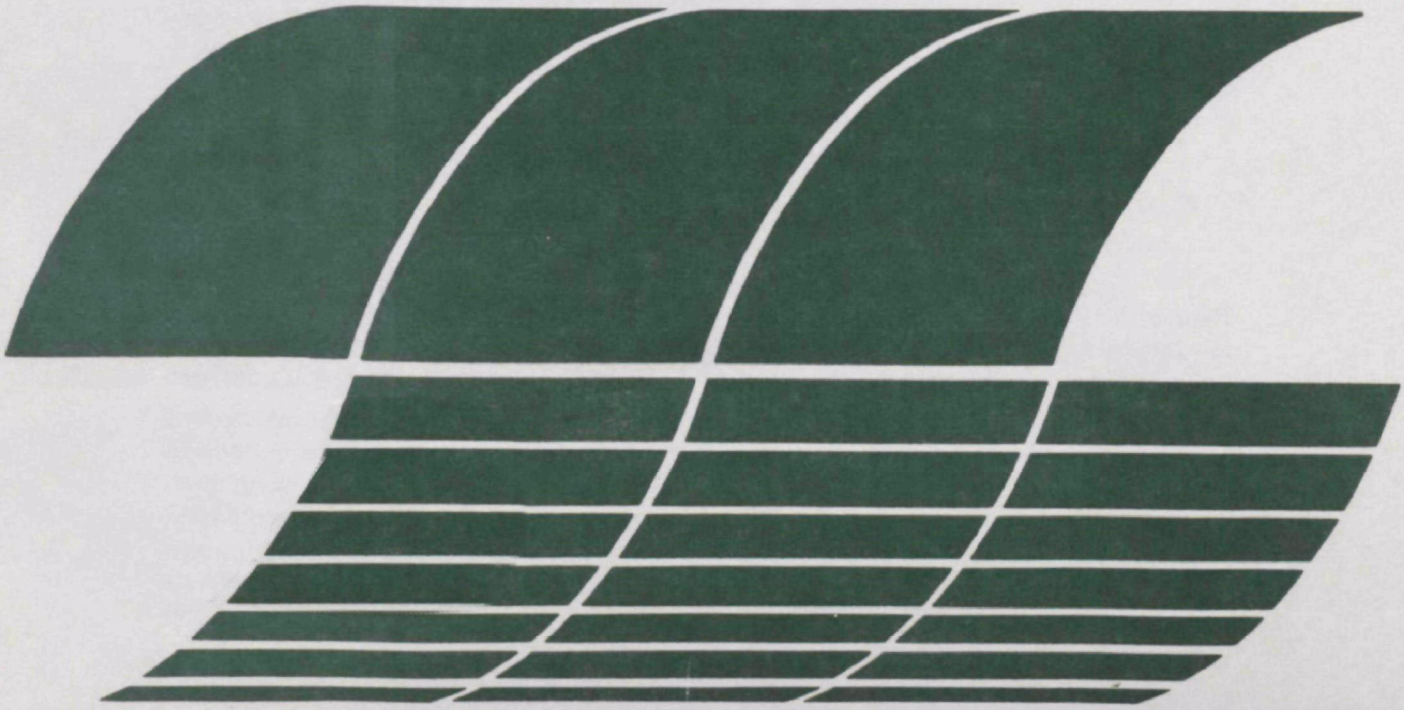
ABMA | American Boiler Manufacturers Association | 1500 Wilson Boulevard Arlington VA 22209

DoE | United States Department of Energy | Division of Power Systems Energy Technology Branch Washington DC 20545

EPA | United States Environmental Protection Agency | Industrial Environmental Research Laboratory Research Triangle Park NC 27711 | EPA-600/7-80-137b May 1980

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

Interagency Energy/Environment R&D Program Report



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May 1980

Field Tests of Industrial Stoker Coal-fired Boilers for Emissions Control and Efficiency Improvement — Site J (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 eact test, detailed particulate, O_2, CO_2, NO, SO_2 and SO_3 data, particle size distribution data, chemical analysis of the coal, coal size consistency data, combustible analysis and overfire air traverse data.

TABLE OF CONTENTS

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 J; as it is the tenth boiler tested under the program entitled, "A Testing Program to Update Equipment Specifications and Design Criteria for Stoker Fired Boilers".

KVB 4-15900-545

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

CONVERSION FACTORS

ENGLISH AND METRIC UNITS TO SI UNITS

To Convert From	To	Multiply By
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
$lb/10^6BTU$	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
$"H_2O$	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	($lb/10^6Btu$)	0.851 ($1.98x10^{-3}$)
ppm @ 3% O_2 (SO_3)	ng/J	($lb/10^6Btu$)	1.063 ($2.47x10^{-3}$)
ppm @ 3% O_2 (NO)*	ng/J	($lb/10^6Btu$)	0.399 ($9.28x10^{-4}$)
ppm @ 3% O_2 (NO_2)	ng/J	($lb/10^6Btu$)	0.611 ($1.42x10^{-3}$)
ppm @ 3% O_2 (CO)	ng/J	($lb/10^6Btu$)	0.372 ($8.65x10^{-4}$)
ppm @ 3% O_2 (CH_4)	ng/J	($lb/10^6Btu$)	0.213 ($4.95x10^{-4}$)
g/kg of fuel**			

*Federal environmental regulations express NOx in terms of NO_2; thus NO units should be converted using the NO_2 conversion factor.

**Based on higher heating value of 10,000 Btu/lb. For a heating value other than 10,000 Btu/lb, multiply the conversion factor by 10,000/(Btu/lb).

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CONVERSION FACTORS

SI UNITS TO ENGLISH AND METRIC UNITS

To Convert From	To	Multiply By
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	$"H_2O$	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
ng/J	g/kg of fuel	0.000233

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SI PREFIXES

Multiplication Factor	Prefix	SI Symbol
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)

To Obtain \ Multiply By	% Weight in Fuel		lbs/10^6Btu		grams/10^6Cal		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		13.2×10^{-4}		1.48	
% Weight In Fuel — N				0.405		0.225		5.76×10^{-4}		.903
lbs/10^6Btu — SO_2	1.50		1		(.556)		19.8×10^{-4}		(2.23)	
lbs/10^6Btu — NO_2		2.47				(.556)		14.2×10^{-4}		(2.23)
grams/10^6Cal — SO_2	2.70		(1.8)		1		35.6×10^{-4}		(4.01)	
grams/10^6Cal — NO_2		4.44		(1.8)				25.6×10^{-4}		(4.01)
PPM (Dry @ 3% O_2) — SOx	758		505		281		1		1127	
PPM (Dry @ 3% O_2) — NOx		1736		704		391				1566
Grains/SCF (Dry @ 12% CO_2) — SO_2	.676		(.448)		(.249)		8.87×10^{-4}		1	
Grains/SCF (Dry @ 12% CO_2) — NO_2		1.11		(.448)		(.249)		6.39×10^{-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.

SECTION 1.0

PANEL BOARD DATA

KVB

Steam Flow, lbs/hr 33,766
Coal Flow, lbs/hr 3000
% Design Capacity 48.2
lb steam/lb coal 11.3

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	01				
TEST DATE	6-3-79				
TEST COAL	Ohio				
TEST CONDITIONS	35,000 LB/HR				
COAL					
TIME	13:30			15:30	
POUNDS ADDED	filled			3tons	
STEAM TIME	13:25	14:23	15:25	15:50	
INTEGRATOR READING	50876	50917	50962	50978	
CHART RECORDER					
STEAM FLOW Klbs/hr	36	36	32	35	
AIR FLOW, RELATIVE	33	35	32		
DRAFT GAUGES					
WIND BOX "H_2O	1.4	2.0	1.4		
FURNACE "H_2O	0.2	0.2	0.2		
BOILER OUT "H_2O	-0.8	-0.5	-0.6		
DUST COLLECTOR "H_2O	-3.0	-3.5	-3.0		
STOKER ZONE #1	0	0	0		
#2	0.2	0.2	0.2		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

KVB

Test # 01

PRESSURE GAUGES					
STEAM PRESSURE psig	128	127	160		
FEEDWATER psig	162	180	185		
AIR PRESSURE psig					
CONTROLS					
BOILER MASTER	100				
STOKER	100				
FORCED DRAFT	10				
OVERFIRE AIR	42				
INDUCED DRAFT	-0.2				
STOKER					
COAL GATE POSITION	5				
WIND BOX POSITION #1	0				
#2	0				
#3	0				
#4	0				
#5	0				
#6	0				
OVERFIRE AIR PRESSURE "H_2O	0.75				
TEMP. F.D. FAN °F					
TEMP. F.W. °F					

KVB

PANEL BOARD DATA

ABMA TEST SITE J

Steam Flow, lbs/hr 51,652
Coal Flow, lbs/hr 4219
% Design Capacity 73.8
lb steam/lb coal 12.2

TEST NO.	2				
TEST DATE	6-4-79				
TEST COAL	Ohio				
TEST CONDITIONS	50,000 LB/HR	as found			
COAL					
TIME	1:45			4:58	
POUNDS ADDED	filled			13010 pounds	
STEAM TIME	1:47	2:46	3:49	4:51	
INTEGRATOR READING	51732	51794	51863	51930	
CHART RECORDER					
STEAM FLOW Klbs/hr	50	50	52		
AIR FLOW, RELATIVE	52	54	54		
DRAFT GAUGES					
WIND BOX "H_2O	1.4	1.3	1.3		
FURNACE "H_2O	0.25	0.25	0.25		
BOILER OUT "H_2O	-0.8	-0.5	-0.5		
DUST COLLECTOR "H_2O	-3.2	-3.5	-3.5		
STOKER ZONE #1	0.4	0.6	0.5		
#2	0.8	1.0	0.9		
#3	0.5	0.6	0.5		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

KVB

TEST #02

PRESSURE GAUGES					
STEAM PRESSURE psig	138	114	150		
FEEDWATER psig	164	170	169		
AIR PRESSURE psig					
CONTROLS					
BOILER MASTER	100	100	47		
STOKER	88	100	25		
FORCED DRAFT	70	70	65		
OVERFIRE AIR	67	68	65		
INDUCED DRAFT	-0.2	-0.2	-0.2		
STOKER					
COAL GATE POSITION	7.2	7.7	7.5		
WIND BOX POSITION #1	ø	ø	ø		
#2	ø	ø	ø		
#3	ø	ø	ø		
#4	ø	ø	ø		
#5	ø	ø	ø		
#6	ø	ø	ø		
OVERFIRE AIR PRESSURE "H_2O	3.5				
TEMP. F.D. FAN °F					
TEMP. F.W. °F					

KVB

Steam Flow, lbs/hr_____
Coal Flow, lbs/hr_____
% Design Capacity_____
lb steam/lb coal_____

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	03				
TEST DATE	6-5-79				
TEST COAL	Ohio				
TEST CONDITIONS	70,000 LB/HR	low O2			
COAL					
TIME	10:00				
POUNDS ADDED	filled	BOILER	STARTED	SMOKING	
STEAM TIME	1000	REALLY	BAD,	SO TESTING	
INTEGRATOR READING	52500	WAS	STOPPED		
CHART RECORDER					
STEAM FLOW Klbs/hr	70				
AIR FLOW, RELATIVE	58				
DRAFT GAUGES					
WIND BOX "H_2O					
FURNACE "H_2O	0.25				
BOILER OUT "H_2O					
DUST COLLECTOR "H_2O					
STOKER ZONE #1	0.5				
#2	1.2				
#3	1.0				
#4	0.2				
#5	0				
#6	0				

KVB

TEST #03

PRESSURE GAUGES					
STEAM PRESSURE psig	130				
FEEDWATER psig	195				
AIR PRESSURE psig					
CONTROLS					
BOILER MASTER	100				
STOKER	44				
FORCED DRAFT	85				
OVERFIRE AIR	60				
INDUCED DRAFT	-0.2				
STOKER					
COAL GATE POSITION	8.4				
WIND BOX POSITION #1	o				
#2	o				
#3	o				
#4	o				
#5	o				
#6	o				
OVERFIRE AIR PRESSURE "H_2O					
TEMP. F.D. FAN °F					
TEMP. F.W. °F					

KVB

Steam Flow, lbs/hr 71,822
Coal Flow, lbs/hr 6000
% Design Capacity 102.6
lb steam/lb coal 12.0

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	5				
TEST DATE	6-12-79				
TEST COAL	OH10				
TEST CONDITIONS	70,000				
COAL					
TIME	3:15			5:45	
POUNDS ADDED	full			7 1/2 tons	
STEAM Time	3:22	4:18	5:22	5:37	
INTEGRATOR READING X800	58,775	58,959	58,954	58,977	
CHART RECORDER					
STEAM FLOW Klbs/hr	73	70	74		
AIR FLOW, RELATIVE	59	57	58		
DRAFT GAUGES					
WIND BOX "H_2O	2.0	2.2	2.3		
FURNACE "H_2O	-0.2	-0.2	-0.2		
BOILER OUT "H_2O	-0.8	-0.7	-0.7		
DUST COLLECTOR "H_2O	-7.0	-7.2	-7.0		
STOKER ZONE #1	0.6	0.7	0.7		
#2	1.4	1.5	1.5		
#3	1.1	0.9	1.1		
#4	0.1	0.	0.1		
#5	0	0	0		
#6	0	0	0		

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	130	125	132		
FEEDWATER psig	170	190	190		
AIR PRESSURE psig	50	50	50		
CONTROLS					
BOILER MASTER	100	100	100		
STOKER	100	100	100		
FORCED DRAFT	100	100	100		
OVERFIRE AIR	70	70	70		
INDUCED DRAFT	0.2	-0.2	-0.2		
STOKER					
COAL GATE POSITION	11.0	10.7	10.7		
WIND BOX POSITION #1	0	0	0		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		
OVERFIRE AIR PRESSURE "H_2O	7 3/4"				
TEMP. F.D. FAN °F	70				
TEMP. F.W. °F	215				

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Steam Flow, lbs/hr 67,0[illegible]
Coal Flow, lbs/hr 4941
% Design Capacity [illegible]
lb steam/lb coal 14.1

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	6				
TEST DATE	6-13-79				
TEST COAL	Kentucky				
TEST CONDITIONS	70,000				
COAL					
TIME	11:15			2:05	
POUNDS ADDED	filled			7 tons	
STEAM Time	11:05	12:08	1:07	2:10	
INTEGRATOR READING	59,674	59,766	59,850	59,940	
CHART RECORDER					
STEAM FLOW Klbs/hr	70	72	70		
AIR FLOW, RELATIVE	56	58	57		
DRAFT GAUGES					
WIND BOX "H_2O	2.4	2.2	2.4		
FURNACE "H_2O	0.25	0.25	0.20		
BOILER OUT "H_2O	-0.7	-0.8	-0.8		
DUST COLLECTOR "H_2O	-6.5	-7.0	-6.7		
STOKER ZONE #1	0.5	0.4	0.5		
#2	1.1	1.0	1.0		
#3	0.7	0.5	0.5		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

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PRESSURE GAUGES					
STEAM PRESSURE psig	140	140	142		
FEEDWATER psig	195	225	173		
AIR PRESSURE psig	50	50	50		
CONTROLS					
BOILER MASTER	50	100	50		
STOKER	50	100	50		
FORCED DRAFT	35	50	50		
OVERFIRE AIR	55	60	60		
INDUCED DRAFT	0.1	0.2	0.2		
STOKER					
COAL GATE POSITION					
WIND BOX POSITION #1	9.0	8.5	8.2		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0			
OVERFIRE AIR PRESSURE "H_2O	4"		4"		
TEMP. F.D. FAN °F		70	70		
TEMP. F.W. °F		217	220		

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PANEL BOARD DATA

ABMA TEST SITE J

Steam Flow, lbs/hr 59,463
Coal Flow, lbs/hr 4800
% Design Capacity 84.9
lb steam/lb coal 12.4

TEST NO.	7				
TEST DATE	6-14-79				
TEST COAL	OH10				
TEST CONDITIONS	60,000				
COAL					
TIME	11:00		13:15		
POUNDS ADDED	filled		10,800		
STEAM Time	11:00	12:15	13:14		
INTEGRATOR READING	60635	60725	60801		
CHART RECORDER					
STEAM FLOW Klbs/hr	61	60			
AIR FLOW, RELATIVE	47	50			
DRAFT GAUGES					
WIND BOX "H_2O	2.0	2.2			
FURNACE "H_2O	-0.20	-0.20			
BOILER OUT "H_2O	-0.5	-0.6			
DUST COLLECTOR "H_2O	-4.5	-5.0			
STOKER ZONE #1	0.3	0.3			
#2	0.7	0.7			
#3	0.4	0.5			
#4	0	0			
#5	0	0			
#6	0	0			

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PRESSURE GAUGES					
STEAM PRESSURE psig	147	140			
FEEDWATER psig	196	202			
AIR PRESSURE psig	50	50			
CONTROLS					
BOILER MASTER	25	60			
STOKER	25	60			
FORCED DRAFT	55	60			
OVERFIRE AIR	60	60			
INDUCED DRAFT	-0.2	-0.2			
STOKER					
COAL GATE POSITION	8.4	8.5			
WIND BOX POSITION #1	0-	0-			
#2	0-	0-			
#3	0-	0-			
#4	0-	0-			
#5	0-	0-			
#6	0-	0-			
OVERFIRE AIR PRESSURE "H_2O	4.25	4.25			
TEMP. F.D. FAN °F	80	81			
TEMP. F.W. °F	224	224			

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PANEL BOARD DATA

ABMA TEST SITE J

Steam Flow, lbs/hr 51,200
Coal Flow, lbs/hr 4113 8
% Design Capacity 73.1
lb steam/lb coal 12.4

TEST NO.	8				
TEST DATE	6-15-79				
TEST COAL	Kentucky				
TEST CONDITIONS	50,000				
COAL					
TIME	10:25			12:50	
POUNDS ADDED	filled			10,000	
STEAM Time	10:22	11:26	12:27	12:52	
INTEGRATOR READING	61550	61620	61684	61710	
CHART RECORDER					
STEAM FLOW Klbs/hr	53	52	52		
AIR FLOW, RELATIVE	40	41	42		
DRAFT GAUGES					
WIND BOX "H_2O	1.4	1.3	1.3		
FURNACE "H_2O	-0.2	-0.20	0.25		
BOILER OUT "H_2O	-0.8	-0.5	-0.5		
DUST COLLECTOR "H_2O	-3.2	-3.5	-3.5		
STOKER ZONE #1	0.2	0.2	0.2		
#2	0.7	0.7	0.6		
#3	0	0.1	0.1		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

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PRESSURE GAUGES					
STEAM PRESSURE psig	125	145	140		
FEEDWATER psig	200	165	190		
AIR PRESSURE psig	50	50	50		
CONTROLS					
BOILER MASTER	100	40	60		
STOKER	100	40	60		
FORCED DRAFT	45	40	45		
OVERFIRE AIR	45	45	47		
INDUCED DRAFT	-0.2	0.2	-0.2		
STOKER					
COAL GATE POSITION	6.8	6.7	6.9		
WIND BOX POSITION #1	0	0	0		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		
OVERFIRE AIR PRESSURE "H_2O		2.5			
TEMP. F.D. FAN °F		83			
TEMP. F.W. °F		224			

KVB

Steam Flow, lbs/hr 34,699
Coal Flow, lbs/hr 49.6
% Design Capacity 49.6
lb steam/lb coal 12.2

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	9				
TEST DATE	6-16-79				
TEST COAL	Kentucky				
TEST CONDITIONS	35,000				
COAL					
TIME	1030			13:10	
POUNDS ADDED	filled			7600	
STEAM Time	10:25	11:36	12:25	13:11	
INTEGRATOR READING x 800	62376	62426	62462	62496	
CHART RECORDER					
STEAM FLOW Klbs/hr	35,000	38	35		
AIR FLOW, RELATIVE	36	38	38		
DRAFT GAUGES					
WIND BOX "H_2O	1.4	2.0	1.6		
FURNACE "H_2O	-0.15	-0.15	-0.15		
BOILER OUT "H_2O	-0.5	-0.5	-0.4		
DUST COLLECTOR "H_2O	-2.7	-3.5	-3.2		
STOKER ZONE #1	0.3	0.4	0.3		
#2	0.7	0.9	0.8		
#3	0	0.1	0.1		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	142	140	140		
FEEDWATER psig	180	185	181		
AIR PRESSURE psig	50	50	50		
CONTROLS					
BOILER MASTER	40	50	50		
STOKER	40	50	50		
FORCED DRAFT	20	20	18		
OVERFIRE AIR	37	42	42		
INDUCED DRAFT	-0.1	-0.1	-0.1		
STOKER					
COAL GATE POSITION	5.7	5.8	5.7		
WIND BOX POSITION #1	0	0	0		
#2	0	0	0		
#3	0	0	0		
#4	0	0	0		
#5	0	0	0		
#6	0	0	0		
OVERFIRE AIR PRESSURE "H_2O	2.25				
TEMP. F.D. FAN °F	82				
TEMP. F.W. °F		224			

KVB

PANEL BOARD DATA

ABMA TEST SITE J

Steam Flow, lbs/hr 71,714
Coal Flow, lbs/hr 5419
% Design Capacity 102.5
lb steam/lb coal 13.2

TEST NO.	13				
TEST DATE	6-19-79				
TEST COAL	OH10				
TEST CONDITIONS	70,000 lb/hr				
COAL					
TIME	10:55	13:30			
POUNDS ADDED	filled	7 tons			
STEAM Time	12:53	13:57			
INTEGRATOR READING x800	64823	64913			
CHART RECORDER					
STEAM FLOW Klbs/hr	68	68			
AIR FLOW, RELATIVE	56	58			
DRAFT GAUGES					
WIND BOX "H_2O	2.0	2.0			
FURNACE "H_2O	-0.2	-0.2			
BOILER OUT "H_2O	-0.6	-0.7			
DUST COLLECTOR "H_2O	-5.2	-6.0			
STOKER ZONE #1	0.7	0.5			
#2	1.5	1.0			
#3	0.8	0.7			
#4	0	0			
#5	0	0			
#6	0	0			

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	140	135			
FEEDWATER psig	145	192			
AIR PRESSURE psig	50	50			
CONTROLS					
BOILER MASTER	48	60			
STOKER	50	65			
FORCED DRAFT	75	75			
OVERFIRE AIR	30	30			
INDUCED DRAFT	0.1	0.1			
STOKER					
COAL GATE POSITION	9.5	9.0			
WIND BOX POSITION #1	0	0			
#2	0	0			
#3	0	0			
#4	0	0			
#5	0	0			
#6	0	0			
OVERFIRE AIR PRESSURE "H_2O	1				
TEMP. F.D. FAN °F	75				
TEMP. F.W. °F	224				

KVB

Steam Flow, lbs/hr 68,000
Coal Flow, lbs/hr 5876
% Design Capacity 97.1
lb steam/lb coal 11.6

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	14				
TEST DATE					
TEST COAL	OH10				
TEST CONDITIONS	70,000 compliance				
COAL					
TIME	11:45				
POUNDS ADDED	filled				
STEAM Time	11:47	12:15	12:47	13:15	13:47
INTEGRATOR READING	65813		65898		65984
CHART RECORDER					
STEAM FLOW Klbs/hr	70,000		63,000	68,000	70,000
AIR FLOW, RELATIVE	57		55	59	57
DRAFT GAUGES					
WIND BOX "H_2O	1.8	1.7	1.9	1.8	2.0
FURNACE "H_2O	-0.2	-0.2	-0.25	-0.	-0.25
BOILER OUT "H_2O	-0.7	-0.7	-0.7	-0.7	-0.7
DUST COLLECTOR "H_2O	-6.8	-7.0	-6.5	-6.5	-6.5
STOKER ZONE #1	0.4	0.4	0.6	0.7	1.0
#2	1.1	1.1	1.5	1.3	1.7
#3	0.8	0.7	0.7	1.0	1.4
#4	0	0	0	0.2	0.3
#5	0	0	0	0	0
#6	0	0	0	0	0

KVB

PANEL BOARD DATA

ABMA TEST SITE J

Steam Flow, lbs/hr 68,000
Coal Flow, lbs/hr 5876
% Design Capacity 97.1
lb steam/lb coal 11.6

TEST NO.	14				
TEST DATE					
TEST COAL	OH 10				
TEST CONDITIONS	70,000				
COAL					
TIME					16:55
POUNDS ADDED					30,360 added
STEAM Time	14:19	14:47	15:15	15:47	16:47
INTEGRATOR READING X800		66068		66153	66238
CHART RECORDER					
STEAM FLOW Klbs/hr	68000	68000	70,000	67000	
AIR FLOW, RELATIVE	58	59	59	56	
DRAFT GAUGES					
WIND BOX "H_2O	2.0	2.0	1.7	2.0	
FURNACE "H_2O	-.25	-.25	-0.2	-0.2	
BOILER OUT "H_2O	-0.7	-0.7	-0.70	-0.7	
DUST COLLECTOR "H_2O	-6.5	-6.5	-7.0	-6.5	
STOKER ZONE #1	0.7	0.7	0.3	0.5	
#2	1.5	1.5	1.0	1.2	
#3	1.2	1.2	0.8	0.8	
#4	0.3	0.3	0.1	0	
#5	0	0	0	0	
#6	0	0	0	0	

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	140	145	130	138	138
FEEDWATER psig	187	187	197	144	187
AIR PRESSURE psig	50	50	50	50	50
CONTROLS					
BOILER MASTER	71	22	100	100	90
STOKER	71	25	100	100	90
FORCED DRAFT	50	55	55	56	60
OVERFIRE AIR	100	60	100	100	70
INDUCED DRAFT	-0.2	-0.2	-0.2	-0.2	-0.2
STOKER					
COAL GATE POSITION	10.1	10.5	10.5	10.5	10.1
WIND BOX POSITION #1	0	0	0	0	0
#2	0	0	0	0	0
#3	0	0	0	0	0
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0
OVERFIRE AIR PRESSURE "H_2O		7 3/4"			
TEMP. F.D. FAN °F		80			
TEMP. F.W. °F		224			

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	140	140	150	135	150
FEEDWATER psig	145	189	180	180	187
AIR PRESSURE psig	50	50	50	50	50
CONTROLS					
BOILER MASTER	100	75		82	20
STOKER	100	75		80	45
FORCED DRAFT	55	55		45	60
OVERFIRE AIR	100	100		100	85
INDUCED DRAFT	-0.2	-0.2		-0.2	-0.2
STOKER					
COAL GATE POSITION	10.1	10.1	10.1	10.1	10.1
WIND BOX POSITION #1	0	0	0	0	0
#2	0	0	0	0	0
#3	0	0	0	0	0
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0
OVERFIRE AIR PRESSURE "H_2O	7 3/4				7 1/2
TEMP. F.D. FAN °F					80
TEMP. F.W. °F	225				230

KVB

NOTES

TEST NO: 14

Coal used

Bunker leveled at 11:45

pounds added	250	1980	1970	2010	
	2030	2020	2100	1960	
	1970	2010	2030	1970	
	2000	1980	2000	2080	total 30,360 lbs

TEST NO:

Bunker leveled off at 16:55

TEST NO:

TEST NO:

TEST NO:

KVB

Steam Flow, lbs/hr 65,760
Coal Flow, lbs/hr 5143
% Design Capacity 93.9
lb steam/lb coal 12.8

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	15				
TEST DATE	6-28-79				
TEST COAL	Kentucky				
TEST CONDITIONS	as found				
Sass - SOx					
COAL					
TIME	12:00	1300	14:09	15:00	16:00
POUNDS ADDED	filled				
STEAM					
INTEGRATOR READING	71512	71592	71688	71759	71842
CHART RECORDER					
STEAM FLOW Klbs/hr	66	65	63	68	70
AIR FLOW, RELATIVE	54	54	55	55	56
DRAFT GAUGES					
WIND BOX "H_2O	2.4	2.4	2.2	2.4	1.6
FURNACE "H_2O	-0.20	-0.20	-0.25	-0.23	-0.20
BOILER OUT "H_2O	-0.7	-0.7	-0.8	-0.8	-0.6
DUST COLLECTOR "H_2O	-5.5	-55	-6.5	-6.7	-5.5
STOKER ZONE #1	0.6	0.6	0.6	0.7	0.5
"H_2O #2	1.1	1.1	1.2	1.4	0.9
#3	0.5	0.5	0.6	0.7	0.5
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0

KVB

Steam Flow, lbs/hr 65,760
Coal Flow, lbs/hr 5143
% Design Capacity 43.5
lb steam/lb coal 12.8

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	15				
TEST DATE	6-28-79				
TEST COAL	Kentucky				
TEST CONDITIONS	as found				
Sass - SO_x					
COAL					
TIME	17:00				
POUNDS ADDED	13.5 tons				
STEAM					
INTEGRATOR READING	71923				
CHART RECORDER					
STEAM FLOW Klbs/hr	66				
AIR FLOW, RELATIVE	54				
DRAFT GAUGES					
WIND BOX "H_2O	1.6				
FURNACE "H_2O	-0.22				
BOILER OUT "H_2O	-0.6				
DUST COLLECTOR "H_2O	-5.4				
STOKER ZONE #1	0.5				
#2	1.0				
#3	0.5				
#4	0				
#5	0				
#6	0				

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	145	125	135	144	145
FEEDWATER psig	180	150	160	170	170
AIR PRESSURE psig	50	50	50	50	50
CONTROLS					
BOILER MASTER	25	100	100	27	25
STOKER	25	60	100	27	40
FORCED DRAFT	50	75	100	45	62
OVERFIRE AIR	60	65	80	90	70
INDUCED DRAFT	0.2	-0.2	-0.2	-0.2	-0.2
STOKER					
COAL GATE POSITION	8.2	9.0	9.3	9.5	9.2
WIND BOX POSITION #1	O	O	O	O	O
#2	O	O	O	O	O
#3	O	O	O	O	O
#4	O	O	O	O	O
#5	O	O	O	O	O
#6	O	O	O	O	O
OVERFIRE AIR PRESSURE "H_2O		6.5		6.5	4.25 →
TEMP. F.D. FAN °F		80	82		
TEMP. F.W. °F		216		216	

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	145				
FEEDWATER psig	210				
AIR PRESSURE psig	50				
CONTROLS					
BOILER MASTER	25				
STOKER	30				
FORCED DRAFT	62				
OVERFIRE AIR	50				
INDUCED DRAFT	-0.2				
STOKER					
COAL GATE POSITION	9.5				
WIND BOX POSITION #1	0				
#2	0				
#3	0				
#4	0				
#5	0				
#6	0				
OVERFIRE AIR PRESSURE "H_2O					
TEMP. F.D. FAN °F					
TEMP. F.W. °F					

KVB

Steam Flow, lbs/hr 64,808
Coal Flow, lbs/hr 5200
% Design Capacity 92.6
lb steam/lb coal 12.5

PANEL BOARD DATA

ABMA TEST SITE J

TEST NO.	16				
TEST DATE	6-30-79				
TEST COAL	2H10				
TEST CONDITIONS	as found				
Sass d SOx					
COAL					
TIME	11:15				16 15
POUNDS ADDED	filled				13 tons
STEAM					
INTEGRATOR READING	11:15	12:30	13:30	14:30	16:12
CHART RECORDER					73632
STEAM FLOW Klbs/hr	70	60	65	62	65
AIR FLOW, RELATIVE	56	55	52	55	58
DRAFT GAUGES					
WIND BOX "H_2O	1.8	2.1	2.4	2.2	2.1
FURNACE "H_2O	-0.20	-0.20	-0.21	-0.20	-0.25
BOILER OUT "H_2O	-0.7	-0.7	-0.7	-0.7	-0.8
DUST COLLECTOR "H_2O	-6.4	-6.5	-6.3	-6.6	-7.0
STOKER ZONE #1	0.2	0.2	0.3	0.5	0.7
#2	0.7	0.8	1.0	1.0	1.5
#3	0.3	0.2	0.2	0.2	1.0
#4	0	0	0	0	0
#5	0	0	0	0	0
#6	0	0	0	0	0

KVB

PRESSURE GAUGES					
STEAM PRESSURE psig	137	130	130	120	125
FEEDWATER psig	162	135	147	150	178
AIR PRESSURE psig	50	50	50	50	50
CONTROLS					
BOILER MASTER	36	60	55	100	45
STOKER	59	90	85	65	35
FORCED DRAFT	90	90	85	85	70
OVERFIRE AIR	65	50	75	70	100
INDUCED DRAFT	-0.2	-0.2	-0.2	-0.2	-0.2
STOKER					
COAL GATE POSITION	8.5	8.5	8.3	9.0	9.4
WIND BOX POSITION #1	O	O	O	O	O
#2	O	O	O	O	O
#3	O	O	O	O	O
#4	O	O	O	O	O
#5	O	O	O	O	O
#6	O	O	O	O	O
OVERFIRE AIR PRESSURE "H_2O	6		6		8 1/2
TEMP. F.D. FAN °F	75		75		73
TEMP. F.W. °F	216		216		217

SECTION 2.0

PARTICULATE DATA

BLR OUT AREA = 30.65 ft²
STACK AREA = 18.35 ft²

PARTICULATE DATA SUMMARY
PART I

LOCATION: ABMA TEST SITE J

TEST NO.	Total Mass mgm.	Dry Gas Volume ft^3	Liquid Coll. ml.	Baro. Press. "Hg	Static Press. "H_2O	Pitot ΔP "H_2O	Orifice ΔH "H_2O	Stack Gas Temp. °R	Excess O_2 %	Sampling Time min.	Nozzle Dia. in.	Pitot Factor n.d.	Fuel Factor SCF/10^6BTU	Flue Gas MW g/g mole
BLR 01	428.1	48.57	59	29.52	-0.18	0.705	1.29	934	10.2	60.17	0.378	0.837	9634	28.85
STACK 01	125.3	43.582	50.5	29.52	-0.12	0.092	0.63	779	9.7	72.42	0.375	0.817	9634	28.95
BLR 02	976.4	55,354	59.8	29.42	-0.625	0.493	1.55	970	10.6	60.5	0.316	0.837	9773	29.15
STACK 02	432.1	10.897	127	29.36	-0.02	0.20	1.34	820	10.8	120	0.377	0.817	9773	29.05
BLR 05	1313.6	34.074	59	29.55	-2.0	0.65	0.61	1008	7.9	60	0.235	0.837	10453	29.04
STACK 05	284.7	47.897	74	29.70	-0.26	0.243	0.75	827	8.3	72	0.312	0.817	10453	29.11
BLR 06	1811.5	88.781	100	29.88	-1.25	0.59	1.62	1010	8.1	98.23	0.316	0.837	9553	29.34
STACK 06	303.9	60,202	80	29.88	-0.26	0.22	0.67	816	8.7	96	0.312	0.817	9553	29.20
BLR 07	635.9	50.867	78	29.85	-1.25	0.46	1.31	969	8.7	60	0.316	0.837	9804	29.09
STACK 07	1783	41.189	63	29.85	-0.21	0.185	0.56	800	9.2	72	0.312	0.817	9804	29.06
BLR 08	6325	40.699	69	29.80	-0.625	0.747	0.837	943	9.0	60	0.316	0.837	9537	28.85
STACK 08	1439	47.375	72	29.80	-0.06	0.105	0.769	777	9.2	72	0.377	0.817	9537	29.11
BLR 09	440.2	40.627	52	29.69	-0.78	0.26	0.83	920	12.7	60	0.316	0.837	10721	28.95
STACK 09	150.6	42.458	59	29.69	-0.12	0.087	0.62	763	11.5	72	0.377	0.817	10721	28.95
BLR 13														
STACK 13	BLR INK													
BLR 14	2726.7	105.410	149	29.67	-20	0.58	3.7	998	8.8	80.23	0.377	0.837	10013	29.19
STACK 14	428.4	74.664	130	29.67	-0.28	0.216	0.68	821	9.0	120	0.313	0.817	10013	28.97

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PARTICULATE DATA SUMMARY
PART II

Location ABMA TEST SITE I - corrected

TEST NO.	LOAD %	O_2 %	CONDITIONS	EMISSIONS lb/10^6BTU	EMISSIONS GR/SCF	EMISSIONS LB/HR	Moisture %	Stack Gas Velocity Ft/sec	Stack Gas Flow SCF/sec	Isokin. %
BLR OUT 01	48.2	10.2	OHIO COAL AS FOUND	0.369	0.137	41	5.50	33.96	582	95
STACK 01	48.2	9.7	↓ ↓	0.115	0.045	6	5.27	20.23	249	101
BLR OUT 02	73.8	10.6	↓ ↓	0.779	0.276	125	4.93	53.47	879	101
STACK 02	73.8	10.8	↓ ↓	0.188	0.065	12	5.56	30.62	356	100
BLR OUT 05	102.6	7.9	↓ low O_2	1.442	0.602	307	7.66	62.67	993	104
STACK 05	102.6	8.3	↓ ↓	0.228	0.092	19	6.86	33.68	393	104
BLR OUT 06	98.6	8.1	KENTUCKY COAL AS FOUND	0.699	0.314	153	5.06	59.08	946	95
STACK 06	98.6	8.7	↓ ↓	0.182	0.078	15	5.92	31.69	377	102
BLR OUT 07	84.9	8.7	OHIO COAL	0.462	0.193	85	6.77	51.34	856	100
STACK 07	84.9	9.2	↓ ↓	0.167	0.067	12	6.77	28.85	350	101
BLR OUT 08	73.1	9.0	KENTUCKY COAL	0.574	0.240	87	7.45	40.87	700	98
STACK 08	73.1	9.2	↓ ↓	0.114	0.047	6	6.73	21.42	267	104
BLR OUT 09	49.6	12.2	↓ ↓	0.617	0.168	57	5.75	37.78	661	102
STACK 09	49.6	11.5	↓ ↓	0.185	0.054	7	6.15	19.41	245	102
BLR OUT 14	97.1	8.8	OHIO COAL HIGH O_2	0.984	0.369	193	6.28	58.64	942	98
STACK 14	97.1	9.0	↓ ↓	0.224	0.089	17	7.67	31.73	373	103

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PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min — Before — After

Sampling Time Per Point, Min
7 1/2

ISOKINETICS = 96.1 %

TEST NUMBER 1
DATE 6-3-74
OPERATOR JD
FUEL Oil #6
SITE 3
PROBE LOCATION Boiler Out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
								Impingers				
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	In	Out	Meter		
1		.22	1.40	5621.78	480	280	250	--	—	98		8.5
2		.22	1.40	5628.25	490	350	220			100		8.5
3		.15	.94	5633.51	460	350	300			102		6.0
4		.15	.94	5638.76	440	320	312			110		6.0
5		.27	1.70	5645.65	460	200	200			115		10.0
6		.23	1.45	5654.00	500	250	250			120		8.7
7	+10 sec	.20	1.25	5658.04	480	200	360			120		7.7
8		.20	1.25	5663.92	480	200	310			120		7.7
	60.7											
Average		0.205	1.29		434°R 474°F					683°R 223°F		

METER VOL. END 5663.92
START 5615.35
SAMPLE VOL 48.57 ft^3

C_{p} tot	Stack Press. ~~in. Hg Gauge~~	Barometric Pressure
.837	-0.78" H_2O	29.52

Percent O_2 =

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) = .370
% H_2O = Noz(Actual) = .378

V_s = 33.61 ft/sec
F = .30

34

Imp.	Vol.(End)		Vol. (Start)		ΔVol. (ml)
#1	134	-	100	=	34
#2	111	-	100	=	11
#3	0	-	0	=	0
				Total	45

#4 Silica Gel	g(End)		g(Start)		Δgrams
	144	-	130	=	14

Total Vol. H_2O 59 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min — Before — After

ISOKINETICS = _____ %

Sampling Time Per Point, Min
5.0

TEST NUMBER 1
DATE 5-3-79
OPERATOR R.A.P.
FUEL OIL #6
SITE J
PROBE LOCATION STACK

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE-1	15:30	.08	.58	5298.62	318	240	310		88	85		~~22.0~~
2		.08	.58	5360.35	315	250	310		80	100		<2.0
3		.11	.80	5302.33	320	255	310		80	100		2.0
4		.12	.87	5304.38	320	250	310		75	100		2.0
5		.13	.90	5306.45	320	250	300		80	102		2.0
6		.13	.90	5308.51	320	255	300		82	108		2.0
7		.10	.70	5310.38	320	260	280		78	102		<2.0
8		.07	.48	5311.81	310	255	285		75	105		<2.0
9		.07	.48	5313.35	310	250	270		82	110		<2.0
10		.07	.48	5314.75	310	250	285		80	115		<2.0
11		.07	.48	5316.19	310	250	290		80	118		2.0
M2		.07	.48	5317.68	—	250	285		82	118		<2.0
—												
NW-1		.09	.60	5319.40	320	220	270		82	115		<2.0
2		.10	.68	5321.20	320	220	270		82	118		<2.0
3		.11	.75	5323.06	325	250	270		88	120		<2.0
4	3:25	.11	.75	5325.13	330	250	265		88	118		<2.0
5		.12	.82	5327.10	330	250	260		80	118		<2.0
6		.11	.75	5328.97	325	250	270		80	115		<2.0
7		.09	.60	5330.60	322	250	270		82	115		<2.0
8		.06	.41	5332.02	320	250	275		85	115		<2.0
9		.10	.68	5333.76	320	260	265		90	115		<2.0
10		.09	.60	5335.49	318	250	270		90	115		<2.0
11		.05	.34	5336.73	—	235	270		90	115		<2.0
12		.08	.55	5338.404	—	250	290		90	120		<2.0
Average		.092	.63	43.582	319							

METER VOL. END 5338.404
START 5296.960
SAMPLE VOL. 41.582 ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	29.52	

Percent O_2 = _____ − 0.12

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔHg = Noz(Ideal)=
% H_2O = 5.3 Noz(Actual)= .375

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	133	100	33
#2	105	100	5
#3	0	0	0
		Total	38

#4 Silica Gel	g(End)	g(Start)	Δgrams
	142.5	130	12.5
		Total Vol. H_2O	50.5 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min

Before

After

ISOKINETICS = 102%

TEST NUMBER 2

DATE 6-4-79

OPERATOR JD

FUEL OH10

SITE J

PROBE LOCATION Boiler-Out #4

Sampling Time Per Point, Min
7 1/2

Sample Point	Time	METER CONDITIONS ΔPs	ΔH	Meter Reading	TEMPERATURES, °F Stack	Probe	Oven	Impingers In	Impingers Out	Meter	O_2, %	Vac.
1		.52	1.61	5351.36	500	200	250			110		5.2
2		.57	1.80	5357.85	500	200	250			110		4.8
3		.49	1.51	5364.43	480	200	280			120		9.8
4		.48	1.50	5371.47	500	200	280			123		9.8
5	*	.50	1.58	5680.00 / 5686.70	540	200	260			105		10.0
6		.54	1.70	5693.64	530	200	300			105		11.3
7		.50	1.58	5700.71	530	200	280			110		10.0
8		.34	1.10	5706.33	500	190	310			115		20
	60.5											
Average		0.4625	1.5475		510F 970R							

METER VOL. END — START 5344.37 — SAMPLE VOL — ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-0.025" Hg	29.42

Percent O_2 =

Nomograph Setup

P_{meter} = C =

P_{stack} = T_{stack} =

T_{meter} = ΔP =

ΔH_g = Noz(Ideal) =

% H_2O = 5.1 Noz(Actual) = .316

V_s = 53.17

$\bar{y}$ = .6

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	138	100	38
#2	108	100	8
#3	0	0	0
		Total	46

#4	g(End)	g(Start)	Δgrams
Silica Gel	143.8	130	13.8
		Total Vol. H_2O	59.8 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min

Sampling Time Per Point, Min	
5.0	Before
	After

ISOKINETICS = 95.7%

TEST NUMBER 2 1st comp.
DATE 6-4-79
OPERATOR R.H.P
FUEL 6H10
SITE J
PROBE LOCATION Stack

Sample Point	Time	METER CONDITIONS			14 TC TEMPERATURES, °F						O_2,%	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE 1	14:25	.19	1.30	2929.36	355	250	295		70	98		2.2
2		.19	1.30	2933.67	350	260	350		70	98		2.2
3		.24	1.55	2938.33	355	260	310		73	100		2.8
4		.23	1.50	2942.95	355/345	260	305		72	100		2.7
5		.23	1.50	2947.47	355	265	295		76	102		2.5
6		.23	1.50	2952.00	355/348	260	285		75	105		3.0
7		.19	1.30	2956.28	360	260	290		—	—		—
8		.19	1.30	2960.43	360	260	285		78	110		2.4
9		.18	1.150	2964.42	355	260	285		70	105		2.3
10		.18	1.15	2968.39	347/355	260	285		70	110		2.3
11		.18	1.15	2972.37	350	260	280		70	110		2.3
12		.13	.85	2975.79	—	250	270		72	110		2.2
NW 1		.21	1.35	2980.23	347/355	260	280		70	105		3.3
2		.22	1.42	2984.58	360/364	260	290		75	110		3.2
3		.23	1.50	2989.11	360	270	285		78	105		3.4
4		.23	1.50	2994.03	352/365	270	285		72	100		3.4
5		.21	1.45	2998.34	360	270	285		72	101		3.4
6		.23	1.60	3003.12	353/360	270	285		72	100		3.6
7		.21	1.50	3007.65	360	270	285		72	98		3.3
8		.20	1.40	3012.09	365/370	260	285		72	98		3.2
9		.20	1.40	3016.54	370	250	275		72	98		3.5
10		.14	1.35	3020.93	370	250	280		73	100		3.3
11		.19	1.35	3025.28	365	260	280		73	100		3.8
12		.13	.90	3028.905	—	270	285		73	94		2.8
Average		.20	1.34	103.897	360	—	—			98		

METER VOL. END 3028.905
START 2925.008
SAMPLE VOL 103.897 ft^3

C_{pitot}	Stack Press. In. He-Gauge	Barometric Pressure
.817	-.02 " H_2O	29.36

Percent O_2 =

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = 5.5 Noz(Ideal)= .377
% H_2O = Noz(Actual)=

37

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	172	100	72
#2	135	100	35
#3	1	0	1
		Total	108

#4	g (End)	g (Start)	Grams
Silica Gel	219	200.0	19

Total Vol. H_2O 127 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min

Before

After

Sampling Time Per Point, Min
7 1/2

ISOKINETICS = 105 %

TEST NUMBER 5
DATE 6-13-79
OPERATOR JD
FUEL OIL
SITE J
PROBE LOCATION Rt. Ter Jct

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
1		.56	.53	5725.98	550	150	280			100		4.1
2		.72	.68	5730.49	560	150	310			100		4.6
3		.70	.65	5734.75	560	180	300			100		5.0
4		.58	.55	5738.73	520	150	300			100		4.5
5	*	.60	.56	5371.98 / 5375.15								5.0
6		.68	.64	5379.67								5.2
7		.72	.67	5384.15								5.5
8		.64	.60	5388.34								5.0
Average		.65	.61	16.870 / 17.204	548							

1.056

METER VOL. END
START 5721.80
SAMPLE VOL 34.079 ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-2.0 "H_2O	29.70

Percent O_2 =

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H_2O = 7.6 Noz(Actual) = .235

P = 2.0

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	142	100	42
#2	108	100	8
#3	0	0	0
		Total	50

#4 Silica Gel:	g(End)	g(Start)	Δgrams
	139	130	9

Total Vol. H_2O 59 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min

Sampling Time Per Point, Min	Before	After
3.0		

ISOKINETICS = 96.2

TEST NUMBER 5
DATE 6/8-77
OPERATOR RAP
FUEL OHIO
SITE J
PROBE LOCATION STACK - #4

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE-1	15:30	.30	.96	3042.57	365	220	300		68	75		3.5
2		.33	1.05	3045.02	370	250	300		65	75		3.8
3		.32	1.01	3047.36	370	260	305		68	78		3.5
4		.29	.93	3049.62	375	240	305		65	80		3.2
5		.28	.90	3051.86	380	250	300		67	80		3.2
6		.26	.84	3054.05	380	250	295		63	80		3.0
7		.24	.77	3056.12	380	260	290		63	83		5.0
8		.21	.67	3058.02	370	260	290		62	82		2.8
9		.20	.64	3059.86	365	255	295		63	83		2.4
10		.24	.73	3061.04	370	250	295		63	83		2.6
11		.20	.60	3063.12	360	250	290		62	83		2.2
12		.17	.52	3065.32	—	245	285		62	80		2.0
NW-1		.28	.85	3067.41	365	220	250		72	90		3.0
2		.27	.81	3069.48	365	250	255		68	90		3.0
3		.26	.79	3071.50	365	280	270		65	91		3.0
4		.26	.79	3074.52	360	285	272		65	92		2.9
5		.25	.75	3075.49	360	280	275		68	92		2.8
6		.25	.75	3077.46	360	280	275		68	92		2.8
7		.23	.70	3079.35	360	280	275		70	92		2.8
8		.21	.64	3081.14	365	280	275		70	92		2.5
9		.21	.64	3082.94	365	280	275		70	93		2.5
10		.22	.67	3084.76	365	270	270		71	95		2.5
11		.22	.67	3086.59	360	275	275		71	96		2.5
12		.15	.46	3088.125	—	270	270		71	96		2.0
Average		.243	.15	41.897	361				87 →			

3040.228

METER VOL. END ____ START 3040.228 ft^3
SAMPLE VOL. ____ ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	+.26" H_2O	29.70

Percent O_2 = ____

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔHg = Noz(Ideal) =
% H_2O = 6.8 Noz(Actual) =

.312 - 1 - .60 = 39

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	149	100	49
#2	114	100	14
#3	0	0	0
		Total	

	g(End)	g(Start)	Δgrams
#4 Silica Gel	211	200	11

Total Vol. H_2O 74 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min — Before — After

ISOKINETICS = 96.0%

Sampling Time Per Point, Min
10

TEST NUMBER 6
DATE
OPERATOR JD
FUEL Kent
SITE J
PROBE LOCATION 13" Ver out

Sample Point	Time	METER CONDITIONS ΔP_s	ΔH	Meter Reading	TEMPERATURES, °F Stack	Probe	Oven	Impingers In	Impingers Out	Meter	O_2, %	Vac.
* B 1	10	.48	1.31	5401.68	1							5.7
2	10	.52	1.41	5410.10	550							6.2
3	13	.69	1.90	5422.35	1							8.5
4	13	.74	2.00	5434.42	1							9.0
				5746.75	1							
A 5	13	.54	1.50	5758.27		180	208			98		7.5
6	13	.61	1.70	5770.15								
7	13	.65	1.80	5782.13		220	220			120		7.2
8	13	.50	1.40	5792.51	↓							
Average		.59	1.62	43021 / 15,760	550							

1.0516

+14 Sec

METER VOL. END
START 5342.51
SAMPLE VOL 58.24 ft^3

C_{Pitot}	Stack Press. in. Hg-Gauge	Barometric Pressure
.837	-1.25	29.58

Percent O_2 =

Meter corr B* 1.05%

Nomograph Setup

F_{meter} = C =
P_{stac} T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal)=
% H_2O = 5.0 Noz(Actual)= .316

Y = .68

40

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	140	100	40
#2	128	100	28
#3	0	0	0
		Total	68

#4 Silica Gel	g (End)	g (Start)	Δgrams
	162	130	32
		Total Vol. H_2O	100 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min — Before — After

ISOKINETICS = _____ %

Sampling Time Per Point, Min
4.0

TEST NUMBER 6
DATE 6-13-79
OPERATOR R.A.P
FUEL KENT.
SITE J
PROBE LOCATION STACK #4

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE-1	11.11	.25	.78	3091.07	355	260	260		70	82		2.8
2		.17	.53	3093.38	350	265	265		65	82		2.2
3		.23	.72	3096.02	345	265	270		55	82		2.5
4		.23	.72	3098.65	355	250	280		55	85		2.5
5		.23	.72	3101.32	350	265	280		53	85		2.5
6		.23	.72	3103.95	350	265	280		53	88		3.5
7		.21	.65	3106.42	355	255	270		58	90		3.5
8		.19	.61	3108.79	360	260	260		57	92		3.0
9		.23	.72	3111.42	355	245	245		60	91		3.8
10		.21	.65	3113.94	350	250	250		58	91		3.5
11		.21	.65	3116.43	350	255	250		58	91		3.5
12		.16	.50	3118.60	—	260	250		58	92		2.8
NW-1		.24	.75	3121.32	355	220	230		62	95		
2		.26	.81	3124.06	360	255	245		58	95	*	4.0
3		.25	.74	3126.64	360	285	250		57	96		3.9
4		.28	.82	3129.38	360	280	260		59	97		4.0
5		.25	.74	3131.96	365	280	270		62	98		3.8
6		.25	.74	3134.52	365	280	270		62	100		3.9
7		.22	.64	3136.93	365	280	270		63	101		3.5
8		.22	.64	3139.35	360	280	275		63	102		3.5
9		.22	.64	3141.73	360	280	280		64	102		3.5
10		.22	.64	3144.17	360	275	285		65	102		3.5
11		.21	.62	3146.49	355	280	285		67	104		3.2
12		.15	.44	3148.46	—	275	300		68	105		3.4
Average		.22	.67	60.202	356	—	—	—	—	93.6	—	—

METER VOL. END 3208.266
START 3088.266
SAMPLE VOL. _____ ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.26 H_2O	29.88

Percent O_2 = _____

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔHg = Noz(Ideal) =
% H_2O = Noz(Actual) = .312

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	154	100	54
#2	112	100	12
#3	1	0	1
		Total	67

	g(End)	g(Start)	Δgrams
#4 Silica Gel	143	130	13

Total Vol. H_2O 80 ml

* NOMO CHANGE .63

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min — Before — After

ISOKINETICS = 100 %

Filter #15

Sampling Time Per Point, Min
7 1/2

TEST NUMBER 7
DATE 6-10-76
OPERATOR JD
FUEL OIL #2
SITE J
PROBE LOCATION B, 1 in. OD P

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
A 1		.32	.91	5811.65	510	150	310			100		4.1
2		.47	1.35	5817.62	520	180	310			101		5.2
3		.50	1.41	5823.90	535	180	300			110		5.3
4		.40	1.13	5829.50	490	180	300			110		4.5
				5445.00								
* B 1		.48	1.37	5451.34	500	150	250			110		5.1
2		.49	1.40	5457.59	520	200	270			111		5.3
3		.53	1.50	5464.11	500	210	300			118		6.0
4		.50	1.41	5470.34	500	195	300			122		5.5
Average		.46	1.31	24.22 / 26.647	969							

METER VOL. END 5805.28
START 5780.647 ft^3
SAMPLE VOL 50.863 ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-1.25	29.85

Percent O_2 =

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H_2O = Noz(Actual) = .314

Y = .60

* meter corr. 1.0516

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	153	100	53
#2	112	100	12
#3	0	0	0
		Total	65

#4 Silica Gel	g(End)	g(Start)	Δgrams
	143	130	13
		Total Vol. H_2O	78 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min — Before — After

ISOKINETICS = _____ %

Sampling Time Per Point, Min
3.0

TEST NUMBER 7
DATE 6-14-79
OPERATOR R.AP
FUEL KENT.
SITE J
PROBE LOCATION STACK #4

Filter #10

Sample Point	Time	METER CONDITIONS ΔPs	ΔH	Meter Reading	TEMPERATURES, °F Stack	Probe	Oven	Impingers In	Impingers Out	Meter	O_2, %	Vac.
NE-1	11:00	.16	.48	3154.128	330	265	310		70	82		2.3
2		.18	.55	3155.86	330	260	320		68	82		2.5
3		.19	.59	3157.63	335	260	300		65	84		2.6
4		.18	.55	3159.39	335	260	295		65	84		2.5
5		.20	.61	3161.25	335	260	285		62	87		2.6
6		.21	.64	3163.09	340	260	280		63	89		2.9
7		.20	.61	3164.91	340	255	280		63	90		2.8
8		.18	.55	3166.61	340	260	280		63	92		2.5
9		.17	.52	3168.32	340	255	280		65	92		2.4
10		.17	.52	3169.95	340	260	270		68	94		2.4
11		.19	.52	3171.61	335	260	270		67	95		2.4
12		.15	.46	3173.20	—	255	275		67	98		2.0
NW-1		.20	.61	3175.01	340	220	250		71	100		2.7
2		.20	.61	3176.79								
3		.21	.64	3178.61	345	270	270		65	100		2.8
4		.21	.64	3181.44	345	265	265		66	100		2.8
5		.22	.66	3182.28	345	260	270		66	100		3.0
6		.21	.64	3184.09	345	265	270		68	101		3.0
7		.19	.57	3185.75								
8		.19	.57	3187.45	345	260	270		70	102		2.5
9		.20	.60	3189.17	350	250	270		70	102		2.6
10		.18	.54	3190.79	345	250	270		68	103		2.8
11		.16	.48	3192.35	340	250	270		68	105		2.3
12		.11	.33	3193.622	—	250	270		68	105		22.0
Average		.185	.56	41.189	340					95		

METER VOL. END _____ START 3152.433 SAMPLE VOL. _____ ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.21 H_2O	29.85

Percent O_2 = _____

Nomograph Setup

P_{meter} = C = P_{stack} = T_{stack} = T_{meter} = ΔP = ΔHg = Noz(Ideal)= % H_2O = Noz(Actual)=

43

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	144	100	44
#2	109	100	9
#3	1	0	1
		Total	54

#4 Silica Gel	g(End)	g(Start)	Δgrams
	139	130	9

Total Vol. H_2O 63 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min

ISOKINETICS = _____ %

Sampling Time Per Point, Min	Before	After
7½		

TEST NUMBER 8

DATE 6-15-76

OPERATOR JD

FUEL Kent

SITE J

PROBE LOCATION Duct-Out

Sample Point	Time	METER CONDITIONS ΔPs	ΔH	Meter Reading	TEMPERATURES, °F Stack	Probe	Oven	Impingers In	Impingers Out	Meter	O_2, %	Vac.
* B 1		.30	.85	5474.41	460	150	280			105		3.9
2		.29	.81	5485.80	480	180	290			110		3.7
3		.32	.90	5489.83	460	190	290			115		4.0
4		.34	.96	5495.13	480	150	300			120		4.2
				5841.22								
A 1		.26	.74	5845.48	480	150	250			100		3.9
2		.30	.85	5851.04	500	190	280			100		4.1
3		.28	.79	5855.85	510	180	280			105		4.0
4		.28	.74	5860.55	440	170	300			110		4.1
Average		0.297	0.837	21.3685 / 1933	483°F							

METER VOL. END _____ START 5474.41 SAMPLE VOL. 4.64 ft^3

C_{pitot}	Stack Press. in. Hg-Gauge	Barometric Pressure
.837	-5/8	29.80

Percent O_2 = _____

Nomograph Setup

P_{meter} = C =

P_{stack} = T_{stack} =

T_{meter} = ΔT =

ΔHg = Noz(Ideal) =

% H_2O = 8.6 Noz(Actual) = .316

F = .66

* meter corr. 1.0516

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	150	100	50
#2	109	100	9
#3	0	0	0
		Total	59

	g (End)	g (Start)	Δgrams
#4 Silica Gel	140	130	10
		Total Vol. H_2O	69 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft³/min — ISOKINETICS = ____ %

Sampling Time Per Point, Min	Before	After
3.0		6-11-1145

TEST NUMBER 8
DATE 6-6-79
OPERATOR R.AP
FUEL KENT.
SITE J
PROBE LOCATION STACK #4

Sample Point	Time	METER CONDITIONS ΔPs	ΔH	Meter Reading	TEMPERATURES, °F Stack	Probe	Oven	Impingers In	Impingers Out	Meter	O2, %	Vac.
NE-1	10:25	.09	.70	3198.25	310	250	290		80	85		4.8
2		.11	.85	3200.39	310	260	285		70	86		5.5
3		.09	.70	3202.35	310	260	290		70	88		4.8
4		.10	.75	3204.33	315	240	250		78	90		4.7
5		.12	.90	3206.52	320	250	250		68	90		5.5
6		.14	1.05	3208.89	320	260	255		70	90		6.1
7		.12	.90	3211.09	320	260	255		70	91		5.2
8		.12	.90	3213.27	320	260	255		71	95		5.2
9		.10	.75	3215.23	320	265	260		72	95		4.5
10		.09	.67	3217.07	320	265	255		72	97		4.0
11		.09	.67	3218.90	310	260	255		70	100		3.8
12		.05	.38	3220.32	—	265	260		70	100		2.3
NW-1		.10	.75	3222.79	310	280	220		78	100		4.5
2		.10	.75	3224.29	315	240	240		70	101		4.5
3		.12	.85	3226.35	320	250	240		72	101		4.8
4		.11	.78	3228.31	320	255	245		72	102		4.5
5		.10	.71	3230.18	322	260	250		72	102		4.0
6		.13	.92	3232.32	325	260	255		71	102		5.0
7		.12	.85	3234.37	320	255	260		70	103		4.8
8		.13	.92	3236.47	320	255	260		72	103		4.8
9		.12	.85	3238.53	320	255	265		72	103		4.7
10		.12	.85	3240.58	320	255	275		72	103		4.7
11		.09	.64	3242.37	315	250	280		73	104		3.6
12		.05	.36	3243.653	—	250	275		75	105		2.0
Average		.105	.769	47.375	317							

METER VOL. END ____ START 3196.278 ft³

SAMPLE VOL. ____ ft³

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.06" H_2O	29.80

Percent O_2 = ____

Nomograph Setup

P_{meter} = C =
P_{stack} = T_{stack} =
T_{meter} = ΔP =
ΔHg = Noz(Ideal) =
% H_2O = 6.7 Noz(Actual) = .377

45 26

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	152	100	52
#2	110	100	10
#3	____	0	____
		Total	62

#4 Silica Gel	g(End)	g(Start)	Δgrams
	140	130	10

Total Vol. H_2O 12 ml

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min

ISOKINETICS = _____ %

Sampling Time Per Point, Min.	
7 1/2	Before
	After

TEST NUMBER 9
DATE 6-16-74
OPERATOR JJ
FUEL Kent.
SITE J
PROBE LOCATION Boiler Out

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
A 1		.24	.68	5878.77	460	150	240			100		2.8
2		.27	.77	5883.55	480	180	270			105		3.0
3		.22	.62	5887.83	480	190	290			110		2.6
4		.24	.68	5892.26	460	180	300			112		2.8
				5500.00								
* B 1		.28	.79	5505.90	440	150	200			111		2.8
2		.31	.87	5510.98	460	180	250			195		3.0
3		.42	1.20	5515.85	460	180	290			120		3.7
4		.38	1.09	5521.46	440	180	320			122		3.5
Average		.26	.83		920°R							

METER VOL. END _____ START _____ SAMPLE VOL _____ ft^3

C_{pitot}	Stack Press. ~~In. Hg Gauge~~	Barometric Pressure
.837	-.78 "H_2O	29.69

Percent O_2 = _____

Nomograph Setup

P_{meter} = C = pH 1.6
P_{stack} = T_{stack} = pH 2.5
T_{meter} = ΔP =
ΔH_g = Noz(Ideal) =
% H_2O = Noz(Actual) = .316

Y = .66

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	135	100	35
#2	107	100	7
#3	0	0	0
		Total	42

#4 Silica Gel	g(End)	g(Start)	Δgrams
	140	130	10

Total Vol. H_2O 52 ml

* meter corr 1.051.6
Initial Imp water pH 5.3

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min

ISOKINETICS = ____ %

Sampling Time Per Point, Min
3.0

Before

After

TEST NUMBER 9
DATE 6-16-75
OPERATOR RAP
FUEL Kent.
SITE J
PROBE LOCATION Stack

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2, %	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
NE 1	10:18	.08	.56	3249.62	300	280	320		72	90		2.5
2		.08	.56	3251.39	300	260	320		70	90		2.4
3		.09	.64	3253.28	300	260	320		68	91		2.9
4		.11	.78	3255.32	300	265	315		70	91		3.2
5		.11	.78	3257.35	305	265	310		70	92		3.2
6		.10	.71	3259.31	305	260	310		70	92		3.0
7		.09	.64	3261.18	305	265	310		71	93		2.8
8		.06	.43	3262.68	305	260	305		70	97		2.0
9		.07	.50	3264.36	295	265	305		65	95		2.2
10		.05	.36	3265.68	295	265	310		62	97		<2.0
11		.05	.36	3267.13	290	260	300		61	97		<2.0
12		.05	.36	3268.48	—	260	300		60	98		<2.0
1		.07	.50	3270.14	305	220	280		72	102		—
2		.09	.64	3272.00	305	250	280		65	102		2.7
3		.11	.78	3274.01	305	270	275		68	102		2.0
4		.12	.85	3276.14	305	260	280		68	103		3.3
5		.10	.71	3278.05	310	260	270		67	103		2.9
6		.11	.77	3280.02	305	265	275		65	102		3.1
7		.14	1.0	3282.27	310	270	275		63	103		4.0
8		.12	.85	3284.35	315	265	270		68	110		3.8
9		.10	.71	3286.30	310	260	270		70	110		3.3
10		.07	.50	3287.86	310	250	270		70	110		2.3
11		.07	.50	3289.42	300	250	270		70	110		2.3
12		.05	.36	3290.808	—	250	265		71	111		<2.0
Average		.087	.62	42.958	303F					95F		

METER VOL. END ____ START ____ SAMPLE VOL ____ ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	−.12" H_2O	29.69

Percent O_2 = ____

Nomograph Setup

P_{meter} = ____ C = ____

P_{stack} = ____ T_{stack} = ____ pH 1.6 #1

T_{meter} = ____ ΔP = ____ pH 2.5 #2

ΔH_g = ____ Noz (Ideal) = .37 #3

% H_2O = ____ Noz (Actual) = ____

Imp.	Vol. (End)	Vol. (Start)	ΔVol. (ml)
#1	140	100	40
#2	108	100	8
#3	1	0	1
		Total	49

#4	g (End)	g (Start)	Δgrams
Silica Gel	140	130	10

Total Vol. H_2O 59 ml

Initial Imp. pH 5.3

47

PARTICULATE

DATA

Leak Check Rate — Vac in. Hg — ft^3/min — ISOKINETICS: ____%

Sampling Time Per Point, Min	Before	After
10		

TEST NUMBER: M-6
DATE: 6/30/79
OPERATOR: JD
FUEL: Coal
SITE: J
PROBE LOCATION: Boiler AT

Sample Point	Time	METER CONDITIONS ΔPs	ΔH	Meter Reading	TEMPERATURES, °F Stack	Probe	Oven	Impingers In	Impingers Out	Meter	O_2, %	Vac.
A (1 min)	Sec	.56	3.50	5916.00	530	250	340			100		12.0
2		.68	4.30	5930.54	530	250	340			105		15.0
3		.50	3.20	5943.45	530	250	310			105		11.0
4		.52	3.30	5956.30	520	250	300			100		12.0
B 1		5.0	3.20	5969.15	520	180	290			110		12.5
2		6.8	4.30	5983.21	540	260	280			110		22.0
3		2.0	4.40	5996.47	590	290	300			110		23.0
4		1.3	2.40	6008.26	540	250	300			110		20.0
Average		.58	3.1		537.5							

METER VOL. END 6008.26 — START 5903.35 — SAMPLE VOL. 104.91 ft^3

C_{Pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837		29.67

Percent O_2 =

Nomograph Setup

P_{meter} = C = ph 1.0
P_{stack} = T_{stack} = ph 2.5
T_{meter} = ΔP =
ΔHg = Noz(Ideal) =
% H_2O = Noz(Actual) = .377
Y = .30

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1	185	100	85
#2	136	100	36
#3	0	0	0
		Total	121

#4 Silica Gel	g(End)	g(Start)	Δgrams
	158	130	28
		Total Vol. H_2O	149 ml

PARTICULATE

DATA

comp. Test #2

Leak Check Rate — Vac in. Hg — ft^3/min

ISOKINETICS = _____ %

Sampling Time Per Point, Min
5.0

Before

After

TEST NUMBER 14
DATE 6-20-79
OPERATOR RHP
FUEL OH10
SITE J
PROBE LOCATION Stack #4

Sample Point	Time	METER CONDITIONS ΔPs	ΔH	Meter Reading	TEMPERATURES, °F Stack	Probe	Oven	Impingers In	Impingers Out	Meter	O_2, %	Vac.
NE 1	11:45	.22	.64	3297.89	350	250	250		82	88		3.5
2		.27	.80	3301.38	360	270	260		81	90		4.2
3		.27	.80	3304.76	365	270	265		63	90		4.2
4	*	.26	.77	3308.16	365	265	265		64	91		4.0
5		.25	.73	3311.42	365	230	230		68	94		3.9
6		.22	.65	3314.50	365	240	240		64	96		3.7
7		.22	.65	3317.55	365	250	250		67	98		3.7
8		.23	.67	3320.64	360	260	250		68	98		3.8
9		.18	.53	3323.44	355	260	255		65	100		3.2
10		.19	.56	3326.28	350	655	260		65	101		3.3
11		.19	.56	3329.11	345*	260	270		64	102		3.3
12		.16	.47	3331.62	—	260	270		65	102		3.0
NW 1	6min	.20	.63	3385.32	360	240	245		78	105	*	4.0
* 2	2min	.21	.67	3338.50	355	270	—		65	101		4.0
3		.25	.79	3342.02	365	260	260		62	82		4.8
4		.25	.79	3345.41	365	280	270		62	90		4.7
5		.24	.75	3348.73	365	280	270		62	91		4.5
6		.22	.67	3351.84	365	265	265		65	92		4.3
7		.20	.62	3354.85	365	250	265		68	95		4.0
8		.20	.62	3357.82	365	265	265		68	98		4.0
9		.19	.59	3360.70	365	265	265		66	101		3.8
10		.20	.62	3363.66	365	265	270		65	102		4.0
11		.20	.62	3366.58	365	255	265		63	103		4.0
12		.17	.54	3369.366	—	250	260		65	105		3.7
—							—					
Average		.216	.68	741.664	—					96	—	

SEVERE STORM

METER VOL. END _____ START 3294.702 ft³

SAMPLE VOL. _____ ft³

Pitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.817	-.28 in Hg	

Percent O_2 = _____

Nomograph Setup

T_{meter} = _____ °C = _____

T_{stack} = _____ °C = _____

T_{meter} = _____ °F = _____

$\Delta H_@$ = _____ Noz(Ideal) = _____

% H_2O = 7.7 Noz(Actual) = .313

F = .59

* Hg Therm. = 338

Imp.	Vol.(End)	Vol. (Start)	ΔVol.(ml)
#1 pH 1.3	191	100	91
#2 pH 2.5	121	100	21
#3	0	0	0
		Total	112

	#4	g(End)	g(Start)	Δgrams
	Silica Gel	227	209	18
			Total Vol. H_2O	130 ml

PARTICULATE LAB WORKSHEET

TEST NO. 1 BLR OUT (Inlet, Outlet) LOCATION S.K J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			25	23	1		
DATE WT.			—	—	—		
TARE WT.	1		95.9771	50.1574	.8510		
	2		95.9771	50.1572	.8513		
	3		95.9770	50.1569	.8514		
	4		—	—	—		
AVG.			95.9771	50.1572	0.8512		

POST TEST WTS.

	1		96.0947	50.3647	.9570		
	2		96.0925	50.3640	.9561		
	3		96.0923	50.3639	.9554		
	4		—	—	—		
AVG.			96.0932	50.3642	0.9562		
Δ WT.			0.1161	0.2070	0.1050		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 428.1 mgm REMARKS: _____

8830-5 rev

PARTICULATE LAB WORKSHEET

TEST NO. 1 (MSCH OUT ~~Inlet, Outlet~~) LOCATION Site J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			26		2		
DATE WT.			—		—		
TARE WT.	1		97.0261		.7880		
	2		97.0262		.7882		
	3		97.0266		.7883		
	4		—		—		
AVG.			97.0263		0.7882		

POST TEST WTS.

	1		97.0573		.8852		
	2		97.0540		.8840		
	3		97.0554		.8833		
	4		—		—		
AVG.			97.0556		0.8842		
Δ WT.			0.0293		0.096		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 125.3 mgm REMARKS: _____

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 2 BLR OUT (Inlet, Outlet) LOCATION Site J

Date 6-4-79 Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			27	28	8		
DATE WT.			—	—	—		
TARE WT.	1		104.4577	50.3050	.7375		
	2		104.4578	50.3047	.7372		
	3		104.4586	50.3050	.7373		
	4		—	—	—		
AVG.			104.4580	50.3049	.7373		

POST TEST WTS.

	1		104.6151	50.9958	.8670		
	2		104.6129	50.9955	.8673		
	3		104.6131	50.9957	.8674		
	4		—	—	—		
AVG.			104.6137	50.9957	.8672		
Δ WT.			0.1557	0.6908	0.1299		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 976.4 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 5 MECH OUT (~~Inlet, Outlet~~) LOCATION Side J

Date 6-12-79 Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			32		5		
DATE WT.			—		—		
TARE WT.	1		97.7662		.7476		
	2		97.7660		.7478		
	3		97.7661		.7471		
	4		—		—		
AVG.			97.7661		.7475		

POST TEST WTS.

	1		97.8747		.9231		
	2		97.8751		.9234		
	3		97.8752		.9234		
	4		—		—		
AVG.			97.8750		0.9233		
Δ WT.			0.1089		0.1758		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 284.7 mgm REMARKS: _____

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 6 (BLR OUT ~~Inlet, Outlet~~) LOCATION Stk J

Date 6-13-79 Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			36	34	4		
DATE WT.			—	—	—		
TARE WT.	1		95.9774	50.3270	.7895		
	2		95.9773	50.3270	.7893		
	3		95.9774	50.3271	.7893		
	4		—	—	—		
AVG.			95.9774	50.3270	0.7894		

POST TEST WTS.

	1		96.2451	51.6351	1.0256		
	2		96.2453	51.6338	1.0263		
	3		96.2458	51.6337	1.0266		
	4		—	—	—		
AVG.			96.2454	51.6337	1.0262		
Δ WT.			0.2680	1.3067	0.2368		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 1811.5 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 6 MECH (~~Inlet, Outlet~~) LOCATION Side J

Date 6-13-79 Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			33		6		
DATE WT.			—		—		
TARE WT.	1		104.3509		.7525		
	2		104.3511		.7526		
	3		104.3514		.7524		
	4		—		—		
AVG.			104.3511		0.7525		

POST TEST WTS.

	1		104.4802		.9268		
	2		104.4806		.9268		
	3		104.4811		.9272		
	4		—		—		
AVG.			104.4806		0.9269		
Δ WT.			0.1295		0.1744		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 303.9 mgm REMARKS: _____

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 7 BLR OUT (Inlet, Outlet) LOCATION Side J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			38	35	15		
DATE WT.			—	—	—		
TARE WT.	1		104.4559	64.5799	.7384		
	2		104.4567	64.5801	.7385		
	3		104.4554	64.5801	.7387		
	4		—	—	—		
AVG.			104.4560	64.5800	.7385		

POST TEST WTS.

1		104.6014	64.9283	.8836		
2		104.6020	64.9273	.8823		
3		104.6024	64.9283	.8805		
4		—	—	—		
AVG.		104.6019	64.9280	0.8805		
Δ WT.		0.1459	0.3480	0.1420		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 635.9 mgm REMARKS: _____

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 7 MECH OUT (Inlet, Outlet) LOCATION S. to J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			39		10		
DATE WT.			—		—		
TARE WT.	1		95.5720		.7510		
	2		95.5711		.7508		
	3		95.5703		.7506		
	4		—		—		
AVG.			95.5711		.7508		

POST TEST WTS.

	1		95.6090		~~.8926~~		
	2		95.6087		.8917		
	3		95.6086		.8911		
	4		—		—		
AVG.			95.6088		.8914		
Δ WT.			0.0377		0.1406		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 178.3 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 6 BLR OUT (Inlet, Outlet) LOCATION Sile J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			40	31	16		
DATE WT.			—	—	—		
TARE WT.	1		97.0244	105.2116	.7344		
	2		97.0248	105.2118	.7342		
	3		97.0244	105.2118	.7337		
	4		—	—	—		
AVG.			97.0245	105.2115	.7341		

POST TEST WTS.

1		97.1668	105.5810	.8545		
2		97.1673	105.5809	.8547		
3		97.1676	105.5814	.8537		
4		—	—	—		
AVG.		97.1672	105.5811	.8543		
Δ WT.		0.1427	0.3696	0.1202		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 632.5 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 8 MECH (Inlet, Outlet) LOCATION Site J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			42		11		
DATE WT.			—		—		
TARE WT.	1		95.0094		.5912		
	2		95.0100		.5910		
	3		95.0091		.5908		
	4		—		—		
AVG.			95.0095		.5910		

POST TEST WTS.

	1		95.0392		~~.7057~~		
	2		95.0402		.7046		
	3		95.0409		.7039		
	4		—		—		
AVG.			95.0401		.7043		
Δ WT.			0.0306		0.1133		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 143.9 mgm REMARKS: _____

8830-5 rev

PARTICULATE LAB WORKSHEET

TEST NO. 9 BLR OUT (Inlet, Outlet) LOCATION Site J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			50	41	17		
DATE WT.			—	—	—		
TARE WT.	1		104.4578	50.8311	.7896		
	2		104.4577	50.8310	.7895		
	3		104.4576	50.8306	.7897		
	4		—	—	—		
AVG.			104.4577	50.8309	.7896		

POST TEST WTS.

	1		104.6163	51.0025	.9019		
	2		104.6164	51.0026	.8999		
	3		104.6164	51.0025	.8991		
	4		—	—	—		
AVG.			104.6164	51.0025	.8995		
Δ WT.			0.1587	0.1716	0.1099		

Δ Vlc = _____ ml

Δ DgV = _____ ft^3

Δ Mn 440.2 mgm

LOAD _____ klb/hr

O_2 _____ %

REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 9 MECH OUT (Inlet, Outlet) LOCATION Site J

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			55		18		
DATE WT.			—		—		
TARE WT.	1		95.9792		.5868		
	2		95.9791		.5867		
	3		95.9793		.5864		
	4		—		—		
AVG.			95.9792		.5866		

POST TEST WTS.

	1		96.0125		~~.7059~~		
	2		96.0129		.7035		
	3		96.0130		.7037		
	4		—		—		
AVG.			96.0128		.7036		
Δ WT.			0.0336		0.1170		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 150.6 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 14 BLR OUT (Inlet, Outlet) LOCATION Stk 5

Date _____ Box No. _____ Eng. _____

Test Description _____

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			56	37	21		
DATE WT.			—	—	—		
TARE WT.	1		95.0115	63.3967	.9317		
	2		95.0112	63.3970	.9315		
	3		95.0110	63.3970	.9316		
	4		—	—	—		
AVG.			95.0112	63.3969	.9316		

POST TEST WTS.

	1		95.2491	~~65.6075~~	1.2104		
	2		95.2501	65.6058	1.2114		
	3		95.2502	65.6057	1.2108		
	4		—	—	—		
AVG.			95.2498	65.6057	1.2109		
Δ WT.			0.2386	2.2088	0.2793		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 2726.7 mgm REMARKS: _____

PARTICULATE LAB WORKSHEET

TEST NO. 14 MECH OUT (Inlet, Outlet) LOCATION Side J

Date _____ Box No. _____ Eng. _____

Test Description #2nd. COMPLIANCE

Dry Gas Meter Vol (ft^3)

Final _____

Initial _____

Δ DgV _____

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—		—		
BEAKER NO.			58		19		
DATE WT.			—		—		
TARE WT.	1		104.3524		.5840		
	2		104.3518		.5841		
	3		104.3521		.5839		
	4		—		—		
AVG.			104.3521		.5840		

POST TEST WTS.

	1		104.5261		~~.8618~~		
	2		104.5260		.8384		
	3		104.5261		.8383		
	4		—		—		
AVG.			104.5261		.8384		
Δ WT.			0.1740		0.2544		

Δ Vlc = _____ ml LOAD _____ klb/hr

Δ DgV = _____ ft^3 O_2 _____ %

Δ Mn 428.4 mgm REMARKS: _____

8830-5 rev.

SECTION 3.0

GASEOUS DATA

GASEOUS EMISSION SUMMARY

Location: TEST SITE J

Fuel: KENTUCKY AND OHIO

				BOILER OUTLET						STACK						
TEST NO.	DATE	LOAD %	CONDITIONS	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	SO_2 ppm Dry	SO_3 ppm Dry	NOTES
01	6-3-79	48.2	PART OHIO COAL	10.2	6.7	005	291	0		9.7	7.3	005	253			
2	6-4-79	73.8	PART	10.6	8.1		304	0	107	10.8	7.9		267			
3	6-5-79		scratched	7.5	10.4		231	0	80	—	—		—			
4	6-6-79		scratched	9.1	9.0		258	0		7.6	10.1		171			
5	6-12-79	102.6	PART, Low O2	7.9	10.2		287	0		8.3	9.9		305			
6	6-13-79	98.6	PART KENT COAL	8.1	10.1		247	0		9.7	9.7		265			
7	6-14-79	84.9	OHIO COAL	8.7	9.6		276	0		9.2	9.3		285			
8	6-15-79	73.1	KENT COAL	9.0	9.4		203	0		9.2	9.6		222			
9	6-16-79	49.6		12.2	7.0		306	003		11.5	7.5		261			
10	6-17-79		OFA TRAVERSE													
11	6-17-79															
12	6-17-79															
13	6-19-79	102.5	BRINK OHIO COAL	7.9	10.1		206			7.8	10.4		227			
14	6-20-79	97.1	PART, high O2	8.8	9.9		280			9.0	9.5		256			
15	6-28-79	93.9	SASS, SO_x KENT COAL	7.9	9.9		236			8.2	9.8		231	1008	5	
16	6-30-79	92.6	SASS, SO_x OHIO COAL	8.9	8.9	V	320			9.2	8.7	V	324	1468	11	

NOTE: All parts per million (ppm) figures are corrected to a 3% O_2 constant dilution factor

#15900

REV.

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO 1

DATE 6-3-79

FUEL Ohio

LOAD 35,000

CONDITIONS as found

DATA TAKEN BY JOB

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Stack	155	10.3	7.4			155	262							550	929	? Hot Line HC
	2:15	10.3	7.0			150	253							560	946	Contaminated ?
Blr out.																
23-567	230															
		10.1	7.0			180	298							600	994	
23-567	245	10.3	6.0			170	287							580	979	
27-56	255	10.2	6.4			160	265							590	978	
23,5,6	305	10.0	7.3			190	312							580	952	
STACK	320	9.2	7.8			185	283							575	880	
STACK	350	9.1	6.8			140	212							620	941	

AVERAGES

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO unc	CO cor	NO unc	NO cor	NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
BLR		10.2	6.7				291								976	HC contaminated
STACK		9.7	7.3				253								934	

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE 1 FUEL Ohio

TEST NO 2 LOAD 50,000

DATE 6-4-79 CONDITIONS as found

DATA TAKEN BY MJ

RH = 44%

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Stack																Cal After Stack
215	215	11.5	7.6			70	133.3							100	190.4	
	220	12.5	6.5			95	202.4							80	170.5	
	245	11.5	7.4			145	276.1							78	148.5	
Blr Out																
	250	11.0	7.8			160	281.3							78	141.0	
	300	10.0	8.5			180	295.6							80	131.4	
	305	10.2	8.4			189	316.2	178	297.8	178	297.8	0		39	65.3	* Lower when No sample -
	310															ReCal Hot Line
	315	10.1	8.4			180	298.3	170	281.8	170	281.8	0		77	127.6	w/ NO
	325	10.2	8.4			180	301.1	170	284.4	170	284.4	0		30	50.2	*
	330	10.1	8.4			190	314.9							76	126.0	
Stack																
	340	10.0	8.4			180	295.6							77	126.5	
	345	10.1	8.4			185	306.6							78	129.3	
	355	10.7	7.9			180	315.9							80	140.4	
																ReCal
	310	11.3	7.5			150	279.7							78	145.4	
	315	10.7	8.0			170	298.3							76	133.4	
	325	9.2	9.0			190	290.7							65	99.4	
Blr Out																
	335	10.6	8.4			185	306.6							65	107.7	
	343	11.0	7.9			170	307.4	149	269.4	149	269.4	0		29	52.4	
	345	11.7	7.2			150	291.8							68	132.3	
	355	11.6	7.3			165	317.6							70	134.7	

AVERAGES

Blr		10.6	8.1				304					0			107	
Stack		10.8	7.9				267								157	

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO #3

DATE 6-5-79

FUEL Oleo

LOAD 70%

CONDITIONS

DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Bkgnd																
23567	10:10	8.2	9.8			130	253	~~190.6~~		~~190~~		~~.6~~		75	106	
		6.5	11.2					190.6		190		.6	.7	48	60	
	10:30	5.0	12.0			170	191							60	68	
	10:40	7.2	10.4			145	189							56	73	
	10:50	11.3	8.0			168	313							56	104	
	11:00	9.0	9.3			140	211	120		120			0	~~43~~/60	~~69~~/90	
	11:10	6.0	11.3			161	193							61	73	
	11:15	7.0	10.8			205	264							64	82	Recal
Stack																
	11:20															
																~~TEST~~ stopped due to smoke
AVERAGES		7.5	10.4				231						.4		80	

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO 4
DATE 6-6-79

FUEL Oil
LOAD 70K
CONDITIONS as is
DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	Hot Line NOx unc	Hot Line NOx cor	Hot Line NO unc	Hot Line NO cor	Hot Line NO_2 unc	Hot Line NO_2 cor	Hot Line HC unc	Hot Line HC cor	REMARKS
Stack	905	8.0	9.5			125	173									
	915	7.1	10.6			130	169									
Blr out	930	9.1	9.0			170	258									
																TEST
																scratched
																due
																to
																bad
																feed water
																regulator

AVERAGES

BLR		9.1	9.0				278									
STACK		7.6	10.1				171									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO ~~#6~~ #5

DATE 6-12-79

FUEL Ohio

LOAD 70 K

CONDITIONS

DATA TAKEN BY MJ

RH = 45%

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Blr Out																
23 567	330	7.9	10.2			190	261.6									
23567	345	8.2	9.9			170	239									
23 567	400	8.0	10.0			180	249.7									
Stack	415	8.5	9.9			208	290									
Stack	470	8.6	9.7			215	313									
Stack	445	8.7	9.4			210	308									Re Cal
Stack	500	7.5	10.5			230	307									
Dlr Out																
23 56	515	7.9	10.2			250	344	220	303	220	303		0			
23 56	530	7.6	10.5			230	309	220	296	220	296		0			
23 56	545	7.5	10.5			240	321									

AVERAGES

BLR		7.9	10.2				287						0			
STACK		8.3	9.4				305						0			

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO #6
DATE 6-13-79

FUEL Kty.
LOAD 70,000
CONDITIONS as found
DATA TAKEN BY MJ

RH = 36%

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Blr Out																
2356	1130	6.6	11.2			80	100									
2356	1150	8.3	10.0			180	256									Cal.
2356	1200	6.1	11.4			180	218	160	191	160	191		0			
Stack	1215	8.0	10.2			160	222									
	1230	10.5	8.5			180	310									
	1240	9.4	9.0			175	272									Cal Change Probe
	1250	8.2	10.0			185	261									
	1:00	7.2	10.7			199	260									
Blr Out	110	7.0	10.9			190	246									
	120	9.5	9.1			180	283									
	130	9.5	9.0			180	283	180	283	180	283		0			
	150	9.7	8.8			165	244									
	200	7.9	10.2			185	255									
	205	8.0	10.2			195	271									
	215	8.0	10.2			210	291									

AVERAGES

Blr		8.1	10.1				247						0			
Stack		8.7	9.7				268									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE J — FUEL Ohio

TEST NO # 7 — LOAD 60,000

DATE 6-14-79 — CONDITIONS as found

DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Bkgnd																Cal. start
23567	11:15	9.0	9.4			160	241									
	11:25	9.4	9.0			180	280									Cal.
	11 35	9.0	9.4			190	286	170	256	170	256	0	0			
	11 40	8.8	9.5			195	288									
Stack	11 50	9.0	9.4			190	286									
	1155	9.1	9.4			185	281									Changed sides
	1205	9.4	9.0			190	296									
Bkgnd	1210	9.0	9.2			210	316									
23 56	1220	7.8	10.2			200	273	162	221	162	221	0	0			
	1230	7.5	10.5			195	260									
	1245	8.5	9.7			190	274									
	1:00	7.5	8.9			183	284									
	1:10	8.0	10.2			185	257									

AVERAGES

Bkgd		8.7	9.6				276						0			
Stack		9.2	9.3				288									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO #8
DATE 6-15-79

FUEL Kentucky
LOAD 50 K
CONDITIONS [illegible] forced
DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Bl. out																
23 56	1040	6.0	11.4			130										
	1050	5.5	12.0			126		90		90		0				Lost Load
																Stop Test
	11 30	9.1	9.3			132	200									Start
	11 45	9.0	9.4			134	202	97	146	97	146	0	0			
	1215	9.0	9.4			137	206									
Stack	1220	9.1	9.4			141	214									
	1235	9.1	9.6			142	215									
	1250	9.2	10.0			1m	224									
	1.00	92	9.4			150	229									

AVERAGES

Probe Position	Time	O_2	CO_2	CO unc	CO cor	NO unc	NO cor	NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
BLR		9.0	9.4				203						0			
STACK		9.2	9.6				222									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE 1 — FUEL Kentucky

TEST NO 9 — LOAD 35,000

DATE 6-16-79 — CONDITIONS as found

DATA TAKEN BY MT

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Stack	1040	11.2	7.8			130	240									
	1050	11.2	7.7			127	234									
	1105	11.5	7.4			129	246									
Bleed	1115	11.9	7.0			135	268									Change Side Coal
2356	1120	11.9	7.4			143	284									
	1130	12.0	7.1			143	288									
	1140	12.0	7.1			155	312									
	1155	11.6	7.4			145	279									
Stack																
	1200	11.6	7.6			150	289									
	1210	11.2	7.8			145	268									
	1220	11.9	7.2			149	284									
Bleed	1230	12.1	7.0			142	289									
2356	1250	11.5	6.6			155	330									
2356	115	13.0	6.9			158	358									

AVERAGES

Bleed		12.2	7.0				326									
Stack		11.5	7.5				261									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE 1

TEST NO 13

DATE 6-14-79

FUEL Ohio Coal

LOAD 570 x 10⁶ #/hr

CONDITIONS as found

DATA TAKEN BY RD

Humidity 46 %

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Stack	12:30	8.2	9.9			140	197									
Stack	12:40	8.0	9.7			155	215									
Stack	12:50	7.0	10.6			145	186									
Stack	1:00	7.5	10.7			155	207									
Stack	1:10	8.6	9.8			155	226									
Boiler	1:20	7.6	10.6			210	283									
Boiler	1:30	6.4	11.2			170	210									
Boiler	1:40	6.2	11.4			150	183									
Boiler	1:50	8.1	10.0			150	210									
Boiler	2:00	10.8	8.6			140	248									
																Dry 82° Wet 67°

AVERAGES

Stack		7.9	10.1				206									
BoilerOut		7.8	10.4				227									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE J

TEST NO 14

DATE [illegible]

FUEL [illegible]

LOAD [illegible]

CONDITIONS [illegible]

DATA TAKEN BY [illegible]

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
BLR	1200	8.6	9.7			215	313									
																BLR [illegible]
	1230	9.6	9.7			170	256									[illegible]
STACK	1300	9.5	9.5			185	285									
	1330	8.0	10.4			180	250									
	1400	8.5	9.9			225	325									
BLR	1430	9.2	9.7			215	329									
	1500	8.3	10.3			180	262									
STACK	1530	10.0	8.8			130	213									
	1600	9.1	9.4			135	205									
																RH = 72%
																Tdry - 80°F
																Twet - 73°F

AVERAGES

BLR		8.8	9.9				290									
STACK		9.0	9.5				256									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO 15
DATE 6-28-79

FUEL Kentucky
LOAD 65,000 LB/HR
CONDITIONS ~8% O_2
DATA TAKEN BY JOB

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
BLR	1215	8.5	9.6		065	140	202									
STACK	1300	8.2	9.8			148	209									
BLR	1400	8.8	8.5			180	266									Twet = 70F Tdry = 82F
BLR	1340	7.0	10.6			170	249									RH = 56%
STACK	1430	8.1	9.7			170	252									
BLR	1530	7.2	10.6			178	233									
BLR	1600	7.2	10.6			165	216									
BLR	1630	8.7	9.5			170	249									
BLR	1700	7.8	10.0			175	239									
BLR	1720	8.3	9.5			188	263									
AVERAGES																
BLR		7.9	9.9				236									
STACK		8.2	9.8				231									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

KVB

GASEOUS EMISSIONS DATA

TEST SITE J
TEST NO 16
DATE 6-30-79

FUEL Ohio
LOAD 70,000 LB/HR
CONDITIONS ~8% O_2 as found
DATA TAKEN BY JOB

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO · ppm(dry) unc	CO · ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
BLR	1200	7.4	9.8		005	180	239									
STACK	1245	8.5	9.2			180	260									Twet = 68°F
BLR	1330	9.5	8.7			235	369									Tdry = 75°F RH = 70%
BLR	1400	9.3	8.8			202	312									
BLR	1440	8.5	7.2			200	289									
BLR	1530	9.7	8.2			245	391									
STACK	1600	9.8	8.2			240	387									

AVERAGES

BLR		8.9	8.9				320									
STACK		9.2	8.1				324									

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

15900

Local _____

SOx DATA SHEET

Date _____ Probe Location & Probe Length 3' - NW PORT

Unit # _____ Fuel KENTUCKY 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	3	15:40	97	- 0 -	0.000	29.74	Stack NW	20.0'	
		15:54	94		1.000				
15B	1	16:20	93		0.000			16:35	
		16:34	90		1.000			20.0	
15C		17:00	88		0.000			17:13	
		17:12	86		1.000			20.0	

SAMPLED BY _____

TITRATED BY R.H.

	Test # 15A			Test # 15B			Test # 15C		
	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.0108								
Dilution Factor F	25	1		20	1		20	1	
Blank B									
Averages									
Ml. of Titrant A	5.4	.9		8.5	.6		7.2	.8	
	5.3			8.5			7.2		
	5.3			8.6			7.3		
Averages	5.3			8.5	.6		7.2	.8	
460 + T									
Sample Vol. V									
P + p									
A - B									

$SO2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$

$SO2 = \frac{(5.3)(.0108)(25)(555.5)24}{(1.000)(29.74)}$

SO2 = 641.5 SO3 = 4.1

$SO3 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO2 @ 3% 02 = 704.2

SO3 @ 3% 02 = 4.1

SOx @ 3% 02 = 710.6

$SO2 = \frac{(8.5)(.0108)(20)(551.5)24}{(\ )(\ )}$ * contaminated

SO2 = 817

$SO3 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO3 = 2.55

SO2 @ 3% 02 = 1151.5

SO3 @ 3% 02 = 4.1

SOx @ 3% 02 = 1155

$SO2 = \frac{(7.2)(.0108)(20)(547)24}{(\ )(\ )}$

SO2 = 6865

$SO3 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO3 = 3.5

SO2 @ 3% 02 = 961.6

SO3 @ 3% 02 = 5.4

SOx @ 3% 02 = 967

Local Site J

SOx DATA SHEET

Date 6-30-79 Probe Location & Probe Length 3' — NW PORT STACK

Unit # 4 Fuel OHIO Load

Test Description:

Test No.	Box No.	Sample Time	Meter Temp.(T)	(p) Meter Press.	Meter Reading	(p) Baro. Press.	Port	Purge Time	O2
16A	3	13:32	64°	-0-	0.000	29.26	NW	13:51	
		13:47	64		1.200			14:11	
16B	1	14:18	63		0.000			14:37	
		14.34	63		1.200			14:57	
16C	1	15:10	62		0.000			15:25	
		15:25	62		1.200			15:50	

SAMPLED BY T.M.P

	Test # 16A			Test # 16B			Test # 16C		
	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.0108	—							→
Dilution Factor F	20	1		20	1		20	1	
Blank B	—								
Averages									
Ml. of Titrant A	11.7	1.9		11.2	1.8		14.3	2.2	
	11.8			11.3			14.3		
	11.8			11.2			14.2		
Averages	11.8	1.9		11.2	1.8		14.3	2.2	
460 + T	524	→		523	→		522		
Sample Vol. V	1.200	→		1.200	→		1.200	→	
P + p	29.26	→		29.26	→		29.26	→	
A - B	11.8	1.9		11.2	1.8		14.3	2.2	

TITRATED BY T.M.P

$SO2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$

$SO2 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO2 = 913 SO3 = 9.3

$SO3 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO2 @ 3% O2 = 1396.8
SO3 @ 3% O2 = 11.2
SOx @ 3% O2 = 1408

$SO2 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO2 = 864

$SO3 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO3 = 6.9

SO2 @ 3% O2 = 1321.8
SO3 @ 3% O2 = 11.6
SOx @ 3% O2 = 1333

$SO2 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO2 = 1102

$SO3 = \frac{(\ )(\ )(\ )(\ )24}{(\ )(\ )}$

SO3 = 8.4

SO2 @ 3% O2 = 1686.6
SO3 @ 3% O2 = 12.9
SOx @ 3% O2 = 1699

SECTION 4.0

PARTICLE SIZE DISTRIBUTION

KVB

BRINK CASCADE IMPACTOR DATA SHEET

TEST NO. 13 LOAD 70,000 LB/HR

TEST SITE T % O_2 7.8 %

TEST DATE 6-19-79 FUEL Ohio

SAMPLE LOCATION BLR OUT SPECIAL CONDITIONS as found

GAS VELOCITY DETERMINATION

PITOT TUBE ΔP .65 BAROMETRIC PRESS in. Hg, P_{bar} 29.87

GAS TEMP. °R, Ts 480 940 GAS STATIC PRESS in. H_2O -1.7 "H_2O

PITOT CORRECTION FACTOR, Cp .86 GAS STATIC PRESS in. Hg abs, Ps 29.74

MOLECULAR WT. FLUE GAS, MW_s 29.4

$$Vs = 85.48\ Cp \left(\frac{Ts\ \Delta P}{Ps\ MWs}\right)^{\frac{1}{2}} = 61.45 \text{ ft/sec}$$

IMPACTOR FLOW RATE DETERMINATION

NOZZLE DIAMETER inches, Dn .059

NOZZLE AREA ft^2, An 1.902×10^{-5} $An = \pi(Dn/24)^2$

$Qs = Vs\ An\ 60 = .070$ ft^3/min at nozzle

$Qc = Qs \left(\frac{PsMWs}{1.3Ts}\right)^{\frac{1}{2}} = .059$ ft^3/min corrected to calibration conditions

PRESSURE DROP ACROSS IMPACTOR FROM CALIBRATION CURVE 16.5 in. H_2O

OPERATING VACUUM (corrected for static pressure of duct) 18.2 in. H_2O

ISOKINETICS DETERMINATION

	SAMPLE TIME (θ)	METER READING (Vm)	METER TEMP (Tm)
INITIAL	000 →	→	80
FINAL	[illegible]	[illegible]	[illegible]
Δ			

$\%H_2O$ = 6.0 %

$$I = \frac{1.667\ Ts\ Vm\ P_{bar}}{\theta\ Tm\ Vs\ Ps\ An\left(1-\frac{\%H_2O}{100}\right)} = \text{\_\_\_\_\_}\ \%$$

#15900

KVB

BRINK CASCADE IMPACTOR LAB WORKSHEET

TEST No. 13 LOCATION Site J - BLR our #4

TEST DATE 6-19-79 ENGINEER _____

TEST DESCRIPTION _____

SET #1

PRE TEST WEIGHTS (GRAMS)

PLATE NO.		CYCLONE	1	2	3	4	5	FINAL FILTER
DATE WT.								
TARE WT.	1	.1136	3.5085	3.0907	3.9792	3.7788	3.9004	.0370
	2	.1137	3.5085	3.0907	3.9791	3.7788	3.9005	.0380
	3	—						—
	4	—						—
AVERAGE		.1136	3.5085	3.0907	3.9791	3.7788	3.9004	.0379

POST TEST WEIGHTS (GRAMS)

DATE WT.								
GROSS WT.	1	.1266	3.5106	3.0922	3.9803	3.7799	3.9013	.0380
	2	.1268	3.5107	3.0922	3.9805	3.7799	3.9012	.0383
	3	—	3.5105	3.0921	3.9805	3.7798	3.9012	.0384
	4	—	—	—	—	—	—	—
AVERAGE		.1267	3.5106	3.0922	3.9804	3.7799	3.9012	.0382

NET TEST RESULTS (MILLIGRAMS)

NET WT.	0.0131	0.0021	0.0015	0.0013	0.0011	0.0008	0.0003
PERCENT	64.9	10.4	7.4	6.4	5.4	4.0	1.5

TOTAL NET WEIGHT 20.2 mgm

#15900

KVB

BRINK CASCADE IMPACTOR DATA REDUCTION

TEST NO. 13 LOAD 70,000 LB/HR

TEST SITE J % O_2 7.8 %

TEST DATE 6-19-79 FUEL Ohio

SAMPLE LOCATION BLR-OUT SPECIAL CONDITIONS as found

ρ_p - Density of particles 2.5 g/cm^3 Vm - Dry gas volume _____ SCF

μ - Viscosity of flue gas 2.59×10^{-4} poise Mn - Total particulate mass _____ mgm

MWs - Molecular wt. flue gas 29.04 g/g mole Cn - Total concentration _____ grains/SCF

ΔP_I - Pressure drop across impactor 16.5 in H_2O I - Percent isokinetics _____ %

Ps - Absolute stack pressure 29.74 in. Hg Vs - Gas velocity _____ ft/sec.

Ts - Absolute stack temperature 940 °R Dn - Nozzle diameter _____ in.

Qs - Actual flow rate at stack conditions 0.070 ft^3/min

Stage Number	CYCLONE	1	2	3	4	5	FINAL FILTER
Dj - Jet Diameter, cm		0.2490	0.1775	0.1396	0.0946	0.0731	
Fj - Press. factor, n.d.		0.0210	0.0273	0.0395	0.0903	0.3277	
$D_{s,50}$ Stokes diameter, µm		2.95	1.70	1.13	0.55	0.32	
$D_{A,50}$ Aerodynamic diameter, µm		4.78	2.80	1.90	0.97	0.60	
$D_{AI,50}$ Aerodynamic impaction diameter, µm		4.98	3.00	2.09	1.16	0.787	
Mn - Particulate mass, mgm	13.1	2.1	1.5	1.3	1.1	0.8	0.3
% - Percent of Total	64.9	10.4	7.4	6.4	5.4	4.0	1.5
Cumulative percent	35.1	24.7	17.3	10.9	5.5	1.5	0
Cn - Concentration, grains/SCF							
Cumulative concentration, grains/SCF							

#15900

KVB

BRINK CASCADE IMPACTOR DATA SHEET

TEST NO. 13 LOAD 70,000 LB/HR

TEST SITE J % O_2 7.8%

TEST DATE 6-19-79 FUEL OHIO

SAMPLE LOCATION STACK SPECIAL CONDITIONS simultaneous Brink

GAS VELOCITY DETERMINATION

PITOT TUBE ΔP .17 BAROMETRIC PRESS in. Hg, P_{bar} 29.87

GAS TEMP. °R, Ts 345 GAS STATIC PRESS in. H_2O —

PITOT CORRECTION FACTOR, Cp .86 GAS STATIC PRESS in. Hg abs, Ps —

MOLECULAR WT. FLUE GAS, MW_s 29.4

$$Vs = 85.48\ Cp \left(\frac{Ts\ \Delta P}{Ps\ MWs}\right)^{\frac{1}{2}} = 29.02 \text{ ft/sec}$$

IMPACTOR FLOW RATE DETERMINATION

NOZZLE DIAMETER inches, Dn .071

NOZZLE AREA ft^2, An 2.749×10^{-3} $An = \pi(Dn/24)^2$

$Qn = Vs\ An\ 60 = .047$ ft^3/min at nozzle

$Qc = Qs \left(\frac{PsMWs}{1.3Ts}\right)^{\frac{1}{2}} = .043$ ft^3/min corrected to calibration conditions

PRESSURE DROP ACROSS IMPACTOR FROM CALIBRATION CURVE 9.0 in. H_2O

OPERATING VACUUM (corrected for static pressure of duct) 9.0 in. H_2O

ISOKINETICS DETERMINATION

	SAMPLE TIME (θ)	METER READING (Vm)	METER TEMP (Tm)
INITIAL		0.000	86
FINAL	45.0'	1.275	87
Δ			

87

$\%H_2O = 6.0\ \%$

$$I = \frac{1.667\ Ts\ Vm\ P_{bar}}{\theta\ Tm\ Vs\ Ps\ An\left(1-\frac{\%H_2O}{100}\right)} = \_\_\_\_\ \%$$

#15900

KVB

BRINK CASCADE IMPACTOR LAB WORKSHEET

TEST No. 13 LOCATION Site J – MECH #4

TEST DATE 6-19-79 ENGINEER _____

TEST DESCRIPTION _____

SET #2

PRE TEST WEIGHTS (GRAMS)

PLATE NO.		CYCLONE	1	2	3	4	5	FINAL FILTER
DATE WT.								
TARE WT.	1		~~3.4130~~	~~3.2716~~	~~3.4991~~	~~3.4646~~	~~3.3018~~	~~.0304~~
	2		3.4124	3.2709	3.4966	3.4639	3.3012	.0378
	3		3.4128	3.2710	3.4966	3.4639	3.3012	.0377
	4	—						—
AVERAGE			3.4126	3.2709	3.4966	3.4639	3.3012	.0377

POST TEST WEIGHTS (GRAMS)

DATE WT.								
GROSS WT.	1		3.4132	3.2719	3.4972	3.4650	3.3019	.0381
	2		3.4132	3.2719	3.4970	3.4649	3.3020	.0380
	3		3.4131	3.2720	3.4972	3.4651	3.3021	.0382
	4		—	—	—	—	—	—
AVERAGE			3.4132	3.2719	3.4971	3.4650	3.3020	.0381

NET TEST RESULTS (MILLIGRAMS)

NET WT.	—	0.0006	0.0010	0.0005	0.0011	0.0008	0.0004
PERCENT	—	13.6	22.7	11.4	25.0	18.2	9.1

TOTAL NET WEIGHT 4.4 mgm

#15900

KVB

BRINK CASCADE IMPACTOR DATA REDUCTION

TEST NO. 13 LOAD 70,000 LB/HR

TEST SITE J % O_2 7.9%

TEST DATE 6-19-79 FUEL Ohio Coal

SAMPLE LOCATION STACK SPECIAL CONDITIONS as found

ρ_p - Density of particles 2.5 g/cm^3 Vm - Dry gas volume _____ SCF

μ - Viscosity of flue gas 2.32×10^{-4} poise Mn - Total particulate mass _____ mgm

MWs - Molecular wt. flue gas 29.04 g/g mole Cn - Total concentration _____ grains/SCF

ΔP_I - Pressure drop across impactor 9.0 in H_2O I - Percent isokinetics _____ %

Ps - Absolute stack pressure 29.87 in. Hg Vs - Gas velocity _____ ft/sec.

Ts - Absolute stack temperature 805 °R Dn - Nozzle diameter _____ in.

Qs - Actual flow rate at stack conditions 0.047 ft^3/min

Stage Number	CYCLONE	1	2	3	4	5	FINAL FILTER
Dj - Jet Diameter, cm		0.2490	0.1775	0.1396	0.0946	0.0731	
Fj - Press. factor, n.d.		0.0210	0.0273	0.0395	0.0903	0.3277	
$Ds,\overline{50}$ Stokes diameter, µm		3.49	2.04	1.38	0.71	0.43	
$D_{A,\overline{50}}$ Aerodynamic diameter, µm		5.60	3.31	2.26	1.20	0.77	
$D_{AI,\overline{50}}$ Aerodynamic impaction diameter, µm		5.75	3.46	2.41	1.35	0.912	
Mn - Particulate mass, mgm	0	0.6	1.0	0.5	1.1	0.8	0.4
% - Percent of Total	0	13.6	22.7	11.4	25.0	18.2	9.1
Cumulative percent	100.0	86.4	63.7	52.3	27.3	9.1	0
Cn - Concentration, grains/SCF							
Cumulative concentration, grains/SCF							

#15900

SITE J

SASS GRAVIMETRICS

			%	% Passing
Test 15				
	10μ	0.4739	24.77	75.23
	3μ	0.1265	6.61	68.62
	1μ	0.1979	10.35	58.27
	Filters	0.6897	58.27	0
		0.4249		
	Total	1.9129	100.00	
Test 16	10μ	0.2905	19.06	80.94
	3μ	None	-	80.94
	1μ	0.2358	15.47	65.47
	Filter	0.9975	65.46	0
	Total	1.5238	99.99	

SECTION 5.0

FUEL AND ASH ANALYSIS

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COMMERCIAL TESTING & ENGINEERING CO.

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

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

June 28, 1979

Sample identification
by KVB

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Test No. 1
Sample: Ohio Coal
Test Site: J

Analysis report no. 71-34526

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.89	xxxxx
% Ash	6.31	6.50
% Volatile	37.43	38.54
% Fixed Carbon	53.37	54.96
	100.00	100.00
Btu/lb.	13572	13976
% Sulfur	1.06	1.09

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	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
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Test No. 2
Sample: Ohio Coal
Test Site: J

Analysis report no. 71-34530

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.12	xxxxx
% Ash	7.06	7.29
% Volatile	37.62	38.83
% Fixed Carbon	52.20	53.88
	100.00	100.00
Btu/lb.	13405	13837
% Sulfur	1.52	1.57

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ohio Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/12/79
Date received	7/12/79

Test No. 5

Analysis report no. 71- 35626

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	4.44	xxxxx
% Ash	10.22	10.69
% Volatile	37.19	38.92
% Fixed Carbon	48.15	50.39
	100.00	100.00
Btu/lb.	12570	13154
% Sulfur	2.18	2.28

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H = Cone Height
W = Cone Width

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification by KVB, Inc.

Kind of sample reported to us	Kentucky Coal	Test No. 6
Sample taken at	Test site J	
Sample taken by	KVB, Inc.	
Date sampled	6/13/79	
Date received	7/12/79	

Analysis report no. 71- 35632

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.02	xxxxx
% Ash	4.18	4.27
% Volatile	40.58	41.42
% Fixed Carbon	53.22	54.31
	100.00	100.00
Btu/lb.	13966	14254
% Sulfur	1.30	1.33

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H = Cone Height
W = Cone Width

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification by KVB, Inc.

Kind of sample reported to us	Ohio Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/14/79
Date received	7/12/79

Test No. 7

Analysis report no. 71- 35630

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.93	xxxxx
% Ash	7.11	7.32
% Volatile	38.89	40.06
% Fixed Carbon	51.07	52.62
	100.00	100.00
Btu/lb.	13373	13777
% Sulfur	1.68	1.73

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xx °F	xxx °F

H = Cone Height
W = Cone Width

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification by KVB, Inc.

Kind of sample reported to us	Kentucky Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/15/79
Date received	7/12/79

Test No. 8

Analysis report no. 71- 35628

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	1.94	xxxxx
% Ash	5.31	5.42
% Volatile	40.35	41.15
% Fixed Carbon	52.40	53.43
	100.00	100.00
Btu/lb.	13995	14272
% Sulfur	1.40	1.43

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H = Cone Height
W = Cone Width

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification by KVB, Inc.

Kind of sample reported to us	Kentucky Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/16/79
Date received	7/12/79

Test No. 9

Analysis report no. 71- 35629

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.91	xxxxx
% Ash	11.76	12.11
% Volatile	35.85	36.92
% Fixed Carbon	49.48	50.97
	100.00	100.00
Btu/lb.	12511	12886
% Sulfur	2.57	2.65

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½ W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H = Cone Height
W = Cone Width

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ohio Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/19/79
Date received	7/12/79

Test No. 13

Analysis report no. 71- 35631

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	4.85	xxxxx
% Ash	8.23	8.65
% Volatile	36.71	38.58
% Fixed Carbon	50.21	52.77
	100.00	100.00
Btu/lb.	12810	13463
% Sulfur	1.64	1.72

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H = Cone Height
W = Cone Width

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Ohio Coal
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/20/79
Date received	7/12/79

Test No. 14

Analysis report no. 71- 35625

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.18	xxxxx
% Ash	8.23	8.50
% Volatile	38.91	40.19
% Fixed Carbon	49.68	51.31
	100.00	100.00
Btu/lb.	13101	13531
% Sulfur	1.82	1.88

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxx °F	xxx °F
Softening (H = W)	xxx °F	xxx °F
Softening (H = ½W)	xxx °F	xxx °F
Fluid	xxx °F	xxx °F

H = Cone Height
W = Cone Width

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OFFICE TEL. (312) 264-1173

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

July 25, 1979

Sample identification
by KVB

Kind of sample reported to us	Kent. Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	6/28/79
Date received	7/12/79

Test #15
Test Site: J

Analysis report no. 71-35627

PROXIMATE ANALYSIS

	As Received	Dry Basis
%Moisture.....	2.09	xxxxx
%Ash.....	5.02	5.13
%Volatile.....	39.58	40.42
%Fixed Carbon.....	53.31	54.45
	100.00	100.00
Btu/lb.....	13954	14252
%Sulfur.....	1.03	1.05

SULFUR FORMS	%Weight As Received	%Weight Dry Basis
%Pyritic Sulfur.....	0.26	0.27
%Sulfate Sulfur.....	0.02	0.02
%Organic Sulfur(dif)...	0.75	0.76

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OFFICE TEL. (312) 264-1173

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

July 21, 1979

Sample identification by KVB

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	6/30/79
Date received	7/12/79

Sample: Ohio coal
Test No. 16
Test site: J

Analysis report no. 71-35633

PROXIMATE ANALYSIS

	As Received	Dry Basis
%Moisture	3.73	xxxxx
%Ash	7.77	8.07
%Volatile	38.06	39.53
%Fixed carbon	50.44	52.40
	100.00	100.00
Btu/lb.	12990	13493
%Sulfur	2.02	2.10
%Pyritic sulfur	1.39	1.44
%Sulfate sulfur	0.10	0.11
%Organic sulfur	0.53	0.55

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OFFICE TEL. (312) 264-1173

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

July 25, 1979

Kind of sample reported to us: Ohio Coal

Sample identification by KVB

Sample taken at: ——

Test No.: Composite
Test Site: J

Sample taken by: KVB

Date sampled: ——

Date received: 7/12/79

Analysis report no. 71-35635

PROXIMATE ANALYSIS	As received	Dry basis
% Moisture	3.05	xxxxx
% Ash	7.05	7.27
% Volatile	37.93	39.12
% Fixed Carbon	51.97	53.61
	100.00	100.00
Btu/lb.	13368	13789
% Sulfur	1.75	1.80
% Alk. as Na_2O	xxxxx	0.12
SULFUR FORMS		
% Pyritic Sulfur	0.97	1.00
% Sulfate Sulfur	0.05	0.05
% Organic Sulfur	0.73	0.75
WATER SOLUBLE ALKALIES		
% Na_2O =	xxxxx	xxxxx
% K_2O =	xxxxx	xxxxx

FUSION TEMPERATURE OF ASH	Reducing	Oxidizing
Initial Deformation	2100 °F	xxxxx °F
H is Cone Height — Softening (H = W)	2250 °F	xxxxx °F
W is Cone Width — Softening (H = ½W)	2400 °F	xxxxx °F
Fluid	2535 °F	xxxxx °F

% EQUILIBRIUM MOISTURE =	2.94
HARDGROVE GRINDABILITY INDEX =	53
FREE SWELLING INDEX =	4

ULTIMATE ANALYSIS	As received	Dry basis
Moisture	3.05	xxxxx
Carbon	74.74	77.09
Hydrogen	5.13	5.29
Nitrogen	1.66	1.71
Chlorine	0.19	0.20
Sulfur	1.75	1.80
Ash	7.05	7.27
Oxygen (diff)	6.43	6.64
	100.00	100.00

MINERAL ANALYSIS OF ASH	% Weight Ignited Basis
Silica, SiO_2	42.48
Alumina, Al_2O_3	26.60
Titania, TiO_2	1.29
Ferric oxide, Fe_2O_3	22.09
Lime, CaO	2.11
Magnesia, MgO	0.83
Potassium oxide, K_2O	1.91
Sodium oxide, Na_2O	0.35
Sulfur trioxide, SO_3	1.43
Phos. pentoxide, P_2O_5	0.40
Undetermined	0.38*
	100.00
SILICA VALUE =	62.92
BASE: ACID RATIO	0.39
T_{250} Temperature =	2425°F

*These ignited basis results were used to calculate undetermined value above

%Strontium oxide, SrO	0.00
%Barium oxide, BaO	0.08
%Manganese oxide, Mn_3O_4	0.05

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OFFICE TEL. (312) 264-1173

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

July 26, 1979

Kind of sample reported to us: Coal

Sample identification by KVB

Sample taken at: ——

Test No. Composite
Sample: Kent Coal
Test Site: J

Sample taken by: KVB

Date sampled: ——

Date received: 7/12/79

Analysis report no. 71-35634

PROXIMATE ANALYSIS	As received	Dry basis
% Moisture	1.96	xxxxx
% Ash	6.14	6.26
% Volatile	39.08	39.86
% Fixed Carbon	52.82	53.88
	100.00	100.00
Btu/lb.	13624	13897
% Sulfur	1.43	1.46
% Alk. as Na_2O	xxxxx	0.12
SULFUR FORMS		
% Pyritic Sulfur	0.68	0.69
% Sulfate Sulfur	0.02	0.02
% Organic Sulfur	0.73	0.75
WATER SOLUBLE ALKALIES		
% Na_2O =	xxxxx	xxxxx
% K_2O =	xxxxx	xxxxx

FUSION TEMPERATURE OF ASH	Reducing	Oxidizing
Initial Deformation	2205 °F	°F
H is Cone Height — Softening (H=W)	2335 °F	°F
W is Cone Width — Softening (H=½W)	2465 °F	°F
Fluid	2580 °F	°F

% EQUILIBRIUM MOISTURE =	2.07
HARDGROVE GRINDABILITY INDEX =	49
FREE SWELLING INDEX =	6

ULTIMATE ANALYSIS	As received	Dry basis
Moisture	1.96	xxxxx
Carbon	76.77	78.31
Hydrogen	5.09	5.19
Nitrogen	1.23	1.25
Chlorine	0.13	0.13
Sulfur	1.43	1.46
Ash	6.14	6.26
Oxygen (diff)	7.25	7.40
	100.00	100.00

MINERAL ANALYSIS OF ASH	% Weight Ignited Basis
Silica, SiO_2	44.08
Alumina, Al_2O_3	26.46
Titania, TiO_2	1.51
Ferric oxide, Fe_2O_3	17.80
Lime, CaO	2.28
Magnesia, MgO	0.78
Potassium oxide, K_2O	1.78
Sodium oxide, Na_2O	0.80
Sulfur trioxide, SO_3	1.85
Phos. pentoxide, P_2O_5	0.31
Undetermined	1.89
	100.00
SILICA VALUE =	67.88
BASE: ACID RATIO	0.33
T_{250} Temperature =	2515°F

*These ignited basis results were us . to calculate undetermined value above

%Strontium oxide, SrO	0.14
%Barium oxide, BaO	0.30
%Manganese oxide, Mn_3O_4	0.02
Fouling index	0.26
Slagging index	0.48

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OFFICE TEL. (312) 264-1173

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

June 28, 1979

Sample identification
by KVB

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Test No. 1
Sample: Bottom Ash
Site: J

Analysis report no. 71-34527

	Dry Basis
%Ash.....	79.83
%Combustible.....	20.17

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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

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

June 28, 1979

Sample identification by KVB

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Test No. 2
Sample: Bottom Ash
Site: J

Analysis report no. 71-34531

	Dry Basis
%Ash.....	84.53
%Combustible.....	15.47

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification
by KVB, Inc.

Test No. 6

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/13/79
Date received	7/12/79

Analysis report no. 71- 35638

% Combustible, dry basis 20.26

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

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/14/79
Date received	7/12/79

Test No. 7

Analysis report no. 71- 35641

% Combustible, dry basis 19.57

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/15/79
Date received	7/12/79

Test No. 8

Analysis report no. 71- 35640

% Combustible, dry basis 30.75

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/16/79
Date received	7/12/79

Test No. 9

Analysis report no. 71- 35637

% Combustible, dry basis 7.23

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/19/79
Date received	7/12/79

Test No. 13

Analysis report no. 71- 35639

% Combustible, dry basis 18.58

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

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

July 17, 1979

Sample identification by KVB, Inc.

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/20/79
Date received	7/12/79

Test No. 14

Analysis report no. 71- 35636

% Combustible, dry basis 30.93

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/28/79
Date received	7/12/79

Test No. 15

Analysis report no. 71- 35643

% Combustible, dry basis	24.09
% Sulfur, dry basis	0.51

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

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

July 17, 1979

Sample identification
by KVB, Inc.

Kind of sample reported to us	Bottom Ash
Sample taken at	Test site J
Sample taken by	KVB, Inc.
Date sampled	6/30/79
Date received	7/12/79

Test No. 16

Analysis report no. 71- 35642

% Combustible, dry basis	18.97
% Sulfur, dry basis	0.31

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OFFICE TEL. (312) 264-1173

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

June 28, 1979

Sample identification
by KVB

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Test No. 1
Sample: Multclone Ash
Test Site: J

Analysis report no. 71-34548

	Dry Basis
%Ash.....	70.14
%Combustible.....	29.86

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

June 28, 1979

Sample identification
by KVB

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Test No. 2
Sample: Multclone Ash
Site: J

Analysis report no. 71-34532

	Dry Basis
%Ash.....	87.91
%Combustible.....	12.09

Respectfully submitted,
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COMBUSTIBLES DATA SHEET

SITE J

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
25	TEST #1 Side J BLR OUT	9.6889	9.8850	0.1961	9.8325	.0525	26.7
		9.6889	9.8850		9.8326		
		9.6891	—		—		
	AVG.	9.6889	9.8850		9.8325		
26	TEST #2 BLR OUT	10.2368	10.9118	0.6750	10.7432	0.1686	24.9
		10.2370	10.9120		10.7434		
		10.2369	—		—		
	AVG.	10.2369	10.9119		10.7433		
27	TEST #5 BLR OUT	9.4131	9.6644	0.2511	~~10.3777~~	0.0597	23.7
		9.4132	9.6643		9.6045		
		9.4132	—		9.6047		
	AVG.	9.4132	9.6643		9.6046		
29	TEST #6 BLR OUT	10.2774	11.5592	1.2820	11.2150	0.3442	26.8
		10.2772	11.5594		11.2152		
		10.2773	—		—		
	AVG.	10.2773	11.5593		11.2151		
33	TEST #7 BLR OUT	10.2320	10.5351	0.3031	10.4604	0.0749	24.7
		10.2321	10.5353		10.4602		
		10.2323	—		—		
	AVG.	10.2321	10.5352		10.4603		
37	TEST #8 BLR OUT	10.2072	10.4690	0.2618	10.3747	0.0945	36.0
		10.2073	10.4692		10.3746		
		10.2073	—		—		
	AVG.	10.2073	10.4691		10.3746		
40	TEST #9 BLR OUT	9.2519	9.4155	0.1636	9.3661	0.0493	30.1
		9.2521	9.4157		9.3664		
		9.2521	—		—		
	AVG.	9.2520	9.4156		9.3663		
	AVG.						
	AVG.						
	AVG.						
	AVG.						

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 1

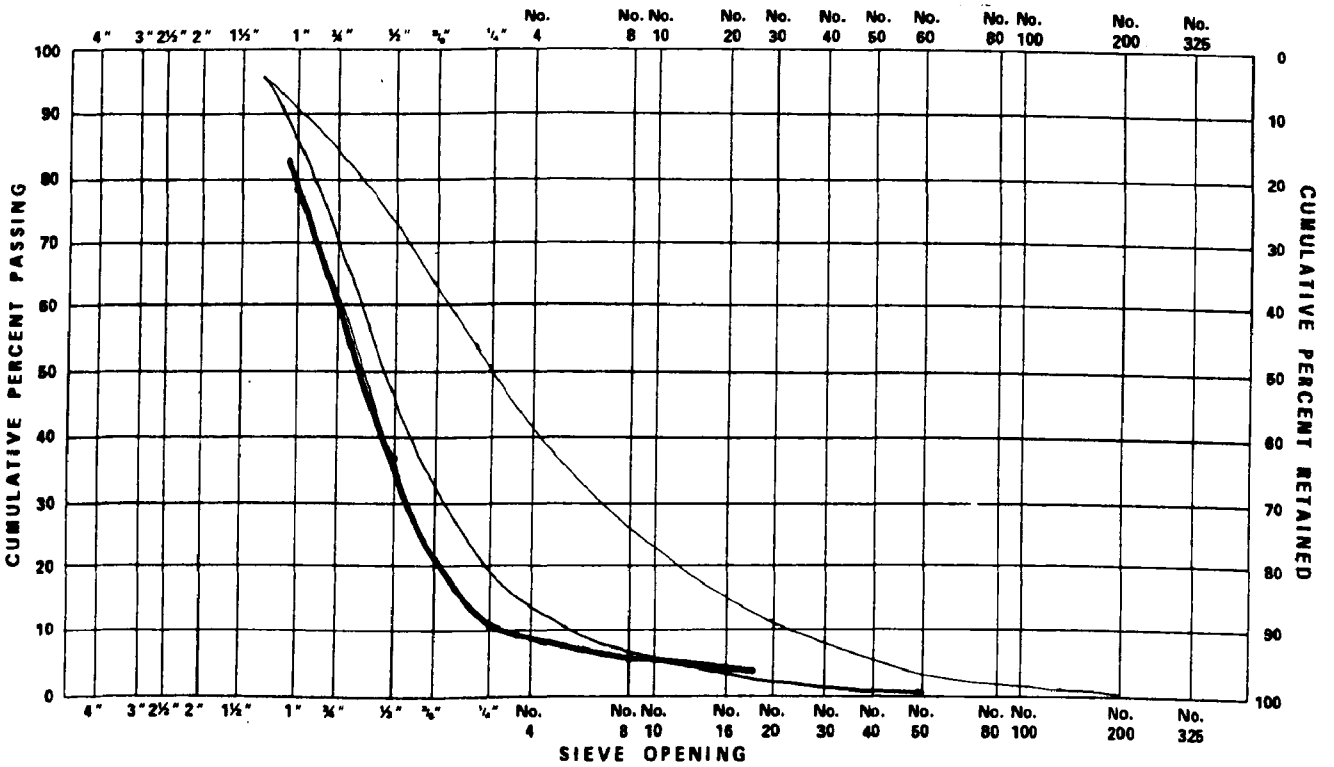
TEST SITE J

SAMPLE IDENTIFICATION Ohio

DATE SAMPLE TAKEN 6-3-79

TEST PERFORMED BY JCB

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	109.3	559.2 770.7	1111.3	22.5	4944.7	100.0	5
1"		1155.2 1124.0	2060.6	41.7	3833.4	77.5	5
½"		748.4 707.2	1237.0	25.0	1772.8	35.8	5
¼"		387.9	278.6	5.6	535.8	10.8	5
#8		150.0	40.7	0.8	257.2	5.2	5
#16		325.8	216.5	4.4	216.5	4.4	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 2

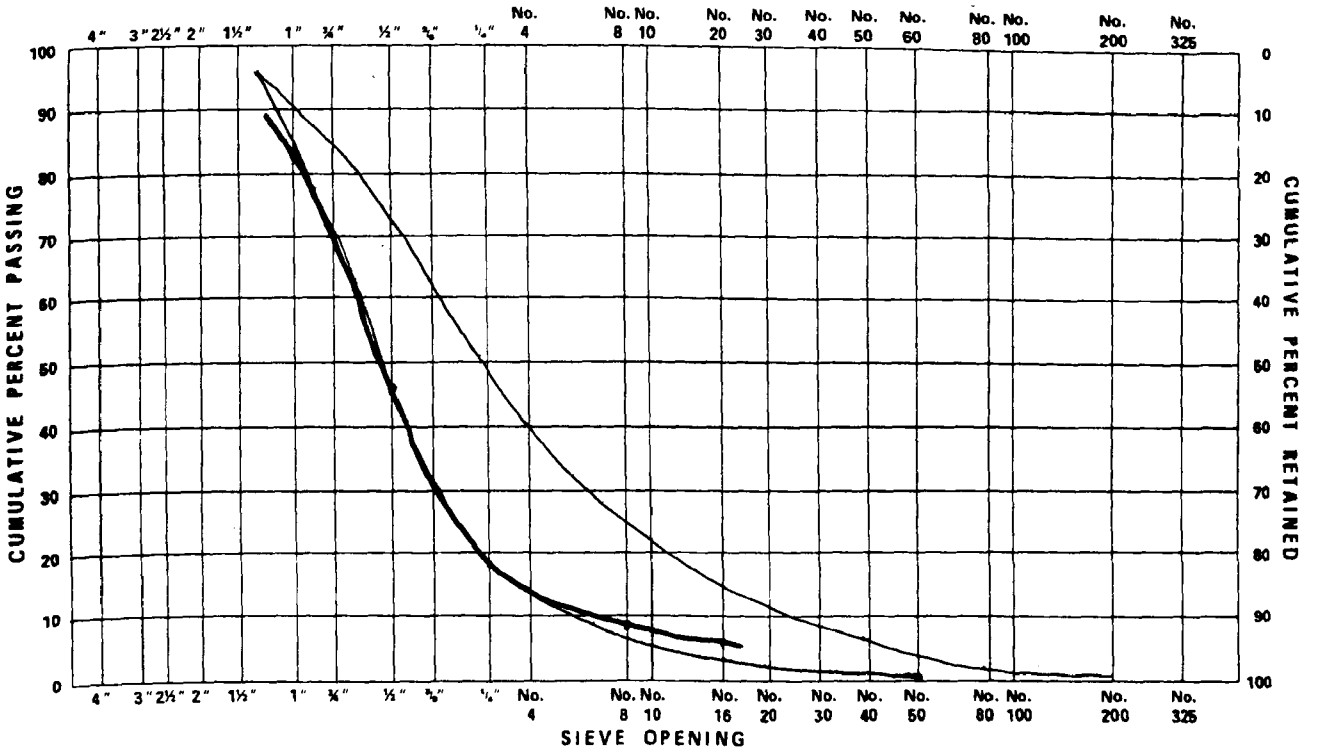
TEST SITE J

SAMPLE IDENTIFICATION Ohio

DATE SAMPLE TAKEN 6-4-79

TEST PERFORMED BY JOB

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	109.8	5943 538.1	912.8	16.4	5553.5	100.0	5
1"	↓	1131.4 1234.0	2135.8	38.5	4640.7	83.5	5
½"		819.8 907.4	1507.6	27.1	2504.9	45.0	5
¼"		345.7 406.5	532.6	9.6	997.3	17.9	5
#8		250.2	140.4	2.5	464.7	8.3	5
#16		434.1	324.3	5.8	324.3	5.8	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 5

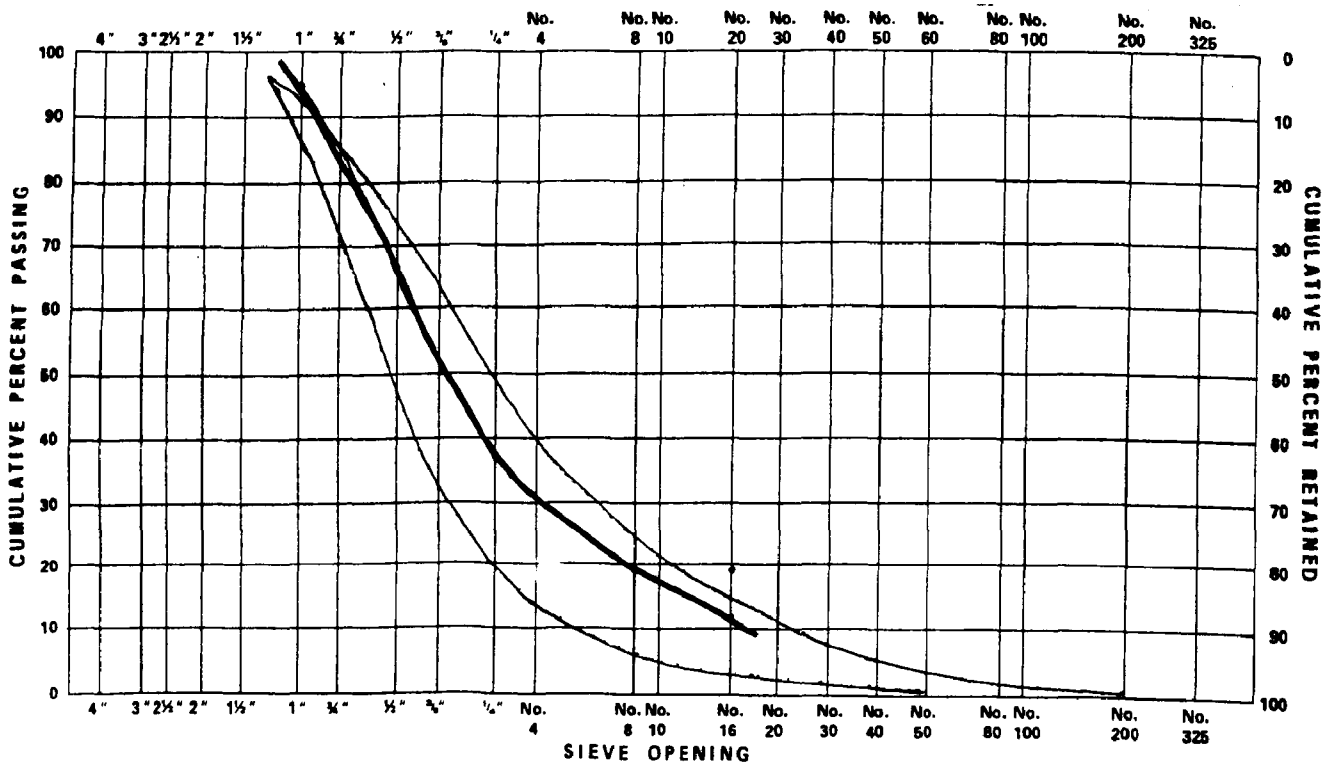
TEST SITE J

SAMPLE IDENTIFICATION Ohio

DATE SAMPLE TAKEN 6-12-79

TEST PERFORMED BY JOB

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	109.0	448.2	339.2	5.9	5710.7	100.0	5
1"	↓	7645 990.2	1536.7	26.9	5371.5	94.2	5
1/2"		7788 1167.0	1727.8	30.3	3834.8	67.3	5
1/4"		1123.0	1014.0	17.8	2107.0	37.0	5
#8		548.0	439.0	7.7	1093.0	19.2	5
#16		763.0	654.0	11.5	654.0	11.5	5



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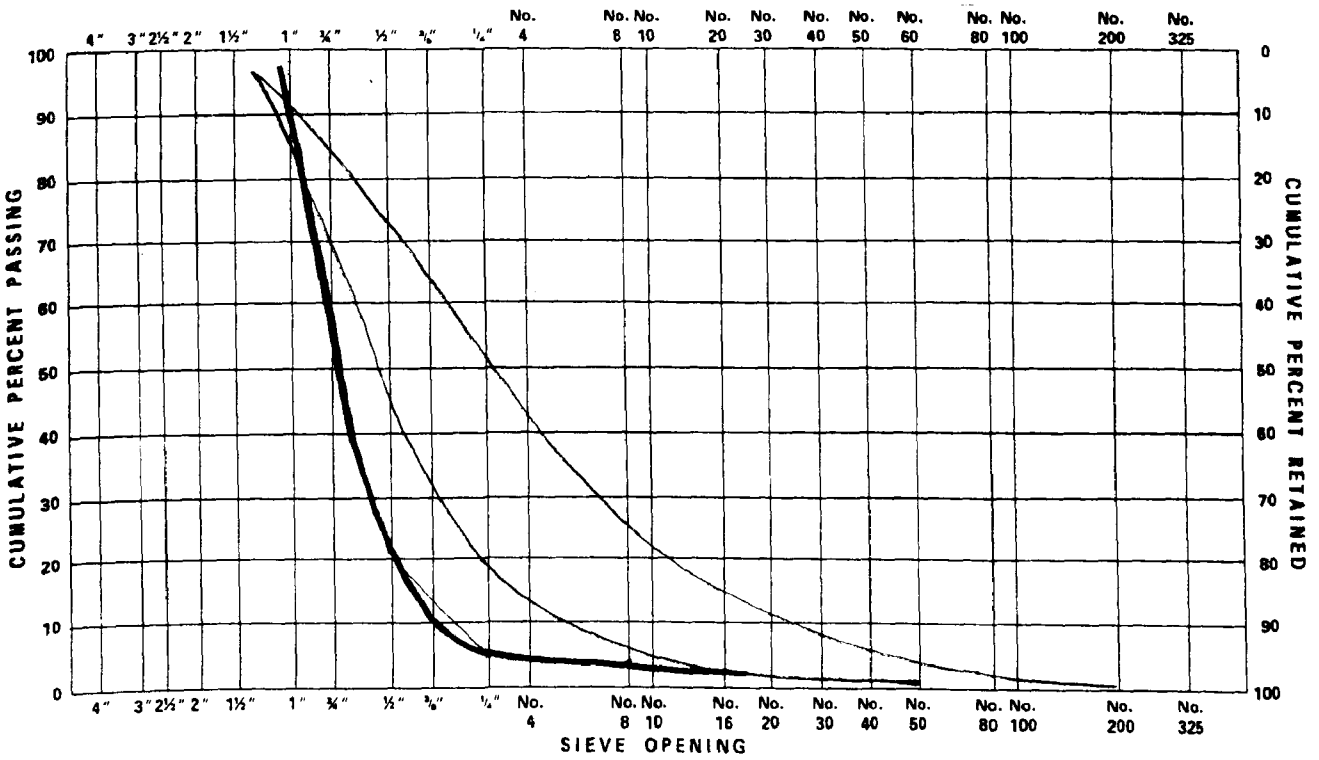
SIEVE ANALYSIS TEST REPORT

TEST NO. 6 DATE SAMPLE TAKEN 6-13-75

TEST SITE 1 TEST PERFORMED BY JWB

SAMPLE IDENTIFICATION Kentucky Coal

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	109.6	262.2 520.6	563.6	9.4	5994.5	100.0	5
1"		1817.4 1464.5 1232.5	4185.6	69.8	5430.9	90.6	5
½"		804.8 373.0	958.6	16.0	1245.3	20.8	5
¼"		199.0	89.4	1.5	286.7	4.8	5
#8		133.1	23.5	0.4	197.3	3.3	5
#16		283.4	173.8	2.9	173.8	2.9	5



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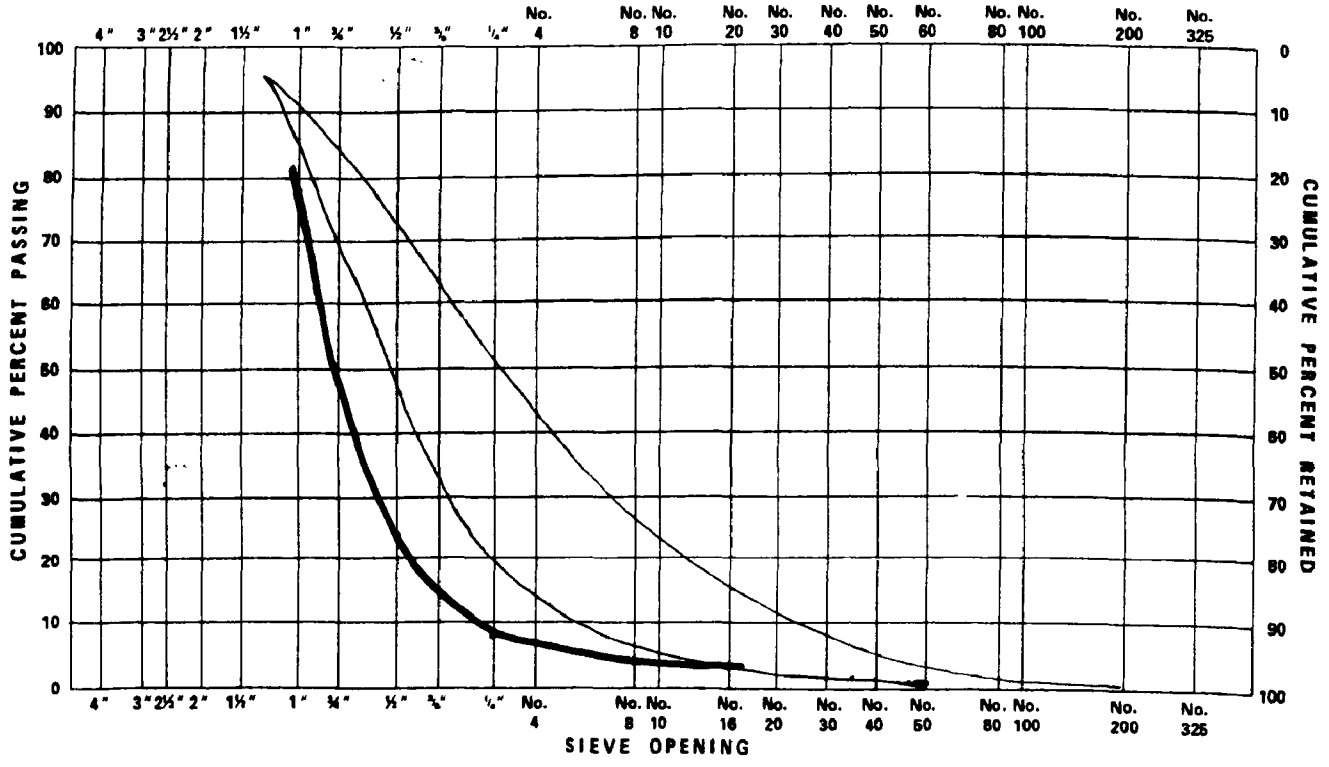
SIEVE ANALYSIS TEST REPORT

TEST NO. 7 DATE SAMPLE TAKEN 6-14-79

TEST SITE J TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

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	109.0	818.7 600.0	1200.7	22.6	5324.0	100.0	5
1"		1385.1 1309.9 378.3	2855.3	53.6	4123.3	77.4	5
½"		685.5 405.3	872.8	16.4	1268.0	23.8	5
¼"		295.0	186.0	3.5	395.2	7.4	5
#8		142.9	33.9	0.6	209.2	3.9	5
#16	↓	284.3	175.3	3.3	175.3	3.3	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 8

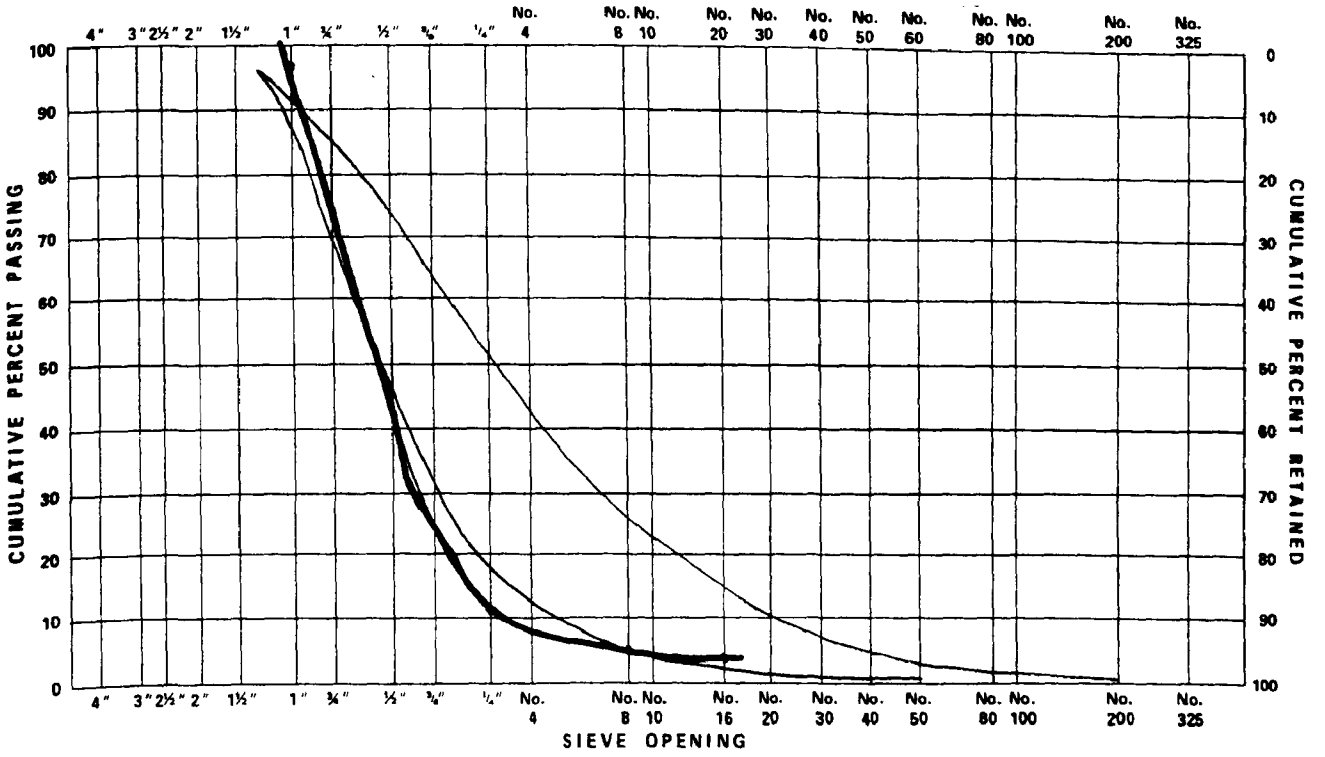
TEST SITE J

SAMPLE IDENTIFICATION Kentucky

DATE SAMPLE TAKEN 6-15-79

TEST PERFORMED BY J.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	1092	208.0 174.7	164.3	3.0	5452.0	100.0	5
1"		1826.7 1248.4	2856.7	52.4	5287.7	97.0	5
½"		1141.8 914.3	1837.7	33.7	2431.0	44.6	5
¼"		423.4	314.2	5.8	593.3	10.9	5
#8		160.8	51.6	0.9	279.1	5.1	5
#16	↓	336.1	227.5	4.2	227.5	4.2	5



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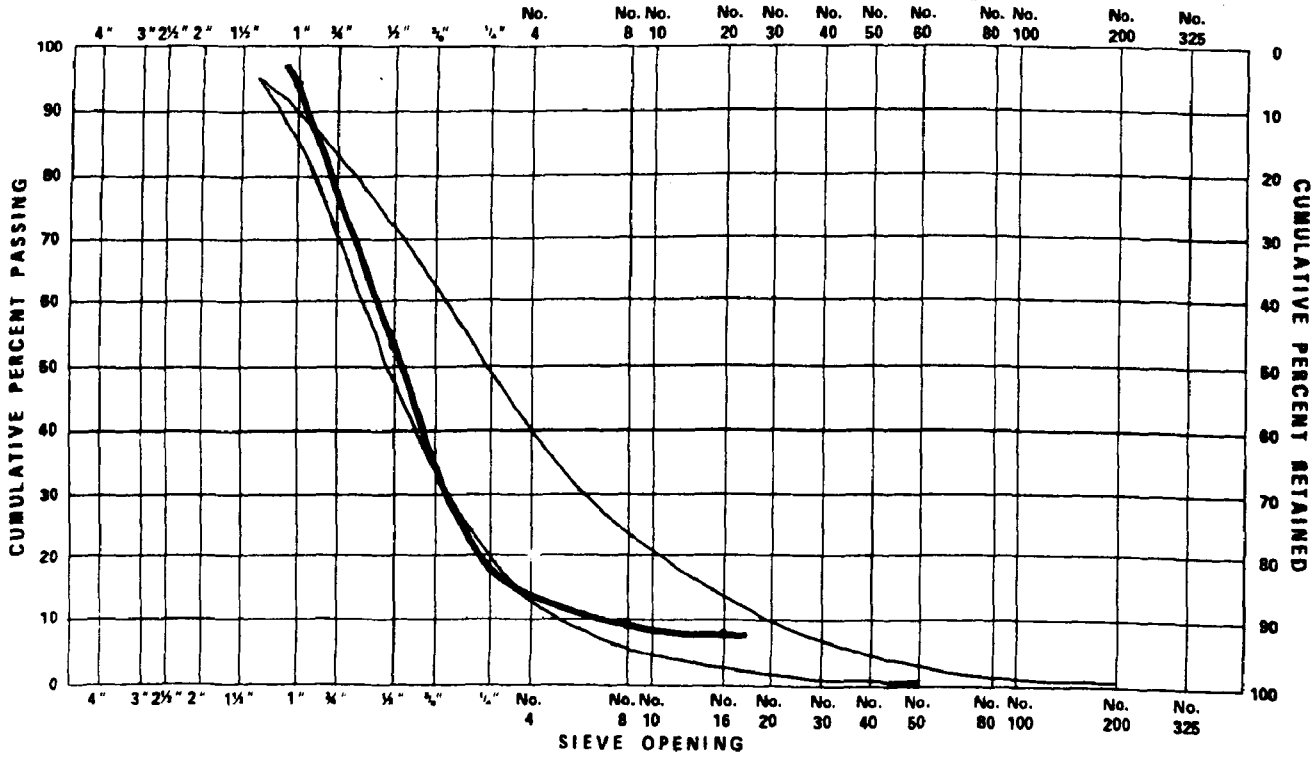
SIEVE ANALYSIS TEST REPORT

TEST NO. 9 DATE SAMPLE TAKEN 6-16-79

TEST SITE J TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Kentucky Coal

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	109.7	191.4 3391	311.1	5.9	5245.7	100.0	5
1"		1304.4 1061.9	2146.9	40.9	4934.6	94.0	5
½"		1259.6 801.9	1842.1	35.1	2787.7	53.1	5
¼"		557.4	447.7	8.5	945.6	18.0	5
#8		221.7	112.0	2.1	497.9	9.5	5
#16		495.6	385.9	7.4	385.9	7.4	5



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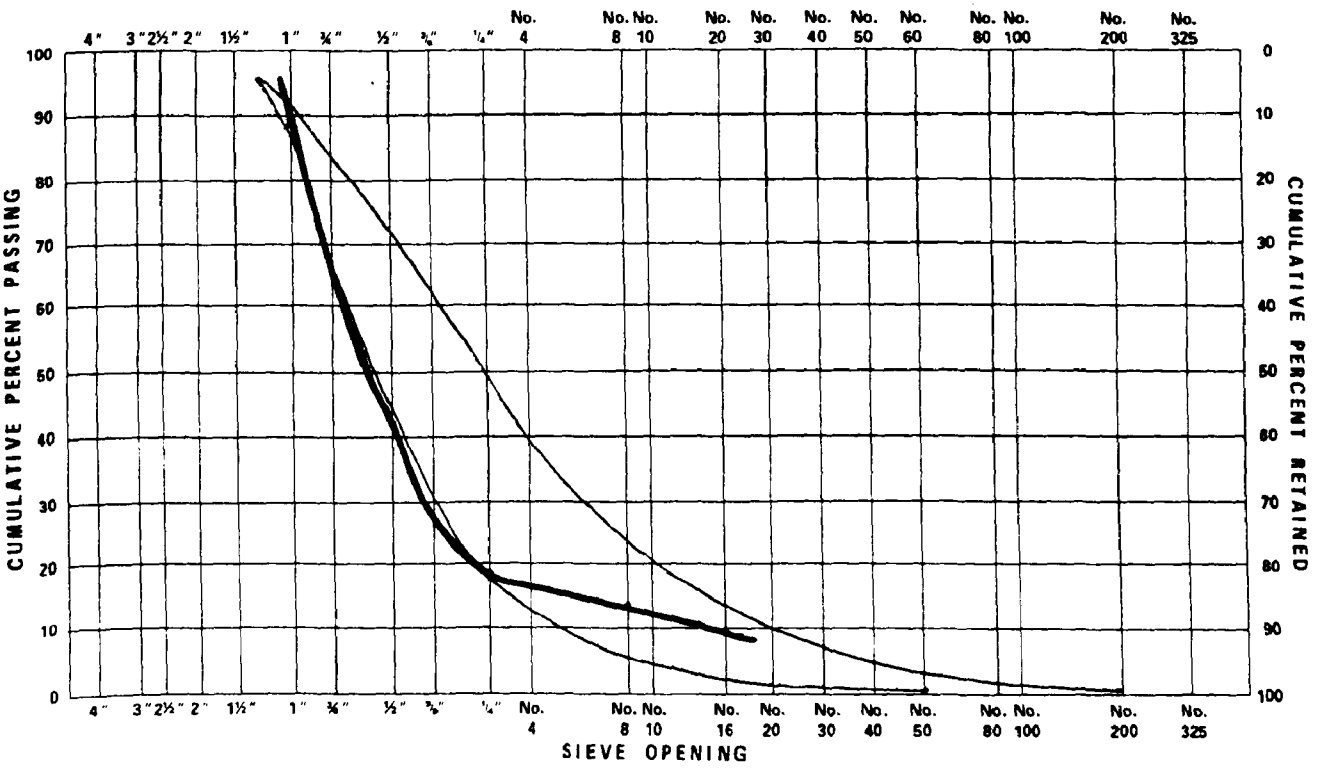
SIEVE ANALYSIS TEST REPORT

TEST NO. 13 DATE SAMPLE TAKEN 6-19-79

TEST SITE J TEST PERFORMED BY JeB

SAMPLE IDENTIFICATION Ohio

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	109.3	4977 276.6	556.7	10.5	5216.0	100.0	5
1"	↓	1102.6 1581.4	2465.4	46.7	4720.3	89.5	5
½"		7320 776.3	1289.7	24.4	2254.9	42.8	5
¼"		382.2	272.9	5.2	965.2	18.4	5
#8		280.9	171.6	3.3	692.3	13.2	5
#16	↓	630.0	520.7	9.9	520.7	9.9	5



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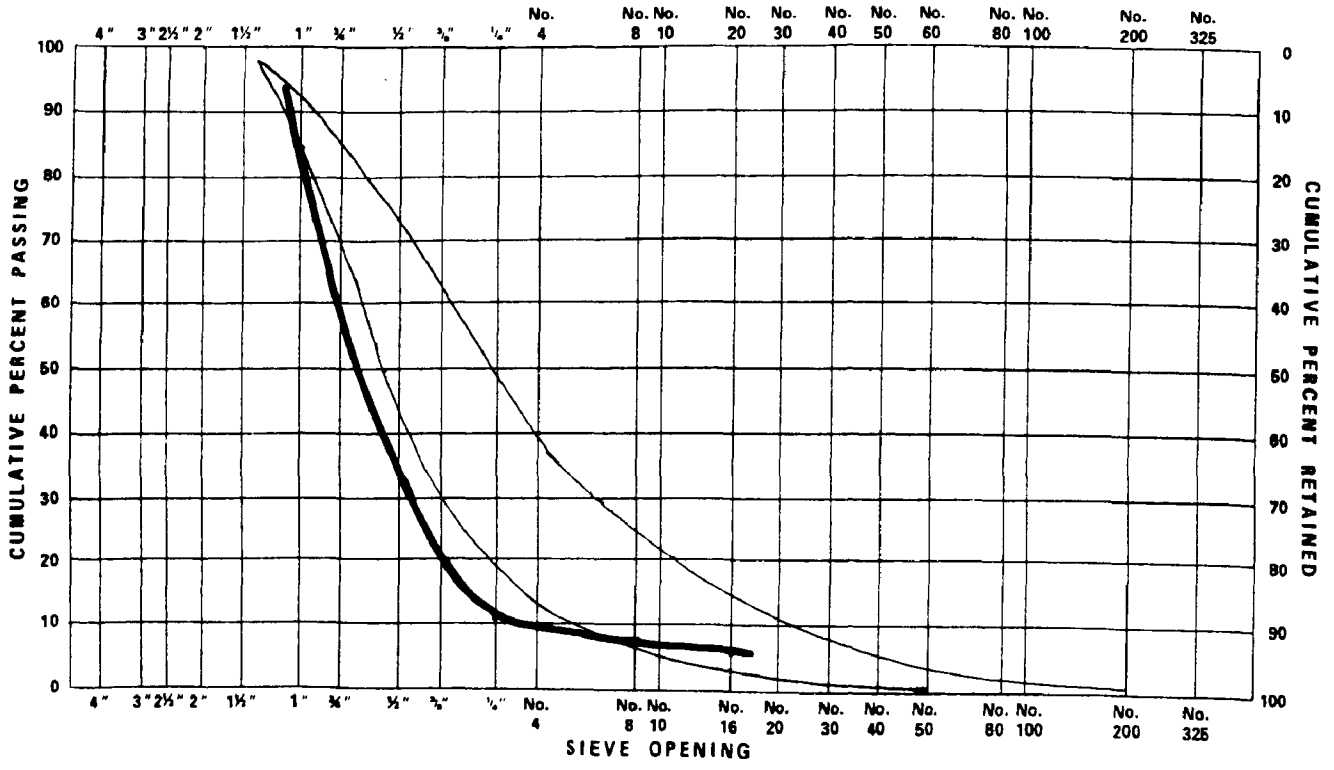
SIEVE ANALYSIS TEST REPORT

TEST NO. 14 DATE SAMPLE TAKEN 6-20-79

TEST SITE J TEST PERFORMED BY JB

SAMPLE IDENTIFICATION Ohio

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	109.4	329.2 540.0	650.4	15.6	4171.8	100.0	5
1"		1048.2 1222.2	2051.6	49.2	3521.4	84.4	5
½"		635.9 594.7	1011.8	24.3	1469.8	35.2	5
#4		285.7	176.3	4.2	458.0	10.9	5
#8		169.3	59.9	1.4	281.7	6.7	5
#16		331.2	221.8	5.3	221.8	5.3	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 15

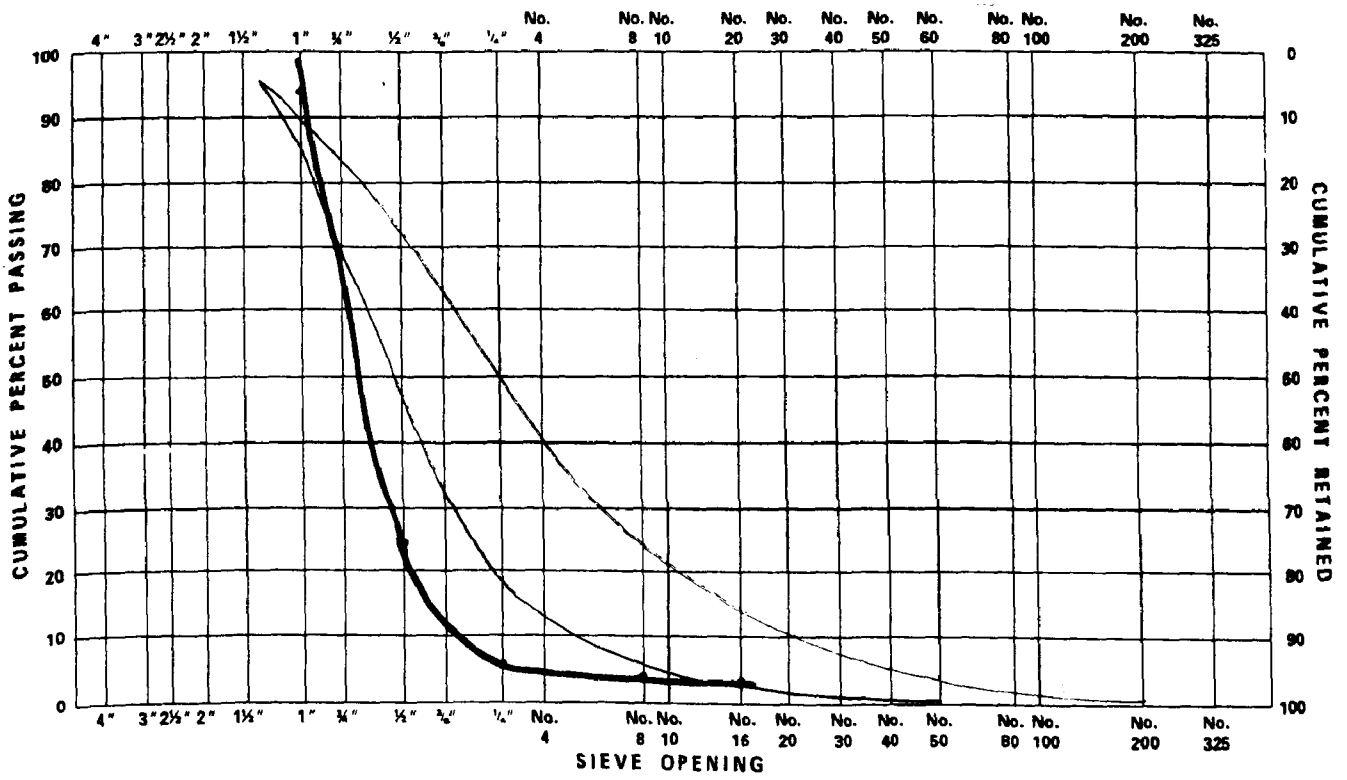
TEST SITE ✓

SAMPLE IDENTIFICATION Kentucky

DATE SAMPLE TAKEN 6-28-79

TEST PERFORMED BY JOE

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	109.5	185.4 427.7	3994	6.0	6850.1	100.0	5
1"	↓	1696.5 1238.1 1367.0 728.2	4592.2	70.1	6156.0	94.0	5
1/2"		608.1 863.9	1253.0	19.1	1563.8	23.9	5
#4		208.5	99.0	1.5	310.8	4.8	5
#8		131.5	22.0	0.3	211.8	3.3	5
#16		259.3	129.8	2.9	189.8	3.0	5



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KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 16

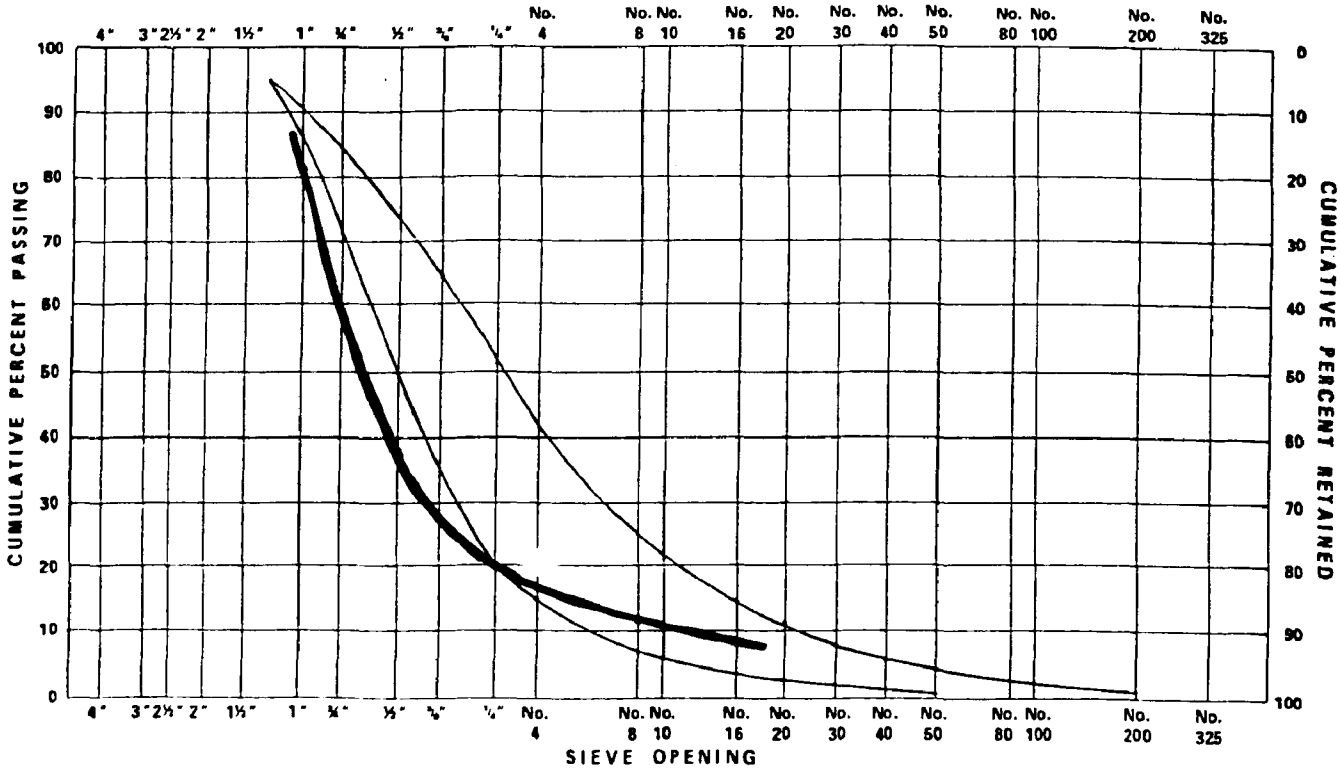
DATE SAMPLE TAKEN 6-30-09

TEST SITE J

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

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	844.2 675.3	1298.9	19.1	6817.0	100.0	5
1"		1541.6 641.3	2962.3	43.5	5518.1	81.0	5
½"		549.0 851.1	1209.5	17.7	2555.8	37.5	5
¼"		668.3	558.0	8.2	1346.3	19.8	5
#8		339.2	228.9	3.4	788.3	11.6	5
#16		669.7	559.4	8.2	559.4	8.2	5



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KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Composite

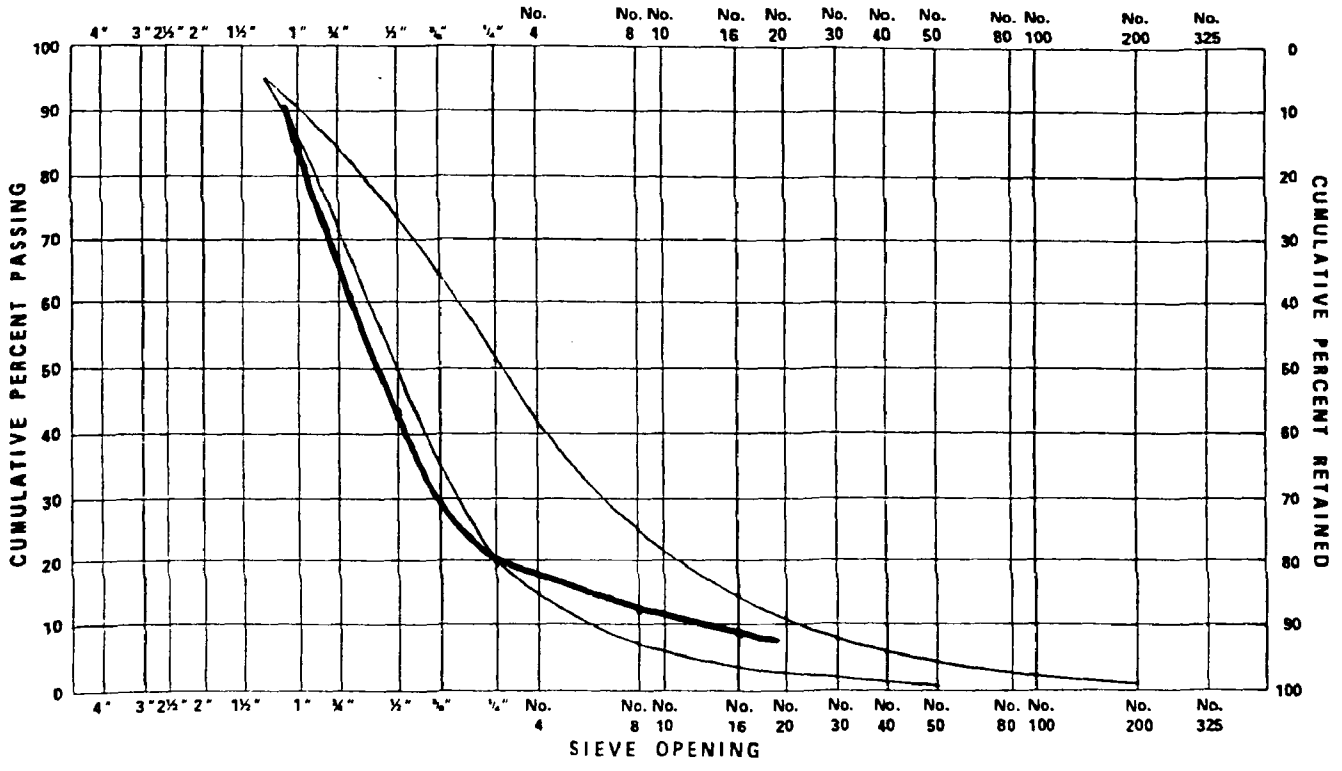
TEST SITE J

SAMPLE IDENTIFICATION Ohio Coal

DATE SAMPLE TAKEN —

TEST PERFORMED BY JOB

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	756.2 894.1	1429.7	15.1	9452.8	100.0	5
1"		1650.4 1514.3	3915.7	41.4	8023.1	84.9	5
½"		994.2 1471.5	2245.1	23.8	4107.4	43.5	5
¼"		501.1 482.8	763.3	8.1	1862.3	19.7	5
#8		392.5	282.2	3.0	1099.0	11.6	5
#16	↓	977.1	816.8	8.6	816.8	8.6	5



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KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Composite

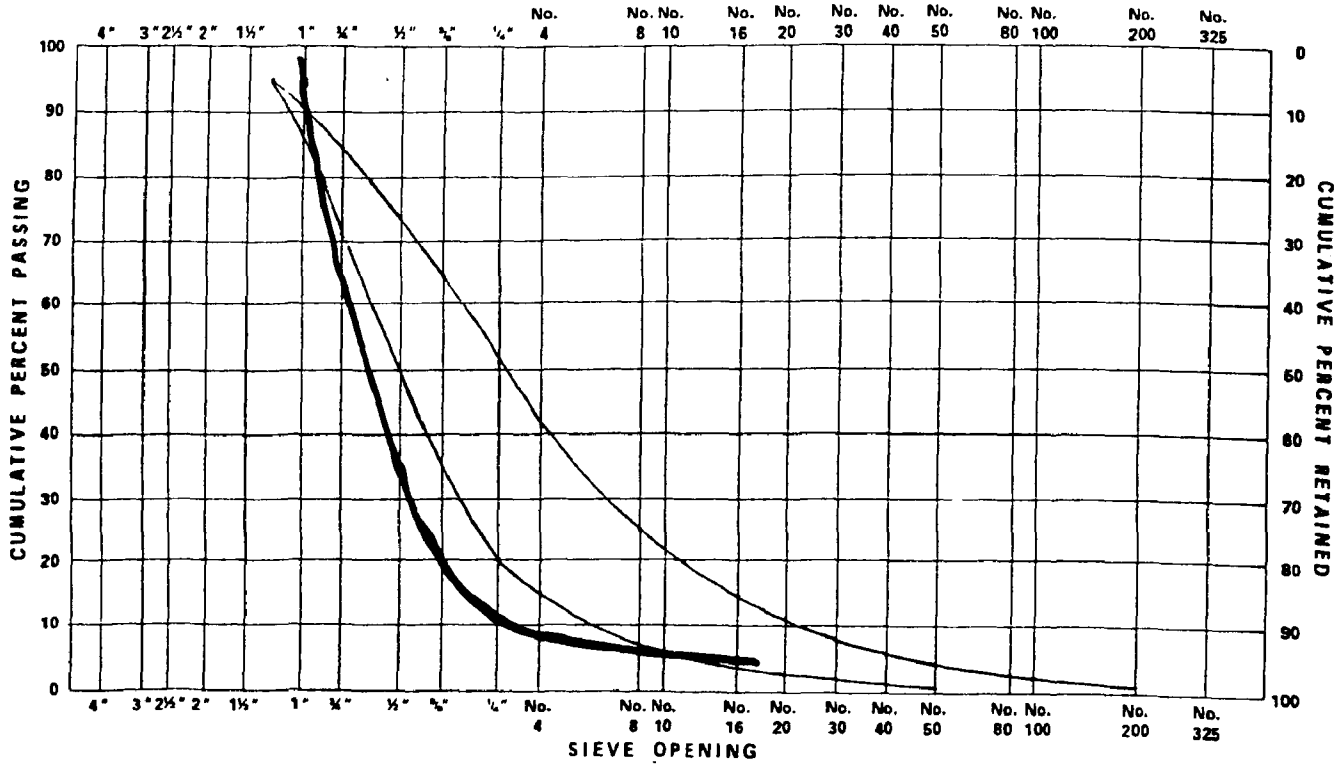
TEST SITE J

SAMPLE IDENTIFICATION Kentucky Coal

DATE SAMPLE TAKEN —

TEST PERFORMED BY JCB

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	1095	190.8 339.2	311.0	5.5	5666.1	100.0	5
1"		1507.2 1268.7 965.9	3413 3	60.2	5355.1	94.5	5
½"		594.4 997.6	1373.0	24.2	1941.8	34.3	5
¼"		358.4	248.9	4.4	568.8	10.1	5
#8		176.0	66.5	1.2	319.9	5.7	5
#16		362.9	253.4	4.5	253.4	4.5	5



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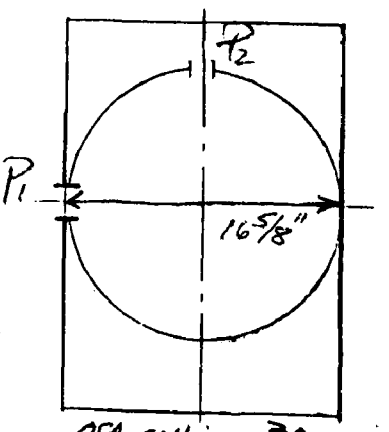
SECTION 6.0

OVERFIRE AND TRAVERSES

OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE



TEST NO. 10
LOCATION NO. MAIN DUCT
DATE 6-17-79
SAMPLING LOCATION FRONT OFA
INSIDE OF FAR WALL TO 19 3/4"
OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in.Hg 29.36
INSIDE OF NEAR WALL TO 3 1/8"
OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, iwg _____
STACK I.D. (DISTANCE A - DISTANCE B) 16 5/8 STK. GAS SP. GRAVITY, G_S _____
NEAREST UPSTREAM DISTURBANCE _____
NEAREST DOWNSTREAM DISTURBANCE _____

OFA setting 30
OFA top static - ½" H_2O
RH = 33%

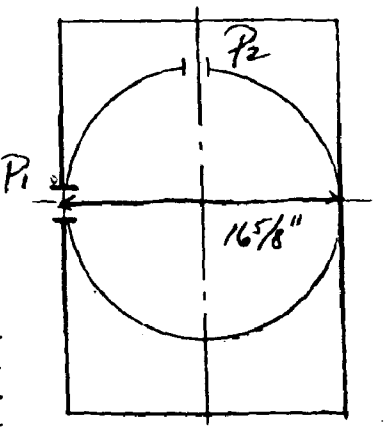
TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_2O		STACK TEMPERATURE (T_s, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP_1	ΔP_2			
1.	3.2	0.549" + 3 1/8 = 3 11/16	0.03	0.03	110		
2.	10.5	1.745 + 3 1/8 = 4 7/8	0.03	0.04			
3.	19.4	3.225 + 3 1/8 = 6 3/8	0.03	0.04			
4.	32.3	5.370 + 3 1/8 = 8 1/2	0.04	0.04			
5.	67.7	11.255 + 3 1/8 = 14 3/8	0.04	0.005 *			
6.	80.6	13.40 + 3 1/8 = 16 1/2	0.03	0.008 *			
7.	89.5	14.879 + 3 1/8 = 18"	0.04	0.008 *			
8.	96.8	16.076 + 3 1/8 = 19 3/16	0.01	0.008 *			
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

STACK GAS SPEED, $V_s = 174\ F_s \sqrt{\Delta P_{Average} (T_s + 460) \left(\frac{407}{P_s}\right) \left(\frac{1.00}{G_s}\right)}$

* Standard pitot tube used otherwise S type (C = 0.837)

60-23
rev. 11/74

OVERFIRE AIR TRAVERES
SMOKESTACK FLOW PROFILE



TEST NO. 11
LOCATION NO. MAIN DUCT
DATE 6-17-79
SAMPLING LOCATION FRONT OF A
INSIDE OF FAR WALL TO 19 3/4"
OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in.Hg 29.36
INSIDE OF NEAR WALL TO 3 1/8"
OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, iwg _____
STACK I.D. (DISTANCE A - DISTANCE B) 16 5/8 STK. GAS SP. GRAVITY, G_S _____
NEAREST UPSTREAM DISTURBANCE _____
NEAREST DOWNSTREAM DISTURBANCE _____

OFA setting - 60
OFA stable 2 1/2 "H_2O
RH = 33%

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_S, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP_1 ΔP_2			
1.	3.2	3 1/16"	0.15 0.11	110		
2.	10.5	4 7/8"	0.16 0.12			
3.	19.4	6 3/8"	0.17 0.11			
4.	32.3	8 1/2"	0.17 0.11			
5.	67.7	14 3/8"	0.12 0.05 *			
6.	80.6	16 1/2"	0.10 0.05 *			
7.	89.5	18"	0.09 0.03 *			
8.	96.8	19 3/16"	0.08 0.02 *			
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
Average						

STACK GAS SPEED, $V_S = 174\ F_S \sqrt{\Delta P_{Average} (T_S + 460) \left(\frac{407}{P_S}\right) \left(\frac{1.00}{G_S}\right)}$

* standard pitot tube used otherwise S type (C = 0.837)

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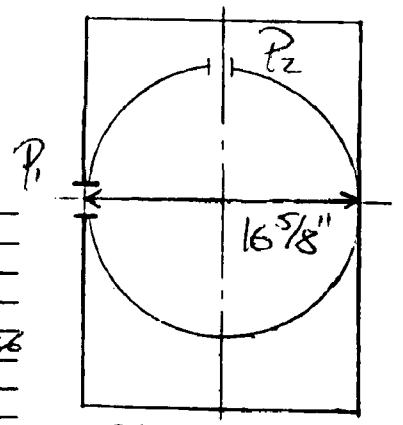
rev. 11/74

OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE



TEST NO. 12
LOCATION NO. MAIN DUCT
DATE 6-17-79
SAMPLING LOCATION FRONT OFA
INSIDE OF FAR WALL TO 19 3/4"
OUTSIDE OF NIPPLE, (DISTANCE A) _____ BAROMETRIC PRESS, in.Hg 29.36
INSIDE OF NEAR WALL TO 3 1/8"
OUTSIDE OF NIPPLE, (DISTANCE B) _____ STACK PRESS., Ps, iwg _____
STACK I.D. (DISTANCE A - DISTANCE B) 16 5/8 STK. GAS SP. GRAVITY, G_s _____
NEAREST UPSTREAM DISTURBANCE _____
NEAREST DOWNSTREAM DISTURBANCE _____

OFA setting 100
OFA stack - 8½" H2O
RH = 33%

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_sO		STACK TEMPERATURE (T_s, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP_1	ΔP_2			
1.	3.2	3 1/16"	032	0.28	108		
2.	10.5	4 7/8"	0.36	0.27			
3.	19.4	6 3/8"	0.44	0.30			
4.	32.3	8 1/2"	0.47	0.33			
5.	67.7	14 3/8"	0.39	0.14 *			
6.	80.6	16 1/2"	0.39	0.14 *			
7.	89.5	18"	0.37	0.10 *			
8.	96.8	19 3/16"	0.30	0.08 +			
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

STACK GAS SPEED, $V_s = 174\ F_s \sqrt{\Delta P_{Average} (T_s + 460) \left(\frac{407}{P_s}\right) \left(\frac{1.00}{G_s}\right)}$

* standard pitot tube used otherwise S type (C = 0.837)

60-23
rev. 11/74

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(Please read Instructions on the reverse before completing)

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EPA-600/7-80-137b		

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7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
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15. SUPPLEMENTARY NOTES (*)Cosponsors are DoE and the American Boiler Manufacturers Assn. Project officers are R. Hall (EPA) and W. Harvey Jr. (DoE). The final technical report is "a" of this same series.

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, NO, 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	Improvement	Air Pollution Control	13B
Boilers	Efficiency	Stationary Sources	13A
Combustion	Flue Gases	Combustion Modification	21B
Coal	Fly Ash	Spreader Stokers	21D
Field Tests	Particle Size	Particulate	14B
Dust	Nitrogen Oxides	Overfire Air	11G 07B
Stokers	Sulfur Oxides		

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