
20	60.92	0.24	3.58	0.490	124	251	57	94	5
21	63.72	0.23	3.43	0.480	124	250	57	94	4
22	66.47	0.20	2.98	0.447	125	252	58	95	4
23	69.04	0.19	2.83	0.436	125	252	58	94	4
24	71.55	0.20	2.98	0.447	125	251	59	95	4
End	74.124								

Total Moisture Collected (mL): 34.5

System Leak Check (cfm): 0.003

Advanced Industrial Resources, LLC

Particulate Matter Field Data Sheet

Client:	Franklin Industrial Minerals	**Test Date:**	May 11, 2000
Location:	Alabaster, Alabama	**Console ID:**	C-001
Source:	BH-750	**Y_m / $\Delta H_@$:**	0.990 / 1.780
Test Team:	DJK, KB	**Sampling Box ID:**	B-01
EPA Methods:	1, 2, 3, 5	**Probe Assembly ID:**	P3-01
D_s (in.):	30.0	**D_n (in.):**	0.350
% O_2	20.9	**Assumed B_{ws}:**	1.0
% CO_2	0.0	**P_{bar} (in. Hg):**	29.45
Start Run:	12:28PM	**p_g (in. H_2O):**	0.00
End Run:	1:31PM	**Minutes/Point:**	2.5
Run Number:	3	**K-Factor:**	14.9

		Inches H_2O			Temperature Readings (°F)				
Point	**Meter (dcf)**	**Δp**	**ΔH**	**$(\Delta p)^{1/2}$**	**t_s**	**Filter**	**Last Impinger**	**t_m Average**	**Vacuum (in. Hg)**
1	0.000	0.29	0.90	0.539	124	249	67	93	8
2	3.05	0.39	1.26	0.624	125	252	58	93	10
3		0.42	0.14	0.648	126	248	62	93	11
4	10.29	0.38	1.56	0.616	127	252	65	93	7
5	13.79	0.38	1.92	0.616	127	251	65	94	7
6	17.26	0.34	1.96	0.583	127	251	60	94	6
7	20.47	0.20	0.90	0.447	126	252	58	95	4
8		0.20	1.00	0.447	126	250	57	95	4
9	25.64	0.18	0.84	0.424	125	252	58	96	4
10	28.11	0.19	1.30	0.436	127	252	57	96	4
11	30.60	0.19	0.96	0.436	126	250	56	96	4
12	33.09	0.18	1.04	0.424	125	249	58	97	4
13	35.529	0.13	1.14	0.361	123	250	64	97	3
14	37.58	0.14	1.10	0.374	126	252	59	97	3
15	39.71	0.13	1.30	0.361	128	251	59	97	3
16	41.75	0.13	1.38	0.361	128	248	60	97	3
17	43.83	0.15	1.64	0.387	126	246	60	97	3
18	46.07	0.18	1.70	0.424	128	250	60	97	4
19	48.54	0.40	1.60	0.632	128	250	61	97	8
20	52.14	0.41	1.30	0.640	126	252	61	95	8
21	55.78	0.42	1.16	0.648	127	251	61	98	8
22	59.54	0.41	1.10	0.640	128	250	61	98	8
23	63.10	0.41	1.16	0.640	127	248	61	98	8
24	66.77	0.42	1.04	0.648	127	250	61	99	8
End	70.458								

Total Moisture Collected (mL): 28.0

System Leak Check (cfm): 0.000

Advanced Industrial Resources, LLC

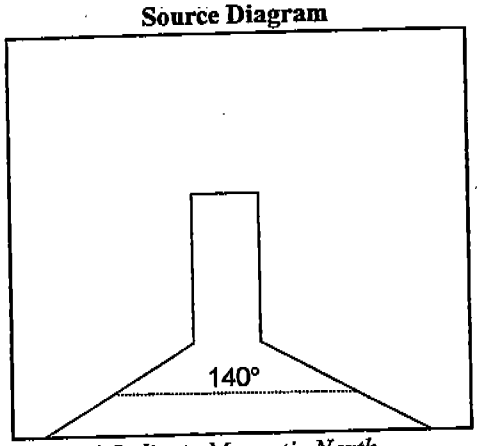
Visible Emissions Field Data Sheet

Client: Franklin Ind. Minerals
Location: Alasbaster Ala.
Source:
Control Device: Baghouse
Test Personnel: Kenny Bryant
Wind Direction: South
Wind Speed: 3-5 MPH
Sky Color: overcast
Background: Plant equipment (brown color)

Date: 5-11-00
Run Number: 1
Start Run: 9:00 AM
Distance to Source: 50'
Height of Discharge Point: 18'
Ambient Temperature: [illegible]° 74°

Condensed H_2O in Plume:
Plume:

Source Diagram



* *Indicate Magnetic North*

Minutes Read: 60

Average Percent Opacity:

Percent Opacity Readings

Minutes	Seconds 0:00	0:15	0:30	0:45	Minutes	Seconds 0:00	0:15	0:30	0:45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	5	0	5	34	5	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	5	0	36	0	0	5	0
7	0	0	0	0	37	0	0	0	0
8	0	0	5	0	38	0	0	0	0
9	0	0	0	0	39	0	5	0	0
10	0	0	0	0	40	0	0	0	0
11	5	0	0	0	41	0	0	0	0
12	0	0	0	5	42	0	0	0	0
13	0	0	0	0	43	0	5	0	5
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	5	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	5	0	0	48	0	0	5	0
19	0	0	0	0	49	0	0	5	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	5	0	0	0
23	5	0	5	0	53	0	5	0	0
24	0	0	0	0	54	0	5	0	0
25	0	0	0	0	55	0	0	0	0
26	5	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	5	0	58	0	0	0	0
29	0	5	0	0	59	0	0	5	0

Comments:

Test Personnel: Kenneth M Bryant
Certification Date: 4-25-00

Advanced Industrial Resources, LLC

Visible Emissions Field Data Sheet

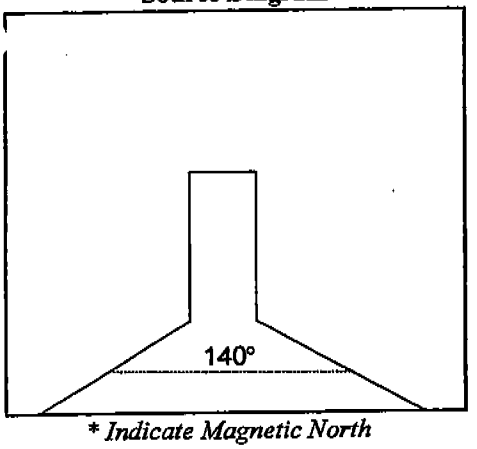
Client: Franklin Ind. Minerals
Location: Alabaster Ala.
Source:
Control Device: Baghouse
Test Personnel: Kenny Bryant
Wind Direction: South West
Wind Speed: 5-7 mph
Sky Color: Overcast
Background: plant equip.

Date: 5-11-00
Run Number: 2
Start Run: 10 58
Distance to Source: 50'
Height of Discharge Point: 18'
Ambient Temperature: 88°

Condensed H_2O in Plume:
Plume:

N

Source Diagram



* *Indicate Magnetic North*

Minutes Read: 60

Average Percent Opacity:

Percent Opacity Readings

Minutes	Seconds 0:00	0:15	0:30	0:45	Minutes	Seconds 0:00	0:15	0:30	0:45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	5	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	5	0	0
5	0	0	0	0	35	0	0	0	0
6	5	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	5	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	5	0
10	0	0	0	0	40	5	0	0	0
11	0	0	0	5	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	5	0	0	43	0	0	0	0
14	0	0	0	0	44	0	5	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	5
17	0	0	5	0	47	0	0	0	0
18	0	0	0	0	48	5	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	5	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	5	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	5	0	0

Comments:

Test Personnel: Kenneth M Bryant
Certification Date: 4-25-00

Advanced Industrial Resources, LLC

Visible Emissions Field Data Sheet

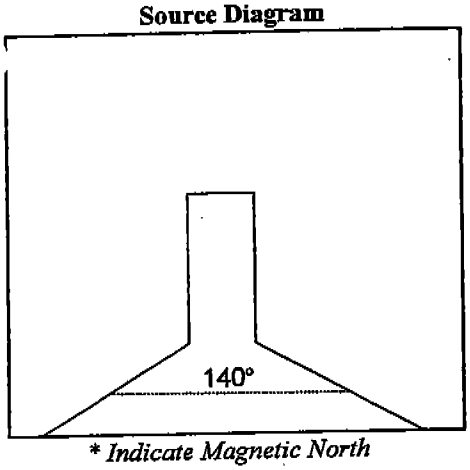
Client: Franklin Ind. Minerals
Location: Alabaster Ala.
Source:
Control Device: Bag house
Test Personnel: Kenny Bryant
Wind Direction: South West
Wind Speed: 5-8 MPH
Sky Color: Overcast
Background: Plant equip.

Date: 5-11-00
Run Number: 3
Start Run: 12:27 P.M.
Distance to Source: 50'
Height of Discharge Point: 18'
Ambient Temperature: 90°

Condensed H_2O in Plume:
Plume:

N

Source Diagram



* *Indicate Magnetic North*

Minutes Read: 60

Average Percent Opacity:

Percent Opacity Readings

Minutes	Seconds 0:00	0:15	0:30	0:45	Minutes	Seconds 0:00	0:15	0:30	0:45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	5	32	0	0	0	5
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	5	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	5
13	0	0	0	5	43	0	0	0	0
14	0	5	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	5	0	0	0	49	0	5	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	5	0	0	0	52	0	0	0	0
23	0	0	0	0	53	5	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	5	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0

Comments:

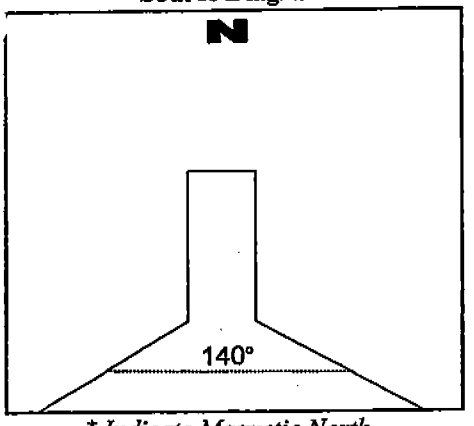
Test Personnel: Kenneth M Bryant
Certification Date: 4-25-00

Advanced Industrial Resources, LLC

Visible Emissions Field Data Sheet

Client:	Franklin Industrial Minerals	**Date:**	5/11/00
Location:	Alabaster, Alabama	**Run Number:**	1
Source:	BH-750	**Start Run:**	9:00AM
Control Device:	Baghouse	**Distance to Source:**	50'
Test Personnel:	Kenny Bryant	**Height of Discharge Point:**	18'
Wind Direction:	Southwest	**Ambient Temperature:**	74 F
Wind Speed:	5-8 mph		
Sky Color:	over cast	**Condensed H_2O in Plume:**	No
Background:	Plant equipment	**Plume:**	NA

Source Diagram



** Indicate Magnetic North*

Percent Opacity Readings

	Seconds					Seconds			
Minutes	**0:00**	**0:15**	**0:30**	**0:45**	**Minutes**	**0:00**	**0:15**	**0:30**	**0:45**
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	5	0	5	34	5	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	5	0	36	0	0	5	0
7	0	0	0	0	37	0	0	0	0
8	0	0	5	0	38	0	0	0	0
9	0	0	0	0	39	0	5	0	0
10	0	0	0	0	40	0	0	0	0
11	5	0	0	0	41	0	0	0	0
12	0	0	0	5	42	0	0	0	0
13	0	0	0	0	43	0	5	0	5
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	5	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	5	0	0	48	0	0	5	0
19	0	0	0	0	49	0	0	5	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	5	0	0	0
23	5	0	5	0	53	0	0	0	0
24	0	0	0	0	54	0	5	0	0
25	0	0	0	0	55	0	0	0	0
26	5	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	5	0	58	0	0	0	0
29	0	5	0	0	59	0	0	5	0

Minutes Read: 60

Average Percent Opacity: 0

Comments: _____

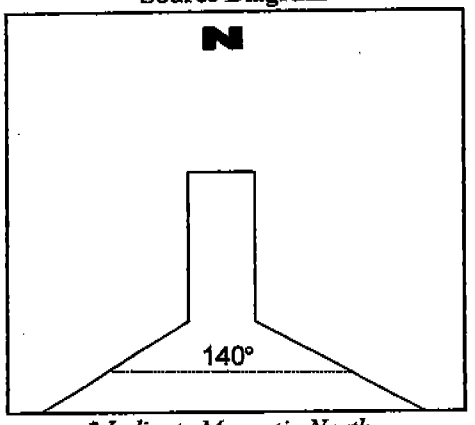
Test Personnel Kenny Bryant _____

Advanced Industrial Resources, LLC

Visible Emissions Field Data Sheet

Client:	Franklin Industrial Minerals	**Date:**	05/11/00
Location:	Alabaster, Alabama	**Run Number:**	2
Source:	BH-750	**Start Run:**	10:58AM
Control Device:	Baghouse	**Distance to Source:**	50'
Test Personnel:	Kenny Bryant	**Height of Discharge Point:**	18'
Wind Direction:	Southwest	**Ambient Temperature:**	88 F
Wind Speed:	5-7 mph		
Sky Color:	over cast	**Condensed H_2O in Plume:**	No
Background:	Plant equipment	**Plume:**	NA

Source Diagram



** Indicate Magnetic North*

Percent Opacity Readings

	Seconds					Seconds			
Minutes	**0:00**	**0:15**	**0:30**	**0:45**	**Minutes**	**0:00**	**0:15**	**0:30**	**0:45**
0	0	0	0	0	**30**	0	0	0	0
1	0	0	0	0	**31**	0	0	0	0
2	0	0	0	0	**32**	0	5	0	0
3	0	0	0	0	**33**	0	0	0	0
4	0	0	0	0	**34**	0	5	0	0
5	0	0	0	0	**35**	0	0	0	0
6	5	0	0	0	**36**	0	0	0	0
7	0	0	0	0	**37**	0	0	5	0
8	0	0	0	0	**38**	0	0	0	0
9	0	0	0	0	**39**	0	0	5	0
10	0	0	0	0	**40**	5	0	0	0
11	0	0	0	5	**41**	0	0	0	0
12	0	0	0	0	**42**	0	0	0	0
13	0	5	0	0	**43**	0	0	0	0
14	0	0	0	0	**44**	0	5	0	0
15	0	0	0	0	**45**	0	0	0	0
16	0	0	0	0	**46**	0	0	5	0
17	0	0	5	0	**47**	0	0	0	0
18	0	0	0	0	**48**	5	0	0	0
19	0	0	0	0	**49**	0	0	0	0
20	0	0	0	0	**50**	0	0	0	0
21	0	0	0	0	**51**	0	0	0	0
22	0	0	0	0	**52**	0	0	0	0
23	0	0	0	0	**53**	5	0	0	0
24	0	0	0	0	**54**	0	0	0	0
25	0	0	0	0	**55**	0	0	0	0
26	0	0	5	0	**56**	0	0	0	0
27	0	0	0	0	**57**	0	0	0	0
28	0	0	0	0	**58**	0	0	0	0
29	0	0	0	0	**59**	0	5	0	0

Minutes Read: 60

Average Percent Opacity: 0

Comments: _____

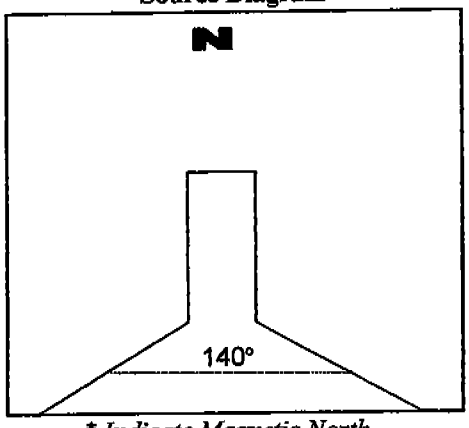
Test Personnel Kenny Bryant

Advanced Industrial Resources, LLC

Visible Emissions Field Data Sheet

Client:	Franklin Industrial Minerals	**Date:**	05/11/00
Location:	Alabaster, Alabama	**Run Number:**	3
Source:	BH-750	**Start Run:**	12:27PM
Control Device:	Baghouse	**Distance to Source:**	50'
Test Personnel:	Kenny Bryant	**Height of Discharge Point:**	18'
Wind Direction:	Southwest	**Ambient Temperature:**	90 F
Wind Speed:	5-8 mph		
Sky Color:	over cast	**Condensed H_2O in Plume:**	No
Background:	Plant equipment	**Plume:**	NA

Source Diagram



* *Indicate Magnetic North*

Minutes Read: 60

Average Percent Opacity: 0

Percent Opacity Readings

	Seconds					Seconds			
Minutes	**0:00**	**0:15**	**0:30**	**0:45**	**Minutes**	**0:00**	**0:15**	**0:30**	**0:45**
0	0	0	0	0	**30**	0	0	0	0
1	0	0	0	0	**31**	0	0	0	0
2	0	0	0	5	**32**	0	0	0	5
3	0	0	0	0	**33**	0	0	0	0
4	0	0	0	0	**34**	0	0	0	0
5	0	0	0	0	**35**	0	0	0	0
6	0	5	0	0	**36**	0	0	0	0
7	0	0	0	0	**37**	0	0	0	0
8	0	0	0	0	**38**	0	0	0	0
9	0	0	0	0	**39**	0	0	0	0
10	0	0	0	0	**40**	0	0	0	0
11	0	0	0	0	**41**	0	0	0	0
12	0	0	0	0	**42**	0	0	0	5
13	0	0	0	5	**43**	0	0	0	0
14	0	5	0	0	**44**	0	0	0	0
15	0	0	0	0	**45**	0	0	0	0
16	0	0	0	0	**46**	0	0	0	0
17	0	0	0	0	**47**	0	0	0	0
18	0	0	0	0	**48**	0	0	0	0
19	5	0	0	0	**49**	0	5	0	0
20	0	0	0	0	**50**	0	0	0	0
21	0	0	0	0	**51**	0	0	0	0
22	5	0	0	0	**52**	0	0	0	0
23	0	0	0	0	**53**	5	0	0	0
24	0	0	0	0	**54**	0	0	0	0
25	0	0	0	0	**55**	0	0	0	0
26	0	0	0	0	**56**	0	0	5	0
27	0	0	0	0	**57**	0	0	0	0
28	0	0	0	0	**58**	0	0	0	0
29	0	0	0	0	**59**	0	0	0	0

Comments: _____

_____

Test Personnel Kenny Bryant _____

Georgia Department of Natural Resources
Environmental Protection Division, Air Protection Branch
4244 International Parkway, Suite 120, Atlanta, Georgia 30354
404/363-7000
Lonice C. Barrett, Commissioner
Harold F. Reheis, Director

May 12, 2000

Kenneth M. Bryant
Advanced Industrial Resources
5075 Roswell Rd.
Atlanta, GA 30342

Dear Mr. Bryant:

Please be advised that you have successfully completed the field certification training of the Georgia Visible Emissions Evaluation Certification Training Course conducted at Lakewood Fairgrounds, Atlanta, Georgia on April 25-27, 2000.

Your plume evaluations were within the specifications of Federal Reference Method "9", which qualified you as a visible emissions evaluator. Your average error on black and white smoke did not exceed 7.5 percent opacity and you incurred no single error exceeding 15 percent opacity during your qualifying run.

This letter serves as your official notice of certification which is valid for six months from the date you qualified, April 25, 2000, subject to the following visual restrictions:

Prescription Corrective Lenses Required: No

A copy of your Qualifying Field Test Form is enclosed. If we may be of further assistance, feel free to contact our office.

It is our hope that the end result of your participation in this course will help in promoting cleaner and healthier air.

Yours for Clean Air,

Arthur D. Hollis
Environmental Specialist
Air Protection Branch
Planning and Support Program

ADH/mb
Enclosure

VISIBLE EMISSIONS EVALUATION CERTIFICATION TEST

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
AIR PROTECTION BRANCH

Kenneth M. Bryant	5075 Roswell Rd. Ath. Ga. 30349		
DATE: 4-25-00	TIME: 2:27 PM	COURSE LOCATION: Lakewood Fairgrounds	
RUN NO.: 1W	WIND DIRECTION AND SPEED: SW 7-10 MPH	SKY CONDITIONS: overcast	DIRECTION AND DISTANCE TO DISCHARGE: North-Northeast 150'
CHECK IF YOU ARE WEARING: SUN GLASSES ☐ CLEAR GLASSES ☐	TINTED CONTACTS ☐ CLEAR CONTACTS ☐	ARE THEY PRESCRIPTION? YES ☐ NO ☐	E-MAIL ADDRESS: AIRTEST@Mindspring.com

CHECK ☒ WHITE SMOKE ☐ BLACK SMOKE

READING	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	ERROR
1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	(90)	95	100	0
2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	(75)	80	85	90	95	100	0
3	0	5	10	15	20	25	30	35	40	45	(50)	(55)	60	65	70	75	80	85	90	95	100	1
4	0	5	10	15	20	25	30	35	40	(45)	(50)	55	60	65	70	75	80	85	90	95	100	1
5	(0)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
6	0	(5)	(10)	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
7	0	5	10	(15)	(20)	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
8	0	5	10	15	20	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
9	0	5	(10)	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
10	0	(5)	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
11	0	5	10	(15)	(20)	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
12	0	5	10	15	(20)	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
13	0	5	10	15	20	(25)	(30)	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
14	0	5	10	15	20	25	(30)	35	40	(45)	50	55	60	65	70	75	80	85	90	95	100	3
15	0	5	10	15	(20)	(25)	(30)	35	40	45	50	55	60	65	70	75	80	85	90	95	100	2
16	0	5	(10)	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
17	0	(5)	(10)	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
18	0	5	10	(15)	20	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	2
19	0	5	10	15	20	(25)	30	(35)	40	45	50	55	60	65	70	75	80	85	90	95	100	2
20	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	(80)	85	(90)	95	100	3
21	(0)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	2
22	0	(5)	10	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	2
23	0	5	10	15	20	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	2
24	0	5	10	(15)	(20)	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
25	0	(5)	(10)	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1

CHECK ☐ WHITE SMOKE ☐ BLACK SMOKE

READING	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	ERROR
26	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	(75)	80	85	90	95	100	1
27	0	5	10	15	20	25	30	35	40	45	(50)	55	60	65	70	75	80	85	90	95	100	0
28	0	5	10	15	20	25	30	(35)	(40)	45	50	55	60	65	70	75	80	85	90	95	100	0
29	0	5	10	15	20	(25)	(30)	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
30	0	5	10	15	20	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
31	0	5	10	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
32	0	5	(10)	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
33	0	(5)	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
34	0	5	(10)	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
35	0	5	10	(15)	(20)	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
36	0	(5)	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
37	0	5	(10)	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
38	0	5	10	15	(20)	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
39	0	5	10	15	20	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
40	0	5	10	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
41	0	5	(10)	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
42	0	5	10	15	(20)	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
43	0	5	10	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
44	0	(5)	(10)	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
45	0	5	(10)	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
46	0	5	10	(15)	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
47	0	5	10	15	20	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
48	0	5	10	15	(20)	(25)	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	1
49	0	5	(10)	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0
50	0	(5)	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	0

TOTAL ERROR: 9

I AFFIRM THAT THE ABOVE OPACITY JUDGEMENTS ARE MY OWN. [signature] SIGNATURE

GRADED BY: [signature] SIGNATURE

VALIDATED BY: _____ SIGNATURE

Advanced Industrial Resources, LLC
Source Description Sheets

Client: FRANKLIN Indust Minerals
Location: ALABASTER, ALABAMA
Source: BH-750

Date: 5/11/00
Test Team: DJK, KB

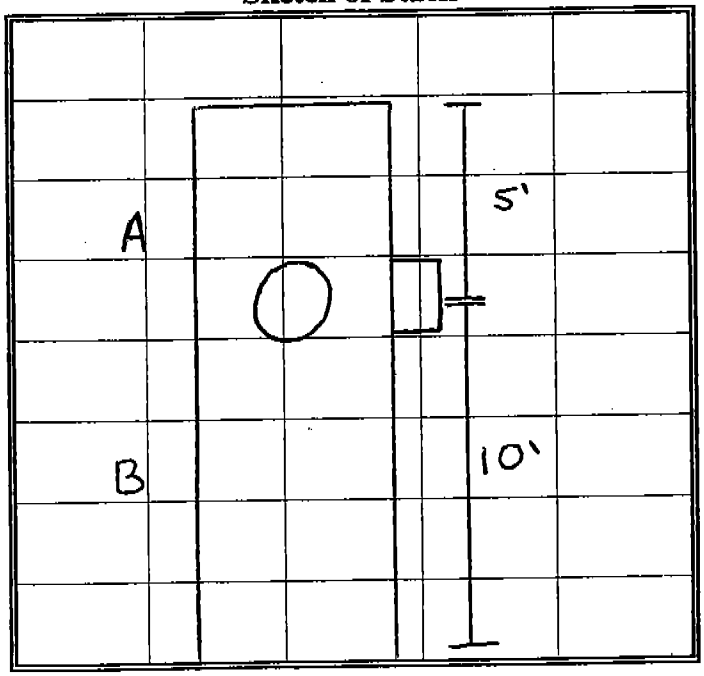
D_n (in.): .311 / .350
A_n (ft^2): .000621
D_s (in.): 30"
A_s (ft^2): 4.91
Length A: 5'
Length B: 10'

t_{amb} (°F): 87°
Assumed B_{ws}: 2.2%
P_{bar} (in. Hg): 30.12
P_g (in. H_2O): 0.0
% O_2: 20.9
% CO_2: 0.0

Point	Δp (in. H_2O)	t_s (°F)
1	.17	115
2	.24	114
3	.43	119
4	.37	125
5	.23	124
6	.20	125

Console ID: C-001
Y: 1.780
$\Delta H_@$: 0.990
C_p: 0.84
K-Factor: 9.1 / 14.9

Sketch of Stack



Advanced Industrial Resources, LLC

Cyclonic Flow Absence Verification Field Data

EPA Method 1

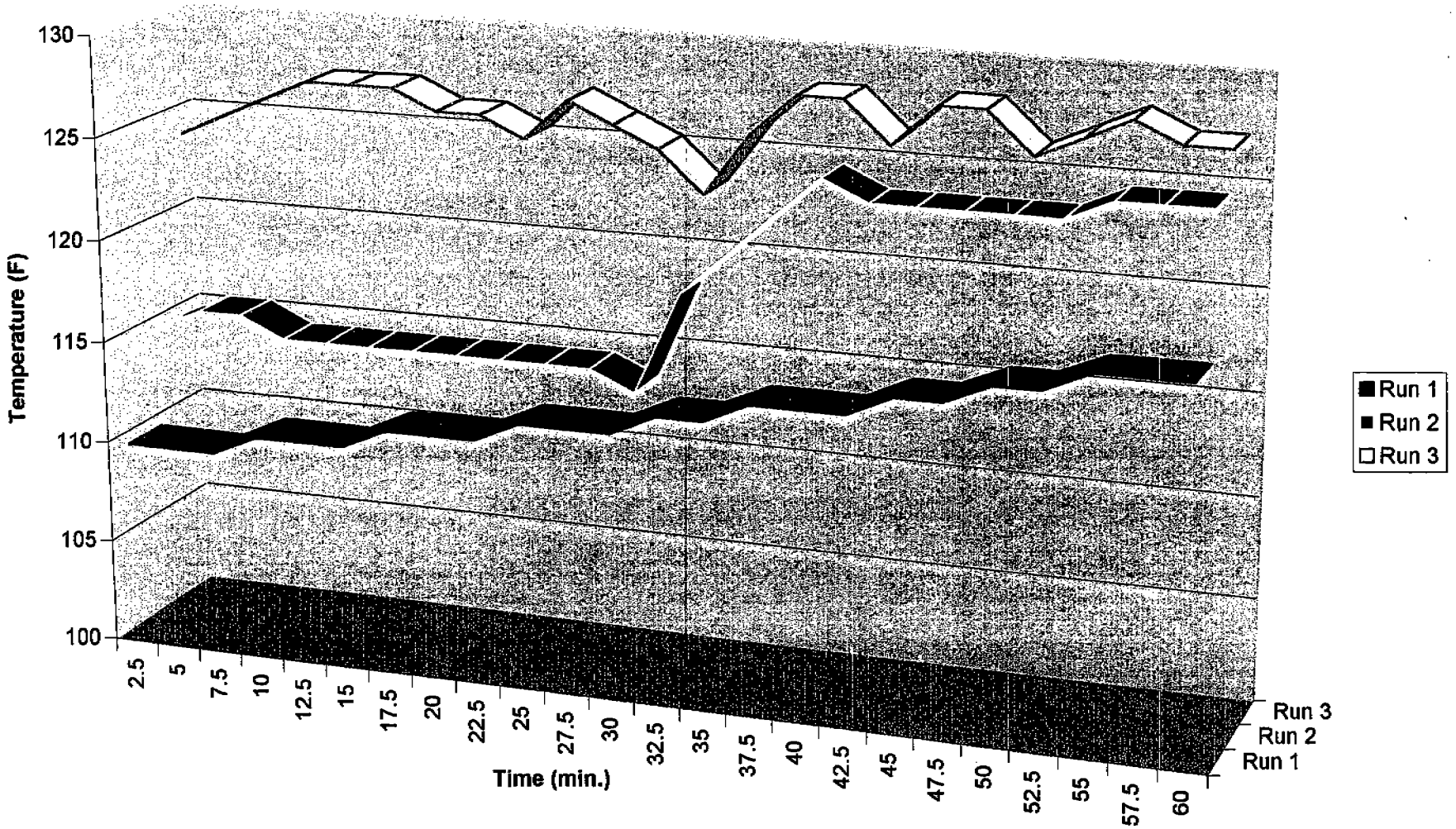
Client: Franklin Indust
Location: Alabaster, AL
Source: BH-750
Test Team: DJK, KB
Probe ID: P3-01
C_p: 0.84

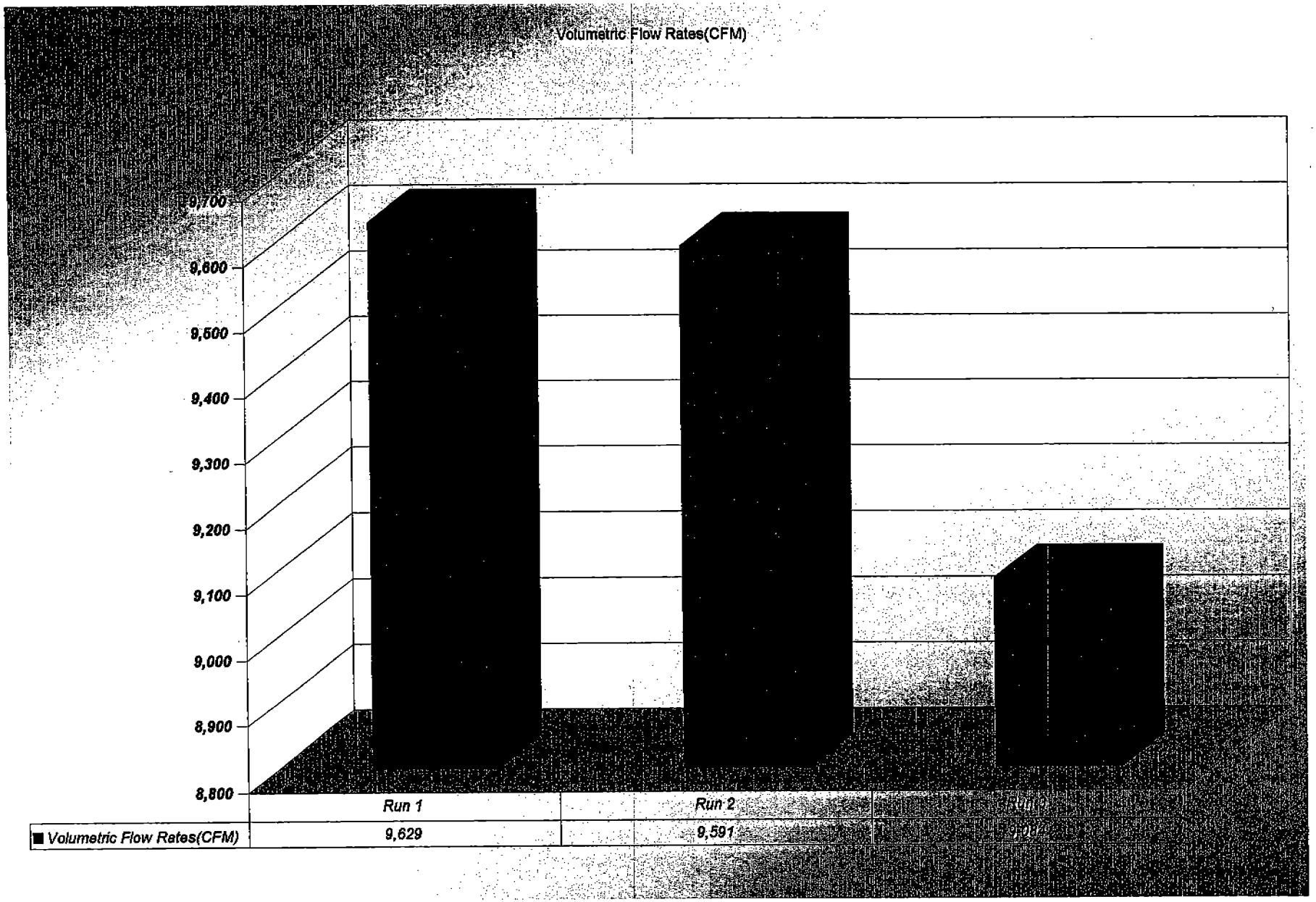
Date: 5-11-00
D_s (in.): 30"
A_s (ft^2): 4.91 /
D_n (in.): 0.311 & .350
A_n (ft^2): 0.000528
0.000668

t_m (°F): 82°
Console ID: C-001
Y_m: 0.990
$\Delta H_@$: 1.780
Assumed B_{ws}: 2.2
P_{bar} (in. Hg): 29.45

Point	Δp (in. H_2O)	α (degrees)
1	0.44	0.0
2	0.46	0.0
3	0.41	0.0
4	0.25	0.0
5	0.26	0.0
6	0.23	0.0
Change Ports		
7	0.14	0.0
8	0.15	0.0
9	0.22	0.0
10	0.44	0.0
11	0.42	0.0
12	0.42	0.0

Figure 2 : Temperature of Stack vs. Time




Volumetric Flow Rates(CFM)
9,700
9,600
9,500
9,400
9,300
9,200
9,100
9,000
8,900
8,800
Run 1
Run 2
Volumetric Flow Rates(CFM)
9,629
9,591

APPENDIX E

LABORATORY REPORTS

AND

CUSTODY RECORDS

Advanced Industrial Resources, LLC
Laboratory Test Report

Client: Franklin Industrail Minerals
Location: Alabaster, Alabama
Source: BH-750

Test Date: May 11, 2000
Analytical Method: EPA Method 5
Target Analytes: PM

Particulate Matter Analysis Data and Results

H_2O Blank Volume: 200 mL
Blank Residue: 0.3 mg

H_2O Density: 1.00 g/mL
Residue Concentration: 0.0015 mg/g

Filter Samples

Test	Filter ID	Average Tare Weight (g)		Average Gross Weight (g)		Net Weight (g)
1	387	0.4024	0.4025	0.4103	0.4104	0.0079
2	388	0.4039	0.4039	0.4118	0.4120	0.0079
3	389	0.4103	0.4102	0.4179	0.4182	0.0076
Blank	390	0.4054	0.4055	0.4056	0.4054	0.0002

Solvent Wash Samples

Test	Beaker ID	Average Tare Weight (g)		Average Gross Weight (g)		Net Weight (g)
1	A-19	115.9603	115.9604	115.9722	115.9722	0.0119
2	A-16	114.4221	114.4222	114.4302	114.4305	0.0081
3	A-1	118.8747	118.8752	118.8826	118.8830	0.0079
Blank	A-21	115.6267	115.6269	115.6270	115.6269	0.0003

Solvent Blank Residue

Test	Beaker ID	Solvent Volume (mL)	Solvent Residue (g)
1	A-19	205	0.0003
2	A-16	210	0.0003
3	A-1	200	0.0003

Net Particulate Matter in Sample

Test	m_{PM} (g)
1	**0.0192**
2	**0.0154**
3	**0.0149**

Comments: None.

Prepared By: Shannon Rackley **Date:** May 12, 2000

Advanced Industrial Resources, LLC
Compliance Sample Custody Record

Client: Franklin Industrial Minerals
1152 Old Highway 31
Alabaster, Alabama

Sample ID	Date	Source	Description	Matrix	Analyses Desired: Method 5					Sample Condition
BH-750-1B	5/11/00	BH-750	Test 1 Bottle	M5	×					
BH-750-2B	5/11/00	BH-750	Test 2 Bottle	M5	×					
BH-750-3B	5/11/00	BH-750	Test 3 Bottle	M5	×					
BH-750-1F	5/11/00	BH-750	Test 1 Filter	M5	×					
BH-750-2F	5/11/00	BH-750	Test 2 Filter	M5	×					
BH-750-3F	5/11/00	BH-750	Test 3 Filter	M5	×					
			Acetone blank		×					
			Glass Fiber Filter Blank		×					

Relinquished By/Sign:	Date/Time	Received By / Sign:		Relinquished By / Sign:	Date/Time	Received By / Sign:
Dan Kirk	5/11/00					
Relinquished By/Sign:	**Date/Time**	**Received By / Sign:**		**Relinquished By / Sign:**	**Date/Time**	**Received By / Sign:**

Field Team Members:

AIR Field Supervisor: Dan Kirk
Field Supervisor Sign: Dan Kirk
AIR Contact Name: Scott Wilson
AIR Contact Number: (770) 420-3080

Analyses To Be Performed By:
Advanced Industrial Resources, LLC
5075 Roswell Road
Atlanta, GA 30342

APPENDIX F

CALIBRATION DATA

Advanced Industrial Resources, LLC

Dry Gas Meter Calibration Data

Dry Gas Meter	
Console ID:	C-001
Serial Number:	801001

Reference Meter	
Meter ID:	28374
Calibration Factor, Y_w:	1.011

Date: 07/09/99

Barometric Pressure, P_b (in. Hg): 29.33 **Performed By:** GSG

Data								
				Temperatures (°F)				Time
		Reference	Dry Gas	Reference	Dry Gas Meter			Elapsed
Vacuum (in. Hg)	ΔH (in. H_2O)	Meter Volume V_w (ft^3)	Meter Volume V_m (ft^3)	Meter t_w	init. t_i	final t_f	avg. t_m	θ (min.)
4	1.00	5.000	5.212	75	78.0	79.0	78.5	9.00
4	2.00	5.551	5.655	75	79.0	81.0	80.0	7.00
4	4.00	5.643	5.752	76	81.0	82.0	81.5	5.00
4	5.00	6.310	6.436	76	83.0	85.0	84.0	5.00
4	8.00	6.328	6.419	76	85.0	86.0	85.5	4.00

Calculations			
ΔH (inches H_2O)	Y_m (dimensionless)	Variation	$\Delta H_@$ (inches H_2O)
1.00	0.974	-0.016	1.821
2.00	0.997	0.007	1.783
4.00	0.992	0.002	1.762
5.00	0.994	0.003	1.753
8.00	0.994	0.004	1.780
Averages:	**0.990**		**1.780**

Where:

Y_m is the ratio of the reading of the reference meter to that of the dry gas meter (DGM); variance limit: ±0.02.

$$Y_m = \frac{Y_w V_w P_b (t_m + 460)}{V_m (P_b + \Delta H/13.6)(t_w + 460)}$$

$\Delta H_@$ is the orifice pressure differential (inches H_2O) that corresponds to 0.75 cfm of air at 68 °F and 29.92 inches of mercury; variance limit: ±0.20.

$$\Delta H_@ = \frac{0.0317\, \Delta H ((t_w + 460)\theta)^2}{P_b (t_m + 460)(Y_w V_w)^2}$$

Advanced Industrial Resources, LLC

Nozzle Calibration Data

Date: 05/11/00 **Performed By:** DJK

Nozzle ID	Nozzle Description	Measurements (inches)			Average (inches)
		1	2	3	
S1-300	Stainless Nozzle	0.310	0.311	0.311	**0.311**

Advanced Industrial Resources, LLC

Nozzle Calibration Data

Date: 05/11/00 **Performed By:** DJK

Nozzle ID	Nozzle Description	Measurements (inches)			Average (inches)
		1	2	3	
SS12	Stainless Nozzle	0.350	0.350	0.351	**0.350**

Advanced Industrial Resources, LLC

Thermocouple Calibration Data

Thermometer ID: RT-01 **Date:** 01/15/00

Bias: 0

Performed By: GSG

Apparatus ID	Apparatus Description	Reference Temperature Reading		Indicated Temperature		Relative Variation
		°F	°R	°F	°R	%
P3-01	Stack Temp.	68	528	68	528	0.0
B-01	Filter Temp.	238	698	240	700	0.3
B-01	Exit Imp. Temp.	64	524	63	523	-0.2
C-001	Meter In Temp.	69	529	71	531	0.4
C-001	Meter Out Temp.	69	529	71	531	0.4

Thermocouple Calibration Procedure

A. References

1. Mercury-in-glass reference thermometer, calibrated against thermometric fixed points.
2. Thermometric fixed points, including ice bath and boiling water (corrected for barometric pressure)

B. Measurement

1. Compare field temperature sensors against the reference thermometer. Agreement must be within ±1.5% of the absolute reference temperature.

Advanced Industrial Resources, LLC

Thermometer Calibration Data

Thermometer Type: Mercury-in-Glass
Thermometer ID: RT-01
Barometric Pressure (in. Hg): 29.32

Date: 01/15/00
Performed By: GSG

Thermometric Fixed Points		Fixed points Corrected for Pressure		Reference Thermometer Reading	
°F	°R	°F	°R	°F	°R
32	492	32	492	32	492
212	672	211	671	211	671

Reference Calibration Procedure

1. Correct appropriate thermometric fixed points for variation from standard pressure.
2. Compare the reference thermometer readings to the corrected thermometric fixed points.
3. Find the linear relationship between the reference thermometer reading and the known temperature.
4. Use the linear factor, if necessary, to correct the temperature reading of the reference thermometer for calibration of thermocouples.

Advanced Industrial Resources, LLC

Type S Pitot Tube Calibration Data

Date: 05/11/00 **Performed By:** GSG

Probe Assembly ID	External Tubing Diameter D_t (inches)	Base / Face Plane Distances (inches)		Pitot Tube Coefficient
		P_A	P_B	C_p (dimensionless)
P3-01	0.375	0.440	0.440	0.84

It has been determined that the above listed pitot tubes meet the external tubing diameter, face plane alignment, and base-to-face plane distance specifications given in *40 CFR 60*, Appendix A, Method 2 (see following pages). Thus, the baseline value of 0.84 is assumed for the pitot coefficient.

Assigned values of C_p apply to the Type S pitot tube either in isolated use or as a component of a probe assembly. The baseline (isolated) and probe assembly coefficients are identical since the relative placement of the components (such as the sampling probe, thermocouple, and nozzle) of the indicated probe assembly meet the interference-free alignment specifications given in *40 CFR 60*, Appendix A, Method 2 (see following pages), thereby eliminating adverse aerodynamic effects.

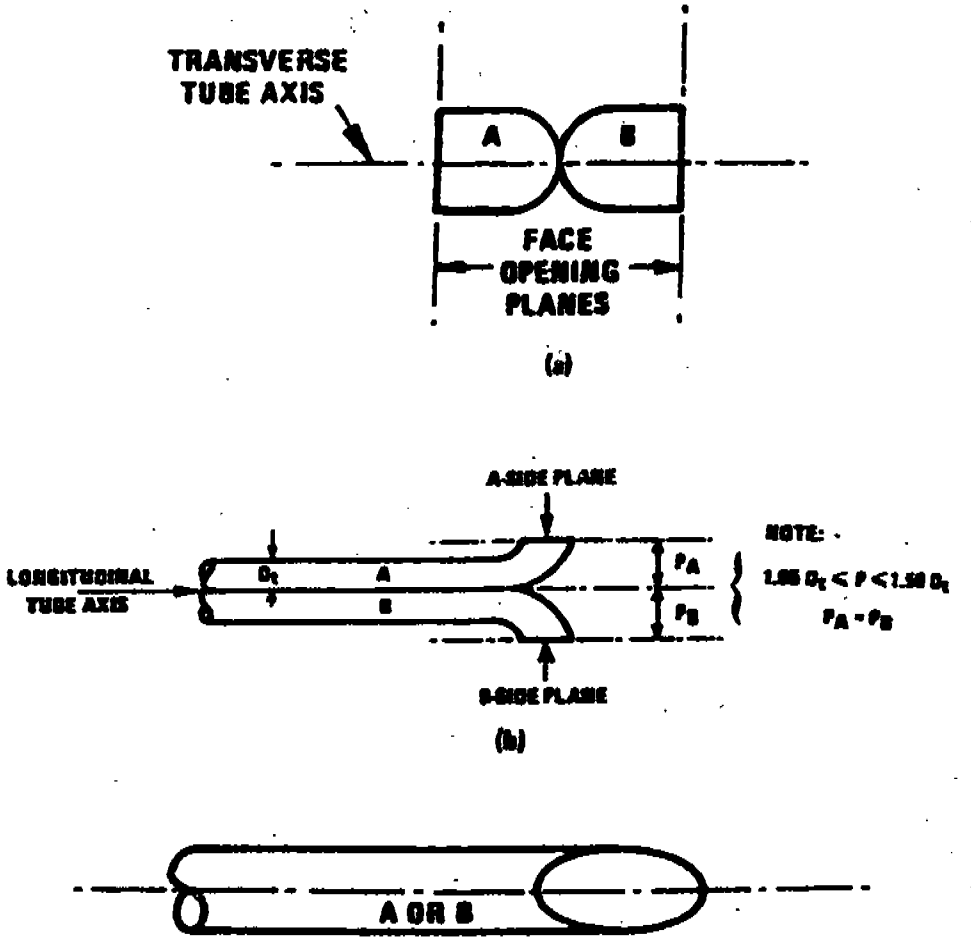


Figure 2-2. Properly constructed Type S pitot tube, shown in: (a) end view; face opening planes perpendicular to transverse axis; (b) top view; face opening planes parallel to longitudinal axis; (c) side view; both legs of equal length and centerlines coincident, when viewed from both sides. Baseline coefficient values of 0.84 may be assigned to pitot tubes constructed this way.

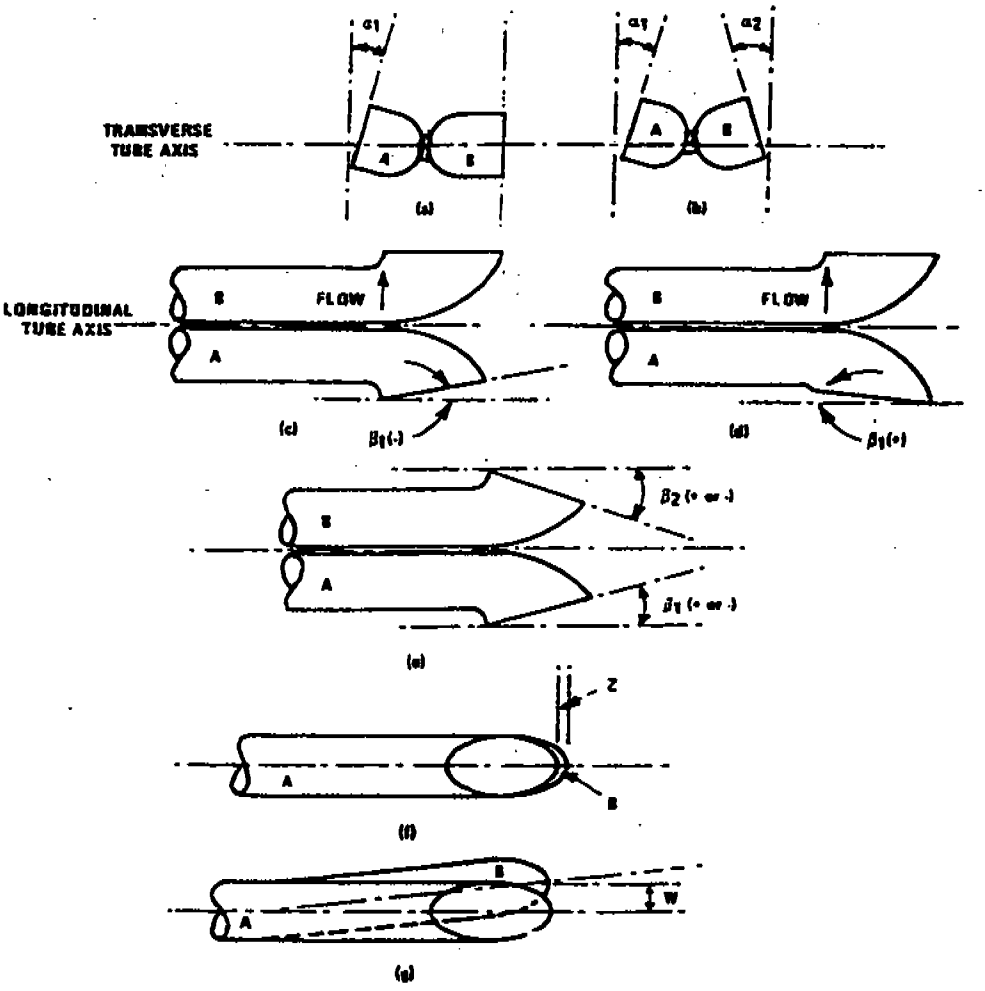


Figure 2–3. Types of face-opening misalignment that can result from field use or improper construction of Type S pitot tubes. These will not affect the baseline value of Cp(s) so long as α^1 and $\alpha^2 \leq 10°$, β^1 and $\beta^2 \leq 5°$, $z \leq 0.32$ cm (1/8 in.) and $w \leq 0.08$ cm (1/32 in.) (citation 11 in Bibliography).

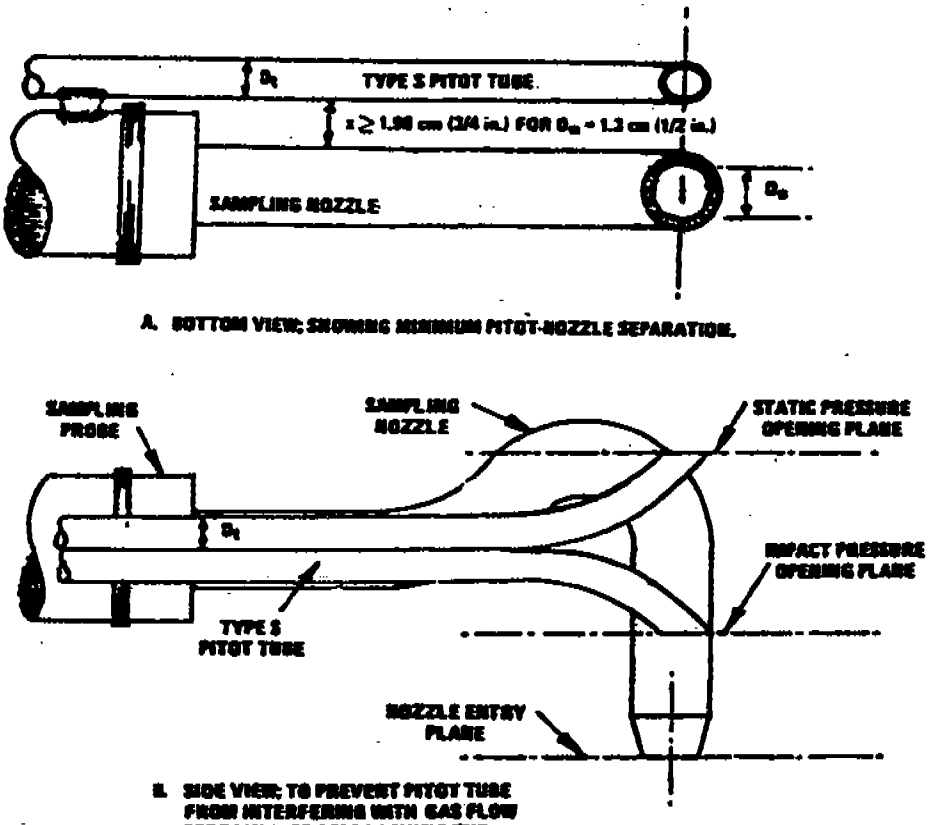


Figure 2-6. Proper pitot tube-sampling nozzle configuration to prevent aerodynamic interference; buttonhook-type nozzle; centers of nozzle and pitot opening aligned; D, between 0.48 and 0.95 cm (3/16 and 3/8 in.).

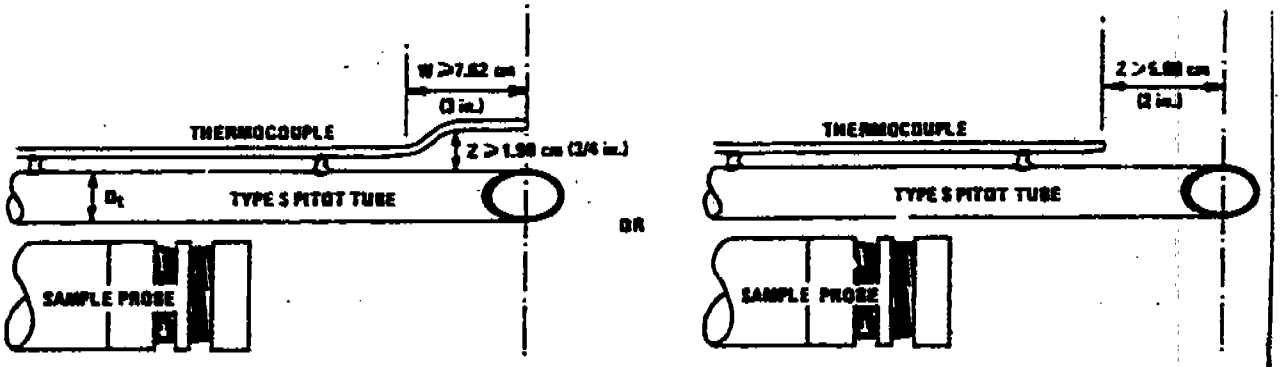


Figure 2-7. Proper thermocouple placement to prevent interference; D_t between 0.48 and 0.95 cm (3/16 and 3/8 in.).

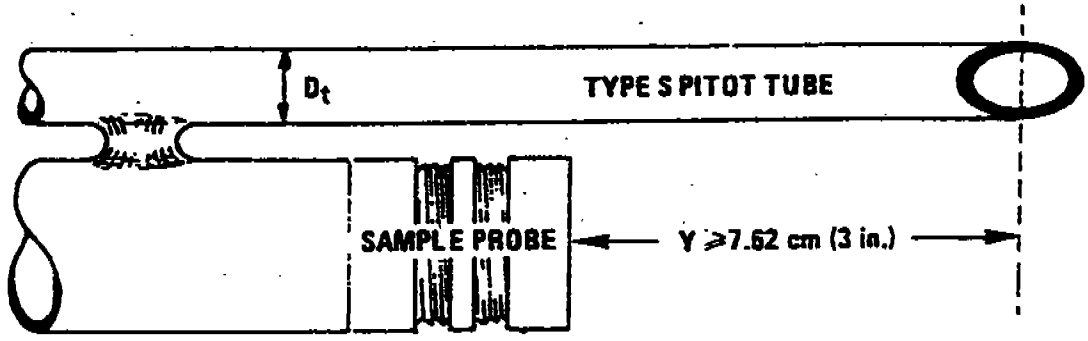


Figure 2-8. Minimum pitot-sample probe separation needed to prevent interference; D_t between 0.48 and 0.95 cm (3/16 and 3/8 in.).

APPENDIX G

PROCESS OPERATION DATA

FRANKLIN INDUSTRIAL MINERALS
PROCESS OPERATIONAL DATA

Test Company: Advanced Industrial Resources

Location: Franklin Industrial Minerals
Old Highway 31
Alabaster AL

Permit No: 411-0049-X002

Testing Date: May 11, 2000

Source: BH-750 controlling Limestone System

Differential Pressure Measurement Data – The baghouse magnahelic gauge indicated a pressure differential of approximately 1.5" of H2O during the testing.

Material Throughput – Limestone processed during the testing averaged 21 tons per hour. The maximum permitted throughput is 25 tons per hour. Processing conditions were normal throughout the testing.