

ABMA

American
Boiler Manufacturers
Association

1500 Wilson Boulevard
Arlington VA 22209

DoE

United States
Department
of Energy

Division of Power Systems
Energy Technology Branch
Washington DC 20545

EPA

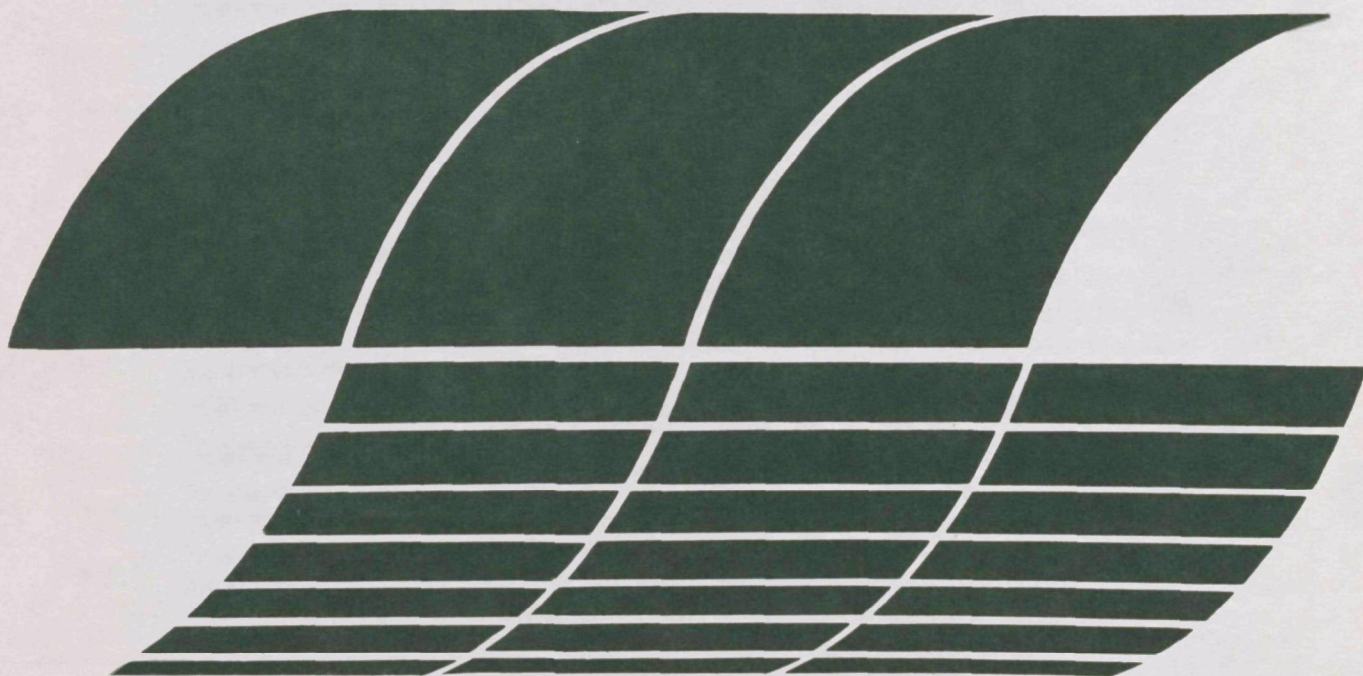
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Field Tests of Industrial Stoker Coal-fired Boilers for Emissions Control and Efficiency Improvement — Site G (Data Supplement)

Interagency
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R&D Program Report



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April 1980

Field Tests of Industrial Stoker Coal-fired Boilers for Emissions Control and Efficiency Improvement — Site G (Data Supplement)

by

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and

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ABSTRACT

The Data Supplement is a compilation of test data presented in greater detail than was practical in the Final Technical Report. It is intended to provide the necessary details to other researchers who are interested in performing their own analysis. Readers are referred to the contract final report for information as to objectives, description of facility tested and coals fired, test equipment and procedures, interpretations and conclusions. The Final Technical Report also contains data summaries not found in this volume. The Supplement contains panel board data for each test, detailed particulate, O₂, CO₂, CO, NO, NO₂, SO₂ and SO₃ data, particle size distribution data, chemical analysis of the coal, coal size consistency data, and combustible analysis and overfire air traverse data.

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FOREWORD

The purpose of this Data Supplement Volume is to document data in greater detail than was practical in the Final Technical Report.¹ It is intended to provide the necessary details to other researchers who are interested in performing their own analysis. Readers are referred to the contract final report for information as to objectives, description of facility tested and coals fired, test equipment and procedures, interpretations and conclusions. The Final Technical Report also contains data summaries not found in this volume.

The data in this volume are arranged by type (i.e., Panel Board Data, Particulate Data, etc.) and within each type by test number. Data summaries where they exist are at the front of each section. The boiler tested is referred to as Boiler G; as it is the seventh boiler tested under the program entitled, "A Testing Program to Update Equipment Specifications and Design Criteria for Stoker Fired Boilers."

¹Langsjoen, P. L., et al., "Field Tests of Industrial Stoker Coal-Fired Boilers for Emissions Control and Efficiency Improvement - Site G."

CONVERSION FACTORS

ENGLISH AND METRIC UNITS TO SI UNITS

<u>To Convert From</u>	<u>To</u>	<u>Multiply By</u>
in	cm	2.540
in ²	cm ²	6.452
ft	m	0.3048
ft ²	m ²	0.09290
ft ³	m ³	0.02832
lb	Kg	0.4536
lb/hr	Mg/s	0.1260
lb/10 ⁶ BTU	ng/J	430
g/Mcal	ng/J	239
BTU	J	1054
BTU/lb	J/kg	2324
BTU/hr	W	0.2929
J/sec	W	1.000
J/hr	W	3600
BTU/ft/hr	W/m	0.9609
BTU/ft/hr	J/hr/m	3459
BTU/ft ² /hr	W/m ²	3.152
BTU/ft ² /hr	J/hr/m ²	11349
BTU/ft ³ /hr	W/m ³	10.34
BTU/ft ³ /hr	J/hr/m ³	37234
psia	Pa	6895
"H ₂ O	Pa	249.1
Rankine	Celsius	C = 5/9R-273
Fahrenheit	Celsius	C = 5/9(F-32)
Celsius	Kelvin	K = C+273
Rankine	Kelvin	K = 5/9R

FOR TYPICAL COAL FUEL

ppm @ 3% O ₂ (SO ₂)	ng/J (lb/10 ⁶ Btu)	0.851 (1.98x10 ⁻³)
ppm @ 3% O ₂ (SO ₃)	ng/J (lb/10 ⁶ Btu)	1.063 (2.47x10 ⁻³)
ppm @ 3% O ₂ (NO)*	ng/J (lb/10 ⁶ Btu)	0.399 (9.28x10 ⁻⁴)
ppm @ 3% O ₂ (NO ₂)	ng/J (lb/10 ⁶ Btu)	0.611 (1.42x10 ⁻³)
ppm @ 3% O ₂ (CO)	ng/J (lb/10 ⁶ Btu)	0.372 (8.65x10 ⁻⁴)
ppm @ 3% O ₂ (CH ₄)	ng/J (lb/10 ⁶ Btu)	0.213 (4.95x10 ⁻⁴)

*Federal environmental regulations express NO_x in terms of NO₂;
thus NO units should be converted using the NO₂ conversion factor.

CONVERSION FACTORS

SI UNITS TO ENGLISH AND METRIC UNITS

<u>To Convert From</u>	<u>To</u>	<u>Multiply By</u>
cm	in	0.3937
cm ²	in ²	0.1550
m	ft	3.281
m ²	ft ²	10.764
m ³	ft ³	35.315
Kg	lb	2.205
Mg/s	lb/hr	7.937
ng/J	lb/10 ⁶ BTU	0.00233
ng/J	g/Mcal	0.00418
J	BTU	0.000948
J/kg	BTU/lb	0.000430
J/hr/m	BTU/ft/hr	0.000289
J/hr/m ²	BTU/ft ² /hr	0.0000881
J/hr/m ³	BTU/ft ³ /hr	0.0000269
W	BTU/hr	3.414
W	J/hr	0.000278
W/m	BTU/ft/hr	1.041
W/m ²	BTU/ft ² /hr	0.317
W/m ³	BTU/ft ³ /hr	0.0967
Pa	psia	0.000145
Pa	"H ₂ O	0.004014
Kelvin	Fahrenheit	F = 1.8K-460
Celsius	Fahrenheit	F = 1.8C+32
Fahrenheit	Rankine	R = F+460
Kelvin	Rankine	R = 1.8K

FOR TYPICAL COAL FUEL

ng/J	ppm @ 3% O ₂ (SO ₂)	1.18
ng/J	ppm @ 3% O ₂ (SO ₃)	0.941
ng/J	ppm @ 3% O ₂ (NO)	2.51
ng/J	ppm @ 3% O ₂ (NO ₂)	1.64
ng/J	ppm @ 3% O ₂ (CO)	2.69
ng/J	ppm @ 3% O ₂ (CH ₄)	4.69

SI PREFIXES

<u>Multiplication Factor</u>	<u>Prefix</u>	<u>SI Symbol</u>
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^9	giga	G
10^6	mega	M
10^3	kilo	k
10^2	hecto*	h
10^1	deka*	da
10^{-1}	deci*	d
10^{-2}	centi*	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

*Not recommended but occasionally used

EMISSION UNITS CONVERSION FACTORS
FOR TYPICAL COAL FUEL (HV = 13,320 BTU/LB)

Multiply To Obtain	Multiply By	% Weight in Fuel		lbs/10 ⁶ Btu		grams/10 ⁶ Cal		PPM (Dry @ 3% O ₂)		Grains/SCF. (Dry @ 12% CO ₂)	
		S	N	SO ₂	NO ₂	SO ₂	NO ₂	SOx	NOx	SO ₂	NO ₂
% Weight In Fuel	S	1		0.666	/	0.370	/	13.2x10 ⁻⁴	/	1.48	/
	N			/	0.405	/	0.225	/	5.76x10 ⁻⁴	/	.903
lbs/10 ⁶ Btu	SO ₂	1.50	/	1		(.556)	/	19.8x10 ⁻⁴	/	(2.23)	/
	NO ₂	/	2.47			/	(.556)	/	14.2x10 ⁻⁴	/	(2.23)
grams/10 ⁶ Cal	SO ₂	2.70	/	(1.8)	/	1		35.6x10 ⁻⁴	/	(4.01)	/
	NO ₂	/	4.44	/	(1.8)			/	25.6x10 ⁻⁴	/	(4.01)
PPM (Dry @ 3% O ₂)	SOx	758	/	505	/	281	/	1		1127	/
	NOx	/	1736	/	704	/	391			/	1566
Grains/SCF (Dry @ 12% CO ₂)	SO ₂	.676	/	(.448)	/	(.249)	/	8.87x10 ⁻⁴	/	1	
	NO ₂	/	1.11	/	(.448)	/	(.249)	/	6.39x10 ⁻⁴		

NOTE: 1. Values in parenthesis can be used for all flue gas constituents such as oxides of carbon, oxides of nitrogen, oxides of sulfur, hydrocarbons, particulates, etc.
2. Standard reference temperature of 530°R was used.

KVB 15900-540

SECTION 1.0
PANEL BOARD DATA

1.1 CONTROL ROOM DATA SHEETS

PAGE 2

KVB

 Steam Flow, lb/hr 69,153
 % Design Capacity 92.2
 Coal A

 PANEL BOARD DATA
 ABMA TEST SITE G

TEST NUMBER	1				
DATE	2-10-79				
DESCRIPTION	max DFR				
INTEGRATOR	363057	363217			
STEAM FLOW					
TIME OF READING	12:37	12:35			
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	63				
AIR FLOW, RELATIVE	65				
FLUE GAS TEMP, °F	510				
STEAM HEADER PRESSURE, PSIG	136				
OPACITY, %	005				
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	+0.1				
UNDERGRATE PRESSURE, "H ₂ O	+1.0				
FURNACE PRESSURE, "H ₂ O	-0.1				
LER OUTLET PRESSURE, "H ₂ O	-1.0				
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.2				

KVB

TEST NUMBER	1				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	173				
STEAM PRESSURE, PSIG	138				
CONTROLS					
COAL/AIR RATIO	86				
BOILER LOAD	70				
COAL FEEDER BIAS	68				
FD FAN	97				
OFA FAN	86				
ID FAN DAMPER	22				
FEEDWATER	64				
OVERFIRE AIR TAPS					
FRONT UPPER OFA	none				
FRONT LOWER OFA	22"				
REAR UPPER OFA	22"				
REAR LOWER OFA	22"				
FURNACE					
ASH BED DEPTH, INCHES	1 1/2 - 2"				

KVB

Steam Flow, lb/hr 63,750% Design Capacity 85Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	2				
DATE	2-11-79				
DESCRIPTION	60,000 lbs MAX O.F.A 23"				
INTEGRATOR					
STEAM FLOW	363712	363780	363859	363907	
TIME OF READING	9:03	10:08	11:06	11:47	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	64	64	60		
AIR FLOW, RELATIVE	62	62	56		
FLUE GAS TEMP, °F	500	500	500		
STEAM HEADER PRESSURE, PSIG	137	138	136		
OPACITY, %	005	005	005		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	.3	.3	.3		
UNDERGRATE PRESSURE, "H ₂ O	.9	1.0	.8		
FURNACE PRESSURE, "H ₂ O	-.1	-0.1	-0.1		
LER OUTLET PRESSURE, "H ₂ O	-1.0	-1.2	-1.0		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-.2	-.5	-.5		

KVB

TEST NUMBER	2				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	171	182	173		
STEAM PRESSURE, PSIG	138	138	138		
CONTROLS					
COAL/AIR RATIO	82	81	82		
BOILER LOAD	90	- 68	- 62		
COAL FEEDER BIAS	90	60	62		
FD FAN	82	94	94		
OFA FAN	84	86	84		
ID FAN DAMPER	32	28	26		
FEEDWATER	62	58	74		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	none	none	none		
FRONT LOWER OFA	23"	23"	23"		
REAR UPPER OFA	23"	23"	23"		
REAR LOWER OFA	23"	23"	23"		
FURNACE					
ASH BED DEPTH, INCHES	1 1/2"	1 1/2"	1 1/2"		
Temp fan	67.6				
RH	46%				

KVB

Steam Flow, lb/hr 59707% Design Capacity 796Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	3				
DATE	2-11-79				
DESCRIPTION	60000 lb/hr NG UFA				
INTEGRATOR					
STEAM FLOW	4022	4110	4176	4214	
TIME OF READING	15.13	16.23	17.25	17.51	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	60	62	58		
AIR FLOW, RELATIVE	60	64	60		
FLUE GAS TEMP, °F	500	500	480		
STEAM HEADER PRESSURE, PSIG	139	139	139		
OPACITY, %	005	005	005		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	3	3	3		
UNDERGRATE PRESSURE, "H ₂ O	8	8	7		
FURNACE PRESSURE, "H ₂ O	-1.3	-1.5	-1.0		
WATER OUTLET PRESSURE, "H ₂ O	-1.0	-1.0	-1.0		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-4.5	-4.5	-4.5		

KVB

TEST NUMBER					
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	172	187	185		
STEAM PRESSURE, PSIG	136	139	138		
CONTROLS					
COAL/AIR RATIO	80	80	80		
BOILER LOAD	78	76	70		
COAL FEEDER BIAS	76	58	72		
FD FAN	90	90	90		
OFA FAN	45	42	42		
ID FAN DAMPER	20	20	20		
FEEDWATER	70	70	70		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	mm				
FRONT LOWER OFA	18"				
REAR UPPER OFA	15'				
REAR LOWER OFA	12"				
FURNACE					
ASH BED DEPTH, INCHES	1½"	2"	2"		

KVB

Steam Flow, lb/hr 57.557
~~57.74~~
 % Design Capacity 76.7
 Coal A

PANEL BOARD DATA
 ABMA TEST SITE G

TEST NUMBER	4				
DATE	2-16-74				
DESCRIPTION	Swing load				
INTEGRATOR					
STEAM FLOW	5806	5847	5450	6043	
TIME OF READING	1400	16:15	16:07	17:30	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	5.8	6.0	7.0		
AIR FLOW, RELATIVE	5.4	6.0	6.5		
FLUE GAS TEMP, °F	440	500	540		
STEAM HEADER PRESSURE, PSIG	174	140	140		
OPACITY, %	005	005	005		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.2	0.2	0.2		
UNDERGRATE PRESSURE, "H ₂ O	0.6	0.6	0.7		
FURNACE PRESSURE, "H ₂ O	21.2	-1.2	-1.0		
LER OUTLET PRESSURE, "H ₂ O	-0.9	-0.9	-1.0		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-3.8	-4.2	-4.0		

KVB

TEST NUMBER	4	4	4		
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	176	175	173		
STEAM PRESSURE, PSIG	140	140	140		
CONTROLS					
COAL/AIR RATIO	62	74	70		
BOILER LOAD	70	70	70		
COAL FEEDER BIAS	68	66	66		
FD FAN	84	96	96		
OFA FAN	72	84	83		
ID FAN DAMPER	20	22	22		
FEEDWATER	60	66	64		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	none				
FRONT LOWER OFA	22"				
REAR UPPER OFA	22"				
REAR LOWER OFA	22"				
FURNACE					
ASH BED DEPTH, INCHES	1 1/2"	1 1/2"			
<i>Temp</i>	57°F				
<i>Temp</i>	75°F				
<i>R#</i>	33%				

KVB

Steam Flow, lb/hr 76,278% Design Capacity 101.7Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	5				
DATE	2-17-79				
DESCRIPTION	75,000 lbs with range				
INTEGRATOR					
STEAM FLOW	6654	6762	6498		
TIME OF READING	9:10	10:21	13:00		
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	77	78			
AIR FLOW, RELATIVE	67	67			
FLUE GAS TEMP, °F	530	550			
STEAM HEADER PRESSURE, PSIG	138	138			
OPACITY, %	66	005			
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	+1.2	+1.2			
UNDERGRATE PRESSURE, "H ₂ O	+1.0	+0.4			
FURNACE PRESSURE, "H ₂ O	-0.10	-0.10			
LER OUTLET PRESSURE, "H ₂ O	-0.12	-0.12			
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.7	-5.8			

KVB

TEST NUMBER	5				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	174	178			
STEAM PRESSURE, PSIG	136	138			
CONTROLS					
COAL/AIR RATIO	92	94			
BOILER LOAD	100	80			
COAL FEEDER BIAS	98	76			
FD FAN	99	98			
OFA FAN	94	94			
ID FAN DAMPER	28	28			
FEEDWATER	83	80			
OVERFIRE AIR TAPS					
FRONT UPPER OFA	None				
FRONT LOWER OFA	23"				
REAR UPPER OFA	22"				
REAR LOWER OFA	22"				
FURNACE					
ASH BED DEPTH, INCHES	2 1/2 - 3"				
	clean '13				
FD fan Temp	73°F				
RH	32%				

KVB

Steam Flow, lb/hr 43,060% Design Capacity 57.4Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	6				
DATE	2-17-79				
DESCRIPTION	45,000				
INTEGRATOR					
STEAM FLOW	7106	7114	7216	7247	
TIME OF READING	15:50	17:12	18:01	18:37	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	46	46	47		
AIR FLOW, RELATIVE	45	45	46		
FLUE GAS TEMP, °F	430	430	430		
STEAM HEADER PRESSURE, PSIG	141	141	142		
OPACITY, %	005	005	005		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	+1.2	+1.2	+1.2		
UNDERGRATE PRESSURE, "H ₂ O	+1.4	+1.3	+1.4		
FURNACE PRESSURE, "H ₂ O	-1.10	-1.12	-1.10		
LER OUTLET PRESSURE, "H ₂ O	-1.5	-1.6	-1.6		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-3.0	-3.0	-3.0		

KVB

TEST NUMBER	6				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	182	181	181		
STEAM PRESSURE, PSIG	140	141	141		
CONTROLS					
COAL/AIR RATIO	52	53	53		
BOILER LOAD	56	53	49		
COAL FEEDER BIAS	52	50	48		
FD FAN	70	70	69		
OFA FAN	56	53	55		
ID FAN DAMPER	14	14	14		
FEEDWATER	57	56	56		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	mc				
FRONT LOWER OFA	18"				
REAR UPPER OFA	20"				
REAR LOWER OFA	18"				
FURNACE					
ASH BED DEPTH, INCHES	1 1/2 - 2"				
Temp FD In	Dry	75F			
	Test	55F			
		32%			

KVB

Steam Flow, lb/hr 13,005% Design Capacity 17.3Coal BPANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	7				
DATE	2-25-79				
DESCRIPTION	15,000 lb/hr coal B				
INTEGRATOR					
STEAM FLOW	371100	371121	371145	371151	
TIME OF READING	9:33	10:43	12:30	12:53	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	15	13	15		
AIR FLOW, RELATIVE	20	21	23		
FLUE GAS TEMP, °F	325	320	325		
STEAM HEADER PRESSURE, PSIG	140	141	141		
OPACITY, %					
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.1	0.1	0.1		
UNDERGRATE PRESSURE, "H ₂ O	~0	~0	~0		
FURNACE PRESSURE, "H ₂ O	-0.15	-0.17	-0.15		
LER OUTLET PRESSURE, "H ₂ O	-0.3	-0.3	-0.3		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-1.1	-1.2	-1.3		

KVB

NOTES

TEST NO: 7

Stack was dirty so O.F.A. was raised to 15" at 9:45,
but stack didn't get any cleaner
Operator says he as tried all combinations and nothing seems
to work

TEST NO:

TEST NO:

TEST NO:

TEST NO:

KVB

Steam Flow, lb/hr 74,690% Design Capacity 99.6Coal BPANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	8				
DATE	2-25-71				
DESCRIPTION	75,000 coal B				
INTEGRATOR					
STEAM FLOW	371245	371391	371472		
TIME OF READING	16:37	17:17	18:12		
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	76	73			
AIR FLOW, RELATIVE	65	63			
FLUE GAS TEMP, °F	512	510			
STEAM HEADER PRESSURE, PSIG	141	140			
OPACITY, %	005	005			
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.1	0.1			
UNDERGRATE PRESSURE, "H ₂ O	1.0	0.9			
FURNACE PRESSURE, "H ₂ O	-0.10	-0.11			
LER OUTLET PRESSURE, "H ₂ O	-1.1	-1.1			
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.4	-5.5			

KVB

TEST NUMBER	8				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	179	180			
STEAM PRESSURE, PSIG	140	140			
CONTROLS					
COAL/AIR RATIO	90	84			
BOILER LOAD	78	64			
COAL FEEDER BIAS	76	61			
FD FAN	100	98			
OFA FAN	99	90			
ID FAN DAMPER	20	23			
FEEDWATER	98	65			
OVERFIRE AIR TAPS					
FRONT UPPER OFA	none				
FRONT LOWER OFA	21"				
REAR UPPER OFA	22"				
REAR LOWER OFA	21"				
FURNACE					
ASH BED DEPTH, INCHES	1 1/2" none	3/4, 1 1/2, 1 1/2			

KVB

Steam Flow, lb/hr 54,217
 % Design Capacity 72.3
 Coal A

PANEL BOARD DATA
 ABMA TEST SITE G

TEST NUMBER	9				
DATE	2-28-79				
DESCRIPTION	SASS				
	coal A				
INTEGRATOR					
STEAM FLOW	374485	374725	374621	374940	
TIME OF READING	11.00	14.20	15.46	18.08	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	76	56	46	52	
AIR FLOW, RELATIVE	60	50	40	50	
FLUE GAS TEMP, °F	540	480	460	500	
STEAM HEADER PRESSURE, PSIG	135	138	138	138	
OPACITY, %	005	005	005	005	
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.1	0.1	0.1		
UNDERGRATE PRESSURE, "H ₂ O	1.0	0.80	0.50		
FURNACE PRESSURE, "H ₂ O	-0.08	-0.08	-0.10		
LER OUTLET PRESSURE, "H ₂ O	-1.0	-1.0	-0.8		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.3	-4.5	-3.5		

KVB

TEST NUMBER	9	9		
PRESSURE GAUGES				
FEEDWATER PRESSURE, PSIG	175	178	179	
STEAM PRESSURE, PSIG	136	140	138	
CONTROLS				
COAL/AIR RATIO	92	74	60	
BOILER LOAD	96	64	76	
COAL FEEDER BIAS	94	64	76	
FD FAN	100	90	76	
OFA FAN	96	78	61	
ID FAN DAMPER	26	20	18	
FEEDWATER	78	64	57	
OVERFIRE AIR TAPS				
FRONT UPPER OFA	none	none		
FRONT LOWER OFA	22"	22"		
REAR UPPER OFA	22"	22"		
REAR LOWER OFA	22"	22"		
FURNACE				
ASH BED DEPTH, INCHES	2 1/2 - 3"	3' - 3 1/2'	3'	
Temp 67 ft	79°F			
RH	30%			

KVB

NOTES

TEST NO:	9: load by the hour
	11-12 - 75,000
	12-30 - 45,000 lunch
	13-14 60-65,000
	14-17 50,000
TEST NO:	
TEST NO:	
TEST NO:	

KVB

Steam Flow, lb/hr 64,508% Design Capacity 86 %Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	10				
DATE	3-2-79				
DESCRIPTION	swing load normal				
INTEGRATOR					
STEAM FLOW	376732	376831	376917	376966	
TIME OF READING	10:33	11:45	13:02	13:38	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	70	70	60		
AIR FLOW, RELATIVE	66	65	58		
FLUE GAS TEMP, °F	530	520	500		
STEAM HEADER PRESSURE, PSIG	136	136	134		
OPACITY, %	005	005	005		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.1	0.1	0.1		
UNDERGRATE PRESSURE, "H ₂ O	1.0	1.0	1.0		
FURNACE PRESSURE, "H ₂ O	-0.1	-0.1	-0.1		
LER OUTLET PRESSURE, "H ₂ O	-1.1	-1.0	-1.1		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.5	-5.5	-5.5		

KVB

TEST NUMBER	10				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	176	178	177		
STEAM PRESSURE, PSIG	138	138	138		
CONTROLS					
COAL/AIR RATIO	90	82	80		
BOILER LOAD	84	84	84		
COAL FEEDER BIAS	84	84	83		
FD FAN	100	100	95		
OFA FAN	100	96	90		
ID FAN DAMPER	26	26	24		
FEEDWATER	73	70	65		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	None				
FRONT LOWER OFA	21"				
REAR UPPER OFA	21"				
REAR LOWER OFA	21"				
FURNACE					
ASH BED DEPTH, INCHES	34"		34"		
F.O. fan Temp	Temp	80°F			
	Temp	62°F			
	R4	37%			

KVB

Steam Flow, lb/hr 58,418% Design Capacity 779Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	11				
DATE	3-3-79				
DESCRIPTION	60,000 gaseous				
INTEGRATOR					
STEAM FLOW	37746	377676	377716	377769	377785
TIME OF READING	7:55	9:00	9:39	10:24	10:40
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	61	61	60	60	
AIR FLOW, RELATIVE	57	49	44	40	
FLUE GAS TEMP, °F	480	475	460	450	
STEAM HEADER PRESSURE, PSIG	136	137	137	138	
OPACITY, %	005	015	005	05	
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.2	0.2	0.2	0.2	
UNDERGRATE PRESSURE, "H ₂ O	0.9	0.7	0.5	0.5	
FURNACE PRESSURE, "H ₂ O	-0.12	-0.10	-0.10	-0.12	
SLUR OUTLET PRESSURE, "H ₂ O	-1.0	-0.8	-0.7	-0.6	
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-4.4	-4.0	-3.0	-2.9	

KVB

TEST NUMBER	11				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	170	171	171	172	
STEAM PRESSURE, PSIG	138	140	140	140	
CONTROLS					
COAL/AIR RATIO	73	72/65	70/53	71/50	
BOILER LOAD	72	66	66	60	
COAL FEEDER BIAS	72	66	68	60	
FD FAN	88	80	68	70	
OFA FAN	75	68	55	52	
ID FAN DAMPER	22	18	15	14	
FEEDWATER	64	66	66	67	
OVERFIRE AIR TAPS					
FRONT UPPER OFA	None				
FRONT LOWER OFA	21"				
REAR UPPER OFA	21"				
REAR LOWER OFA	21"				
FURNACE					
ASH BED DEPTH, INCHES	3"	3"	3"	3"	
			*3 (right) side is clicking a little		

KVB

Steam Flow, lb/hr 73,703% Design Capacity 98.3Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	12				
DATE	3-3-79				
DESCRIPTION	75,000 gas flow				
INTEGRATOR					
STEAM FLOW	377830	377907	377976	378043	378054
TIME OF READING	1:12	12:06	12:54	13:29	13:47
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	74	74	75	75	
AIR FLOW, RELATIVE	66	63	60.55	50	
FLUE GAS TEMP, °F	530	520	520	500	
STEAM HEADER PRESSURE, PSIG	138	137	137	137	
OPACITY, %	005	005	005	005	
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.2	0.2	0.2	0.2	
UNDERGRATE PRESSURE, "H ₂ O	0.9	0.9	0.8	0.8	
FURNACE PRESSURE, "H ₂ O	-0.15	-0.12	-0.11	-0.09	
LER OUTLET PRESSURE, "H ₂ O	-1.2	-1.1	-1.0	-0.9	
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.3	-5.0	-4.8	-4.0	

KVB

TEST NUMBER	12				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	176	176	176	176	
STEAM PRESSURE, PSIG	139	139	139	139	
CONTROLS					
COAL/AIR RATIO	87	86/82	90/80	86/66	
BOILER LOAD	66	76	76	75	
COAL FEEDER BIAS	65	74	74	74	
FD FAN	98	94	92	80	
OFA FAN	90	86	82	70	
ID FAN DAMPER	26	25	24	26	
FEEDWATER	78	77	72	76	
OVERFIRE AIR TAPS					
FRONT UPPER OFA	none				
FRONT LOWER OFA	22"				
REAR UPPER OFA	22"				
REAR LOWER OFA	21"				
FURNACE					
ASH BED DEPTH, INCHES	3"	3"	3"	3"	

KVB

Steam Flow, lb/hr 65,571% Design Capacity 87.4Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	15				
DATE	3-16				
DESCRIPTION	SASS				
	varying load				
INTEGRATOR					
STEAM FLOW	11:00	12:30	15:20	16:50	
TIME OF READING	340950	341054	341206	341400	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	60	50	75		
AIR FLOW, RELATIVE	58	46	65		
FLUE GAS TEMP, °F	520	470	530		
STEAM HEADER PRESSURE, PSIG	136	136	136		
OPACITY, %	005	005	005		
	slightly brown	white	slightly brown		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.3	0.3	0.3		
UNDERGRATE PRESSURE, "H ₂ O	0.8	0.8	1.0		
FURNACE PRESSURE, "H ₂ O	-1.15	-1.08	-1.10		
LER OUTLET PRESSURE, "H ₂ O	-1.0	-1.0	-1.1		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-4.7	-4.6	-5.3		

KVB

TEST NUMBER	15				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	174	179	178		
STEAM PRESSURE, PSIG	136	138	137		
CONTROLS					
COAL/AIR RATIO	74	78	86		
BOILER LOAD	90	72	84		
COAL FEEDER BIAS	90	72	83		
FD FAN	94	94	100		
OFA FAN	82	82	94		
ID FAN DAMPER	24	21	26		
FEEDWATER	62	53	68		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	None				
FRONT LOWER OFA	21"				
REAR UPPER OFA	21"				
REAR LOWER OFA	21"				
FURNACE					
ASH BED DEPTH, INCHES	4" even	4"			

KVB

NOTES

TEST NO:	load -	11-12	70-76,000
		12-13	65,000
		13-14	65,000
		14-15	65,000
TEST NO:			
TEST NO:			
TEST NO:			
TEST NO:			

KVB

Steam Flow, lb/hr 11,854
 % Design Capacity 15.8
 Coal A

PANEL BOARD DATA
 ABMA TEST SITE G

TEST NUMBER	16				
DATE	3-17-79				
DESCRIPTION	part 15 Kwh				
INTEGRATOR					
STEAM FLOW	391843	391916	391929	391936	
TIME OF READING	8:50	1030	11:22	11:55	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	14	15	13		
AIR FLOW, RELATIVE	18	19	17		
FLUE GAS TEMP, °F	320	325	312		
STEAM HEADER PRESSURE, PSIG	137	138	137		
OPACITY, %	005	005	005		
	drawn	drawn	drawn		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.1	0.1	0.2		
UNDERGRATE PRESSURE, "H ₂ O	~0	~0	~0		
FURNACE PRESSURE, "H ₂ O	-.12	-.12	-.12		
SLER OUTLET PRESSURE, "H ₂ O	-.4	-.4	-.3		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-1.3	-1.3	-1.2		

KVB

TEST NUMBER	16				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	172	173	172		
STEAM PRESSURE, PSIG	138	138	138		
CONTROLS					
COAL/AIR RATIO	17	18	16		
BOILER LOAD	70	72	68		
COAL FEEDER BIAS	70	72	68		
FD FAN	33	35	24		
OFA FAN	18	20	18		
ID FAN DAMPER	6	12	6		
FEEDWATER	40	40	37		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	low				
FRONT LOWER OFA	7"				
REAR UPPER OFA	7"				
REAR LOWER OFA	7"				
FURNACE					
ASH BED DEPTH, INCHES	2"	2"	1-2"		
	dark				

KVB

Steam Flow, lb/hr 73,268% Design Capacity 97.7Coal APANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	17				
DATE	3-17-79				
DESCRIPTION	7500 without fly ash recycling				
INTEGRATOR					
STEAM FLOW	412072	392161		2276	
TIME OF READING	15:40	16:42	17:52	18:02	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	77	75	76		
AIR FLOW, RELATIVE	67	65	66		
FLUE GAS TEMP, °F	430	430	430		
STEAM HEADER PRESSURE, PSIG	136	136	135		
OPACITY, %	005	005	005		
	brown (slightly)				
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.2	0.2	0.2		
UNDERGRATE PRESSURE, "H ₂ O	1.1	1.0	0.9		
FURNACE PRESSURE, "H ₂ O	-1.1	-1.08	-1.01		
LER OUTLET PRESSURE, "H ₂ O	-1.2	-1.2	-1.2		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.6	-5.6	-5.8		

KVB

TEST NUMBER	17				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	176	176	179		
STEAM PRESSURE, PSIG	136	136	137		
CONTROLS					
COAL/AIR RATIO	92	93	90		
BOILER LOAD	90	91	83		
COAL FEEDER BIAS	88	88	80		
FD FAN	100	100	100		
OFA FAN	94	94	92		
ID FAN DAMPER	28	29	28		
FEEDWATER	76	74	70		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	mm				
FRONT LOWER OFA	20"				
REAR UPPER OFA	21"				
REAR LOWER OFA	21"				
FURNACE					
ASH BED DEPTH, INCHES	3'	3"	3'		
Temp F.P. fan - 144	38°F				
Temp	58°F				
RH	27%				

KVB

Steam Flow, lb/hr 72,857% Design Capacity 97Coal DPANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	18			
DATE	3-18-77			
DESCRIPTION	75,000 load			
INTEGRATOR				
STEAM FLOW	392643	392794		392613
TIME OF READING	930	1040	11:52	12:04
CHART RECORDINGS				
STEAM FLOW x 1000 lb/hr	75	75	74	
AIR FLOW, RELATIVE	65	65	65	
FLUE GAS TEMP, °F	527	525	525	
STEAM HEADER PRESSURE, PSIG	135	136	136	
OPACITY, %	005	005	005	
	9.2/10			
DRAFT GAUGES				
WINDBOX PRESSURE, "H ₂ O	0.2	0.2	0.2	
UNDERGRATE PRESSURE, "H ₂ O	1.1	1.0	1.1	
FURNACE PRESSURE, "H ₂ O	-0.05	-0.08	-0.10	
LER OUTLET PRESSURE, "H ₂ O	-1.1	-1.1	-1.1	
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.5	-5.3	-5.3	

KVB

TEST NUMBER	18				
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	176	176	176		
STEAM PRESSURE, PSIG	137	138	138		
CONTROLS					
COAL/AIR RATIO	88	84	87		
BOILER LOAD	78	77	70		
COAL FEEDER BIAS	76	70	70		
FD FAN	99	99	99		
OFA FAN	90	86	88		
ID FAN DAMPER	28	26	26		
FEEDWATER	72	72	73		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	mm				
FRONT LOWER OFA	21"				
REAR UPPER OFA	21"				
REAR LOWER OFA	21"				
FURNACE					
ASH BED DEPTH, INCHES	3"	3"			
T_{mp} F.D. fan	T_{dry} 74°F				
	T_{wet} 58°F				
	RH 29%				

KVB

Steam Flow, lb/hr 12,449% Design Capacity 16.6Coal DPANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	19				
DATE	3-13-79				
DESCRIPTION	15,000 COPD T				
INTEGRATOR					
STEAM FLOW	39,297	39,298.4	39,497	39,200.2	
TIME OF READING	14.27	15.33	16.13	16.34	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	14	14	14		
AIR FLOW, RELATIVE	24	24	24		
FLUE GAS TEMP, °F	320	320	320		
STEAM HEADER PRESSURE, PSIG	141	141	141		
OPACITY, %	003	003	003		
	0.003/100	0.003/100	0.003/100		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.1	0.1	0.2		
UNDERGRATE PRESSURE, "H ₂ O	-0.2	-0.2	-0.2		
FURNACE PRESSURE, "H ₂ O	-0.15	-0.15	-0.20		
LER OUTLET PRESSURE, "H ₂ O	-0.4	-0.4	-0.4		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-1.2	-1.2	-1.2		

KVB

TEST NUMBER					
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	172	172	172		
STEAM PRESSURE, PSIG	134	138	138		
CONTROLS					
COAL/AIR RATIO	17	17	18		
BOILER LOAD	57	60	58		
COAL FEEDER BIAS	56	59	58		
FD FAN	22	30	30		
OFA FAN	16	17	17		
ID FAN DAMPER	30	32			
FEEDWATER	40	40	40		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	Hum				
FRONT LOWER OFA	5"				
REAR UPPER OFA	5"				
REAR LOWER OFA	5"				
FURNACE					
ASH BED DEPTH, INCHES	3"	3" Ash			
	Slack Stucky				
Temp F.P. fan	Temp	72°F			
	Thet	58°F			
	RH	30%			

KVB

Steam Flow, lb/hr 58,286% Design Capacity 77.7Coal DPANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	20				
DATE	3-21-79				
DESCRIPTION	SASS/SOX				
	COAL D				
INTEGRATOR					
STEAM FLOW	395665	395982	276796	396185	
TIME OF READING	10:04	11:45	13:34	14:49	
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	66	70	60		
AIR FLOW, RELATIVE	50	64	53		
FLUE GAS TEMP, °F	465	520	485		
STEAM HEADER PRESSURE, PSIG	138	139	138		
OPACITY, %	0.05	0.05	0.05		
	black white		white		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.2	0.7	0.2		
UNDERGRATE PRESSURE, "H ₂ O	0.7	1.0	1.0		
FURNACE PRESSURE, "H ₂ O	-0.1	-0.10	-0.05		
ILER OUTLET PRESSURE, "H ₂ O	-1.0	-1.0	-1.0		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-4.6	-4.5	-4.7		

KVB

TEST NUMBER					
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	175	173	174		
STEAM PRESSURE, PSIG	138	137	138		
CONTROLS					
COAL/AIR RATIO	66	86	77		
BOILER LOAD	74	- 82	- 64		
COAL FEEDER BIAS	76	82	64		
FD FAN	82	94	90		
OFA FAN	70	90	80		
ID FAN DAMPER	18	27	27		
FEEDWATER	63	70	66		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	none				
FRONT LOWER OFA	19'				
REAR UPPER OFA	19'				
REAR LOWER OFA	19'				
FURNACE					
ASH BED DEPTH, INCHES	3" PL	3"	3" PL		
FD for Tdry	73°F				
Twet	57°F				
RH	40				

KVB

NOTES

TEST NO:	20	Load	10 to 12 - 60 to 65,000 15%/hr.
			12 to 1330 - 50,000 16%/hr.
			1330 to 1400 - 65,70,000 16%/hr.
			14 to 1500 - 55,000 16%/hr.
TEST NO:			
TEST NO:			
TEST NO:			
TEST NO:			

KVB

Steam Flow, lb/hr 61,780% Design Capacity 824Coal DPANEL BOARD DATA
ABMA TEST SITE G

TEST NUMBER	22			
DATE	3-23-79			
DESCRIPTION	PART-SWING LOAD			
INTEGRATOR				
STEAM FLOW	398125	398213		398274
TIME OF READING	10:12	11:22	11:50	12:15
CHART RECORDINGS				
STEAM FLOW x 1000 lb/hr	67	70	57	
AIR FLOW, RELATIVE	62	64	55	
FLUE GAS TEMP, °F	510	513	470	
STEAM HEADER PRESSURE, PSIG	138	138	138	
OPACITY, %	005 white	005 white	005 white	
DRAFT GAUGES				
WINDBOX PRESSURE, "H ₂ O	0.2	0.1	0.1	
UNDERGRATE PRESSURE, "H ₂ O	1.1	1.1	0.9	
FURNACE PRESSURE, "H ₂ O	-1.0	-0.08	-0.10	
ILER OUTLET PRESSURE, "H ₂ O	-1.0	-1.0	-1.0	
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-5.0	-5.3	-4.5	

KVB

TEST NUMBER					
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	179	175	174		
STEAM PRESSURE, PSIG	139	137	139		
CONTROLS					
COAL/AIR RATIO	76	82	67		
BOILER LOAD	62	70	60		
COAL FEEDER BIAS	63	70	60		
FD FAN	94	99	86		
OFA FAN	84	90	73		
ID FAN DAMPER	25	27	20		
FEEDWATER	62	80	66		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	none	none	none		
FRONT LOWER OFA	21"	21"	21"		
REAR UPPER OFA	21"	21"	21"		
REAR LOWER OFA	21"	21"	21"		
FURNACE					
ASH BED DEPTH, INCHES	3-4"	3-4"	3-4"		
Temp fd fan	Tdry	75 F			
	Twet	61 F			
	RA	46 2/3			

KVB

PANEL BOARD DATA
ABMA TEST SITE G

Steam Flow, lb/hr 56,667
% Design Capacity 75.5
Coal D

TEST NUMBER	23				
DATE	3-24-79				
DESCRIPTION	60,000				
INTEGRATOR					
STEAM FLOW	398954	399025	399089		
TIME OF READING	846	942	10:43		
CHART RECORDINGS					
STEAM FLOW x 1000 lb/hr	60	59	59		
AIR FLOW, RELATIVE	57	56	56		
FLUE GAS TEMP, °F	490	480	470		
STEAM HEADER PRESSURE, PSIG	138	138	138		
OPACITY, %	005 white	005	006		
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.2	0.2	0.2		
UNDERGRATE PRESSURE, "H ₂ O	0.9	0.8	0.8		
FURNACE PRESSURE, "H ₂ O	-0.10	-0.1	-0.10		
ILER OUTLET PRESSURE, "H ₂ O	-1.0	-1.0	-1.0		
PRIMARY COLLECTOR OUT PRESSURE, "H ₂ O	-4.5	-4.4	-4.5		

KVB

TEST NUMBER					
PRESSURE GAUGES					
FEEDWATER PRESSURE, PSIG	171	171	170		
STEAM PRESSURE, PSIG	139	139	139		
CONTROLS					
COAL/AIR RATIO	72	72	72		
BOILER LOAD	60	58	57		
COAL FEEDER BIAS	60	61	58		
FD FAN	80	90	96		
OFA FAN	76	74	74		
ID FAN DAMPER	22	20	20		
FEEDWATER	66	66	66		
OVERFIRE AIR TAPS					
FRONT UPPER OFA	none				
FRONT LOWER OFA	19" H ₂ O		19"		
REAR UPPER OFA	19" H ₂ O		19"		
REAR LOWER OFA	19" H ₂ O		19"		
FURNACE					
ASH BED DEPTH, INCHES	2½-3" OK	2½-3" OK	2½-3"		
TEMP FD FAN T _{DRY}	69°F				
T _{WET}	65°F				
RH	82%				

KVB

10f3

LOAD 58,690 lb/hr
% 78.3%
COAL D

PANEL BOARD DATA
ACMA TEST SITE 6

TEST NUMBER	24				
DATE	3-24-79				
DESCRIPTION	60000 lb/hr LOW OFA				
INTEGRATOR					
STEAM FLOW	399222	399245	399356	399367	
TIME OF READING	14:23	15:26	16:20	16:29	
CHART RECORDINGS					
STEAM FLOW X 1000 lb/hr	60	59	59		
AIR FLOW, RELATIVE	54	55	55		
FLUE GAS TEMP, °F	475	475	480		
STEAM HEADER PRESSURE, PSIG	137	137	137		
OPACITY	grayish white				
DRAFT GAUGES					
WINDBOX PRESSURE, "H ₂ O	0.2	0.1	0.1		
UNDERGRATE PRESSURE, "H ₂ O	0.8	0.8	0.8		
FURNACE PRESSURE, "H ₂ O	-0.1	-0.1	-0.1		
BOILER OUTLET PRESS, "H ₂ O	-1.0	-1.0	-1.0		
PRIMARY COLLECTOR OUTLET PRESSURE, "H ₂ O	-4.2	-4.2	-4.1		

KVB

PRESSURE GAUGES					
FEED WATER PRESS, PSIG	176	176	175		
STEAM PRESSURE, PSIG	138	138	139		
CONTROLS					
COAL/AIR RATIO	72	70	70		
BOILER LOAD	66	62	62		
COAL FEEDER BIAS	64	64	64		
FD FAN	86	87	88		
OFA FAN	40	40	40		
ID FAN DAMPER	14	20	22		
FEEDWATER	65	66	64		
OVERFIRE AIR TAPS					
FRONT OFA	12"				
REAR UPPER OFA	12"				
REAR LOWER OFA	12"				
FURNACE					
ASH BED DEPTH, INCHES	3" 8" at #3 feeder	3"	3" OK		
TEMPERATURE FD FAN ^{Tdry}	76 °F				
^{Twet}	64 °F				
RH	52%				

1 of 3

KVB

LOAD 74,645 lbs/hr
 % 99.5 %
 COAL D

PANEL BOARD DATA
 ASMA TEST SITE G

TEST NUMBER	25				
DATE	3-25-79				
DESCRIPTION	VARY AIR 75,000				
INTEGRATOR					
STEAM FLOW	349731			349892	
TIME OF READING	7:34			9:29	
CHART RECORDINGS					
STEAM FLOW X 1000 lbs/hr	74	75	75	75	
AIR FLOW, RELATIVE	66	65	60	56	
FLUE GAS TEMP, °F	530	530	516	502	
STEAM HEADER PRESS, PSIG	137	137	137	137	
OPACITY	white, sh				
DRAFT GAUGES					
WINDBOX PRESS. "H ₂ O	.2	.2	.2	.2	
UNDERGRATE PRESS "H ₂ O	1.0	1.0	.9	.8	
FURNACE PRESS "H ₂ O	-.10	-.10	-.10	-.10	
BLR OUT PRESS "H ₂ O	-.11	-.11	-.10	-.10	
PRIMARY COLLECTOR OUT PRESS "H ₂ O	-.56	-.55	-.48	-.44	

KVB

1 of 3

PANEL BOARD DATA
ALMA TEST SITE G

LOAD 58,361
% 77.8
COAL D

TEST NUMBER	26				
DATE	3-25-79				
DESCRIPTION	VARY AIR 60,000				
INTEGRATOR					
STEAM FLOW	344906				400017
TIME OF READING	940				11.17
CHART RECORDINGS					
STEAM FLOW $\times 1000 \text{ kg/hr}$	61	60	59	60	
AIR FLOW, RELATIVE	57	54	51	45	
FLUE GAS TEMP, °F	490	485	470	452	
STEAM HEADER PRESS PSIG	139	139	139	139	
OPACITY	white/red/brown				
DRAFT GAUGES					
WINDBOX PRESS $"H_2O$	.2	.2	.2	.2	
UNDERGRATE PRESS $"H_2O$	.7	.7	.6	.6	
FURNACE PRESSURE $"H_2O$	-.10	-.10	-.10	-.10	
BLR OUTLET PRESS $"H_2O$	-.10	-.09	-.08	-.07	
PRIMARY COLLECTOR OUTLET PRESS $"H_2O$	-.44	-.40	-.35	-.30	

KVB

PRESS GAUGES					
FEEDWATER PRESS	PSIG	172	175	175	174
STEAM PRESSURE	PSIG	140	140	140	140
CONTROLS					
COAL/AIR RATIO		70/70	72/66	70/58	72/52
BOILER LOAD		67	60	64	61
COAL FEEDER BIAS		66	60	62	60
FD FAN		96	84	76	72
OFA FAN		70	70	60	(55)
ID FAN		20	20	16	15
FEEDWATER		66	66	65	65
OVERFIRE AIR					
FRONT OFA		20"			16"
REAR UPPER OFA		20"			16"
REAR LOWER OFA		20"			16"
FURNACE					
ASH BED DEPTH, INCHES		3" OK			

SECTION 2.0
PARTICULATE DATA

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PARTICULATE DATA SUMMARY
PART I

LOCATION: APPA Test Site G

Boiler Outlet Area = 38.474 ft²

TEST NO.	Total Mass mgm.	Dry Gas Volume ft ³	Liquid Coll. ml.	Baro. Press. "Hg	Static Press. "H ₂ O	Pitot ΔP "H ₂ O	Orifice ΔH "H ₂ O	Stack Gas Temp. °R	Excess O ₂ %	Sampling Time min.	Nozzle Dia. in.	Pitot Factor n.d.	Fuel Factor SCF/10 ⁶ BTU	Flue Gas MW g/g mole
2	27.3	23.88	25.4	30.75	-0.8	0.28	0.217	991	8.0	75	0.245	0.837	9705	
3	35.03	27.65	28.1	30.75	-0.7	0.28	0.272	980	8.7	75	0.245	0.837	9279	
4	5.274	25.82	28.1	30.75	-0.7	0.28	0.272	980	8.7	75	0.245	0.837	9530	
5	5721.0	27.65	30.4	30.75	-0.8	0.28	0.260	980	7.1	65	0.245	0.837	10197	
6	2357.2	27.65	18.1	30.75	-0.8	0.28	0.272	980	6.5	65	0.245	0.837	9261	
7	1093.0	34.52	20.4	30.75	-0.36	0.218	0.260	851	10.1	80	0.245	0.837	9407	29.17
8	3034.0	34.52	49.9	30.24	-0.8	0.216	0.281	985	6.6	80	0.245	0.837	9335	29.23
10	4926.9	28.1	39.0	30.75	-0.8	0.273	0.270	980	1.0	75	0.245	0.837	9585	29.11
11	21.4	4.25	4.2	30.24	-0.36	0.2567	0.213	843	15.2	62	0.245	0.837	9462	29.10
12	1002.6	31.34	28.1	30.26	-0.7	0.28	0.272	987	7.2	75	0.245	0.837	10402	29.13
13	1000.7	27.65	24.6	30.75	-0.8	0.28	0.272	982	9.5	75	0.245	0.837	10653	29.34
14	1000.7	27.65	28.1	30.75	-0.8	0.28	0.272	983	15.1	75	0.245	0.837	9672	29.37
15	433.7	27.65	4.2	30.75	-0.8	0.28	0.272	982	9.1	75	0.245	0.837	9750	29.32
16	1000.7	27.65	4.2	30.75	-0.8	0.28	0.272	975	8.0	65	0.245	0.837	9791	29.15
17	1000.7	27.65	4.2	30.75	-0.8	0.28	0.272	980	7.3	65	0.245	0.837	9699	29.22

PARTICULATE DATA SUMMARY
PART I

LOCATION: ABRA Test Site G

Multichase Outlet

AREA = 11.045 A²

TEST NO.	Total Mass mgm.	Dry Gas Volume ft ³	Liquid Coll. ml.	Baro. Press. "Hg	Static Press. "H ₂ O	Pitot ΔP "H ₂ O	Orifice ΔH "H ₂ O	Stack Gas Temp. °R	Excess O ₂ %	Sampling Time min.	Nozzle Dia. in.	Pitot Factor n.d.	Fuel Factor SCF/10 ⁶ BTU	Flue Gas MW g/g mole
2	176.2	31.22	31.0	30.77	0	0.752	0.751	935	9.9	72.38	0.190	0.857	9705	29.25
3	297.1	47.99	49.2	30.77	0	0.718	0.813	966	9.2	72	0.242	0.837	9279	29.27
4	243.0	43.37	49.3	30.76	0	0.719	0.632	914	10.0	73.5	0.242	0.837	9530	29.27
5	150.7	18.78	21.1	30.92	0	0.852	0.752	960	7.6	31	0.242	0.837	10197	29.56
6	148.9	22.31	20.4	30.92	0	0.482	0.456	940	11.0	46	0.242	0.837	9261	29.56
7	930.2	11.1	11.1	30.92	0	0.241	0.836	860	14.2	105	0.242	0.837	9407	29.56
8	349.3	63.62	59.6	30.24	0	0.841	0.730	960	6.9	96	0.242	0.837	9335	29.74
10	610.2	46.22	58.0	30.24	0	0.841	0.730	960	9.1	72	0.242	0.837	9565	29.74
16	51.1	11.1	11.1	30.24	0	0.841	0.730	825	15.2	72	0.242	0.837	9462	29.74
17	514.2	11.1	11.1	30.24	0	0.841	0.730	1007	7.4	72	0.242	0.837	10402	29.45
18	430.0	11.1	11.1	30.24	-0.50	0.841	0.730	960	7.6	73.5	0.242	0.837	10053	29.45
19	273.0	21.02	18.1	30.00	0	0.841	0.730	889	15.1	73.25	0.242	0.837	9672	29.00
22	111.0	11.1	11.1	30.00	0	0.841	0.730	968	9.1	72	0.242	0.837	9750	29.27
23	460.0	46.02	46.0	30.00	0	0.841	0.730	945	8.0	72	0.242	0.837	9791	29.27
24	368.6	11.1	11.1	30.00	0	0.841	0.730	955	7.3	72	0.242	0.837	9699	29.27

PARTICULATE DATA SUMMARY
PART II

Location ABMA Test Site G
Bunker Outlet

TEST NO.	LOAD %	O ₂ %	CONDITIONS	EMISSIONS			Moisture %	Stack Gas Velocity Ft/sec	Stack Gas Flow SCF/sec	Isokin. %
				lb/10 ⁶ BTU	GR/SCF	LB/HR				
2	80.0	8.4	high off ^{SCALE}	4.271	1.772	763	4.90	39.69	838	107
3	79.6	8.7	low off	4.332	1.911	781	5.15	39.12	705	99
4	76.5	10.4	swing load	7.408	2.740	1179	5.28	38.4	835	10
5	101.7	7.0	normal operation	6.786	3.102	1424	6.07	42.27	715	101
6	91.4	10.5	normal operation ^{SCALE}	4.171	1.572	577	3.58	30.86	695	105
7	17.5	10.6	normal operation ^{SCALE}	2.139	0.482	76	2.66	16.10	326	97
8	99.6	6.6	normal operation ^{SCALE}	2.932	1.112	568	7.07	35.12	734	112
10	86.0	9.7	swing load ^{SCALE}	6.592	2.590	1120	5.92	38.00	811	107
16	15.8	10.2	normal operation ^{SCALE}	2.265	0.460	76	3.06	16.72	407	102
17	97.7	7.4	normal operation ^{SCALE}	5.858	2.510	1526	4.75	50.55	1012	103
18	91.1	7.5	normal operation ^{SCALE}	4.783	2.138	980	6.20	32.00	842	104
19	8.6	10.1	normal operation	2.057	0.416	81	2.62	15.83	380	100
22	82.0	9.1	swing load	4.720	1.917	848	6.61	41.25	860	100
23	75.6	8.0	high off	4.567	2.008	871	5.12	37.00	781	100
24	100.0	7.3	low off	4.003	1.842	717	6.82	37.00	741	102

**PARTICULATE DATA SUMMARY
PART II**

Location ARMA Test Site G
Multiflow Outlet

TEST NO.	LOAD %	O ₂ %	CONDITIONS	EMISSIONS			Moisture %	Stack Gas Velocity Ft/sec	Stack Gas Flow SCF/sec	Isokin. %
				lb/10 ⁶ BTU	GR/SCF	LB/HR				
1	85.0	9.9	high off	0.222	0.085	18	4.37	63.21	405	107
2	79.6	9.2	low off	0.220	0.093	19	4.52	62.64	350	106
3	75.5	10.0	Swirl Load	0.221	0.085	17	5.03	62.88	300	93
4	100.7	7.6	with flyash reversion	0.274	0.120	25	4.89	65.63	414	92
5	100.7	11.0	normal swirl off	0.129	0.046	8	1.94	50.28	324	93
6	17.3	14.8	normal swirl off	0.453	0.208	26	2.68	34.78	239	95
7	52.3	6.0	normal swirl off	0.166	0.084	18	6.12	68.19	420	98
10	86.0	9.1	swirl load	0.484	0.200	42	5.52	65.87	411	97
16	15.2	15.2	normal swirl off	0.933	0.130	20	2.30	28.70	210	100
17	22.7	7.4	with flyash reversion	0.364	0.158	34	5.44	68.65	412	101
18	20.1	7.5	normal swirl off	0.320	0.142	32	6.04	70.96	432	104
19	15.3	15.1	normal swirl off	0.495	0.130	10	1.99	27.57	200	90
22	10.0	2.0	swirl load	0.334	0.136	29	4.12	67.62	412	102
23	10.0	5.0	low off	0.320	0.141	27	6.76	60.42	352	108
24	75.5	7.5	low off	0.260	0.122	24	6.58	62.61	382	105

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = _____

TEST NUMBER 1

Sampling Time
Per Point, Min

Vac
in. Hg ft³/min

Before
After

VELOCITY TRAVERSE

DATE 2-10-79

OPERATOR MS

FUEL A

SITE G

PROBE LOCATION BLROW

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
1	13:16	.01			526							
2		.40			550							
3		.15			508							
4		.18			455							
5		.01			504							
6		.05			540							
7		.50			527							
8		.40			441							
9		.60			515							
10		.02			496							
11		.55			549							
12		.12			495							
13		.60			520							
14		.03			526							
15		.60			523							
16		.12			416							
17		.00			507							
18		.02			527							
19		.60			527							
20		.12										
21		.01										
22		.50										
23		.24										
24		.15										
Average												

Nomograph Setup

METER VOL.	END
	START
SAMPLE VOL.	ft ³

C _{pitot}	Stack Press.	Barometric Pressure
.037	In. Hg-Gauge	

Percent O₂ =

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal)=
% H₂O = Noz(Actual)=

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1			
#2			
#3			
Total			
#4	g(End)	g(Start)	Δgrams
Silica Gel			
Total Vol. H ₂ O			ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = _____

TEST NUMBER 1

Vac
in. Hg ft³/min

DATE 2-10-79

Sampling Time
Per Point, Min

Before
After

OPERATOR

FUEL

SITE

PROBE LOCATION STACK

VELOCITY TRAVERSE

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
1		.35			500							
2		.37			500							
3		.38			500							
4		.47			500							
5		.57			500							
6		.75			500							
7		1.20			500							
8		1.30			500							
9		1.40			500							
10		1.40			500							
11		1.1			500							
12		1.00			500							
Average		.428										

METER VOL. END
START
SAMPLE VOL. ft³

C_{pitot} Stack Press. Barometric Pressure
In. Hg-Gauge
.037

Percent O₂ =

Nomograph Setup

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal)=
% H₂O = Noz(Actual)=

Imp. Vol. (End) Vol. (Start) ΔVol. (ml)
#1 - - - - -
#2 - - - - -
#3 - - - - -
Total
#4 g(End) g(Start) Agrams
Silica Gel - - - - -
Total Vol. H₂O ml

PARTICULATE

DATA

Leak Check Date

ISOKINETICS = 97.1

TEST NUMBER 2

DATE 2-11-79

OPERATOR MJ

FUEL A

SITE G

PROBE LOCATION BLR out

Sampling Time
Per Point, Min

Before

After

Vac
in. Hg ft³/min

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
1	—	.00	—	4354.97	500	—	—	—	—	—	—	—
2	3	.44	.48	4355.48	533	370	250	—	200	98	—	3.5
3	3	.08	.09	4356.20	510	370	260	—	235	98	—	1.0
4	3	.16	.18	4357.12	—	370	280	—	230	98	—	2.0
5	3	.05	.06	4357.63	560	370	270	—	240	98	—	.08
6	3	.56	.61	4359.47	550	360	270	—	250	99	—	5.0
7	3	.12	.13	4360.36	480	365	290	—	240	100	—	2.0
8	—	.00	—	—	—	—	—	—	—	—	—	—
9	—	.00	—	—	504	—	—	—	—	—	—	—
10	—	.00	—	—	560	—	—	—	—	—	—	—
11	3	.54	.59	4361.96	560	340	300	—	230	100	—	4.0
12	3	.11	.12	4362.70	—	370	310	—	230	100	—	1.5
13	—	.00	—	—	—	—	—	—	—	—	—	—
14	—	.00	—	—	523	—	—	—	—	—	—	—
15	5	.61	.67	4365.58	543	360	300	—	230	100	—	4.8
16	5	.12	.13	4366.91	528	380	310	—	230	100	—	2.0
17	—	.00	—	—	—	—	—	—	—	—	—	—
18	—	.00	—	—	—	—	—	—	—	—	—	—
19	5	.64	.70	4369.90	537	350	310	—	230	110	—	5.0
20	5	.10	.11	4371.20	—	370	310	—	220	105	—	2.0
21	—	.00	—	—	522	—	—	—	—	—	—	—
22	5	.48	.52	4373.82	555	340	300	—	240	105	—	4.0
23	5	.24	.26	4375.64	525	370	320	—	260	105	—	3.0
24	5	.12	.13	4377.02	—	370	320	—	235	105	—	2.0
59	—	—	—	—	—	—	—	—	—	—	—	—
Average	—	.29	.319	—	531	—	—	—	—	—	—	—

METER CORR
METER VOL. END 4377.02 1.0516
START 4354.97
SAMPLE VOL. 23.18 ft³ CORR

C _p tot	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-1.0 "H ₂ O	30.75

Percent O₂ =

Nomograph Setup
P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal) =
% H₂O = Noz(Actual) = 245

Imp. Vol. (End) Vol. (Start) ΔVol. (ml)
#1 120 - 100 = 20
#2 101.5 - 100 = 1.5
#3 0 - 0 = 0
Total 21.5
#4 g(End) g(Start) Δgrams
Silica 149.4 - 145 = 4.4
Gel
Total Vol. H₂O 25.9 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 17.1TEST NUMBER 2Vac
in. Hg ft³/minDATE 2-11-77Sampling Time
Per Point, Min
3Before
AfterOPERATOR JDFUEL ASITE GPROBE LOCATION STACK

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
1		.35	.14	4779.45	490				33	30		2.3
2		.46	.19	4780.53	500				31	31		2.5
3		.49	.20	4781.71	500				30	32		3.0
4		.52	.21	4782.94	500				30	35		3.0
5		.60	.25	4784.25	500				30	38		3.1
6		.80	.33	4785.68	500				25	40		3.8
7		1.2	.50	4787.37	340				75	75		4.5
8		1.3	.55	4789.11	500				30	40		5.0
9		1.3	.55	4790.80	500				—	—		—
10		1.3	.55	4792.51	500				—	—		—
11		1.2	.50	4794.17	500				30	50		4.5
12		1.1	.46	4795.67	400				30	50		4.0
13		.45	.185	4796.38	500				30	65		2.5
14		.45	.185	4797.35								2.5
15		.56	.22	4798.49								3.0
16		.62	.23	4799.65								3.2
17		.65	.29	4800.89								—
18		.85	.35	4802.27								—
19	23 sec	.97	.41	4803.91								4.6
20		.95	.40	4805.07								4.0
21		.97	.41	4806.46								—
22		.90	.38	4807.90								4.0
23		.80	.33	4808.72								3.5
24		.33	.135	4809.63								—
Average		.752	.331		480°F							
					940°K							

Nomograph Setup

METER VOL. END 4809.63
START 4778.41
SAMPLE VOL. 31.23 ft³

C _{pitot}	Stack Press. in. Hg-Gauge	Barometric Pressure
.837		30.77

Percent O₂ =

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal)=
% H₂O = Noz(Actual)= .190

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	168	100	68
#2	58	100	-42
#3	0	0	0
Total			26

#4	g(End)	g(Start)	Δgrams
Silica	153	148	5
Gel			
Total Vol. H ₂ O			31 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 99.4.

TEST NUMBER 3

Vac
in, Hg ft³/min

DATE 2-11-79

Sampling Time
Per Point, Min
5Before
After

OPERATOR MJ

FUEL A

SITE 6

PROBE LOCATION BLR

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
1		.00			545								
2		.34	.37	4379.44	530	360	300	230		100		2.1	
3		.10	.11	4380.64	520	350	310	240		100		.5	
4		.12	.13	4382.10	450	340	310	245		100		.5	
5		.00			502								
6		.05	.06	4383.04	535	300	270	230		105		—	
7		.40	.44	4385.52	550	350	270	250		105		3.0	
8		.12	.13	4386.73	475	370	270	260		110		—	
9		.00			500								
10		.00			510								
11		.50	.55	4389.25	560	300	300	260		110		3.0	
12		.10	.11	4390.47	540	350	320	240		110		.5	
13		.00			530								
14		.00			515								
15		.50	.55	4393.00	535	325	320	280		110		3.0	
16		.12	.13	4394.39	520	350	320	290		110		1.9	
17		.00			510								
18		.00			545								
19		.46	.50	4396.81	560	330	330	270		115		3.0	
20		.08	.09	4397.84	508	360	340	300		110		1.0	
21		.00			520								
22		.44	.48	4400.36	560	340	340	280		115		3.0	
23		.30	.33	4402.39	545	360	340	290		115		2.8	
24		.11	.12	4403.53	450	370	340	290		115		1.5	
Average		.249	.273	—	520°F 980°R								

Nomograph Setup:

METER VOL. END 4403.53
START 4377.23
SAMPLE VOL. 26.30 ft³ - 27.65

C _{pilot}	Stack Press. In. Hg Gauge	Barometric Pressure
.837	1.0	30.70

Percent O₂ =

P_{meter} = C
T_{stack} =
T_{meter} = ΔP
ΔH_g = Noz(Ideal)=
% H₂O = Noz(Actual)= .245

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	129.5	100	29.5
#2	102.5	100	2.5
#3	0	0	0
Total			32

	g(End)	g(Start)	Δgrams
Silica	136.4	130.3	6.1
Gel			
Total Vol. H ₂ O			38.1 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 107

TEST NUMBER 3

Vac
in. Hg ft³/min

DATE 2-11-79

Sampling Time
Per Point, Min

Before

OPERATOR JLI

3

After

FUEL A

SITE

PROBE LOCATION Stack

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
Port 8								In	Out			
1		.44	.50	4821.44	520	70			30	40		3.5
2		.44	.50	4823.17	—	—			—	—		3.5
3		.50	.55	4824.90	—	—			—	—		3.7
4		.58	.65	4826.75	520	72			55	60		4.2
5		.65	.74	4828.77	500	80			43	60		5.0
6		.73	.82	4830.85	500	90			42	60		5.2
7		.70	.79	4832.88	500	87			42	60		5.0
8		.75	.85	4834.88	500	70			42	61		5.0
9		.80	.90	4837.01	500	70			41	61		5.4
10		.67	.76	4838.01	500	70			40	63		4.8
11		.55	.62	4840.81	500	70			50	70		4.4
12		.44	.50	4842.46	—	70			50	70		3.8
Port A		.30	.34	4843.89	520	50			35	65		3.5
1		.40	.45	4845.46	520	80			32	70		4.0
2		.40	.45	4846.00	520	85			40	65		4.0
3		.46	.52	4848.68	520	90			40	68		4.5
4		.51	.57	4850.45	520	90			40	70		5.0
5		.70	.79	4852.46	520	92			40	70		6.0
6		1.1	1.2	4854.90	520	90			40	70		9.5
7		1.3	1.5	4857.64	520	91			37	70		11.0
8		1.3	1.5	4860.43	520	95			39	70		11.0
9		1.3	1.5	4863.21	520	98			38	72		11.0
10		1.2	1.4	4865.86	500	98			30	70		11.0
11		1.0	1.1	4868.09	380	90			30	70		7.5
	72											
Average		0.7175	0.8125		506°F	966°F						

Nomograph Setup

METER VOL. END 4868.09
START 4820.10
SAMPLE VOL. 47.99 ft³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		30.70

Percent O₂ =

P _{meter}	C	Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
P _{stack}	T _{stack}	#1	112	100	12
T _{meter}	ΔP	#2	120	100	20
ΔH _g	Noz (Ideal)	#3	4	0	4
Total					36

1 H₂O = 43 Noz (Actual) = .242

V_S = 62.70 ft³/sec

#4	g (End)	g (Start)	Δgrams
Silica Gel	153.0	139.7	13.3

Total Vol. H₂O 414.3 ml

0.12 14/mcyn BTU

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 98

TEST NUMBER 41
DATE 2-15-77
OPERATOR A.T.
FUEL 4
SITE
PROBE LOCATION 810.00 ft

Sampling Time
Per Point, Min
5

Before
After

Vac
in. Hg ft³/min

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
1		0		4405.07	441							
2		.34	.37	4407.34	526	350	310	235		110		2.2
3		.09	.10	4408.47	504	370	310	245		110		.90
4		.14	.15	4409.83	500	350	310	245		110		1.0
5		0			470							
6		.05	.06	4410.78	540	310	310	245		120		.50
7		.56	.62	4413.56	555	350	320	255		120		3.0
8		.14	.15	4414.93	515	350	330	260		120		1.5
9		0			510							
10		0			500							
11		.5	.55	4417.52	540	310	310	235		125		3.0
12		.10	.11	4418.64	500	350	300	240		125		.9
13		0			520							
14		0			497							
15		.5	.55	4421.28	530	320	300	240		130		3.0
16		.1	.11	4422.47	470	340	310	240		125		.9
17		0			500							
18		0			530							
*19	5:30	.56	.59	4425.42	560	310	310	240		125		3.0
20		.09	.1	4426.48	500	320	310	240		130		.9
21		0			496							
22		.40	.44	4428.94	563	300	310	250		140		3.0
23		.28	.31	4430.76	502	320	305	235		130		2.0
24		.12	.13	4432.12	500	325	305	220		130		1.5
	75.5'											
Average		.266	.321		492°F 952°R							

METER VOL. END 4452.12
START 4405.07
SAMPLE VOL. 27.05 ft³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		30.27

Percent O₂ =

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H₂O = 6.3 Noz(Actual) =

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	130	100	30
#2	103	100	3
#3	0	0	0
Total			33

#4	g(End)	g(Start)	Δgrams
Silica Gel	158.5	152.9	5.6
Total Vol. H ₂ O			38.6 ml

8.18 10/100 BTU

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = _____

TEST NUMBER 4Vac
in. Hg ft³/minDATE 2-16-74Sampling Time
Per Point, Min

Before

OPERATOR JDFUEL ASITE GPROBE LOCATION Stack3

After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
Port A 1		.35	.36	4881.74	490	60	120		40	50		3.2
2		.35	.36	4883.19	490	80	130		40	50		3.2
3		.35	.36	4884.58	495	83	150		41	52		3.2
4		.42	.44	4886.19	495	82	160		45	52		3.5
5	+1 min	.58	.49	4888.36	510	50	200		40	50		3.8
6		.65	.55	4890.12	510	70	210		45	50		4.1
7		1.1	.95	4892.30	510	80	210		46	50		6.2
8		1.3	1.1	4894.71	500	80	210		50	50		7.3
9		1.2	1.0	4896.98	500	80	210		51	50		6.5
10		1.3	1.10	4899.29	490	50	240		48	50		7.0
11		1.2	.96	4901.51	—	70	250		50	50		6.8
12		.93	.83	4903.61	480	80	250		50	50		6.0
Port B 1		.35	.31	4904.02	480	60	260		45	51		3.5
2		.47	.41	4906.51	480	80	275		48	50		3.6
3	+30 sec	.53	.47	4908.40	480	80	280		50	50		4.0
4		.57	.50	4910.08	480	80	280		50	52		4.2
5		.60	.54	491	480	80	290		51	55		4.5
6		.67	.60	491	485	82	290		58	58		4.8
7		.72	.65	491	490	82	300		58	58		5.1
8		.67	.60	491	490	80	300		60	58		4.8
9		.75	.66	491	490	80	300		60	60		5.0
10		.75	.66	491	500	80	300		60	60		5.0
11		.68	.61	4922.11	—	75	300		60	60		4.8
12		.75	.66	4923.85	—	70	300		60	60		5.1
Average		.719	.632		444°F 954°R							

Nomograph Setup

METER VOL. END 4923.85
START 4880.28
SAMPLE VOL. 43.57 ft³

Cpitot	Stack Press. In. Hg-Gauge	Barometric Pressure
<u>837</u>		<u>30.26</u>

Percent O₂ = _____

P_{meter} = C = _____
P_{stack} = T_{stack} = _____
T_{meter} = ΔP = _____
ΔHg = Noz(Ideal) = _____

% H₂O = 4.8 Noz(Actual) = 242V_S = 62.82

0.217 lb/mega BTU

Imp. Vol. (End) Vol. (Start) ΔVol. (ml)
#1 118 - 100 = 18.0
#2 116 - 100 = 16.0
#3 2.5 - 0 = 2.5
Total 36.5

#4 g(End) g(Start) Δgrams
Silica 151.4 - 139.1 = 12.8
Gel
Total Vol. H₂O 419.3 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 101

TEST NUMBER 5

Vac
in. Hg ft³/min

DATE 2-17-79

Sampling Time
Per Point, Min
5

Before

After

OPERATOR B.C.

FUEL N

SITE C

PROBE LOCATION Bldg 6

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
1		0		125	497							
2	5	.40	.44	4435.16	545	320	320	200		100		3.0
3		.12	.13	4436.27	535	350	310	210		100		1.5
4		.16	.18	4438.37	510	350	310	240		100		1.8
5		0			520							
6		0			547							
7		.69	.76	4441.42	563	320	315	250		100		4.0
8		.15	.16	4443.29	520	320	330	240		100		1.5
9		—	—									
10		—	—									
11		.55	.61	4445.58	575	300	320	230		100		3.5
12		.13	.14	4446.98	500	360	330	250		100		1.5
13		0			510							
14		0			535							
15		.69	.76	4450.07	580	320	320	240		110		4.0
16		.12	.15	4451.49	530	360	330	245		105		1.8
17		0										
18		0										
19		.71	.74	4454.53	540	320	340	260		100		4.0
20		.11	.12	4455.77	540	350	340	245		110		1.5
21		0			560							
22		0										
23		.28	.31	4457.72	560	310	330	230		120		2.0
24		.12	.13	4458.08	525	340	350	250		120		1.8
Average		.327	.36		510°F 92.8							

Nomograph Setup

METER VOL. END 4458.68
START
SAMPLE VOL. 26.48 ft³

C_{pitot} Stack Press. Barometric Pressure
In. Hg-Gauge 35.95

Percent O₂ =

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal) =
H₂O = 6.4 Noz(Actual) =

4.229

6.85 16'

Imp. Vol. (End) Vol. (Start) ΔVol. (ml)
#1 131 - 100 = 31
#2 103 - 100 = 3
#3 0 - 0 = 0
Total 34

#4 q(End) q(Start) Δgrams
Silica 48.7 - 43.5 = 5.2
Gel
Total Vol. H₂O 39.2 ml

DATA

ISOKINETICS = 91

TEST NUMBER 5
DATE 2-17-71
OPERATOR JD
FUEL A
SITE G
PROBE LOCATION Stack

Sampling Time Per Point, Min	3
---------------------------------	---

	<u>Vac</u> <u>in. Hg</u>	<u>ft³/min</u>
Before		
After		

[illegible]

METER VOL.	END	4955	95
	START	4437	17
SAMPLE VOL.		15.78	ft ³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	1" H ₂ O	30.95

Percent O₂ =

Nomograph Setup

$P_{\text{meter}} =$ $C =$
 $P_{\text{stack}} =$ $T_{\text{stack}} =$
 $T_{\text{meter}} =$ $\Delta P =$
 $\Delta H_g =$ $\text{Noz(Ideal)} =$
 $\% \text{ H}_2\text{O} = 4.7$ $\text{Noz(Actual)} =$

$$\frac{1}{4} = 65.89$$
$$T = 24$$

1250 10^6 / meca BKA

<u>Imp.</u>	<u>Vol. (End)</u>	<u>Vol. (Start)</u>	<u>ΔVol. (ml)</u>
#1	<u>113</u>	- <u>100</u>	- <u>13</u>
#2	<u>104</u>	- <u>100</u>	- <u>4</u>
#3	<u>0</u>	- <u>0</u>	- <u>0</u>
		Total	<u>17</u>

Total 17

#4	<u>g(End)</u>	<u>g(Start)</u>	<u>Δgrams</u>
Silica	158.4	154.3	4.1
Gel			

Total Vol. H₂O 211 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 105

TEST NUMBER 6

Vac
in. Hg ft³/min

DATE 2-17-79

Sampling Time
Per Point, Min

Before

OPERATOR B.C.

5

After

FUEL A

SITE G

PROBE LOCATION BLRout

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
1		.00											
2		.22	.24	4461.21	490	320	360			100		2.0	
3		.05	.06	4462.11	470	350	315			110		—	
4		.16	.17	4463.57	450	340	325			120		—	
5		.00											
6		.00											
7		.20		4465.35	480	310	350			115		1.9	
8		.20		4467.05	450	330	350			110		—	
9		.00											
10		.00			450								
11		.21	.23	4468.76	460	320	360			115		.9	
12		.17	.19	4470.32	450	340	360			115		—	
13		.00											
14		.00											
15		.27	.30	4472.26	480	370	360			120		1	
16		1.2	1.3	4473.52	450	350	350			120		—	
17		.00											
18		.00			475								
19		.29	.32	4475.58	500	330	350			120		1	
20		.06	.07	4476.54	450	340	350			120		—	
21		.00											
22		.00											
23		.29	.32	4478.58	490	340	350			120		1	
24		.06	.07	4480.64	450	350	340			115		1	
Average		.177	.195		466 F 926°R								

Nomograph Setup

METER VOL. END 4480.64
START 4459.38
SAMPLE VOL. 21.26 ft³

C _p pitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.637	-1.0" H ₂ O	30.95

Percent O₂ =

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H₂O = Noz(Actual) =

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	114	100	14
#2	100	100	0
#3	0	0	0
Total			14

	g (End)	g (Start)	Δgrams
#4 Silica Gel	146.4	142.3	4.1
Total Vol. H ₂ O			18.1 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 92

TEST NUMBER 6

Vac
in. Hg ft³/min

DATE 2-17-79

OPERATOR JDMJ

FUEL A

SITE G

PROBE LOCATION Stack

Sampling Time
Per Point, Min
3 and 5

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
Port B 1		.33	.31	4971.96	480	90	130		33	70		3.0
2		.37	.35	4973.325		85	140		35	75		2.8
3		.37	.35	4974.85		70	200		35	78		2.8
4		.37	.35	4976.28		60	200		35	80		2.8
5		.42	.40	4977.71		55	225		35	80		2.8
6		.39	.37	4978.16		55	240		40	80		2.8
7		.54	.50	4980.73		55	250		40	80		3.0
8		.50	.47	4982.30		50	230		35	80		2.8
9		.50	.47	4983.84		52	255		35	80		2.8
10		.43	.41	4985.33		60	260		35	80		2.8
11		.38	.36	4986.66		55	270		35	80		2.8
12		.40	.38	4988.10		50	265		35	80		2.8
Port A 1	50	.21	.20	4989.82		70	200		40	85		2.0
2		.21	.20	4991.55		45	200		35	85		2.0
3		.24	.22	4993.41		60	210		34	85		2.0
4		.27	.25	4995.40		60	235		34	90		2.5
5		.35	.33	4997.11		60	235		32	70.0		2.5
6		.42	.40	4998.17								4.5
7		.76	.74	5001.38								4.5
8		.84	.79	5004.76								4.8
9		.95	.85	5008.31								4.8
10		.87	.82	5011.73								4.8
11		.77	.72	5014.96								4.8
12		.67	.63	5017.99								4.8
Average		0.482	0.456		480?							

METER VOL. END 5017.99
START 4989.82
SAMPLE VOL. 42.51 ft³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
1837		30.95

Percent O₂ =

Nomograph Setup

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal) =
% H₂O = 1.9 Noz(Actual) =

V_S = 50.54
0.116 1/1000
68

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	164	100	64
#2	51	100	-49
#3	1	0	1
Total			16

#4	g(End)	g(Start)	Δgrams
Silica Gel	157.0	152.6	4.4
Total Vol. H ₂ O			20.4 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 98

TEST NUMBER 7

Sampling Time
Per Point, Min
5

Vac
in. Hg ft³/min
Before
After

DATE 2-25-79
OPERATOR B.C.
FUEL B
SITE G
PROBE LOCATION B1104

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
1		0			390								
2		.09	.65	4548.53	410	320	300	180		100		3.0	
4		.03	.21	4500.83	440	350	310	170		100			
3		.02	.14	4501.26	390	340	310	190		100			
5		0			380								
6		.014	.103	4502.47	400	320	330	180		100			
7		.08	.53	4505.14	400	340	320	210		100		3.5	
8		.011	.103	4506.33	250	340	340	210		90			
9		0			350								
10		0			390								
* 11	5 1/2	.07	.50	4509.17	400	310	330	200		110		3.5	
12		.05	.35	4511.27	210	340	330	225		115		30	
1		.07	.50	4513.71	400	330	330	200		120		3.5	
16		.05	.35	4515.81	110	350	340	240		120		3.0	
17		0											
18		.04	.28	4517.65	410	340	340	220		120		30	
19		.0	.55	4520.36	410	350	340	250		120		40	
20		.04	.28	4522.20	130	340	340	250		120		30	
22		.10	.70	4525.15	380	320	330	230		120		5.0	
23		.02	.14	4526.41	410	320	330	240		120		20	
24		.05	.35	4528.58	150	340	330	245		120		4.0	
	80%												
Average		.0518	.360		4017 86.1°K								

METER VOL. END 4528.58
START 4455.62
SAMPLE VOL. 32.96 ft³/min

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		30.241

Percent O₂ =

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal)=
H₂O = 2.8 Noz(Actual)=
V_g = 16.05
F = 2.6

2.29 16.05 874

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	112	100	12
#2	102	100	2
#3	0	0	0
Total			14

#4	g(End)	g(Start)	Δgrams
Silica Gel	154.2	148.3	6.2
Total Vol. H ₂ O			20.2ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 96

TEST NUMBER

7

Vac
in. Hg ft³/min

DATE

2-25-79

OPERATOR

JU, MT

FUEL

B

SITE

G

PROBE LOCATION

Stack

Sampling Time Per Point, Min
5

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
1	0	0		5033.65		60	200		50	85		
2	0	0										
3	0	0										
4	5	.1	.35	5035.85		60	190		45	85		3.0
5		.14	.42	5038.34		70	200		45	85		3.2
6		.18	.44	5040.45		70	200		45	85		4.0
7		.20	.7	5044.17		75	210		45	85		5.3
8		.25	.89	5047.68		55	225		45	85		6.0
9		.30	1.1	5051.49		60	220		45	85		7.2
10		.28	.92	5055.13		60	225		45	85		7.0
11		.1	.35	5057.35		65	230		45	85		4.0
12		.15	.53	5060.15		60	230		45	85		4.9
13		.30	1.0	5063.81		70	250		45	85		8.0
14		.15	.53	5066.48		70	270		48	85		5.0
15		.40	1.4	5069.76		80	270		50	85		10.0
16		.30	1.1	5073.45		80	290		50	85		9.0
17		.10	.35	5075.68		75	260		48	85		4.0
18		.12	.39	5078.02		70	260		48	85		4.0
19		.15	.53	5080.64		---	---		---	---		4.2
20		.25	.90	5085.72		---	---		---	---		10.0
21		.50	1.8	5089.66		---	---		---	---		15.0
22		.40	1.4	5094.06		70	280		48	85		12.0
23		.35	1.25	5097.70		70	250		48	85		10.0
24		.35	1.25	5101.75		70	250		48	85		10.0
	105											
Average		.241	.836		860K							

Nomograph Setup

METER VOL. END 501.75
START 5033.65
SAMPLE VOL. 65.7 ft³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.037		30.24

Percent O₂ =

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =

% H₂O = 2.6 Noz(Actual) = .316

V_g = 34.60
0.451 100.0 g/m³
P = .53

Imp. Vol. (End) Vol. (Start) ΔVol. (ml)
#1 118 - 100 = 18
#2 110 - 100 = 10
#3 0 - 0 = 0
Total 28

#4 g(End) g(Start) Δgrams
Silica 1652 - 1531 = 121
Gel
Total Vol. H₂O 40.1 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 112

TEST NUMBER 8

Vac
in. Hg ft³/min

DATE 2-25-76

Sampling Time
Per Point, Min
5

Before
After

OPERATOR B.C.
FUEL B
SITE C
PROBE LOCATION B/A Out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
1		0						In	Out			
2		.46	.51	4547.12	580	320	280	125		100		3
3		.1	.11	4548.40	530	310	310	140		80		-
4		.24	.26	4550.31	260	330	310	210		95		2
5		0										
6		.11	.12	4551.56	550	320	310	220		90		-
7		.51	.56	4554.41	570	320	330	250		90		3
8		.11	.12	4555.64	240	355	340	250		100		-
9		0			550							
10		0										
11		.42	.46	4558.12	540	325	350	260		90		3
12		.18	.2	4558.68	140	340	350	270		100		2
13		0										
14		0										
15		.34	.38	4561.43	660	310	360	250		100		3
16		.12	.13	4563.28	240	350	350	280		100		-
17		0										
18		.04	.05	4564.01	540	340	360	240		100		-
19		.45	.49	4566.50	700	330	350	260		110		3
20		.11	.12	4567.71	250	340	340	260		110		
21		0										
22		.52	.57	4570.44	740	330	370	250		110		4
23		.2	.22	4572.19	670	335	340	270		105		2
24		.17	.19	4573.66	220	320	330	250		110		2
	80167											
Average		.216	.281		525 F 485 R							

Nomograph Setup

METER VOL. END 457266
START 454442
SAMPLE VOL. 28.24 ft³ min

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		30.24

Percent O₂ =

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz (Ideal) =
H₂O = 7.4 Noz (Actual) = 2.45

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	139	100	39
#2	104	100	4
#3	0	0	0
Total			43

V_g = 35.03

71

#4	q (End)	q (Start)	Δgrams
Silica	138.4	131.5	6.9
Ca			
Total Vol. H ₂ O			49.4 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 98.

TEST NUMBER 8

Vac
in. Hg ft³/min

DATE 2-25-79

OPERATOR BTJ

FUEL B

SITE 6

PROBE LOCATION Stack

Sampling Time
Per Point, Min
4

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
1		.6	.55	5114.20		—	170		—	65		4.0
2		.6	.55	5116.43		—	—		—	75		4.0
3		.6	.55	5118.70		—	—		—	75		4.0
4		.67	.62	5121.16		—	—		—	75		5.0
5		.75	.70	5123.63		—	—		—	75		5.5
6		.55	.51	5125.85		—	200		—	75		5.0
7		.95	.88	5129.04		—	—		—	75		7.0
8		.90	.89	5131.47		80	210		45	75		7.0
9		.90	.84	5134.28		80	215		45	75		7.0
10		.91	.85	5137.08		75	230		45	75		7.0
11		.85	.79	5139.78		80	230		45	70		6.5
12		.75	.70	5142.33		75	210		45	75		6.0
13		.61	.57	5144.60		50	170		40	75		4.0
14		.62	.58	5146.92		70	170		40	75		4.2
15		.59	.55	5149.23		70	170		40	75		4.0
16		.7	.65	5151.71		75	170		40	75		5.0
17		.83	.76	5154.78		80	175		42	75		6.0
18		.90	.84	5157.21		80	175		45	75		6.5
19		1.2	1.1	5160.27		—	—		—	75		7.0
20		1.2	1.1	5163.33		—	—		—	—		7.5
21		1.2	1.1	5166.37		—	—		—	—		7.5
22		1.1	1.0	5169.43		—	—		—	—		7.5
23		1.1	1.0	5172.62		—	—		—	—		7.8
24		1.1	1.0	5175.63		—	—		—	—		7.8
96												
Average		.841	.730		500K 960K							

METER VOL. END 5175.63
START 5111.95
SAMPLE VOL. 63.68 ft³ corr

Pitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		30.24

Percent O₂ =

Nomograph Setup

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal) =
H₂O = 5.8 Noz(Actual) = .245
K_s = 88.24 P = 2.0

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	152	100	52
#2	107	100	7
#3	15	0	15
Total			74
#4	g(End)	g(Start)	Δgrams
Silica Gel	170.7	156.1	14.6
Total Vol. H ₂ O			98.6 ml

72

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 98

TEST NUMBER 10

Vac
in. Hg ft³/min

DATE 3-2-74

OPERATOR B.C.

FUEL A

SITE G

PROBE LOCATION BLR

Sampling Time
Per Point, Min
5

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
1		0			460							
2		.39	.45	4580.16	480	320	340	220		100		4.0
3		.13	.14	4581.45	530	330	330	215		105		—
4		.25	.27	4583.3	500	340	340	250		110		2.0
5		0			500							
6		.18	.20	4584.61	510	300	340	220		110		2.0
7		.49	.50	4587.41	540	300	360	250		115		3.5
8		.14	.15	4588.62	510	340	300	210		100		—
9		0										—
10		0			530							
11		.36	.4	4590.76	530	330	330	200		120		3.0
12		.31	.34	4592.78	510	340	320	230		120		3.0
13		0			460							—
14		0			480							—
15		.21	.23	4594.50	490	300	310	190		120		2.0
16		.14	.21	4596.04	420	320	300	215		125		2.0
17		0										—
19		.53	.58	4598.54	520	340	305	200		130		4.0
20		.14	.15	4599.84	380	350	330	220		140		—
21		0										
22		.16	.18	4601.21	380	350	300	210		140		2.0
23		.46	.5	4603.58	480	340	310	240		140		4.0
24		.16	.18	4604.89	500	340	310	240		140		2.0
	75											
Average		0.273	0.30		502°F 902°R							

Nomograph Setup

METER VOL. END 4604.89
START 4577.65
SAMPLE VOL. 27.24 ft³

C_{pitot} .837
Stack Press. In. Hg-Gauge
Barometric Pressure 30.64

Percent O₂ =

P_{meter} = C
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H₂O = 6.2 Noz(Actual) = .245
v_s = 38.66
7.15 143.2

Imp. Vol. (End) Vol. (Start) ΔVol. (ml)
#1 132 - 100 = 32
#2 102 - 100 = 2
#3 0 - 0 = 0
Total 34
#4 g(End) g(Start) Δgrams
Silica Gel 143.2 - 140.2 = 3
Total Vol. H₂O 39 ml

73

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 97

TEST NUMBER 10

Vac
in. Hg ft³/min

DATE 3-2-79

Sampling Time
Per Point, MinBefore
AfterLoad Start
6:00-6:51

OPERATOR MVT

FUEL A

SITE G

PROBE LOCATION 5 ft. A

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
1		.45	.42	5205.92	500	90	200		55	70		
2		.52	.44	5207.45		100	200		55	72		
3		.60	.56	5209.15		100	220		56	72		
4		.65	.61	5210.88		110	210		55	72		
5		.72	.67	5212.74		110	200		55	75		
6		.82	.76	5214.65		110	210		55	75		
7		1.2	1.	5216.92		100	190		60	79		
8		1.3	1.2	5219.28		100	195		55	75		
9		1.3	1.2	5221.65		100	185		60	75		
10		1.2	1.1	5223.97		100	190		60	75		
11		.93	.87	5226.05		100	195		60	75		
12		.80	.74	5227.44		95	210		60	79		
13		.40	.37	5229.27		90	190		70	80		
14		.60	.56	5230.91		80	200		70	79		
15		.60	.56	5232.58		90	200		65	80		
16		.72	.68	5234.41		100	230		65	80		
17		.78	.73	5236.29		100	210		65	80		
18		.86	.80	5238.25		105	250		70	80		
19		.93	.88	5240.31		110	260		70	80		
20		.86	.80	5242.26		110	260		80	85		
21		.88	.83	5244.21		90	250		65	83		
22		.80	.74	5246.10		100	270		65	85		
23		.77	.72	5247.93		100	260		65	83		
24		.40	.37	5249.26		100	270		70	85		
72												
Average		0.796	0.74		500°F							

METER VOL. END 5249.26
START 5203.45
SAMPLE VOL. 45.83 ft³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		30.64

Percent O₂ =

Nomograph Setup

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔHg = Noz(Ideal) =
% H₂O = 5.3 Noz(Actual) = .242

45 = 65.44
499 1651
468704

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	143	100	43
#2	106	100	6
#3	0	0	0
Total			49
#4	g(End)	g(Start)	Δgrams
Silica Gel	151.6	142.65	9
Total Vol. H ₂ O			58 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 10.4

TEST NUMBER 16

Vac
in. Hg ft³/min

DATE 3-17-79

OPERATOR B.C.

FUEL A

SITE 0

PROBE LOCATION BCR

Sampling Time
Per Point, Min
5Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
2	520'	.04	.28	41610.50		300	250	120		120		
3		0										
4		.02	.14	41611.89	340	340	300	120		120		
5		0			40							
6		0			415							
7		.06	.42	41614.29		320	270	220		120		
8		.04	.28	41616.20		350	280	250		120		1"
9		0										
10		0										
11		.09	.65	41619.04		300	290	230		120		2.8
12		.05	.36	41621.17								
13		0										
14		0										
15	640'	.07	.50	41624.414		350	280	220		130		2.5
16		.05	.36	41626.60		340	300	220		130		2.0
17		0										
18		0										
19		.11	.78	41629.65		340	310	240		150		3.8
20		0										
21		0										
22		.07	.50	41632.23		330	300	220		150		3.0
23		.05	.36	41634.30		310	320	240		150		2.9
24		.03	.21	41635.85		320	330	240		150		-
	62											
Average		.0567	.403		863R							

METER VOL. END 4635.35
START 4608.45
SAMPLE VOL. 27.4

C_{pitot} Stack Press. Barometric Pressure
In. Hg-Gauge 30.86

Percent O₂ =

Nomenclature Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
H₂O = 3.2 Noz(Actual) = 3.25
V_g = 16.65
P = 1.20

Imp. Vol. (End) Vol. (Start) ΔVol. (ml)
#1 105 - 100 = 5
#2 120 - 101 = 19
#3 0 - 0 =
Total 15
#4 g(End) g(Start) Δgrams
Silica Gel 152.3 - 147.5 = 4.8
Total Vol. H₂O 14.8 ml

75

PARTICULATE

DATA

Leak Check Rate

ISOINETICS = 170

TEST NUMBER 16

Vac
in. Hg ft³/min

DATE 3-17-79

OPERATOR JD

FUEL A

SITE G

PROBE LOCATION Stack

Sampling Time Per Point, Min
3

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
1		.10	.36	5262.84	360	180	200		65	60			
2		.11	.39	5264.25	365	180	220		65	62			
3		.12	.43	5265.71	365	180	220		65	65			
4		.12	.43	5267.23	365	180	220		62	65			
5		.13	.46	5268.73	365	180	240		62	68			
6		.13	.46	5270.29	365	180	250		61	70			
7		.20	.70	5272.15	370	240	250		61	70			
8		.23	.82	5274.20	370	170	250		60	70			
9		.25	.90	5276.30	370	180	255		61	70			
10		.25	.90	5278.41	370	350	220		68	68			
11		.23	.82	5280.47	300	240	230		60	70			
12		.14	.67	5282.31	110	150	260		61	70			
13		.12	.43	5283.74	—	—	—		—	70			
2		.12	.43	5285.28						70			
3		.13	.46	5286.38						70			
4		.14	.50	5288.48						70			
5		.15	.54	5290.15						70			
6		.15	.54	5291.78						70			
7		.22	.78	5293.72						70			
8		.24	.85	5295.80						70			
9		.24	.85	5297.89						70			
10		.22	.78	5299.87						70			
11		.22	.78	5301.80						70			
12		.14	.67	5303.02						70			
	72												
Average		0.173	0.504		325K								

METER VOL. END 5303.02
START 5261.44
SAMPLE VOL. 41.58 ft³

C _{Pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
837		30.86

Percent O₂ =

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =

% H₂O = 2.2 Noz(Actual) = 3.16

U_g = 28.57
γ = 0.53

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	108	100	8
#2	104	100	4
#3	0	0	0
Total			12

#4	g (End)	g (Start)	Δgrams
Silica Gel	151.8	143.2	8.6
Total Vol. H ₂ O			21.6 ml

76

DATA

ISOKINETICS - 10

TEST NUMBER 17

Vac
in. Hg ft³/min

DATE 3-11-77

OPERATOR Sc

FUEL *A*

SITE G

PROBE LOCATION *B.L.R.*

Sampling Time Per Point, Min	5
---------------------------------	---

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
2		.45	.49	4037.856	600	290	250	210		130		2.5
3		.11	.12	4041.28	580	320	275	230		110		-
4		.18	.20	4042.27		320	300	250		145		1
5		0										
6		.58	.64	4045.55	590	290	310	250		130		3
7		.38	.42	4047.82		315	320	260		140		2.5
8		.70	.77	4050.80	590	320	330	280		140		4.0
9		0										
10		0										
11		.62	.66	4053.55		300	340	260		130		3.2
12		.36	.40	4055.72		330	350	280		150		2.2
13		0										
14		0										
15		.65	.71	4058.65	500	310	360	260		150		3.5
16		.35	.39	4060.73		350	340	270		150		2.5
22		.67	.74	4064.06	600	325	350	280		170		4.0
23		.36	.40	4066.26								
24		.20	.22	4067.82		360	350	290		150		2.0
	65											
Average		.432	.470		1047 R							

Nomograph Setup

METER VOL.	END	7667.52	31.4.5000
	START	7631.42	
SAMPLE VOL.		36.20	

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
837		30.86

Percent O₂ %

$P_{\text{meter}} = C =$
 $P_{\text{stack}} = T_{\text{stack}} =$
 $T_{\text{meter}} = \Delta P =$
 $\Delta H_g = \text{Noz (Ideal)} =$
 $\text{H}_2\text{O} = 5.6 \quad \text{Noz (Actual)} =$
 $5.6 = 52.57$

<u>Imp.</u>	<u>Vol. (End)</u>	<u>Vol. (Start)</u>	<u>ΔVol. (ml)</u>
#1	<u>124</u>	- <u>100</u>	= <u>24</u>
#2	<u>102</u>	- <u>100</u>	= <u>2</u>
#3	<u>0</u>	- <u>0</u>	= <u>0</u>
Total			<u>26</u>

#4	$\frac{g(\text{End})}{g(\text{Start})}$	Δgrams
Silica Gel	$\frac{156.5}{141.7}$	14.8
Total Vol. H ₂ O		34.8 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 98

TEST NUMBER 17

Vac
in. Hg ft³/min

DATE 8-1-57

OPERATOR J. D.

FUEL A

SITE G

PROBE LOCATION Stack

Sampling Time
Per Point, Min
3

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
Port A								In	Out			
1		.62	.57	5309.96	547					80		
2		.63	.58	5311.57						80		
3		.63	.58	5313.27						80		
4		.75	.70	5315.15						80		
5		.79	.74	5316.12						80		
6		.89	.83	5319.12						80		
7		.90	.84	5321.12						80		
8		1.21	1.1	5323.39						80		
9		1.30	1.2	5325.76						80		
10		1.30	1.2	5328.18						80		
11		1.30	1.2	5330.49						80		
12		.70	.65	5332.35						80		
Port B												
1		.62	.57	5334.05						80		
2		.68	.64	5335.81						80		
3		.73	.68	5337.63						80		
4		.75	.70	5339.48						80		
5		.87	.82	5341.51						80		
6		.95	.89	5343.52						80		
7		1.0	.92	5345.67						80		
8		1.0	.92	5347.52						80		
9		.95	.87	5349.89						80		
10		.95	.87	5352.00						80		
11		.90	.84	5354.05						80		
12		.82	.76	5355.84						80		
	72											
Average		0.831	0.820		100.7%							

METER VOL. END 5355.84
START 5305.32
SAMPLE VOL. 47.52 ft³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
0.837		30.56

Percent O₂ =

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H₂O = 5.2 Noz(Actual) =
V_g = 69.75
F = 2.0

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	139	100	39
#2	100	100	0
#3	1	0	1
Total			40

#4	g(End)	g(Start)	Δgrams
Silica	155.0	144.4	10.6
Gel			
Total Vol. H ₂ O			54.6 ml

78

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 100%

TEST NUMBER 18

Vac
in. Hg ft³/min

DATE 3/1/75

Sampling Time
Per Point, Min

Before

OPERATOR J.S.

5

After

FUEL 18

SITE 5

PROBE LOCATION 320

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
1		0										
2		.40	.44	4672.35	540	290	260	190		90		3
3		.10	.11	4673.64	520	330	280	210		100		—
4		.20	.22	4675.47	500	320	300	230		110		2
5		0										—
6		.05	.06	4676.42	540	300	310	240		110		4
7		.67	.74	4679.46	550	310	315	210		120		—
8		.14	.15	4680.77	440	310	330	250		120		
9		0										
10		0										
11		.58	.64	4683.59	560	300	330	240		125		3.5
12		.11	.12	4684.89	480	330	335	260		130		—
13		0										
14		0										
15		.67	.74	4687.90	560	310	320	235		130		4.0
16		.13	.14	4689.33								
17		0										
18		0										
19	5 1/2	.74	.82	4692.73	575	310	310	220		140		4.8
20		.11	.12	4694.05		330	320	240		140		—
21		0										3.5
22		.52	.57	4696.68	580	315	315	240		140		
23		.28	.31	4698.72	550	320	320	240		140		2.5
24		.13	.14	4700.10	520	330	320	240		140		—
Average		.32	.35		532							

METER VOL. END 4698.2
START 3154.2
SAMPLE VOL. 1544.0

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-1.0" H ₂ O	30.52

Percent O₂ =

METER CORR.
1.05%

Nomograph Setup

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal)=
V_{H₂O} = 6.7 Noz(Actual)=
V_g = 42.61

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	138	100	38
#2	104	100	4
#3	0	0	0
Total			42
#4	g(End)	g(Start)	Δgrams
Silica Gel	144.4	141.8	2.6
Total Vol. H ₂ O			41.6 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 101.2

TEST NUMBER 10

Vac
in. Hg ft³/min

DATE 3-18-79

OPERATOR RAP

FUEL B

SITE 6

PROBE LOCATION STACK

Sampling Time
Per Point, Min
3

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
5-1	9:30	.57	.72	5362.97	—							6.5
5-2		.70	.88	5364.07	518						*	7.6
3		.78	.90	5366.16	—							—
4	8.5	.96	1.10	5368.83	519							9.4
5		.86	1.02	5371.09	—							9.0
6		1.1	1.23	5373.482	—							10.3
7		1.15	1.30	5375.00	—							11.2
8		1.1	1.23	5378.42	—							10.8
9		1.1	1.23	5380.82	517							10.9
10		1.05	1.20	5383.26	—							10.7
11		1.05	1.20	5385.67	—							—
12		.32	.36	5387.080	—							4.2
E-1	10:35	.49	.55	5388.70	—							5.3
-2		.53	.59	5390.42	519							5.7
3		.64	.72	5392.31	—							6.7
4		.62	.70	5394.15	—							6.6
5		.68	.76	5396.07	—							7.0
6		.83	.92	5398.20	—							8.2
7		1.20	1.32	5400.63	519						*	11.2
8		1.20	1.32	5403.11	—							11.2
9		1.20	1.32	5405.52	—							11.3
10		1.25	1.37	5407.04	519							12.0
11	4.0	1.20	1.32	5411.31	—							11.7
12		1.05	1.15	5413.611	—							10.6
Average		.90	1.01	52.538	519							

METER VOL. END 5413.611
START 5361.073 .70P
SAMPLE VOL. 52.538

C _p tot	Stack Press.	Barometric Pressure
.837	-0.49	30.52

Percent O₂ = 17.2

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =

H₂O = 6.0 Noz(Actual) = .245

80

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	150	100	50
#2	110	100	10
#3	1	0	1

Total

#4	g(End)	g(Start)	Δgrams
Silica Gel	161.4	147.5	11.9

Total Vol. H₂O 72.9 ml

* RESET NOMO

1.6

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 96.6

TEST NUMBER

19

DATE

3-18-79

OPERATOR

R. AP

FUEL

D

SITE

G

PROBE LOCATION

BLANK

Sampling Time
Per Point, Min
5

Vac
in. Hg ft³/min
Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
1	4:23	.09	.58	4714.54	420	320	280		90	128		3.5	
2		0.00											
3		.03	.20	4715.71	400	320	315		98	130		22.0	
4		.03	.20	4716.84	380	330	320			130		22.0	
5		0.00											
6		0.01	.07	4717.74	405	320	320			135		22.0	
7		.11	.75	4720.88	410	320	325			140		5.0	
8		.03	.20	4721.99	390	320	325			142		22.0	
9		0.00											
10		.01	.07	4722.85	400	320	305			148		22.0	
11		.09	.62	4725.63	405	320	300			150		4.3	
12		.04	.27	4727.43	395	330	300			152		3.0	
13		.00											
14		.01	.07	4728.26	400	320	305			155		22.0	
15		.11	.75	4731.25	420	330	310			155		5.8	
16		.04	.27	4733.20									
17		0.00											
18		.03	.22	4734.83	420	310	300			160	*	2.5	
19		.09	.74	4737.84	420	320	300			160		6.0	
20		.04	.27	4739.97	395	325	300			162		3.8	
21		0.00											
22		.07	.56	4742.77	400	315	300			163		5.4	
23		.04	.32	4745.07	410	320	305			166		4.0	
24		.05	.40	4747.495	380	320	305			168		4.2	
Average		.05	.367		403								

METER CORR - 1.0516

* NOMO GRAPH CHANG.

METER VOL. END 4747.495
START 4711.702
SAMPLE VOL. 35.792

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	.36" H ₂ O	30.44

Percent O₂ =

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal) =
% H₂O = 2.6 Noz(Actual) = .375

1/3 = 15.36

81

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	112	100	12
#2	102	100	2
#3	0	0	0
Total			14

#4	q(End)	q(Start)	Δgrams
Silica Gel	1520	147.3	7.7
Total Vol. H ₂ O			21.7 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 101

TEST NUMBER

DATE

OPERATOR

FUEL

SITE

PROBE LOCATION

Sampling Time
Per Point, Min
3

Vac
in. Hg ft³/min
Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F					O ₂ , %	Vac.	
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers				Meter
								In	Out			
Port A												
1		.12	.43	5415.6	359						3.5	
2		.12	.43	5417.31							3.5	
3		.14	.50	5418.85							4.0	
4		.13	.47	5420.39							3.8	
5	+30 sec.	.14	.50	5422.25							4.1	
6	+30 sec.	.15	.55	5424.21							4.5	
7	+15 sec.	.20	.72	5426.23								
8		.22	.80	5428.20								
9		.22	.80	5430.14								
10		.22	.80	5432.12								
11		.20	.72	5434.00								
12		.14	.50	5435.55								
Port B												
1		.11	.40	5437.01								
2		.12	.43	5438.50								
3		.12	.43	5440.04								
4		.13	.47	5441.55								
5		.12	.43	5443.07								
6		.15	.55	5444.73								
7		.21	.75	5446.70								
8		.23	.84	5448.86								
9		.24	.86	5450.93								
10		.22	.80	5451.96								
11		.22	.80									
12		.03	.11	5455.72								
Average		.16	.587	41.430								

Nomograph Setup

METER VOL. END 5455.72
START 5415.6
SAMPLE VOL. ft³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.037		

Percent O₂ =

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H₂O = 2.0 Noz(Actual) = 3.6
y = 27.38
P = .53

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	100	100	0
#2	102	100	2
#3	4	0	4
Total			6
#4	g(End)	g(Start)	Δgrams
Silica Gel	159.2	147.1	12.1
Total Vol. H ₂ O			15.1 ml

82

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 1.41

TEST NUMBER 22

Vac
in. Hg ft³/min

DATE 2-22-70

Sampling Time
Per Point, Min
5

Before
After

OPERATOR SS

FUEL D

SITE C

PROBE LOCATION RR

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
2		.37	.40	4752.84	540	340	290	132		145		2	
3		.12	.13	4754.41	510	340	300	130		135		-	
4		.14	.15	4760.85	510	325	310	130		140		-	
5		0											
6		0											
7		.57	.63	4763.69	540	315	315	130		140		3	
8		.15	.16	4765.21		335	325	125		130		-	
9		0											
10		0											
11		.36	.44	4767.50	530	340	315	130		150		3	
12		.13	.14	4769.07	440	340	320	130		150		-	
13		0											
14		0											
15		.57	.63	4771.83	560	330	320	240		140		3	
16		.15	.16	4773.35	530	350	340	160		150		2	
17		0											
18		0											
19		.73	.80	4776.46	570	340	310	130		160		4	
20		.11	.12	4777	500	350	340	130		150		-	
21		0											
22		0											
23		.35	.48	4780.21	550	330	300	130		160		3	
24		.15	.16	4781.61	510	350	300	130		160		2	
	65												
Average		0.30	0.34		532°F 992°K								

Nomograph Setup

METER VOL. END 4781.61
START 4755.55
SAMPLE VOL. 27.426 ft³ @ 20°C

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		30.141

Percent O₂ =

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H₂O = 6.6 Noz(Actual) =

W_g = 411.50

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	132	100	32
#2	103	100	3
#3	0	0	0
			Total 35

#4	g(End)	g(Start)	Δgrams
Silica Gel	154.2	120.0	34.2
			Total Vol. H ₂ O 41.3 ml

83

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 10%

TEST NUMBER 22

Vac
in. Hg ft³/min

DATE 3-23-79

Sampling Time
Per Point, Min
3.0Before
After

OPERATOR R.A.D.

FUEL D

SITE G

PROBE LOCATION STACK

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
PORT 5	10:10	.49	.54	5472.58	500	—	270		60	62		4.8	
2		.53	.57	5474.35	505	250	280		58	62		4.8	
3		.61	.67	5476.18	505	285	285		60	65		5.0	
4		.68	.75	5478.14	505	290	285		60	63		5.5	
5		.80	.87	5480.25	505	290	290		60	65		6.2	
6		.82	.87	5482.34	510	290	295		58	65		6.2	
7		.90	.95	5484.52	510	270	295		59	65		7.0	
8		.82	.87	5486.63	510	270	295		59	63		6.5	
9		.73	.77	5488.62	485	285	295		59	62		6.0	
10		.56	.60	5490.40	—	290	290		58	62		5.0	
11		.63	.74	5492.35	—	285	285		58	62		5.8	
12		.97	1.03	5494.62	510	290	285		58	62		8.6	
EP 1		.47	.51	5496.30	510	—	250		62	65		4.7	
2		.51	.55	5498.07	505	260	250		55	68		5.0	
3		.51	.55	5499.75	505	280	250		55	68		5.0	
4		.67	.72	5501.62	505	290	250		57	68		6.0	
5		.76	.81	5503.68	510	290	250		57	68		6.5	
6		.87	.95	5505.84	520	290	260		57	68		7.2	
7		1.2	1.30	5508.41	520	290	270		57	69		9.7	
8		1.20	1.30	5510.93	520	285	275		60	70		9.8	
9		1.25	1.35	5513.50	520	300	285		60	70		10.0	
10		1.35	1.45	5516.16	—	300	290		60	70		11.0	
11		1.20	1.30	5518.66	—	310	300		60	72		9.8	
12		.95	1.02	5520.902	—	285	295		60	72		8.2	
	72												
Average		0.814	0.864		508°F 968R								

METER VOL. END 5520.902
START 5471.322
SAMPLE VOL. 49.65 ft³

C pitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.817		30.17

Percent O₂ =

Nomenclature Setup

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal)=
% H₂O = Noz(Actual)=

k = 67.52

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	126	100	26
#2	128	100	28
#3	0	0	0
Total			34

#4	g(End)	g(Start)	Δgrams
Silica Gel	154	1425	115
Total Vol. H ₂ O			45.5 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 93.

TEST NUMBER

DATE

OPERATOR

FUEL

SITE

PROBE LOCATION

Sampling Time
Per Point, Min
5

Before
After

Vac
in. Hg ft³/min

23

3-24-79

B.C.

D

G

Dir. Out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		Δ P _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
1		0										
2		.30	.33	4800.48	540	300	290	120		120		
3		.10	.11	801.65	500	325	290	220		120		
4		.12	.13	803.06	490	320	300	230		120		
5		0										
6		0										
7		.39	.43	805.42	530	200	250	200		125		2
8		.10	.11	806.58	390	260	280	210		125		1
9		0										
10		0										
11		.53	.58	809.32	540	360	290	190		130		3
12		.11	.12	810.52	320	340	300	230		130		
13		0										
14		0										
15		.50	.55	813.19	520	320	310	220		130		3
16		.10	.11	814.23	440	320	310	225		130		
17		0										
18		0										
19		.61	.67	817.12	525	310	310	215		130		3
20		.09	.10	818.28	490	320	315	230		130		
21		0										
22		0										
23		.16	.17	819.59	520	300	320	200		130		
24		.09	.10		490	300	315	220		130		
65												
Average		.246	.270		515°F							
					915°F							

METER VOL. END 4819.89
START 4198.36
SAMPLE VOL. 22.315 ft³ Corr

Pitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.897		29.70

Percent O₂ =

Nomograph Setup
P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal)=
H₂O = 8.0 Noz(Actual)=
V_g = 37.54

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	128	100	28
#2	105	100	5
#3	0	0	0
Total			33
#4	g(End)	g(Start)	Δgrams
Silica Gel	156.4	143.6	12.8
Total Vol. H ₂ O			40.8 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 105.

TEST NUMBER 23

DATE 3-24-78

OPERATOR RAP

FUEL D

SITE G

PROBE LOCATION STACK

Sampling Time Per Point, Min
30

Vac
in. Hg ft³/min
Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
E-1	8:36	.31	.32	5521.40	460	260	250		51	58			3.1
2		.37	.39	5522.84	470	290	250		48	58			3.7
3		.44	.46	5524.43	475	295	260		50	60			4.0
4		.56	.59	5526.25	480	295	270		51	60			4.7
5		.41	.43	5527.72	480	295	275		51	60			3.8
6		.67	.71	5529.68	490	295	285		52	60			5.2
7		1.1	1.15	5532.19	490	300	295		52	60			8.1
8		1.15	1.20	5534.69	490	295	295		52	61			8.3
9		1.15	1.20	5537.21	490	290	295		55	62			8.5
10		1.1	1.15	5539.63	—	290	305		58	62			8.2
11		1.1	1.15	5542.12	—	295	310		60	65			8.2
12		.87	.92	5544.35	—	290	310		60	63			7.0
S-1		.50	.52	5545.99	490	250	250		—	62			4.2
2		.53	.55	5547.70	490	275	270		—	62			4.7
3		.58	.62	5549.53	490	280	280		—	62			5.0
4		.66	.70	5551.44	490	295	295		—	62			5.2
5	10:53	.77	.81	5553.50	490	290	300		—	63			6.0
6		.83	.87	5555.64	490	285	310		—	63			6.3
7		.79	.84	5557.77	490	270	310		—	65			6.2
8		.67	.72	5559.72	485	265	315		—	58			5.8
9		.62	.65	5561.56	485	260	315		—	58			5.1
10		.58	.62	5563.40	—	260	310		—	68			5.0
11		.57	.60	5565.19	—	260	310		—	68			4.9
12		.51	.54	5566.878	—	265	315		—	66			4.7
Average		0.654	0.738		488.4	945.8							

METER VOL. END 5566.878
START 5520.075
SAMPLE VOL. 46.803 ft³

C _{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		29.70

Percent O₂ =

Nomograph Setup

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔHg = Noz(Ideal) =

% H₂O = 6.8
u_s = 60.24
Noz(Actual) = 1.75

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	149	100	49
#2	110	100	10
#3	1	0	1
			Total 60
#4	g(End)	g(Start)	Δgrams
Silica Gel	152.5	141.3	11.2
			Total Vol. H ₂ O 74.2 ml

PARTICULATE

DATA

Leak Check Rate

ISO KINETICS = 90

TEST NUMBER 24

Vac
in. Hg 1.3/min

DATE 3-24-77

OPERATOR

FUEL D

SITE G

PROBE LOCATION Box Out

Sampling Time Per Point, Min
5

Before
After

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O ₂ , %	Vac.
		ΔP _s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers		Meter		
								In	Out			
1		0										
2		0										
3		.09	.10	4852.98	440	240	310	250		120		
4		.11	.12	4854.29	380	320	300	240		125		
5		0										
6		.02	.03	4854.89	520	300	290	240		125		
7		.42	.46	4857.34	530	300	290	240		130		2
8		.10	.11	4858.51	480	320	300	240		130		
9		0										
10		0										
11		.46	.50	4860.97	540	300	300	240		140		2.5
12		.09	.10	4862.21	400	320	310	245		140		
13		0										
14		0										
15		.47	.52	4864.69	510	300	310	240		140		
16		.10	.11	4865.83	380	310	310	250		140		
17		0										
18		0										
19		.56	.62	4868.59	520	305	310	240		150		3
20		.09	.10	4869.58	280	310	320	250		150		
21		0										
22		0										
23		.31	.34	4871.58	520	305	310	215		150		2
24		.08	.09	4872.57	490	310	310	215		150		
	65 1/2											
Average		.223	.246		511°F 471°F							

Nomograph Setup

METER VOL. END 4872.57
START 4851.8
SAMPLE VOL. 20.79

C _P Pitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		29.48

Percent O₂ =

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz (Ideal) =
H₂O = 7.2 Noz (Actual) =
W_S = 35.29

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	127	100	27
#2	102	100	2
#3	0	0	0
Total			29

#4	g (End)	g (Start)	Δgrams
Silica Gel	142.3	138.6	4.3
Total Vol. H ₂ O			33.3 ml

PARTICULATE

DATA

Leak Check Rate

ISOKINETICS = 105.

TEST NUMBER 24

Vac
in. Hg ft³/min

DATE 3-24-79

Sampling Time
Per Point, Min
3Before
After

OPERATOR RKP

FUEL D

SITE C

PROBE LOCATION STACK

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F							O ₂ , %	Vac.
		ΔP _s	Δ H	Meter Reading	Stack	Probe	Oven	Impingers		Meter			
								In	Out				
S-1	14:30	.56	.55	5568.04	490	230	250		60	72		4.2	
2		.61	.60	5570.59	490	280	250		60	72		4.5	
3		.69	.67	5572.44	490	310	250		55	65		5.0	
4		.77	.75	5574.42	490	310	250		58	68		5.5	
5		.78	.77	5576.43	490	295	255		55	65		5.7	
6		.82	.81	5578.49	490	285	260		55	62		6.0	
7		.68	.67	5580.38	490	295	265		57	62		5.1	
8		.62	.61	5582.19	490	295	270		60	62		4.8	
9		.55	.54	5583.87	485	280	275			65		4.5	
10		.61	.60	5585.63	—	290	280			65		4.8	
11		.47	.46	5587.21	—	295	285			65		4.0	
12		.47	.46	5588.72	—	285	285			63		4.0	
E-1		.33	.32	5590.06	480	220	220			62		3.3	
2		.35	.34	5591.41	480	270	230			62		3.4	
3		.37	.36	5592.79	480	280	240			62		3.6	
4		.41	.40	5594.30	480	290	250			60		3.7	
5		.41	.46	5595.85	480	290	250			61		4.1	
6		.53	.51	5597.58	480	290	255			61		4.7	
7		1.1	1.08	5600.00	485	280	265			62		8.0	
8		1.1	1.08	5602.38	485	280	265			62		8.0	
9		1.15	1.14	5604.81	480	275	270			62		8.3	
10		1.15	1.14	5607.29	—	270	270			62		8.3	
11		1.15	1.14	5609.71	—	275	275			63		8.3	
12	12	1.05	1.03	5612.102	—	270	270			63		7.9	
Average		.8700	.675		445R								
					945R								

METER VOL. END
START 5562.184
SAMPLE VOL. 47.232 ft³

C _{fitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
337		29.48

Percent O₂ =

Nomograph Setup

P_{meter} = C
P_{stack} = T_{stack}
T_{meter} = ΔP
ΔH_g = Noz(Ideal)=
H₂O = 6.6
Noz(Actual)=
4.6256

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	148	100	48
#2	109	100	9
#3	2	0	2
Total			58
#4	g(End)	g(Start)	Δgrams
Silica	142.0	136.7	11.3
Gel			
Total Vol. H ₂ O			64.3 ml

PARTICULATE LAB WORKSHEET

TEST NO. 2 (Inlet, Outlet) LOCATION BLR
 Date 2-10-79 Box No. _____ Eng. _____
 Test Description max. J.F. 60,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
 Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		<u>#3</u>	<u>#1</u>	<u>#3</u>		
BEAKER NO.						
DATE WT.						
TARE WT.	1	<u>95.9807</u>	<u>50.2985</u>	<u>0.8063</u>		
	2	<u>95.9804</u>	<u>50.2983</u>	<u>0.8062</u>		
	3	<u>95.9801</u>	<u>50.2981</u>	<u>0.8065</u>		
	4					
AVG.		<u>95.9804</u>	<u>50.2983</u>	<u>0.8063</u>		

POST TEST WTS.

1		<u>96.6208</u>	<u>52.2547</u>	<u>0.9479</u>		
2		<u>96.6208</u>	<u>52.2550</u>	<u>0.9469</u>		
3		<u>96.6207</u>	<u>52.2543</u>	<u>0.9467</u>		
4						
AVG.		<u>96.6208</u>	<u>52.2547</u>	<u>0.9472</u>		
Δ WT.		<u>0.6404</u>	<u>1.9564</u>	<u>0.1409</u>		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 L Mn 2737.7 mgm

LOAD _____ klb/hr
 O₂ _____ %
 REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 2 (Inlet, Outlet) LOCATION STAGE
 Date 2-11-79 Box No. _____ Eng. _____
 Test Description max. O.F.A 60,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Final _____
 Initial _____
 Δ Vlc _____

Impinger Water Vol (ml)

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#4	#2	#4		
BEAKER NO.						
DATE WT.						
TARE WT.	1	102.1440	49.6422	0.9591		
	2	102.1437	49.6410	0.9597		
	3	102.1435	49.6406	0.9590		
	4					
AVG.		102.1437	49.6413	0.9593		

POST TEST WTS.

1		102.1954	49.6469	1.0790		
2		102.1955	49.6468	1.0782		
3		102.1955	49.6455	1.0787		
4						
AVG.		102.1955	49.6464	1.0786		
Δ WT.		0.0518	0.0051	0.1193		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 176.2 mgm

LOAD _____ klb/hr

O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 3 (Inlet, Outlet) LOCATION BLR
 Date 2-11-77 Box No. _____ Eng. _____
 Test Description 60,000 mi off

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#7	#5	#5		
BEAKER NO.						
DATE WT.						
TARE WT.	1	104.3528	50.3073	0.8440		
	2	104.3525	50.3077	0.8440		
	3	104.3524	50.3074	0.8440		
	4					
AVG.		104.3526	50.3075	0.8440		

POST TEST WTS.

	1	104.6858	53.3166	1.0184		
	2	104.6862	53.3163	1.0176		
	3	104.6855	53.3157	1.0179		
	4					
AVG.		104.6858	53.3162	1.0180		
Δ WT.		0.3332	3.0087	0.1740		

Δ Vlc = _____ ml

LOAD _____ klb/hr

Δ DgV = _____ ft³

O₂ _____ %

Δ Mn 3515.9 mcgm

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 3 (Inlet, Outlet) LOCATION STACK
 Date _____ Box No. _____ Eng. _____
 Test Description 60,000 m^3/hr min. OPA

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#8	#6	#6		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.5732	50.1598	0.7382		
	2	95.5735	50.1597	0.7385		
	3	95.5731	50.1595	0.7382		
	4					
AVG.		95.5733	50.1597	0.7382		

POST TEST WTS.

	1	95.6562	50.1865	0.9262		
	2	95.6564	50.1857	0.9265		
	3	95.6557	50.1846	0.9263		
	4					
AVG.		95.6564	50.1856	0.9263		
Δ WT.		0.0831	0.0259	0.1881		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 297.1 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 4 (Inlet, Outlet) LOCATION BLR
 Date 2-16-79 Box No. _____ Eng. _____
 Test Description swing load

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#12	#16	#7		
BEAKER NO.						
DATE WT.						
TARE WT.	1	97.0268	49.6405	0.6955		
	2	97.0288	49.6404	0.6952		
	3	97.0293	49.6406	0.6954		
	4					
AVG.		97.0283	49.6405	0.6954		

POST TEST WTS.

1		97.3957	54.2717	0.8781		
2		97.4245	54.2716	0.8791		
3		97.4183		0.8791		
4		97.4058				
AVG.		97.4111	54.2717	0.8788		
Δ WT.		0.3828	4.6312	0.1834		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 5197.4 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 4 (Inlet, Outlet) LOCATION STACK
 Date 2-16-79 Box No. _____ Eng. _____
 Test Description swing load

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#13	#17	#8		
BEAKER NO.						
DATE WT.						
TARE WT.	1	104.4621	50.2978	0.7901		
	2	104.4609	50.2977	0.7905		
	3	104.4610	50.2973	0.7906		
	4					
AVG.			50.2976	0.7904		

POST TEST WTS.

	1	104.5163	50.3236	0.9636		
	2	104.5094	50.3235	0.9638		
	3	104.4883	50.3237	0.9637		
	4					
AVG.		104.5047	50.3236	0.9637		
Δ WT.		0.0437	0.0260	0.1733		

Δ Vlc = _____ ml LOAD _____ klb/hr
 Δ DgV = _____ ft³ O₂ _____ %
 Δ Mn 243.0 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 5 (Inlet, Outlet) LOCATION BLR
 Date 2-17-79 Box No. _____ Eng. _____
 Test Description 75,000 ^{lb}/hr with reinjection

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#14	#20	#9		
BEAKER NO.						
DATE WT.						
TARE WT.	1	97.7704	50.3060	0.6473		
	2	97.7703	50.3064	0.6475		
	3	97.7704	50.3063	0.6473		
	4					
AVG.		97.7704	50.3064	0.6474		

POST TEST WTS.

1		97.9646	55.7083	0.8318		
2		97.9643	55.7086	0.8323		
3				0.8324		
4						
AVG.		97.9645	55.7085	0.8322		
Δ WT.		0.1941	5.4021	0.1848		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 57810 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 5 (Inlet, Outlet) LOCATION STACK
 Date 2-17-79 Box No. _____ Eng. _____
 Test Description 75,000 lbs/hr with reimpaction

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#15	#21	#10		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.0119	50.1591	0.7432		
	2	95.0121	50.1588	0.7440		
	3	95.0133	50.1591	0.7437		
	4					
AVG.			50.1590	0.7436		

POST TEST WTS.

1		94.9918	50.1698	0.8283		
2		94.9952	50.1703	0.8283		
3		94.9896	50.1704	0.8284		
4		side had a large weight				
AVG.			50.1702	0.8283		
Δ WT.		~ 0.055 estimate	0.0112	0.0847		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 150.9 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 6 (Inlet, Outlet) LOCATION BLR
 Date 2-17-79 Box No. _____ Eng. _____
 Test Description 45,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
 Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#18	#10	#11		
BEAKER NO.						
DATE WT.						
TARE WT.	1	104.3536	95.6496	0.6662		
	2	104.3543	95.6497	0.6662		
	3	104.3539	95.6494	0.6664		
	4					
AVG.		104.3539	95.6496	0.6663		

POST TEST WTS.

1		104.4573	97.8037	0.7696		
2		104.4519	97.8031	0.7684		
3			97.8039	0.7684		
4						
AVG.		104.4546	97.8036	0.7688		
Δ WT.		0.1007	2.1540	0.1025		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 2357.2 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 6 (Inlet, Outlet) LOCATION STACK
 Date 2-17-79 Box No. _____ Eng. _____
 Test Description 45,000

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Final _____
 Initial _____
 Δ Vlc _____

Impinger Water Vol (ml)

1	2	3	Total
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#19	#11	#12		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.9201	105.2098	0.7469		
	2	95.9820	105.2100	0.7468		
	3	95.9815	105.2103	0.7469		
	4					
AVG.		95.9812	105.2100	0.7469		

POST TEST WTS.

	1	96.0254	105.2139	0.8567		
	2	96.0183	105.2133	0.8573		
	3		105.2127	0.8573		
	4					
AVG.		96.0146	105.2133	0.8571		
Δ WT.		0.0334	0.0033	0.1102		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 146.9 mgm

LOAD _____ klb/hr
 O₂ _____ %
 REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 7 (Inlet, Outlet) LOCATION BLR
 Date 2-25-79 Box No. _____ Eng. _____
 Test Description 15,000 fpm/hr

Dry Gas Meter Vol (ft³)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

1	2	3	Total
Final			
Initial			
Δ Vlc			

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#22	#24	#13		
BEAKER NO.						
DATE WT.						
TARE WT.	1	102.1448	50.3518	0.6958		
	2	102.1476	50.3521	0.6937		
	3	102.1469	50.3523	0.6941		
	4					
AVG.		102.1464	50.3521	0.6939		

POST TEST WTS. ↓

	1	102.2749	49.6425	0.9513		
	2		49.6423	0.9515		
	3		49.6420	0.9520		
	4					
AVG.		102.2749	49.6423	0.9516		
Δ WT.		0.1285	0.7098	0.2577		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 1096.0 mgm

LOAD _____ klb/hr
 O₂ _____ %
 REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 7 (Inlet, Outlet) LOCATION STACK
 Date 2-25-79 Box No. _____ Eng. _____
 Test Description 15,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
 Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#23	#25	#14		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.5735	50.1613	0.7901		
	2	95.5744	50.1610	0.7902		
	3	95.5734	50.1609	0.7909		
	4					
AVG.		95.5742	50.1611	0.7904		

POST TEST WTS.

1		96.0939	50.1864	1.1764		
2		96.0934	50.1861	1.1758		
3			50.1857	1.1760		
4						
AVG.		96.0937	50.1861	1.1761		
Δ WT.		0.5195	0.0250	0.3857		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 930.2 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 8 (Inlet, Outlet) LOCATION BLR
 Date 2-25-71 Box No. _____ Eng. _____
 Test Description 75,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		*31	*26	*15		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.1122	50.3074	0.7313		
	2	95.0128	50.3075	0.7314		
	3	95.0117	50.3073	0.7315		
	4					
AVG.		95.0122	50.3074	0.7314		

POST TEST WTS.

	1	95.2012	52.9698	0.9212		
	2	95.2007	52.9704	0.9100		
	3	95.2007	52.9700	0.9109		
	4					
AVG.		95.2009	52.9701	0.9140		
Δ WT.		0.1887	2.6627	0.1826		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 3034.0 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 8 (Inlet, Outlet) LOCATION STACK
 Date 2-25-79 Box No. _____ Eng. _____
 Test Description 75,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#37	#27	#16		
BEAKER NO.						
DATE WT.						
TARE WT.	1	102.1451	50.2992	0.8225		
	2	102.11446	50.2990	0.8229		
	3	102.1446	50.2989	0.8232		
	4					
AVG.		102.1448	50.2990	0.8229		

POST TEST WTS.

	1	102.2406	50.3140	1.0608		
	2	102.2419	50.3136	1.0608		
	3	102.2418	50.3137			
	4					
AVG.		102.2414	50.3138	1.0608		
Δ WT.		0.0966	0.0148	0.2379		

Δ Vlc = _____ ml LOAD _____ klb/hr
 Δ DgV = _____ ft³ O₂ _____ %
 Δ Mn 349.3 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 10 (Inlet, Outlet) LOCATION BLR
 Date 3-2-79 Box No. _____ Eng. _____
 Test Description swing load

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
 Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#41	#29	#17		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.6519	49.6427	0.7321		
	2	95.6518	49.6426	0.7324		
	3	95.6523	49.6420	0.7317		
	4					
AVG.		95.6520	49.6424	0.7321		

POST TEST WTS.

1		95.9435	54.0898	0.9183		
2		95.9424	54.0901	0.9212		
3		95.9428	54.0905	0.9228		
4						
AVG.		95.9429	54.0901	0.9204		
Δ WT.		0.2909	4.4477	0.1883		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 4926.9 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 10 (Inlet, Outlet) LOCATION Stack
 Date 3-2-79 Box No. _____ Eng. _____
 Test Description Swing

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#42	#31	#18		
BEAKER NO.						
DATE WT.						
TARE WT.	1	104.4602	50.1609	0.8454		
	2	104.4605	50.1605	0.8454		
	3	104.4601	50.1604	0.8454		
	4					
AVG.		104.4602	50.1606	0.8456		

POST TEST WTS.

	1	104.8456	50.1864	1.0430		
	2	104.8453	50.1863	1.0455		
	3	104.8450	50.1864	1.0462		
	4					
AVG.		104.8453	50.1864	1.0449		
Δ WT.		0.3861	0.0288	0.1993		

Δ Vlc = _____ ml

LOAD _____ klb/hr

Δ DgV = _____ ft³

O₂ _____ %

Δ Mn 610.2 mgm

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 16 (Inlet, Outlet) LOCATION BLR
 Date _____ Box No. _____ Eng. _____
 Test Description 15.11.11 11:40/11

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
 Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		# <u>39</u>	# <u>33</u>	# <u>19</u>		
BEAKER NO.						
DATE WT.						
TARE WT.	1	<u>95.9809</u>	<u>50.3073</u>	<u>0.6809</u>		
	2	<u>95.9810</u>	<u>50.3069</u>	<u>0.6809</u>		
	3	<u>95.9809</u>	<u>50.3069</u>	<u>0.6810</u>		
	4					
AVG.		<u>95.9809</u>	<u>50.3069</u>	<u>0.6810</u>		

POST TEST WTS.

	1	<u>96.0820</u>	<u>50.9238</u>	<u>0.8490</u>		
	2	<u>96.0827</u>	<u>50.9237</u>	<u>0.8496</u>		
	3	<u>96.0816</u>	<u>50.9244</u>	<u>0.8495</u>		
	4					
AVG.		<u>96.0819</u>	<u>50.9241</u>	<u>0.8494</u>		
Δ WT.		<u>0.1010</u>	<u>0.6171</u>	<u>0.1684</u>		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 8505 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 16 (Inlet, Outlet) LOCATION STACK
 Date _____ Box No. _____ Eng. _____
 Test Description 15,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Final _____
 Initial _____
 Δ Vlc _____

Impinger Water Vol (ml)

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#40	#34	#20		
BEAKER NO.						
DATE WT.						
TARE WT.	1	97.7692	50.2988	0.8455		
	2	97.7691	50.2986	0.8455		
	3	97.7690	50.2987	0.8456		
	4					
AVG.		97.7691	50.2987	0.8455		

POST TEST WTS.

	1	97.9959	50.4011	1.0514		
	2	97.9961	50.4011	1.0513		
	3	97.9959	50.4011	1.0508		
	4					
AVG.		97.9960	50.4011	1.0512		
Δ WT.		0.2269	0.1024	0.2057		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 535.0 mgm

LOAD _____ klb/hr

O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 17 (Inlet, Outlet) LOCATION BLR
 Date _____ Box No. _____ Eng. _____
 Test Description 75,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
 Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#45	#43	#21		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.6500	50.1600	.6406		
	2	95.6515	50.1598	.6407		
	3	95.6514	50.1596	.6410		
	4					
AVG.		95.6510	50.1598	0.6408		

POST TEST WTS.

	1	95.9276	55.1611	0.8063		
	2	95.9260	55.1606	0.8060		
	3	95.9262	55.1613	0.8057		
	4					
AVG.		95.9266	55.1610	0.8060		
Δ WT.		0.2756	5.0012	0.1652		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 5442.0 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 17 (Inlet, Outlet) LOCATION STACK
 Date _____ Box No. _____ Eng. _____
 Test Description 75,000 lbs/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Final _____
 Initial _____
 Δ Vlc _____

Impinger Water Vol (ml)

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#46	#44	#22		
BEAKER NO.						
DATE WT.						
TARE WT.	1	102.1443	49.6418	0.8282		
	2	102.1474	49.6419	0.8284		
	3	102.1483	49.6415	0.8285		
	4					
AVG.		102.1479	49.6416	0.8284		

POST TEST WTS.

	1	102.2683	49.7403	1.1139		
	2	102.2672	49.7397	1.1148		
	3	102.2677	49.7398	1.1152		
	4					
AVG.		102.2677	49.7398	1.1146		
Δ WT.		0.1198	0.0982	0.2862		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 504.2 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 18 (Inlet, Outlet) LOCATION RLR
 Date _____ Box No. _____ Eng. _____
 Test Description 25 ft³ 104 ft³

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Final _____
 Initial _____
 Δ Vlc _____

Impinger Water Vol (ml)

1	2	3	Total
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#47	#35	#23		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.0129	45.5753	0.7222		
	2	95.0120	45.5742	0.7219		
	3	95.0127	45.5747	0.7220		
	4					
AVG.		95.0125	45.5746	0.7220		

POST TEST WTS.

1		95.2199	45	0.9122		
2		95.2186	44.6805	0.9138		
3		95.2182	44.6746	0.9137		
4			44.6809			
AVG.		95.2189	44.6822	0.9132		
Δ WT.		0.2064	4.1056	0.1912		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 45032 mgm

LOAD _____ klb/hr
 O₂ _____ %
 REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 18 (Inlet, Outlet) LOCATION MECH
 Date _____ Box No. _____ Eng. _____
 Test Description 75,000 1hr/hr

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		# 48	# 36	# 24		
BEAKER NO.						
DATE WT.						
TARE WT.	1	104.4593	97.0303	0.8558		
	2	104.4588	97.0297	0.8558		
	3	104.4593	97.0298	0.8558		
	4					
AVG.		104.4591	97.0299	0.8558		

POST TEST WTS.

	1	104.5802	97.1283	1.1300		
	2	104.5805	97.1277	1.1324		
	3	104.5800	97.1282	1.1313		
	4					
AVG.		104.5802	97.1281	1.1312		
Δ WT.		0.1211	0.0982	0.2754		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 494.7 mgm

LOAD _____ klb/hr
 O₂ _____ %
 REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 19 (Inlet, Outlet) LOCATION 31R
 Date _____ Box No. _____ Eng. _____
 Test Description _____

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
 Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		<u>49</u>	<u>37</u>	<u>25</u>		
BEAKER NO.						
DATE WT.						
TARE WT.	1	<u>105.2148</u>	<u>105.2129</u>	<u>0.7285</u>		
	2	<u>105.2141</u>	<u>105.2126</u>	<u>0.7185</u>		
	3	<u>105.2140</u>	<u>105.2124</u>	<u>0.7286</u>		
	4					
AVG.		<u>105.2143</u>	<u>105.2126</u>	<u>0.7285</u>		

POST TEST WTS.

1						
2		<u>105.3148</u>	<u>105.8600</u>	<u>1.0105</u>		
3		<u>105.3148</u>	<u>105.8607</u>	<u>1.0113</u>		
4		<u>105.3144</u>	<u>105.8605</u>	<u>1.0110</u>		
AVG.		<u>105.3147</u>	<u>105.8603</u>	<u>1.0109</u>		
Δ WT.		<u>0.1004</u>	<u>0.6479</u>	<u>0.2824</u>		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 1030.7 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 19 (Inlet, Outlet) LOCATION STACK
 Date _____ Box No. _____ Eng. _____
 Test Description _____

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#50	#38	#26		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.9823	104.3553	0.8371		
	2	95.9818	104.3550	0.8371		
	3	95.9816	104.3551	0.8370		
	4					
AVG.		95.9819	104.3551	0.8371		

POST TEST WTS.

	1	96.0333	104.3789	1.0004		
	2	96.0329	104.3774	1.0004		
	3	96.0332	104.3775	1.0004		
	4					
AVG.		96.0331	104.3779	1.0004		
Δ WT.		0.0512	0.0228	0.1633		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 2373 mgm

LOAD _____ klb/hr

O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 22 (Inlet, Outlet) LOCATION BLR
 Date _____ Box No. _____ Eng. _____
 Test Description _____

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Final _____
 Initial _____
 Δ Vlc _____

Impinger Water Vol (ml)

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		* 57	* 51	* 27		
BEAKER NO.						
DATE WT.						
TARE WT.	1	104.4600	50.2995	0.7215		
	2	104.4608	50.2996	0.7215		
	3	104.4602	50.2993	0.7215		
	4					
AVG.		104.4603	50.2995	0.7215		

POST TEST WTS.

1	104.6293	53.3980	0.8838		
2	104.6309	53.3984	0.8865		
3	104.6309	53.3993	0.8876		
4					
AVG.	104.6304	53.3986	0.8860		
Δ WT.	0.1701	3.0631	0.1645		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 3433.7 mgm

LOAD _____ klb/hr
 O₂ _____ %
 REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 22 (Inlet, Outlet) LOCATION MECH
 Date _____ Box No. _____ Eng. _____
 Test Description _____

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#55	#52	#28		
BEAKER NO.						
DATE WT.						
TARE WT.	1	97.0285		0.9784		
	2	97.0283	49.6418	0.9784		
	3	97.0283	49.6415	0.9783		
	4		49.6416			
AVG.		97.0284	49.6416	0.9784		

POST TEST WTS.

	1	97.1470	49.7048	1.2322		
	2	97.1508	49.7047	1.2357		
	3	97.1522	49.7046	1.2369		
	4					
AVG.		97.1500	49.7047	1.2349		
Δ WT.		0.1216	0.0631	0.2558		

Δ Vlc = _____ ml LOAD _____ klb/hr
 Δ DgV = _____ ft³ O₂ _____ %
 Δ Mn 441.2 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 23 (Inlet, Outlet) LOCATION BLR

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft³)

Final _____
Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		*59	*53	*29		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.5742	102.11459	0.7264		
	2	95.5754	102.1456	0.7265		
	3	95.5748	102.1457	0.7265		
	4					
AVG.		95.5748	102.1457	0.7265		

POST TEST WTS.

1		95.7679	104.7056	0.8703		
2		95.7687	104.7066	0.8720		
3		95.7692	104.7079	0.8725		
4						
AVG.		95.7684	104.7067	0.8716		
Δ WT.		0.1938	2.5610	0.1451		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 2899.9 mgm

LOAD _____ kIb/hr
O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 23 (Inlet, Outlet) LOCATION MEZT
 Date _____ Box No. _____ Eng. _____
 Test Description _____

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#60	#54	#30		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.0118	104.3550	0.9745		
	2	95.0120	104.3546	0.9744		
	3	95.0119	104.3550	0.9746		
	4					
AVG.		95.0119	104.3549	0.9745		

POST TEST WTS.

	1	95.1074	104.4331	1.2226		
	2	95.1101	104.4327	1.2258		
	3	95.1107	104.4326	1.2270		
	4					
AVG.		95.1094	104.4328	1.2251		
Δ WT.		0.0975	0.0779	0.2506		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 426.0 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 24 (Inlet, Outlet) LOCATION BLR
 Date _____ Box No. _____ Eng. _____
 Test Description _____

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Final _____
 Initial _____
 Δ Vlc _____

Impinger Water Vol (ml)

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#61	#55	#31		
BEAKER NO.						
DATE WT.						
TARE WT.	1	95.6515	50.1604	0.7368		
	2	95.6519	50.1598	0.7361		
	3	95.6513	50.1599	0.7371		
	4					
AVG.		95.6516	50.1600	0.7367		

POST TEST WTS.

1		95.8124	52.4478	0.8639		
2		95.8127	52.4499	0.8658		
3		95.8138	52.4496	0.8654		
4						
AVG.		95.8130	52.4441	0.8650		
Δ WT.		0.1614	2.3391	0.1283		

Δ Vlc = _____ ml
 Δ DgV = _____ ft³
 Δ Mn 2628.8 mgm

LOAD _____ klb/hr
 O₂ _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 24 (Inlet, Outlet) LOCATION STACK
 Date _____ Box No. _____ Eng. _____
 Test Description _____

Dry Gas Meter Vol (ft³)

Final _____
 Initial _____
 Δ DgV _____

Impinger Water Vol (ml)

Final _____
 Initial _____
 Δ Vlc _____

1	2	3	Total

CONTENT	H ₂ O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.		#62	#56	#32		
BEAKER NO.						
DATE WT.						
TARE WT.	1	97.7696		0.9771		
	2	97.7694	50.3076	0.9770		
	3	97.7687	50.3070	0.9771		
	4		50.3072			
AVG.		97.7692	50.3073	0.9771		

POST TEST WTS.

1	97.8816	50.3547	1.1828		
2	97.8831	50.3550	1.1849		
3	97.8834	50.3550	1.1844		
4					
AVG.	97.8827	50.3549	1.1840		
Δ WT.	0.1135	0.0476	0.2069		

Δ Vlc = _____ ml LOAD _____ klb/hr
 Δ DgV = _____ ft³ O₂ _____ %
 Δ Mn 368.0 mgm REMARKS: _____

SECTION 3.0
GASEOUS DATA

	PAGE
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3.3 SO _x DATA SUMMARY	143
3.4 SO _x DATA SHEETS	144

GASEOUS EMISSION SUMMARY

Location: ABMA TEST SITE 6

Fuel: COAL A & B

TEST NO.	DATE	LOAD %	CONDITIONS	BLR					STACK					SO ₂ ppm Dry	SO ₃ ppm Dry	NOTES
				O ₂ % Dry	CO ₂ % Dry	CO ppm Dry	NO ppm Dry	NO ₂ ppm Wet	HC ppm Wet	O ₂ % Dry	CO ₂ % Dry	CO ppm Dry	NO ppm Dry			
2	2-11-79	85.0	max OFA 25% H ₂ O	8.9	10.2		321			9.9	9.4		317			coal A
3	2-11-79	79.6	low OFA	8.7	10.5		380									
4	2-16-79	76.7	swing load	10.4	9.4		486	-8		10.0	9.5		477			
5	2-17-79	101.7	reinjection	7.0	12.0		350									
6	2-17-79	57.4	as found	10.5	9.4		478									
7	2-25-79	17.3	as found	14.6	4.4		364	-3		14.8	4.4		384			Boiler smoked at low load
8	2-25-79	99.6	as found	6.6	11.6		306	0		6.9	11.3		320			coal B
9	2-28-79	72.3	swing load - SASS	10.2	9.0		330			10.1	9.3		344	622	5	coal A SASS
10	2-2-79	86.0	swing load	9.7	9.8		442	3		9.1	10.6		403			
11A	3-3-79	77.9	Vary O ₂	8.0	11.0		402	0	19	8.9	10.2		455			
B				7.6	11.0		458	0	20							
C				6.7	12.2		358	0	23	7.3	11.4		316			
D				6.0	12.8		300	0	24	6.9	11.6		313			

NOTE: All parts per million (ppm) figures are corrected to a 3% O₂ constant dilution factor

#15900

GASEOUS EMISSION SUMMARY

Location: ABMA TEST SITE 6

Fuel: COAL A+D

TEST NO.	DATE	LOAD %	CONDITIONS	BLR						STACK				SO ₂ ppm Dry	SO ₃ ppm Dry	NOTES
				O ₂ % Dry	CO ₂ % Dry	CO ppm Dry	NO ppm Dry	NO ₂ ppm Wet	HC ppm Wet	O ₂ % Dry	CO ₂ % Dry	CO ppm Dry	NO ppm Dry			
12	3-3-79	98.3	Vary O ₂	7.2	11.6		418	0	39	7.4	11.4		348			COAL A
13			↓	6.8	12.2		381	0	41	6.9	12.0		371			
14				6.1	12.4		363	0	35	6.6	12.2		350			
17				5.8	12.4		320	0	38	6.0	12.4		312			
18			↓	5.0	13.2		304	0	39	5.8	12.8		296			
15	3-16-79	87.4	as found - swing	8.7	10.6		457	0	-	9.9	9.4		457	544	3	SASS / SO _x
16	3-17-79	15.8	as found	15.2	4.6		391	0	-	15.7	4.4		414			
17	3-17-79	97.7	as found - without fuel	7.4	11.5		347	-13	-	8.2	10.4		366			↓
18	3-18-79	97.1	as found	7.5	11.6		415	7	-	7.9	11.2		399			COAL D
19	3-18-79	16.6	as found	15.1	4.1		381	0	-	15.4	3.8		347			
20	3-21-79	77.7	as found swing	9.2	10.4		316	-11	-	9.8	9.7		313	540	5	SASS-SO _x
22	3-23-79	82.4	as found swing	9.1	10.3		414	-14		8.7	10.7		400			
23	3-24-79	75.5	High O ₂ A	8.0	11.2		423	-41	-	9.0	10.2		406			
24	3-24-79	78.3	Low O ₂ A	7.3	11.7		336	-57	-	8.4	11.0		345			↓

NOTE: All parts per million (ppm) figures are corrected to a 3% O₂ constant dilution factor

GASEOUS EMISSION SUMMARY

Location: TEST SITE G

Fuel: COAL D

TEST NO.	DATE	LOAD %	CONDITIONS	BLR OUTLET						STACK				SO ₂ ppm Dry	SO ₃ ppm Dry	NOTES
				O ₂ % Dry	CO ₂ % Dry	CO ppm Dry	NO ppm Dry	NO ₂ ppm Wet	HC ppm Wet	O ₂ % Dry	CO ₂ % Dry	CO ppm Dry	NO ppm Dry			
25A	3-25-79	99.5	Vary O ₂	6.0	12.8		360			7.1	12.2		389			
B			↓	5.7	13.2		388			7.0	11.6		399			
C				5.2	13.2		353			6.2	12.4		341			
D			↓	4.0	14.4		296			6.0	13.0		312			
26A	3-25-79	77.8	Vary O ₂	8.0	11.4		402			8.8	11.0		399			
B			↓	7.0	12.2		348			7.6	11.8		310			
C				6.0	13.2		300			7.4	11.6		305			
D			↓	5.2	13.7		265			6.3	12.8		257			

NOTE: All parts per million (ppm) figures are corrected to a 3% O₂ constant dilution factor

GASEOUS EMISSIONS DATA

FUEL A

LOAD 60,000

CONDITIONS *High OFA*

DATA TAKEN BY *BC.*

[illegible][illegible]

GASEOUS EMISSIONS DATA

FUEL A

LOAD *Swing*

CONDITIONS *as Purch*

DATA TAKEN BY *BC*

[illegible][illegible]

125

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE G
TEST NO. 5 + 6
DATE 2-17-79

FUEL A
LOAD 7,600, 41,000
CONDITIONS as found
DATA TAKEN BY JOE

[illegible]

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

GASEOUS EMISSIONS DATA

FUEL B
LOAD 15,000
CONDITIONS as found
DATA TAKEN BY DB

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

GASEOUS EMISSIONS DATA

FUEL B
LOAD 75,000
CONDITIONS as found
DATA TAKEN BY JOR

[illegible]

128

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE 6
TEST NO. 9
DATE 2-28-79

FUEL A

LOAD Swing

CONDITIONS As Amended

DATA TAKEN BY JOE

[illegible]

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

GASEOUS EMISSIONS DATA

DATA TAKEN BY BC

AVERAGES

A 10x10 grid with 10 columns shaded with diagonal lines.

GASEOUS EMISSIONS DATA

FUEL A
LOAD 75,000
CONDITIONS Very Dry
DATA TAKEN BY BC

[illegible]

AVERAGES

A 3x15 grid with 5 shaded columns. The shaded columns are the 5th, 7th, 8th, 10th, 11th, and 13th columns from the left. The other columns are white.

132

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

15900

GASEOUS EMISSIONS DATA

TEST SITE 6

FUEL A

TEST NO 15

LOAD SLINGING

DATE 3-16-79

CONDITIONS Normal

DATA TAKEN BY Job

Probe Position	Time	O ₂ (dry)	CO ₂ (dry)	CO		NO		HOT LINE SAMPLES, PPM (WET)								REMARKS	
				ppm(dry)		ppm(dry)		NOx		NO		NO ₂		HC			
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor		
1,3,5,6	11:40	8.0	11.4	-	-	340	472										
7	12:14	11.8	8.2	-	-	230	424										
1,3,5,6	12:44	8.8	9.8			320	473	275	406	275	400		0				
7	13:10	9.5	9.8			310	487										CO ₂ read
1,3,5,6	13:10	9.0	10.4			300	452										
7	14:24	9.6	9.6			285	447										
1,3,5,6	14:57	8.8	10.8			305	461										
7	15:40	9.5	10.0			300	471										
3,5,6	16:20	9.0	10.4			290	437					0		0			

[illegible]

133

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

15900

GASEOUS EMISSIONS DATA

FUEL A
LOAD 15,000
CONDITIONS as found
DATA TAKEN BY R. A. P.

BLR		15.2	4.6				391						
STACK		15.7	4.4				414						

GASEOUS EMISSIONS DATA

FUEL A

LOAD 75000

CONDITIONS without flash pink etc

DATA TAKEN BY JOE

AVERAGES													
BLR	7.4	11.5				397				-13			
STACK	8.2	10.9				366							

135

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

GASEOUS EMISSIONS DATA

FUEL *D*

LOAD 75,000

CONDITIONS as found

DATA TAKEN BY *JD*

Probe Position	Time	O2 (dry)	CO2 (dry)	CO		NO		HOT LINE SAMPLES, PPM (WET)								REMARKS	
				ppm(dry)		ppm(dry)		NOx		NO		NO2		HC			
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor		
7	10:06	8.1	11.2	—	—	270	378										
1-5	10:21	7.6	11.4	—	—	310	417										
7	10:36	7.7	11.4	—	—	305	416										
1-5	10:51	7.4	11.6	—	—	332	440										
7	11:25	8.0	10.9	—	—	290	402										
1-5	12:00	7.5	11.7	—	—	290	387					5	7				

AVERAGES													
B.L.R.	7.5	11.6					45					7	
S.I.A.L.R.	7.9	11.2					347						

136

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

15900

GASEOUS EMISSIONS DATA

FUEL 7

LOAD 1500

CONDITIONS *as per*

DATA TAKEN BY R.C.

[illegible]

AVERAGES												
B.P.	15.1	4.1			38'					0		
STROKE	15.4	3.8			38"							

137

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

GASEOUS EMISSIONS DATA

FUEL 2

LOAD 500 lbs

CONDITIONS as found

DATA TAKEN BY WCS

AVERAGES													
BLR		9.2	10.4				9.6					-11	
STACK		9.8	9.1				3.93						

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

GASEOUS EMISSIONS DATA

FUEL D

LOAD *Storing*

CONDITIONS *as found*

DATA TAKEN BY VJ

[illegible][illegible]

Cl. R.H. 4/6

139

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

GASEOUS EMISSIONS DATA

DATA TAKEN BY *JD*

[illegible][illegible]

141

NOTE: Parts per million (ppm) figures are corrected to .3% O₂

KVB

GASEOUS EMISSIONS DATA

TEST SITE G
 TEST NO 25 + 26
 DATE 3-25-79

FUEL D
 LOAD 75,000
 CONDITIONS Vary O₂
 DATA TAKEN BY BC

Probe Position	Time	O ₂ (dry)	CO ₂ (dry)	CO		NO		HOT LINE SAMPLES, PPM (WET)								REMARKS	
				ppm(dry)		ppm(dry)		NO _x		NO		NO ₂		HC			
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor		
A	1-5	7:40	6.0	12.8	—	—	300	360									Boiler Out
	7	7:55	7.1	12.2	—	—	300	359									Stack
B	1-5	8:05	5.7	13.2	—	—	330	388									
	7	8:20	7.0	11.6	—	—	310	399									
C	1-5	8:30	5.2	13.2	—	—	310	353									
	7	8:45	6.2	12.4	—	—	280	341									
D	1-5	9:00	4.0	14.4	—	—	280	296									
	7	9:15	6.0	13.0	—	—	260	312									
Load changed TEST #26 60,000																	
A	1-5	9:40	8.0	11.4	—	—	290	402									
	7	9:55	8.8	11.0	—	—	270	399									
B	1-5	10:05	7.0	12.2	—	—	270	348									
	7	10:20	7.6	11.8	—	—	230	310									
C	1-5	10:30	6.0	13.2	—	—	250	300									
	7	10:45	7.4	11.6	—	—	230	305									
D	1-5	10:55	5.2	13.7	—	—	232	265									
	7	11:10	6.3	12.8	—	—	210	257									

AVERAGES

142

NOTE: Parts per million (ppm) figures are corrected to 3% O₂

SOx DATA SUMMARY - SITE G

[illegible]

Local Six 6

SOx DATA SHEET

Test # 1+2 Test 3

Date 2-8-79 Probe Location & Probe Length Port #2 13" ΔP=.07 24" ΔP=.07Unit # 5 Fuel A Load swing ~ 54 KlbsTest Description: Swing Load - Test 1+2 about 60K Test 3 Load 40K

Test No. #9	Box No.	Sample Time	Meter Temp. (T)	Meter (P) Press.	Meter Reading	(P) Baro. Press.	Port	Purge Time	O2
1	2	0.0	128	0	0.0	30.5	2		
	1B	13.59.5	130	↓	1.00			60	10.0
2	1	0.0	130	↓	0.0	↓	↓		
	BB	15.18.3	130	↓	1.00			60	
3	1	0.0	130	↓	0.0	↓	↓		
	1C	13.39.0	130	↓	1.00			45	

SAMPLED BY

N = H₂SO₄ = .0214Test # 1 (1B)Test # 2 method 6Test # 3 (1C)

	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.00977			.00968			.00977		
Dilution Factor F	10	1		5	1		10	1	
Blank B	0			0			0		
Averages									
Ml. of Titrant A	8.3	.75		16.1	.55		8.7	.65	
	8.3			16.3			8.8		
	8.3			16.2			8.7		
Averages									
460 + T	587			590			590		
Sample Vol. V	1			1			1		
F + p									
A - B	8.3	.75		16.2	.55		8.74	.65	

TITRATED BY

$$SO_2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(F+p)}$$

$$SO_2 = \frac{(8.3)(.00977)(10)(587)24}{(1)(30.5)}$$

$$SO_2 = \boxed{375.8} \quad SO_3 = \boxed{3.4}$$

$$SO_3 = \frac{(.75)(.00977)(1)(587)24}{(1)(30.5)}$$

$$SO_2 @ 3\% O_2 = \underline{617}$$

$$SO_3 @ 3\% O_2 = \underline{6}$$

$$SOx @ 3\% O_2 = \underline{623}$$

$$SO_2 = \frac{(16.2)(.00968)(5)(590)24}{(1)(30.5)}$$

$$SO_2 = \boxed{364.0}$$

$$SO_3 = \frac{() () () () 24}{() ()}$$

$$SO_3 = \boxed{2.5}$$

$$SO_2 @ 3\% O_2 = \underline{598}$$

$$SO_3 @ 3\% O_2 = \underline{4}$$

$$SOx @ 3\% O_2 = \underline{602}$$

$$SO_2 = \frac{(8.74)(.00977)(10)(590)24}{(1)()}$$

$$SO_2 = \boxed{396.4}$$

$$SO_3 = \frac{() () () () 24}{() ()}$$

$$SO_3 = \boxed{2.9}$$

$$SO_2 @ 3\% O_2 = \underline{651}$$

$$SO_3 @ 3\% O_2 = \underline{5}$$

$$SOx @ 3\% O_2 = \underline{656}$$

SHELL METHOD

Local Site G

SOx DATA SHEET

Date 3-16-79 Probe Location & Probe Length BLR OUT PORT #2 - Site G

Unit # _____ Fuel _____ Load _____

Test Description: _____

Test No.	Box No.	Sample Time	Meter Temp. (T)	Meter (P) Press.	Meter Reading	(P) Baro. Press.	Port	Purge Time	O2
15A	1	14:31	108	— 0 —	0.000	30.73	2	15:05	
		14:57	114		1.5000			15:35	
15B	2	14:59	115		0.000			15:35	
		15:18	118		1.500			16:05	

SAMPLED BY

Test # 15ATest # 15B

Test # _____

	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.0097								
Dilution Factor F	20	1		20	1				
Blank B									
Averages									
Ml. of Titrant A	6.3	.8		6.7	1.0				
	6.3			6.6					
	6.5			6.7					
Averages	6.4			6.7	1.0				
460 + T	571			576.5					
Sample Vol. V	1.500			1.500					
F + P	30.73			30.73					
A - B	6.4	.8		6.7	1.0				

TITRATED BY

$$SO_2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$$

$$SO_2 = \frac{(6.4)(.0097)(20)(571)(24)}{(1.500)(30.73)}$$

$$SO_2 = \boxed{369.} \quad SO_3 = \boxed{2.3}$$

$$SO_3 = \frac{(.8)(.0097)(1)(571)(24)}{(1.5)(30.73)}$$

$$SO_2 @ 3\% O_2 = \underline{541.4}$$

$$SO_3 @ 3\% O_2 = \underline{3.7}$$

$$SOx @ 3\% O_2 = \underline{544.8}$$

145

$$SO_2 = \frac{(6.7)(.0097)(20)(576.5)(24)}{(1.500)(30.73)}$$

$$SO_2 = \boxed{390}$$

$$SO_3 = \frac{(1)(.0097)(1)(576.5)(24)}{(1.5)(30.73)}$$

$$SO_3 = \boxed{2.9}$$

$$SO_2 @ 3\% O_2 = \underline{572.2}$$

$$SO_3 @ 3\% O_2 = \underline{4.3}$$

$$SOx @ 3\% O_2 = \underline{576.5}$$

$$SO_2 = \frac{(\quad)(\quad)(\quad)(\quad)(24)}{(\quad)(\quad)}$$

$$SO_2 = \boxed{\quad}$$

$$SO_3 = \frac{(\quad)(\quad)(\quad)(\quad)(24)}{(\quad)(\quad)}$$

$$SO_3 = \boxed{\quad}$$

$$SO_2 @ 3\% O_2 = \underline{\quad}$$

$$SO_3 @ 3\% O_2 = \underline{\quad}$$

$$SOx @ 3\% O_2 = \underline{\quad}$$

20700 0.11

METHOD #6

Local Side G

SOx DATA SHEET

Date 3-16-79 Probe Location & Probe Length BLR OUT -

Unit # Fuel Load

Test Description:

Test No.	Box No.	Sample Time	Meter Temp. (T)	Meter (P) Press.	Meter Reading	(P) Baro. Press.	Port	Purge Time	O2
150	#6-1	16:05	120	-0-	0.000	30.73	2	16:16	
		16:15	120		1.000			16:31	
150	#6-2	16:35	120		0.000			—	
		16:45	120		1.000			—	

SAMPLED BY

Test # 6-1

Test # 6-2

Test #

	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.0095								
Dilution Factor F	5	1		5	1				
Blank B									
Averages									
Ml. of Titrant A	16.5 16.6 16.7	.2		17.1 17.2 16.9	.3				
Averages	16.6	.2		17.1	.3				
460 + T	580			580					
Sample Vol. V	1.000			1.000					
P + p	30.73			30.73					
A - B	16.6			17.1	.3				

150 $\frac{5.924 \times 10^{-5}}{16/4^3} \cdot SO_2$

150 $\frac{6.103 \times 10^{-5}}{16/4^3} \cdot SO_2$

$$SO_2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$$

$$SO_2 = \frac{(16.6)(.0095)(5)(580)24}{(1)(30.73)}$$

$$SO_2 = \boxed{357.2} \quad SO_3 = \boxed{.9}$$

$$SO_3 = \frac{(.2)(.0095)(1)(580)24}{(1)(30.73)}$$

$$\begin{aligned} SO_2 @ 3\% O_2 &= 524.0 \\ SO_3 @ 3\% O_2 &= 1.3 \\ SOx @ 3\% O_2 &= 525.3 \end{aligned}$$

146

(over)

$$SO_2 = \frac{(17.1)(5)(.0095)(580)24}{(1)(30.73)}$$

$$SO_2 = \boxed{367.9}$$

$$SO_3 = \frac{(.3)(.0095)(1)(580)24}{(1)(30.73)}$$

$$SO_3 = \boxed{1.3}$$

$$\begin{aligned} SO_2 @ 3\% O_2 &= 539.8 \\ SO_3 @ 3\% O_2 &= 1.9 \\ SOx @ 3\% O_2 &= 541.7 \end{aligned}$$

$$SO_2 = \frac{(\quad)(\quad)(\quad)(\quad)24}{(\quad)(\quad)}$$

$$SO_2 = \boxed{\quad}$$

$$SO_3 = \frac{(\quad)(\quad)(\quad)(\quad)24}{(\quad)(\quad)}$$

$$SO_3 = \boxed{\quad}$$

$$\begin{aligned} SO_2 @ 3\% O_2 &= \quad \\ SO_3 @ 3\% O_2 &= \quad \\ SOx @ 3\% O_2 &= \quad \end{aligned}$$

Local TEST SITE G

SCx DATA SHEET

Date 3-21-79 Probe Location & Probe Length 3'Unit # 5 Fuel COAL D Load SwingTest Description: METHOD #6

Test No.	Box No.	Sample Time	Meter Temp. (T)	Meter (P) Press.	Meter Reading	(P) Baro. Press.	Port	Purge Time	O2
20A	6A	11:45	106	0	0.000	30.40	2	11:57	
		11:55	108		1.000			12:12	
20B	6B	12:25	113		0.000	30.40	2	12:37	
		12:35	114		1.000			12:52	

SAMPLED BY

STACK GAS DP = -0.10

sample @ 0.1 g/min

Test # 20ATest # 20B

Test #

	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	0.0095								
Dilution Factor F	5	1		5	1				
Blank B									
Averages									
Ml. of Titrant A	16.0	0.3		17.8	0.4				
	16.0			17.8					
	16.2			17.8					
Averages	16.1			17.8					
460 + T	567			573.5					
Sample Vol. V	1000			1000					
P + p	30.40			30.40					
A - B	16.1	0.3		17.8	4				

TITRATED BY

$$C_{SO_2} = 5.643 \times 10^{-5} \text{ lb/ft}^3$$

$$SO_2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$$

$$SO_2 = \frac{(16.1)(0.0095)(5)(567)(24)}{(1)(30.4)}$$

$$SO_2 = \boxed{340.2} \quad SO_3 = \boxed{1.3}$$

$$SO_3 = \frac{(1.3)(0.0095)(1)(567)(24)}{(10)(30.4)}$$

$$SO_2 @ 3\% O_2 = \underline{520.5}$$

$$SO_3 @ 3\% O_2 = \underline{2.0}$$

$$SO_x @ 3\% O_2 = \underline{522.5}$$

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$$C_{SO_2} = 5.772 \times 10^{-5} \text{ lb/ft}^3$$

$$SO_2 = \frac{(17.8)(0.0095)(10)(573.5)(24)}{(10)(30.4)}$$

$$SO_2 = \boxed{382.8}$$

$$SO_3 = \frac{(4)(0.0095)(10)(573.5)(24)}{(10)(30.4)}$$

$$SO_3 = \boxed{1.7}$$

$$SO_2 @ 3\% O_2 = \underline{585.7}$$

$$SO_3 @ 3\% O_2 = \underline{2.6}$$

$$SO_x @ 3\% O_2 = \underline{588.3}$$

$$SO_2 = \frac{(\quad)(\quad)(\quad)(\quad)(24)}{(\quad)(\quad)}$$

$$SO_2 = \boxed{\quad}$$

$$SO_3 = \frac{(\quad)(\quad)(\quad)(\quad)(24)}{(\quad)(\quad)}$$

$$SO_3 = \boxed{\quad}$$

$$SO_2 @ 3\% O_2 = \underline{\quad}$$

$$SO_3 @ 3\% O_2 = \underline{\quad}$$

$$SO_x @ 3\% O_2 = \underline{\quad}$$

SHELL METHOD

Local Site G

SOx DATA SHEET

Date 3-21-79 Probe Location & Probe Length 3'

Unit # _____ Fuel _____ Load _____

Test Description: _____

Test No.	Box No.	Sample Time	Meter Temp. (T)	Meter (P) Press.	Meter Reading	(P) Baro. Press.	Port	Purge Time	O2
20C	2	13:07	118	-0-	0.000	30.40	PORT #2		
		—	119		1.500				
200	1	13:39	119		0.000				
		14:03	119		1.700				

SAMPLED BY _____

Test # 20CTest # 200

Test # _____

	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.0097								
Dilution Factor F	20	1		20	1				
Blank B									
Averages									
Ml. of Titrant A	5.9	2.0		6.5	1.8				
	5.9			6.5					
	5.4			6.6					
Averages	5.7			6.5	1.8				
460 + T	578			579					
Sample Vol. V	1.500			1.700					
P + p	30.40			30.40					
A - B	5.7			6.5	1.8				

$$SO_2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$$

$$SO_2 = \frac{(5.7)(.0097)(20)(578)(24)}{(1.500)(30.40)}$$

$$SO_2 = \boxed{336} \quad SO_3 = \boxed{5.9}$$

$$SO_3 = \frac{(2)(.0097)(1)(518)(24)}{(1.5)(30.40)}$$

$$SO_2 @ 3\% O_2 = \underline{514.1}$$

$$SO_3 @ 3\% O_2 = \underline{7.0}$$

$$SOx @ 3\% O_2 = \underline{523.1}$$

$$SO_2 = \frac{(6.5)(.0097)(20)(579)(24)}{(30.40)(1.700)}$$

$$SO_2 = \boxed{339}$$

$$SO_3 = \frac{(1.8)(.0097)(1)(519)(24)}{(30.4)(1.7)}$$

$$SO_3 = \boxed{4.7}$$

$$SO_2 @ 3\% O_2 = \underline{518.6}$$

$$SO_3 @ 3\% O_2 = \underline{7.2}$$

$$SOx @ 3\% O_2 = \underline{525.8}$$

$$SO_2 = \frac{(\quad)(\quad)(\quad)(\quad)(24)}{(\quad)(\quad)}$$

$$SO_2 = \boxed{\quad}$$

$$SO_3 = \frac{(\quad)(\quad)(\quad)(\quad)(24)}{(\quad)(\quad)}$$

$$SO_3 = \boxed{\quad}$$

$$SO_2 @ 3\% O_2 = \underline{\quad}$$

$$SO_3 @ 3\% O_2 = \underline{\quad}$$

$$SOx @ 3\% O_2 = \underline{\quad}$$

SECTION 4.0
PARTICULATE SIZE DISTRIBUTION

	PAGE
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4.3 BAHCO	157

KVB

BRINK CASCADE IMPACTOR DATA SHEET

TEST NO. 5 LOAD 76,000
 TEST SITE ABMA G % O₂ 7%
 TEST DATE 2-11-71 FUEL K
 SAMPLE LOCATION BLR OUT SPECIAL CONDITIONS Penetration

GAS VELOCITY DETERMINATION

PITOT TUBE ΔP 0.28 BAROMETRIC PRESS in. Hg, P_{bar} 30.95
 GAS TEMP. °R, T_s 960 GAS STATIC PRESS in. H₂O -1.0
 PITOT CORRECTION FACTOR, C_p 0.837 GAS STATIC PRESS in. Hg abs, P_s 30.85
 MOLECULAR WT. FLUE GAS, MW_s 29.4

$$V_s = 85.48 C_p \left(\frac{T_s \Delta P}{P_s MW_s} \right)^{1/2} = \underline{38.93} \text{ ft/sec}$$

IMPACTOR FLOW RATE DETERMINATION

NOZZLE DIAMETER inches, D_n 0.08
 NOZZLE AREA ft², A_n 3.491×10^{-5} $A_n = \pi (D_n/24)^2$
 $Q_n = V_s A_n 60 = \underline{0.0815} \text{ ft}^3/\text{min}$ at nozzle
 $Q_c = Q_s \left(\frac{P_s MW_s}{1.3 T_s} \right)^{1/2} = \underline{0.0695} \text{ ft}^3/\text{min}$ corrected to calibration conditions
 PRESSURE DROP ACROSS IMPACTOR FROM CALIBRATION CURVE 235 in. H₂O
 OPERATING VACUUM (corrected for static pressure of duct) 245 in. H₂O

ISOKINETICS DETERMINATION

	SAMPLE TIME (θ)	METER READING (V_m)	METER TEMP (T_m)
INITIAL	0	0.00	86
FINAL	23.7	1.00	86
Δ	23.7	1.00	86

$$\% H_2O = \underline{6.0} \%$$

$$I = \frac{1.667 T_s V_m P_{bar}}{\theta T_m V_s P_s A_n \left(1 - \frac{\% H_2O}{100} \right)} = \underline{97} \%$$

KVB

BRINK CASCADE IMPACTOR LAB WORKSHEET

TEST NO. 5

LOCATION Port #5 15" into a port

TEST DATE 2-17-79

ENGINEER Mike Jackson

TEST DESCRIPTION Brink at Boiler Out

PRE TEST WEIGHTS (GRAMS)

PLATE NO.		CYCLONE	1	2	3	4	5	FINAL FILTER
DATE WT.		Beaker #9						
TARE WT.	1	64.5866	3.5113	3.0934	3.4985	3.4647	3.9021	0.0350
	2	64.5867	3.5107	3.0929	3.4647	3.4642	3.9020	0.0351
	3	64.5865	3.5108	3.0930	3.4979	3.4640	3.9018	0.0350
	4				3.4919			
AVERAGE		64.5866	3.5109	3.0931	3.4981	3.4643	3.9020	0.0350

POST TEST WEIGHTS (GRAMS)

DATE WT.	Beaker #9							
GROSS WT.	1	64.7131	3.5179	3.0959	3.4996	3.4654	3.9030	0.0404
	2	64.7129	3.5172	3.0955	3.4996	3.4648	3.9028	0.0394
	3	64.7131	3.5174	3.0954	3.5000	3.4650	3.9024	0.0399
	4							
AVERAGE		64.7130	3.5175	3.0956	3.4997	3.4651	3.9027	0.0399

NET TEST RESULTS (MILLIGRAMS)

NET WT.	0.1264	0.0066	0.0025	0.0016	0.0008	0.0007	0.0049
PERCENT	83.1	4.6	1.7	1.1	0.6	0.5	3.4

TOTAL NET WEIGHT 143.5 mgm

KVB

BRINK CASCADE IMPACTOR DATA REDUCTION

TEST NO. 5 LOAD 75,000
 TEST SITE ABMA G % O₂ 7
 TEST DATE 2/17/79 FUEL A
 SAMPLE LOCATION Bir Out SPECIAL CONDITIONS Reinjection

Op - Density of particles 2.5 g/cm³
 μ - Viscosity of flue gas 2.75 × 10⁻⁴ Poise
 Mws - Molecular wt. flue gas 29.4 g/g mole
 ΔP_I - Pressure drop across impactor 23.5 in H₂O
 Ps - Absolute stack pressure 30.88 in. Hg
 Ts - Absolute stack temperature 960 °R
 Qs - Actual flow rate at stack conditions .07 ft³/min
 Vm - Dry gas volume 1.00 SCF
 Mn - Total particulate mass 143.5 mgm
 Cn - Total concentration 2.216 grains/SCF
 I - Percent isokinetics 97 %
 Vs - Gas velocity 38.93 ft/sec.
 Dn - Nozzle diameter 0.08 in.

Stage Number	CYCLONE	1	2	3	4	5	FINAL FILTER
Dj - Jet Diameter, cm		.2490	0.1775	0.1396	0.0946	0.0731	
Fj - Press. factor, n.d.		.0210	0.0273	0.0395	0.0903	0.3277	
Ds, $\overline{S_0}$ Stokes diameter, μm		3.04	1.75	1.16	0.56	0.32	
D _{A,50} Aerodynamic diameter, μm		4.92	2.88	1.95	1.00	0.61	
D _{AI,50} Aerodynamic impaction diameter, μm		5.13	3.09	2.15	1.20	0.81	
Mn - Particulate mass, mgm	126.4	6.6	2.5	1.6	0.8	0.7	4.9
% - Percent of Total	88.1	4.6	1.7	1.1	0.6	0.5	3.4
Cumulative percent	11.9	7.3	5.6	4.5	3.9	3.4	
Cn - Concentration, grains/SCF	1.95	0.10	0.04	0.02	0.01	0.01	0.08
Cumulative concentration, grains/SCF	1.95	2.05	2.09	2.11	2.12	2.13	2.21

KVB

BRINK CASCADE IMPACTOR DATA SHEET

TEST NO. 17 LOAD 75,000
 TEST SITE C % O₂ _____
 TEST DATE 3-17-79 FUEL A
 SAMPLE LOCATION BLR OUT Port #2 SPECIAL CONDITIONS W.O. ReInjection

GAS VELOCITY DETERMINATION

PITOT TUBE ΔP .26 BAROMETRIC PRESS in. Hg, P_{bar} 30.80
 GAS TEMP. °R, T_s 1015 GAS STATIC PRESS in. H₂O -1.0 H₂O
 PITOT CORRECTION FACTOR, C_p .837 GAS STATIC PRESS in. Hg abs, P_s 30.73
 MOLECULAR WT. FLUE GAS, MW_s 29.0

$$V_s = 85.48 C_p \left(\frac{T_s \Delta P}{P_s M W_s} \right)^{1/2} = \underline{38.93} \text{ ft/sec}$$

IMPACTOR FLOW RATE DETERMINATION

NOZZLE DIAMETER inches, D_n .076
 NOZZLE AREA ft², A_n 3.1503×10^{-5} $A_n = \pi (D_n/24)^2$
 $Q_n = V_s A_n 60 = \underline{.073} \text{ ft}^3/\text{min at nozzle}$
 $Q_c = Q_s \left(\frac{P_s M W_s}{1.3 T_s} \right)^{1/2} = \underline{.060} \text{ ft}^3/\text{min corrected to calibration conditions}$
 PRESSURE DROP ACROSS IMPACTOR FROM CALIBRATION CURVE 17.2 in. H₂O
 OPERATING VACUUM (corrected for static pressure of duct) 18.2 in. H₂O

ISOKINETICS DETERMINATION

	SAMPLE TIME (θ)	METER READING (V _m)	METER TEMP (T _m)
INITIAL	0	0.000	110
FINAL	34.45"	1.300	110
Δ	34.75	1.300	110

$$\% H_2O = \underline{5.0} \%$$

$$I = \frac{1.667 T_s V_m P_{bar}}{\theta T_m V_s P_s A_n (1 - \frac{\% H_2O}{100})} = \underline{95.5} \%$$

KVB

BRINK CASCADE IMPACTOR LAB WORKSHEET

TEST No. 17 LOCATION Port #2 Boiler Outlet
 TEST DATE 3-17-79 ENGINEER Russ
 TEST DESCRIPTION Brink port #2 Boiler without flash venturi

PRE TEST WEIGHTS (GRAMS)

PLATE NO.		CYCLONE	1	2	3	4	5	FINAL FILTER
DATE WT.								
TARE WT.	1	0.1541	3.5112	3.0937	3.4474	3.4644	3.9025	0.0352
	2	0.1547	3.5108	3.0932	3.4472	3.4641	3.9016	0.0349
	3	0.1547	3.5106	3.0930	3.4473	3.4641	3.9016	0.0351
	4							
AVERAGE		0.1547	3.5104	3.0933	3.4473	3.4642	3.9017	0.0351

POST TEST WEIGHTS (GRAMS)

DATE WT.								
GROSS WT.	1	0.3171	3.5243	3.0974	3.4496	3.4656	3.9028	0.0453
	2	0.3173	3.5247	3.0972	3.4494	3.4656	3.9026	0.0451
	3	0.3169	3.5241	3.0972	3.4495	3.4657	3.9026	0.0453
	4							
AVERAGE		0.3171	3.5241	3.0973	3.4496	3.4656	3.9027	0.0452

NET TEST RESULTS (MILLIGRAMS)

NET WT.	0.1574	0.0132	0.0040	0.0032	0.0014	0.0010	0.0001
PERCENT	87.8	7.4	2.2	1.2	0.78	0.56	0.06

TOTAL NET WEIGHT 174.3 mgm

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#15900

KVB

BRINK CASCADE IMPACTOR DATA REDUCTION

TEST NO. 17 LOAD 75,000
 TEST SITE ABMAG % O₂ 7%
 TEST DATE 3/17/79 FUEL A
 SAMPLE LOCATION Blr. Out Port 2 SPECIAL CONDITIONS W.O. Reinj.

ρ_p - Density of particles 2.5 g/cm³
 μ - Viscosity of flue gas 2.75 × 10⁻⁴ poise
 MW_s - Molecular wt. flue gas 29.0 g/g mole
 ΔP_I - Pressure drop across impactor 17.2 in H₂O
 P_s - Absolute stack pressure 30.73 in. Hg
 T_s - Absolute stack temperature 1015 °R
 Q_s - Actual flow rate at stack conditions .06 ft³/min
 V_m - Dry gas volume 1.3 SCF
 M_n - Total particulate mass 179.3 mgm
 C_n - Total concentration 2.130 grains/SCF
 I - Percent isokinetics 95.5 %
 V_s - Gas velocity 38.93 ft/sec.
 D_n - Nozzle diameter 0.076 in.

Stage Number	CYCLONE	1	2	3	4	5	FINAL FILTER
D _j - Jet Diameter, cm		0.2490	0.1775	0.1396	0.0946	0.0731	
F _j - Press. factor, n.d.		0.0210	0.0273	0.0395	0.0903	0.3277	
D _{s, 50} Stokes diameter, μm		3.29	1.89	1.26	0.61	0.35	
D _{A, 50} Aerodynamic diameter, μm		5.32	3.12	2.11	1.08	0.66	
D _{AI, 50} Aerodynamic impaction diameter, μm		5.54	3.33	2.33	1.30	0.88	
M _n - Particulate mass, mgm	157.4	13.2	4.0	2.2	1.4	1.0	0.1
% - Percent of Total	87.8	7.4	2.2	1.2	0.78	0.56	0.06
Cumulative percent	12.2	4.8	2.6	1.4	0.62	0.06	
C _n - Concentration, grains/SCF	14.07	0.16	0.05	0.03	0.03	0.01	0.00
Cumulative concentration, grains/SCF	14.07	14.23	14.28	14.31	14.34	14.35	14.35

SITE G

SASS GRAVIMETRICS

Test 9	10μ	13.1823	21.06% Passing
	3μ	1.7872	10.36% Passing
	1μ	0.5809	6.88% Passing
	Filter	<u>1.1490</u>	
	Total	16.6994	

Test 15	10μ	22.9985	27.52% Passing
	3μ	6.1673	8.10% Passing
	1μ	1.6766	2.80% Passing
	Filter	<u>0.8931</u>	
	Total	31.7355	

Test 20	10μ	56.4322	50.19% Passing
	3μ	30.8089	23.00% Passing
	1μ	25.1032	0.85% Passing
	Filter	<u>0.9585</u>	
	Total	113.3028	

KVB
6990-01
July 12, 1979

Sample No.	<u>K-23144</u>	<u>K-23145</u>	<u>K-23146</u>
Description	Fly Ash G-5 2/17/79	Fly Ash G-8 2/25/79	Fly Ash G-17 3/17/79

Bahco Particle
Size Determination

% Through #100 (149 Microns)	26.1	33.3	40.3
---------------------------------	------	------	------

Results:	<u>Terminal Velocity</u>	<u>Diameter (Microns)</u>	<u>%Smaller</u>	<u>Diameter (Microns)</u>	<u>% Smaller</u>	<u>Diameter (Microns)</u>	<u>%Smaller</u>
	112.	29.	12.7	26.	18.5	27.	24.0
	79.	24.	10.9	22.	16.2	22.	21.4
	31.	15.	7.1	14.	10.4	14.	14.5
	12.3	9.5	4.2	8.6	6.4	8.8	8.7
	4.15	5.5	2.3	5.0	4.0	5.1	4.8
	0.96	2.6	0.9	2.4	2.0	2.5	1.9
	0.35	1.6	0.3	1.4	0.9	1.5	0.7

Density, gms/cc (On #100 Mesh Material Only)	1.91	2.32	2.18
---	------	------	------

Screen Sizing

% Through #10	100.0	100.0	100.0
16	96.6	95.8	97.5
30	64.8	64.6	76.2
50	39.8	45.2	54.8
100	26.1	33.3	40.3
200	14.9	21.8	25.9
325	9.9	15.1	18.8

KVB
6990-01
July 12, 1979

Sample No.	<u>K-23147</u>	<u>K-23143</u>
Sample Description	Fly Ash G-18 3/18/79	Fly Ash G-4 2/16/79

Bahco Particle
Size Determination

% Through #100 (149 Microns)	32.6	37.2
---------------------------------	------	------

Results: Terminal Velocity	Diameter (Microns)	%Smaller	Diameter (Microns)	%Smaller
112.	26.	20.5	26.	21.3
79.	22.	18.2	22.	19.0
31.	14.	12.5	14.	13.1
12.3	8.8	7.5	8.7	8.0
4.15	5.1	4.0	5.0	4.7
0.96	2.4	1.7	2.4	2.0
0.35	1.4	0.5	1.5	0.8

Density, gms/cc (On #100 Mesh Material Only)	2.47	2.27
--	------	------

Screen Sizing

% Through #10	100.0	100.0
16	97.0	98.0
30	73.3	76.7
50	49.1	53.3
100	32.6	37.2
200	20.0	22.8
325	13.6	15.8

SECTION 5.0
FUEL AND ASH ANALYSIS

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COMMERCIAL TESTING & ENGINEERING CO.

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6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample
reported to us

Coal

Test No.: 2
Test Site: G

Sample taken at

Sample taken by

KVB, Inc.

Date sampled

2/11/79

Date received

5/3/79

Analysis report no. 71- 31076

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	4.55	xxxxx
% Ash	9.44	9.89
% Volatile	35.68	37.38
% Fixed Carbon	50.33	52.73
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12639	13242
% Sulfur	0.72	0.75

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>	
Initial Deformation	xxxx °F	xxxx °F	
Softening (H = W)	xxxx °F	xxxx °F	H - Cone Height
Softening (H = 1/2 W)	xxxx °F	xxxx °F	W - Cone Width
Fluid	xxxx °F	xxxx °F	

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173



KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal

Test No.: 3
Test Site: G

Sample taken at ----

Sample taken by KVB, Inc.

Date sampled 2/11/79

Date received 5/3/79

Analysis report no. 71- 31075

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	4.40	xxxxx
% Ash	5.91	6.18
% Volatile	35.79	37.44
% Fixed Carbon	53.90	56.38
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	13224	13833
% Sulfur	0.81	0.85

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = 1/2 W)	xxxx °F	xxxx °F
Flow	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

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R. A. HOUSER, Manager, Midwest Division



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KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No.: 4
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/16/79	
Date received	5/3/79	

Analysis report no. 71- 31077

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	5.57	xxxxx
% Ash	7.65	8.10
% Volatile	34.66	36.70
% Fixed Carbon	52.12	55.20
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12864	13623
% Sulfur	0.60	0.64

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>
Initial Deformation	xxxx °F	xxxx °F
Softening (H=W)	xxxx °F	xxxx °F
Softening (H= 1/2 W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H --- Cone Height
W --- Cone Width

Respectfully submitted,
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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal

Sample taken at ----

Sample taken by KVB, Inc.

Date sampled 2/17/79

Date received 5/3/79

Test No.: 5
Test Site: G

Analysis report no. 71- 31074

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	7.56	xxxxx
% Ash	10.05	10.87
% Volatile	31.80	34.40
% Fixed Carbon	50.59	54.73
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12036	13020
% Sulfur	0.85	0.92

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>	
Initial Deformation	xxxx °F	xxxx °F	H = Cone Height W = Cone Width
Softening (H = W)	xxxx °F	xxxx °F	
Softening (H = 1/2 W)	xxxx °F	xxxx °F	
Fluid	xxxx °F	xxxx °F	

Respectfully submitted,
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KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at -----
Sample taken by KVB, Inc.
Date sampled 2/17/79
Date received 5/3/79

Test No.: 6
Test Site: G

Analysis report no. 71- 31000

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	3.16	XXXXX
% Ash	7.05	7.28
% Volatile	37.23	38.44
% Fixed Carbon	52.56	54.28
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	13254	13687
% Sulfur	0.86	0.89

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>
Initial Deformation	XXXX °F	XXXX °F
Softening (H = W)	XXXX °F	XXXX °F
Softening (H = ½ W)	XXXX °F	XXXX °F
Fluid	XXXX °F	XXXX °F

H = Cone Height
W = Cone Width

Respectfully submitted,
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A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal

Sample taken at ----

Sample taken by KVB, Inc.

Date sampled 2/25/79

Date received 5/3/79

Test No.: 7
Test Site: G

Analysis report no. 71- 31080

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	3.12	xxxxx
% Ash	4.57	4.72
% Volatile	39.33	40.60
% Fixed Carbon	52.98	54.68
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	13797	14241
% Sulfur	1.16	1.20

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>		<u>Oxidizing</u>	
Initial Deformation	xxxx °F		xxxx °F	
Softening (H + W)	xxxx °F		xxxx °F	
Softening (H - W)	xxxx °F		xxxx °F	
Fluid	xxxx °F		xxxx °F	

H Cone Height
W Cone Width

Respectfully submitted,
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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal

Test No.: 8
Test Site: G

Sample taken at ----

Sample taken by KVB, Inc.

Date sampled 2/25/79

Date received 5/3/79

Analysis report no. 71- 31078

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	2.91	xxxxx
% Ash	4.27	4.40
% Volatile	38.62	39.78
% Fixed Carbon	54.20	55.82
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	13922	14339
% Sulfur	1.46	1.50

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>	
Initial Deformation	xxxx °F	xxxx °F	
Softening (H=W)	xxxx °F	xxxx °F	
Softening (H=½W)	xxxx °F	xxxx °F	H = Cone Height
Fluid	xxxx °F	xxxx °F	W = Cone Width

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OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at Test Site G
Sample taken by KVB, Inc.
Date sampled 2/28/79
Date received 5/3/79

Test No. 9
Sample: A
Test Site: G
Date taken 2/28/79

Analysis report no. 71- 30996 page 1 of 2

PROXIMATE ANALYSISAs Rec'd Dry Basis

% Moisture	4.32	xxxxx
% Ash	7.24	7.57
% Volatile	36.72	38.38
% Fixed Carbon	51.72	54.05
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	13117	13709
% Sulfur	0.81	0.85

ULTIMATE ANALYSISAs Rec'd Dry Basis

% Moisture	4.32	xxxxx
% Carbon	73.76	77.09
% Hydrogen	4.90	5.12
% Nitrogen	0.84	0.88
% Chlorine	0.12	0.13
% Sulfur	0.81	0.85
% Ash	7.24	7.57
% Oxygen(diff)	8.01	8.36
	<u>100.00</u>	<u>100.00</u>

FUSION TEMPERATURE OF ASH

Reducing

Initial Def., IT ----	2700+°F
Softening, ST -----	2700+°F
Softening, HT -----	2700+°F
Fluid, FT -----	2700+°F

FORMS OF SULFUR

% Pyritic	0.12	0.13
% Sulfate	0.03	0.03
% Organic	0.66	0.69

HARDGROVE GRINDABILITY INDEX: 41 FREE SWELLING INDEX: 2-1/2

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 284-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No.	9
		Sample:	A
		Test site:	G
Sample taken at	Test site G	Date taken:	2/28/79
Sample taken by	KVB, Inc.		
Date sampled	2/28/79		
Date received	5/3/79		

Analysis report no. 71- 30996 page 2 of 2

MINERAL ANALYSIS OF ASH	Percent Weight Ignited Basis
Silica, SiO ₂	51.40
Alumina, Al ₂ O ₃	32.80
Titania, TiO ₂	1.39
Ferric oxide, Fe ₂ O ₃	6.99
Lime, CaO	2.11
Magnesia, MgO	1.02
Potassium oxide, K ₂ O	2.23
Sodium oxide, Na ₂ O	0.52
Sulfur trioxide, SO ₃	0.99
Phos. pentoxide, P ₂ O ₅	0.18
Strontium Oxide, SrO	0.05
Barium Oxide, BaO	0.24
Manganese Oxide, Mn ₂ O ₄	0.01
Undetermined	0.07
	<u>100.00</u>

Alkalies as Na₂O, Dry Coal Basis = 0.15
Silica Value = 83.55
Base: Acid Ratio = 0.15

Fouling Index = 0.08
Slagging Index = 0.13

ESTIMATED VISCOSITY at critical viscosity
Temperature of ----- °F = ----- Poises
T Temperature = 2820 °F

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 3/2/79
Date received 5/3/79

Test No.: 10
Test Site: G
Sample: A

Analysis report no. 71- 31072

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	3.90	xxxxx
% Ash	8.57	8.92
% Volatile	34.89	36.31
% Fixed Carbon	52.64	54.77
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12837	13358
% Sulfur	0.93	0.97

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = 1/2 W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division



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KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No. 15
Sample taken at	Test Site G	Sample: A
Sample taken by	KVB, Inc.	Test Site: G
Date sampled	3/17/79	Date taken 3/17/79
Date received	5/3/79	

Analysis report no. 71- 30992 page 1 of 2

PROXIMATE ANALYSIS

	<u>As Rec'd</u>	<u>Dry Basis</u>
% Moisture	4.22	xxxxx
% Ash	9.50	9.92
% Volatile	34.95	36.49
% Fixed Carbon	51.33	53.59
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12649	13206
% Sulfur	0.68	0.71

ULTIMATE ANALYSIS

	<u>As Rec'd</u>	<u>Dry Basis</u>
% Moisture	4.22	xxxxx
% Carbon	71.62	74.78
% Hydrogen	4.66	4.87
% Nitrogen	1.12	1.17
% Chlorine	0.07	0.07
% Sulfur	0.68	0.71
% Ash	9.50	9.92
% Oxygen(diff)	8.13	8.48
	<u>100.00</u>	<u>100.00</u>

FUSION TEMPERATURE OF ASH

Reducing

Initial Def., IT ----	2700+°F
Softening, ST -----	2700+°F
Softening, HT -----	2700+°F
Fluid, FT -----	2700+°F

FORMS OF SULFUR

% Pyritic	0.05	0.06
% Sulfate	0.04	0.04
% Organic	0.59	0.61

HARDGROVE GRINDABILITY INDEX: 41 FREE SWELLING INDEX: 2

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No. 15
		Sample: A
Sample taken at	Test site G	Test site: G
		Date taken: 3/17/79
Sample taken by	KVB, Inc.	
Date sampled	3/17/79	
Date received	5/3/79	

Analysis report no. 71- 30992 page 2 of 2

MINERAL ANALYSIS OF ASHPercent Weight Ignited Basis

Silica, SiO ₂	52.83
Alumina, Al ₂ O ₃	31.52
Titania, TiO ₂	1.58
Ferric oxide, Fe ₂ O ₃	6.84
Lime, CaO	1.19
Magnesia, MgO	1.09
Potassium oxide, K ₂ O	2.47
Sodium oxide, Na ₂ O	0.48
Sulfur trioxide, SO ₃	0.80
Phos. pentoxide, P ₂ O ₅	0.14
Strontium Oxide, SrO	0.08
Barium Oxide, BaO	0.23
Manganese Oxide, Mn ₂ O ₃	0.02
Undetermined	0.73
	<u>100.00</u>

Alkalies as Na₂O, Dry Coal Basis = 0.21
Silica Value = 85.28
Base: Acid Ratio = 0.14

Fouling Index = 0.07
Slagging Index = 0.10

ESTIMATED VISCOSITY at critical viscosity
Temperature of ---- °F = ---- Poises
T_{max} Temperature = 2845 °F

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 3/17/79
Date received 5/3/79

Test No.: 16
Test Site: G
Sample: A

Analysis report no. 71- 31071

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	4.02	xxxxx
% Ash	7.63	7.95
% Volatile	34.86	36.32
% Fixed Carbon	53.49	55.73
	100.00	100.00
Btu/lb.	12965	13508
% Sulfur	0.74	0.77

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = 1/2 W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601

AREA CODE 312 726-8434



PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 3/17/79
Date received 5/3/79

Test No.: 17
Test Site: G
Sample: A

Analysis report no. 71- 31073

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	3.88	xxxxx
% Ash	7.41	7.71
% Volatile	35.33	36.76
% Fixed Carbon	53.38	55.53
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	13103	13632
% Sulfur	0.82	0.85

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>	
Initial Deformation	XXXX °F	XXXX °F	
Softening (H = W)	XXXX °F	XXXX °F	
Softening (H = 1/2 W)	XXXX °F	XXXX °F	
Fluid	XXXX °F	XXXX °F	

H Cone Height
W Cone Width

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COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 284-1173

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 3/18/79
Date received 5/3/79

Test No. 18
Test Site: G
Sample: D

Analysis report no. 71- 31079

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	5.04	xxxxx
% Ash	8.94	9.41
% Volatile	34.03	35.84
% Fixed Carbon	51.99	54.75
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12488	13151
% Sulfur	0.69	0.73

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>
Initial Deformation	°F	°F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½ W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division



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KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 3/18/79
Date received 5/3/79

Test No.: 19
Test Site: G
Sample: D

Analysis report no. 71- 30998

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	4.53	xxxxx
% Ash	6.52	6.83
% Volatile	36.91	38.66
% Fixed Carbon	52.04	54.51
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12989	13605
% Sulfur	0.85	0.89

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = 1/2 W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H -- Cone Height
W -- Cone Width

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at Test Site G
Sample taken by KVB, Inc.
Date sampled 3/21/79
Date received 5/3/79

Test No. 20
Sample: D
Test Site: G
Date taken 3/21/79

Analysis report no. 71- 30997 page 1 of 2

PROXIMATE ANALYSISAs Rec'd Dry Basis

% Moisture	4.81	xxxxx
% Ash	6.95	7.30
% Volatile	36.47	38.31
% Fixed Carbon	51.77	54.39
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12860	13510
% Sulfur	0.69	0.72

ULTIMATE ANALYSISAs Rec'd Dry Basis

% Moisture	4.81	xxxxx
% Carbon	72.43	76.09
% Hydrogen	4.90	5.15
% Nitrogen	1.04	1.09
% Chlorine	0.05	0.05
% Sulfur	0.69	0.72
% Ash	6.95	7.30
% Oxygen(diff)	9.13	9.60
	<u>100.00</u>	<u>100.00</u>

FUSION TEMPERATURE OF ASHReducing

Initial Def., IT ----	2700+°F
Softening, ST -----	2700+°F
Softening, HT -----	2700+°F
Fluid, FT -----	2700+°F

FORMS OF SULFUR

% Pyritic	0.10	0.10
% Sulfate	0.00	0.00
% Organic	0.59	0.62

HARDGROVE GRINDABILITY INDEX: 35 FREE SWELLING INDEX: 2-1/2

Respectfully submitted,
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OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample identification
by **KVB, Inc.**

Kind of sample reported to us	Coal	Test No.	20
		Sample:	D
Sample taken at	Test site G	Test site:	G
		Date taken:	3/21/79
Sample taken by	KVB, Inc.		
Date sampled	3/21/79		
Date received	5/3/79		

Analysis report no. **71- 30997** page **2 of 2**MINERAL ANALYSIS OF ASHPercent Weight Ignited Basis

Silica, SiO ₂	49.62		
Alumina, Al ₂ O ₃	37.75		
Titania, TiO ₂	1.88		
Ferrous oxide, FeO	4.52		
Lime, CaO	1.32		
Magnesia, MgO	0.84		
Potassium oxide, K ₂ O	1.53		
Sodium oxide, Na ₂ O	0.31		
Sulfur trioxide, SO ₃	0.56		
Phosphorus pentoxide, P ₂ O ₅	0.15		
Silicic acid, SiO ₂ ·nH ₂ O	0.07		
Carbon dioxide, CO ₂	0.12		
Unburned carbon, C	0.01		
Loss on ignition	1.32		
	100.00		
Alkalies as Na ₂ O, CaO, K ₂ O, etc.	0.10	Finling Index =	0.03
	88.13	Slagging Index =	0.07
Burnt carbon	0.10		

2900+

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 3/23/79
Date received 5/3/79

Test No.: 22
Test Site: G
Sample: D

Analysis report no. 71- 30999

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	4.69	xxxxx
% Ash	7.17	7.52
% Volatile	37.65	39.50
% Fixed Carbon	50.49	52.98
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12881	13515
% Sulfur	0.78	0.82

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = 1/2 W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

Core Height
Core Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No.: 23
		Test Site: G
Sample taken at	----	Sample: D
Sample taken by	KVB, Inc.	
Date sampled	3/24/79	
Date received	5/3/79	

Analysis report no. 71- 31070

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	4.56	xxxxx
% Ash	7.15	7.49
% Volatile	36.83	38.59
% Fixed Carbon	51.46	53.92
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12830	13443
% Sulfur	0.83	0.87

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>	
Initial Deformation	xxxx °F	xxxx °F	
Softening (H = W)	xxxx °F	xxxx °F	
Softening (H = 1/2 W)	xxxx °F	xxxx °F	
Fluid	xxxx °F	xxxx °F	

H - Cone Height
W - Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 284-1173

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 16, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No.: 24
Sample taken at	----	Test Site: G
Sample taken by	KVB, Inc.	Sample: D
Date sampled	3/24/79	
Date received	5/3/79	

Analysis report no. 71- 31081

PROXIMATE ANALYSIS

	<u>As Received</u>	<u>Dry Basis</u>
% Moisture	3.93	xxxxxx
% Ash	7.19	7.48
% Volatile	35.87	37.34
% Fixed Carbon	53.01	55.18
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12943	13472
% Sulfur	0.69	0.72

FUSION TEMPERATURE OF ASH

	<u>Reducing</u>	<u>Oxidizing</u>	
Initial Deformation	xxxx °F	xxxx °F	
Softening (H = W)	xxxx °F	xxxx °F	
Softening (H = 1/2 W)	xxxx °F	xxxx °F	H - Cone Height
Fluid	xxxx °F	xxxx °F	W - Cone Width

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division



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16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at Test Site G
Sample taken by KVB, Inc.
Date sampled -----
Date received 5/3/79

Test No. Composite
Sample: A
Test Site: G
Date taken -----

Analysis report no. 71- 30994 page 1 of 2

PROXIMATE ANALYSIS

	<u>As Rec'd</u>	<u>Dry Basis</u>
% Moisture	4.00	xxxxx
% Ash	10.03	10.45
% Volatile	36.46	37.98
% Fixed Carbon	49.51	51.57
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12635	13161
% Sulfur	0.77	0.80

ULTIMATE ANALYSIS

	<u>As Rec'd</u>	<u>Dry Basis</u>
% Moisture	4.00	xxxxx
% Carbon	71.40	74.37
% Hydrogen	4.60	4.79
% Nitrogen	0.98	1.02
% Chlorine	0.10	0.10
% Sulfur	0.77	0.80
% Ash	10.03	10.45
% Oxygen(diff)	8.12	8.47
	<u>100.00</u>	<u>100.00</u>

FUSION TEMPERATURE OF ASH

Reducing

Initial Def., IT ---- 2700 °F
Softening, ST ----- 2700+°F
Softening, HT ----- 2700+°F
Fluid, FT ----- 2700+°F

FORMS OF SULFUR

% Pyritic	0.09	0.09
% Sulfate	0.05	0.05
% Organic	0.63	0.66

HARDGROVE GRINDABILITY INDEX: 38

FREE SWELLING INDEX: 1-1/2

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 284-1173KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample Identification
By KVB, Inc.

Kind of sample reported to us	Coal	Test No.	Composite
Sample taken at	Test site G	Sample:	A
Sample taken by	KVB, Inc.	Test site:	G
Date sampled	-----	Date taken:	-----
Date received	5/3/79		

Analysis report no. 71- 30994 page 2 of 2

Moisture Content (g/100g) Percent Weight Ignited Basis

Moisture Content (g/100g)	54.45
Fixed Carbon (g/100g)	29.56
Volatile Matter (g/100g)	1.29
Asphaltenes (g/100g)	7.15
Resins (g/100g)	1.54
Paraffins (g/100g)	0.98
Trapped Gas (g/100g)	2.69
Untrapped Gas (g/100g)	0.44
Water-soluble (g/100g)	0.57
Insoluble (g/100g)	0.18
Acid-soluble (g/100g)	0.00
Insoluble (g/100g)	0.24
Alkaline-soluble (g/100g)	0.03
Insoluble (g/100g)	0.88
	<u>100.00</u>

Alkalies as Na ₂ O (g/100g)	0.24
Alkalies as K ₂ O (g/100g)	84.92
Barium Asbestos (g/100g)	0.15

Swelling Index	0.03
Shrinkage Index	0.12

ESTIMATED VISCOSITY at ambient temperature
Temperature in ----- F ----- C
T₁ Temperature in 2825Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-11

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No. Composite	
		Coal B	
Sample taken at	Test Site G	Date taken	-----
Sample taken by	KVB, Inc.		
Date sampled	-----		
Date received	5/3/79		

Analysis report no. 71- 30995 page 1 of 2

PROXIMATE ANALYSIS

	<u>As Rec'd</u>	<u>Dry Basis</u>
% Moisture	3.32	xxxxx
% Ash	6.56	6.79
% Volatile	39.20	40.55
% Fixed Carbon	50.92	52.66
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	13397	13857
% Sulfur	1.31	1.36

ULTIMATE ANALYSIS

	<u>As Rec'd</u>	<u>Dry Basis</u>
% Moisture	3.32	xxxxx
% Carbon	74.59	77.15
% Hydrogen	5.11	5.29
% Nitrogen	1.12	1.16
% Chlorine	0.18	0.19
% Sulfur	1.31	1.36
% Ash	6.56	6.79
% Oxygen(diff)	7.81	8.06
	<u>100.00</u>	<u>100.00</u>

FUSION TEMPERATURE OF ASH**Reducing**

Initial Def., IT ----- 2420 °F
Softening, ST ----- 2650 °F
Softening, HT ----- 2680 °F
Fluid, FT ----- 2700+°F

FORMS OF SULFUR

% Pyritic	0.47	0.49
% Sulfate	0.04	0.04
% Organic	0.80	0.83

HARDGROVE GRINDABILITY INDEX: 37

FREE SWELLING INDEX: 2-1/2

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division

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COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 AREA CODE 312 726-6434



PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No. Composite
		Sample: B
Sample taken at	Test site G	Test site: G
		Date taken: -----
Sample taken by	KVB, Inc.	
Date sampled	-----	
Date received	5/3/79	

Analysis report no. 71- 30995 page 2 of 2

MINERAL ANALYSIS OF ASHPercent Weight Ignited Basis

Silica, SiO_2	43.26
Alumina, Al_2O_3	30.37
Titania, TiO_2	1.21
Ferric oxide, Fe_2O_3	13.50
Lime, CaO	3.43
Magnesia, MgO	1.32
Potassium oxide, K_2O	2.05
Sodium oxide, Na_2O	0.61
Sulfur trioxide, SO_3	3.61
Phos. pentoxide, P_2O_5	0.19
Strontium Oxide, SrO	0.10
Barium Oxide, BaO	0.26
Manganese Oxide, Mn_2O_3	0.02
Undetermined	0.07
	<u>100.00</u>

Alkalies as Na_2O , Dry Coal Basis = 0.13

Silica Value = 70.33

Base: Acid Ratio = 0.28

Fouling Index = 0.17

Slagging Index = 0.38

ESTIMATED VISCOSITY at critical velocity

Temperature of ----- $^{\circ}\text{F}$ ----- $^{\circ}\text{C}$ Temperature = 2575 $^{\circ}\text{F}$

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No. Composite	Coal D
Sample taken at	Test Site G	Date taken	-----
Sample taken by	KVB, Inc.		
Date sampled	-----		
Date received	5/3/79		

Analysis report no. 71- 30993 page 1 of 2

PROXIMATE ANALYSIS

	<u>As Rec'd</u>	<u>Dry Basis</u>
% Moisture	4.45	xxxxx
% Ash	7.24	7.58
% Volatile	37.07	38.80
% Fixed Carbon	51.24	53.62
	<u>100.00</u>	<u>100.00</u>
Btu/lb.	12912	13513
% Sulfur	0.65	0.68

ULTIMATE ANALYSIS

	<u>As Rec'd</u>	<u>Dry Basis</u>
% Moisture	4.45	xxxxx
% Carbon	72.91	76.31
% Hydrogen	4.86	5.09
% Nitrogen	0.96	1.00
% Chlorine	0.05	0.05
% Sulfur	0.65	0.68
% Ash	7.24	7.58
% Oxygen(diff)	8.88	9.29
	<u>100.00</u>	<u>100.00</u>

FUSION TEMPERATURE OF ASH

Reducing

Initial Def., IT ----	2700+°F
Softening, ST -----	2700+°F
Softening, HT -----	2700+°F
Fluid, FT -----	2700+°F

FORMS OF SULFUR

% Pyritic	0.08	0.08
% Sulfate	0.00	0.00
% Organic	0.57	0.60

HARDGROVE GRINDABILITY INDEX: 37 FREE SWELLING INDEX: 1-1/2

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Coal	Test No. Composite
		Sample: D
Sample taken at	Test site G	Test site: G
Sample taken by	KVB, Inc.	Date taken: 4/4/79
Date sampled	4/4/79	
Date received	5/3/79	

Analysis report no. 71- 30993 page 2 of 2

MINERAL ANALYSIS OF ASHPercent Weight Ignited Basis

Silica, SiO ₂	52.38
Alumina, Al ₂ O ₃	36.61
Titania, TiO ₂	1.96
Ferric oxide, Fe ₂ O ₃	3.75
Lime, CaO	1.19
Magnesia, MgO	0.77
Potassium oxide, K ₂ O	1.61
Sodium oxide, Na ₂ O	0.26
Sulfur trioxide, SO ₃	0.65
Phos. pentoxide, P ₂ O ₅	0.16
Strontium Oxide, SrO	0.06
Barium Oxide, BaO	0.13
Manganese Oxide, Mn ₂ O ₃	0.00
Undetermined	0.47
	<u>100.00</u>

Alkalies as Na₂O, Dry Coal Basis = 0.10

Silica Value = 90.17

Base: Acid Ratio = 0.08

Fouling Index = 0.02

Slagging Index = 0.05

ESTIMATED VISCOSITY at critical viscosity

Temperature of ---- °F = ---- Poises

T₂₅₀ Temperature = 2900+ °FRespectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 2
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/11/79	
Date received	5/3/79	

Analysis report no. 71- 31085

%Combustible, dry basis..... 12.53

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Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 3
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/11/79	
Date received	5/3/79	

Analysis report no. 71- 31086

%Combustible, dry basis..... 7.26

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Ash
Sample taken at -----
Sample taken by KVB, Inc.
Date sampled 2/16/79
Date received 5/3/79

Bottom Ash
Test # 4
Test Site: G

Analysis report no. 71- 31084

%Combustible, dry basis..... 11.23

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Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

► KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 5
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/17/79	
Date received	5/3/79	

Analysis report no. 71- 31099

%Combustible, dry basis..... 6.93

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R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Coal
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 2/17/79
Date received 5/3/79

Test # 6
Test Site: G

Bottom Ash

Analysis report no. 71- 31095

%Combustible, dry basis..... 7.11

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
Sample taken at	----	Test # 7
Sample taken by	KVB, Inc.	Test Site: G
Date sampled	2/25/79	
Date received	5/3/79	

Analysis report no. 71- 31096

%Combustible, dry basis..... 4.22

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

► KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample Ash
reported to us

Sample taken at ----

Sample taken by KVB, Inc.

Date sampled 2/25/79

Date received 5/3/79

Bottom Ash
Test # 8
Test Site: G

Analysis report no. 71- 31094

%Combustible, dry basis..... 6.02

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 9
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/28/79	
Date received	5/3/79	

Analysis report no. 71- 31089

%Combustible, dry basis.....	7.87
%Sulfur, dry basis.....	0.09

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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample
reported to us Ash

Bottom Ash
Test # 10
Test Site: G

Sample taken at ----

Sample taken by KVB, Inc.

Date sampled 3/2/79

Date received 5/3/79

Analysis report no. 71- 31088

%Combustible, dry basis..... 9.77

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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
Sample taken at	----	Test # 15
Sample taken by	KVB, Inc.	Test Site: G
Date sampled	3/16/79	
Date received	5/3/79	

Analysis report no. 71- 31092

%Combustible, dry basis.....	14.88
%Sulfur, dry basis.....	0.09

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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P. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

► KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 16
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/17/79	
Date received	5/3/79	

Analysis report no. 71- 31093

%Combustible, dry basis..... 8.18

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 284-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 17
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/17/79	
Date received	5/3/79	

Analysis report no. 71- 31087

%Combustible, dry basis..... 7.34

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

► KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample
reported to us

Ash

Bottom Ash
Test # 18
Test Site: G

Sample taken at

Sample taken by

KVB, Inc.

Date sampled

3/18/79

Date received

5/3/79

Analysis report no. 71- 31091

%Combustible, dry basis..... 13.93

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Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser
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OFFICE TEL. (312) 284-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
Sample taken at	----	Test # 19
Sample taken by	KVB, Inc.	Test Site: G
Date sampled	3/18/79	
Date received	5/3/79	

Analysis report no. 71- 31090

%Combustible, dry basis..... 8.79

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 AREA CODE 312 726-8434



PLEASE ADDRESS ALL CORRESPONDENCE TO:
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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 20
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/21/79	
Date received	5/3/79	

Analysis report no. 71- 31100

%Combustible, dry basis.....	12.32
%Sulfur, dry basis.....	0.08

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 22
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/23/79	
Date received	5/3/79	

Analysis report no. 71- 31098

%Combustible, dry basis..... 19.09

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Ash
Sample taken at -----
Sample taken by KVB, Inc.
Date sampled 3/24/79
Date received 5/3/79

Bottom Ash
Test # 23
Test Site: G

Analysis report no. 71- 31097

%Combustible, dry basis..... 13.12

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us	Ash	Bottom Ash
		Test # 24
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/24/79	
Date received	5/3/79	

Analysis report no. 71- 31101

%Combustible, dry basis..... 11.48

Respectfully submitted,
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A. HOUSER, Manager, Midwest Division



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► KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Dust Collector
		Test # 2 & 3
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/11/79	
Date received	5/3/79	

Analysis report no. 71- 31082

%Combustible, dry basis..... 53.91

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division

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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash Test # 4 Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/16/79	
Date received	5/3/79	

Analysis report no. 71- 31083

%Combustible, dry basis..... 56.74

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample Identification
by KVB, Inc.

Kind of sample
reported to us Ash

Multiclone Ash
Test # 5 & 6
Test Site: G

Sample taken at ----

Sample taken by KVB, Inc.

Date sampled 2/17/79

Date received 5/3/79

Analysis report no. 71- 31106

%Combustible, dry basis..... 49.85

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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 7
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/25/79	
Date received	5/3/79	

Analysis report no. 71- 31111

%Combustible, dry basis..... 50.05

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division



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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 8
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	2/25/79	
Date received	5/3/79	

Analysis report no. 71- 31104

%Combustible, dry basis..... 56.65

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 9
Sample taken at	----	Test Site: G
Sample taken by	KVB, Inc.	
Date sampled	2/28/79	
Date received	5/3/79	

Analysis report no. 71- 31114

%Combustible, dry basis.....	55.71
%Sulfur, dry basis.....	0.44

210

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 10
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/2/79	
Date received	5/3/79	

Analysis report no. 71- 31108

%Combustible, dry basis..... 42.73

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
Sample taken at	----	Test # 15
Sample taken by	KVB, Inc.	Test Site: G
Date sampled	3/16/79	
Date received	5/3/79	

Analysis report no. 71- 31109

%Combustible, dry basis.....	40.65
%Sulfur, dry basis.....	0.42

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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[Signature]
Manager, Midwest Division



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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Analysis report no. 71-31110
To: KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 16 & 17
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/17/79	
Date received	5/3/79	

Analysis report no 71- 31110

%Combustible, dry basis..... 57.30

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

► KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample Ash
reported to us

Sample taken at ----

Sample taken by KVB, Inc.

Date sampled 3/17/79

Date received 5/3/79

Fly Ash
Test # 17
Test Site: G
from re-injection

Analysis report no. 71- 31115

%Combustible, dry basis..... 83.34

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R. A. Rouser
R. A. ROUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

► KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample Identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 18
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/18/79	
Date received	5/3/79	

Analysis report no. 71- 31113

%Combustible, dry basis..... 51.15

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 19
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/18/79	
Date received	5/3/79	

Analysis report no. 71- 31112

%Combustible, dry basis..... 62.51

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample taken at
KVB, Inc.

Kind of sample reported to us Ash
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 3/21/79
Date received 5/3/79

Multiclone Ash
Test # 20
Test Site: G

Analysis report no 71- 31105

%Combustible, dry basis..... 57.09
%Sulfur, dry basis..... 0.34

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 22
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/23/79	
Date received	5/3/79	

Analysis report no. 71- 31102

%Combustible, dry basis..... 67.03

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R. A. Houser
R. A. HOUSER, Manager, Midwest Division



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OFFICE TEL. (312) 264-1173

► KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us Ash
Sample taken at ----
Sample taken by KVB, Inc.
Date sampled 3/24/79
Date received 5/3/79

Multiclone Ash
Test # 23
Test Site: G

Analysis report no. 71- 31103

%Combustible, dry basis..... 57.57

Original Copy Watermarked
For Your ProtectionRespectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

219


R. A. HOUSER, Manager, Midwest Division

Charter Member

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RAH/ br

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434



PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

May 14, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ash	Multiclone Ash
		Test # 24
		Test Site: G
Sample taken at	----	
Sample taken by	KVB, Inc.	
Date sampled	3/24/79	
Date received	5/3/79	

Analysis report no. 71- 31107

%Combustible, dry basis..... 56.15

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

220

R. A. Houser
R. A. HOUSER, Manager, Midwest Division



Charter Member

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For Your Protection

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HENDERSON, KY • MIDDLESBORO, KY • MOBILE, AL • NEW ORLEANS, LA • NORFOLK, VA • PIKEVILLE, KY • VALE, CO • WASHINGTON, DC

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COMBUSTIBLES DATA SHEET

SITE

6

Crucible Number	Sample Origin	Crucible Weight grams	Crucible & Sample Weight Post 110°C gms	Sample Weight grams	Post 750°C grams	Δ Weight grams	% Combustibles
39	TEST #3 BLR OUT	10.0010	10.7173	0.7164	10.3431	0.3743	52.2
		10.0010	10.7174		10.3430		
		AVG. 10.0010	10.7174		10.3431		
38	TEST #2 BLR OUT	10.1408	11.1241	0.9759	10.5572	0.5668	58.1
		10.1402	11.1243		11.5576		
		AVG. 10.1483	11.1242		10.5574		
40	TEST #6 BLR OUT	9.2524	9.9193	0.6670	9.6013	0.3182	47.7
		9.2525	9.9197		9.6012		
		AVG. 9.2525	9.9195		9.6015		
41	TEST #7 BLR OUT	9.8835	10.3878	0.5041	10.1487	0.2390	47.4
		9.8834	10.3873		10.1484		
		AVG. 9.8835	10.3876		10.1486		
42	TEST #10 BLR OUT	10.3697	11.3369	0.9670	10.7852	0.516	57.0
		10.3700	11.3368		10.7853		
		AVG. 10.3699	11.3369		10.7853		
43	TEST #16 BLR OUT	9.8502	10.2285	0.3782	10.0483	0.1800	47.6
		9.8501	10.2283		10.0485		
		AVG. 9.8502	10.2284		10.0484		
20	TEST #19 BLR OUT	8.8423	9.1105	0.2685	8.9762	0.1343	50.1
		8.8422	9.1107		8.9763		
		AVG. 8.8423	9.1106		8.9763		
21	B#21 #22 BLR OUT	9.4816	10.3321	0.8506	9.8666	0.4657	54.7
		9.4816	10.3323		9.8663		
		AVG. 9.4816	10.3322		9.8665		
22	B#53 #23 BLR OUT	9.7282	10.5350	0.8069	10.1272	0.4080	50.6
		9.7282	10.5352		10.1270		
		AVG. 9.7282	10.5351		10.1271		
23	B#55 #24 BLR OUT	10.1035	10.7920	0.6886	10.3590	0.4330	62.9
		10.1035	10.7921		10.3592		
		AVG. 10.1035	10.7921		10.3591		
	AVG.						

COMBUSTIBLES DATA SHEET

SITE 6 - MECH

Crucible Number	Sample Origin	Crucible Weight grams	Crucible & Sample Weight Post 110°C gms	Sample Weight grams	Post 750°C grams	Δ Weight grams	% Combustibles
1	TEST #3 MECH OUT	3.6814	3.7066	0.0251	3.6992	0.0073	29.1
		3.6812	3.7061		3.6989		
		—	—		—		
		AVG. 3.6813	3.7064		3.6991		
2	TEST #4 MECH	3.9729	3.9976	0.0246	3.9905	0.0071	28.9
		3.9729	3.9974		3.9902		
		—	—		—		
		AVG. 3.9729	3.9975		3.9904		
3	TEST #7 MECH	3.6690	3.6928	0.0238	3.6800	0.0129	54.2
		3.6689	3.6927		3.6798		
		—	—		—		
		AVG. 3.6690	3.6928		3.6799		
4	TEST #8 MECH	3.7108	3.7183	0.0081	3.7160	0.0028	34.6
		3.7107	3.7189		3.7161		
		—	—		—		
		AVG. 3.7108	3.7189		3.7161		
6	TEST #10 MECH	3.7402	3.7633	0.0231	3.7582	0.0053	22.9
		3.7401	3.7632		3.7578		
		—	—		—		
		AVG. 3.7402	3.7633		3.7580		
7	TEST #16 MECH	3.7839	3.8710	0.0870	3.8563	0.0146	16.8
		3.7839	3.8708		3.8562		
		—	—		—		
		AVG. 3.7839	3.8709		3.8563		
8	TEST #17 MECH	3.8307	3.9267	0.0961	3.8993	0.0276	28.7
		3.8308	3.9270		3.8992		
		—	—		—		
		AVG. 3.8308	3.9269		3.8993		
11	TEST #18 MECH	3.7119	3.7909	0.0791	3.7677	0.0233	29.5
		3.7117	3.7909		3.7674		
		—	—		—		
		AVG. 3.7118	3.7904		3.7676		
34	TEST #19 MECH	10.1719	10.1900	0.0181	10.1805	0.0096	53.0
		10.1720	10.1902		10.1804		
		—	—		—		
		AVG. 10.1720	10.1901		10.1805		
35	TEST #22 MECH	9.8311	9.8941	0.0630	9.8763	0.0180	28.6
		9.8312	9.8943		9.8761		
		—	—		—		
		AVG. 9.8312	9.8942		9.8762		
36	TEST #23 MECH	9.4585	9.5373	0.0787	9.5148	0.0227	28.8
		9.4586	9.5373		9.5144		
		—	—		—		
		AVG. 9.4586	9.5373		9.5146		

COMBUSTIBLES ANALYSIS

SITE

G-Mech

Crucible Number	Sample Origin	Crucible Weight grams	Crucible & Sample Weight Post 100°C grams	Sample Weight grams	Post 750°C grams	Δ Weight grams	% Combustibles
37	TEST #24 MECH	10.2083	10.2561	0.0478	10.2418	0.0144	30.2
		10.2084	10.2561		10.2415		
		—	—		—		
		AVG. 10.2084	10.2561		10.2417		
24	SITE 6 TEST #25 Boiler OUT	10.4908	10.9515	0.4607	10.7227	0.2290	49.7
		10.4908	10.9518		10.7227		
		—	—		—		
		AVG. 10.4908	10.9517		10.7227		
	AVG.						
	AVG.						
	AVG.						
	AVG.						
	AVG.						
	AVG.						
	AVG.						
	AVG.						

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 2

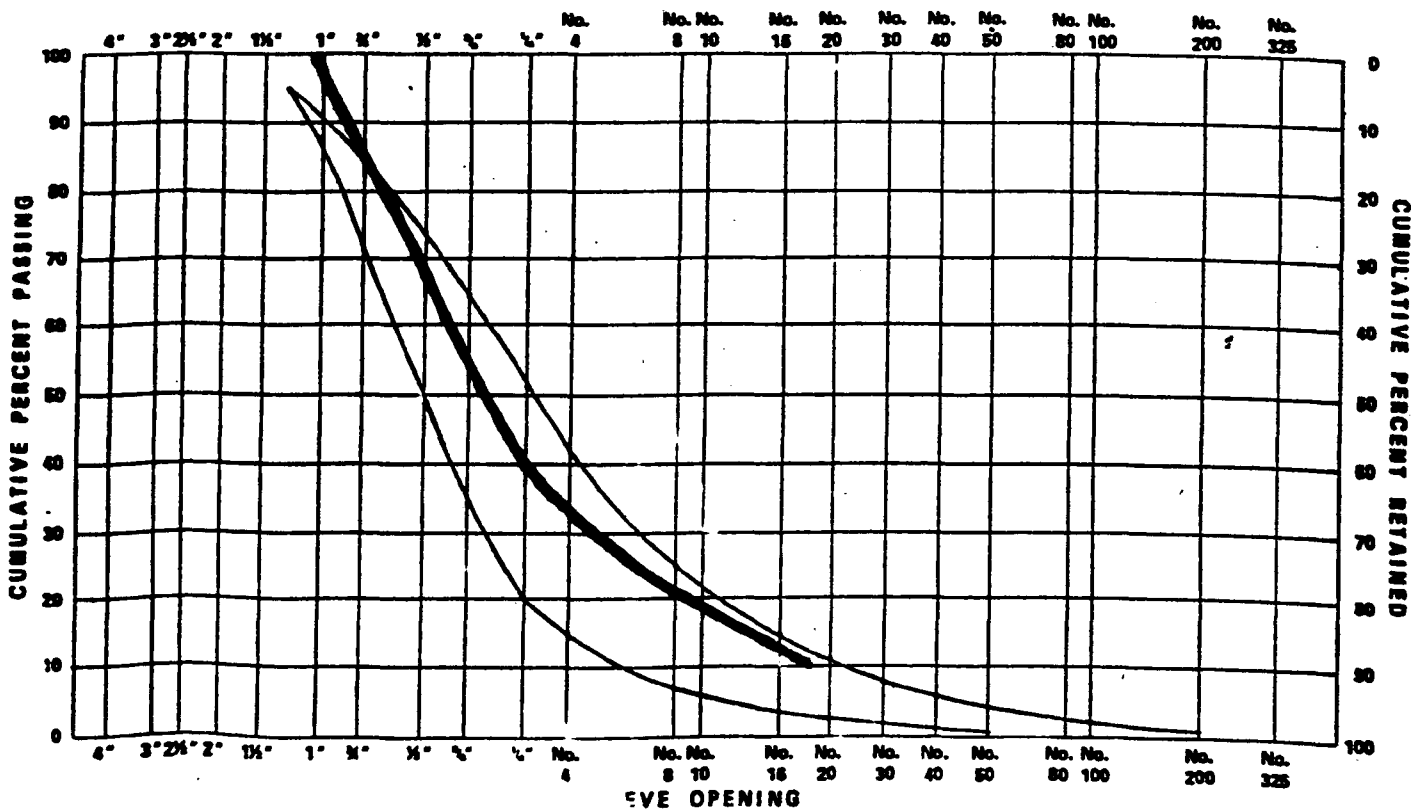
DATE SAMPLE TAKEN 2-11-79

TEST SITE G

TEST PERFORMED BY JOE

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	94.2	254.1	164.9	2.5	6646.4	100.0	4
1"	110.0	546.2 1713.5	2033.7	30.6	6481.5	97.5	4
1/2"		508.0 1532.0	1820.0	27.4	4447.8	66.9	4
1/4"		1386.7	1276.7	19.2	2627.8	39.5	4
#8		612.9	502.9	7.6	1351.1	20.3	4
#16		958.2	848.2	12.8	848.2	12.7	4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 3

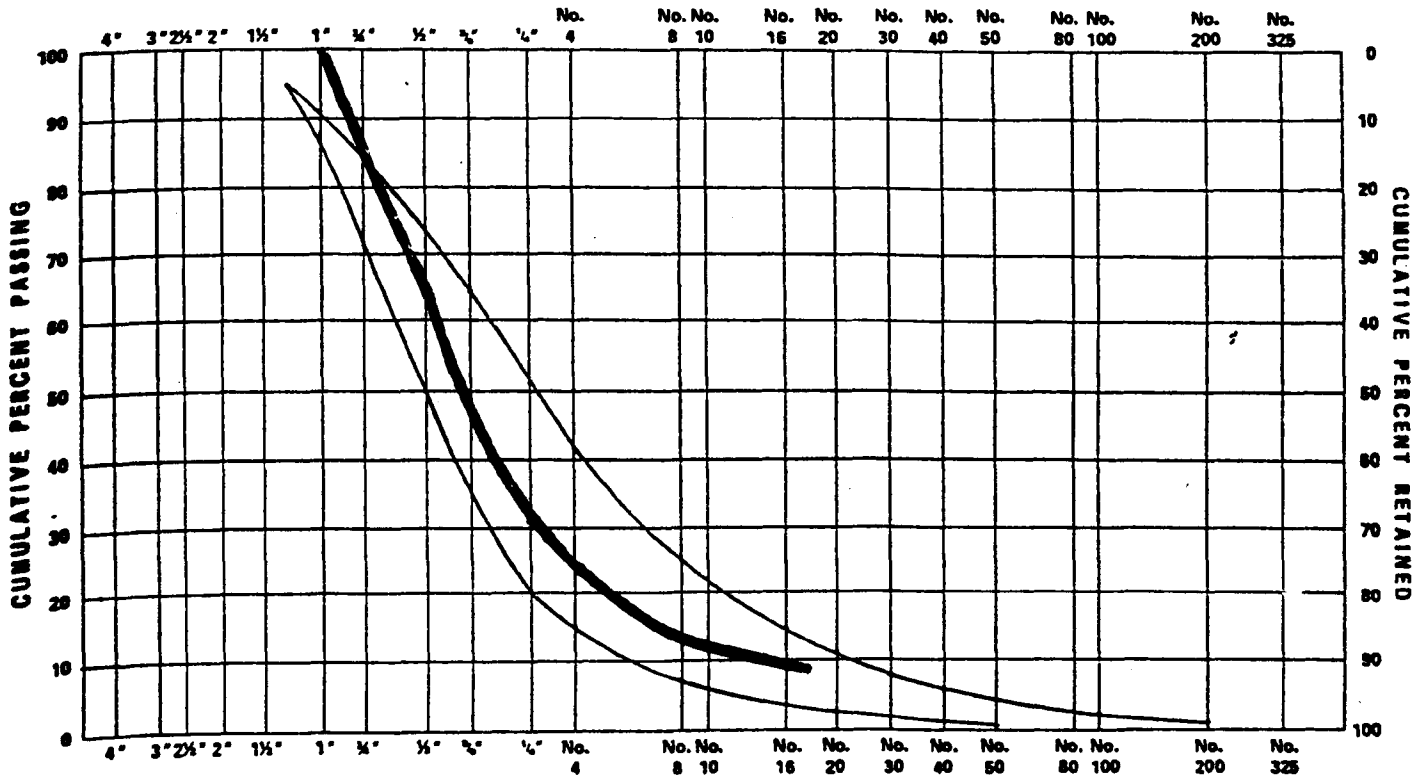
DATE SAMPLE TAKEN 2-11-79

TEST SITE G

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.4	135.5	25.1	0.7	3446.6	100.0	4
1"		1315.8	1205.4	35.0	3421.5	99.3	4
1/2"		1268.8	1158.4	33.6	2216.1	64.3	4
3/4"		694.7	584.3	17.0	1057.7	30.7	4
#8		274.8	164.4	4.8	473.4	13.7	4
#16		419.4	309.0	9.0	309.0	8.9	4



225

15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 4

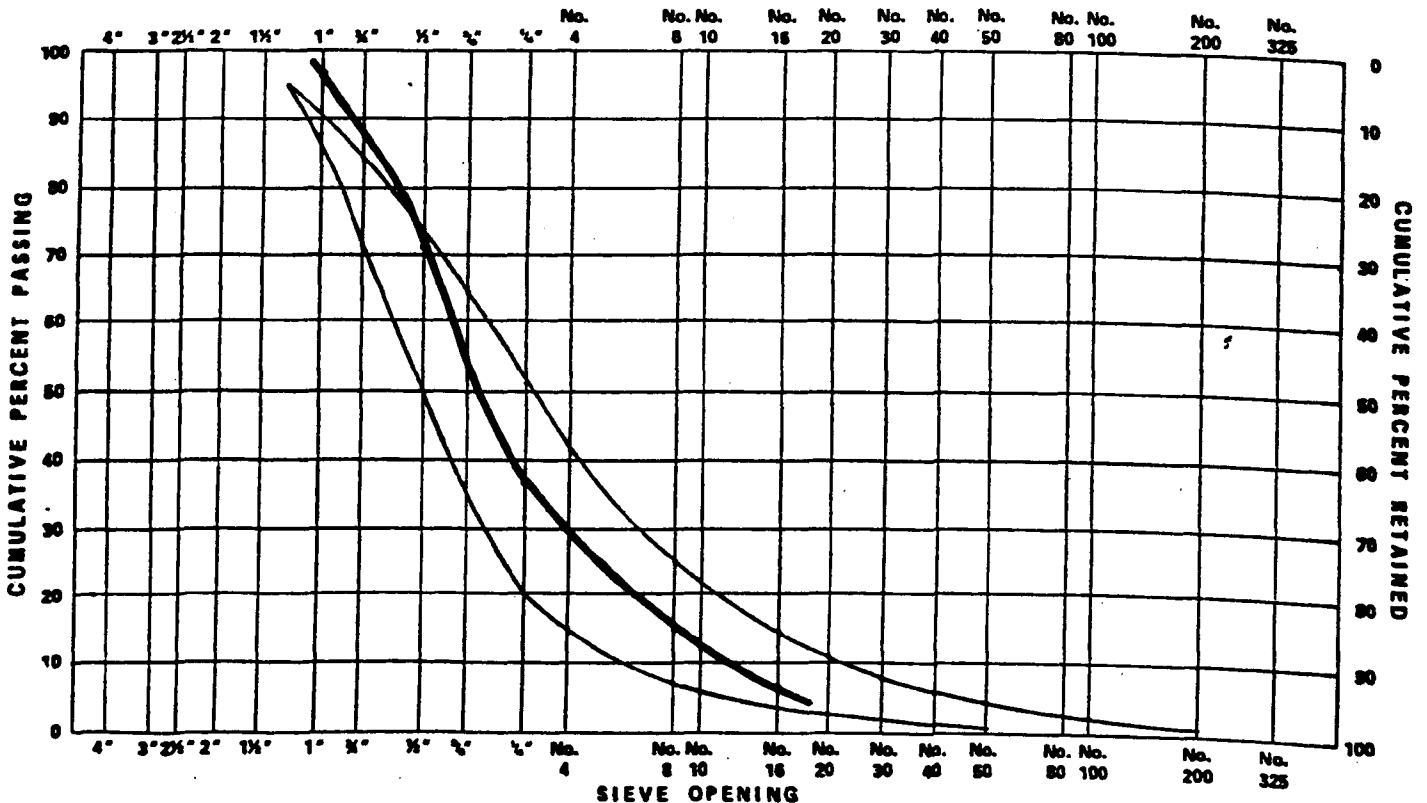
DATE SAMPLE TAKEN 2-16-79

TEST SITE C

TEST PERFORMED BY J.B.

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.2	348.6	278.4	3.1	8878.2	100.0	4
1"		1342.1 1126.4	2298.1	25.9	8599.8	96.9	4
1/2"		1134.9 651.8 1621.4	3077.5	34.7	6301.7	71.0	4
1/4"		1082.9 1042.0	1904.5	21.5	3224.2	36.3	4
#8		911.9	801.7	9.0	1319.7	14.8	4
#16		628.2	518.0	5.8	518.0	5.8	4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 5

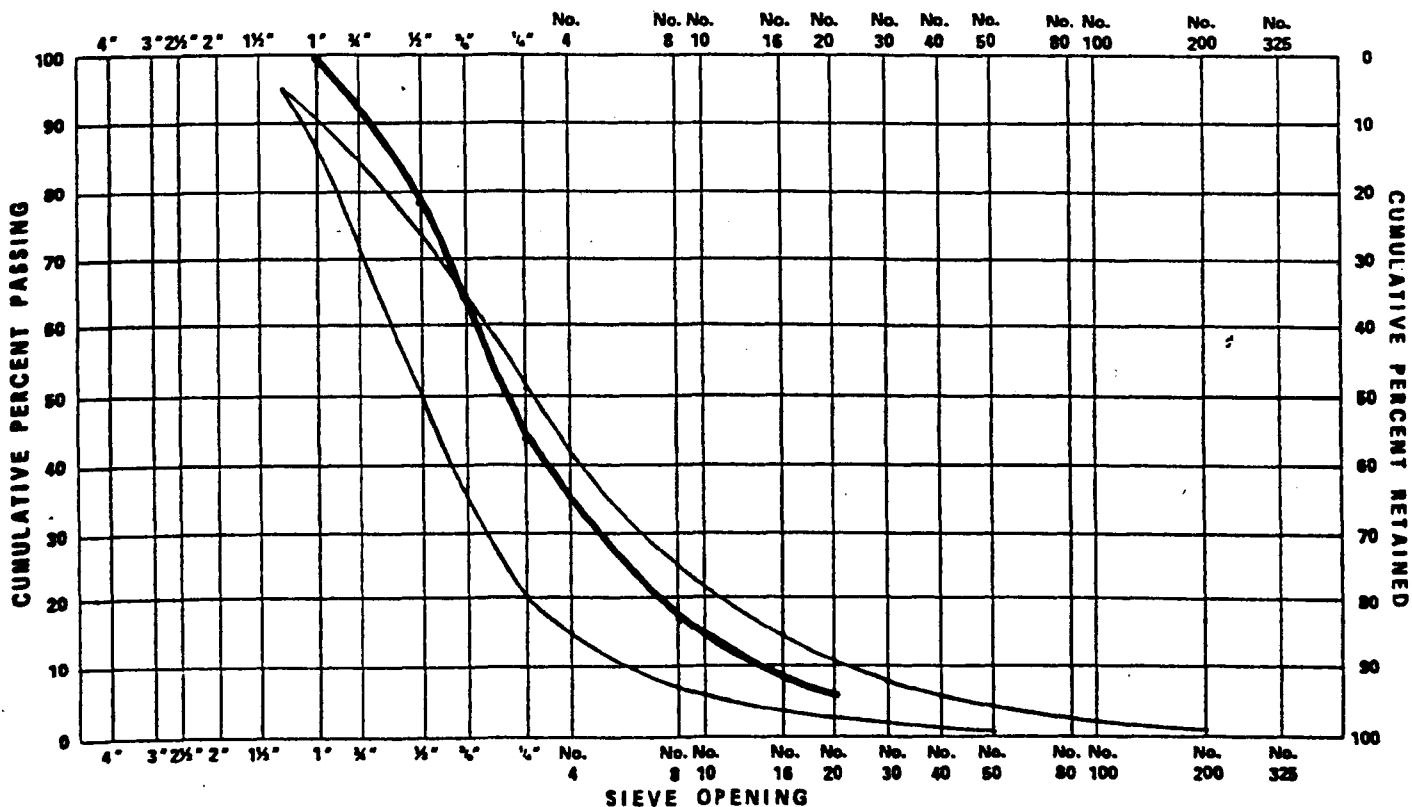
DATE SAMPLE TAKEN 2-12-79

TEST SITE G

TEST PERFORMED BY JOF

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	1102	1235 1401	43.2	0.6	7695.2	100.0	4
1"		914.3 932.5	1626.4	21.1	7652.0	99.4	4
1/2"		1183.3 1467.0	2719.7	35.3	6025.6	78.3	4
1/4"		788.8 1248.8	1497.2	25.8	3305.9	43.0	4
#8		852.9	742.7	9.7	1318.7	17.2	4
#16		686.2	576.0	7.5	576.0	7.5	4



227

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KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 6

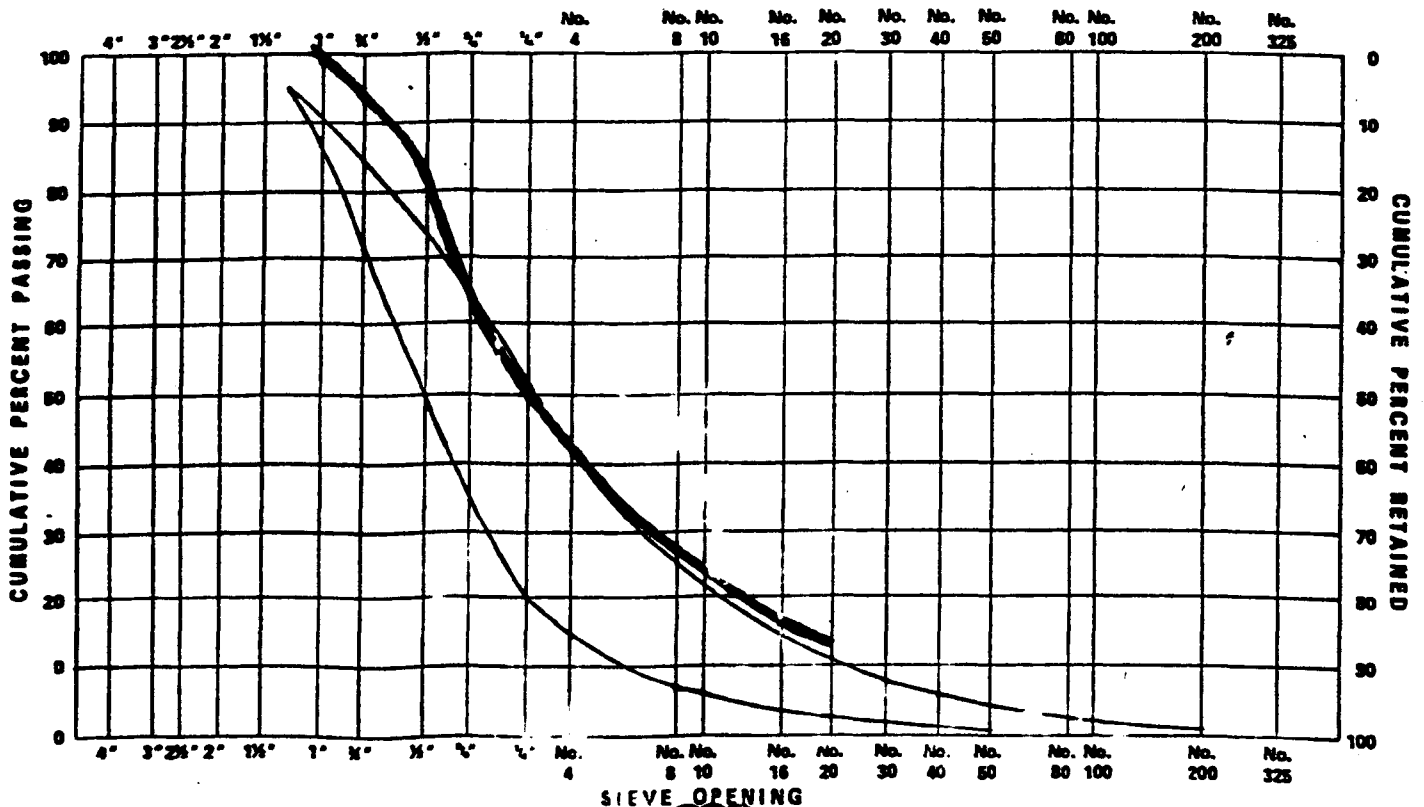
DATE SAMPLE TAKEN 2-17-79

TEST SITE 6

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.9	191.9	81.0	0.9	9174.6	100.0	4
1"	↓	1648.1	1537.2	16.8	9093.6	99.2	4
2"		1632.4	2991.6	32.6	7556.4	82.4	4
1/4"		1131.0	2124.8	23.2	4564.8	49.8	4
#8		1076.7	965.8	10.5	2440.0	26.6	4
#16		596.8	1474.2	16.1	1474.2	16.1	4
		1099.2					



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 7

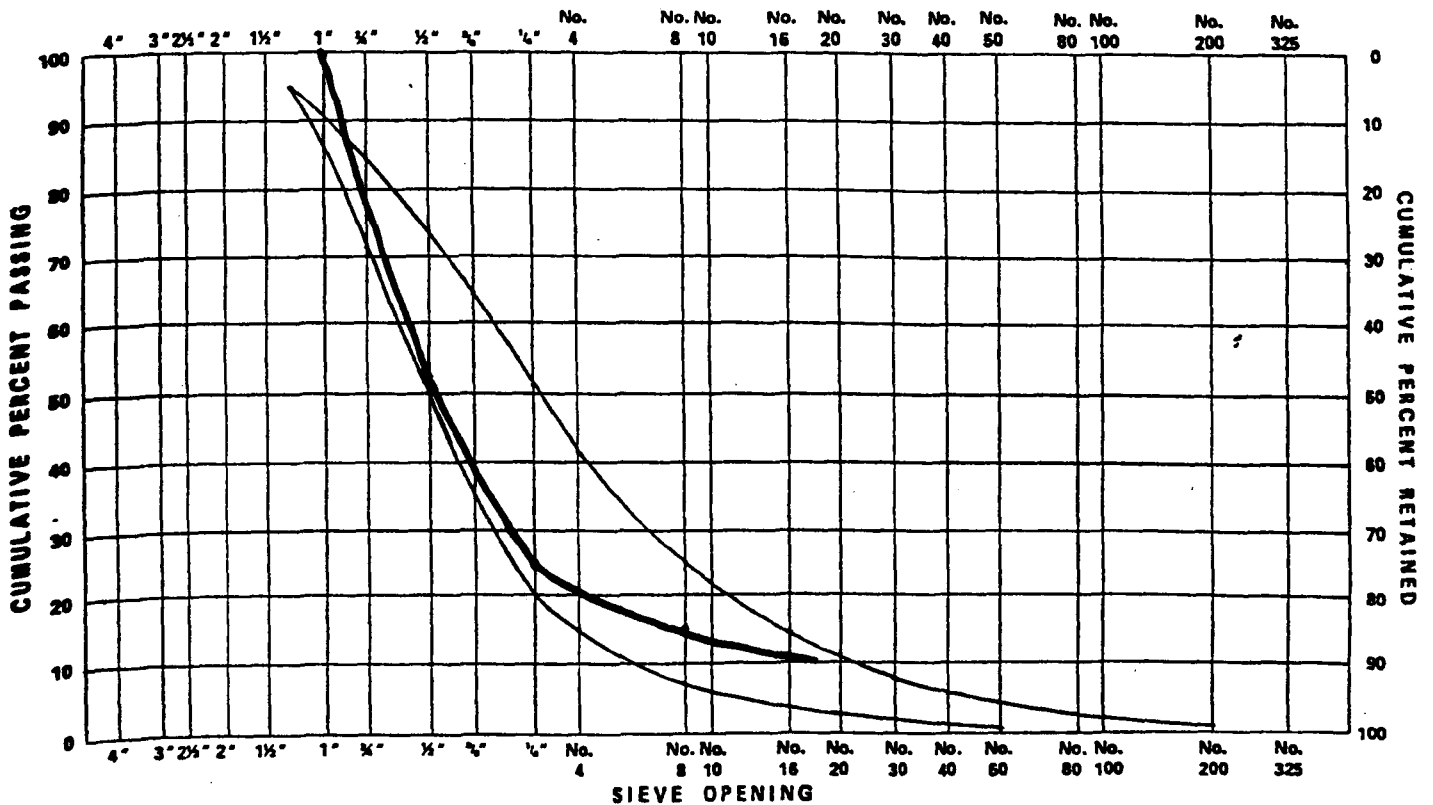
DATE SAMPLE TAKEN 2-25-79

TEST SITE C

TEST PERFORMED BY JB

SAMPLE IDENTIFICATION B

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.9	151.0	40.1	0.5	85433	100.0	4
1"	↓	1272.4 1916.0	4151.1	48.6	8503.2	99.6	4
1/2"		1197.9 1312.1	2288.2	26.8	4352.1	51.0	4
3/4"		910.0	799.1	9.4	2063.9	24.2	4
#8		470.9	360.0	4.2	1264.8	14.8	4
#16		1015.7	904.8	10.6	904.8	10.6	4



229

15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 8

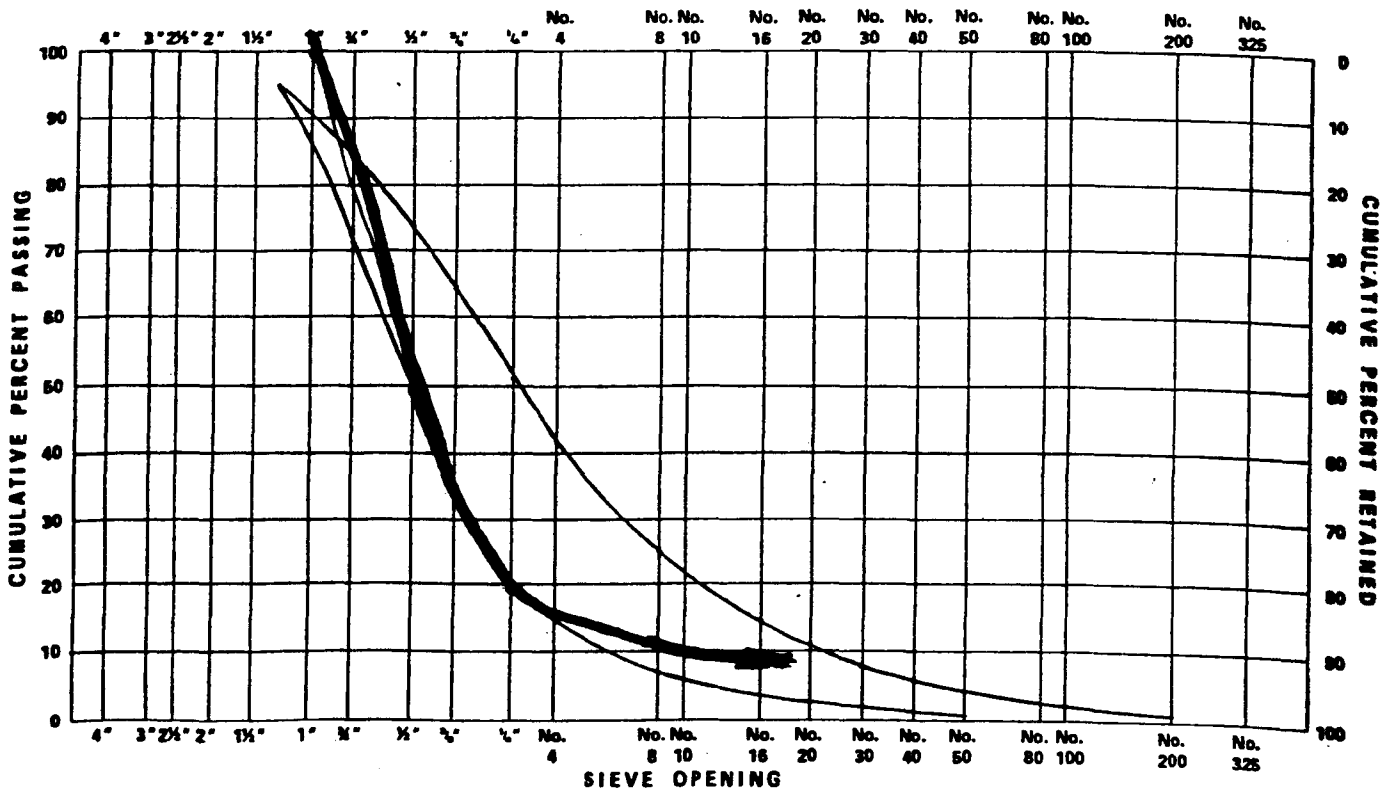
DATE SAMPLE TAKEN 2-25-79

TEST SITE 6

TEST PERFORMED BY Job

SAMPLE IDENTIFICATION B

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.9	110.9	0	0	8484.8	100.0	4
1"	↓	1539.9 / 1320.0	4320.6	51.0	8484.8	100.0	4
1/2"		1245.9	2535.8	29.9	4154.2	49.0	4
3/8"		1511.7	2535.8	29.9	1618.4	19.1	4
4"		769.8	658.9	7.8	959.5	11.3	4
#8		369.6	258.7	3.0	700.8	8.3	4
#16		811.7	100.8	8.3			4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 9

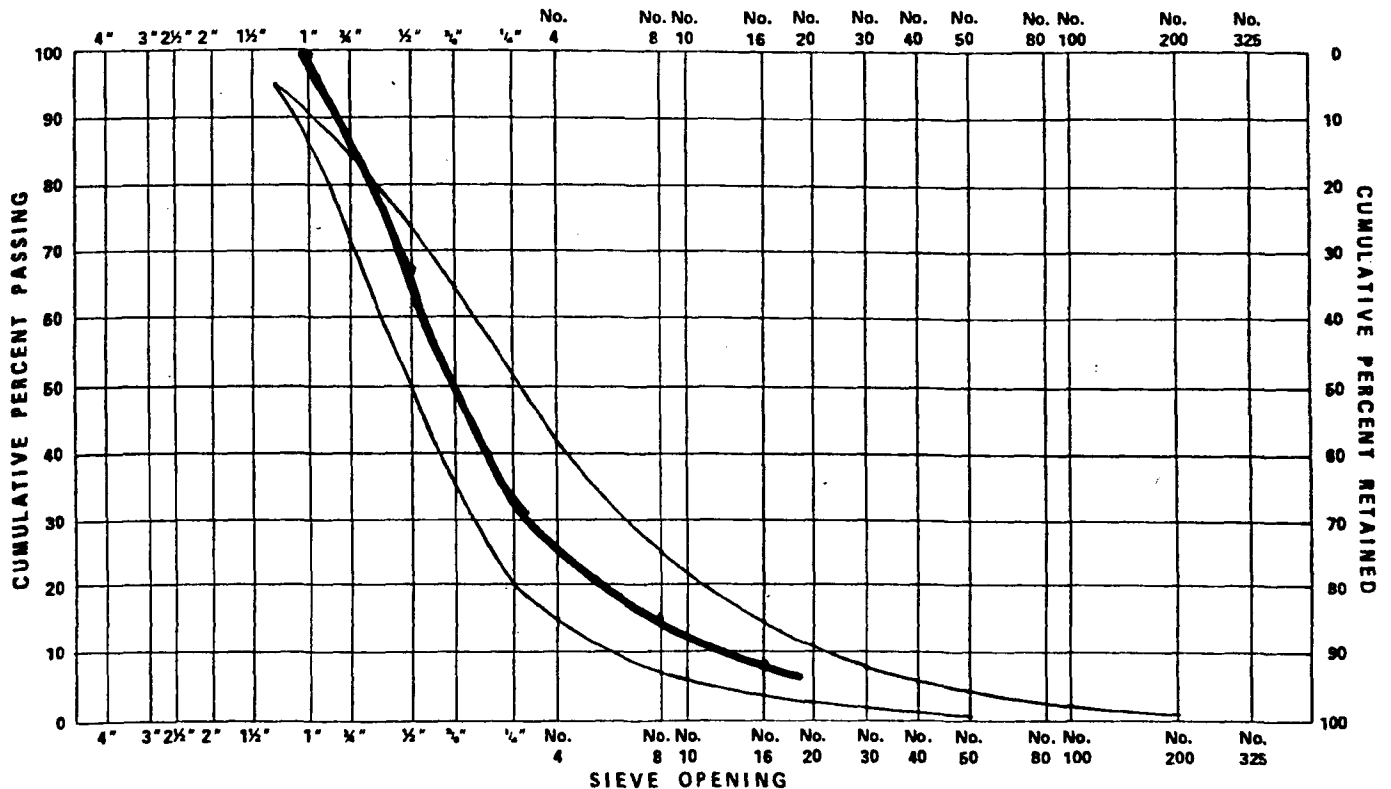
DATE SAMPLE TAKEN 2-28-79

TEST SITE G

TEST PERFORMED BY J.B.

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.3	187.4	77.1	1.0	7901.8	100.0	4
1"	↓	1167.7	2617.0	33.1	7824.7	99.0	4
1"		1669.9					
1/2"		1379.6	2662.8	33.7	5207.7	65.9	4
1/2"		1503.8					
3/4"		1466.2	1355.9	17.2	2544.9	32.2	4
#8		653.7	543.4	6.9	1189.0	15.0	4
#16	↓	755.9	645.6	8.2	645.6	8.1	4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 10

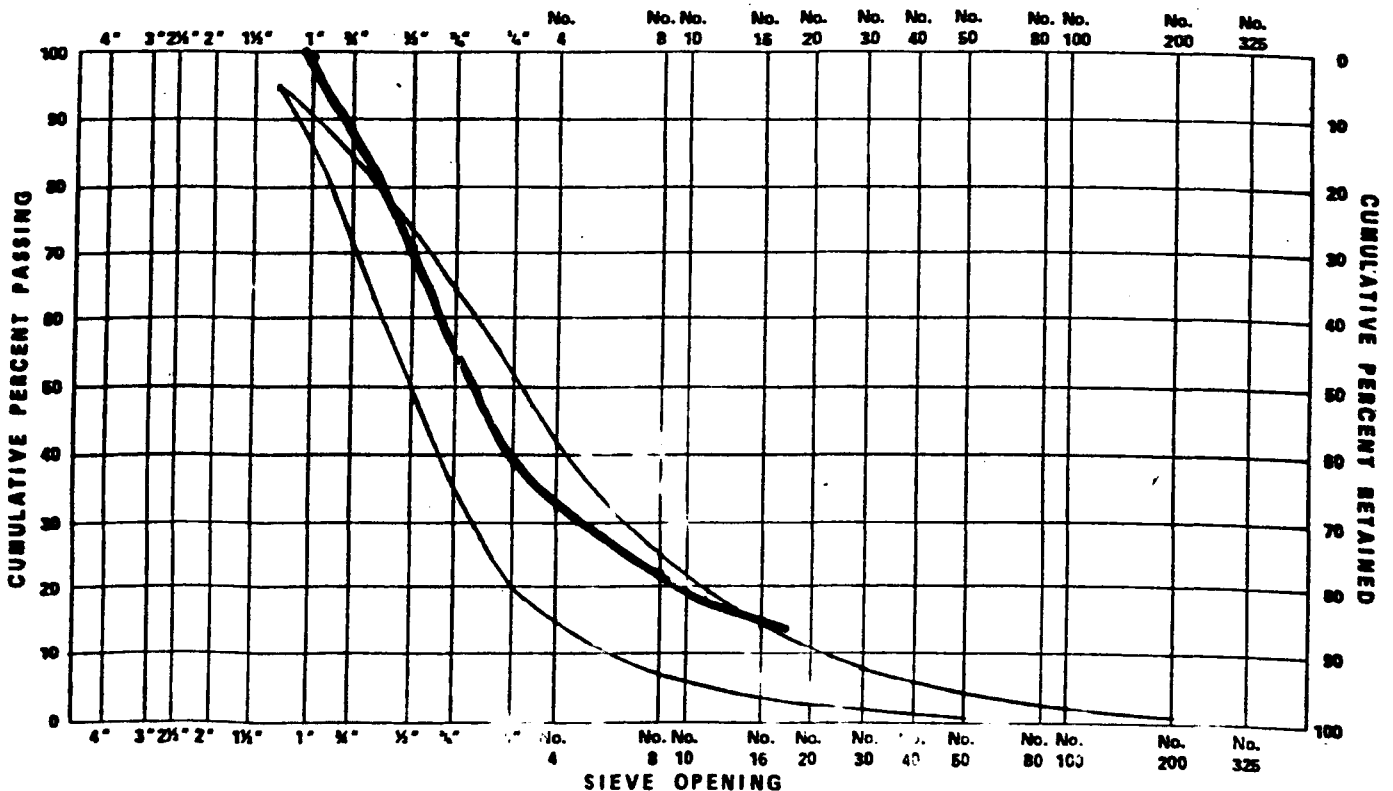
DATE SAMPLE TAKEN 3-2-79

TEST SITE 6

TEST PERFORMED BY Job

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.0	170.3	80.3	1.1	6992.5	100.0	4
1"	↓	773.6	1988.9	28.4	6912.2	98.9	4
1"		1435.13					
2"		1152.4	2182.6	31.2	4923.3	70.5	4
2"		1252.2					
4"		1333.6	1223.6	17.5	2740.7	39.3	4
8"		563.7	453.7	6.5	1517.1	21.8	4
16"		1173.4	1063.4	15.2	1063.4	15.3	4



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SIEVE ANALYSIS TEST REPORT

TEST NO. 15

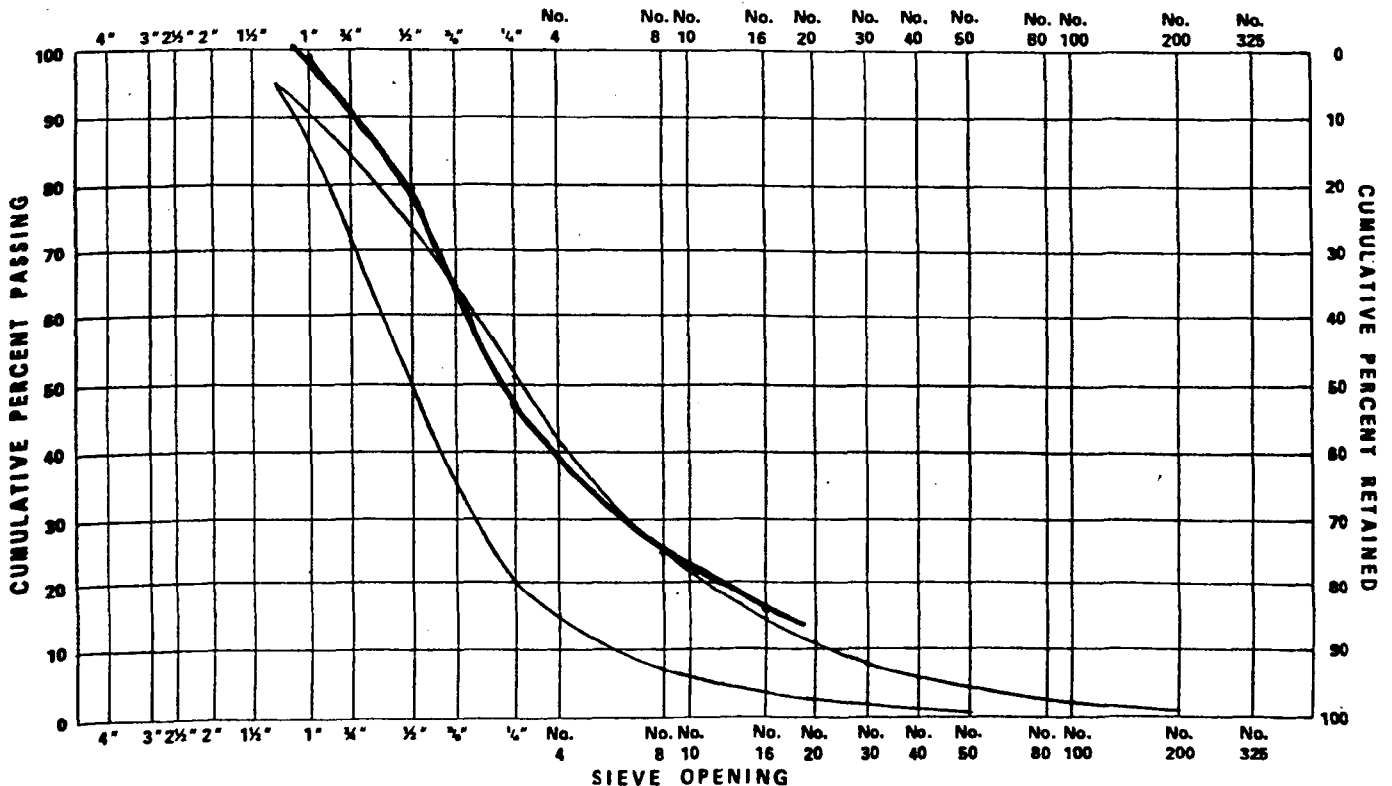
DATE SAMPLE TAKEN JOB

TEST SITE G

TEST PERFORMED BY 3-15-79

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.0	200.0	90.0	1.5	5934.7	100.0	4
1"		1230.4	1120.4	18.9	5844.7	98.5	4
1/2"		1118.4 1058.1	1956.5	33.0	4724.3	79.5	4
1/4"		746.4 772.1	1298.5	21.9	2767.8	46.6	4
#8		676.7	566.7	9.5	1469.3	24.7	4
#16		1012.6	902.6	15.2	902.6	15.2	4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 16

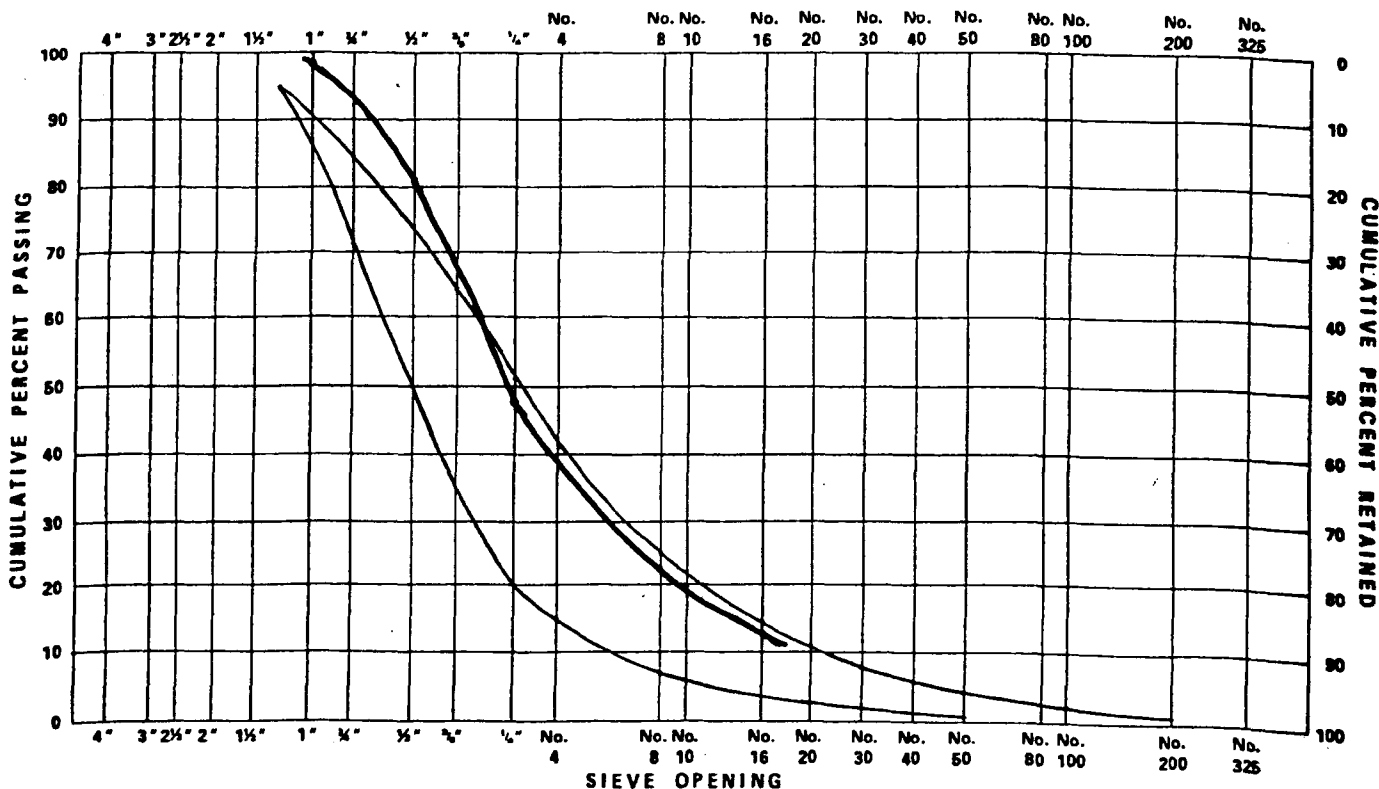
DATE SAMPLE TAKEN 3-17-79

TEST SITE G

TEST PERFORMED BY VOS

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.0	190.0	80.0	1.7	4662.7	100.0	4
1"	↓	934.3	824.3	17.7	4582.7	98.3	4
1/2"		1641.5	1531.5	32.8	3758.4	80.6	4
3/4"		1277.0	1167.0	25.0	2226.9	47.8	4
#8		565.4	455.4	9.8	1054.7	22.8	4
#16		714.5	604.5	13.0	604.5	13.0	4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 17

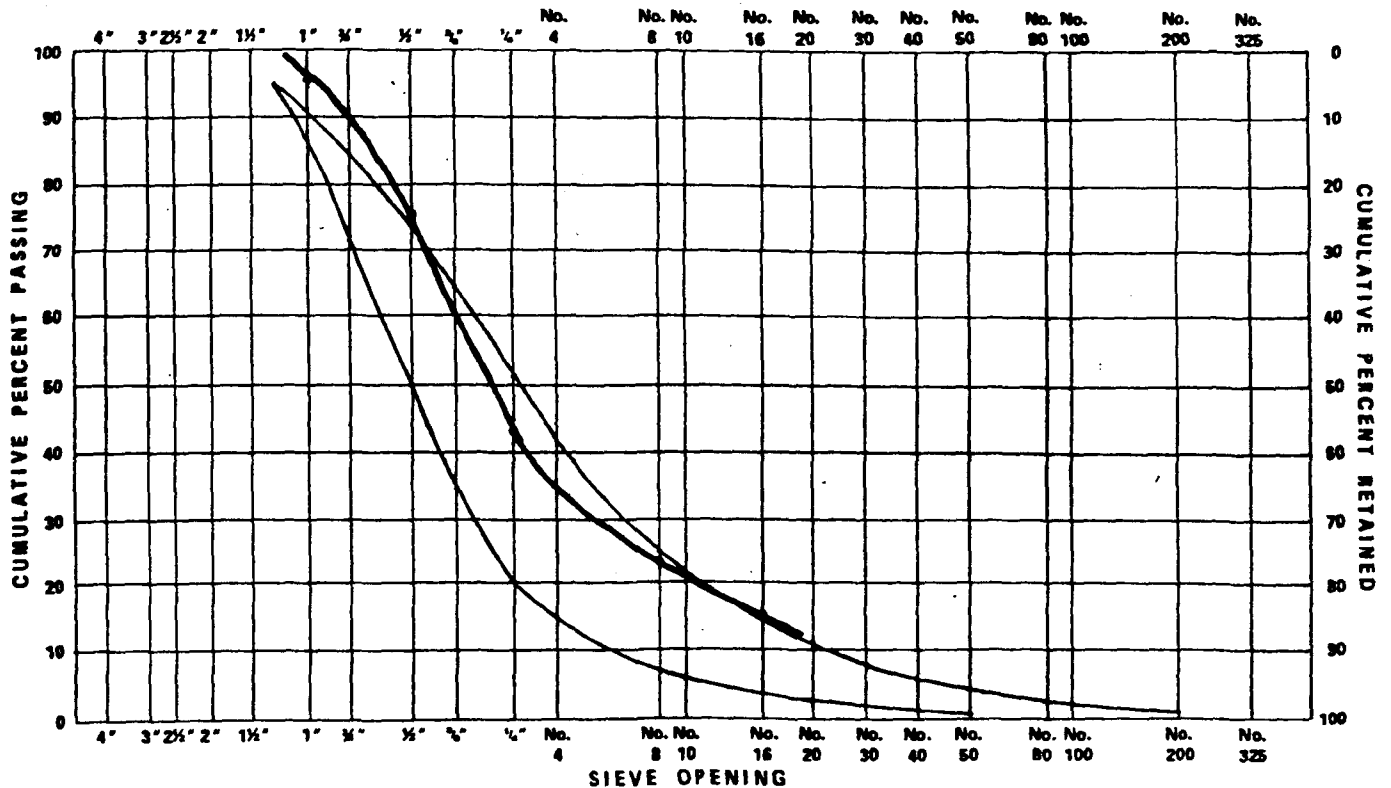
DATE SAMPLE TAKEN 3-17-79

TEST SITE G

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.8	361.6	250.8	43	5816.5	100.0	4
1"		1311.0	1200.2	20.6	5565.7	95.6	4
1/2"		991.3	1863.6	32.0	4365.5	75.0	4
1/4"		1093.9	1164.0	20.0	2501.9	43.0	4
#8		1274.8	466.2	8.0	1337.9	23.0	4
#10	V	577.0	871.7	15.0	871.7	15.0	4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 18

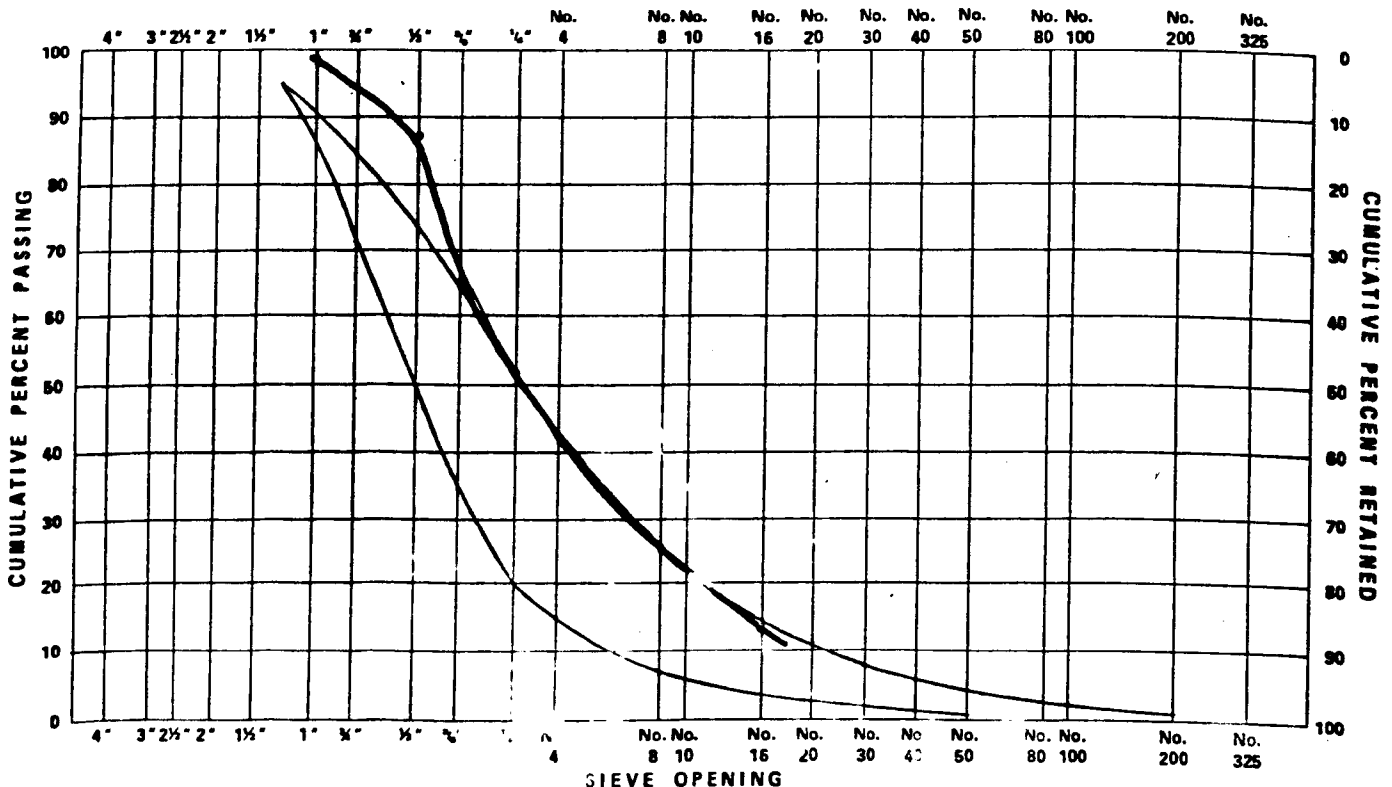
DATE SAMPLE TAKEN 3-18-79

TEST SITE 6

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION D

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	1100	191.3	81.3	1.4	5978.3	100.0	4
1"	↓	846.9	736.9	12.3	5897.0	98.6	4
1/2"		780.7 1493.0	2053.7	34.4	5160.1	86.3	4
3/4"		735.6 1130.6	1646.2	27.5	3106.4	51.9	4
#6		715.3	605.3	10.1	1460.2	24.4	4
#16		964.9	854.9	14.3	854.9	14.3	4



236

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KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 19

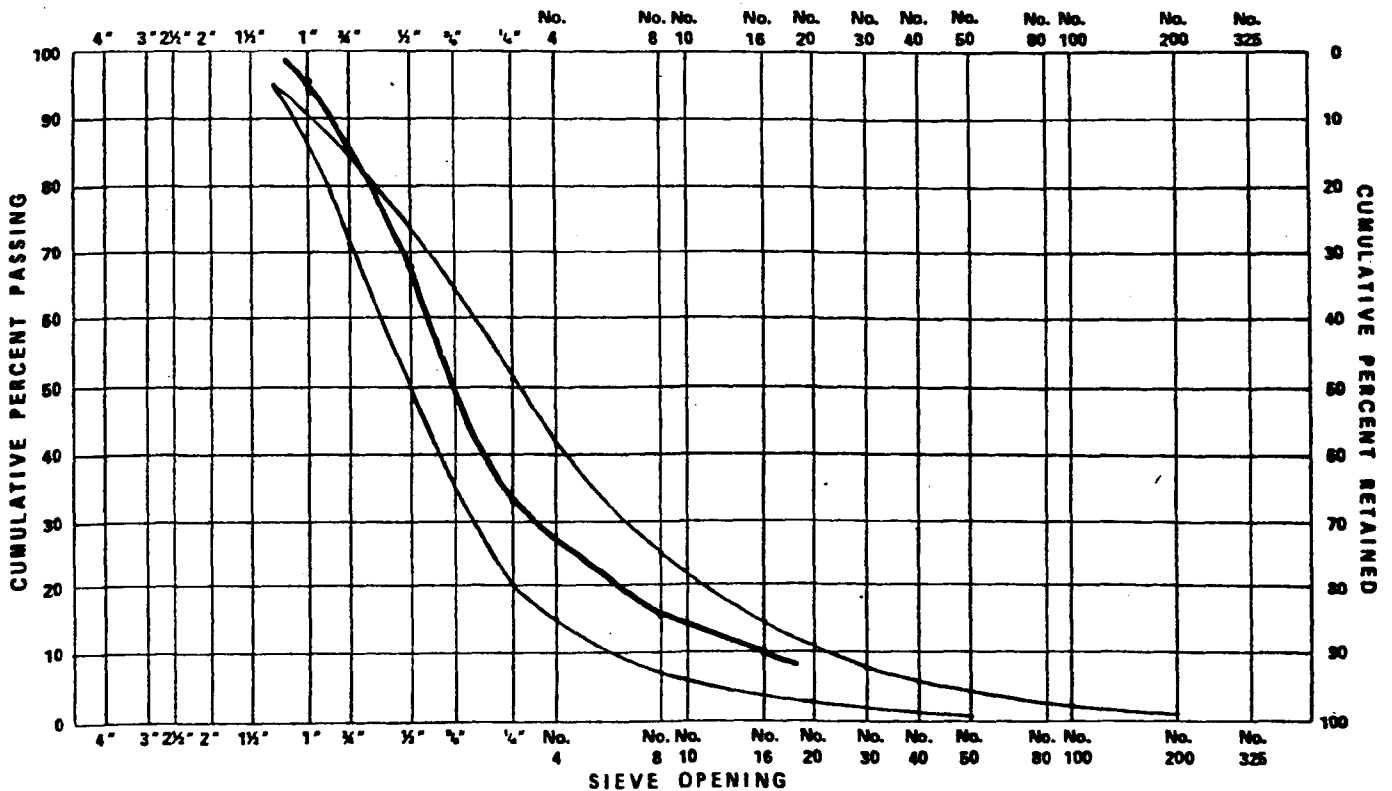
DATE SAMPLE TAKEN 3-18-79

TEST SITE G

TEST PERFORMED BY JCR

SAMPLE IDENTIFICATION D

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.2	391.2	281.0	4.3	6510.5	100.0	4
1"		998.1 1038.6	1816.3	27.4	6229.5	95.7	4
1/2"		1144.0 1304.6	2228.2	34.2	4413.2	67.8	4
1/4"		1299.7	1189.5	18.3	2135.0	33.6	4
#8		460.4	350.2	5.4	995.5	15.3	4
#16		755.5	645.3	9.9	645.3	9.9	4



237

15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 20

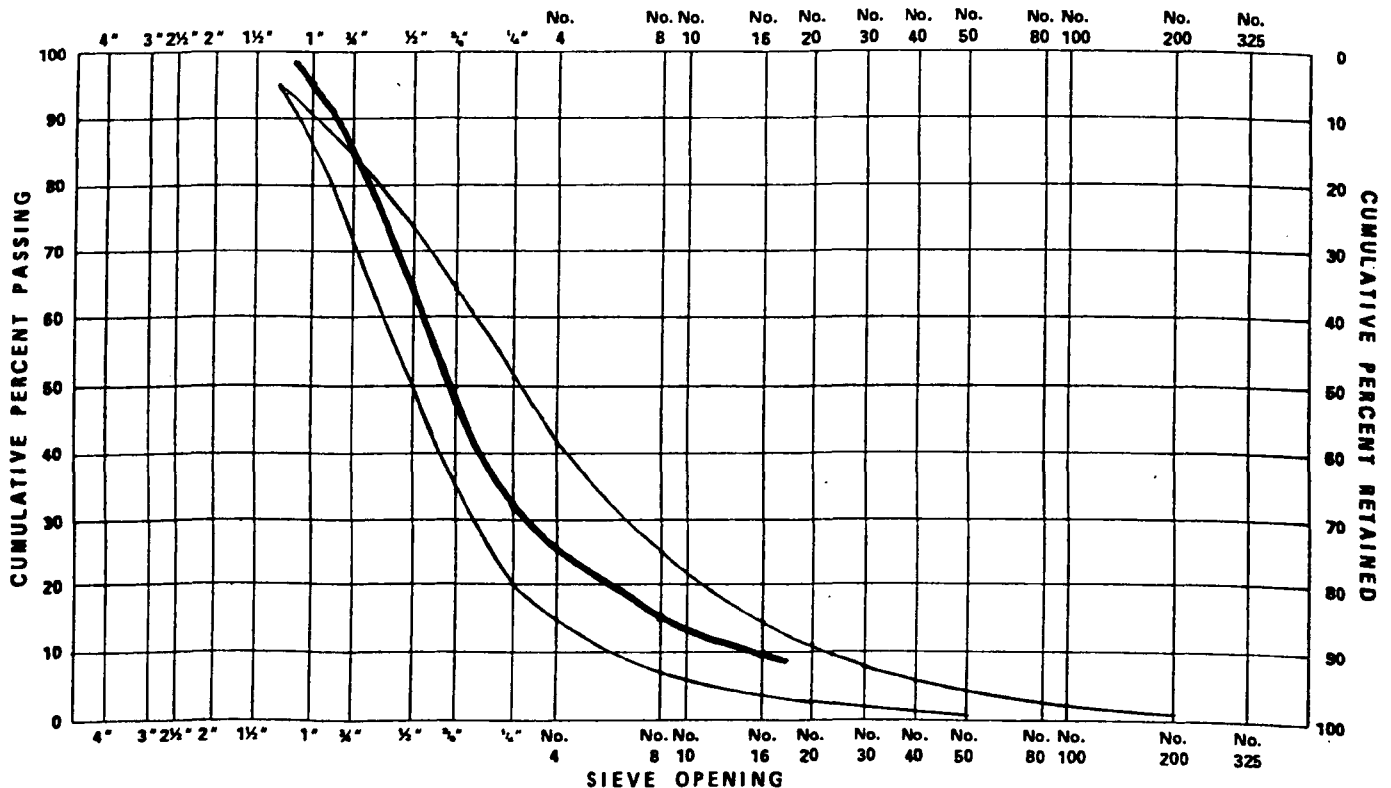
DATE SAMPLE TAKEN 3-21-76

TEST SITE G

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION D

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.0	309.7	199.7	35	5708.1	100.0	4
1"		1944.7	1834.7	32.1	5508.4	96.5	4
1/2"		8678	1845.5	32.3	3673.7	64.4	4
3/8"		11777	995.2	17.4	1828.2	32.1	4
#8		407	291.7	5.1	833.0	14.7	4
#16		651.3	541.3	9.5	541.3	9.6	4



238

15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 22

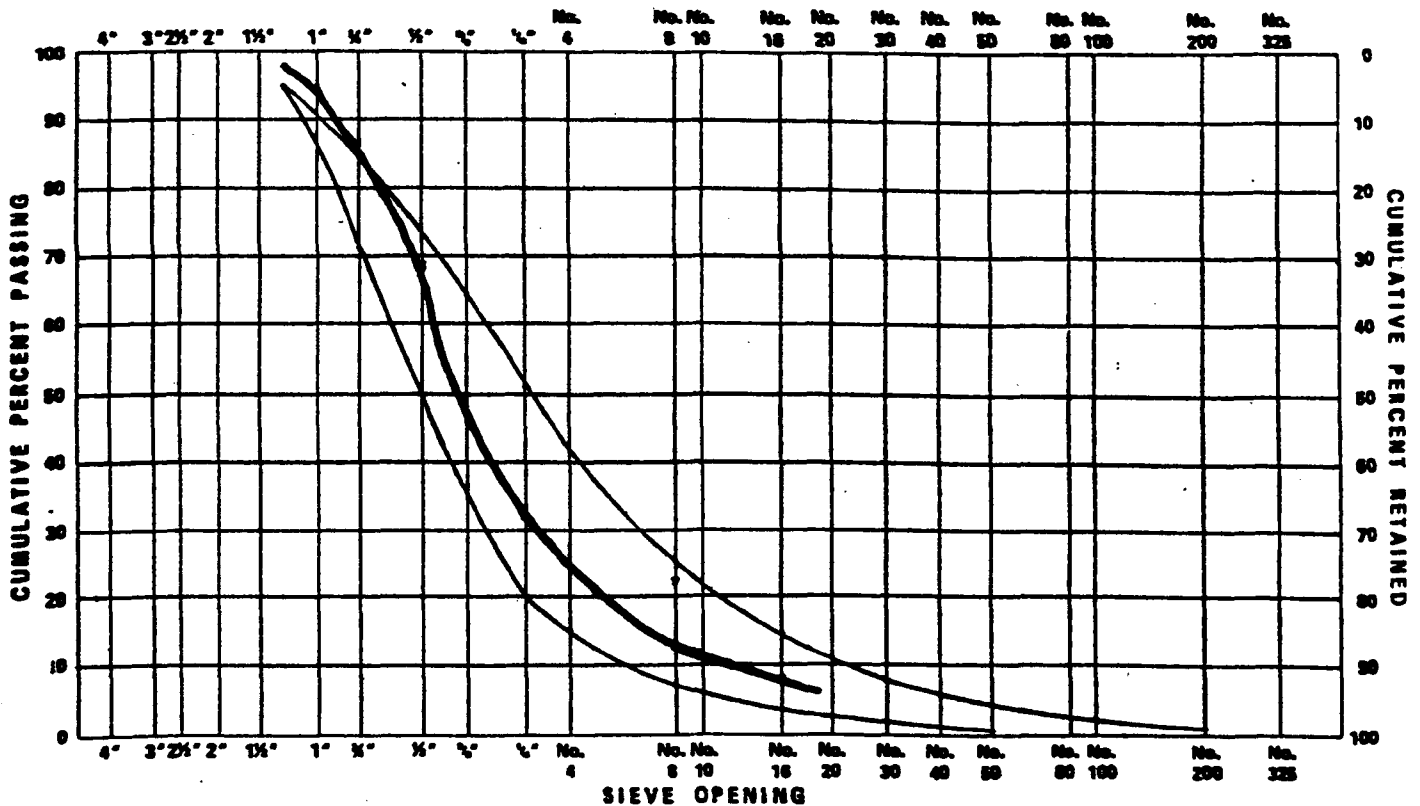
DATE SAMPLE TAKEN 3-22-79

TEST SITE 6

TEST PERFORMED BY JGR

SAMPLE IDENTIFICATION D

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.0	447.1	337.1	5.8	5830.7	100.0	4
1"		1584.5	1474.5	25.9	5493.6	94.2	4
2"		1192.5	2159.0	37.0	4019.1	68.9	4
4"		1197.6	1087.6	18.7	1860.1	31.9	4
#8		413.5	303.5	5.2	772.5	13.2	4
#16		579.0	469.0	8.0	469.0	8.0	4



239

15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 23

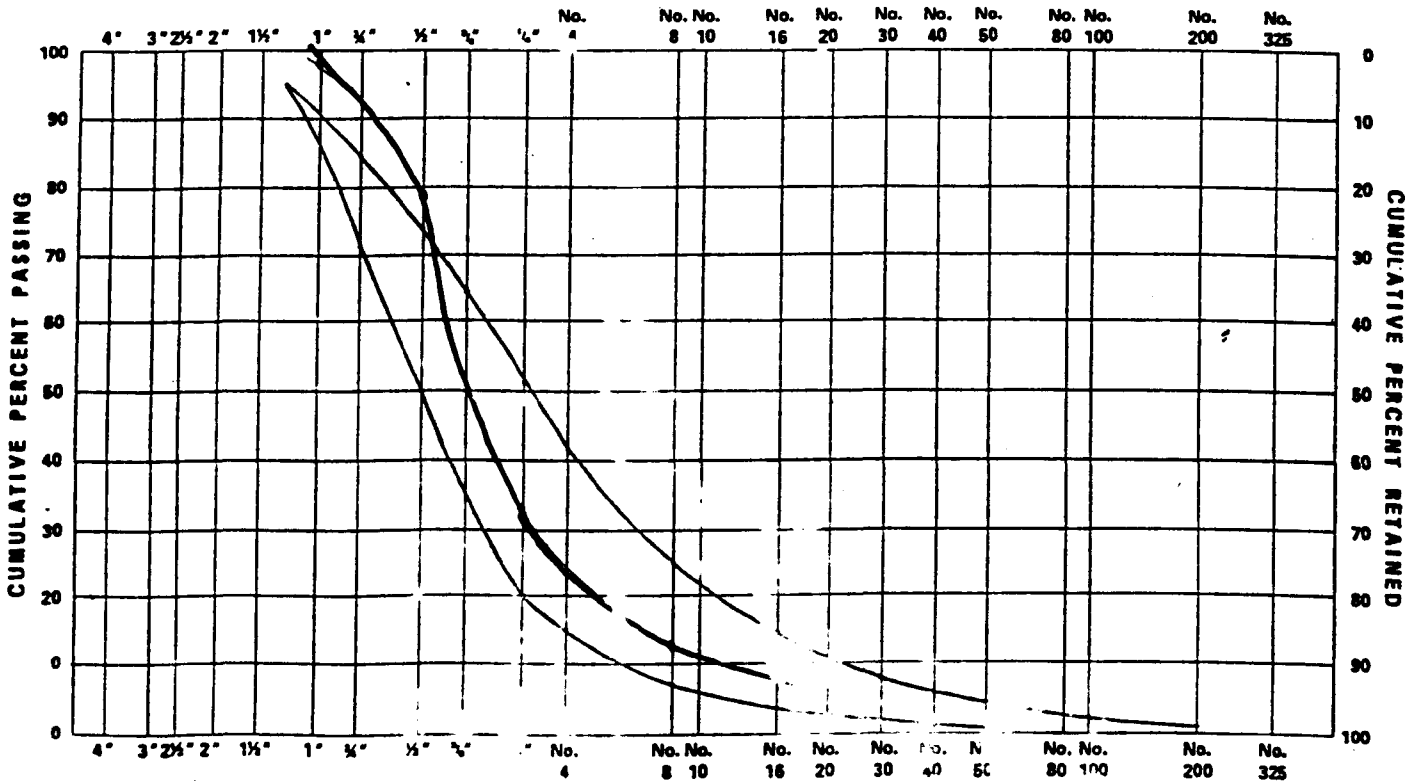
DATE SAMPLE TAKEN 3-21-79

TEST SITE E

TEST PERFORMED BY JGJ

SAMPLE IDENTIFICATION D

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.0	179.2	69.2	1.4	5043.7	100.0	4
1"		1094.0	984.0	19.5	4974.5	98.6	4
2"		1257.2	2360.5	46.8	3990.5	79.1	4
4"		1105.0	995.0	19.7	1630.0	32.3	4
#8		344.0	234.0	4.6	635.0	12.6	4
#16		54.0	40.0	8.0	40.0	8.0	4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 24

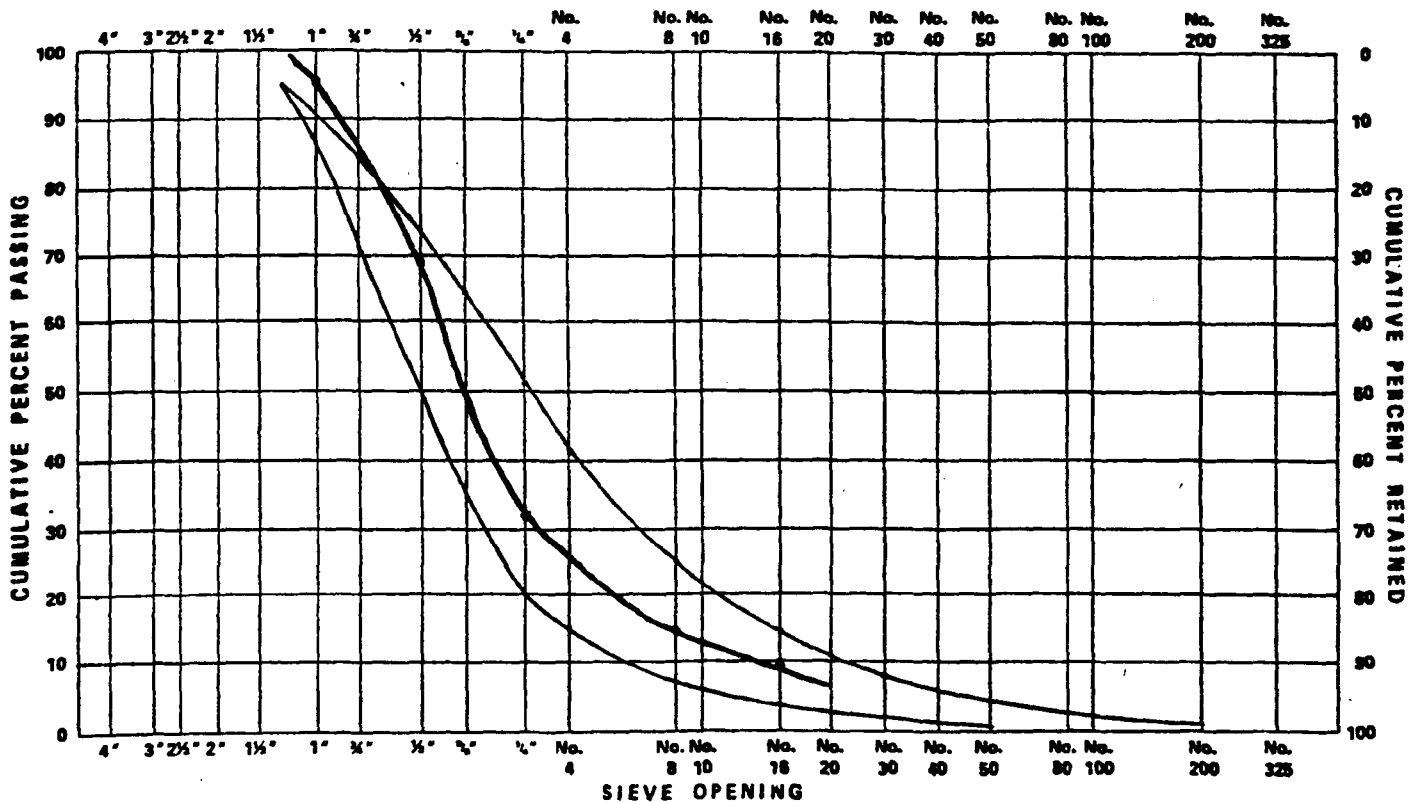
DATE SAMPLE TAKEN 3/24/77

TEST SITE G

TEST PERFORMED BY JD

SAMPLE IDENTIFICATION D

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110	391.5	231.5	4.4	5312.4	100.0	4
1"		1516.9	1406.9	26.5	5180.9	95.6	4
1/2"		1339.2 876.4	1996.3	37.6	3674.0	69.1	4
1/4"		1030.8	920.8	17.3	1677.7	31.5	4
# 8		558.3	240.3	4.5	756.7	14.2	4
# 10		616.6	516.6	9.7	516.6	9.7	4



241

15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Composite

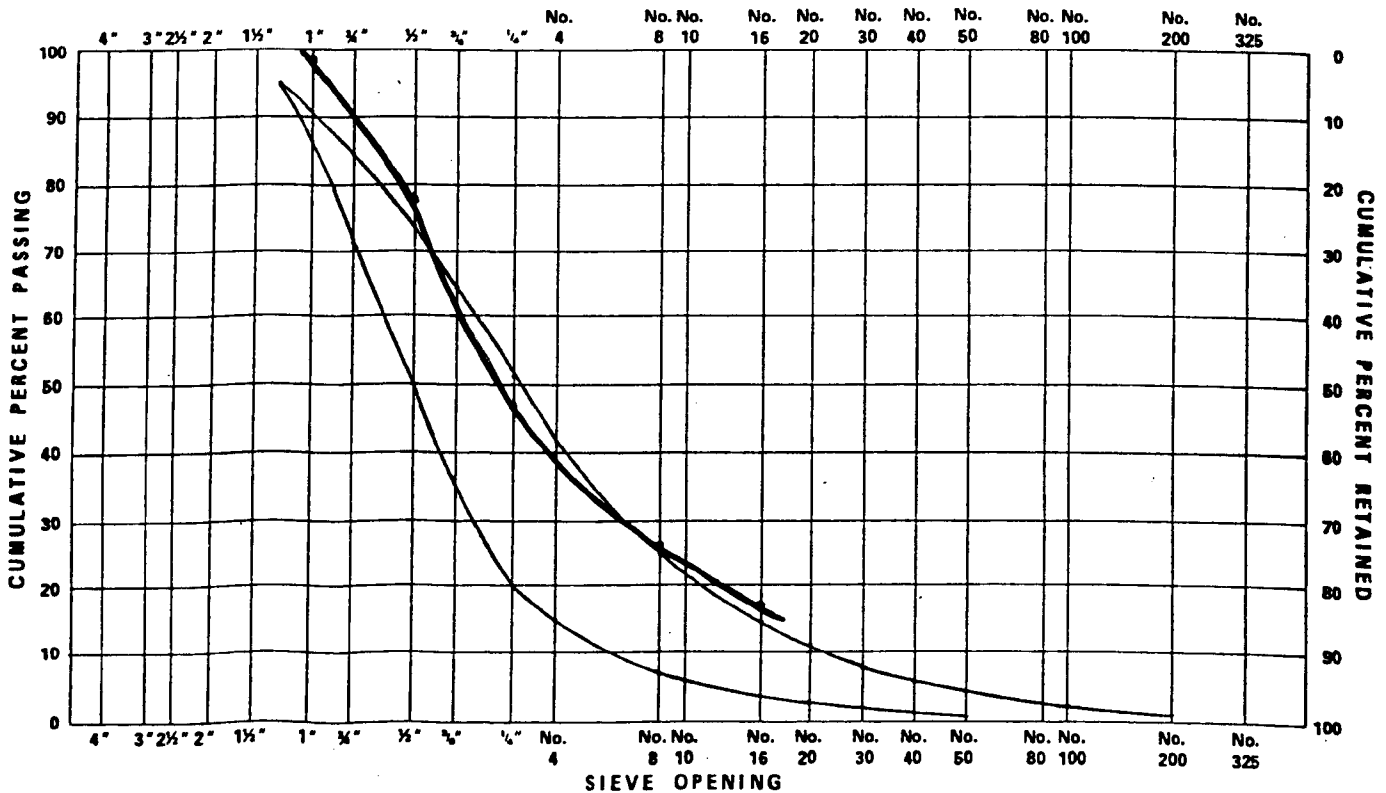
DATE SAMPLE TAKEN

TEST SITE 6

TEST PERFORMED BY JB

SAMPLE IDENTIFICATION A

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	1100	2076	976	1.9	5192.1	100.0	4
1"		11827	1072.7	20.7	5094.5	98.2	4
1/2"		8800 945.0	1605.0	30.9	4021.8	77.5	4
3/4"		1271.8	1104.8	21.3	2416.8	46.6	4
#2		554.1	444.1	8.6	1312.0	25.3	4
#16		977.9	867.9	16.7	867.9	16.7	4



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Composite

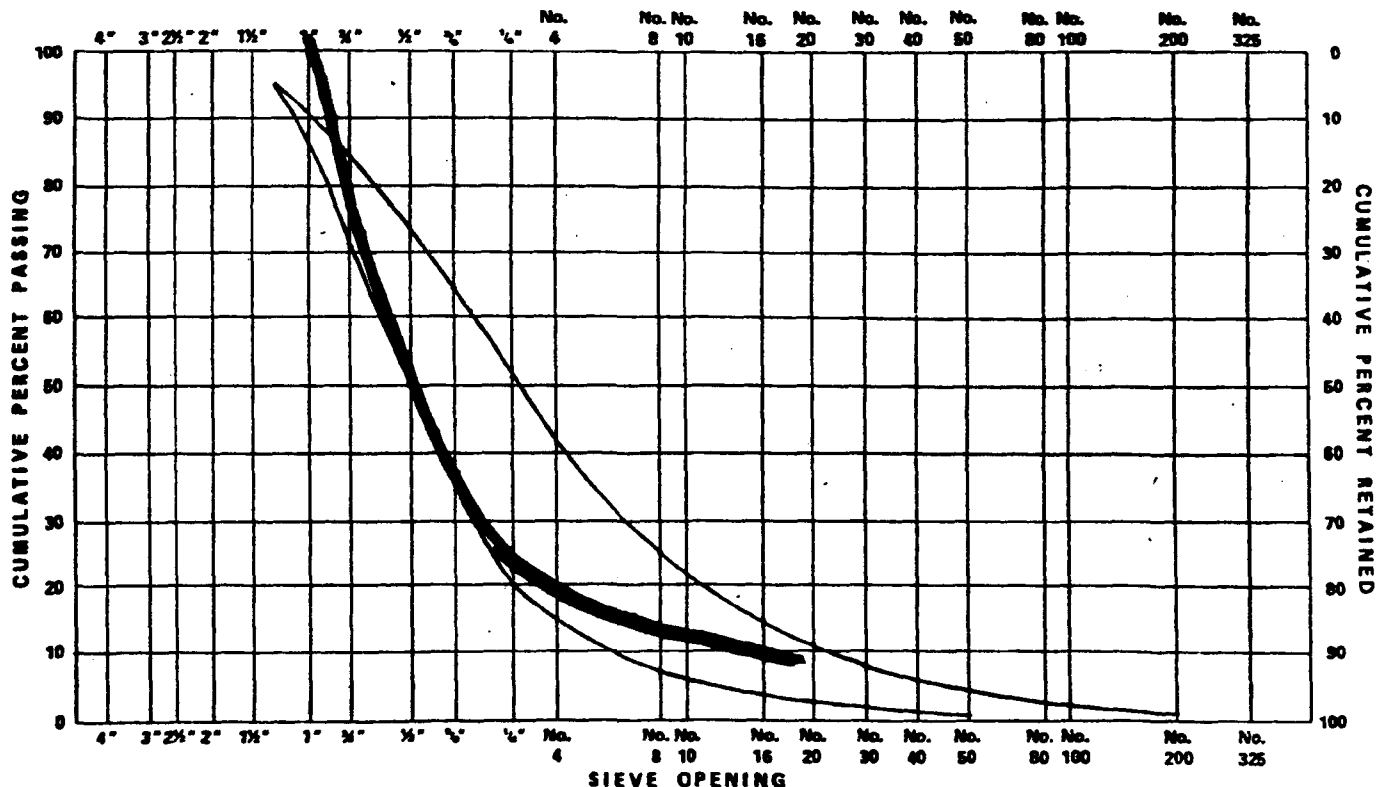
DATE SAMPLE TAKEN —

TEST SITE 6

TEST PERFORMED BY J.B.

SAMPLE IDENTIFICATION B

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.6	127.6	17.0	0.2	8514.3	100.0	4
1"	↓	4316.7	4206.1	49.4	8497.3	99.8	4
1/2"	↓	2503.1	2392.5	28.1	4291.2	50.4	4
3/4"	↓	895.4	774.8	9.1	1898.7	22.3	4
#8	↓	425.6	315.0	3.7	1123.9	13.2	4
#16	↓	698.3	808.9	9.5	808.9	9.5	4



243

15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Comp Coal D

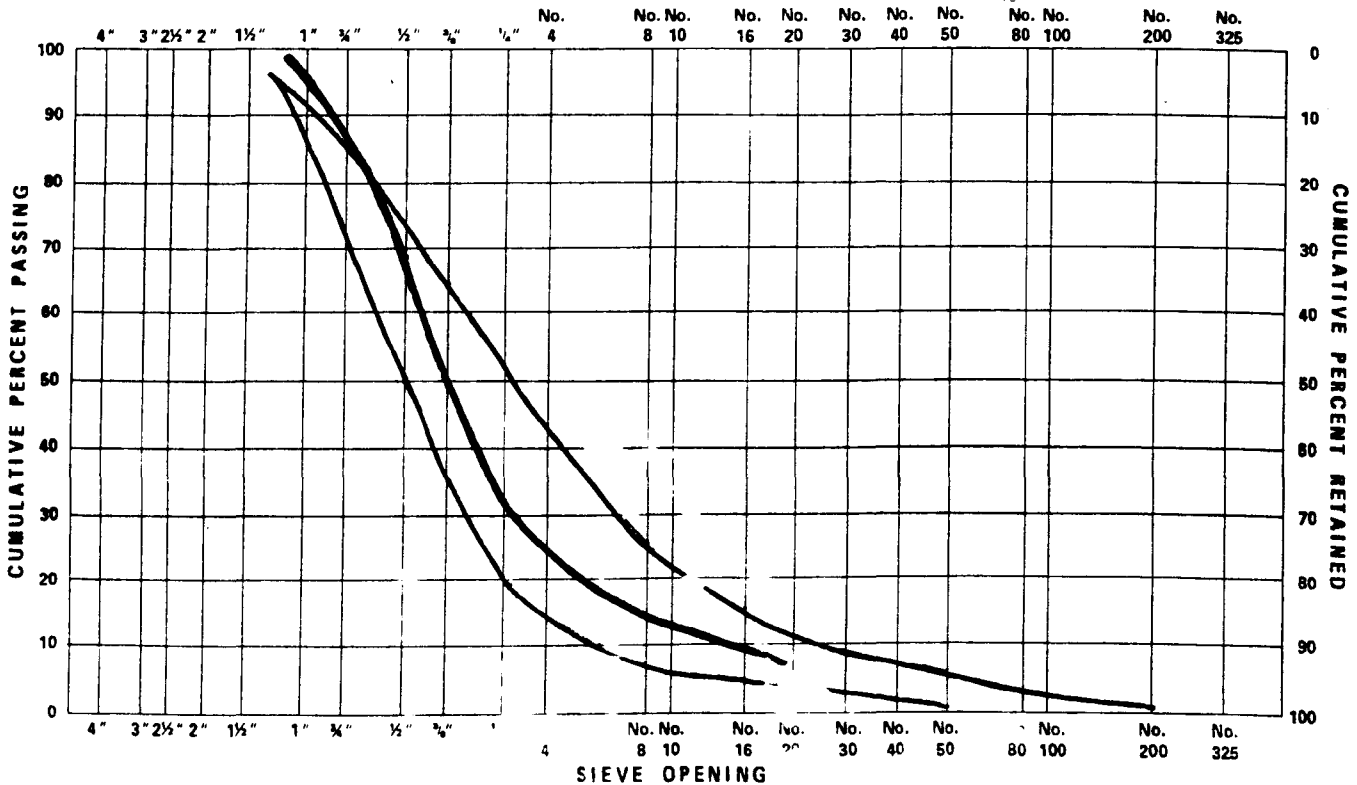
DATE SAMPLE TAKEN 1

TEST SITE G

TEST PERFORMED BY JD

SAMPLE IDENTIFICATION coal D

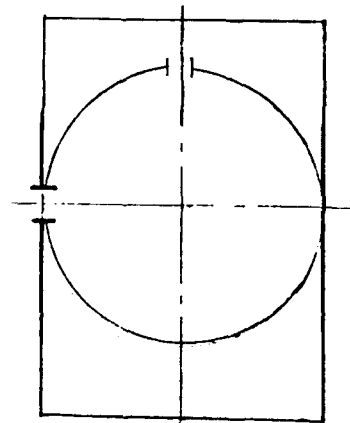
Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.0	417.1	307.1	5.4	5711.5	100.0	4
1"	↓	1609.9	1499.9	26.3	5404.5	94.6	4
1/2"	↓	1354.6 930.6	2065.2	36.2	3904.5	68.3	4
1/4"	↓	1125.9	1015.9	17.8	1839.3	32.1	4
#8	↓	409.2	299.2	5.2	823.4	14.3	4
#16	↓	634.2	524.2	9.2	524.2	9.1	4



SECTION 6.0
OVERFIRE AIR TRAVERSES

	PAGE
6.1 OVERFIRE AIR DATA SHEETS	246

**OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE**



TEST NO. 13
 LOCATION NO. TEST SITE G
 DATE MARCH 15 1979
 SAMPLING LOCATION OFA - Main Duct - gray tape standard p.tet tube
 INSIDE OF FAR WALL TO OUTSIDE OF NIPPLE, (DISTANCE A) 13 1/4" BAROMETRIC PRESS, in.Hg 30.58
 INSIDE OF NEAR WALL TO OUTSIDE OF NIPPLE, (DISTANCE B) 1 3/8" STACK PRESS., Ps, iwg 22
 STACK I.D. (DISTANCE A - DISTANCE B) 11 7/8" STK. GAS SP. GRAVITY, G_S
 NEAREST UPSTREAM DISTURBANCE _____
 NEAREST DOWNSTREAM DISTURBANCE _____

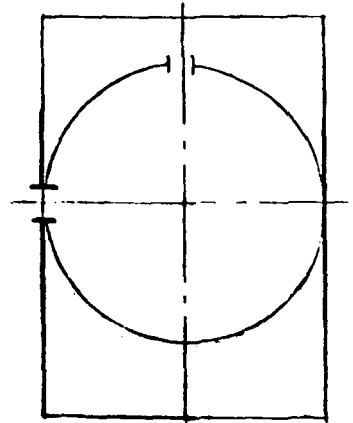
Area = 0.769 ft²
 T_{wet} = 57°F
 RH = 21%
 OFA setting = 66

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (ΔP_s), in. H ₂ O ΔP_1 ΔP_2		STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
1.	3.3	0.392 + 1.38 = 1.77	0.78	0.82	81 57		
2.	10.5	1.247 + " = 2.622	1.40	0.87			
3.	19.4	2.304 + " = 3.679	1.40	0.94			
4.	32.3	3.836 + " = 5.211	1.30	1.10			
5.	67.7	8.039 + " = 9.414	1.30	1.30			
6.	80.6	9.571 + " = 10.946	1.00	1.20			
7.	89.5	10.625 + " = 12.003	1.10	1.10			
8.	96.7	11.483 + " = 12.858	0.80	1.05			
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average $\sqrt{\Delta P}$			1.059	1.021			
TOTAL AVE			1.04				

STACK GAS, V_s = 174 F_s $\sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{407}{P_s}\right) \left(\frac{1.00}{G_s}\right)}$
 SPEED

OVERFIRE AIR TRAVERSE SMOKESTACK FLOW PROFILE

TEST NO. 13
 LOCATION NO. TEST SITE G
 DATE March 15, 1979
 SAMPLING LOCATION OFA - Rear Upper Duct Back
 INSIDE OF FAR WALL TO
 OUTSIDE OF NIPPLE, (DISTANCE A) 7 1/8" BAROMETRIC PRESS., in. Hg 30.58
 INSIDE OF NEAR WALL TO
 OUTSIDE OF NIPPLE, (DISTANCE B) 1 1/8" STACK PRESS., in. Hg 22
 STACK I.D. (DISTANCE A - DISTANCE B) 6 3/4" STK. GAS SP. GRAVITY, G_s
 NEAREST UPSTREAM DISTURBANCE
 NEAREST DOWNSTREAM DISTURBANCE



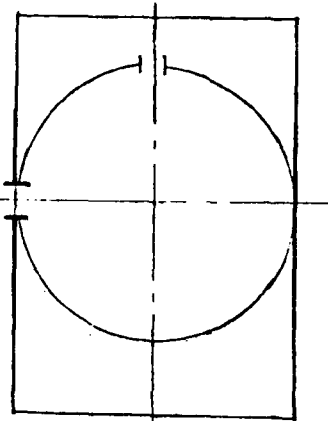
Area = 0.244 ft²
 RH = 21%
 OFA setting = 66

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H ₂ O Δp_1 Δp_2		STACK TEMPERATURE (T_s), °F	OXYGEN %	STACK GAS SPEED, V_s ft/min
1.	4.4	0.297 + 1.125 = 1.422	2.3	2.2	83 Twet 59		
2.	14.7	0.992 + " = 2.417	2.2	2.1	↓ ↓		
3.	29.5	1.991 + " = 3.416	2.2	2.0	↓ ↓		
4.	44.3	2.989 + " = 4.415	1.5	1.3	↓ ↓		
5.	58.8	3.988 + " = 5.414	1.4	1.3	↓ ↓		
6.	73.6	4.987 + " = 6.413	1.5	1.3	↓ ↓		
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average Δp			1.35	1.29			
TOTAL ME			1.32				

$$\text{STACK GAS, } V_s = 174 F_s \sqrt{\frac{\text{Average } \Delta p (T_s + 460)}{P_s} \left(\frac{407}{P_s} \right) \left(\frac{1.00}{G_s} \right)}$$

SPEED

OVERPIPE AIR TRAVERSE SMOKESTACK FLOW PROFILE



TEST NO. 13
 LOCATION NO. TEST SITE C
 DATE March 15, 1979
 SAMPLING LOCATION OFF - REAR lower of A AP1 - masking tape AP2 - black
 INSIDE OF FAR WALL TO
 OUTSIDE OF NIPPLE, (DISTANCE A) 8 1/4" BAROMETRIC PRESS, in.Hg 30.58
 INSIDE OF NEAR WALL TO
 OUTSIDE OF NIPPLE, (DISTANCE B) 1 1/2" STACK PRESS., Ps, inHg 20
 STACK I.D. (DISTANCE A - DISTANCE B) 6 3/4" STK. GAS SP. GRAVITY, Gs
 NEAREST UPSTREAM DISTURBANCE
 NEAREST DOWNSTREAM DISTURBANCE

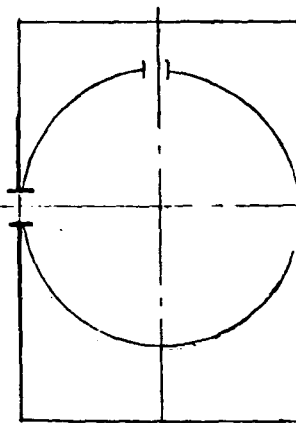
Area = 0.249 ft²
 RH = 21%
 off setting = 68

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (ΔP_s), in. H ₂ O AP ₁ AP ₂	STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
1.	4.4	.247 + 1.5 = 1.747	.71 1.10	82 58		
2.	14.7	.992 + = 2.492	.74 1.10			
3.	29.5	1.991 + = 3.491	.83 1.10			
4.	70.5	4.759 + = 6.259	1.10 1.00			
5.	85.3	5.758 + = 7.258	1.10 0.96			
6.	95.6	6.453 + = 7.953	1.10 0.83			
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
Average (AP)			0.96 1.01			
TOTAL AVE			0.98			

STACK GAS, V_s = 174 F_s $\sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{1.00}{G_s}\right)}$
 SPEED

**OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE**

TEST NO. 13
 LOCATION NO. TEST SITE G
 DATE March 15, 1979
 SAMPLING LOCATION OFA - FRONT DUCT - white tape
 INSIDE OF FAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE A) 11 1/4" BAROMETRIC PRESS, in.Hg 30.58
 INSIDE OF NEAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE B) 13/8" STACK PRESS., Ps, iwg 20
 STACK I.D. (DISTANCE A - DISTANCE B) 5 7/8 STK. GAS SP. GRAVITY, G_S _____
 NEAREST UPSTREAM DISTURBANCE _____
 NEAREST DOWNSTREAM DISTURBANCE _____



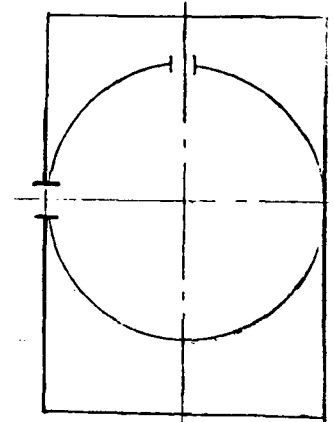
Area = 0.188 ft²
 RH = 21
 OFA setting = 68

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H ₂ O ΔP , <u>AP</u>	STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
1.	4.4	.259 + 1.375 = 1.634	0.41 0.40	81 T _{uct} 57		
2.	14.7	.864 + = 2.239	0.56 0.42			
3.	29.5	1.753 + = 3.109	0.65 0.43			
4.	70.5	4.142 + = 5.517	0.70 0.50			
5.	85.3	5.011 + = 6.386	0.61 0.72			
6.	95.6	5.617 + = 6.992	0.50 0.60			
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
Average <u>AP</u>			0.753 0.711			
FINAL AVE			0.73			

STACK GAS, V_s = 174 F_s $\sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{407}{P_s}\right) \left(\frac{1.00}{G_s}\right)}$
 SPEED

OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE

TEST NO. 14
 LOCATION NO. TEST SITE G
 DATE March 15, 1979
 SAMPLING LOCATION off Main Duct - gray tape
 INSIDE OF FAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in. Hg 30.58
 INSIDE OF NEAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, iwg 23"
 STACK I.D. (DISTANCE A - DISTANCE B) 1178 STK. GAS SP. GRAVITY, G_S _____
 NEAREST UPSTREAM DISTURBANCE _____
 NEAREST DOWNSTREAM DISTURBANCE _____



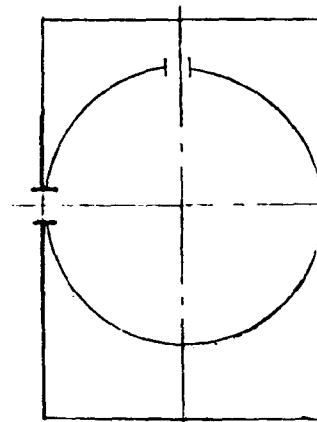
Area = 0.769 ft²
 RH = 21%
 off setting = 90

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (ΔP_s), in. H ₂ O ΔP	STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
1.	3.3	1.767	0.84	0.75	81	57
2.	10.5	2.622	1.50	0.83		
3.	19.4	3.679	1.50	0.95		
4.	32.3	5.211	1.30	1.05		
5.	67.7	9.414	1.05	1.20		
6.	80.6	10.946	0.87	1.20		
7.	89.5	12.003	0.82	1.20		
8.	96.7	12.858	0.74	1.20		
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
Average ΔP			1.029	1.020		
TOTAL AVE			1.02			

STACK GAS, V_s = 174 F_s $\sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{407}{G_s}\right) \left(\frac{1.00}{G_s}\right)}$
 SPEED

**OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE**

TEST NO. 14
 LOCATION NO. TEST SITE 9
 DATE March 15 1979
 SAMPLING LOCATION off Rear Upper Duct - black to
 INSIDE OF FAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PR., in. Hg 30.58
 INSIDE OF NEAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, inwg 23"
 STACK I.D. (DISTANCE A - DISTANCE B) 6 3/4" STK. GAS SP. GRAVITY, G_s _____
 NEAREST UPSTREAM DISTURBANCE _____
 NEAREST DOWNSTREAM DISTURBANCE _____



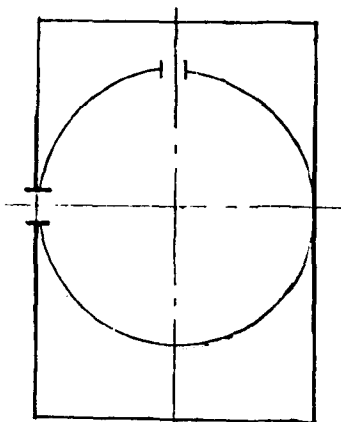
Area = 0.249 ft²
 RH = 21%
 off setting = 90

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (ΔP_s), in. H ₂ O ΔP_s	STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
1.	4.4	1.422	2.2	84		
2.	14.7	2.117	2.2	59		
3.	29.5	3.116	2.1			
4.	40.5	5.884	1.4			
5.	85.3	6.883	1.7			
6.	95.6	7.578	1.2			
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
Average			1.333			1.246
REAL AVE			1.29			

STACK GAS, V_s = 174 F_s $\sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{407}{P_s}\right) \left(\frac{1.00}{G_s}\right)}$
 SPEED

**OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE**

TEST NO. 14
 LOCATION NO. TEST SITE G
 DATE March 15, 1979
 SAMPLING LOCATION OFA - Room lower part AP₁ - masking tape AP₂ - block
 INSIDE OF FAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in. Hg 30.58
 INSIDE OF NEAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, iwg 21"
 STACK I.D. (DISTANCE A - DISTANCE B) 6 3/4 STK. GAS SP. GRAVITY, G_S _____
 NEAREST UPSTREAM DISTURBANCE _____
 NEAREST DOWNSTREAM DISTURBANCE _____

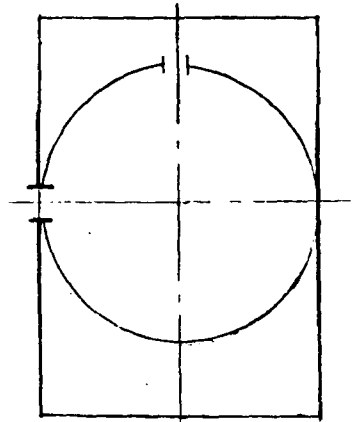


$A_{ave} = 0.249 \text{ ft}^2$
 $RH = 21\%$
 OFA setting = 90

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H ₂ O		STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
			AP ₁	AP ₂			
1.	4.4	1.797	0.93	0.63	83°F		
2.	14.7	2.492	1.0	0.77			
3.	24.5	3.491	1.1	0.88			
4.	30.5	6.259	1.2	1.1			
5.	85.3	7.258	1.1	1.2			
6.	95.6	7.953	0.90	1.3			
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average AP ₁			1.018	0.982			
TOTAL AVE				1.00			

STACK GAS, V_S = 174 F_S $\sqrt{\frac{\text{Average } \Delta P(T_s + 460)}{P_s} \cdot \frac{1.00}{G_s}}$
 SPEED

**OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE**



Area = 0.185 ft²
RH = 21
ofA setting = 90

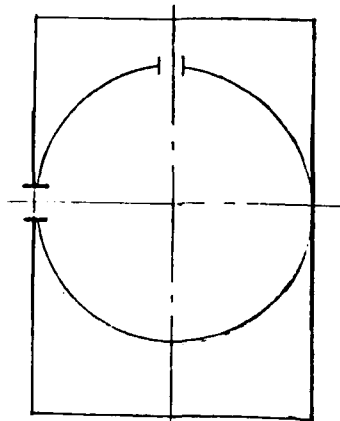
TEST NO. 14
LOCATION NO. TEST SITE 6
DATE March 15, 1979
SAMPLING LOCATION OFA - Front Duct - white tape
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in.Hg 30.53
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, inwg 21"
STACK I.D. (DISTANCE A - DISTANCE B) 5 7/8 STK. GAS SP. GRAVITY, G_S _____
NEAREST UPSTREAM DISTURBANCE _____
NEAREST DOWNSTREAM DISTURBANCE _____

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H ₂ O DP ₁ DP ₂	STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
1.	4.4	1.634	0.65 0.62	82		
2.	14.7	2.239	0.70 0.65			
3.	24.5	3.109	0.66 0.78			
4.	30.5	5.517	0.70 0.69			
5.	85.3	6.386	0.60 0.45			
6.	95.6	6.992	0.57 0.44			
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16.						
17.						
18.						
Average <u>67</u>			0.806 0.774			
			0.19			

STACK GAS, V_s = 174 F_s $\sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{407}{P_s}\right) \left(\frac{1.00}{G_s}\right)}$
SPEED

OVERFIRE AIR TRAVERSE SMOKESTACK FLOW PROFILE

TEST NO. 21
 LOCATION NO. TEST SITE G
 DATE March 22, 1979
 SAMPLING LOCATION OFA - Main Duct - gray tape using standard Pitot
 INSIDE OF FAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in.Hg 30.51
 INSIDE OF NEAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, iwg 16
 STACK I.D. (DISTANCE A - DISTANCE B) 11.4 STK. GAS SP. GRAVITY, G_S _____
 NEAREST UPSTREAM DISTURBANCE _____
 NEAREST DOWNSTREAM DISTURBANCE _____



Area = 0.769 ft²
 OFA setting = 40
 RH = 50%

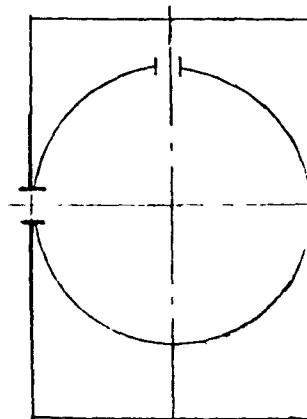
TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (ΔP _s), in. H ₂ O ΔP _i ΔP _e	STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
1.	3.3	1.767"	0.48 0.58	80 T _{wet} 67		
2.	10.5	2.622	0.71 0.65			
3.	19.4	3.679	0.81 0.74			
4.	32.3	5.211	0.94 0.79			
5.	67.7	9.414	1.10 1.20			
6.	80.6	10.946	0.93 1.20			
7.	89.5	12.003	0.77 1.20			
8.	96.7	12.858	0.67 1.10			
9.						
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12.						
13.						
14.						
15.						
16.						
17.						
18.						
Average ΔP			0.869 0.955			
TOTAL AVE			0.92			

$$\text{STACK GAS, } V_s = 174 F_s \sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{407}{P_s} \right) \left(\frac{1.00}{G_s} \right)}$$

SPEED

OVERFIRE AIR TRAVERSES
SMOKESTACK FLOW PROFILE

TEST NO. 21
LOCATION NO. TEST SITE C
DATE March 22, 1979
SAMPLING LOCATION OFA - Rear Upper Duct - black +
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETR _____ RES., in. Hg 30.51
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, inwg 15
STACK I.D. (DISTANCE A - DISTANCE B) _____ STK. GAS SP. GRAVITY, G_S _____
NEAREST UPSTREAM DISTURBANCE _____
NEAREST DOWNSTREAM DISTURBANCE _____



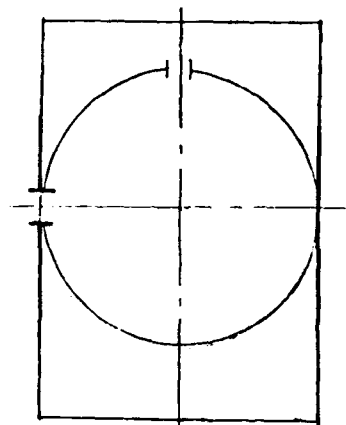
Area = 0.249 ft²
RH = 50%
OFA setting = 40

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (ΔP _s), in. H ₂ O <i>AP_s AB</i>	STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
1.	4.4	1.422"	1.20 1.20	79 <i>T_{wet} 66</i>		
2.	14.7	2.117	1.3 1.05			
3.	29.5	3.116	1.4 1.0			
4.	40.5	5.884	0.56 0.95			
5.	85.3	6.983	0.53 0.87			
6.	95.6	7.578	0.22 0.85			
7.						
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9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
Average <i>AP</i>			0.868 0.92			
<i>REAL AVE</i>			0.93			

STACK GAS, V_s = 174 F_s $\sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{407}{P_s}\right) \left(\frac{1.00}{G_s}\right)}$
SPEED

**OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE**

TEST NO. 21
 LOCATION NO. TEST SITE G
 DATE March 22, 1979
 SAMPLING LOCATION OFA - Rear Lower AP₁ - masking tape AP₂ - black
 INSIDE OF FAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in.Hg _____
 INSIDE OF NEAR WALL TO _____
 OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., P_s, iwq _____
 STACK I.D. (DISTANCE A - DISTANCE B) 6 3/4" STK. GAS SP. GRAVITY, G_s _____
 NEAREST UPSTREAM DISTURBANCE _____
 NEAREST DOWNSTREAM DISTURBANCE _____

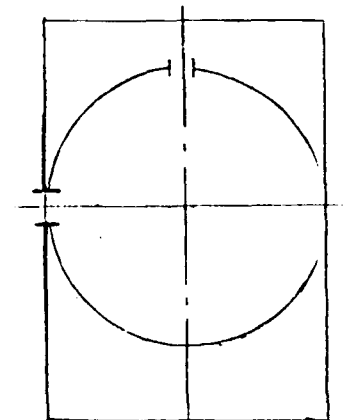


Area = 0.244 ft²
RH = 50%
OFA setting = 42

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (ΔP_s), in. H ₂ O		STACK TEMPERATURE (T _s), °F	OXYGEN %	STACK GAS SPEED, V _s ft/min
			AP ₁	AP ₂			
1.	4.4	1.797"	0.55	1.10	78		
2.	14.7	2.492"	0.75	1.10	5		
3.	29.5	3.491"	0.83	1.20	5		
4.	70.5	6.259"	0.99	1.30	5		
5.	85.3	7.258"	0.82	1.40	5		
6.	95.6	7.953"	0.77	1.50	5		
7.							
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10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

STACK GAS, V_s = 174 F_s $\sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \left(\frac{1.00}{G_s}\right)}$
 SPEED

OVERHEAD AIR TRAVERSE
SMOKESTACK FLOW PROFILE



$A_{area} = 0.188 \text{ ft}^2$
 $RH = 21$
OFA setting 4/2

TEST NO. 21
LOCATION NO. TEST SITE G2
DATE March 22, 1979
SAMPLING LOCATION OFA - Front Duct - white tape
INSIDE OF FAR WALL TO _____
OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in.Hg 30.51
INSIDE OF NEAR WALL TO _____
OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., P_s , inwg 13"
STACK I.D. (DISTANCE A - DISTANCE B) 11/4" STK. GAS SP. GRAVITY, G_s _____
NEAREST UPSTREAM DISTURBANCE _____
NEAREST DOWNSTREAM DISTURBANCE _____

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (ΔP_s), in. H_2O ΔP_1 ΔP_2	STACK TEMPERATURE (T_s), °F Tuct	OXYGEN %	STACK GAS SPEED, V_s ft/min
1.	4.4	1.634"	0.33 0.44	80 67		
2.	14.7	2.239	0.50 0.45			
3.	24.5	3.109	0.54 0.55			
4.	26.5	5.517	0.50 0.51			
5.	85.3	6.386	0.48 0.47			
6.	95.6	6.492	0.40 0.41			
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
Average ΔP			0.675 0.686			
TOTAL AVE			0.68			

$$\text{STACK GAS, } V_s = 174 F_s \sqrt{\frac{\text{Average } \Delta P (T_s + 460)}{P_s} \cdot \frac{1.00}{G_s}}$$

SPEED

TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)		
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4. TITLE AND SUBTITLE Field Tests of Industrial Stoker Coal-fired Boilers for Emissions Control and Efficiency Improvement--Site G (Data Supplement)		5. REPORT DATE April 1980
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7. AUTHOR(S) J. O. Burlingame, R. A. Parker, B. Crockett, W. M. Jackson, and J. D. Demont		8. PERFORMING ORGANIZATION REPORT NO.
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16. ABSTRACT The Data Supplement is a compilation of test data presented in greater detail than was practical in the final technical report. It is intended to provide the necessary details to other researchers who are interested in performing their own analysis. Readers are referred to the contract final report for information as to objectives, description of facility tested and coals fired, test equipment and procedures, interpretations, and conclusions. The final technical report also contains data summaries not found in this Supplement. The Supplement contains panel board data for each test, detailed particulate, O2, CO2, CO, NO, NO2, SO2, and SO3 data, particle size distribution data, chemical analysis of the coal, coal size consistency data, and combustible analysis and overfire air traverse data.		
17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Boilers Combustion Coal Field Tests Dust Stokers	Improvement Efficiency Flue Gases Fly Ash Particle Size Nitrogen Oxides Sulfur Oxides	Air Pollution Control Stationary Sources Combustion Modification Spreader Stokers Particulate Overfire Air Flyash Reinjection
		13B 13A 21B 21D 14B 11G 07B
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