United States
Environmental Protection
Agency

Industrial Environmental Research
Laboratory
Research Triangle Park NC 27711

EPA-600/7-78-099b
December 1978

EPA

Emission Reduction on Two Industrial Boilers with Major Combustion Modifications

(Data Supplement)

Interagency Energy/Environment R&D Program Report

RESEARCH REPORTING SERIES

Research reports of the Office of Research and Development, U.S. Environmental Protection Agency, have been grouped into nine series. These nine broad categories were established to facilitate further development and application of environmental technology. Elimination of traditional grouping was consciously planned to foster technology transfer and a maximum interface in related fields. The nine series are:

1. Environmental Health Effects Research
2. Environmental Protection Technology
3. Ecological Research
4. Environmental Monitoring
5. Socioeconomic Environmental Studies
6. Scientific and Technical Assessment Reports (STAR)
7. Interagency Energy-Environment Research and Development
8. "Special" Reports
9. Miscellaneous Reports

This report has been assigned to the INTERAGENCY ENERGY-ENVIRONMENT RESEARCH AND DEVELOPMENT series. Reports in this series result from the effort funded under the 17-agency Federal Energy/Environment Research and Development Program. These studies relate to EPA's mission to protect the public health and welfare from adverse effects of pollutants associated with energy systems. The goal of the Program is to assure the rapid development of domestic energy supplies in an environmentally-compatible manner by providing the necessary environmental data and control technology. Investigations include analyses of the transport of energy-related pollutants and their health and ecological effects; assessments of, and development of, control technologies for energy systems; and integrated assessments of a wide range of energy-related environmental issues.

EPA REVIEW NOTICE

EPA-600/7-78-099b

December 1978

Emission Reduction on Two Industrial Boilers with Major Combustion Modifications (Data Supplement)

by

K.T. Fisher, J.J. Buening, W.A. Carter, and S.C. Hunter

KVB, Inc.
17332 Irvine Boulevard
Tustin, California 92680

Contract No. 68-02-2144
Program Element No. EHE624A

EPA Project Officer: Robert E. Hall

Industrial Environmental Research Laboratory
Office of Energy, Minerals, and Industry
Research Triangle Park, NC 27711

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Research and Development
Washington, DC 20460

Limitations On Application Of Data Reported

The data cited in this report are test results of measured pollutant emissions from two industrial boilers. These emission levels are not suitable for use in estimating mean emissions from industrial boilers as a class nor are they suitable in compiling areawide emission inventories. They are not suitable for predicting emissions from any one boiler or as regulatory limits or emission standards. Use of emissions as emission standards automatically would place a large proportion of the industrial boiler population in noncompliance.

CONTENTS

	Page
FOREWORD	iv
INSTRUMENTATION	vii
GLOSSARY	viii
CONVERSION FACTORS	ix
SITE LOCATION NUMBER 19	
Industrial Boiler Design Data	1
Mobile Laboratory Data	2
Unit Operating Data	56
Fuel Analyses	108
Particulate and Impactor Data	111
Plume Opacity Data	177
Velocity Traverse Data	194
SO_x Data Sheets	206
SASS Test Data	246
SITE LOCATION NUMBER 38	
Industrial Boiler Design Data	291
Mobile Laboratory Data	292
Control Room Data	312
Fuel Analyses	332
Particulates and Impactor Data	335
Velocity Traverse Data	372
Staged Combustion Air Flow Data	397

FOREWORD

The purpose of this Data Supplement Volume is to document data in greater detail than was practical in the final report for this contract. 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, selection of units, measurement procedures, interpretations and conclusions.[1]

All data presented for gaseous emission concentrations of NO, NO_x, CO, HC, SO_2, and SO_3 are expressed in parts per million by volume (ppm) on a dry basis corrected to 3 percent O_2 by volume (dry) in the flue gas.

The data are arranged in this volume by Location Number for Locations 19 and 38. A location is defined as one company or plant in which one or more units were tested. Each boiler tested at a location is identified by a unit number. The contract final report refers to the test number when data are discussed. The test number is of the form XX/YY-ZZ, where XX = location number, YY = unit number, and ZZ = test number on that unit. For sites where only one unit was tested the /YY unit number is deleted.

---

[1] Carter, W. A., et al., "Emissions Reduction on Two Industrial Boilers with Major Combustion Modifications," PB 283 109, EPA 600/7-78-099a, June 1978.

For each unit tested, the data supplement contains the following information:

1. Industrial Boiler Design Data

   Design data tabulations include: unit description, installation date, steam conditions, furnace characteristics, burner type and spacing, fuels burned, and design temperatures for fuel, air and stack gas.

2. Mobile Laboratory Data (Gaseous Emissions)

   Emission measurements tabulated for each test include test type test load, combustion conditions (excess O_2, CO_2), gaseous emissions (NO_x, NO, CO, HC, SO_x, and SO_2 all at the measured O_2 and at 3% O_2, dry).

3. Unit Operating Data

   Control room data tabulated include steam pressure and temperature, combustion air and stack temperatures, fuel flow, fuel temperature and pressure, furnace pressure, and burner air register setting.

4. Fuel Analysis

   Laboratory reports of fuel analysis are included.

5. EPA Method 5 Particulates and Cascade Impactor Data

   Data sheets for EPA Method 5 include control console data, particulate calculation sheet, and particulate emission calculations. Data sheets for cascade impactors include control console data, cascade impactor weight data, calculated aerodynamic particle size for each stage, and particulate emission calculations.

   The impactor used was an Anderson 2000 Model III with the following stage dimensions:

Jet No.	Jet Diameter, cm
1	0.1638
2	0.1253
3	0.0948
4	0.0759
5	0.0567
6	0.0359
7	0.0261
8	0.0251

6. Plume Opacity Observation Record

   Opacity observations by EPA Method 9 are recorded.

7. Velocity Traverse Data

   Stack traverse data for O_2, velocity and temperature as a function of position in the stack are included.

8. SO_x Data Sheets

   SO_x calculation data for each of three runs with the wet chemistry train are included.

9. SASS Test Data (Location 19 only)

   Data sheets include sampling conditions, control console data, particulate emission calculations, sample recovery logs, and sample concentration results by atomic absorption, spark source mass spectrometry, gas chromatography, and gas chromatograph-mass spectrograph.

Dash marks entered on the data forms indicate that data were not available.

INSTRUMENTATION

The emission measurements were made with instrumentation contained in a 2.5 by 9 meter (8 by 30 ft) laboratory trailer. The gaseous emission measurements were made with analyzers located in the measurement console in the trailer. The particulate concentration, particulate size, sulfur oxides, and trace species concentration measurements were made with instrumentation prepared in the wet chemistry area of the laboratory and taken to the sample port. The weighing and titration were done in or near the laboratory.

The emission measurement instrumentation used for the program was that shown in Table 1. The operation of the instrumentation is discussed in detail in the contract final report.

TABLE 1. EMISSION MEASUREMENT INSTRUMENTATION

Emission	Symbol	Measurement Method	Equipment Mfgr & Model
Nitric oxide	NO	Chemiluminescent*	Thermo Electron, 10A
Oxides of nitrogen	NO_x	Chemiluminescent*	Thermo Electron, 10A
Carbon monoxide	CO	Spectrometer*	Beckman, 864
Carbon dioxide	CO_2	Spectrometer*	Beckman, 865
Oxygen	O_2	Polarographic*	Teledyne, 326A
Hydrocarbons	HC	Flame ionization*	Beckman, 402
Sulfur dioxide	SO_2	Photometric*	Dupont, 400
Sulfur dioxide and trioxide	SO_2, SO_3	Absorption/titration	KVB Equipment Co.
Total particulate matter	PM	EPA Standard Method 5	Joy Mfg. Co.
Particulate size	--	Cascade impactor	Anderson 2000, Mark III
Smoke spot	K	Reflection	Research Appliance Co.
Opacity	--	EPA Standard Method 9	--
Trace species and organics		EPA SASS Train	Acurex/Aerotherm SASS

*Precision, ± 1% of Full Scale

GLOSSARY OF SYMBOLS USED ON DATA FORMS

Burner Type

Air	Air Atomizer
Ring	Natural Gas Ring
Spud	Natural Gas Gun
Steam	Steam Atomizer

Test Fuel

NG	Natural Gas
#2	No. 2 Grade Fuel Oil
#6	No. 6 Grade Fuel Oil

Test Type

Air Reg	Air Register Adjustment
Atom Press	Burner Atomizing Pressure Adjustment
BOOS	Burners Out Of Service
Base	Baseline
BrTune	Boiler Tuneup
Damper	Air Damper Adjustment
HiAir	High Excess Air
HiLoad	High Load
LowAir	Low Excess Air
LowLoad	Low Load
LowNOx	Low NO_x Condition
NrmlAir	Normal Excess Air
OFA	Overfire Air
SCA	Staged Combustion Air
SteamInjec	Steam Injection
VPH	Variable Combustion Air Temperature
Viscosity	Fuel Oil Viscosity
FGR	Flue Gas Recirculation
SASS	Source Assessment Sampling System

CONVERSION FACTORS

SI Units to Metric or English Units

To Obtain	From	Multiply By
g/Mcal	ng/J	0.004186
10^6 Btu	GJ	0.948
Btu	gm cal	3.9685×10^{-3}
lb/10^6 Btu	ng/J	0.00233
ft	m	3.281
in.	cm	0.3937
ft^2	m^2	10.764
ft^3	m^3	35.314
lb	kg	2.205
Fahrenheit	Celsius	$t_F = 9/5(t_c) + 32$
Fahrenheit	Kelvin	$t_F = 1.8t_K - 460$
psig	Pa	$P_{psig} = (P_{pa})(1.450 \times 10^{-4}) - 14.7$
psia	Pa	$P_{psia} = (P_{pa})(1.450 \times 10^{-4})$
iwg (39.2 °F)	Pa	$P_{iwg} = (P_{pa})(4.014 \times 10^{-3})$
10^6 Btu/hr	MW	3.413
GJ/hr	MW	3.60

To Obtain ppm at 3% O_2 of	Multiply* Concentration in ng/J by
Natural Gas Fuel	
CO	3.23
HC	5.65
NO or NO_x	1.96
SO_2 or SO_x	1.41
Oil Fuel	
CO	2.93
HC	5.13
NO or NO_x	1.78
SO_2 or SO_x	1.28
Coal Fuel	
CO	2.69
HC	4.69
NO or NO_x	1.64
SO_2 or SO_x	1.18

*These conversions depend on fuel composition. The values given are for typical fuels.

English and Metric Units to SI Units

To Obtain	From	Multiply By
ng/J	$lb/10^6$ Btu	430
ng/J	g/Mcal	239
GJ	10^6 Btu	1.055
m	ft	0.3048
cm	in.	2.54
m^2	ft^2	0.0929
m^3	ft^3	0.02832
kg	lb	0.4536
Celsius	Fahrenheit	$t_C = 5/9\ (t_F - 32)$
Kelvin	Fahrenheit	$t_K = 5/9\ (t_F - 32) + 273$
Pa	psig	$P_{pa} = (P_{psig} + 14.7)(6.895x10^3)$
Pa	psia	$P_{pa} = (P_{psia})(6.895x10^3)$
Pa	iwg (39.2 °F)	$P_{pa} = (P_{iwg})(249.1)$
MW	10^6 Btu/hr	0.293
MW	GJ/hr	0.278

To Obtain ng/J of	Multiply* Concentration in ppm @ 3% O_2 by
Natural Gas Fuel	
CO	0.310
HC	0.177
NO or NO_x (as NO_2)	0.510
SO_2 or SO_x	0.709
Oil Fuel	
CO	0.341
HC	0.195
NO or NO_x (as NO_2)	0.561
SO_2 or SO_x	0.780
Coal Fuel	
CO	0.372
HC	0.213
NO or NO_x (as NO_2)	0.611
SO_2 or SO_x	0.850

*These conversions depend on fuel composition.
The values given are for typical fuels.

INDUSTRIAL BOILER DESIGN DATA

Location No. 19 Unit No.

Unit Description

KEELER WATERTUBE BOILER TYPE D

MODEL WB-1-145

Installation Date	1970
Steam Output (lb/hr x 10^3)	17.5
Design Pressure, psig	250
Operating Pressure, psig	160
Final Steam Temp., °F	SATURATED
Feedwater Temp., °F	220
Furnace Type	WATERTUBE
Furnace Size L-W-H (ft)	9-6-8
Total Heating Surface, ft^2	1881
Radiant Heating Surface, ft^2	288
Convection Heating Surface, ft^2	1593
Furnace Volume, ft^3	430
Burner Description	1 FABER GAS RING AND OIL GUN BURNER
Test Fuel	NAT. GAS, #2 OIL, #6 OIL
Primary Air Temp., °F	AMBIENT
Stack Temp., °F	~490

Comments: BOILER WAS EQUIPPED WITH OVER FIRE AIR PORTS AND FLUE GAS RECIRCULATION DUCTING

MOBILE LABORATORY DATA

Test No.________

Test No. 19-3 Date 1/4/77 Location 19 Engr. G. SOTTER

Unit No. ________ Fuel #2 Capacity 17500 lbs/hr

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-1		19-2		19-3		19-4		19-5	
1. Test No.										
2. Date	1/4/77		1/4/77		1/5/77		1/5/77		1/6/77	
3. Time	1440		1515		1035		1510		0925	
4. Load	14500		14 500		14 500		14 500		14 500	
5. Process Rate	—									
6. Flue Diam. or Size, ft	2 1/2		2 1/2		2 1/2		2 1/2		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.05		2.95		3.18		3.15		3.20	
9. NOx (hot) read/3% O_2 (ppm)*	95	95	93	93	92	93	88	81	105	106
10. NO (hot) read/3% O_2 (ppm)*	95	95	93	93	92	93	88	81	105	106
11. NO_2 (hot) read/3% O_2 (ppm)*	0		0		0	0	0	0	0	
12. NO (cold) read/3% O_2 (ppm)*	110	110	108	108	107	108	108	109	119	120
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	9		8		11	11	8	8	4	4
15. Hydrocarbon (ppm) uncor/cor*	0		0		5	5	3	3	2	2
16. Sulfur Dioxide (ppm) uncor/cor*	60	60	80	80	80	81	90	91	70	71
17. Smoke Spot (Bacharach)	0		0		0					
18. Atmos. Temp. (°F/°C)	36 °F		36 °F		18 °F		26		10 °F	
19. Dew Point Temp. (°F/°C)									—	
20. Atmos. Pressure (in. Hg)	30.07		30.07		30.16		30.06		30.19	
21. Relative Humidity (%)	65%		65%		87%		63%		87	
22. % SULFUR (APPROX FROM SO_2)	0.10		0.14		0.14		.156		0.12	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ________

Test No. 1 Date ________ Location 19 Engr. G. SOTTER

Unit No. ________ Fuel #2 Capacity 17,500 LB/HR

Unit Type DS 9-2 Burner Type FABER WB 114.5

	19-6		19-7		19-8		19-9		19-10	
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	1-6-77		1-6-77		1-6-77		1-7-77		1-10-77	
3. Time	10:30		15:30		1605		1015		0900	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate	—									
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.12		2.95		2.90		3.05		3 2	
9. NOx (hot) read/3% O_2 (ppm)*	102		102	102	102	101	88	88	101	102
10. NO (hot) read/3% O_2 (ppm)*	102		102	102	102	101	88	88	101	102
11. NO_2 (hot) read/3% O_2 (ppm)*	0		0	0	0		0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	117		115	115	117	116	107	107	116	117
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	1		11	11	12	12	11	11	12	12
15. Hydrocarbon (ppm) uncor/cor*	3		5	5	7	7	5	5	5	5
16. Sulfur Dioxide (ppm) uncor/cor*	85	85.4	100	100	90	89	80	80	80	81
17. Smoke Spot (Bacharach)	0						0		0	
18. Atmos. Temp. (°F/°C)	14		25°F		25°F		26		34°F	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.19		30.10		30.06		29.60		29.28	
21. Relative Humidity (%)	87						90			
22. % S IN FUEL	0.15		.172		.153		.138		.139	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.__________

Test No. 2 + 4 Date 1-10-77 Location 19 Engr. BRIENZA

Unit No. ______ Fuel [illegible] Capacity [illegible]

Unit Type DS 9-2 Burner Type FABER WB 114.5

	19-11		19-12		19-13		19-14		19-15	
1. Test No.										
2. Date	1-10-77		1-10-77		1-10-77		1-10-77		1-11-77	
3. Time	0950		1040		1100		1138		0938	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	5.15		0.92		0.59		3.00		3.00	
9. NOx (hot) read/3% O_2 (ppm)*	88	100	88	79	88	78	33	33	91	91
10. NO (hot) read/3% O_2 (ppm)*	88	100	88	79	88	78	33	33	91	91
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0		0		0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	102	116	106	95	107	94	38	38	105	105
13. Carbon Dioxide (%)	—									
14. Carbon Monoxide (ppm) uncor/cor*	8	9	72-84	65-75	400-580	352-510	8	8	8	8
15. Hydrocarbon (ppm) uncor/cor*	5	5.6	8	7.2	12	10.5	10	10	5	5
16. Sulfur Dioxide (ppm) uncor/cor*	70	79	90	81	90	79	80	80	75	75
17. Smoke Spot (Bacharach)	0		4		5		0		0	
18. Atmos. Temp. (°F/°C)	34°F		33°F		33°F		33°F		14°F	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.28		29.25		29.24		29.24		30.04	
21. Relative Humidity (%)	~100% RAINING		~100% SNOW		~100% SNOW		SNOW		53%	
22. % S IN FUEL	.136		.139		.136		.137		.129	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 4 Date 1-11-77 Location 19 Engr. BRIENZA

Unit No. ________ Fuel #2 Capacity 17,500

Unit Type DS 9-2 Burner Type FABER WB 114.5

	19-16		19-17		19-18		19-19		19-20	
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	1-11-77		1-11-77		1-11-77		1-11-77		1-11-77	
3. Time	1030		1055		1205		1225		1250	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.00		2.85		2.90		0.70		1.05	
9. NOx (hot) read/3% O_2 (ppm)*	43	43	32	32	36	36	32	28	38	34
10. NO (hot) read/3% O_2 (ppm)*	43	43	32	32	36	36	32	28	38	34
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	50	50	43	43	42	42	37	33	45	40
13. Carbon Dioxide (%)	—									
14. Carbon Monoxide (ppm) uncor/cor*	8	8	10	10	10	10	350	310	62	56
15. Hydrocarbon (ppm) uncor/cor*	3	3	5	5	7	7	7	6.2	5	4.5
16. Sulfur Dioxide (ppm) uncor/cor*	70	70	80	79	70	70	80	71	85	77
17. Smoke Spot (Bacharach)	0		0		0		1		1	
18. Atmos. Temp. (°F/°C)	14°F		15°		15°		17		17	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.08		30.10		30.10		30.11		30.11	
21. Relative Humidity (%)	53		53		51		51		51	
22. %S IN FUEL	.121		.136		.121		.122		.132	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.__________

Test No.__________ Date [illegible] Location__________ Engr. BRIENZA

Unit No.__________ Fuel #2 Capacity__________

Unit Type [illegible] Burner Type FABER WB 114.5

	19-21		19-22		19-23		19-24		19-25	
1. Test No.	[illegible]		[illegible]							
2. Date	1/11/77		1/12/77		1/12/77		1/12/77		1/12/77	
3. Time	1330		0750		0845		0905		0920	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	.90		3.00		5.7		5.4		4.8	
9. NOx (hot) read/3% O_2 (ppm)*	27	24	90	90	75	88	80	92	96	106
10. NO (hot) read/3% O_2 (ppm)*	27	24	90	90	75	80	80	92	96	106
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	32	28	103	103	88	103	92	106	111	123
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	45	40								
15. Hydrocarbon (ppm) uncor/cor*	5	5	5	5	5	5.8	3	3	5	5
16. Sulfur Dioxide (ppm) uncor/cor*	90	80	75	75	50	58	60	69	65	72
17. Smoke Spot (Bacharach)	0		0		0.5		0		0	
18. Atmos. Temp. (°F/°C)	19		0		0		0		0	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.15		30.25		30.26		30.26		30.26	
21. Relative Humidity (%)	45		75		75		75		75	
22. % S IN FUEL	.138		.129		.101		.119		.124	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date [illegible] Location [illegible] Engr. BRIENZA

Unit No.________ Fuel [illegible] Capacity [illegible]

Unit Type [illegible] Burner Type WB 114.5 FABER

	1926		1927		1928		19-29		19-30	
1. Test No.	[illegible]		[illegible]		34-1a		[illegible]		[illegible]	
2. Date	1 12 77		1 12 77		1 12 77		1 12 77		1 12 77	
3. Time	0940		0950		1230		1245		1300	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	6.3		6.1		3.00		3.00		3.03	
9. NOx (hot) read/3% O_2 (ppm)*	71	87			75	75	73	73	72	72
10. NO (hot) read/3% O_2 (ppm)*	71	87			75	75	73	73	72	72
11. NO_2 (hot) read/3% O_2 (ppm)*	0				0		0		0	
12. NO (cold) read/3% O_2 (ppm)*	88	107	82	99	88	88	88	88	87	87
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*					10	10	10	10	10	10
15. Hydrocarbon (ppm) uncor/cor*	5	6	5		1	1	3	3	3	3
16. Sulfur Dioxide (ppm) uncor/cor*	60	73	60		70	70	70	70	70	70
17. Smoke Spot (Bacharach)	—				4		4		4	
18. Atmos. Temp. (°F/°C)	0		0		10		10		10	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.27		30.27		30.24		30.24		30.24	
21. Relative Humidity (%)	75		75		55		55		55	
22. % S IN FUEL					.121		.121		.121	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA — Test No.

Test No. ____ Date 1/12/77 Location 19 Engr. BRIENZA

Unit No. ____ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-31		19-32		19-33		19-34		19-35	
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	1/12/77		1/12/77		1/12/77		1/12/77		1/12/77	
3. Time	1315		1340		1350		1405		1425	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.00		3.04		3.00		3.10		3.12	
9. NOx (hot) read/3% O_2 (ppm)*	74	74	62	62	63	63	63	63	63	63
10. NO (hot) read/3% O_2 (ppm)*	74	74	62	62	63	63	63	63	63	63
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0		0	
12. NO (cold) read/3% O_2 (ppm)*	87	87	72	72	74	74	74	74	75	75
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	15	15	80	80	53	53	40	40	12	12
15. Hydrocarbon (ppm) uncor/cor*	3	3	3	3	5	5	5	5	5	5
16. Sulfur Dioxide (ppm) uncor/cor*	60	60	60	60	60	60	60	60	60	60
17. Smoke Spot (Bacharach)	5		6.5		5.5		5.0		4	
18. Atmos. Temp. (°F/°C)	12		13		13		13		13	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.24		30.24		30.24		30.24		30.24	
21. Relative Humidity (%)	45		45		45		45		45	
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BRIENZA

Unit No.________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

1. Test No.	19-36		19-37				19-38		19-39	
2. Date	1/12/77		1/12/77				1/13/77		1/13/77	
3. Time	1445		1500				850		1115	
4. Load	14500		14500				14500			
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5				2.5		2.5	
7. Probe Position	CENTER		CENTER				CENTER		CENTER	
8. Oxygen (%)	1.8		1.8				3.00		3.25	
9. NOx (hot) read/3% O_2 (ppm)*	83	78	83	78			100			
10. NO (hot) read/3% O_2 (ppm)*	83	78	83	78			100			
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0			0			
12. NO (cold) read/3% O_2 (ppm)*	98	91	97	91			117			
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	44	41	52	48						
15. Hydrocarbon (ppm) uncor/cor*	5	5	5	5			5		5	
16. Sulfur Dioxide (ppm) uncor/cor*	60	56	60	56			60		240	
17. Smoke Spot (Bacharach)	4.5		4.5				0		2	
18. Atmos. Temp. (°F/°C)	13		14				-4		5°F	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.24		30.24				30.60		30.57	
21. Relative Humidity (%)	45		45							
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BRIENZA

Unit No.________ Fuel #6 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-40		19-41		19-42		19-43		19-44	
1. Test No.	~~12-1~~		~~12-2~~		~~[illegible]~~		~~[illegible]~~		~~[illegible]~~	
2. Date	1/13/77		1/13/77		1/13/77		1/13/77		1/14/77	
3. Time	1450		1530		1555		1620		0820	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.71		5.21		1.33		.70		3.21	
9. NOx (hot) read/3% O_2 (ppm)*	207	215	207	236	173	158	160	142	197	199
10. NO (hot) read/3% O_2 (ppm)*	207	215	207	236	173	158	160	142	197	199
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	230	239	224	255	200	183	187	166	217	219
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	17	17	19	21	40	36	330	292	8	9
15. Hydrocarbon (ppm) uncor/cor*	4	14	5	5	5	5	5	5	2	2
16. Sulfur Dioxide (ppm) uncor/cor*	300	312	270	308	350	320	380	336	330	334
17. Smoke Spot (Bacharach)	1.5		1.5		5		7		2.0	
18. Atmos. Temp. (°F/°C)	7		7		7		7		20	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.49		30.49		30.49		30.49		30.05	
21. Relative Humidity (%)	53		53		53		53		62	
22. % S IN FUEL	.538		.530		.552		.580		.575	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BRIENZA

Unit No.________ Fuel #6 Capacity 17500

Unit Type DS 9-2 Burner Type WB 114.5 FABER

	19-45		19-46		19-47		19-48		19-49	
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	1/14/77		1/14/77		1/14/77		1/14/77		1/14/77	
3. Time	0920		0945		1030		1050		1110	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.10		3.08		3.15		3.20		0.82	
9. NOx (hot) read/3% O_2 (ppm)*	180	181	180	181	177	178	172	174	126	112
10. NO (hot) read/3% O_2 (ppm)*	180	181	180	181	177	178	172	174	126	112
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	205	206	205	206	200	201	193	195	148	132
13. Carbon Dioxide (%)	—									
14. Carbon Monoxide (ppm) uncor/cor*	16	16	12	12	12	12	12	12	200	178
15. Hydrocarbon (ppm) uncor/cor*	2	2	5	5	5	5	5	5	5	4
16. Sulfur Dioxide (ppm) uncor/cor*	320	321	320	321	320	322	320	323	360	321
17. Smoke Spot (Bacharach)	2.0		2.0		2.0		2.5		5.5	
18. Atmos. Temp. (°F/°C)	20		20		20		20		20	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.04		30.04		30.04		30.03		30.03	
21. Relative Humidity (%)	62		62		62		62		62	
22. % S IN FUEL	.554		.554		.555		.557		.553	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BRIENZA

Unit No.________ Fuel #6 Capacity 17500

Unit Type DS 9-2 Burner Type WB 114.5 FABER

	19-50		19-51		19-52		19-53		19-54	
1. Test No.	~~[illegible]~~		~~14A-2~~		~~[illegible]~~		~~[illegible]~~		~~[illegible]~~-1a	
2. Date	1/14/77		1/14/77		1/17/77		1/17/77		1/17/77	
3. Time	1140		1150		1125		1410		1515	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	.98		.89		4.8		3.2		2.79	
9. NOx (hot) read/3% O_2 (ppm)*	126	113	144	129	100	111	90	91	37	37
10. NO (hot) read/3% O_2 (ppm)*	126	113	144	129	100	111	90	91	37	37
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0		0	0	0	
12. NO (cold) read/3% O_2 (ppm)*	178	160	169	151	103	114	107	108	42	42
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	50	45	180	161			10	10	15	15
15. Hydrocarbon (ppm) uncor/cor*	5	5	5	5	3	3	0		5	5
16. Sulfur Dioxide (ppm) uncor/cor*	350	314	360	322	55	61	60	61	70	70
17. Smoke Spot (Bacharach)	4.5		5		0		0		0	
18. Atmos. Temp. (°F/°C)	20		20		-4		1		1	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.03		30.03		29.84		29.80		29.80	
21. Relative Humidity (%)	65		65		54		54		54	
22. % S IN FUEL	.542		.555		.105		.105		.120	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ________

Test No. ________ Date ________ Location 19 Engr. BRIENZA

Unit No. ________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-55		19-56		19-57		19-58		19-59	
1. Test No.	56la		56Tu		[illegible]		[illegible]		[illegible]	
2. Date	1/17/77		1/17/77		1/17/77		1/17/77		1/17/77	
3. Time	1525		1535		1555		1610		1620	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	2.72		2.72		3.39		3.22		3.26	
9. NOx (hot) read/3% O_2 (ppm)*	35	34	35	34	27	28	27	27	27	27
10. NO (hot) read/3% O_2 (ppm)*	35	34	35	34	27	28	27	27	27	27
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	42	41	40	39	32	33	34	34	34	34
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	25	25	20	20	10	10	10	10	12	12
15. Hydrocarbon (ppm) uncor/cor*	5	5	5	5	5	5	5	5	5	5
16. Sulfur Dioxide (ppm) uncor/cor*	70	69	70	69	60	61	55	55	55	55
17. Smoke Spot (Bacharach)	0		0		0		0		0	
18. Atmos. Temp. (°F/°C)	/		/		/		/		/	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.80		30.80		30.80		30.80		30.80	
21. Relative Humidity (%)										
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BRIENZA

Unit No.________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB114.5 FABER

	19-60		19 61		19-62		19-63		19-64	
1. Test No.	5J1a		5A2b		5C2b		5I2b		5C2b	
2. Date	1/17/77		1/18/77							
3. Time	1645		1025		1040		1105		1115	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	2.97		1.65		1.65		2.40		2.40	
9. NOx (hot) read/3% O_2 (ppm)*	37	37	35	32	32	30	27	25	27	25
10. NO (hot) read/3% O_2 (ppm)*	37	37	35	32	32	30	27	25	27	25
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0		0	
12. NO (cold) read/3% O_2 (ppm)*	43	43	42	39	37	34	32	31	32	31
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	20	20	340	316	500	465	100	98	100	98
15. Hydrocarbon (ppm) uncor/cor*	3	3	30	28	40	37	5	5	5	5
16. Sulfur Dioxide (ppm) uncor/cor*	60	65	80	74	80	74	70	67	70	67
17. Smoke Spot (Bacharach)	0		4		5		0.2		0.2	
18. Atmos. Temp. (°F/°C)	1		0		0		0		0	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.08		29.85		29.85		29.85		29.85	
21. Relative Humidity (%)	51		48		48		48			
22. % S IN FUEL	.112		.127		.127		.115		.115	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BRIENZA

Unit No.________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5

	19-65		19-66		19-67		19-68			
1. Test No.	~~[illegible]~~		~~5I2c~~		~~6G2c~~		~~[illegible]~~			
2. Date	1/18/77						1/18/77			
3. Time	1125		1115		1215		1225			
4. Load	14500		14500		14500		14500			
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5			
7. Probe Position	CENTER		CENTER		CENTER		CENTER			
8. Oxygen (%)	2.45		2.45		2.2		2.18			
9. NOx (hot) read/3% O_2 (ppm)*	26	25	23	22	33	32	33	32		
10. NO (hot) read/3% O_2 (ppm)*	26	25	23	22	33	32	33	32		
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0		0			
12. NO (cold) read/3% O_2 (ppm)*	30	29	26	25	37	36	38	37		
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	160	155	600	582	500	478	230	220		
15. Hydrocarbon (ppm) uncor/cor*	10	10	100	97	30	29	20	11		
16. Sulfur Dioxide (ppm) uncor/cor*	65	63	65	63	60	58	50	48		
17. Smoke Spot (Bacharach)	0		0		5.5		4.2			
18. Atmos. Temp. (°F/°C)	0		0		0		0			
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.85		29.85		29.85		29.85			
21. Relative Humidity (%)	48		48		48		48			
22. % S IN FUEL	.108		.108		.100		.083			
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 1/18/77 Location 19 Engr. BRIENZA

Unit No.________ Fuel #6 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-69		19-70		19-71				19-72	
1. Test No.	11-3		~~13A1b~~		~~13B1b~~				13C1b	
2. Date	1/18/77		1/18/77		1/18/77				1/18/77	
3. Time	1415		1545		1600				1640	
4. Load	14500		14500		14500				14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5				2.5	
7. Probe Position	CENTER		CENTER		CENTER				CENTER	
8. Oxygen (%)	3.1		3.22		3.30				3.28	
9. NOx (hot) read/3% O_2 (ppm)*	187	188	150	152	133	137			143	145
10. NO (hot) read/3% O_2 (ppm)*	187	188	150	152	133	137			143	145
11. NO_2 (hot) read/3% O_2 (ppm)*	0		0		0	0			0	
12. NO (cold) read/3% O_2 (ppm)*	210	211	166	168	147	149			160	161
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	4	4	10	10	10	10			20	20
15. Hydrocarbon (ppm) uncor/cor*	5	5	3	3	5	5			5	5
16. Sulfur Dioxide (ppm) uncor/cor*	340	341	330	334	330	335			330	335
17. Smoke Spot (Bacharach)	3.5		4.8		5.2				6.5	
18. Atmos. Temp. (°F/°C)	7		7		7				7	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.77		29.76		29.76				29.76	
21. Relative Humidity (%)	45		45		45				45	
22. % S IN FUEL	.587		.576		.578				.578	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date 1/19/77 Location 19 Engr. BRIENZA

Unit No.__________ Fuel #2 Capacity 17,500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-73		19-74		19-75		19-76		19-77	
1. Test No.	~~1-15~~		~~[illegible]~~		~~[illegible]~~		~~[illegible]~~		~~1-26~~	
2. Date	1/19/77		1/19/77		1/19/77		1/19/77		1/20/77	
3. Time	915		1110		1205		1440		750	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.10		1.15		1.05		1.08		3.00	
9. NOx (hot) read/3% O_2 (ppm)*	98	98	92	83	92	83	92	83	105	105
10. NO (hot) read/3% O_2 (ppm)*	98	98	92	83	92	83	92	83	105	105
11. NO_2 (hot) read/3% O_2 (ppm)*	0		0							
12. NO (cold) read/3% O_2 (ppm)*	112	112	107	97	106	96	107	97	117	117
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	6	6	200	181	300	270	200	181	8	8
15. Hydrocarbon (ppm) uncor/cor*	3	3	3	3	3	3	3	3	—	—
16. Sulfur Dioxide (ppm) uncor/cor*	70	70	85	77	85	77	90	81	85	85
17. Smoke Spot (Bacharach)	0		5		4.5		4.5		0	
18. Atmos. Temp. (°F/°C)	7		10		14		20		25	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.73		29.73		29.72		29.70		29.80	
21. Relative Humidity (%)	63		58		51		50			
22. % S IN FUEL	.120		.133		.132					
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 1/20/77 Location 19 Engr. BRIENZA

Unit No.________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-78		19-79		19-80		19-81		19-82	
1. Test No.	~~3425~~		~~[illegible]~~		~~[illegible]~~		~~[illegible]~~		~~[illegible]~~	
2. Date	1/20/77		1/20/77		1/20/77		1/20/77		1/20/77	
3. Time	820		840		915		955		1005	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	1.85		1.79		1.77		1.92		1.90	
9. NOx (hot) read/3% O_2 (ppm)*	87	82	83	78	71	66	77	73	76	71
10. NO (hot) read/3% O_2 (ppm)*	87	82	83	78	71	66	77	73	76	71
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0		
12. NO (cold) read/3% O_2 (ppm)*	102	96	95	89	82	77	87	82	86	81
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	44	41	50	47	500	468	140	132	45	42
15. Hydrocarbon (ppm) uncor/cor*	3	3	5	5	20	19	8	8	15	15
16. Sulfur Dioxide (ppm) uncor/cor*	—		—		—		100	94	100	94
17. Smoke Spot (Bacharach)	5.8		5.5		8.0		6.8		7.0	
18. Atmos. Temp. (°F/°C)	25		25		25		27		27	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.80		29.80		29.80		29.85		29.85	
21. Relative Humidity (%)	65		65		65		65		65	
22. % S IN FUEL							.162		.162	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 1/20/77 Location 19 Engr. BRIENZA

Unit No.________ Fuel #2 Capacity 17500

Unit Type 059-2 Burner Type WB 114.5 FABER

	19-82		19-83		19-84		19-85			
1. Test No.	3B1b		~~4C2F~~		~~4C20~~		~~4-2I~~			
2. Date	1/20/77		1/20/77		1/20/77		1/20/77			
3. Time			1400		1500		1630			
4. Load	14500		14500		14500		14500			
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5			
7. Probe Position	CENTER		CENTER		CENTER		CENTER			
8. Oxygen (%)			.85		.70		0.68			
9. NOx (hot) read/3% O_2 (ppm)*			29	26	30	26	31	27		
10. NO (hot) read/3% O_2 (ppm)*			29	26	30	26	31	27		
11. NO_2 (hot) read/3% O_2 (ppm)*			0	0	0	0	0			
12. NO (cold) read/3% O_2 (ppm)*			35	31	36	32	37	33		
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*			24	21	25	22	80	71		
15. Hydrocarbon (ppm) uncor/cor*			5	5	5	5	4	4		
16. Sulfur Dioxide (ppm) uncor/cor*			85	76	90	80	78	69		
17. Smoke Spot (Bacharach)			0		0		—			
18. Atmos. Temp. (°F/°C)			27		27					
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)			29.86		29.86		29.91			
21. Relative Humidity (%)			65		65		65			
22. % S			0.131		0.137		0.12			
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 1-21-77 Location 19 Engr.

Unit No. Fuel #2 Capacity 17.5 K

Unit Type DS9-2 Burner Type

	19-86		19-87		19-88		19-89		19-90	
1. Test No.										
2. Date	1-21-77		1-21-77		1-21-77		1-21-77		1-21-77	
3. Time	1027		1135		1345		1400		1420	
4. Load	14.5K		14.5K		14.5K		14.5K		14.5K	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	2.9		2.8		2.5		2.55		2.55	
9. NOx (hot) read/3% O_2 (ppm)*	74	74	62	61	67	65	58	57	57	56
10. NO (hot) read/3% O_2 (ppm)*	72	72	61	60	66	64	58	57	56	55
11. NO_2 (hot) read/3% O_2 (ppm)*	2	2	1	1	1	1	0	0	1	1
12. NO (cold) read/3% O_2 (ppm)*	82	82	70	69	77	75	68	66	66	64
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	32	32	105	104	8	8	64	62	48	47
15. Hydrocarbon (ppm) uncor/cor*	3	3	4	3	0	0	0	0	0	0
16. Sulfur Dioxide (ppm) uncor/cor*	40	40	60	59	80	78	80	78	80	79
17. Smoke Spot (Bacharach)	4.5		6.5		3		6.5		5.5	
18. Atmos. Temp. (°F/°C)					23		23		23	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.03		30.03		29.95		29.95		29.95	
21. Relative Humidity (%)					60%		60%		60%	
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 1-21-77 Location 19 Engr. MBH

Unit No.________ Fuel #2 OIL Capacity 17.5 K

Unit Type DS9-2 Burner Type________

	19-91		19-92		19-93		19-94		19-95	
1. Test No.	~~302C~~		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	1-21-77		1-21-77		1-21-77		1-21-77		1-21-77	
3. Time	1435		1500		1512		1538		1549	
4. Load	14.5		14.5		14.5		14.5		14.5	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	2.45		1.6		1.6		1.5		1.55	
9. NOx (hot) read/3% O_2 (ppm)*	64	62	69	63	64	58	62	57	71	65
10. NO (hot) read/3% O_2 (ppm)*	62	60	68	63	62	57	61	56	69	63
11. NO_2 (hot) read/3% O_2 (ppm)*	2	2	1	0	2	1	1	1	2	2
12. NO (cold) read/3% O_2 (ppm)*	69	67	78	72	72	66	71	65	73	67
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	104	101	124	114	380	349	400	368	420	386
15. Hydrocarbon (ppm) uncor/cor*	0	0	2	2	4	4	4	4	0	0
16. Sulfur Dioxide (ppm) uncor/cor*	80	78	85	78	80	74	80	74	80	74
17. Smoke Spot (Bacharach)	6.5		5.0		6.5		6.0		7.0	
18. Atmos. Temp. (°F/°C)	23		25		25		25		25	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.95		29.89		29.89		29.89		29.89	
21. Relative Humidity (%)	60%		55%		55%		55%		55%	
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date__________ Location 19__________ Engr.__________

Unit No.__________ Fuel__________ Capacity 17500__________

Unit Type DS9-2__________ Burner Type WB 114.5 FABER__________

	19-96		19-97		19-98		19-99		19-100	
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	1/24/77		1/24/77		1/24/77		1/24/77		1/27/77	
3. Time	825		1020		1130		1450		835	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.10		3.00		3.3		3.10		3.15	
9. NOx (hot) read/3% O_2 (ppm)*	103		195		196	199	197	198	88	89
10. NO (hot) read/3% O_2 (ppm)*	103		195		196	199	197	198	88	89
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0		0	
12. NO (cold) read/3% O_2 (ppm)*	117	118	214	214	212	215	218	219	108	109
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	8		4		2	2	4	4	4	4
15. Hydrocarbon (ppm) uncor/cor*	5		10		0	0	5	5	5	5
16. Sulfur Dioxide (ppm) uncor/cor*	60		300	300	280	285	320	321	70	71
17. Smoke Spot (Bacharach)	--		0.5		0.5		0		0	
18. Atmos. Temp. (°F/°C)	13		20		26		2		26	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.18		30.16		30.14		30.00		29.80	
21. Relative Humidity (%)	77		77		77					
22. %S IN FUEL			0.52		.49		.551		.122	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. [illegible]

Unit No.________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-101		19-102		19-103		19-104		19-105	
1. Test No.	~~5A1b~~		~~5G1b~~		~~[illegible]~~		~~5B1k~~		~~5C1b~~	
2. Date	1/25/77		1/25/77		1/25/77		1/25/77		1/25/77	
3. Time	1000		1010		1035		1100		1125	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.04		2.95		2.90		2.90		3.00	
9. NOx (hot) read/3% O_2 (ppm)*	53	53	53	53	34	34	34	34	25	25
10. NO (hot) read/3% O_2 (ppm)*	53	53	53	53	34	34	34	34	25	25
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	61	61	61	61	40	40	40	40	27	27
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	6	6	20	20	10	10	10	10	15	15
15. Hydrocarbon (ppm) uncor/cor*	5	5	3	3	3	3	3	3	3	3
16. Sulfur Dioxide (ppm) uncor/cor*	85	85	80	80	80	80	80	80	80	80
17. Smoke Spot (Bacharach)	1.5		4		.5		.5		.2	
18. Atmos. Temp. (°F/°C)	30		30		30		31		35	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.77		29.77		29.75		29.75		29.75	
21. Relative Humidity (%)	90		90		90		90		90	
22. % S IN FUEL	.146		.138		.138		.138		.138	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.____

Test No.____ Date____ Location 19 Engr. [illegible]

Unit No.____ Fuel [illegible] Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19-106		19-107		19-108		19-109		19-110	
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	1/25/77		1/25/77		1/25/77		1/25/77		1/25/77	
3. Time	1135		1330		1340		1350		1400	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.00		3.20		3.19		3.07		3.11	
9. NOx (hot) read/3% O_2 (ppm)*	26	26	157	159	157	159	151	151	150	151
10. NO (hot) read/3% O_2 (ppm)*	26	26	157	159	157	159	151	151	150	151
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0		0		0	0	0	
12. NO (cold) read/3% O_2 (ppm)*	29	29	175	177	174	176	173	173	170	171
13. Carbon Dioxide (%)	—									
14. Carbon Monoxide (ppm) uncor/cor*	16	16	6	6	8	8	15	15	32	32
15. Hydrocarbon (ppm) uncor/cor*	3	3	0	0	2	2	2	2	5	5
16. Sulfur Dioxide (ppm) uncor/cor*	80	80	280	283	280	283	280	280	285	187
17. Smoke Spot (Bacharach)	0.2		3.0		4.5		4.5		5.1	
18. Atmos. Temp. (°F/°C)	36		36		36		36		36	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.75		29.68		29.68		29.68		29.68	
21. Relative Humidity (%)	90		72		72		72		72	
22. % S IN FUEL	.138		.488		.488		.483		.494	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ________

Test No. ________ Date 1/25/77 Location 19 Engr. [illegible]

Unit No. ________ Fuel #6 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

	19 111		19-112		19-113		19-114		19-115	
1. Test No.	~~[illegible]~~		~~[illegible]~~		~~[illegible]~~		~~[illegible]~~		~~[illegible]~~	
2. Date	1/25/77		1/25/77		1/25/77		1/25/77		1/26/77	
3. Time	1420		1435		1500		1510		0900	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.05		3.10		1.75		1.90		3.10	
9. NOx (hot) read/3% O_2 (ppm)*	132	132	130	131	127	119	116	109	108	108
10. NO (hot) read/3% O_2 (ppm)*	132	132	130	131	127	119	116	109	108	108
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	
12. NO (cold) read/3% O_2 (ppm)*	150	150	148	149	148	138	133	125	125	126
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	60	60	80	80	100	93	2000	1884	6	6
15. Hydrocarbon (ppm) uncor/cor*	5	5	5	5	12	12	150	141	0	
16. Sulfur Dioxide (ppm) uncor/cor*	285	286	285	286	320	299	320	301	60	60
17. Smoke Spot (Bacharach)	6.5		7.0		8		10		0	
18. Atmos. Temp. (°F/°C)	36		36		36		36		26	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.66		29.66		29.66		29.66		29.74	
21. Relative Humidity (%)	72		72		72		72		75	
22. % S IN FUEL	.493		.493		.515		.520		.103	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date [illegible] Location 19 Engr. [illegible]

Unit No.________ Fuel [illegible] Capacity 17500

Unit Type D59-2 Burner Type WB 114.5 FABER

	19-116		19-117		19-118		19-119		19-120	
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	1/26/77				2/15/77		2/16/77		2/16/77	
3. Time	1040		1200		1410		1035		1110	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.1		3.18		3.2		2.9		6.3	
9. NOx (hot) read/3% O_2 (ppm)*	82	83	83	84	117	118	100	100	87	107
10. NO (hot) read/3% O_2 (ppm)*	82	83	83	84	117	118	100	100	87	107
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	96	97	97	98	132	134	115	114	92	113
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	35	35	24	24	9	9	8	8	6	7
15. Hydrocarbon (ppm) uncor/cor*	5	5	0	0	5	5	3	3	2	2.5
16. Sulfur Dioxide (ppm) uncor/cor*	80	81	90	91	80	81	90	90	70	86
17. Smoke Spot (Bacharach)	4		5.5		0		0		0	
18. Atmos. Temp. (°F/°C)	26		30		34		19		20	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.74		29.70		29.97		30.12		30.11	
21. Relative Humidity (%)	75				50%		47%		47%	
22. % S IN FUEL FROM SO_2					.14%		.155%		.148%	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. G. [illegible]

TECH. R. [illegible]

Unit No.________ Fuel #2 OIL Capacity 17500

Unit Type DSG-2 Burner Type WB 114.5 FABER

	19-121		19-122		19-123		19-124		19-125	
1. Test No.	CALIB.		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	2/16/77		2/16/77		2/16/77		2/16/77		2/16/77	
3. Time	1135		1150		1205		1210		1225	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	6.2		6.5		6.4		5.75		5.75	
9. NOx (hot) read/3% O_2 (ppm)*	85	103	83	103	84	104	86	102	87	103
10. NO (hot) read/3% O_2 (ppm)*	85	103	83	103	84	104	86	102	87	103
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	92	112	92	114	93	115	96	113	98	116
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	6	7	8	10	8	10	8	9	8	9
15. Hydrocarbon (ppm) uncor/cor*	0	0	0	0	0	0	0	0	3	4
16. Sulfur Dioxide (ppm) uncor/cor*	70	85	60	75	55	68	55	65	75	89
17. Smoke Spot (Bacharach)	0		0		0					
18. Atmos. Temp. (°F/°C)	20		20		20		22		22	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.11		30.11		30.11		30.09		30.09	
21. Relative Humidity (%)	47		47		47		45		45	
22. % SULFUR IN FUEL FROM SO_2	.147		.128		.117		.112		.153	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. G. SOTTER
TECH. R. PICNESSA

Unit No.________ Fuel #2 or #6 Capacity 17500

Unit Type P59-2 Burner Type WB 114.5 FABER

	19-126		19-127		19-128		19-129		19-130	
1. Test No.	~~CALIB.~~		~~CALIB.~~							
2. Date	2/16/77		2/16/77		2/16/77		2/16/77		2/16/77	
3. Time	1240		1250		1550		1630		1650	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	5.28		6.25		3.25		3.1		2.9	
9. NOx (hot) read/3% O_2 (ppm)*	88	101	89	102	200	203	136	137	93	93
10. NO (hot) read/3% O_2 (ppm)*	88	101	89	102	200	203	136	137	93	93
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	99	113	99	113	220	223	147	148	105	104
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	8	9	8	9	14	14	24	24	340	338
15. Hydrocarbon (ppm) uncor/cor*	3	3	2	2	7	7	8	8	45	45
16. Sulfur Dioxide (ppm) uncor/cor*	70	80	80	91	330	335	360	322	330	328
17. Smoke Spot (Bacharach)					1		2		2	
18. Atmos. Temp. (°F/°C)	22		22		25		24		24	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.09		30.09		30.02		30.02		30.02	
21. Relative Humidity (%)	45		45		42		40		40	
22. %SULFUR IN FUEL FROM SO_2	.138		.158		.578		.624		.566	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. G. [illegible]

Unit No.________ Fuel #6 Capacity 17500 [illegible]

Unit Type DS9-2 Burner Type WB 114.5 FABER

	← 19-131			→	← 19-132			→	19-133	
1. Test No.	19-129 [illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	2/17/77		2/17/77		2/17/77		2/17/77		2/18/77	
3. Time	826		841		942		1106		820	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.20		3.60		0.98		0.95		3.60	
9. NOx (hot) read/3% O_2 (ppm)*	193	195	202	209	143	128	150	135	199	206
10. NO (hot) read/3% O_2 (ppm)*	193	195	202	209	141	127	150	135	199	206
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	2	1	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	223	226	229	237	166	149	167	150	224	232
13. Carbon Dioxide (%)										
14. Carbon Monoxide (ppm) uncor/cor*	25	25	7	7	204	183	120	108	4	4
15. Hydrocarbon (ppm) uncor/cor*	5	5	5	5	18	16	10	9	12	12
16. Sulfur Dioxide (ppm) uncor/cor*	290	293	292	302	370	333	368	330	284	294
17. Smoke Spot (Bacharach)			0		2.5		3.0		0	
18. Atmos. Temp. (°F/°C)	15		15		17		20		10	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.11		30.12		30.12		30.12		30.17	
21. Relative Humidity (%)	58		51		51		45		70	
22. %S IN FUEL FROM SO_2	0.51		0.52		0.57		0.57		0.51	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.__________

Test No.__________ Date__________ Location 19 Engr. G. ... P. LANGSJOEN

Unit No.__________ Fuel #6 Capacity 17500

Unit Type DS 9-2 Burner Type WB 114.5 FABER

	19-134		19-135		19-136		19-137		19-138	
1. Test No.	~~19-132~~		~~19-133~~		~~19-134~~		~~19-135~~		~~19-135~~	
2. Date	2/18/77		2/18/77		2/18/77		2/18/77		2/18/77	
3. Time	1020		1044		121		145		200	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	1.5		1.54		1.65		2.3		2.3	
9. NOx (hot) read/3% O_2 (ppm)*	111	103	98	90	110	102	120	116	104	100
10. NO (hot) read/3% O_2 (ppm)*	110	102	96	89	109	101	120	116	104	100
11. NO_2 (hot) read/3% O_2 (ppm)*	1	1	2	1	1	1	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	127	117	111	103	126	117	138	133	120	116
13. Carbon Dioxide (%)									13.6	
14. Carbon Monoxide (ppm) uncor/cor*	88	81	700	647	756	238	60	58	86	83
15. Hydrocarbon (ppm) uncor/cor*	30	28	30	28	125	116	25	24	15	14
16. Sulfur Dioxide (ppm) uncor/cor*	310	285	—	—	364	339	334	321	330	318
17. Smoke Spot (Bacharach)	2.5		4		2.5		4		1.5	
18. Atmos. Temp. (°F/°C)	13		13		30		30		32	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.13		30.13		30.05		30.05		30.03	
21. Relative Humidity (%)	75		75		40		40		40	
22.	0.49		—		0.58		0.55		0.55	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA **Test No.**________

Test No.________ **Date**________ **Location** 19 **Engr.** SOTTER LANGSJOEN

Unit No.________ **Fuel** #6 **Capacity** 17,500

Unit Type DS9-2 **Burner Type** WB 114.5 FABER

1. Test No.	~~19-137~~ 19-139		~~19-138~~ 19-140		~~19-139~~ 19-141		~~19-140~~ 19-142		~~19-141 P~~ 19-143	
2. Date	2/18/77		2/18/77		2/18/77		2/21/77		2/21/77	
3. Time	2:17		2:50				09:15		10:00	
4. Load	14,500		14,500		14,500		14,500		14,500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	2.0		2.97		2.90		3.14		3.2	
9. NOx (hot) read/3% O_2 (ppm)*	128	121	132	132	108	107	200	201	131	133
10. NO (hot) read/3% O_2 (ppm)*	128	121	132	132	108	107	200	201	130	131
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	1	2
12. NO (cold) read/3% O_2 (ppm)*	145	137	148	147	123	122	225	227	148	149
13. Carbon Dioxide (%)	14.5		13.9		13.6		12.9		13.5	
14. Carbon Monoxide (ppm) uncor/cor*	80	76	20	20	680	676	8	8	24	24
15. Hydrocarbon (ppm) uncor/cor*	30	28	15	15	75	75	5	5	5	5
16. Sulfur Dioxide (ppm) uncor/cor*							340	343	300	303
17. Smoke Spot (Bacharach)	5		1.5		3		0		2.5	
18. Atmos. Temp. (°F/°C)	32		32		32		19			
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.03		30.03		30.01		29.83			
21. Relative Humidity (%)	40		40		38		65			
22. % SULFUR IN FUEL (FROM SO_2)							.59		.52	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. [illegible]

Unit No.________ Fuel #6, 2 Capacity 17,500

Unit Type DS 9-2 Burner Type WB 114.5 FABER

19-144 19-145 19-146

1. Test No.	~~19-141 I~~		[illegible]		[illegible]			
2. Date	2/21/77		2/21/77		2/22/77			
3. Time	1145		1440		838			
4. Load	14500		14500		14500			
5. Process Rate								
6. Flue Diam. or Size, ft	2.5		2.5		2.5			
7. Probe Position	CENTER		CENTER		CENTER			
8. Oxygen (%)	3.1		3.1		2.75			
9. NOx (hot) read/3% O_2 (ppm)*	128	129	125	126	105	104		
10. NO (hot) read/3% O_2 (ppm)*	128	129	—	—	105	104		
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	—	—	0	0		
12. NO (cold) read/3% O_2 (ppm)*	145	146	138	138	124	122		
13. Carbon Dioxide (%)	13.6		13.4					
14. Carbon Monoxide (ppm) uncor/cor*	32	32	60	60	16	16		
15. Hydrocarbon (ppm) uncor/cor*	5	5	—	—	11	11		
16. Sulfur Dioxide (ppm) uncor/cor*	300	302	320	322	104	103		
17. Smoke Spot (Bacharach)	3		—		0			
18. Atmos. Temp. (°F/°C)	23				24			
19. Dew Point Temp. (°F/°C)								
20. Atmos. Pressure (in. Hg)	29.89				29.85			
21. Relative Humidity (%)	45				67			
22. %S IN FUEL (FROM SO_2)	.52		.55		.18			
23.								
24.								
25.								
26.								
27.								
28.								
29.								
30.								

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. SOTTER [illegible]

Unit No.________ Fuel GAS Capacity 17500 #/hr STEAM

Unit Type________ Burner Type________

	19-147		19-148		19-149		19-150		19-151	
1. Test No.	~~19-143~~		~~19-144~~		~~19-145~~		~~19-146~~		~~19-147~~	
2. Date	2/22/77		2/22/77		2/22/77		2/22/77		2/22/77	
3. Time	10:15		10:40		11:00		11:20		11:35	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.03		7.00		1.85		1.05		0.90	
9. NOx (hot) read/3% O_2 (ppm)*	75	75	50	64	81	76	85	77	85	76
10. NO (hot) read/3% O_2 (ppm)*	75	75	50	64	81	76	83	75	84	75
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	2	2	1	1
12. NO (cold) read/3% O_2 (ppm)*	95	95	60	77	105	99	110	99	108	97
13. Carbon Dioxide (%)	10.2									
14. Carbon Monoxide (ppm) uncor/cor*	4	4	3	4	20	19	212	191	600	537
15. Hydrocarbon (ppm) uncor/cor*	4	4	10	13	5	5	4	4	4	4
16. Sulfur Dioxide (ppm) uncor/cor*	0	0	0	0	0	0	0	0	0	0
17. Smoke Spot (Bacharach)	0		0		0		0		0	
18. Atmos. Temp. (°F/°C)	25		25		25		25		25	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.83		29.83		29.81		29.81		29.81	
21. Relative Humidity (%)	57		57		63		63		63	
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. [illegible]

Unit No.________ Fuel GAS Capacity 17500 #/hr STEAM

Unit Type________ Burner Type________

	19-152	19-153	19-154	19-155	19-156
1. Test No.	~~19-148~~	~~19-149~~	~~19-150~~	~~19-151~~	~~19-152~~
2. Date	2/22/77	2/22/77	2/22/77	2/22/77	2/22/77
3. Time	13:30	1:38	1:42	1:50	2:15
4. Load	14500	14500	14500	14500	14500
5. Process Rate					
6. Flue Diam. or Size, ft	2.5	2.5	2.5	2.5	2.5
7. Probe Position	CENTER	CENTER	CENTER	CENTER	CENTER
8. Oxygen (%)	3.05	3.05	3.05	3.00	2.25
9. NOx (hot) read/3% O_2 (ppm)*	54 / 54			52 / 52	45 / 43
10. NO (hot) read/3% O_2 (ppm)*	54 / 54			52 / 52	45 / 43
11. NO_2 (hot) read/3% O_2 (ppm)*	0 / 0			0 / 0	0 / 0
12. NO (cold) read/3% O_2 (ppm)*	69 / 69	68 / 68	65 / 65	66 / 66	57 / 55
13. Carbon Dioxide (%)	9.7			9.9	10.2
14. Carbon Monoxide (ppm) uncor/cor*	24 / 24	22 / 22	16 / 16	48 / 48	680 / 653
15. Hydrocarbon (ppm) uncor/cor*	7 / 7			10 / 10	5 / 5
16. Sulfur Dioxide (ppm) uncor/cor*	0 / 0			0 / 0	0 / 0
17. Smoke Spot (Bacharach)					
18. Atmos. Temp. (°F/°C)	35	35	35	38	38
19. Dew Point Temp. (°F/°C)					
20. Atmos. Pressure (in. Hg)	29.74	29.74	29.74	29.72	29.72
21. Relative Humidity (%)	47	47	47	45	45
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr.________

Unit No.________ Fuel GAS #6 Capacity 17500

Unit Type________ Burner Type WEBER

	19-157	19-158	19-159		
1. Test No.					
2. Date	2/22/77	2/23/77	2/23/77	2/23/77	2/23/77
3. Time	2:25	8:20	9:40	10:40	11:40
4. Load	14500	14500	14500	14500	14500
5. Process Rate					
6. Flue Diam. or Size, ft	2.5	2.5	2.5	2.5	2.5
7. Probe Position	CENTER	CENTER	CENTER	CENTER	CENTER
8. Oxygen (%)	2.25	2.95	1.75	1.70	1.60
9. NOx (hot) read/3% O_2 (ppm)*	51 / 49	195 / 194	138 / 129	138 / 129	— / —
10. NO (hot) read/3% O_2 (ppm)*	51 / 49	195 / 194	138 / 129	138 / 129	— / —
11. NO_2 (hot) read/3% O_2 (ppm)*	0 / 0	0 / 0	0 / 0	0 / 0	— / —
12. NO (cold) read/3% O_2 (ppm)*	65 / 62	223 / 222	160 / 150	158 / 147	155 / 144
13. Carbon Dioxide (%)	9.5	13.6	14.5	14.6	14.8
14. Carbon Monoxide (ppm) uncor/cor*	28 / 27	24 / 24	96 / 90	80 / 75	152 / 141
15. Hydrocarbon (ppm) uncor/cor*	0 / 0	9 / 9	5 / 5	0 / 0	— / —
16. Sulfur Dioxide (ppm) uncor/cor*	0 / 0	310 / 309	344 / 322	360 / 336	— / —
17. Smoke Spot (Bacharach)	—	0	1.5	1.5	—
18. Atmos. Temp. (°F/°C)	38	37	41	44	44
19. Dew Point Temp. (°F/°C)					
20. Atmos. Pressure (in. Hg)	29.72	30.07	30.08	30.09	
21. Relative Humidity (%)	45	82	76	73	
22. % S IN FUEL (FROM SO_2)		.53	.55	.58	
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date__________ Location 19 Engr. [illegible]

Unit No.__________ Fuel #6 OIL + GAS Capacity 17500

Unit Type__________ Burner Type WEBER

	19-160		19-161		19-162		19-163		19-164	
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	2/23/77		2/23/77		2/23/77		2/23/77		2/24/77	
3. Time	2:15		2:35		3:00		3:20		8:05	
4. Load	14500		14500		14500		14500		14500	
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.02		3.00		3.00		3.00		2.8	
9. NOx (hot) read/3% O_2 (ppm)*	138	138	125	125	126	126	143	143	68	67
10. NO (hot) read/3% O_2 (ppm)*	138	138	125	125	126	126	143	143	68	67
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	158	158	143	143	143	143	163	163	91	90
13. Carbon Dioxide (%)			13.8		14.0		14.0		10.7	
14. Carbon Monoxide (ppm) uncor/cor*	64	64	88	88	132	132	52	52	18	18
15. Hydrocarbon (ppm) uncor/cor*	10	10	7	7	15	15	3	3	10	10
16. Sulfur Dioxide (ppm) uncor/cor*	330	330	340	340	340	340	340	340	0	0
17. Smoke Spot (Bacharach)	1.5		2		2.5		2.0			
18. Atmos. Temp. (°F/°C)	56								40	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.03								29.93	
21. Relative Humidity (%)										
22. %S CALCULATE FROM SO_2	.57		.59		.59		.59		0	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date Location 19 Engr.

Unit No. Fuel GAS Capacity 17500

Unit Type Burner Type

1. Test No.	19-165		19-166		19-167		19-168			
2. Date	2/24/77		2/24/77		2/24/77		2/24/77			
3. Time	9:00		9:15		9:30		10:00			
4. Load	14500		14500		14500		14500			
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5			
7. Probe Position	CENTER		CENTER		CENTER		CENTER			
8. Oxygen (%)	3.1		3.0		1.73		1.70			
9. NOx (hot) read/3% O_2 (ppm)*	66	66	68	68	57	53	58	54		
10. NO (hot) read/3% O_2 (ppm)*	66	66	68	68	57	53	58	54		
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0		
12. NO (cold) read/3% O_2 (ppm)*	84	84	86	86	73	68	75	70		
13. Carbon Dioxide (%)	10.6		10.5		11.3		11.3			
14. Carbon Monoxide (ppm) uncor/cor*	20	20	20	20	220	206	56	52		
15. Hydrocarbon (ppm) uncor/cor*	3	3	1	1	1	1	4			
16. Sulfur Dioxide (ppm) uncor/cor*	0	0	0	0	0	0	0			
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)	42									
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.90									
21. Relative Humidity (%)	82									
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should beformed if
the value is measured on a bas

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr.________

Unit No.________ Fuel #6 OIL Capacity 17500 #/hr STEAM

Unit Type________ Burner Type________

	19-169		← 19-170				→			
1. Test No.	19-165		19-167		→		→			
2. Date	3/1/77		3/1/77		→		→			
3. Time	0915		1035		1130		1400			
4. Load	14500		14500		14500		14500			
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5			
7. Probe Position	CENTER		CENTER		CENTER		CENTER			
8. Oxygen (%)	3.0		4.2		4.2		4.2			
9. NOx (hot) read/3% O_2 (ppm)*	185	185	135	145	136	146	134	144		
10. NO (hot) read/3% O_2 (ppm)*	185	185	135	145	136	146	134	144		
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0		
12. NO (cold) read/3% O_2 (ppm)*	215	215	150	161	152	163	153	164		
13. Carbon Dioxide (%)	14.0		13.2		13.3		13.2			
14. Carbon Monoxide (ppm) uncor/cor*	17	17	25	27	8	9	10	11		
15. Hydrocarbon (ppm) uncor/cor*	10	10	0	0	1	1	10	11		
16. Sulfur Dioxide (ppm) uncor/cor*	330	330	320	343	300	321	315	337		
17. Smoke Spot (Bacharach)			1.5		1.5		1.5			
18. Atmos. Temp. (°F/°C)	32/0		35/2		38/3		40/4			
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.99		29.98		29.94		29.89			
21. Relative Humidity (%)	65		45		40		37			
22. %S FROM SO_2	0.57		0.59		0.55		0.58			
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet b... not b... wet b...

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 3-2-77 Location 19 Engr. BWH

Unit No.________ Fuel N. G. Capacity 17500 #/hr

Unit Type________ Burner Type________

	19-171		19-172		19-173		19-174		19-175	
1. Test No.										
2. Date	3-2-77		3-2-77		3-2-77		3-2-77		3-2-77	
3. Time	1120		1157		1330		1345		1500	
4. Load										
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.2		3.05		2.9		3.1		1.5	
9. NOx (hot) read/3% O_2 (ppm)*	20	20	85	85	29	29	46	46	36	33
10. NO (hot) read/3% O_2 (ppm)*	20	20	85	85	29	29	46	46	36	33
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	24	24	102.5	102.7	35	35	56	56	46	42
13. Carbon Dioxide (%)	10.6		11.3		10.8		11.1		11.3	
14. Carbon Monoxide (ppm) uncor/cor*	20	20	22	22	12	12	14	14	96	89
15. Hydrocarbon (ppm) uncor/cor*	3	3	1	1	1	1	1	1	0	0
16. Sulfur Dioxide (ppm) uncor/cor*	0	0	0	0	0	0	0	0	0	0
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)	34/1		34/1		44/6		44/6		45/7	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.27		30.27		30.23		30.23		30.22	
21. Relative Humidity (%)	40		40		29		29		25	
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 3-2-77 Location 19 Engr. BWH

Unit No.________ Fuel N G Capacity 17500 #/hr

Unit Type________ Burner Type________

	19-176		19-177							
1. Test No.										
2. Date	3-2-77		3-2-77							
3. Time	1526		1541							
4. Load										
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5							
7. Probe Position	CENTER		CENTER							
8. Oxygen (%)	3.75		2.5							
9. NOx (hot) read/3% O_2 (ppm)*	26	27	19	18						
10. NO (hot) read/3% O_2 (ppm)*	26	27	19	18						
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0						
12. NO (cold) read/3% O_2 (ppm)*	32	33	23	22						
13. Carbon Dioxide (%)	10.0		10.6							
14. Carbon Monoxide (ppm) uncor/cor*	14	15	16	16						
15. Hydrocarbon (ppm) uncor/cor*	0	0	0	0						
16. Sulfur Dioxide (ppm) uncor/cor*	0	0	0	0						
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)	45/7		45/7							
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.22		30.22							
21. Relative Humidity (%)	25		25							
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BWH

Unit No.________ Fuel________ Capacity 17500 #/hr

Unit Type________ Burner Type________

	19-178				19-179					
1. Test No.										
2. Date	3-3-77		3-3-77		-		-		-	
3. Time	0820		1015		1120		1208		1337	
4. Load	14000									
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	2.7		3.6		3.6		3.5		3.4	
9. NOx (hot) read/3% O_2 (ppm)*	98	96	27	28	28	29	28	29	26	27
10. NO (hot) read/3% O_2 (ppm)*	98	96	27	28	28	29	28	29	26	27
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	113	111	32	33	32	33	32	33	30	31
13. Carbon Dioxide (%)	13.2		13.2		13.0		13.2		13.2	
14. Carbon Monoxide (ppm) uncor/cor*	10	10	18	19	16	17	18	19	18	18
15. Hydrocarbon (ppm) uncor/cor*	6	6	0	0	0	0	0	0	0	0
16. Sulfur Dioxide (ppm) uncor/cor*	60	59	80	83	90	93	80	82	80	82
17. Smoke Spot (Bacharach)	0		0		0		—		0	
18. Atmos. Temp. (°F/°C)	26/-3		35/2		40		45/7		48/9	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.36		30.35		30.34		30.32		30.30	
21. Relative Humidity (%)	71		54		42		34		27	
22. % S IN FUEL FROM SO_2	0.10		0.14		0.16		0.14		0.14	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ________

Test No. ________ Date 3-3-77 Location 19 Engr. BWH

Unit No. ________ Fuel #2 0il Capacity 17500 #/hr

Unit Type ________ Burner Type ________

5-19-179

1. Test No.						
2. Date	3-3-77					
3. Time	1440					
4. Load						
5. Process Rate						
6. Flue Diam. or Size, ft	2.5					
7. Probe Position	CENTER					
8. Oxygen (%)	3.9					
9. NOx (hot) read/3% O_2 (ppm)*	27	28				
10. NO (hot) read/3% O_2 (ppm)*	27	28				
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0				
12. NO (cold) read/3% O_2 (ppm)*	31	33				
13. Carbon Dioxide (%)	12.8					
14. Carbon Monoxide (ppm) uncor/cor*	16	17				
15. Hydrocarbon (ppm) uncor/cor*	2	2				
16. Sulfur Dioxide (ppm) uncor/cor*	90	95				
17. Smoke Spot (Bacharach)	—					
18. Atmos. Temp. (°F/°C)	50					
19. Dew Point Temp. (°F/°C)						
20. Atmos. Pressure (in. Hg)	30.27					
21. Relative Humidity (%)	20					
22. % S	0.16					
23.						
24.						
25.						
26.						
27.						
28.						
29.						
30.						

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BWH

Unit No.________ Fuel N.G. Capacity 17500 #/hr

Unit Type________ Burner Type________

	19-180		19-181		19-182		19-183		19-184	
1. Test No.	~~19-176~~		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	3/4/77		3/4/77		3/4/77		3/4/77		3/4/77	
3. Time	0800		0923		0934		0952		1002	
4. Load										
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	6.2		3.2		6.15		2.0		1.1	
9. NOx (hot) read/3% O_2 (ppm)*	55	67	73	74	57	69	78	74	78	71
10. NO (hot) read/3% O_2 (ppm)*	55	67	73	74	57	69	78	74	78	71
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	69	84	89	90	68	82	97	92	98	87
13. Carbon Dioxide (%)	9.5		11.0		9.4		11.8		12.0	
14. Carbon Monoxide (ppm) uncor/cor*	8	10	19	19	12	15	28	27	1100	995
15. Hydrocarbon (ppm) uncor/cor*	16	19	4	4	1	1	2	2	0	0
16. Sulfur Dioxide (ppm) uncor/cor*	40	49	0	0	0	0	0	0	0	0
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)	43/6		44/7		44/7		44/7		44/7	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.09		30.08		30.08		30.08		30.05	
21. Relative Humidity (%)	86		86		86		86		89	
22. % S	0.08		0		0		0		0	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BWH

Unit No.________ Fuel N. G. Capacity 17500 #/hr

Unit Type________ Burner Type________

	19-185		19-186		19-187		19-188		19-189	
1. Test No.										
2. Date	3/4/77		3/4/77		3/4/77		3/4/77		3/4/77	
3. Time	1045		1103		1350		1404		1423	
4. Load										
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.1		2.8		5.0		4.8		4.1	
9. NOx (hot) read/3% O_2 (ppm)*	44	44	40	40	16	18	16	18	22	23
10. NO (hot) read/3% O_2 (ppm)*	44	44	40	40	16	18	16	18	22	23
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	56	56	50	49	19.5	22	20	22	27	29
13. Carbon Dioxide (%)	11.3		11.0		9.7		9.7		10.2	
14. Carbon Monoxide (ppm) uncor/cor*	60	60	296	293	12	14	12	13	60	64
15. Hydrocarbon (ppm) uncor/cor*	0	0	0	0	0	0	0	0	0	0
16. Sulfur Dioxide (ppm) uncor/cor*	0	0	0	0	0	0	0	0	0	0
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)	44/7		46/8		48/9		48/9		48/9	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.05		30.02		29.87		29.87		28.87	
21. Relative Humidity (%)	89		89		90		90		90	
22. % S	0		0		0		0		0	
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 3/7/77 Location 19 Engr. BWH

Unit No.________ Fuel________ Capacity 17500 #/hr

Unit Type________ Burner Type________

	←19-190			→	19-191		←19-192			→
1. Test No.	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
2. Date	3/7/77		3/7/77		3/7/77		3/7/77		3/7/77	
3. Time	0943		1043		1335		1528		1615	
4. Load										
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5		2.5	
7. Probe Position	CENTER		CENTER		CENTER		CENTER		CENTER	
8. Oxygen (%)	3.3		3.2		2.8		4.2		4.1	
9. NOx (hot) read/3% O_2 (ppm)*	21	21	21	21	183	181	138	149	138	147
10. NO (hot) read/3% O_2 (ppm)*	21	21	21	21	183	181	138	149	138	147
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	26	26	26	26	203	201	153	164	155	165
13. Carbon Dioxide (%)	9.9		10.6		12.1		12.0		13.2	
14. Carbon Monoxide (ppm) uncor/cor*	18	18	14	14	28	28	16	17	16	17
15. Hydrocarbon (ppm) uncor/cor*	0	0	0	0	2	2	1	1	0	0
16. Sulfur Dioxide (ppm) uncor/cor*	20	20	20	20	340	336	300	321	320	341
17. Smoke Spot (Bacharach)	—		—		—		0		1.5	
18. Atmos. Temp. (°F/°C)	35/2		35/2		41/5		42/6		42/6	
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.07		30.07		30.03		30.01		30.01	
21. Relative Humidity (%)	72		72		47		39		39	
22. % S IN FUEL	0.04		0.04		0.58		0.55		0.59	
23.										
24.	HI RECIRC N.G.				BASELINE #6 OIL					
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 3/8/77 Location 19 Engr. BWH

Unit No.________ Fuel NG Capacity 17500 #/hr

Unit Type________ Burner Type________

19-193

1. Test No.	19-189									
2. Date	3/8/77									
3. Time	0925		0930		0935		0940		0945	
4. Load										
5. Process Rate										
6. Flue Diam. or Size, ft	2.5									
7. Probe Position	28" IN		23" IN		18" IN		13" IN		8" IN	
8. Oxygen (%)	3.25		3.2		3.2		3.2		3.2	
9. NOx (hot) read/3% O_2 (ppm)*	65	66	66	67	66	67	67	68	67	68
10. NO (hot) read/3% O_2 (ppm)*	65	66	66	67	66	67	67	68	67	68
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	82	83	82	83	83	84	82	83	82	83
13. Carbon Dioxide (%)	10.6		10.6		10.6		10.6		10.6	
14. Carbon Monoxide (ppm) uncor/cor*	24	24	23	23	22	22	24	24	24	24
15. Hydrocarbon (ppm) uncor/cor*	1	1	4	4	4	4	2	2	1	1
16. Sulfur Dioxide (ppm) uncor/cor*	—	—	20	20	10	10	10	10	20	20
17. Smoke Spot (Bacharach)	—		—		—		—		—	
18. Atmos. Temp. (°F/°C)										
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)										
21. Relative Humidity (%)										
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.____

Test No.____ Date____ Location 19 Engr. BWH

Unit No.____ Fuel N. G. Capacity 17500 #/hr

Unit Type____ Burner Type____

5- 19-193

1. Test No.										
2. Date	3/8/77		3/8/77		3/8/77		3/8/77			
3. Time	0950		1034		1120		1210			
4. Load										
5. Process Rate										
6. Flue Diam. or Size, ft	2.5		2.5		2.5		2.5			
7. Probe Position	3" IN		CENTER		CENTER		CENTER			
8. Oxygen (%)	3.4		3.3		3.3		3.3			
9. NOx (hot) read/3% O_2 (ppm)*	—	—	63	64	64	65	65	66		
10. NO (hot) read/3% O_2 (ppm)*	67	67	63	64	64	65	65	66		
11. NO_2 (hot) read/3% O_2 (ppm)*	—	—	0	0	0	0	0	0		
12. NO (cold) read/3% O_2 (ppm)*	82	83	80	81	80	81	81	82		
13. Carbon Dioxide (%)	10.4		10.6		10.4		10.6			
14. Carbon Monoxide (ppm) uncor/cor*	24	24	21	21	24	24	24	24		
15. Hydrocarbon (ppm) uncor/cor*	0	0	5	5	2	2	2	2		
16. Sulfur Dioxide (ppm) uncor/cor*	10	10	10	10	20	20	10	10		
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)			40/4		43/6		44/7			
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)			30.28		30.27		30.25			
21. Relative Humidity (%)			50		50		40			
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA — Test No. ________

Test No. 19-1-SASS Date 3-10-77 Location ________ Engr. BWH

[illegible] No. ________ Fuel #6 O.I Capacity 17500 #/hr

Unit Type ________ Burner Type ________

1. Test No.	19-1-SASS	→	→	→	→
2. Date	3-10-77	→	→	→	→
3. Time	1120	1200	1300	1406	1500
4. Load	14200				
5. Process Rate	—	—	—	—	—
6. Flue Diam. or Size, ft	2.5	2.5	2.5	2.5	2.5
7. Probe Position	Center	Center	Center	Center	Center
8. Oxygen (%)	2.8	2.8	3.1	2.8	2.8
9. NOx (hot) read/3% O_2 (ppm)	190 / 188	185 / 183	190 / 191	188 / 186	185 / 183
10. NO (hot) read/3% O_2 (ppm)	190 / 188	185 / 183	190 / 191	188 / 186	185 / 183
11. NO_2 (hot) read/3% O_2 (ppm)	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
12. NO (cold) read/3% O_2 (ppm)	213 / 211	210 / 208	216 / 217	213 / 211	214 / 212
13. Carbon Dioxide (%)	13.5	14.0	14.0	14.0	14.0
Carbon Monoxide (ppm) uncor/cor	18 / 18	18 / 18	16 / 16	18 / 18	18 / 18
15. Hydrocarbon (ppm) uncor/cor	0 / 0	3 / 3	1 / 1	1 / 1	0 / 0
16. Sulfur Dioxide (ppm) uncor/cor	340 / 336	360 / 356	360 / 362	360 / 356	340 / 336
17. Smoke Spot (Bacharach)	—	—	—	—	—
18. Atmos. Temp. (°F/°C)	56/13	60/16	70	68	68
19. Dew Point Temp. (°F/°C)			58	53	53
20. Atmos. Pressure (in. Hg)	30.21	30.20↓	30.2	30.17	30.17
21. Relative Humidity (%)	42	33	49	35	35
22. % S in Fuel	0.58	0.61	0.62	0.61	0.58
23.					
24.					
25.					
26.					
27.					
28.					
29.					

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ________

Test No. ________ Date 3/10/77 Location ________ Engr. RWH

I' 't No. ________ Fuel #6 Oil Capacity 17500 #/h.

Unit Type ________ Burner Type ________

1. Test No.	19-1-SASS					
2. Date	3/10/77					
3. Time	1600					
4. Load						
5. Process Rate	—					
6. Flue Diam. or Size, ft	2.5					
7. Probe Position	Center					
8. Oxygen (%)	3.1					
9. NOx (hot) read/3% O_2 (ppm)	193	194				
10. NO (hot) read/3% O_2 (ppm)	193	194				
11. NO_2 (hot) read/3% O_2 (ppm)	0	0				
12. NO (cold) read/3% O_2 (ppm)	218	219				
13. Carbon Dioxide (%)	13.8					
Carbon Monoxide (ppm) uncor/cor	16	16				
15. Hydrocarbon (ppm) uncor/cor	1	1				
16. Sulfur Dioxide (ppm) uncor/cor	340	342				
17. Smoke Spot (Bacharach)	0					
18. Atmos. Temp. (°F/°C)	69					
19. Dew Point Temp. (°F/°C)	54					
20. Atmos. Pressure (in. Hg)	30.17					
21. Relative Humidity (%)	36					
22. % S in Fuel	0.59					
23.						
24.						
25.						
26.						
27.						
28.						
29.						

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No. *19-2-SASS* Date *3/17/77* Location________________ Engr. *BWH*

·· it No.__________ Fuel *#6 Oil* Capacity *17500 #/hr steam*

Unit Type__________________ Burner Type__________________

1. Test No.	19-2-SASS		→							
2. Date	3/17/77		→							
3. Time	1000		1100		1200		1300		1400	
4. Load	14000		14500		14800		14900			
5. Process Rate	—		—		—		—		—	
6. Flue Diam. or Size, ft	2.5		→							
7. Probe Position	Center		→							
8. Oxygen (%)	3.2		2.9		2.8		2.7		3.0	
9. NOx (hot) read/3% O_2 (ppm)	224	227	210	209	208	206	218	214	215	215
10. NO (hot) read/3% O_2 (ppm)	221	224	210	209	208	205	218	214	215	215
11. NO_2 (hot) read/3% O_2 (ppm)	3	3	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)	248	251	238	237	238	235	245	241	240	240
13. Carbon Dioxide (%)	13.6		14.0		14.0		14.0		13.6	
Carbon Monoxide (ppm) uncor/cor	24	24	26	26	84	83	30	30	36	36
15. Hydrocarbon (ppm) uncor/cor	0	0	6	6	5	5	3	3	2	2
16. Sulfur Dioxide (ppm) uncor/cor	740	748	740	736	740	732	740	728	710	710
17. Smoke Spot (Bacharach)	1		0.5							
18. Atmos. Temp. (°F/°C)	39		41		44		46		48	
19. Dew Point Temp. (°F/°C)	35		34		38		38		38	
20. Atmos. Pressure (in. Hg)	29.99		29.99		29.98		29.97		29.93	
21. Relative Humidity (%)	67		49		57		47		38	
22. % S in Fuel	1.29		1.27		1.26		1.25		1.22	
23.										
24.										
25.	BASELINE SASS									
26.										
27.										
28.										
29.										

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ______

Test No. *19-1 SASS* Date *3/17/77* Location ______ Engr. *BWH*

Unit No. *1* Fuel *#6 Oil* Capacity *17500 #/hr steam*

Unit Type ______ Burner Type ______

1. Test No.	19-1 SASS					
2. Date	3/17/77					
3. Time	1450					
4. Load						
5. Process Rate	—					
6. Flue Diam. or Size, ft	2.5					
7. Probe Position	Center					
8. Oxygen (%)	3.2					
9. NOx (hot) read/3% O_2 (ppm)	219	221				
10. NO (hot) read/3% O_2 (ppm)	219	221				
11. NO_2 (hot) read/3% O_2 (ppm)	0	0				
12. NO (cold) read/3% O_2 (ppm)	255	258				
13. Carbon Dioxide (%)	13.6					
Carbon Monoxide (ppm) uncor/cor	24	24				
15. Hydrocarbon (ppm) uncor/cor	3	3				
16. Sulfur Dioxide (ppm) uncor/cor	730	738				
17. Smoke Spot (Bacharach)						
18. Atmos. Temp. (°F/°C)	50					
19. Dew Point Temp. (°F/°C)	40					
20. Atmos. Pressure (in. Hg)	29.92					
21. Relative Humidity (%)	40					
22. % S in Fuel	1.27					
23.						
24.	BASELINE SASS					
25.						
26.						
27.						
28.						
29.						

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 19-3-SASS Date 3/21/77 Location________ Engr. BWH

Unit No. 1 Fuel #6 Oil Capacity 17500 #/hr steam

Unit Type________ Burner Type________

~~1.~~ Test No.	19-3-SASS									
2. Date	3-21-77									
3. Time	1035		1130		1235		1330		1430	
4. Load										
5. Process Rate	—		—		—		—		—	
6. Flue Diam. or Size, ft	2.5									
7. Probe Position	Center									
8. Oxygen (%)	1.7		1.6		2.0		1.7		1.8	
9. NOx (hot) read/3% O_2 (ppm)	163	152	153	142	173	164	170	159	170	159
10. NO (hot) read/3% O_2 (ppm)	163	152	153	142	173	164	170	159	170	159
11. NO_2 (hot) read/3% O_2 (ppm)	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)	180	168	173	167	195	185	193	180	193	181
13. Carbon Dioxide (%)	14.4		14.4		14.8		14.4		14.4	
Carbon Monoxide (ppm) uncor/cor	240	224	470	436	40	38	125	117	80	75
15. Hydrocarbon (ppm) uncor/cor	3	3	5	5	0	0	3	3	—	—
16. Sulfur Dioxide (ppm) uncor/cor	780	727	800	742	740	701	780	727	760	713
17. Smoke Spot (Bacharach)	1.0		1.0		1.0		1.0		0.5	
18. Atmos. Temp. (°F/°C)	42		44		45		47		51	
19. Dew Point Temp. (°F/°C)	37		39		40		42		45	
20. Atmos. Pressure (in. Hg)	30.25		30.23		30.20		30.19		30.14	
21. Relative Humidity (%)	62		64		65		67		64	
22. % S in Fuel	1.25		1.28		1.21		1.25		1.23	
23.	MAX. RECIRC.	SASS								
24.		New #6 Oil Burner Tip								
25.										
26.										
27.										
28.										
29.										

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 3-21-77 Location________ Engr. BWH

T' 't No.________ Fuel #6 Oil Capacity 17500 #/hr steam

Unit Type________ Burner Type________

			Baseline				
1. Test No.	19-3 SASS		19-3				
2. Date	3-21-77		3-21-77				
3. Time	1530		1555				
4. Load							
5. Process Rate	—		—				
6. Flue Diam. or Size, ft	2.5		2.5				
7. Probe Position	Center		Center				
8. Oxygen (%)	1.2		2.85				
9. NOx (hot) read/3% O_2 (ppm)	168	158	237	234			
10. NO (hot) read/3% O_2 (ppm)	168	158	237	234			
11. NO_2 (hot) read/3% O_2 (ppm)	0	0	0	0			
12. NO (cold) read/3% O_2 (ppm)	193	181	273	270			
13. Carbon Dioxide (%)	14.4		13.8				
Carbon Monoxide (ppm) uncor/cor	85	80	16	16			
15. Hydrocarbon (ppm) uncor/cor	—	—	—	—			
16. Sulfur Dioxide (ppm) uncor/cor	760	713	720	712			
17. Smoke Spot (Bacharach)	0.5		0.5				
18. Atmos. Temp. (°F/°C)	50		50				
19. Dew Point Temp. (°F/°C)	43		43				
20. Atmos. Pressure (in. Hg)	30.12		30.12				
21. Relative Humidity (%)	56		56				
22. % S in Fuel	1.23		1.23				
23.	Max. Recirc. SASS		Baseline New #6 Oil + Burner Tip				
24.							
25.							
26.							
27.							
28.							
29.							

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 3-23-77 Location ________ Engr. BWH

Unit No. 1 Fuel #6 Oil Capacity 17500 #/hr steam

Unit Type ________ Burner Type Faber

1. Test No.	19.4 SASS									
2. Date	3-23-77									
3. Time	0930		1030		1140		1230		1340	
4. Load										
5. Process Rate	—		—		—		—			
6. Flue Diam. or Size, ft	2.5									
7. Probe Position	Center									
8. Oxygen (%)	1.5		1.5		1.3		1.9		1.5	
9. NOx (hot) read/3% O_2 (ppm)	163	150	163	150	158	144	180	170	168	155
10. NO (hot) read/3% O_2 (ppm)	163	150	163	150	158	144	180	170	165	152
11. NO_2 (hot) read/3% O_2 (ppm)	0	0	0	0	0	0	0	0	3	3
12. NO (cold) read/3% O_2 (ppm)	188	174	188	174	172	163	208	196	193	178
13. Carbon Dioxide (%)	14.4		14.6		14.4		14.2		14.4	
Carbon Monoxide (ppm) uncor/cor	128	118	120	111	238	208	28	26	104	96
15. Hydrocarbon (ppm) uncor/cor	—	—	—	—	—	—	—	—	—	—
16. Sulfur Dioxide (ppm) uncor/cor	710	655	710	655	680	621	720	679	700	646
17. Smoke Spot (Bacharach)	0.5		0.5		0.5		—		0.5	
18. Atmos. Temp. (°F/°C)	38		40		44		46		46	
19. Dew Point Temp. (°F/°C)	33		35		38		38		37	
20. Atmos. Pressure (in. Hg)	29.84		29.83		29.83		29.83		29.83	
21. Relative Humidity (%)	59		60		58		47		41	
22. % S in Fuel	1.13		1.13		1.07		1.17		1.11	
23.										
24.										
25.										
26.										
27.										
28.										
29.	MAX. RECIRC. MIN O_2 SASS									

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 3-23-77 Location________ Engr. BWK

Unit No.________ Fuel #6 Oil Capacity 17500 #/hr

Unit Type________ Burner Type________

			BASELINE				
1. Test No.	19-4 SASS		19-4				
2. Date	3-23-77		3-23-77				
3. Time	14:50		15:05				
4. Load							
5. Process Rate	—		—				
6. Flue Diam. or Size, ft	2.5		2.5				
7. Probe Position	Center		Center				
8. Oxygen (%)	1.25		2.8				
9. NOx (hot) read/3% O_2 (ppm)	165	150	240	237			
10. NO (hot) read/3% O_2 (ppm)	165	150	240	237			
11. NO_2 (hot) read/3% O_2 (ppm)	0	0	0	0			
12. NO (cold) read/3% O_2 (ppm)	190	173	265	262			
13. Carbon Dioxide (%)	14.4		13.8				
14. Carbon Monoxide (ppm) uncor/cor	112	102	22	22			
15. Hydrocarbon (ppm) uncor/cor	—	—	—	—			
16. Sulfur Dioxide (ppm) uncor/cor	700	638	640	633			
17. Smoke Spot (Bacharach)	—						
18. Atmos. Temp. (°F/°C)	47		47				
19. Dew Point Temp. (°F/°C)	37		37				
20. Atmos. Pressure (in. Hg)	29.83		29.83				
21. Relative Humidity (%)	37		37				
22. % S in Fuel	1.10		1.09				
23.							
24.							
25.							
26.	MAX RECIRC. MIN O_2 SASS		BASELINE				
27.							
28.							
29.							

Data Sheet 6002-2

UNIT OPERATING DATA

Test No.________ Date JAN. 77 Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17500 LB/HR

Test Comments 30" I.D. STACK ¼" WALL

	19-2	19-3	19-4	19-5	19-6
1. Test Number	19-3	~~19-3~~	~~19-3~~	~~19-3~~	19-3
2. Date	1/4/77	1/5/77	1/5/77	1/6/77	1/6/77
3. Time	15:15	11:20	15:00	09:45	10:45
4. Load lb/hr	14500	14300	14200	14000	14000
5. Test Purpose	TEST SERIES 1 BASELINE	#1 BASELINE O_2 TRAVERSE	#1 BASELINE V TRAVERSE	SO_x METHODS #1 BASELINE	→
6. Excess O_2 Condition	NOMINAL	NOM	NOM	NOM	NOM
7. Cont. Room O_2 (%)	—	—	—	—	—
8. Pres.Furn/Windbox(iwg)	0.3 / 1.6	0.25 / 1.5	0.25 / 1.4	0.20 / 1.3	0.20 / 1.3
9. Uptake (iwg)	-0.24	-0.26	-0.28	-0.28	-0.28
10. Final Stm Press (psig)	160 /	98 /	97 /	97 /	98 /
11. Drum Press (psig)	100	99	97	97	98
12. F. Water P/T (psig/°F)	220 / 224	220 / 223	222 / 224	218 / 223	218 / 223
13. Air FD Fan Amps	—	8.2	8.6	8.4	8.4
14. Air Temp @ FD Fan/CR (°F)	— /	75 /	90 /	77 /	79 /
15. Stack Temp (°F)	—	520	514	516	515
16. Fuel Flow (~~CFM or~~ GPM)	2.18	2.20	2.15	2.11	2.14
17. Fuel Pres/Temp (psi/°F)	114 / 52	120 / 52	118 / 54	122 / 53	122 / 54
18. Fuel Atom Pres (psig)	29	29	28	28.5	28.5
19. Primary Reg. Setting	-8 /	-8 /	-8 /	-8 /	-8 /
20. FGR Reg. Setting	— /	— /	— /	— /	— /
21. ΔP Pitot FGR Duct(iwg)	0	0	0	0	0
22. ΔP Orif. FGR Duct(iwg)	0	0	0	0	0
23. Temp. FGR Duct (°F)	—	—	—	—	—
24. Pstat FGR Duct (psig)	—	—	—	—	—
25. Pstat S.A. Fan (psig)	—	—	—	—	—
26. Vortex FD Fan Blades		40	40	40	40
27. Vortex SA Fan Blades		—	—	—	—
28. SA Depth/Flow (ft/cfm)	— / —	— / —	— / —	— / —	— / —
29. % FGR	—	—	—	—	—
30. Total Oil Burned #2/#6	/	— / —	— / —	— / —	— / —
31. Total Gas Burned	0	0	0	0	0
STEAM VENT RATE (lb/hr)	8000	6000	7000	5700	7000
TOTAL STEAM DUMPED	7500		35000		

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______________ Date 6 JAN 77 Location 19 Engr. SETTER

Fuel #2 OIL. Atom.Type AIR Capacity 17500 lb/hr

Test Comments ______________________________

	19-7	19-8	19-9	19-10	19-11
1. Test Number	~~19-3~~	~~19-~~	~~1-9~~	~~1-10~~	~~2-1~~
2. Date	1/6/77	1/6/77	1/7/77	1/10/77	1/10/77
3. Time	15:30	16:05	10:15	9:05	9:50
4. Load	14000	14000	14000	14200	14300
5. Test Purpose	BASELINE 1 IMPACTOR	→	BASELINE 1 CHECK	BASELINE 1 CHECK	HIGH O_2 (ADJ BURNER FUEL CAL)
6. Excess O_2 Condition	NOM	NOM	NOM	NOM	HI
7. Cont. Room O_2 (%)	—	—	—	2.5	4.3
8. Pres.Furn/Windbox(iwg)	0.25 / 1.3	0.25 / 1.3	0.25 / 1.4	0.32 / 1.8	0.60 / 2.4
9. Uptake (iwg)	-0.26	-0.26	-0.25	-0.24	-0.18
10. Final Stm Press (psig)	98	98	98	98	99
11. Drum Press (psig)	96	97	98	100	99
12. F. Water P/T (psig/°F)	223 / 225	221 / 225	221 / 225	218 / 226	218 / 226
13. Air FD Fan Amps	8.6	8.6	8.6	8.8	9.5
14. Air Temp @ FD Fan/CR (°F)	88	88	89	92	94
15. Stack Temp (°F)	511	511	507	513	533
16. Fuel Flow (~~CFM or~~ GPM)	2.11	2.14	2.13	2.22	2.20
17. Fuel Pres/Temp (psi/°F)	120	120 / 56	107 / 58	97 / 56	97 / 94
18. Fuel Atom Pres (psig)	28	28	28	28	28
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	—	—	—	—	—
21. ΔP Pitot FGR Duct(iwg)	0	0	0	0	0
22. ΔP Orif. FGR Duct(iwg)	0	0	0	0	0
23. Temp. FGR Duct (°F)	—	—	—	—	—
24. Pstat FGR Duct (psig)	—	—	—	—	—
25. Pstat S.A. Fan (psig)	—	—	—	—	—
26. F.D. FAN ΔP ~~Vortex FD Fan Blades~~	~~40~~	~~40~~	(1.18)	1.25	1.75
27. Vortex SA Fan Blades	—	—	—	—	—
28. SA Depth/Flow (ft/cfm)	— / —	— / —	— / —	— / —	— / —
29. % FGR	—	—	—	—	—
30. Total Oil Burned #2/#6	— / —	— / —	— / —	— / —	— / —
31. Total Gas Burned	0	0	0	0	0
STEAM VENT RATE (lb/hr)	6000	6000	6500	7000	6500
ATOMIZING AIR PRESS.(PSIG)			23.5	23.9	23.9

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.____ Date____ Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17500 lb/hr

Test Comments O_2 VAR

	19-12		19-13		19-14		19-15		19-16	
1. Test Number	~~2-2~~		~~2-3~~		~~4C-1~~		~~1-11~~		~~4A-11~~	
2. Date	10 JAN		10 JAN		10 JAN		11 JAN		11 JAN	
3. Time	10:30		10:50		11:35		9:30		9:55	
4. Load	14,300		14,400		14,200		14,200		14,500	
5. Test Purpose	OPT. O_2		BARELY VISIBLE SMOKE!		HI RECIRC		BASELINE #1		15% RECIRC	
6. Excess O_2 Condition	OPT.		MIN		3%		3%		3%	
7. Cont. Room O_2 (%)	0.2		0		2.1		2.3		2.4	
8. Pres.Furn/Windbox(iwg)	0.30	1.4	0.30	1.4	0.90	3.7	0.29	1.6	0.55	2.8
9. Uptake (iwg)	-0.2		-0.20		-0.19		-0.22		-0.21	
10. Final Stm Press (psig)	98		98		99		98		97	
11. Drum Press (psig)	99		100		99		98		97	
12. F. Water P/T (psig/°F)	218	226	215	226	215	224	218	224	218	
13. Air FD Fan Amps	8.1		8.1		9.2		8.5		8.8	
14. Air Temp @ FD Fan/CR (°F)	92		93		97		78		84	
15. Stack Temp (°F)	499		499		560		510		548	
16. Fuel Flow (~~CFM or~~ GPM)	2.14		2.17		2.20		2.23		2.18	
17. Fuel Pres/Temp (psi/°F)	107	56	107	56	122	58	122	40	122	40
18. Fuel Atom Pres (psig)	28.6		28.9		29.0		28.8		28.9	
19. Primary Reg. Setting	-8		-8		-8		-8		-8	
20. FGR Reg. Setting IN FROM FACE	—	—	—	—	1.0		4.25	CLOSED	3.3	
21. ΔP Pitot FGR Duct (iwg)	—		—		—		0.00		0.07	
22. ΔP Orif. FGR Duct (iwg)	—		—		0.70		0.00		0.20	
23. Temp. FGR Duct (°F)	—		113		520		105		476	
24. Pstat FGR Duct (psig)	—		—		—		0.46		5.5	
25. Pstat S.A. Fan (psig)	—		—		—		—		—	
26. ~~Vortex FD Fan Blades~~ F.D. FAN INLET ΔP, IWG	0.95		0.94		1.4		1.1		1.2	
27. Vortex SA Fan Blades	—		—		—		—		—	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	—	—	—	—
29. % FGR	—		—		—		—		—	
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned	0		0		0		0		0	
STEAM VENT, lb/hr	7000		7000		7000		5500		5300	
ATOM. AIR PRESS, PSIG	23.8		23.8		23.9		23.8		23.9	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17500 lb/hr

Test Comments ________

	19-17		19-18		19-19		19-20		19-21	
1. Test Number	~~4C-2~~		~~4B-1~~		~~4B-2~~		~~4A-2~~		~~4C-2~~	
2. Date	11 JAN		11 JAN		11 JAN		11 JAN		11 JAN	
3. Time	10:50		12:00		12:20		12:50		1:30	
4. Load	14400		14400		14400		14500		14500	
5. Test Purpose	MAX. RECIRC		MID RECIRC		MID RECIRC LOW O_2		LOW RECIRC LOW O_2		HI RECIRC	
6. Excess O_2 Condition	3%		3%		LOW		LOW		LOW	
7. Cont. Room O_2 (%)	1.9		2.5		0.6		0.4		0.75	
8. Pres.Furn/Windbox(iwg)	0.78	3.5	0.72	3.2	0.55	2.7	0.50	2.5	0.72	3.2
9. Uptake (iwg)	-0.20		-0.16		-0.22		-0.22		-0.21	
10. Final Stm Press (psig)	98		99		98		98		99	
11. Drum Press (psig)	99		99		100		98		99	
12. F. Water P/T (psig/°F)	218	225	218	226	220	226	220	226	218	225
13. Air FD Fan Amps	8.9		9.0		8.5		8.4		8.5	
14. Air Temp @ FD Fan/CR (°F)	89		92		92		94		95	
15. Stack Temp (°F)	560		557		548		541		552	
16. Fuel Flow (~~CPM or~~ GPM)	2.21		2.16		2.26		2.20		2.18	
17. Fuel Pres/Temp (psi/°F)	123	40	123	43	123	45	123	45	123	45
18. Fuel Atom Pres (psig)	29.0		29.2		29.2		29.2		29.1	
19. Primary Reg. Setting	-8		-8		-8		-8		-8	
20. FGR Reg. Setting IN	0.7		2.8		3.0		3.3		0.7	(MAX)
21. ΔP Pitot FGR Duct (iwg)	0.145		0.11		0.095		0.05		0.15	
22. ΔP Orif. FGR Duct (iwg)	0.75		0.40		0.36		0.19		0.80	
23. Temp. FGR Duct (°F)	515		510		510		510		518	
24. Pstat FGR Duct (~~psig~~ iwg)	4.3		4.6		~4.4		~4.8		2.4	
25. Pstat S.A. Fan (~~psig~~)	—		—		—		—		—	
26. Vortex FD Fan ~~Blades~~ ΔP	1.2		1.2		1.0		1.0		1.0	
27. Vortex SA Fan Blades	—		—		—		—		—	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	—	—	—	—
29. % FGR	—		—		—		—		—	
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned	0		0		0		0		0	
STEAM VENT RATE, lb/hr	5500		5500		5500		5500		5600	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 Engr. G. SOTTER

Fuel #2 OIL Atom. Type AIR Capacity 17,500 lb/hr

Test Comments

	19-22		19-23		19-24		19-25		19-26	
1. Test Number	~~1-12~~		~~3-0a~~		~~3-0b~~		~~3-0c~~		~~3-0d~~	
2. Date	12 JAN 76		12 JAN 76		12 JAN 76		12 JAN 76		12 JAN 76	
3. Time	7:45		8:45		9:00		9:10		9:30	
4. Load	14,000		14,000		14,000		14,300		14,000	
5. Test Purpose	BASELINE CHECK		2° AIR CALIBRATION		→		→		→	
6. Excess O_2 Condition	NOM		HI		HI		HI		HI	
7. Cont. Room O_2 (%)	3.3		6.5		5.5		5.0		7.0	
8. Pres.Furn/Windbox(iwg)	0.20	1.6	0.5	1.7	0.45	1.7	0.40	1.7	0.55	1.75
9. Uptake (iwg)	-0.26		-0.20		-0.20		-0.22		-0.20	
10. Final Stm Press (psig)	97		97		97		94		98	
11. Drum Press (psig)	98		98		99		99		99	
12. F. Water P/T (psig/°F)	220	224	212	224	215	224	205	224	218	230
13. Air FD Fan Amps	8.5		8.4		8.4		8.4		8.4	
14. Air Temp @ FD Fan/CR(°F)	72		80		80		81		81	
15. Stack Temp (°F)	505		527		525		522		528	
16. Fuel Flow (~~CFM~~ or GPM)	2.20		2.15		2.16		2.18		2.19	
17. Fuel Pres/Temp(psi/°F)	115	47	115	47	115	47	115	47	115	47
18. Fuel Atom Pres (psig)	29		29		30		30		30	
19. Primary Reg. Setting	-8		-8		-8		-8		-8	
20. FGR Reg. Setting	C	(CLOSED)	C		C		C		C	
21. ΔP Pitot FGR Duct(iwg)	—		—		—		—		—	
22. ΔP Orif. FGR Duct(iwg)	—		0.0		-0.01		-0.01		—	
23. Temp. FGR Duct (°F)	—		95		95		98		98	
24. Pstat FGR Duct (psig)	0.0		0.0		0.0		0.0		0.0	
25. Pstat S.A. ~~Fan~~ LEVEL ~~(psig)~~ IWG	0		4.2		3.0		2.0		5.4 MAX	
26. Vortex FD Fan ~~Blades~~ ΔP, iwg	1.1		1.1		1.1		1.1		1.1	
27. Vortex SA Fan ~~Blades~~ OUTLET STATIC ΔP IWG	—		—		—		11.0		10.5	
28. SA Depth/Flow (ft/cfm)	—	—	5		5		5		5	
29. % FGR	0		0		0		0		0	
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned	0		0		0		0		0	
STEAM VENT RATE, LB/HR	5500		5500		5000		6000		5500	
ATOMIZING AIR PRESS, PSIG	24.1		24.1		24.1		24.1		24.1	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #2 DIESEL Atom. Type AIR Capacity 17,500 LB

Test Comments________

	19-27	19-28	19-29	19-30	19-31
1. Test Number	~~3-0e~~	~~3A1a~~	~~3B1a~~	~~3C1a~~	~~3D1a~~
2. Date	12 JAN 77	12 JAN 77	12 JAN 77	12 JAN 77	12 JAN 77
3. Time	9:45	12:30	12:45	1:00	1:10
4. Load	14,000	14,000	14,500	14,500	14,500
5. Test Purpose	2° AIR CAL PROBE FULL IN	TSC 4' Φ=1.2	TSC 5'	TSC 6'	6' 11"
6. Excess O_2 Condition	HI	NOM	NOM	NOM	NOM
7. Cont. Room O_2 (%)	6.7	2.8	2.8	2.8	2.7
8. Pres.Furn/Windbox(iwg)	0.57 / 1.8	0.30 / 1.2	0.28 / 1.2	0.28 / 1.2	0.3 / 1.2
9. Uptake (iwg)	-0.20	-0.20	-0.22	-0.22	-0.22
10. Final Stm Press (psig)	98	98	96	97	97
11. Drum Press (psig)	100	98	97	98	97
12. F. Water P/T (psig/°F)	205	223 / 224	221 / 224	220 / 224	220 / 224
13. Air FD Fan Amps	8.5	8.0	8.0	7.9	7.9
14. Air Temp @ FD Fan/CR (°F)	82	82	84	82	82
15. Stack Temp (°F)	526	496	495	493	492
16. Fuel Flow (CFM or GPM)	2.17	2.13	2.11	2.12	2.10
17. Fuel Pres/Temp (psi/°F)	115	115 / 48	115 / 48	115 / 48	115 / 48
18. Fuel Atom Pres (psig)	—	28	28	28	28
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	C	C	C	C	C
21. ΔP Pitot FGR Duct (iwg)	—	—	—	—	—
22. ΔP Orif. FGR Duct (iwg)	—	-0.15	—	—	—
23. Temp. FGR Duct (°F)	—	105	—	—	—
24. Pstat FGR Duct (psig)	—	0.0	—	—	—
25. Pstat S.A. ~~Fan (psig)~~ LANCE, IWG	5.6	2.9	3.0	3.2	3.4
26. Vortex FD Fan ΔP ~~Blades~~	1.1	0.68	0.68	0.68	0.68
27. Vortex SA Fan P STATIC ~~Blades~~	10.5	10.9	10.9	10.9	10.9
28. SA Depth/Flow (ft/cfm)	FULL IN	4.0	5.0	6.0	6'11"
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	—	—	—	—	—
31. Total Gas Burned	0	0	0	0	0
STEAM VENT RATE, LB/HR	—	5000	5500	5500	5300
ATOMIZING AIR PRESS, PSIG	—	24.0	23.9	24.0	23.9

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SCTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments

	19-32		19-33		19-34		19-35		19-36	
1. Test Number	3D1B		~~3C1B~~		~~3C1b~~		~~3A1b~~		~~3D2a~~	
2. Date	12 JAN 77		12 JAN 77		→		→		→	
3. Time	1:30		1:45		1:55		2:10		2:40	
4. Load	14,400		14,300		14,200		14,200		14,200	
5. Test Purpose	TSC 7' ϕ = 1.3		TSC 6' ϕ = 1.3		TSC 5' ϕ = 1.3		TSC 4' ϕ = 1.3		TSC 7' ϕ = 1.2	
6. Excess O_2 Condition	NOM		NOM		NOM		NOM		LO	
7. Cont. Room O_2 (%)	2.7		2.7		2.7		2.8		1.5	
8. Pres.Furn/Windbox(iwg)	0.28	1.0	0.28	1.0	0.30	1.0	0.30	1.0	0.22	1.2
9. Uptake (iwg)	-0.20		-0.21		-0.20		-0.20		-0.22	
10. Final Stm Press (psig)	97		97		97		98		98	
11. Drum Press (psig)	97		98		100		98		98	
12. F. Water P/T (psig/°F)	220	224	218	224	216	224	219	225	219	
13. Air FD Fan Amps	7.6		7.6		7.6		7.6		8.1	
14. Air Temp @ FD Fan/CR(°F)	83		85		84		85		82	
15. Stack Temp (°F)	483		488		490		492		498	
16. Fuel Flow (CFM or GPM)	2.14		2.11		2.15		2.14		2.12	
17. Fuel Pres/Temp(psi/°F)	115	48	115	49	115	48	115	49	115	49
18. Fuel Atom Pres (psig)	28		28		28		28		28	
19. Primary Reg. Setting	-8		-8		-8		-8		-8	
20. FGR Reg. Setting	C		C		C		C		C	
21. ΔP Pitot FGR Duct(iwg)	—		—		—		—		0.0	
22. ΔP Orif. FGR Duct(iwg)	—		—		—		—		-0.02	
23. Temp. FGR Duct (°F)	—		—		—		—		107	
24. Pstat FGR Duct (psig)	—		0.0		—		—		—	
25. Pstat S.A. ~~Fan (psig)~~ LANCE SWG	5.6		5.4		5.2		4.9		0.8	
26. Vortex FD Fan ~~Blades~~ ΔP	0.56		0.56		0.56		0.56		0.79	
27. Vortex SA Fan ~~Blades~~ Ps	10.5		10.5		10.5		10.4		10.9	
28. SA Depth/Flow (ft/cfm)	6'11"		6'		5'		4'		6'11"	
29. % FGR	0		0		0		0		0	
30. Total Oil Burned #2/#6										
31. Total Gas Burned	0		0		0		0		0	
S. VENT LB/HR	5500		5500		5500		5500		5600	
AT. AIR PRESS.	24.0		24.0		24.0		24.0		24.0	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr.______

Fuel #2 OR #6 OIL Atom.Type AIR Capacity 17500 LB/HR

Test Comments ______

	19-37	NO. 2 ←→ 19-38	NO. 6 19-39	19-40	19-41
1. Test Number	3C2a	~~1-13~~	~~11-1~~	~~12-1~~	12-2
2. Date	12 JAN 77	13 JAN 77	14 JAN 77	14 JAN 77	14 JAN 77
3. Time	2:50	8:45	11:15	2:45	15:25
4. Load	14,250	14,000	14,100	14,200	14,000
5. Test Purpose	TSC 6 $\phi = 1.2$	BASELINE #2 OIL	BASELINE #6 OIL	MED O_2	HI O_2
6. Excess O_2 Condition	LO	NOM	NOM	NOM	HI
7. Cont. Room O_2 (%)	1.7	—	3.4	3.6	5.0
8. Pres.Furn/Windbox(iwg)	0.25 / 1.2	0.20 / 1.2	0.25 / 1.6	0.35 / 1.8	0.48 / 2.1
9. Uptake (iwg)	−0.20	−0.24	−0.22	−0.22	−0.22
10. Final Stm Press (psig)	97	98	97	97	98
11. Drum Press (psig)	100	98	97	97	98
12. F. Water P/T (psig/°F)	220 / 226	215 / 226	219 / 226	224 / 226	225 / 224
13. Air FD Fan Amps	8.0	8.5	8.4	8.8	9.4
14. Air Temp @ FD Fan/CR (°F)	84	76	80	91	90
15. Stack Temp (°F)	498	499	500	500	512
16. Fuel Flow (~~CFM or~~ GPM)	2.16	2.14	2.22	2.19	2.13
17. Fuel Pres/Temp (psi/°F)	115 / 48	119 / 50	128 / 194	125 / 194	119 / 193
18. Fuel Atom Pres (psig)	28	28	33	33	33
19. Primary Reg. Setting	−8	−8	−8	−8	−8
20. FGR Reg. Setting	C	C	C	C	C
21. ΔP Pitot FGR Duct(iwg)	—	—	−0.05	—	—
22. ΔP Orif. FGR Duct(iwg)	—	—	−0.01	—	—
23. Temp. FGR Duct (°F)	—	95	110	—	—
24. Pstat FGR Duct (psig)	—	+0.4	—	—	—
25. Pstat S.A. Fan ~~(psig)~~	10.9	0	0	0	—
26. Vortex FD Fan ~~Blades~~ ΔP, IWG	0.79	1.1	1.1	1.2	1.4
27. Vortex SA Fan ~~Blades~~ Ps	—	0	0	0	0
28. SA Depth/Flow (ft/cfm)	6'	— / —	— / —	— / —	— / —
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	— / —	— / —	— / —	— / —	— / —
31. Total Gas Burned	0	0	0	0	0
ST. VENT LB/HR	5600	5500	5300	6000	5900
AT AIR PRESS, PSIG	24.0	24.2	26.9	26.8	26.5

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19______ Engr.______

Fuel #6 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ______

	19-42		19-43		19-44		19-45		19-46	
1. Test Number	12-3		12-4		11-2		14A-1		14A-1a	
2. Date	14 JAN 77		14 JAN 77		15 JAN 77		15 JAN 77		15 JAN 77	
3. Time	15:50		16:30		08:15		09:10		9:45	
4. Load	14,400		14,500		14,200		14,300		14,300	
5. Test Purpose	CO		SMOKE		BASELINE PT. 11		LO RECIRC		REPEAT PREV AS CHECK	
6. Excess O_2 Condition	LO		LOW		NOM		NOM		NOM	
7. Cont. Room O_2 (%)	0.80		0.70		—		—		—	
8. Pres.Furn/Windbox(iwg)	0.25	1.55	0.20	1.65	0.40	1.70	0.70	3.0	0.70	3.0
9. Uptake (iwg)	-0.22		-0.21		-0.21		-0.20		-0.20	
10. Final Stm Press (psig)	100		100		99		97		97	
11. Drum Press (psig)	98		98		105		99		99	
12. F. Water P/T (psig/°F)	222	226	225	226	218	LOW WATER	218	214	218	218
13. Air FD Fan Amps	8.6		8.5		8.8		9.1		9.2	
14. Air Temp @ FD Fan/CR(°F)	90		88		90		95		97	
15. Stack Temp (°F)	491		492		540		563		563	
16. Fuel Flow (~~CFM or~~ GPM)	2.21		2.22		2.27		2.30		2.27	
17. Fuel Pres/Temp(psi/°F)	128	194	129	194	120		195	196	120	
18. Fuel Atom Pres (psig)	34		34		33		33		33	
19. Primary Reg. Setting	-8		+6		-8		-8		-8	
20. FGR Reg. Setting	C		C		C		C		C	
21. ΔP Pitot FGR Duct(iwg)	—		—		0.0		+0.20		+0.10	
22. ΔP Orif. FGR Duct(iwg)	—		—		-0.02		+0.20		0.195	
23. Temp. FGR Duct (°F)	—		—		115		508		511	
24. Pstat FGR Duct (psig)	—		—		0.05		5.4		5.4	
25. Pstat S.A. Fan (psig)	—		—		—		—		—	
26. Vortex FD Fan ~~Blades~~ ΔP	0.89		0.86		1.25		1.30		1.30	
27. Vortex SA Fan Blades	—		—		—		—		—	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	—	—	—	—
29. % FGR	0		0		0		0		0	
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned	0		0		0		0		0	
STEAM VENT, LB/HR	5800		6500		5800		4500		4500	
ATOM AIR PRESS, PSIG	26.9		27.0		26.5		26.9		26.9	
DIFFUSER POS.	3"		3"		3"		3		3	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SCTTEL

Fuel #6 OIL . Atom.Type AIR Capacity 17,500

Test Comments

	19-47	19-48	19-49	19-50	19-51
1. Test Number	~~14B-1~~	~~14C-1~~	~~14C-2~~	~~14B-2~~	~~14A-2~~
2. Date	15 JAN 77	15 JAN 77	15 JAN 77	15 JAN 77	15 JAN 77
3. Time	10:20	10:45	11:10	11:30	11:45
4. Load	14,300	14,300	14,500	14 500	14 400
5. Test Purpose	MED RECIRC	HI RECIRC	HI RECIRC WITH CO	MED. REC. WITH CO	LO RECIRC WITH CO
6. Excess O_2 Condition	NOM	NOM	LO	LO	LO
7. Cont. Room O_2 (%)					
8. Pres.Furn/Windbox(iwg)	0.8 / 3.3	0.9 / 3.3	0.75 / 3.3	0.62 / 2.8	0.5 /
9. Uptake (iwg)	-0.20	-0.20	-0.20	-0.22	-0.22
10. Final Stm Press (psig)	98	99	99	99	98
11. Drum Press (psig)	100	100	99	99	100
12. F. Water P/T (psig/°F)	217 / 224	217 /	220 / 224	218 / 224	215 / 224
13. Air FD Fan Amps	9.2	9.4	8.8	8.8	8.9
14. Air Temp @ FD Fan/CR (°F)	97 /	97 /	98 /	97 /	99 /
15. Stack Temp (°F)	568	571	562	557	550
16. Fuel Flow (~~CFM~~ or GPM)	2.24	2.26	2.31	2.26	2.30
17. Fuel Pres/Temp (psi/°F)	120 / 196	121 / 196	120 / 196	121 / 196	120 / 196
18. Fuel Atom Pres (psig)	33	33	33	33	33
19. Primary Reg. Setting	-8 /	-8 /	-8 /	-8 /	-8 /
20. FGR Reg. Setting, IN. FACE TO HANDLE	2 7/8 /	3/4 / MAX	3/4 / MAX	3 /	3 /
21. ΔP Pitot FGR Duct(iwg)	0.1	0.2 - 0.6 RAPID	0.1	0.07	0.03
22. ΔP Orif. FGR Duct(iwg)	0.40	0.74	0.82	0.36	0.18
23. Temp. FGR Duct (°F)	547	540	535	515	500
24. Pstat FGR Duct ~~(psig)~~	5.0	4.5	4.4	5.1	5.5
25. Pstat S.A. Fan (psig)	—	—		—	—
26. Vortex FD Fan Blades	—	1.4	1.05	1.05	1.03
27. Vortex SA Fan Blades	—	—	—	—	—
28. SA Depth/Flow (ft/cfm)	— / —	— / —	— / —	— / —	— / —
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	— / —	— / —	— / —	— / —	— / —
31. Total Gas Burned	0	0	0	0	0
STEAM VENT RATE, LB/HR	6000	6100	7000	6500	6100
ATOM. AIR PRESS, PSIG	26.9	26.9	27.0	27.0	27.0
DIFFUSER POS.	3"	3"	3"	3	3

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #2 Atom. Type AIR Capacity 17,500 LB/HR

Test Comments

	19-52	19-53	19-54	19-55	19-56
1. Test Number	~~0-2~~	~~1-14~~	~~541a~~	~~551a~~	~~561a~~
2. Date	17 JAN 77	17 JAN 77	17 JAN 77	17 JAN 77	17 JAN 77
3. Time	11:30	14:10	15:00	15:15	15:30
4. Load	10,000	14,500	14,200	14,200	14,200
5. Test Purpose	EXTRA - FOR LOW AIR FLOW	#2 BASELINE	#2 ϕ=1.2 LOW RECIRC	→	→
6. Excess O_2 Condition	NOM	NOM	NOM	NOM	NOM
7. Cont. Room O_2 (%)	4.2	3.8	3.0	3.0	2.8
8. Pres.Furn/Windbox(iwg)	0.0 / 1.0	0.32 / 1.7	0.50 / 2.2	0.50 / 2.2	0.50 / 2.3
9. Uptake (iwg)	-0.25	-0.23	-0.23	-0.23	-0.23
10. Final Stm Press (psig)	100	99	99	99	99
11. Drum Press (psig)	99	93	98	100	95
12. F. Water P/T (psig/°F)	225 / 220	223 / 222	223 / 222	223 / 222	223 / 222
13. Air FD Fan Amps	7.4	8.1	7.6	7.6	7.8
14. Air Temp @ FD Fan/CR(°F)	77	76	85	84	84
15. Stack Temp (°F)	481	518	551	550	550
16. Fuel Flow (CFM or GPM)	1.76	2.07	2.09	2.07	2.15
17. Fuel Pres/Temp(psi/°F)	114 / 52	113 / 52	114 / 54	114 / 54	114 / 54
18. Fuel Atom Pres (psig)	23	28	28	28	28
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	C	C	3.4	3.4	3.4
21. ΔP Pitot FGR Duct(iwg)	—	—	0.115	0.115	0.113
22. ΔP Orif. FGR Duct(iwg)	—	—	0.20	0.19	0.19
23. Temp. FGR Duct (°F)	93	97	500	500	500
24. Pstat FGR Duct (psig)	+0.25	0.0	5.3	5.3	5.3
25. Pstat S.A. Fan (psig)	—	—	2.9	3.1	3.3
26. Vortex FD Fan Blades	0.77	1.22	0.68	0.68	0.68
27. Vortex SA Fan Blades	—	—	10.6	10.6	10.6
28. SA Depth/Flow (ft/cfm)	—	—	4	6	6'11"
29. % FGR	0	0			
30. Total Oil Burned #2/#6	—	—	—	—	—
31. Total Gas Burned	0	0	0	0	0
STEAM VENT RATE, LB/HR		5300	4900	4900	4900
ATOM AIR PRESS, PSIG	21.0	24.0	24.0	24.0	24.0

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19________ Engr.________

Fuel #2 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments P_{STAT} ON FGR DUCT FLUCTUATES ± ½ IN.

	19-57		19-58		19-59		19-60		19-61	
1. Test Number	5I1a		~~5F1a~~		~~5C1A~~		~~5J1a~~		5A2b	
2. Date	17 JAN 77		17 JAN 77		17 JAN 77		17 JAN 77		18 JAN 77	
3. Time	15:55		16:05		16:15		16:30		10:15	
4. Load	14,000		14,200		14,100		14,500		14,000	
5. Test Purpose	MAX RECIRC φ=1.2		→		→		LOW (12%) RECIRC		13% FGR φ=1.35	
6. Excess O_2 Condition	NOM		NOM		NOM		NOM		LO (CO)	
7. Cont. Room O_2 (%)	3.0		2.8		3.0		3.0		1.5	
8. Pres.Furn/Windbox(iwg)	0.80	3.0	0.79	3.0	0.79	3.0	0.55	2.3	0.50	2.2
9. Uptake (iwg)	-0.20		-0.20		-0.21		-0.22		-0.22	
10. Final Stm Press (psig)	99		99		100		100		95	
11. Drum Press (psig)	97		97		98		98		96	
12. F. Water P/T (psig/°F)	223	222	223	222	224	224	224	224	210	222
13. Air FD Fan Amps	8.0		8.0		8.0		7.9		8.0	
14. Air Temp @ FD Fan/CR(°F)	83		84		86		87		82	
15. Stack Temp (°F)	563		563		568		555		541	
16. Fuel Flow (~~CFM or~~ GPM)	2.09		2.15		2.10		2.17		2.22	
17. Fuel Pres/Temp(psi/°F)	114	54	114	55	114	54	114	54	116	54
18. Fuel Atom Pres (psig)	28		28		28		28		29	
19. Primary Reg. Setting	-8		-8		-8		-8		-8	
20. FGR Reg. Setting	MAX		MAX		MAX		3.4		3.4	
21. ΔP Pitot FGR Duct(iwg)	0.24		0.24		0.24		0.110		0.09	
22. ΔP Orif. FGR Duct(iwg)	0.78		0.78		0.78		0.17		0.18	
23. Temp. FGR Duct (°F)	535		535		540		505		485	
24. Pstat FGR Duct (psig)	4.0		3.9		3.4		4.4		4.3	
25. Pstat S.A. Fan (~~psig~~)	3.4		3.3		3.1		2.9		2.7	
26. Vortex FD Fan Blades	0.76		0.76		0.76		0.71		0.70	
27. Vortex SA Fan ~~Blades~~ ΔP	10.6		10.6		10.6		10.6		10.8	
28. SA Depth/Flow (ft/cfm)	6'11"		6'		4'		4'		4'	
29. % FGR										
30. Total Oil Burned #2/#6										
31. Total Gas Burned	0		0		0		0		0	
	4900		5000		5000		4900		6000	
	24.0		24.0		24.0		24.0		24.9	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 Engr. SOTTER

Fuel #2 OIL Atom. Type AIR (LOW-PRESS) Capacity 17,500 LB/HR

Test Comments ______

	19-62	19-63	19-64	19-65	19-66
1. Test Number	562b	~~512b~~	~~562b~~	~~562c~~	512c
2. Date	18 JAN 77	→	→	→	→
3. Time	10:35	10:55	11:10	11:30	11:45
4. Load	14,000	14,100	14,100	14,500	
5. Test Purpose	15% FGR $\phi = 1.35$	MAX FGR $\phi = 1.35$	→	MAX FGR $\phi = 1.5$	MAX FGR $\phi = 1.5$
6. Excess O_2 Condition	LO (CO)	LO (CO)	LO (CO)	LO (CO)	LO (CO)
7. Cont. Room O_2 (%)	1.4	1.7	1.5	1.9	1.9
8. Pres. Furn/Windbox (iwg)	0.50 / 2.2	0.78 / 3.0	0.80 / 3.0	0.80 / 3.0	0.80 / 3.0
9. Uptake (iwg)	−0.22	−0.21	−0.21	−0.21	−0.20
10. Final Stm Press (psig)	94	94	94	94	94
11. Drum Press (psig)	95	95	95	95	94
12. F. Water P/T (psig/°F)	212 / 222	210 / 222	210 / 222	215 / 222	215 / 222
13. Air FD Fan Amps	8.0	8.4	8.4	8.0	8.3
14. Air Temp @ FD Fan/CR (°F)	82	82	85	89	87
15. Stack Temp (°F)	542	559	560	560	560
16. Fuel Flow (CFM or GPM)	2.29	2.21	2.29	2.19	2.21
17. Fuel Pres/Temp (psi/°F)	116 / 54	116 / 55	116 / 54	116 / 55	117 / 55
18. Fuel Atom Pres (psig)	29	29	29	29	29
19. Primary Reg. Setting	−8	−8	−8	−8	−8
20. FGR Reg. Setting	3.4	MAX	MAX	MAX	MAX
21. ΔP Pitot FGR Duct (iwg)	0.09	0.20	0.20	0.20	0.20
22. ΔP Orif. FGR Duct (iwg)	0.18	0.79	0.79	0.80	0.80
23. Temp. FGR Duct (°F)	490	529	532	533	535
24. Pstat FGR Duct (psig)	3.9	4.2	4.2	4.2	4.3
25. Pstat S.A. Fan (psig)	3.2	3.2	2.9	4.6	5.1
26. Vortex FD Fan ~~Blades~~ ΔP	0.69	0.79	0.79	0.66	0.66
27. Vortex SA Fan Blades	10.8	10.75	10.7	10.4	10.4
28. SA Depth/Flow (ft/cfm)	7′	7′	4′	4′	7′
29. % FGR					
30. Total Oil Burned #2/#6					
31. Total Gas Burned	0	0	0	0	0
	6300	5700	5700	5700	5700
	24.9	24.9	25.0	25.0	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SETTER

Fuel #2 + #6 Atom.Type AIR Capacity 17,500 LB/HR

Test Comments

	#2 OIL 19-69	19-68	#6 OIL → 19-69	19-70	19-71
1. Test Number	~~'G2C~~	~~5A2C~~	~~#3~~	~~132.1b~~	~~13B1b~~
2. Date	18 JAN 77	→	→	→	→
3. Time	12:05	12:20	14:05	15:30	15:55
4. Load	14,500	14,600	14,500	14,500	14,500
5. Test Purpose	15% RECIRC, ϕ=1.5	→	#6 BASELINE	#6 STAGED ϕ=1.3	→
6. Excess O_2 Condition	LO (CO)	LO	NOM	NOM	NOM
7. Cont. Room O_2 (%)	1.7	1.7	2.4	3.0	2.9
8. Pres.Furn/Windbox(iwg)	0.60 / 2.3	0.60 / 2.3	0.48 / 1.9	0.5 / 1.4	0.48 / 1.4
9. Uptake (iwg)	-0.21	-0.21	-0.18	-0.18	-0.18
10. Final Stm Press (psig)	94	94	95	96	97
11. Drum Press (psig)	94	94	97	97	97
12. F. Water P/T (psig/°F)	214 / 222	215 / 222	216 / 220	214 / 222	215 / 222
13. Air FD Fan Amps	8.4	8.4	9.0	8.5	8.5
14. Air Temp @ FD Fan/CR (°F)	89	91	87	96	96
15. Stack Temp (°F)	548	550	515	510	515
16. Fuel Flow (CFM or GPM)	2.22	2.21	2.29	2.27	2.29
17. Fuel Pres/Temp (psi/°F)	117 / 56	117 / 56	133 / 194	133 / 196	134 / 196
18. Fuel Atom Pres (psig)	30	30	34	34	34
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	3.4	3.4	C	C	C
21. ΔP Pitot FGR Duct(iwg)	0.10	0.098	—	—	—
22. ΔP Orif. FGR Duct(iwg)	0.18	0.18	—	—	—
23. Temp. FGR Duct (°F)	500	500	—	135	—
24. Pstat FGR Duct (psig)	5.4	5.4	—	—	—
25. Pstat S.A. Fan (psig)	4.2	4.0	—	5.0	5.4
26. Vortex FD Fan Blades	0.65	—	1.3	0.68	
27. Vortex SA Fan Blades	10.5	10.5	—	10.1	10.1
28. SA Depth/Flow (ft/cfm)	7'	4'	—	4'	5'
29. % FGR			0	0	0
30. Total Oil Burned #2/#6	—	—	—	—	—
31. Total Gas Burned	0	0	0	0	0
STEAM VENT RATE, LB/HR	5500	5800	6000	5700	6500
ATOM. AIR PRESS., PSIG	25.0	25.0	27.1	27.1	27.1

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel #6 + #2 Atom.Type AIR Capacity 17,500

Test Comments

	#6 OIL 19-72	#2 OIL → 19-73	19-74	19-75	19-76
1. Test Number	3C1b	1-75	2-2F	2-2P	2-2I
2. Date	18 JAN 77	19 JAN 77	→	→	→
3. Time	16:05	9:10	11:00	12:20	14:40
4. Load	14,000	14500	14,300	14,300	14,300
5. Test Purpose	#6 OIL $\Phi = 1.3$	#2 BASELINE	LOW O_2 PARTIC.	→	LOW O_2 IMPACTOR
6. Excess O_2 Condition	NOM	NOM	LO	→	→
7. Cont. Room O_2 (%)	3.0	3.0	1.0	1.0	1.1
8. Pres.Furn/Windbox(iwg)	0.48 / 2.0	0.38 / 1.7	0.28 / 1.4	0.30 / 1.4	0.35 / 1.5
9. Uptake (iwg)	0.198	-0.20	-0.22	-0.22	-0.22
10. Final Stm Press (psig)	97	98	96	97	97
11. Drum Press (psig)	97	100	98	97	97
12. F. Water P/T (psig/°F)	215 / 222	208 / 222	210 / 224	215 / 222	217 / 222
13. Air FD Fan Amps	8.5	8.7	8.3	8.7	8.6
14. Air Temp @ FD Fan/CR (°F)	91	74	80	84	88
15. Stack Temp (°F)	520	515	510	513	521
16. Fuel Flow (~~CPM or~~ GPM)	2.26	2.22	2.22	2.23	2.25
17. Fuel Pres/Temp (psi/°F)	134 / 196	117 / 54	119 / 45	119 / 45	120 / 48
18. Fuel Atom Pres (psig)	34	29	29	29	29
19. Primary Reg. Setting	+5	-8	-8	-8	-8
20. FGR Reg. Setting	—	C	C	C	C
21. ΔP Pitot FGR Duct(iwg)	—	—	—	—	—
22. ΔP Orif. FGR Duct(iwg)	—	—	—	—	—
23. Temp. FGR Duct (°F)	—	100	—	—	—
24. Pstat FGR Duct (psig)	—	—	—	—	—
25. Pstat S.A. Fan (psig)	5.4	—	—	—	—
26. Vortex FD Fan Blades	0.71	1.28	0.99	1.05	1.03
27. Vortex SA Fan Blades	10.1	—	—	—	—
28. SA Depth/Flow (ft/cfm)	6'	—	—	—	—
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	—	—	—	—	—
31. Total Gas Burned	0	0	0	0	0
STEAM VENT RATE, LB/HR	5800	6000	5700	6500	7100
ATOM. AIR PRESS., PSIG	27.1	24.5	24.1	24.1	
DIFFUSER POS, IN.	4.25	3.0	3.0	3.0	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 ________ Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ________

	19-77	19-78	19-79	19-80	19-81
1. Test Number	1-6	~~3A2b~~	~~3B2b~~	~~3B2b~~	3C2b
2. Date	20 JAN 76	20 JAN 76	→	→	→
3. Time	07:45	08:30	08:50	09:15	9:55
4. Load	14,000	14,300	14,300	14,300	14,200
5. Test Purpose	#2 BASELINE	ϕ = 1.35 LO O_2 WITH CO	→	→	→
6. Excess O_2 Condition	NOM	LO	LO	LO	LO
7. Cont. Room O_2 (%)	3.0	1.9	1.9	1.9	1.8
8. Pres.Furn/Windbox(iwg)	0.45 / 1.7	0.38 / 1.2	0.38 / 1.2	0.40 / 1.25	0.40 / 1.25
9. Uptake (iwg)	-0.20	-0.20	-0.21	-0.19	-0.20
10. Final Stm Press (psig)	98	97	97	97	98
11. Drum Press (psig)	102	99	100	100	99
12. F. Water P/T (psig/°F)	217 / 222	213	213 / STEAM	215 / 222	218 / 222
13. Air FD Fan Amps	8.9	8.1	8.1	8.1	8.2
14. Air Temp @ FD Fan/CR (°F)	87	94	90	90	90
15. Stack Temp (°F)	510	513	511	511	514
16. Fuel Flow (CFM or GPM)	2.14	2.19	2.19	2.21	2.14
17. Fuel Pres/Temp (psi/°F)	117 / 52	116 / 51	116 / 51	116 / 51	116 / 52
18. Fuel Atom Pres (psig)	29	29	29	29	29
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	C	C	C	C	C
21. ΔP Pitot FGR Duct(iwg)	—	—	—	—	—
22. ΔP Orif. FGR Duct(iwg)	—	—	—	—	—
23. Temp. FGR Duct (°F)	—	—	—	—	—
24. Pstat FGR Duct (psig)	—	—	—	—	—
25. Pstat S.A. Fan (psig)	0	2.5	2.6	2.6	3.0
26. Vortex FD Fan Blades	1.28	0.74	0.74	0.74	0.74
27. Vortex SA Fan Blades	0	10.5	10.5	10.5	10.5
28. SA Depth/Flow (ft/cfm)	—	4	5	5	6
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	—	—	—	—	—
31. Total Gas Burned	0	0	0	0	0
	7000	7000	7000	7900	8000
	24.0	24.1	24.1	24.1	24.1
	3"	3	3	3	3

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel #2 OIL Atom. Type AIR Capacity 17,500 LB/HR

Test Comments Φ = 1.3 NOT ACHIEVED BECAUSE OF SMOKING AT LOW SECONDARY AIR

	19-82	19-83	19-84	19-85	19-86
1. Test Number	302b	~~4C2P~~	~~4C21~~	→	3A1b
2. Date	20 JAN 76	→	→	→	21 JAN 76
3. Time	10:05	13:55	15:30	17:00	10:35
4. Load	14,160	14,500	14,600	14,600	13,600
5. Test Purpose	Φ=1.3 #2 OIL LOW O_2	V TRAVERSE	HI RECIRC LO O_2 IMPACTOR	→	REPEAT 19-83 AS BASELINE
6. Excess O_2 Condition	1.6	LO	LO	LO	NOM
7. Cont. Room O_2 (%)	1.6	0.7	0.5	—	2.3
8. Pres.Furn/Windbox(iwg)	0.45 / 1.65	0.80 / 3.2	0.86 / 3.2	0.85 / 3.3	0.38 / 1.1
9. Uptake (iwg)	-0.18	-0.18	-0.18	-0.18	-0.20
10. Final Stm Press (psig)	98	97	98	98	98
11. Drum Press (psig)	98	97	98	98	98
12. F. Water P/T (psig/°F)	216 / 222	220 / 222	220 / 222	219 / 222	219 / 222
13. Air FD Fan Amps	8.0	9.0	9.4	9.4	7.9
14. Air Temp @ FD Fan/~~CR~~ 2°FAN (°F)	90	95	100 / 79	93	88 / 76
15. Stack Temp (°F)	514	581	582	583	492
16. Fuel Flow (~~CFM or~~ GPM)	2.17	2.18	2.24	2.24	2.11
17. Fuel Pres/Temp(psi/°F)	116 / 51	116 / 54	116 / 55	116 / 54	110 / 54
18. Fuel Atom Pres (psig)	29	29	29	30	28
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	C	FULL OPEN	C	C	C
21. ΔP Pitot FGR Duct(iwg)	—	—	—	—	—
22. ΔP Orif. FGR Duct(iwg)	—	0.80	0.80	0.80	—
23. Temp. FGR Duct (°F)	—	550	552	555	—
24. Pstat FGR Duct (psig)	—	3.9	2.7	4.1	—
25. Pstat S.A. Fan (psig)	3.0	—	—	—	4.9
26. Vortex FD Fan Blades	0.74	1.10	1.10	1.15	0.56
27. Vortex SA Fan Blades	10.5	—	—	—	—
28. SA Depth/Flow (ft/cfm)	7'	— / —	— / —	— / —	4'
29. % FGR	0	MAX	MAX	MAX	0
30. Total Oil Burned #2/#6	— / —	— / —	— / —	— / —	— / —
31. Total Gas Burned	0	0	0	0	0
	8000	7000	7300	7500	6500
	24.1	24.1	24.2	25.0	24.0
	3	3	3		3

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19________ Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ________

	19-87	19-88	19-89	19-90	19-91
1. Test Number	~~3A2C~~	~~3A2C~~	~~3B2C~~	~~3C2C~~	3D2C
2. Date	21 JAN 76	21 JAN 76	21 JAN 76	→	→
3. Time	11:30	13:45	14:00	14:20	14:35
4. Load	14,200	14,200	14,200	14,200	14,200
5. Test Purpose	SMOKE, TSC, HI Φ →	SWIRLING 2° AIR →	→	→	→
6. Excess O_2 Condition	LO	LO	LO	LO	LO
7. Cont. Room O_2 (%)	1.9	2.1	2.0	2.0	2.1
8. Pres.Furn/Windbox(iwg)	0.38 / 1.1	0.40 / 1.05	0.39 / 1.1	0.39 / 1.1	0.39 / 1.1
9. Uptake (iwg)	-0.20	-0.20	-0.20	-0.20	-0.20
10. Final Stm Press (psig)	98 /	98 /	98 /	98 /	98 /
11. Drum Press (psig)	98	98	98	98	98
12. F. Water P/T (psig/°F)	221 / 222	221 / 222	220 / 222	220 / 222	220 / 222
13. Air FD Fan Amps	8.0	8.0	7.9	7.8	8.0
14. Air Temp @ FD Fan/CR (°F)	91 /	94 /	91 /	88 /	89 /
15. Stack Temp (°F)	498	498	499	502	500
16. Fuel Flow (CFM or GPM)	2.16	2.15	2.18	2.14	2.17
17. Fuel Pres/Temp (psi/°F)	110 / 54	110 / 55	110 / 55	110 / 54	110 / 55
18. Fuel Atom Pres (psig)	28	28	28	28	28
19. Primary Reg. Setting	-8 /	-8 /	-8 /	-8 /	-8 /
20. FGR Reg. Setting	C /	C /	C /	C /	C /
21. ΔP Pitot FGR Duct (iwg)	—	—	—	—	—
22. ΔP Orif. FGR Duct (iwg)	—	—	—	—	—
23. Temp. FGR Duct (°F)	—	—	—	—	—
24. Pstat FGR Duct (psig)	—	—	—	—	—
25. Pstat S.A. Fan (psig)	5.0	5.0	5.2	5.5	5.8
26. Vortex FD Fan Blades	0.56	0.58	0.58	0.58	0.58
27. Vortex SA Fan Blades	10.1	10.1	10.3	10.3	10.3
28. SA Depth/Flow (ft/cfm)	4' / RADIAL	4' / CO-SWIRL	5' / CO-SWIRL	6' /	6'11"
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	— / —	— / —	— / —	— / —	— / —
31. Total Gas Burned	0	0	0	0	0
	6700	7300	7400	7300	7300
	24.0	24.0	24.0	24.0	24.0
	3"	3"	3	3	3

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500

Test Comments ________

	19-92	19-93	19-94	19-95	
1. Test Number	3A2b	~~3B2b~~	~~3C2b~~	~~3D2b~~	
2. Date	21 JAN 76	→	→	→	
3. Time	15:00	15:10	15:30	15:45	
4. Load	14,200	14,200	14,200	14,200	
5. Test Purpose	SMOKE, TSC #2 Φ=1.2	→	→	→	
6. Excess O_2 Condition	LO	LO	LO	LO	
7. Cont. Room O_2 (%)	1.6	1.4	1.0	0.8	
8. Pres.Furn/Windbox(iwg)	0.33 / 1.1	0.33 / 1.1	0.33 / 1.1	0.33 / 1.1	
9. Uptake (iwg)	-0.21	-0.21	-0.21	-0.21	
10. Final Stm Press (psig)	98	98	98	98	
11. Drum Press (psig)	98	98	98	98	
12. F. Water P/T (psig/°F)	221 / 222	220 / 222	220 / 222	220 / 222	
13. Air FD Fan Amps	8.1	8.2	8.4	8.4	
14. Air Temp @ FD Fan/CR (°F)	91	92	90	88	
15. Stack Temp (°F)	505	504	506	506	
16. Fuel Flow (CFM or GPM)	2.11	2.17	2.20	2.17	
17. Fuel Pres/Temp (psi/°F)	110 / 55	110 / 55	110 / 55	110 / 55	
18. Fuel Atom Pres (psig)	28	28	28	28	
19. Primary Reg. Setting	-8	-8	-8	-8	
20. FGR Reg. Setting	C	C	C	C	
21. ΔP Pitot FGR Duct (iwg)	—	—	—	—	
22. ΔP Orif. FGR Duct (iwg)	—	—	—	—	
23. Temp. FGR Duct (°F)	—	125	—	—	
24. Pstat FGR Duct (psig)	—	—	—	—	
25. Pstat S.A. Fan (psig)	2.6	2.6	2.9	2.9	
26. Vortex FD Fan Blades	0.67	0.66	0.66	0.67	
27. Vortex SA Fan Blades	10.8	10.7	10.8	10.8	
28. SA Depth/Flow (ft/cfm)	4	5	6	6'11"	
29. % FGR	0	0	0	0	
30. Total Oil Burned #2/#6	—	—	—	—	
31. Total Gas Burned	0	0	0	0	
	7300	7300	7300	7300	
	24.0	24.0	24.0	24.0	
	3"	3"	3"	3"	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #2 + #6 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ________

	19-96		19-97		19-98		19-99		10-100	
1. Test Number	1-16		11-4P		11-4P		11-4I		1-17	
2. Date	21 JAN 76		→		→		→		25 JAN 76	
3. Time	08:15		10:30		11:40		14:30		08:25	
4. Load	14,200		13,800		14,800		14,000		13,700	
5. Test Purpose	#2 BASELINE		#6 BASELINE PARTIC.		→		→		#2 BASELINE	
6. Excess O_2 Condition	NOM		NOM		NOM		NOM		NOM	
7. Cont. Room O_2 (%)	2.8		2.6		2.7		2.5		—	
8. Pres.Furn/Windbox(iwg)	0.40	1.7	0.35	1.6	0.35	1.6	0.38	1.6	0.40	1.7
9. Uptake (iwg)	-0.22		-0.22		-0.22		-0.22		-0.22	
10. Final Stm Press (psig)	97		98		98		97		97	
11. Drum Press (psig)	98		98		98		98		97	
12. F. Water P/T (psig/°F)	210	222	215	222	222	222	216	212		200
13. Air FD Fan Amps	8.2		8.7		8.8		8.8		8.9	
14. Air Temp @ FD Fan/CR (°F)	81		85		88		92		85	
15. Stack Temp (°F)	520		511		513		517		513	
16. Fuel Flow (~~CFM or~~ GPM)	2.26		2.22		2.22		2.21		—	
17. Fuel Pres/Temp (psi/°F)	118	50	130	192	130	194	129	194	110	54
18. Fuel Atom Pres (psig)	29		32		32		32		27	
19. Primary Reg. Setting	-8		-8		-8		-8		-8	
20. FGR Reg. Setting	C		C		C		C		C	
21. ΔP Pitot FGR Duct(iwg)	—		—		—		—		—	
22. ΔP Orif. FGR Duct(iwg)	—		—		—		—		—	
23. Temp. FGR Duct (°F)	—		—		—		—		—	
24. Pstat FGR Duct (psig)	—		—		—		—		—	
25. Pstat S.A. Fan (psig)	—		—		—		—		—	
26. Vortex FD Fan Blades	1.3		1.15		1.20		1.20		1.25	
27. Vortex SA Fan Blades	—		—		—		—		—	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	—	—	—	—
29. % FGR	0		0		0		0		0	
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned	0		0		0		0		0	
	7000		7500		7100		7000		7500	
	24.5		26.5		26.2		26.2		22.9	
	3"		3"		3		3		3	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19________ Engr. SOTTER

Fuel #2 Atom.Type AIR Capacity 17,500

Test Comments ________

	19-101	19-102	19-103	19-104	19-105
1. Test Number	5A1b	~~5G1b~~	~~5A1b~~	~~5G1b~~	5C1b
2. Date	25 JAN 76	→	→	→	→
3. Time	10:00	10:15	10:35	10:50	11:20
4. Load	14,200	14,200	14,200	14,400	14,500
5. Test Purpose	LO RECIRC $\phi = 1.35$	→	MED RECIRC $\phi = 1.35$	→	MAX RECIRC $\phi = 1.35$
6. Excess O_2 Condition	NOM	NOM	NOM	NOM	NOM
7. Cont. Room O_2 (%)	2.9	2.8	2.9	2.8	2.7
8. Pres.Furn/Windbox(iwg)	0.52 / 1.6	0.52 / 1.6	0.70 / 2.3	0.70 / 2.3	0.92 / 3.1
9. Uptake (iwg)	-0.20	-0.20	-0.20	-0.20	-0.18
10. Final Stm Press (psig)	97	97	96	97	98
11. Drum Press (psig)	99	98	98	98	98
12. F. Water P/T (psig/°F)	218 / 222	217 / 222	217 / 222	215 / 222	222 / 222
13. Air FD Fan Amps	8.4	8.0	8.3	8.3	8.6
14. Air Temp @ FD Fan/CR (°F)	100	94	94	99	103
15. Stack Temp (°F)	523	518	549	549	560
16. Fuel Flow (~~CFM or~~ GPM)	2.28	2.21	2.23	2.28	2.29
17. Fuel Pres/Temp (psi/°F)	110 / 55	110 / 56	110 / 56	110 / 56	110 / 56
18. Fuel Atom Pres (psig)	28	28	28	28	28
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting		C	3.4	3.4	MAX
21. ΔP Pitot FGR Duct(iwg)	0.009	—	0.080	0.075	0.18
22. ΔP Orif. FGR Duct(iwg)	0.055	0.055	0.20	0.20	0.80
23. Temp. FGR Duct (°F)	403	406	500	503	540
24. Pstat FGR Duct (psig)	6.1	6.1	5.9	5.4	4.2
25. Pstat S.A. Fan (psig)	5.2	5.9	5.5	5.4	5.3
26. Vortex FD Fan Blades	0.71	0.71	0.71	0.71	0.75
27. Vortex SA Fan Blades	10.1	10.1	10.1	10.1	10.2
28. SA Depth/Flow (ft/cfm)	4	7	7	4'	4
29. % FGR					
30. Total Oil Burned #2/#6					
31. Total Gas Burned	0	0	0	0	0

7000	7000	6500	6500	7100
23.1	23.2	23.4		
3"	3"	3	3	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19________ Engr. SOTTFR

Fuel________ Atom.Type AIR________ Capacity 17,500

Test Comments________

	#2 OIL 19-106	#6 OIL → 19-107	19-108	19-109	19-110
1. Test Number		~~13A1A~~	~~13B1a~~	~~13C1a~~	~~13D1a~~
2. Date	25 JAN 76	→	→	→	→
3. Time	11:35	13:25	13:35	13:50	14:00
4. Load	14 500	14500	14500	14500	14500
5. Test Purpose	HI REC'C φ=1.35	φ=1.2 →	→	→	→
6. Excess O_2 Condition	NOM	NOM	NOM	NOM	NOM
7. Cont. Room O_2 (%)	2.4	2.5	2.5	2.2	2.2
8. Pres.Furn/Windbox(iwg)	0.90 / 3.1	0.45 / 1.4	0.47 / 1.4	0.47 / 1.4	0.96 / 1.4
9. Uptake (iwg)	-0.18	-0.18	-0.18	-0.18	-0.18
10. Final Stm Press (psig)	98 /	98 /	98 /	98 /	98 /
11. Drum Press (psig)	98	98	98	99	98
12. F. Water P/T (psig/°F)	222 / 222	222 / 222	222 / 222	222 / 222	222 / 222
13. Air FD Fan Amps	8.6	8.3	8.3	8.3	8.4
14. Air Temp @ FD Fan/CR(°F)	100 /	97 /	94 /	91 /	89 /
15. Stack Temp (°F)	560	507	508	506	504
16. Fuel Flow (CFM or GPM)	—	2.26	2.33	2.29	—
17. Fuel Pres/Temp(psi/°F)	110 / 56	130 / 194	129 / 194	129 / 194	129 / 194
18. Fuel Atom Pres (psig)	28	32	32	32	32
19. Primary Reg. Setting	-8 /	-8 /	-8 /	-8 /	-8 /
20. FGR Reg. Setting	FULL OPEN /	OFF / +CLOSED	OFF /	OFF /	OFF /
21. ΔP Pitot FGR Duct(iwg)	0.18	0.00	0.00	—	—
22. ΔP Orif. FGR Duct(iwg)	0.80	0.34	0.00	—	—
23. Temp. FGR Duct (°F)	540	144	138	135	135
24. Pstat FGR Duct (psig)	4.1	~0.05	RE-ZERO 0.00	—	—
25. Pstat S.A. Fan (psig)	5.8	2.8	3.0	3.1	3.2
26. Vortex FD Fan Blades	0.75	0.86	0.86	0.86	0.88 RE-ZERO
27. Vortex SA Fan Blades	10.1	10.5	10.5	10.5	10.6
28. SA Depth/Flow (ft/cfm)	7 /	4 /	5 /	6 /	6'11" /
29. % FGR		0	0	0	0
30. Total Oil Burned #2/#6	+	+	+	+	+
31. Total Gas Burned	0	0	0	0	0
	7200	7000	7100	7400	7400
	23.5	26.0	26.0	26.0	26.0
	3"	3	3	3	3

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #6 Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ________

	19-111	19-112	19-113	19-114	19-115
1. Test Number	~~3A2C~~	~~3D2C~~	~~3A2D~~		
2. Date	25 JAN 76	→	→	→	26 JAN 76
3. Time	14:20	14:30	15:00	15:10	09:00
4. Load	14,500	14,500	14,500	14,500	14,100
5. Test Purpose	75C φ=1.5 SMOKE, CO	→	φ=1.3 SMOKE, CO	→	#2 BASELINE
6. Excess O_2 Condition	LO	LO	LO	LO	NOM
7. Cont. Room O_2 (%)	2.1	2.0	1.0	0.8	3.0
8. Pres.Furn/Windbox(iwg)	0.42 / 1.3	0.41 / 1.3	0.33 / 1.2	0.31 / 1.2	0.50 / 2.0
9. Uptake (iwg)	-0.19	-0.20	-0.20	-0.20	-0.20
10. Final Stm Press (psig)	98	98	98	98	98
11. Drum Press (psig)	98	98	98	98	100
12. F. Water P/T (psig/°F)	220	222 / 222	– / 222	221 / 222	215 / 218
13. Air FD Fan Amps	8.3	8.0	8.0	8.0	9.0
14. Air Temp @ FD Fan/CR (°F)	95	92	91	88	83
15. Stack Temp (°F)	500	496	496	492	532
16. Fuel Flow (~~CFM or~~ GPM)	2.22	2.27	—	—	2.31
17. Fuel Pres/Temp (psi/°F)	129 / 194	129 / 194	128 / 195	128 / 195	125 / 54
18. Fuel Atom Pres (psig)	32	32	32	32	30
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	C	C	C	C	C
21. ΔP Pitot FGR Duct (iwg)	—	—	—	—	—
22. ΔP Orif. FGR Duct (iwg)	—	—	—	—	—
23. Temp. FGR Duct (°F)	—	—	—	—	105
24. Pstat FGR Duct (psig)	—	—	—	—	—
25. Pstat S.A. Fan (~~psig~~)	4.5	5.1	2.6	2.9	—
26. Vortex FD Fan Blades	0.73	0.72	0.71	0.71	1.45
27. Vortex SA Fan Blades	10.4	10.4	10.6	10.6	—
28. SA Depth/Flow (ft/cfm)	4	6'11"	4'	7'	—
29. % FGR					
30. Total Oil Burned #2/#6	—	—	—	—	—
31. Total Gas Burned	0	0	0	0	0
	7400	7400	7400	7500	8000
	26.1	26.1	26.1	26.1	24.9
	3	3	3	3	3

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19______ Engr. SOTTFR

Fuel #2 Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ______

	19-116	19-117			
1. Test Number	3C2CP	~~3C2CP~~			
2. Date	26 JAN 76	→			
3. Time	10:35	11:40			
4. Load	14,500	14,600			
5. Test Purpose	NI Φ PARTICS	→			
6. Excess O_2 Condition	LO	LO			
7. Cont. Room O_2 (%)	2.3	2.4			
8. Pres.Furn/Windbox(iwg)	0.50 / 1.5	0.50 / 1.5			
9. Uptake (iwg)	-0.18	-0.20			
10. Final Stm Press (psig)	100	100			
11. Drum Press (psig)	100	100			
12. F. Water P/T (psig/°F)	214 / 222	217 / 222			
13. Air FD Fan Amps	8.0	8.2			
14. Air Temp @ FD Fan/CR (°F)	87	87			
15. Stack Temp (°F)	520	516			
16. Fuel Flow (CFM or GPM)	2.30	2.27			
17. Fuel Pres/Temp (psi/°F)	125 / 55	125 / 55			
18. Fuel Atom Pres (psig)	30	30			
19. Primary Reg. Setting	-8	-8			
20. FGR Reg. Setting	C	C			
21. ΔP Pitot FGR Duct(iwg)	—	—			
22. ΔP Orif. FGR Duct(iwg)	—	—			
23. Temp. FGR Duct (°F)	117	117			
24. Pstat FGR Duct (psig)	—	—			
25. Pstat S.A. Fan (psig)	5.4	5.4			
26. Vortex FD Fan Blades	0.82	0.81			
27. Vortex SA Fan Blades	10.2	10.2			
28. SA Depth/Flow (ft/cfm)	6	6			
29. % FGR	0	0			
30. Total Oil Burned #2/#6	—	—			
31. Total Gas Burned	0	0			
	7500 250 3	8500 250 3			

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel #2 ______ Atom.Type ______ Capacity ______

Test Comments ______

	19-118		19-119		19-120		19-121		19-122	
1. Test Number	~~1-17~~		~~1-18~~		~~CAL~~		~~CAL~~		~~CAL~~	
2. Date	15 FEB 77		16 FEB 77		→		→		→	
3. Time	14:15		10:50		11:20		11:35		11:45	
4. Load	13700		14500		14200		14200			
5. Test Purpose	BASELINE		BASELINE		CAL 2° AIR		→			
6. Excess O_2 Condition	NOM		NOM		HI		HI			
7. Cont. Room O_2 (%)	2.6 (NO CAL)		2.6 (CAL)		5.6		5.5			
8. Pres.Furn/Windbox(iwg)	0.42	1.8	0.38	1.7	0.70	2.0	0.70	2.0	0.74	2.0
9. Uptake (iwg)	-0.18		-0.21		-0.19		-0.19		-0.17	
10. Final Stm Press (psig)	99		98		97				98	
11. Drum Press (psig)	99		98		98		98			
12. F. Water P/T (psig/°F)	223	214	200	224	200		217	224	215	
13. Air FD Fan Amps	8.4		8.5		8.4		8.4		8.5	
14. Air Temp @ FD Fan/CR(°F)	84		84		87		87		86	
15. Stack Temp (°F)	510		512		532		528		535	
16. Fuel Flow (CFM or GPM)	2.10		2.16		2.19		2.16		2.17	
17. Fuel Pres/Temp(psi/°F)	123	51	129	53	129	54	129	53	129	53
18. Fuel Atom Pres (psig)	28		29		29		29		29	
19. Primary Reg. Setting	-8		-8		-8		-8		-8	
20. FGR Reg. Setting	C		C		C		C		C	
21. ΔP Pitot FGR Duct(iwg)	—		—		—		—		—	
22. ΔP Orif. FGR Duct(iwg)	0.00		—		—		—		—	
23. Temp. FGR Duct (°F)	105		—		—		—		—	
24. Pstat FGR Duct (psig)	0.55		—		—		—		—	
25. Pstat S.A. Fan (psig)	—		—		10.3		10.2		10.1	
26. Vortex FD Fan Blades	1.25		1.15		1.15		1.17		1.17	
27. Vortex SA Fan Blades	—		—		5.0		5.6		5.8	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	4		7		4	
29. % FGR	0		0		0		0		0	
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned	0		0		0		0		0	
ATOM AIR PRESS, PSIG	23.8		24.0		24.0		24.0		24.0	
STEAM VENT RATE, LB/HR	7000		6500		6000		7000		7500	
DIFFUSER POS., IN.										

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19______ Engr. SOTTER

Fuel #2 OIL . Atom.Type AIR Capacity 17,500

Test Comments ______

1. Test Number	19-123	19-124	19-125	19-126	19-127
2. Date	16 FEB 77	→	→	→	→
3. Time	11:55	12:10	12:20	12:35	12:45
4. Load	13,600	13,700	13,700	13,800	13,900
5. Test Purpose	2° AIR CAL	→	→	→	→
6. Excess O_2 Condition	HI	→	→	→	→
7. Cont. Room O_2 (%)	5.7	5.0		4.8	4.7
8. Pres.Furn/Windbox(iwg)	0.76 / 2.0	0.68 / 2.0	0.67 / 2.0	0.62 / 1.95	0.61 / 1.95
9. Uptake (iwg)	-0.18	-0.18	-0.18	-0.20	-0.19
10. Final Stm Press (psig)	98	98		—	
11. Drum Press (psig)				—	
12. F. Water P/T (psig/°F)	216	218 / 222		217 / 222	
13. Air FD Fan Amps	8.6	8.6		8.3	8.3
14. Air Temp @ FD Fan/CR (°F)	89	88	90	86	85
15. Stack Temp (°F)	532	530	530		529
16. Fuel Flow (CFM or GPM)	2.17	2.13	2.19		2.18
17. Fuel Pres/Temp (psi/°F)	129	129	129	/ 53	/ 53
18. Fuel Atom Pres (psig)	29	29	29	29	29
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	C	C	C	C	C
21. ΔP Pitot FGR Duct(iwg)	—	—	—	—	—
22. ΔP Orif. FGR Duct(iwg)	—	—	—	—	—
23. Temp. FGR Duct (°F)	—	—	—	—	—
24. Pstat FGR Duct (psig)	—	—	—	—	—
25. Pstat S.A. Fan (psig)	6.4	3.8	4.2	2.9	3.2
26. Vortex FD Fan Blades	1.17	1.17	1.17	1.17	1.17
27. Vortex SA Fan Blades	10.1	10.5	10.6	10.8	10.8
28. SA Depth/Flow (ft/cfm)	7	4	7	4	7
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	—	—	—	—	—
31. Total Gas Burned	0	0	0	0	0
	24.0	24.0	24.0	24.0	24.0
	7500	7000			7000

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19________ Engr. SOTTEK

Fuel #6 OIL Atom.Type AIR Capacity ________

Test Comments ________

1. Test Number		19-128	19-129	19-130	19-131
2. Date		16 FEB 77	16 FEB 77	⟶	17 FEB 77
3. Time		16:00	16:30	16:45	08:25
4. Load		14,000	13,700	13,700	13,900
5. Test Purpose		#6 BASELINE	#6 MAX Φ + RECIRC	⟶	#6 BASELINE
6. Excess O_2 Condition		NOM	NOM	NOM	NOM
7. Cont. Room O_2 (%)		2.7	2.7	2.6	3.0
8. Pres.Furn/Windbox(iwg)		0.34 / 1.8	0.80 / 3.0	0.80 / 3.0	0.34 / 1.7
9. Uptake (iwg)		-0.21	-0.22	-0.21	-0.22
10. Final Stm Press (psig)		99	98	98	95
11. Drum Press (psig)		98	98	98	99
12. F. Water P/T (psig/°F)		215	215	215 / 222	199 / 222
13. Air FD Fan Amps		8.9	8.0	8.0	8.4
14. Air Temp @ FD Fan/CR (°F)		82	100	98	80
15. Stack Temp (°F)		516	568	562	500
16. Fuel Flow (CFM or GPM)		2.23		2.18	2.15
17. Fuel Pres/Temp (psi/°F)		126 / 192	126 / 194	126 / 194	126 / 194
18. Fuel Atom Pres (psig)		34	34	34	33
19. Primary Reg. Setting		-8	-8	-8	-8
20. FGR Reg. Setting		C	MAX	MAX	C
21. ΔP Pitot FGR Duct(iwg)		—	0.46	0.5	—
22. ΔP Orif. FGR Duct(iwg)		—	0.80	0.80	—
23. Temp. FGR Duct (°F)		—	545	540	102
24. Pstat FGR Duct (psig)		—	4.2	4.2	—
25. Pstat S.A. Fan (psig)		—	10.2	10.0	—
26. Vortex FD Fan Blades		1.25	0.62	0.60	1.2
27. Vortex SA Fan Blades		—	5.7	6.2	—
28. SA Depth/Flow (ft/cfm)		—	4	7	—
29. % FGR		0			0
30. Total Oil Burned #2/#6		—	—	—	—
31. Total Gas Burned		0	0	0	0
		25.1	25.1	25.1	25.1
		6500	7000	6500	6500

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel #6 OIL ______ Atom.Type ______ Capacity ______

Test Comments ______

1. Test Number	19-132		→		19-133		19-134		19-135	
2. Date	17 FEB 77		→		18 FEB 77		→		→	
3. Time	9:50		11:05		08:15		10:20		10:40	
4. Load	14500		13900		13900		13900		13700	
5. Test Purpose	LOW O_2 PARTIC. M5		→		BASELINE		MED RECIRC HI φ LO O_2		→	
6. Excess O_2 Condition	LO		→		NOM		LO		LO	
7. Cont. Room O_2 (%)	0.4		0.4		2.4		1.0		1.2	
8. Pres.Furn/Windbox(iwg)	0.20	1.3	0.20	1.3	0.30	1.6	0.6	2.2	0.6	2.2
9. Uptake (iwg)	-0.22		-0.23		-0.23		-0.22		-0.22	
10. Final Stm Press (psig)	95		93		92		98		96	
11. Drum Press (psig)	95		95		95		98		96	
12. F. Water P/T (psig/°F)	214	222	215	222	210	222	215	222	217	
13. Air FD Fan Amps	8.0		7.9		8.1		7.4		7.5	
14. Air Temp @ FD Fan/CR(°F)	80		79		75		101		104	
15. Stack Temp (°F)	490		508		514		553		553	
16. Fuel Flow (CFM or GPM)	2.16		2.19		2.20		2.20		2.12	
17. Fuel Pres/Temp(psi/°F)	127	191	127	191	133	192	133	197	133	196
18. Fuel Atom Pres (psig)	33		33		33		34		34	
19. Primary Reg. Setting	-8		-8		-8		-9		-9	
20. FGR Reg. Setting	C		C		C		2.9		2.9	
21. ΔP Pitot FGR Duct(iwg)	—		—		—		0.3		—	
22. ΔP Orif. FGR Duct(iwg)	—		—		—		0.38		0.39	
23. Temp. FGR Duct (°F)	—		—		—		523		522	
24. Pstat FGR Duct (psig)	—		—		—		4.9		4.9	
25. Pstat S.A. Fan (psig)	—		—		—		10.0			
26. Vortex FD Fan Blades	0.86		0.84		1.15		0.46			
27. Vortex SA Fan Blades	—		—		—		5.6		5.9	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	4		5	
29. % FGR	0		0		0					
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned	0		0		0		0		0	
	25.0		25.0		25.0		25.9		25.9	
	6500		5500		5500		10500		9000	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel #6 OIL ______ Atom. Type AIR ______ Capacity ______

Test Comments ______

1. Test Number	19-136	19-137	19-138	19-139	19-140
2. Date	18 FEB 77	→	→	→	→
3. Time	13:25	13:45	14:00	14:20	14:50
4. Load	14,600	14,400	14,300	14,300	14,200
5. Test Purpose	MED RECIRC HI Φ	LO RECIRC HI Φ	→	NO RECIRC HI Φ	LO RECIRC HI Φ
6. Excess O_2 Condition	LO	LO	LO	LO	NOM
7. Cont. Room O_2 (%)	1.0	1.7	2.0	1.6	2.5
8. Pres.Furn/Windbox(iwg)	0.63 2.1	0.52 1.7	0.52 1.65	0.43 1.2	0.80 2.5
9. Uptake (iwg)	-0.18	-0.18	-0.20	-0.20	-0.20
10. Final Stm Press (psig)	94	94	94	94	93
11. Drum Press (psig)	94	94	95	95	94
12. F. Water P/T (psig/°F)	216 222	215 222	215 222	214 222	222
13. Air FD Fan Amps	7.2	7.5	7.5	7.2	8.2
14. Air Temp @ FD Fan/CR(°F)	105	105	104	121	107
15. Stack Temp (°F)	549	530	528	513	561
16. Fuel Flow (CFM or GPM)	2.28	2.30	2.23	2.28	2.17
17. Fuel Pres/Temp(psi/°F)	133 192	132 192	133 192	133 192	133 192
18. Fuel Atom Pres (psig)	34	34	34	34	34
19. Primary Reg. Setting	-9	-9	-9	-9	-9
20. FGR Reg. Setting	3.3	3.8	3.7	C	—
21. ΔP Pitot FGR Duct(iwg)	0.4	0.05	—	—	0.1
22. ΔP Orif. FGR Duct(iwg)	0.177	0.043	0.041	0.012 (ZERO DRIFT)	0.22
23. Temp. FGR Duct (°F)	497	440	425	335	517
24. Pstat FGR Duct (psig)	5.5	6.2	5.6	—	5.4
25. Pstat S.A. Fan (psig)	9.9	10.0	10.0	10.0	10.0
26. Vortex FD Fan Blades	0.508	0.55	0.55	0.51	0.64
27. Vortex SA Fan Blades	5.6	5.8	5.9	5.8	5.7
28. SA Depth/Flow (ft/cfm)	4	4	5	4	4
29. % FGR				0	
30. Total Oil Burned #2/#6					
31. Total Gas Burned	0	0	0	0	0
	25.5	25.5	25.5	25.5	25.2
	6500	6500	6500	6500	6500
DIFFUSER POS., IN.	2.9	2.9	2.9	2.9	2.9

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel #6 OIL ______ Atom.Type ______ Capacity ______

Test Comments ______

1. Test Number	19-141	19-142	19-143	→	19-144
2. Date	18 FEB 77	21 FEB 77	→	→	→
3. Time	15:00	09:25	10:20	11:25	12:35
4. Load	14,200	14,200	13,600	13,900	13,900
5. Test Purpose	LO RECIRC HI Φ	#6 BASELINE	HI Φ LOW O_2 PARTICS	→	→
6. Excess O_2 Condition	NOM	NOM	SMOKE THRESHOLD	→	→
7. Cont. Room O_2 (%)	2.2	2.8	3.6	2.8	2.8
8. Pres.Furn/Windbox(iwg)	0.79 / 2.5	0.35 / 1.7	0.35 / 1.7	0.40 / 1.2	0.41 / 1.2
9. Uptake (iwg)	-0.19	-0.22	-0.20	-0.19	-0.19
10. Final Stm Press (psig)	93	94	96	95	95
11. Drum Press (psig)	94	95	95	95	95
12. F. Water P/T (psig/°F)	217 / 222	219 / 220	215 / 222	218 / 222	218 / 222
13. Air FD Fan Amps	8.0	8.5	7.6	7.6	8.0
14. Air Temp @ FD Fan/CR (°F)	104	83	87	89	91
15. Stack Temp (°F)	562	521	503	508	510
16. Fuel Flow (CFM or GPM)	2.21	2.13	2.17	2.13	2.13
17. Fuel Pres/Temp (psi/°F)	133 / 192	127 / 192	129 / 193	126 / 195	125 / 196
18. Fuel Atom Pres (psig)	34	34	34	34	34
19. Primary Reg. Setting	-9	-8	-8	-8	-8
20. FGR Reg. Setting		C	C	C	C
21. ΔP Pitot FGR Duct(iwg)	0.07	—	—	—	—
22. ΔP Orif. FGR Duct(iwg)	0.22	—	—	—	—
23. Temp. FGR Duct (°F)	523	107	—	—	—
24. Pstat FGR Duct (psig)	5.4	—	—	—	—
25. Pstat S.A. Fan (psig)	10.0	—	10.0	10.0	10.0
26. Vortex FD Fan Blades	0.64	1.17	0.53	0.54	0.54
27. Vortex SA Fan Blades	6.2	—	5.9	5.9	5.8
28. SA Depth/Flow (ft/cfm)	7	—	5	5	5
29. % FGR		0	0	0	0
30. Total Oil Burned #2/#6	—	—	—	—	—
31. Total Gas Burned	0	0	0	0	0
ATOM. AIR	25.1	25.0	25.1	25.1	25.0
STEAM VENT	6500	6500	6000	6400	6300
DIFFUSER	2.9	2.9	2.9	2.9	2.9
OPACITY (APPROX)	.60				

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SCOTTER

Fuel #6, #2, + GAS Atom.Type ________ Capacity ________

Test Comments ________

	#6 OIL	#2 OIL	NATURAL GAS →	→	→
1. Test Number	19-145	19-146	19-147	19-148	19-149
2. Date	21 FEB 77	22 FEB 77	22 FEB 77	→	→
3. Time	14:45	08:30	10:05	10:40	11:05
4. Load	14,000	14 100	14,100	13,900	14,600
5. Test Purpose	OPACITY	#2 BASELINE	NATURAL GAS BASELINE	FAN WIDE OPEN	MED O2
6. Excess O_2 Condition	SMOKE THRESHOLD	NOM	NOM	HI	MED
7. Cont. Room O_2 (%)	1.9	2.8	2.8	6.2	1.6
8. Pres.Furn/Windbox (iwg)	0.48 / 1.3	0.38 / 1.7	0.48 / 2.2	0.96 / 3.8	0.40 / 2.2
9. Uptake (iwg)	-0.2	-0.21	-0.21	-0.15	-0.21
10. Final Stm Press (psig)	97	95	97	95	95
11. Drum Press (psig)	97	95	97	95	95
12. F. Water P/T (psig/°F)	218 / 222	216 / 222	207 / 222	208 / 222	217
13. Air FD Fan Amps	7.7	8.2	8.4	11.0	8.4
14. Air Temp @ FD Fan/CR (°F)	104	86	87	85	88
15. Stack Temp (°F)	521	520	538	568	531
16. Fuel Flow (CFM or GPM)	2.22	2.14			
17. Fuel Pres/Temp (psi/°F)	125 / 196	116 / 53	4.8	4.75	4.8
18. Fuel Atom Pres (psig)	34	28	88 IWG	88	88
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	C	C	C	C	C
21. ΔP Pitot FGR Duct (iwg)	—	—	0.9	0.1	—
22. ΔP Orif. FGR Duct (iwg)	—	—	0.001	0.001	—
23. Temp. FGR Duct (°F)	131	—	104	102	—
24. Pstat FGR Duct (psig)	—	—	0.9	1.4	—
25. Pstat S.A. Fan (psig)	9.9	—	0	0	—
26. Vortex FD Fan Blades	0.53	1.18	1.33	2.28	1.19
27. Vortex SA Fan Blades	5.9	—	—	—	—
28. SA Depth/Flow (ft/cfm)	5	— / —	— / —	— / —	— / —
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	— / —	— / —	0 / 0	0 / 0	0 / 0
31. Total Gas Burned	0	0	—	—	—

ATOM AIR		23.1			
STEAM VENT RATE	750	00 : 0	8000	6000	7000
DIFFUSER POS.	2.9		2.9	2.9	2.9

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel N. GAS Atom.Type ______ Capacity ______

Test Comments ______

1. Test Number	19-150	19-151	19-152	19-153	19-154
2. Date	22 FEB 77	→	→	→	→
3. Time	11:25	11:40	13:30	13:40	13:45
4. Load	14,700	14,500	14,400		
5. Test Purpose	OPT O_2	HI CO	HI Φ	CHANGES ONLY PROBE DEPTH	→
6. Excess O_2 Condition	OPT	MIN	NOM		
7. Cont. Room O_2 (%)	0.9	0.8	2.4		
8. Pres.Furn/Windbox(iwg)	0.36 / 2.0	0.36 / 2.0	0.54 / 1.9		
9. Uptake (iwg)	-0.22	-0.22	-0.19		
10. Final Stm Press (psig)	95	95	96		
11. Drum Press (psig)	95	95	96		
12. F. Water P/T (psig/°F)	217 / 222	217	216		
13. Air FD Fan Amps	8.2	8.2	7.6		
14. Air Temp @ FD Fan/CR(°F)	88	91	101		
15. Stack Temp (°F)	525	523	527		
16. Fuel Flow (CFM or GPM)					
17. Fuel Pres/Temp(psi/°F)	4.8 / —	4.8 / —	4.8		
18. Fuel Atom Pres (psig)	88	88	88		
19. Primary Reg. Setting	-8	-8	-8		
20. FGR Reg. Setting	C	C	C		
21. ΔP Pitot FGR Duct(iwg)	—	—	—		
22. ΔP Orif. FGR Duct(iwg)	—	—	—		
23. Temp. FGR Duct (°F)	—	—	—		
24. Pstat FGR Duct (psig)	—	—	—		
25. Pstat S.A. Fan (psig)	—	—	9.6		10.8
26. Vortex FD Fan Blades	1.1	1.1	0.67		
27. Vortex SA Fan Blades	—	—	5.2		5.9
28. SA Depth/Flow (ft/cfm)	— / —	— / —	4	5	6
29. % FGR	0	0	0		
30. Total Oil Burned #2/#6	0 / 0	0 / 0	0 / 0		
31. Total Gas Burned	—	—	—		

Data Sheet 6003-16

	6500	6500	7500
DIFFUSER POS.	2.9	2.9	2.9

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOT TFC

Fuel N. GAS Atom.Type ________ Capacity ________

Test Comments ________

1. Test Number	19-155		19-156		19-157			
2. Date	22 FEB 77		→		→			
3. Time	13:55		14:15		14:30			
4. Load	14300		14400		14500			
5. Test Purpose	HI Φ		HI Φ		HI Φ			
6. Excess O_2 Condition	NOM		LO		LO			
7. Cont. Room O_2 (%)	2.0		1.2		1.8			
8. Pres.Furn/Windbox(iwg)	0.55	1.9	0.51	1.9	0.50	1.8		
9. Uptake (iwg)	-0.20		-0.18		-0.19			
10. Final Stm Press (psig)	96		96		96			
11. Drum Press (psig)	95		96		96			
12. F. Water P/T (psig/°F)	217		217		217			
13. Air FD Fan Amps	7.9		7.6		7.9			
14. Air Temp @ FD Fan/CR(°F)	98		100		102			
15. Stack Temp (°F)	530		524		522			
16. Fuel Flow (CFM or GPM)								
17. Fuel Pres/Temp(psi/°F)	4.8	—	4.8		4.8			
18. Fuel Atom Pres RING ~~(psig)~~	88		88		88			
19. Primary Reg. Setting	-8		-8		-8			
20. FGR Reg. Setting	C		C		C			
21. ΔP Pitot FGR Duct(iwg)	—		—		—			
22. ΔP Orif. FGR Duct(iwg)	—		—		—			
23. Temp. FGR Duct (°F)	—		—		—			
24. Pstat FGR Duct (psig)	—		—		—			
25. Pstat S.A. Fan (psig)	9.7		9.8		9.7			
26. Vortex FD Fan Blades	0.67		0.61		0.60			
27. Vortex SA Fan Blades	5.8		5.8		5.2			
28. SA Depth/Flow (ft/cfm)	7		7		4			
29. % FGR	0		0		0			
30. Total Oil Burned #2/#6	0	0	0	0	0	0		
31. Total Gas Burned	—		—		—			

Data Sheet 6003-16

7500 7600 7800
2.9 2.9 2.9

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel #6 OIL · Atom.Type AIR Capacity ______

Test Comments ______

1. Test Number	19-158	19-159	→	19-160	19-161
2. Date	23 FEB 77	→	→	→	→
3. Time	08:15	09:40	11:20	14:10	14:35
4. Load	14200	14000	13900	14500	14500
5. Test Purpose	#6 BASELINE	HI RECIRC PACTIC	HI RECIRC IMPACTOR	MED & MED RECIRC	→
6. Excess O_2 Condition	NOM	NOM	NOM	NOM	NOM
7. Cont. Room O_2 (%)	2.3	1.0	1.0	2.1	2.2
8. Pres.Furn/Windbox(iwg)	0.40 1.75	0.80 3.5	0.85 3.5	0.83 3.0	0.96 3.1
9. Uptake (iwg)	-0.21	-0.19	-0.20	-0.17	-0.17
10. Final Stm Press (psig)	92	94	95	95	95
11. Drum Press (psig)	95	96	95	95	95
12. F. Water P/T (psig/°F)	193 205	212	214 220	217 222	218 222
13. Air FD Fan Amps	8.2	8.5		8.3	8.4
14. Air Temp @ FD Fan/CR (°F)	85	93	99	108	107
15. Stack Temp (°F)	515	562	563	578	575
16. Fuel Flow (CFM or GPM)					
17. Fuel Pres/Temp (psi/°F)	131 192	130 192	129 192	130	130 192
18. Fuel Atom Pres (psig)	34	34	34	34	34
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	C	WIDE OPEN	WIDE OPEN	3.3	3.3
21. ΔP Pitot FGR Duct(iwg)	—	—	—	0.15	0.15
22. ΔP Orif. FGR Duct(iwg)	—	0.75	—	0.39	0.39
23. Temp. FGR Duct (°F)	110	542	—	540	537
24. Pstat FGR Duct (psig)	—	4.5	—	5.0	5.0
25. Pstat S.A. Fan (psig)	—	—	—	10.5	10.5
26. Vortex FD Fan Blades	1.2	~1.2	1.15	0.92	0.92
27. Vortex SA Fan Blades	—	—	—	2.9	3.2
28. SA Depth/Flow (ft/cfm)				4	7
29. % FGR	0	0	0		
30. Total Oil Burned #2/#6					
31. Total Gas Burned	0	0		0	0
	25.1	25.2	25.2	25.6	25.6
	5000	7000	7200	8000	8100
	2.9	2.9	2.9	2.9	2.9

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19________ Engr. SOTTER

Fuel #6 + NG Atom.Type ________ Capacity ________

Test Comments ________________

1. Test Number	19-162	19-163	19-164	19-165	19-166
2. Date	23 FEB 77	→	24 FEB 77	→	→
3. Time	15:00	15:15	08:05	08:50	09:10
4. Load	14,500	14,500	14,700	13,500	13,600
5. Test Purpose	LO RECIRC MED φ	→	NG BASELINE	MED φ	→
6. Excess O_2 Condition	NOM	NOM	NOM	NOM	NOM
7. Cont. Room O_2 (%)	2.2	2.2	2.9	3.0	2.9
8. Pres.Furn/Windbox(iwg)	0.88 / 2.8	0.86 / 2.7	0.48 / 2.4	0.50 / 2.0	0.48 / 2.0
9. Uptake (iwg)	-0.17	-0.16	-0.19	-0.18	-0.19
10. Final Stm Press (psig)	95	95	94	96	95
11. Drum Press (psig)	95	95	95	96	95
12. F. Water P/T (psig/°F)	218 / 222	219 / 222	193 / 222	203 /	219 / 216
13. Air FD Fan Amps	8.4	8.5	8.5		7.9
14. Air Temp @ FD Fan/CR (°F)	166	110	88	89	89
15. Stack Temp (°F)	569	564	521	521	529
16. Fuel Flow (CFM or GPM)					
17. Fuel Pres/Temp (psi/°F)	130 / 192	130 / 192	4.75 PSIG	4.75	4.75
18. Fuel Atom Pres (psig)	34	34	88 IWG	88	88
19. Primary Reg. Setting	-8	-8	-8	-8	-8
20. FGR Reg. Setting	3.2	3.2	C	C	C
21. ΔP Pitot FGR Duct(iwg)	0.15	0.12	—	—	—
22. ΔP Orif. FGR Duct(iwg)	0.20	0.20	—	—	—
23. Temp. FGR Duct (°F)	525	525	—	—	—
24. Pstat FGR Duct (psig)	5.5	5.5	—	—	—
25. Pstat S.A. Fan (psig)	10.5	10.5	—	10.5	10.6
26. Vortex FD Fan Blades	0.91	0.89	1.28	0.84	0.83
27. Vortex SA Fan Blades	3.2	2.8	—	2.9	3.4
28. SA Depth/Flow (ft/cfm)	7	4'	—	4'	7'
29. % FGR			0	0	0
30. Total Oil Burned #2/#6	—	—	0 / 0	0 / 0	0 / 0
31. Total Gas Burned	0	0	—	—	—
	25.3 8000 2.9	8100 2.9	6500 2.9	8000 2.9	8000 2.9

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ________ Date ________ Location 19 Engr. SC77/R

Fuel NG Atom.Type ________ Capacity ________

Test Comments ________

1. Test Number	19-167		19-168				
2. Date	24 FEB 77		→				
3. Time	09:45		09:55				
4. Load	13400		13900				
5. Test Purpose	MED φ		→				
6. Excess O_2 Condition	LO		LO				
7. Cont. Room O_2 (%)	1.4		1.6				
8. Pres.Furn/Windbox(iwg)	0.40	1.8	0.39	1.8			
9. Uptake (iwg)	-0.19		-0.20				
10. Final Stm Press (psig)	95		95				
11. Drum Press (psig)	95		95				
12. F. Water P/T (psig/°F)	217	220	215				
13. Air FD Fan Amps	7.8		7.7				
14. Air Temp @ FD Fan/CR (°F)	88		89				
15. Stack Temp (°F)	521		513				
16. Fuel Flow (CFM or GPM)							
17. Fuel Pres/Temp (psi/°F)	4.75	PSIG	4.75				
18. Fuel Atom Pres (psig)	88 IWG		88				
19. Primary Reg. Setting	-8		-8				
20. FGR Reg. Setting	C		C				
21. ΔP Pitot FGR Duct (iwg)	—		—				
22. ΔP Orif. FGR Duct (iwg)	—		—				
23. Temp. FGR Duct (°F)	—		—				
24. Pstat FGR Duct (psig)	—		—				
25. Pstat S.A. Fan (psig)	10.5		10.5				
26. Vortex FD Fan Blades	0.68		0.69				
27. Vortex SA Fan Blades	3.2		2.9				
28. SA Depth/Flow (ft/cfm)	7		4				
29. % FGR	0		0				
30. Total Oil Burned #2/#6	0	0	0	0			
31. Total Gas Burned	—		—				

Data Sheet 6003-16

STEAM VENT RATE, LB/HR 7500 7700
DIFFUSER POS., IN. 2.9 2.9

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel #6 OIL Atom.Type AIR Capacity ______

Test Comments ______

1. Test Number	19-169	19-170	→	→	
2. Date	1 MAR 77	→	→	→	
3. Time	09:00	10:40	12:10	1:35	
4. Load	14,200	14,100	14,400	14,300	
5. Test Purpose	#6 BASELINE	HI Φ MAX RECIRC	→	→	
6. Excess O_2 Condition	NOM	LO (MARGINAL STABILITY)	→	→	
7. Cont. Room O_2 (%)	2.4	4.0	3.7	3.7	
8. Pres.Furn/Windbox(iwg)	0.43 / 1.9	1.03 / 3.4	1.03 / 3.4	1.04 / 3.4	
9. Uptake (iwg)	-0.20	-0.15	-0.15	-0.15	
10. Final Stm Press (psig)	98	95	94	95	
11. Drum Press (psig)	98	95	94	94	
12. F. Water P/T (psig/°F)	203 / 222	220 / 222	217 / 222	218 / 222	
13. Air FD Fan Amps	—	—	—		
14. Air Temp @ FD Fan/CR(°F)	87	107	104	105	
15. Stack Temp (°F)	520	567	571	570	
16. Fuel Flow (~~CFM or~~ GPM)	2.21	2.21	2.20	2.17	
17. Fuel Pres/Temp(psi/°F)	127 / 194	125 / 196	126 / 195	124 / 196	
18. Fuel Atom Pres (psig)	33	33	33	32	
19. Primary Reg. Setting	-8	-8	-8	-8	
20. FGR Reg. Setting	C	WIDE OPEN	WIDE OPEN	WIDE OPEN	
21. ΔP Pitot FGR Duct(iwg)	—	0.18	0.17	-0.17	
22. ΔP Orif. FGR Duct(iwg)	—	0.78	0.78	0.78	
23. Temp. FGR Duct (°F)	—	544	549	550	
24. Pstat FGR Duct (psig)	—	4.4	4.4	4.4	
25. Pstat S.A. Fan (psig)	—	9.9	10.0	10.0	
26. Vortex FD Fan Blades	1.23	0.77	0.78	0.77	
27. Vortex SA Fan Blades	—	5.5	5.6	5.6	
28. SA Depth/Flow (ft/cfm)	— / —	4	4	4	
29. % FGR	0				
30. Total Oil Burned #2/#6	— / —	— / —	— / —	— / —	
31. Total Gas Burned	0	0	0	0	
ATOM AIR PRESS, PSIG	24.9	24.5	24.5	24.3	
	10500	9400	6700	7300	
DIFFUSER POS., IN.	2.9	2.9	2.9	2.9	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SCTTER

Fuel NAT. GAS Atom.Type GUN Capacity ______

Test Comments 32-ORIFACE GUN

1. Test Number	19-171		19-172		19-173		19-174		19-175	
2. Date	2 MAR 77		→		→		→		→	
3. Time	11:15		11:50		13:30		13:45		14:50	
4. Load	14,000		14,200		14,100		14,300		14,400	
5. Test Purpose	NGAS WITH MAX RECIRC		GAS GUN BASELINE		MED. RECIRC.		LOW RECIRC		LOW RECIRC	
6. Excess O_2 Condition	NOM		NOM		NOM		NOM		LO	
7. Cont. Room O_2 (%)	3.2		2.7		3.0		3.1		1.6	
8. Pres.Furn/Windbox(iwg)	0.81	5.0	0.45	3.8	1.69	4.35	0.59	4.0	0.58	3.8
9. Uptake (iwg)	-0.20		-0.20		-0.17		-0.18		-0.19	
10. Final Stm Press (psig)	96		95		96		96		96	
11. Drum Press (psig)	95		94		94		95		96	
12. F. Water P/T (psig/°F)	214	222	215		217	222	219	222	217	222
13. Air FD Fan Amps										
14. Air Temp @ FD Fan/CR (°F)	93		94		100		100		103	
15. Stack Temp (°F)	550		519		530		522		510	
16. Fuel Flow (CFM or GPM)										
17. Fuel Pres/Temp (psi/°F)	4.5		4.5		4.5		4.5		4.75	
18. Fuel Atom Pres (~~psig~~ IWG)	78		78		78		78		65	
19. Primary Reg. Setting	-4		-4		-4		-4		-4	
20. FGR Reg. Setting	WIDE OPEN		C		3.3		3.6		3.6	
21. ΔP Pitot FGR Duct (iwg)	0.1		—		0.1		0.0		0.0	
22. ΔP Orif. FGR Duct (iwg)	0.55		-0.003		0.139		0.063		0.058	
23. Temp. FGR Duct (°F)	525		300		455		450		439	
24. Pstat FGR Duct (psig)	4.65		1.1		5.4		5.9		5.3	
25. Pstat S.A. Fan (psig)	—		—		0		0		0	
26. Vortex FD Fan Blades	1.40		1.37		1.26		1.28		1.25	
27. Vortex SA Fan Blades	—		—		—		—		—	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	—	—	—	—
29. % FGR										
30. Total Oil Burned #2/#6	—	—	0	0	0	0	0	0	0	0
31. Total Gas Burned	—		—		—		—		—	
DIFFUSER POS., IN.	6.6		6.6		6.6		6.6		6.6	
STEAM VENT	9200		7500		8000		8000		7800	
GUN POS., IN.	18.7		18.7		18.7		18.7		18.7	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel NAT. GAS +#2 Atom.Type GUN Capacity ______

Test Comments ______

1. Test Number	19-176		19-177		19-178		19-179		→	
2. Date	2 MAR 77		→		3 MAR 77		→		→	
3. Time	15:25		15:45		08:15		10:20		11:20	
4. Load	14,800		15000		14,400		13,600		13,700	
5. Test Purpose	MED RECIRC		HI RECIRC		#2 BASELINE		MAX RECIRC MAX Φ PARTICS			
6. Excess O_2 Condition	LO		LO-STABLE LIMIT		NOM		LO STABILITY LIMIT		→	
7. Cont. Room O_2 (%)	1.7		1.1		2.1		2.9		2.9	
8. Pres.Furn/Windbox(iwg)	0.89	5.1	0.98	5.2	0.46	2.0	0.96	3.2	0.96	3.2
9. Uptake (iwg)	-0.16		-0.18		-0.20		-0.19		-0.19	
10. Final Stm Press (psig)	95		95		100		96		96	
11. Drum Press (psig)	94		95		100		96		96	
12. F. Water P/T (psig/°F)	215	222	216	222	218	222	218	222	218	222
13. Air FD Fan Amps	—		—		—		—		—	
14. Air Temp @ FD Fan/CR (°F)	104		102		87		108		109	
15. Stack Temp (°F)	541		557		519		556		556	
16. Fuel Flow (CFM or GPM)										
17. Fuel Pres/Temp (psi/°F)	4.7		4.7		112		113	56	113	56
18. Fuel Atom Pres (psig)	68		68		29		28		28	
19. Primary Reg. Setting	-4		-4		-8		-8		-8	
20. FGR Reg. Setting	3.4		1.25		C		WIDE OPEN		WIDE OPEN	
21. ΔP Pitot FGR Duct (iwg)	0.0		0.05		—		0.1		0.1	
22. ΔP Orif. FGR Duct (iwg)	0.115		0.49		—		0.80		0.81	
23. Temp. FGR Duct (°F)	480		525		—		540		540	
24. Pstat FGR Duct (psig)	5.3		4.3		—		4.4		4.4	
25. Pstat S.A. Fan (psig)	—		—		—		10.1		10.0	
26. Vortex FD Fan Blades	1.65		1.46		1.32		0.69		0.68	
27. Vortex SA Fan Blades	—		—		—		5.6		5.6	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	4		4	
29. % FGR										
30. Total Oil Burned #2/#6	0	0	0	0	0	0	—	—	—	—
31. Total Gas Burned	—		—		—		0		0	
	6.6		6.6		ATOM AIR 24.1		23.9		23.9	
	8000		8100		10,000		9500		8000	
	18.7		18.7		2.9		3.9		3.9	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19______ Engr. SOTTER

Fuel #2 OIL Atom.Type______ Capacity______

Test Comments______

1. Test Number	19-179		→							
2. Date	3 MAR 77		→							
3. Time	13:45		14:45							
4. Load	14,300		14,000							
5. Test Purpose	IMPACTOR		→							
6. Excess O_2 Condition	STABILITY LIMIT		→							
7. Cont. Room O_2 (%)	2.6		2.8							
8. Pres.Furn/Windbox(iwg)	1.00	3.2	1.00	3.2						
9. Uptake (iwg)	-0.17		-0.17							
10. Final Stm Press (psig)	98		98							
11. Drum Press (psig)	95		95							
12. F. Water P/T (psig/°F)	220	222	220	222						
13. Air FD Fan Amps	—		—							
14. Air Temp @ FD Fan/CR (°F)	116		>116							
15. Stack Temp (°F)	554		552							
16. Fuel Flow (CFM or GPM)										
17. Fuel Pres/Temp (psi/°F)	113	60	113	60						
18. Fuel Atom Pres (psig)	28		28							
19. Primary Reg. Setting	-8		-8							
20. FGR Reg. Setting	WIDE OPEN		WIDE OPEN							
21. ΔP Pitot FGR Duct(iwg)	0.1		0.1							
22. ΔP Orif. FGR Duct(iwg)	0.75		0.73							
23. Temp. FGR Duct (°F)	537		535							
24. Pstat FGR Duct (psig)	4.4		4.4							
25. Pstat S.A. Fan (psig)	9.8		9.8							
26. Vortex FD Fan Blades	0.68		0.67							
27. Vortex SA Fan Blades	5.5		5.5							
28. SA Depth/Flow (ft/cfm)	4		4							
29. % FGR										
30. Total Oil Burned #2/#6	+		+							
31. Total Gas Burned	0		0							

		23.9
	7500	7500
DIFFUSER POS., IN	3.9	3.9

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. ______ Date ______ Location 19 ______ Engr. SOTTER

Fuel NAT. GAS Atom.Type GUN Capacity ______

Test Comments ______

1. Test Number	19-180	19-181	19-182	19-183	19-184
2. Date	4 MAR 77	→	→	→	→
3. Time	08:00	09:00	09:35	09:50	10:00
4. Load	6700	13,800	14,000	14,000	13,900
5. Test Purpose	LOW LOAD	GAS GUN BASELINE	MAX O_2	LO O_2	MIN O_2
6. Excess O_2 Condition	AS FOUND	NOM	MAX	LO	HI CO
7. Cont. Room O_2 (%)	4.8	2.6	5.0	2.0	1.0
8. Pres.Furn/Windbox(iwg)	0.00 / 1.65	0.40 / 3.9	0.68 / 5.5	0.32 / 3.4	0.28 / 3.1
9. Uptake (iwg)	-0.22	-0.20	-0.19	-0.20	-0.21
10. Final Stm Press (psig)	94 /	97 /	97 /	97 /	99 /
11. Drum Press (psig)	92	98	97	98	98
12. F. Water P/T (psig/°F)	225 / 222	214 / 222	212 / 222	213 / 222	214 /
13. Air FD Fan Amps	—	—	—	—	—
14. Air Temp @ FD Fan/CR(°F)	84 /	82 /	84 /	85 /	84 /
15. Stack Temp (°F)	391	508	522	496	489
16. Fuel Flow (CFM or GPM)					
17. Fuel Pres/Temp(psi/°F)	5.6 /	4.5 /	4.5 /	4.5 /	4.5 /
18. Fuel Atom Pres (~~psig~~ IWG)	25	81	79	79	79
19. Primary Reg. Setting	-3 /	-4 /	-4 /	-4 /	-4 /
20. FGR Reg. Setting	C /	C /	C /	C /	C /
21. ΔP Pitot FGR Duct(iwg)	—	—	—	—	—
22. ΔP Orif. FGR Duct(iwg)	—	—	—	—	—
23. Temp. FGR Duct (°F)	—	—	—	—	—
24. Pstat FGR Duct (psig)	—	—	—	—	—
25. Pstat S.A. Fan (psig)	—	—	—	—	—
26. Vortex FD Fan Blades	0.43	1.40	1.92	1.20	—
27. Vortex SA Fan Blades	—	—	—	—	—
28. SA Depth/Flow (ft/cfm)	— / —	— / —	— / —	— / —	— / —
29. % FGR	0	0	0	0	0
30. Total Oil Burned #2/#6	— / —	— / —	— / —	— / —	— / —
31. Total Gas Burned	—	—	—	—	—
			6.5	6.5	6.5
STEAM VENT	0	9500	9100	9100	10,000
			18	18.6	18.6

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 ________ Engr. SOTTER

Fuel NAT. GAS Atom. Type GUN Capacity ________

Test Comments ________

1. Test Number	19-185		19-186		19-187		19-188		19-189	
2. Date	4 MAR 77		→		→		→		→	
3. Time	10:45		11:00		13:50		14:05		14:25	
4. Load	14,000		14,000		14,000		13,700		13,800	
5. Test Purpose	MAX φ		→		MAX φ HI RECIRC		→		MAX φ MED RECIRC	
6. Excess O_2 Condition	NOM		→		STABLE LIMIT		→		CO LIM	
7. Cont. Room O_2 (%)	2.0		1.7		3.9		3.5		2.4	
8. Pres.Furn/Windbox(iwg)	0.43	2.5	0.43	2.5	1.00	4.7	0.99	4.7	0.74	4.2
9. Uptake (iwg)	-0.20		-0.20		-0.17		-0.18		-0.18	
10. Final Stm Press (psig)	97		97		98		95		95	
11. Drum Press (psig)	97		97		97		94		95	
12. F. Water P/T (psig/°F)	216	222	218	222	221	221	220		220	
13. Air FD Fan Amps	—		—		—		—		—	
14. Air Temp @ FD Fan/CR(°F)	90		89		101		103		101	
15. Stack Temp (°F)	497		501		531		530		510	
16. Fuel Flow (CFM or GPM)										
17. Fuel Pres/Temp(psi/°F)	4.5		4.5		4.5		4.5		4.5	
18. Fuel Atom Pres (psig)	80		80		77		77		78	
19. Primary Reg. Setting	-4		-4		-3		-3		-3	
20. FGR Reg. Setting	C		C		2.1		2.1			
21. ΔP Pitot FGR Duct(iwg)	—		—		0.08		0.09		—	
22. ΔP Orif. FGR Duct(iwg)	—		—		0.48		0.50		0.14	
23. Temp. FGR Duct (°F)	—		—		504		504		440	
24. Pstat FGR Duct (psig)	—		—		6.7		4.8		5.7	
25. Pstat S.A. Fan (psig)	10.0		10.0		9.8		9.9		9.9	
26. Vortex FD Fan Blades	0.62		0.62		0.91		0.91		0.81	
27. Vortex SA Fan Blades	5.4		6.0		5.6		6.1		6.1	
28. SA Depth/Flow (ft/cfm)	4		7		4		7		7	
29. % FGR	0		0							
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned										
	6.5		6.5		6.5		6.5		6.5	
	9500		9500		7000		6000		6900	
	18.6		18.6		18.6		18.6		18.6	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel NAT. GAS + #6 OIL Atom.Type________ Capacity________

Test Comments________

	GAS	GAS	#6	#6	
1. Test Number	19-190	→	19-191	19-192	→
2. Date	7 MAR 77	7 MAR 77	→	→	→
3. Time	09:45	1102	13:35	15:25	1621
4. Load	13700	14000	14500	14300	14400
5. Test Purpose	HI RECIRC PARTICS	HI RECIRC PART. + SOx	#6 BASELINE	REPEAT 170 FOR SO_x	→
6. Excess O_2 Condition	NOM	NOM	NOM	MIN STABLE	→
7. Cont. Room O_2 (%)	3.0	2.9	1.6	3.0	4.0
8. Pres.Furn/Windbox(iwg)	0.70 / 4.8	0.73 / 4.8	0.40 / 1.8	1.03 / 3.5	1.04 / 3.5
9. Uptake (iwg)	-0.22	-.19	-0.19	-0.16	-0.18
10. Final Stm Press (psig)	95	95	95	95	95
11. Drum Press (psig)	95	90	96	96	96
12. F. Water P/T (psig/°F)	215	216 / 223	218 / 222	220 / 222	219
13. Air FD Fan Amps	—	—	—	—	—
14. Air Temp @ FD Fan/CR(°F)	87	95	86	105	111
15. Stack Temp (°F)	538	540	508	560	558
16. Fuel Flow (CFM or GPM)					
17. Fuel Pres/Temp(psi/°F)	4.75	4.75	129 / 190	129 / 190	128 / 191
18. Fuel Atom Pres (~~psig~~ iwg)	64	64	33	33	33
19. Primary Reg. Setting	-4	-4	-8	-8	-8
20. FGR Reg. Setting	3.0	3.0	C	WIDE OPEN / (0.75)	0.75
21. ΔP Pitot FGR Duct(iwg)	0.05	0.07	—	—	0.05
22. ΔP Orif. FGR Duct(iwg)	0.27	0.27	—	0.72	0.72
23. Temp. FGR Duct (°F)	504	504	117	541	549
24. Pstat FGR Duct (psig)	5.3	5.25	-0.15	4.4	4.4
25. Pstat S.A. Fan (psig)	0	0	—	10.0	9.8
26. Vortex FD Fan Blades	1.50	1.50	1.23	0.81	0.81
27. Vortex SA Fan Blades	—	—	—	5.7	5.6
28. SA Depth/Flow (ft/cfm)	— / —	— / —	— / —	4	4
29. % FGR		—	0		
30. Total Oil Burned #2/#6	0 / 0	— / —	— / —		
31. Total Gas Burned	—	—	0	0	0
DIFFUSER POSITION, IN.	6.4	6.4	2.9	2.9	2.9
STEAM VENT RATE, LB/HR	7000	6500	7600	7000	7000
GAS GUN POSITION, IN.	18.6	18.6	—	—	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.______ Date______ Location 19______ Engr. SOTTER / BUENING

Fuel NAT. GAS Atom.Type GUN Capacity ______

Test Comments ______

1. Test Number	19-193		SAME		SAME		SAME			
2. Date	3-8-77		3-8-77		3-8-77		3-8-77			
3. Time	9:25		10:25		11:25		12:20			
4. Load	14,400		14,100		14,200		14,500			
5. Test Purpose	BASELINE GAS GUN PART.		SAME		SAME		SAME			
6. Excess O_2 Condition	NORMAL + SOX		SAME		SAME		SAME			
7. Cont. Room O_2 (%)	3.5		3.5		3.5		3.5			
8. Pres.Furn/Windbox(iwg)	0.42	2.8	.41	2.8	.43	2.81	.43	2.8		
9. Uptake (iwg)	-.21		-.2		-0.2		-.2			
10. Final Stm Press (psig)	96	—	99	—	96	—	96	—		
11. Drum Press (psig)	96		98		96		95			
12. F. Water P/T (psig/°F)	219	220	211	216	218	220	219	220		
13. Air FD Fan Amps	N.A.		—		—		—			
14. Air Temp @ FD Fan/CR (°F)	87	74	87	75	86	76	86	78		
15. Stack Temp (°F)	512		515		512		513			
16. Fuel Flow (CFM or GPM)										
17. Fuel Pres/Temp (psi/°F)	4.75	—	4.75	—	4.75	—	4.75			
18. Fuel Atom Pres (~~psig~~ IWG)	64		64		64		65			
19. Primary Reg. Setting	-5	—	-5	—	-5	—	-5	—		
20. FGR Reg. Setting	CLOSED		CLOSED		CLOSED		CLOSED			
21. ΔP Pitot FGR Duct (iwg)	CL.		CL.		CLOS.		CLOSED			
22. ΔP Orif. FGR Duct (iwg)	—		—		—		—			
23. Temp. FGR Duct (°F)	—		—		108		118			
24. Pstat FGR Duct (psig)	—		—		—		—			
25. Pstat S.A. Fan (psig)	—		—		—		—			
26. Vortex FD Fan Blades	1.4 "H_2O		1.4		1.4		1.38			
27. Vortex SA Fan Blades	—		—		—		—			
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	—	—		
29. % FGR	—		—		—		—			
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—		
31. Total Gas Burned	—		—		—		—			
DIFFUSER POS., IN.	6 1/2		6 1/2		6 1/2		6 1/2			
STEAM VENT RATE, LB/HR	7000		10,000		8,200		7,300			
GUN POS., IN.	18 1/2		18 1/2		18 1/2		18 1/2			

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-1 SASS Date 3-10-77 Location 19 Engr. K.

Fuel #6 Oil Atom.Type Air Capacity 17.5

Test Comments

	#6		#6		#6		#6		#6	
1. Test Number	19-1 SASS		—		—		—		→	
2. Date	3-10-77		3-10-77		—		—		→	
3. Time	11:20		12:00		13:00		14:00		15:10	
4. Load	14.3		14.3		14.3		14.4		14.4	
5. Test Purpose	SASS-Basel.		—		—		—		→	
6. Excess O_2 Condition	Normal		—		—		—		→	
7. Cont. Room O_2 (%)	2.2		2.1		2.4		2.1		2.0	
8. Drum Press (psig)	96		96		96		96		97	
9. Final Stm Press (psig)	96	–	96	–	96	–	96	–	97	–
10. F. Water P/T (psig/°F)	219	220	218	220	219	221	219	220	219	220
11. Air FD Fan Amps	—		—		door open		—		—	
12. Air Temp@FD Fan/CR(°F)	89	83	94	86	88	87	95	92	97	94
13. Stack Temp (°F)	511		511		512		513		514	
14. Fuel Flow (~~CPM~~ or GPM)	53s / 2Gal.		55s / 2Gal.		55.5 / 2Gal.		55s / 2Gal.		55s / 2Gal.	
15. Fuel Pres/Temp(psi/°F)	129	193	129	193	129	194	129	195	129	195
16. Fuel Atom Pres (psig)	32.5		32.3		32.5		32.5		32.5	
17. Pres.Furn/Windbox(iwg)	.42	1.8	.45	1.78	.47	1.8	.47	1.8	.5	1.8
18. Primary Reg. Setting	-8	–	-8	–	-8	–	-8	–	-8	–
19. FGR Reg. Setting	–	–	–	–	–	–	–	–	–	–
20. Uptake (iwg)	-.18		-.18		-.18		-.16		-.16	
21. ΔP Pitot FGR Duct(iwg)	—		—		—		—		—	
22. ΔP Orif. FGR Duct(iwg)	—		—		—		—		—	
23. Temp. FGR Duct (°F)	118		119		114		121		124	
24. Pstat FGR Duct ("H_2O ~~psig~~)	.45		.5		.55		.5		.5	
25. Pstat S.A. Fan (psig)	—		—		—		—		—	
26. Vortex FD Fan Blades	1.15		1.12		1.16		1.15		1.15	
27. Vortex SA Fan Blades	—		—		—		—		—	
28. SA Depth/Flow (ft/cfm)	–	–	–	–	–	–	–	–	–	–
29. % FGR	0		0		0				0	
30. Total Oil Burned #2/#6	–	–	–	–	–	–	–	–	–	–
31. Total Gas Burned	—		—		—		—		—	
Diffuser Position, in	2.9		2.9		2.9		2.9		2.9	
Steam Vent rate	10.3		10.4		10.5		10.6		10.6	
Oil Gun position, in	—		—		—		—		—	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-1 SASS Date 3-10-77 Location 19 Engr. K.

Fuel #6 Oil Atom.Type Air Capacity 17.5

Test Comments

1. Test Number	19-1 SASS				
2. Date	3-10-77				
3. Time	16:00				
4. Load	14.2				
5. Test Purpose	SASS Test				
6. Excess O_2 Condition	Baseline Normal				
7. Cont. Room O_2 (%)	2.2				
8. Drum Press (psig)	97				
9. Final Stm Press (psig)	97 / —				
10. F. Water P/T (psig/°F)	219 / 220				
11. Air FD Fan Amps	Door open				
12. Air Temp@FD Fan/CR(°F)	90 / 90				
13. Stack Temp (°F)	518				
14. Fuel Flow (~~CFM~~ or GPM)	55.5s/2gal.				
15. Fuel Pres/Temp(psi/°F)	129 / 195				
16. Fuel Atom Pres (psig)	32.5				
17. Pres.Furn/Windbox(iwg)	.5 / 1.81				
18. Primary Reg. Setting	-8 / —				
19. FGR Reg. Setting	— / —				
20. Uptake (iwg)	-.165				
21. ΔP Pitot FGR Duct(iwg)	—				
22. ΔP Orif. FGR Duct(iwg)	—				
23. Temp. FGR Duct (°F)	119				
24. Pstat FGR Duct (~~psig~~ "H_2O)	5				
25. Pstat S.A. Fan (psig)	—				
26. Vortex FD Fan Blades	1.13				
27. Vortex SA Fan Blades	—				
28. SA Depth/Flow (ft/cfm)	— / —				
29. % FGR	0				
30. Total Oil Burned #2/#6	— / —				
31. Total Gas Burned	—				
Diffuser Position, in	2.9				
Steam vent rate	10.5				

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-2 SASS Date 3-17-77 Location 19 Engr. [illegible]

Fuel #6 Atom.Type Air Atom. Capacity 17.5 K

Test Comments Baseline SASS Test

1. Test Number	19-2 SASS		→		→		→		→	
2. Date	3-17-77		→		→		→		→	
3. Time	10:00		11:00		12:00		13:00		14:00	
4. Load	13.8		14.6		14.8		14.9		14.7	
5. Test Purpose	SASS Test		→		→		→		→	
6. Excess O_2 Condition	normal		→		→		→		→	
7. Cont. Room O_2 (%)	2.6		2.3		1.8		2.0		2.1	
8. Drum Press (psig)	98		97		97		97		97	
9. Final Stm Press (psig)	98	–	97	–	97	–	97	–	97	–
10. F. Water P/T (psig/°F)	220	214	219	215	220	215	219	222	220	220
11. Air FD Fan Amps	–		–		–		–		–	
12. Air Temp@FD Fan/CR(°F)	92	82	91	82	93	85	100	90	99	89
13. Stack Temp (°F)	518		517		512		519		518	
14. Fuel Flow (CFM or GPM)	53s/2Gal.		53s/2Gal.		53s/2Gal.		52.8s/2Gal.		51.6s/2Gal.	
15. Fuel Pres/Temp(psi/°F)	131	212	135	212	136	211	135	212	132	212
16. Fuel Atom Pres (psig)	35		35		35.5		35		34.5	
17. Pres.Furn/Windbox(iwg)	.49	2.25	.49	2.25	.5	2.3	.5	2.25	.5	2.25
18. Primary Reg. Setting	-.6	–	-6	–	-6	–	-6	–	-6	–
19. FGR Reg. Setting	–	–	–	–	–	–	–	–	–	–
20. Uptake (iwg)	-.18		-.18		-.18		-.16		-.17	
21. ΔP Pitot FGR Duct(iwg)	–		–		–		–		–	
22. ΔP Orif. FGR Duct(iwg)	–		–		–		–		–	
23. Temp. FGR Duct (°F)	114		115		117		121		122	
24. Pstat FGR Duct (~~psig~~ "H_2O)	.7		.7		.7		.7		.75	
25. Pstat S.A. Fan (psig)	–		–		–		–		–	
26. Vortex FD Fan Blades "H_2O	1.28		1.27		1.26		1.25		1.22	
27. Vortex SA Fan Blades	–		–		–		–		–	
28. SA Depth/Flow (ft/cfm)	–	–	–	–	–	–	–	–	–	–
29. % FGR	.0		0		0		0		0	
30. Total Oil Burned #2/#6	–	–	–	–	–	–	–	–	–	–
31. Total Gas Burned	–		–		–		–		–	
Diffuser Posit. in	2 7/8"		2 7/8"		2 7/8"		2 7/8		2 7/8	
Steam Vent Rate	12.9		10.3		10.4		10.4		10.3	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-2 SASS Date 3-17-77 Location 19 Engr. K.

Fuel #6 Atom.Type Air Capacity 17.5

Test Comments Baseline SASS Test

1. Test Number	19-2 SASS					
2. Date	3-17-77					
3. Time	15:00					
4. Load	14.7					
5. Test Purpose	SASS-Test					
6. Excess O_2 Condition	normal					
7. Cont. Room O_2 (%)	2.4					
8. Drum Press (psig)	97					
9. Final Stm Press (psig)	97	—				
10. F. Water P/T (psig/°F)	219	220				
11. Air FD Fan Amps	—					
12. Air Temp@FD Fan/CR(°F)	90	89				
13. Stack Temp (°F)	518					
14. Fuel Flow (CFM or GPM)	54.36/26 gal.					
15. Fuel Pres/Temp(psi/°F)	132	212				
16. Fuel Atom Pres (psig)	34.5					
17. Pres.Furn/Windbox(iwg)	.52	2.3				
18. Primary Reg. Setting	-6	—				
19. FGR Reg. Setting	—	—				
20. Uptake (iwg)	-.18					
21. ΔP Pitot FGR Duct(iwg)	—					
22. ΔP Orif. FGR Duct(iwg)	—					
23. Temp. FGR Duct (°F)	119					
24. Pstat FGR Duct (~~psig~~ "H_2O)	.75					
25. Pstat S.A. Fan (psig)	—					
26. Vortex FD Fan Blades	1.25					
27. Vortex SA Fan Blades	—					
28. SA Depth/Flow (ft/cfm)	—	—				
29. % FGR	0					
30. Total Oil Burned #2/#6	—	—				
31. Total Gas Burned	—					
Diffuser Posit. "	2 7/8					
Steam Vent Rate	10.3					

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-3 SASS Date 3-21-77 Location 19 Engr. [illegible]

Fuel #6 Atom. Type Air Capacity 175

Test Comments SASS Test with Hi Recirc. & low air

1. Test Number	19-3 SASS		→							
2. Date	3-21-77		→							
3. Time	10:30		11:30		12:30		13:30		14:30	
4. Load	14.2		14.5		14.4		14.4		14.4	
5. Test Purpose	SASS		→							
6. Excess O_2 Condition	low		→							
7. Cont. Room O_2 (%)	1.1		1.0		1.1		.9		.8	
8. Drum Press (psig)	96		96		96		97		97	
9. Final Stm Press (psig)	96	-	96	-	96	-	97	-	97	-
10. F. Water P/T (psig/°F)	215	220	220	220	220	220	221	220	221	220
11. Air FD Fan Amps	-		-		-		-		-	
12. Air Temp@FD Fan/CR(°F)	99	82	100	84	99	84	100	86	102	88
13. Stack Temp (°F)	550		551		551		551		551	
14. Fuel Flow (~~CPM~~ or ~~GPM~~)	52.55/2Gal.		52.9/2Gal.		53.6/2Gal.		52.5/2Gal.		53.5/2Gal.	
15. Fuel Pres/Temp(psi/°F)	125	222	126	220	123	216	125	223	124	221
16. Fuel Atom Pres (psig)	33.5		33.5		33.5		33.5		33.5	
17. Pres.Furn/Windbox(iwg)	.8	3.55	.84	3.6	.84	3.6	.86	3.6	.85	3.55
18. Primary Reg. Setting	-8	-	-8	-	-8	-	-8	-	-8	-
19. FGR Reg. Setting	100%	open	→							
20. Uptake (iwg)	-.19		-.2		-.19		-.195		-.195	
21. ΔP Pitot FGR Duct(iwg)	.1		.1		.1		.1		.1	
22. ΔP Orif. FGR Duct(iwg)	.72		.72		.72		.72		.71	
23. Temp. FGR Duct (°F)	541		541		539		540		540	
24. Pstat FGR Duct (~~psig~~ "H_2O)	4.5		4.5		4.5		4.45		4.4	
25. Pstat S.A. Fan (psig)	-		-		-		-		-	
26. Vortex FD Fan Blades	1.1		1.1		1.11		1.1		1.1	
27. Vortex SA Fan Blades	-		-		-		-		-	
28. SA Depth/Flow (ft/cfm)	-	-	-	-	-	-	-	-	-	-
29. % FGR	-		-		-		-		-	
30. Total Oil Burned #2/#6	-	-	-	-	-	-	-	-	-	-
31. Total Gas Burned	-		-		-		-		-	
Steam vent Rate	9.5		8.5		9.2		10.2		10.1	
Atom. Air Press.	25.3		25.1		25		25.3		25.2	
Diffuser Posit.	2 7/8"		2 7/8"		2 7/8"		2 7/8"		2 7/8"	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-3 SASS Date 3-21-77 Location 19 Engr. [illegible]

Fuel #6 Atom.Type Air Capacity 17.5

Test Comments SASS Test with Hi Recirc. & Low Air

			Baseline				
1. Test Number	19-3 SASS		19-3 SASS				
2. Date	3-21-77		3-21-77				
3. Time	15:30		15:50				
4. Load	14.4		14.5				
5. Test Purpose	SASS Test		Baseline				
6. Excess O_2 Condition	Low		normal				
7. Cont. Room O_2 (%)	.9		1.9				
8. Drum Press (psig)	97		97				
9. Final Stm Press (psig)	97	-	97				
10. F. Water P/T (psig/°F)	221	220	221	220			
11. Air FD Fan Amps	—		—				
12. Air Temp@FD Fan/CR(°F)	100	89	98	89			
13. Stack Temp (°F)	550		518				
14. Fuel Flow (~~CFM~~ or GPM)	545/2Gal.		54/2Gal.				
15. Fuel Pres/Temp(psi/°F)	124	221	124	221			
16. Fuel Atom Pres (psig)	33		33				
17. Pres.Furn/Windbox(iwg)	.855	3.6	.5	1.9			
18. Primary Reg. Setting	-8	—	-8	—			
19. FGR Reg. Setting	100%	open	—	—			
20. Uptake (iwg)	-.18		-.18				
21. ΔP Pitot FGR Duct(iwg)	.1		—				
22. ΔP Orif. FGR Duct(iwg)	.72		—				
23. Temp. FGR Duct (°F)	536		—				
24. Pstat FGR Duct (psig)	4.4		.55				
25. Pstat S.A. Fan (psig)	—		—				
26. Vortex FD Fan Blades	1.11		1.2				
27. Vortex SA Fan Blades	—		—				
28. SA Depth/Flow (ft/cfm)	—	—	—	—			
29. % FGR	—		8				
30. Total Oil Burned #2/#6	—	—	—	—			
31. Total Gas Burned	—		—				
Steam Vent Rate	10.2		10.2				
Atom. Air Press.	25.2		25.1				
Diffuser Pos.	2 7/8"		2 7/8"				

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-4 SASS Date 3-23-77 Location 19 Engr. [illegible]

Fuel #6 Atom. Type Air Capacity 17.5

Test Comments SASS Test with Hi Recirc & low Air

1. Test Number	19-4 SASS		→							
2. Date	3-23-77		→							
3. Time	9:30		10:30		11:40		12:30		13:30	
4. Load	14.0		14.1		14.2		14.0		14.1	
5. Test Purpose	SASS Test		→							
6. Excess O_2 Condition	low		→							
7. Cont. Room O_2 (%)	.9		.8		.6		.9		.8	
8. Drum Press (psig)	96		96		96		97		97	
9. Final Stm Press (psig)	96	—	96	—	96	—	97	—	97	—
10. F. Water P/T (psig/°F)	218	220	217	220	220	220	221	220	221	220
11. Air FD Fan Amps	—		—		—		—		—	
12. Air Temp@FD Fan/CR(°F)	92	76	94	78	96	81	98	84	98	84
13. Stack Temp (°F)	547		548		548		548		548	
14. Fuel Flow (~~CPM~~ or ~~GPM~~)	52.5/2 Gal.		53.6/2Gal		54.9/2 Gal		54.9/2 Gal.		55/2 Gal.	
15. Fuel Pres/Temp(psi/°F)	127	221	128	221	123	221	123	222	123	221
16. Fuel Atom Pres (psig)	34		34.5		34		33.5		33.5	
17. Pres.Furn/Windbox(iwg)	.72	3.4	.75	3.4	.75	3.4	.8	3.4	.8	3.4
18. Primary Reg. Setting	-8	—	-8	—	-8	—	-8	—	-8	—
19. FGR Reg. Setting	100%	open	→							
20. Uptake (iwg)	-.19		-.2		-.2		-.16		-.18	
21. ΔP Pitot FGR Duct(iwg)	.1		.1		.1		.1		.1	
22. ΔP Orif. FGR Duct(iwg)	.74		.74		.74		.75		.75	
23. Temp. FGR Duct (°F)	537		538		539		538		536	
24. Pstat FGR Duct (~~psig~~ "H_2O)	4.35		4.4		4.35		4.4		4.35	
25. Pstat S.A. Fan (psig)	—		—		—		—		—	
26. Vortex FD Fan Blades	1.05		1.05		1.03		1.0		1.03	
27. Vortex SA Fan Blades	—		—		—		—		—	
28. SA Depth/Flow (ft/cfm)	—	—	—	—	—	—	—	—	—	—
29. % FGR	—		—		—		—		—	
30. Total Oil Burned #2/#6	—	—	—	—	—	—	—	—	—	—
31. Total Gas Burned	—		—		—		—		—	
Diffuser position "	2 7/8		2 7/8		2 7/8		2 7/8		2 7/8	
Air Atom Press psig	26.8		26.9		26.8		26.5		26.2	
Steam vented	6.0		8.5		9.0		8.7		9.9	

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-4SASS Date 3-23-77 Location 19 Engr. K.

Fuel #6 Atom.Type Air Capacity 17.5

Test Comments SASS Test. Hi Recirc. Low Air

			Baseline				
1. Test Number	19-4SASS		19-4SASS				
2. Date	3-23-77		3-23-77				
3. Time	14:50		15:05				
4. Load	14.4		14.2				
5. Test Purpose	SASS Test		Baseline				
6. Excess O_2 Condition	low		normal				
7. Cont. Room O_2 (%)	.8		2.1				
8. Drum Press (psig)	97		97				
9. Final Stm Press (psig)	97	-	97	-			
10. F. Water P/T (psig/°F)	221	220	221	220			
11. Air FD Fan Amps	–		–				
12. Air Temp@FD Fan/CR(°F)	98	86	90	84			
13. Stack Temp (°F)	548		518				
14. Fuel Flow (CFM or GPM)	55.8/2Gal.		53.4/2Gal.				
15. Fuel Pres/Temp(psi/°F)	124	222	126	221			
16. Fuel Atom Pres (psig)	33.5		33.5				
17. Pres.Furn/Windbox(iwg)	.81	3.45	.5	1.8			
18. Primary Reg. Setting	-8	-		-			
19. FGR Reg. Setting	100%	open	closed				
20. Uptake (iwg)	-.2		-.19				
21. ΔP Pitot FGR Duct(iwg)	.1		–				
22. ΔP Orif. FGR Duct(iwg)	.75		–				
23. Temp. FGR Duct (°F)	540		–				
24. Pstat FGR Duct (psig)	4.35		.6				
25. Pstat S.A. Fan (psig)	–		–				
26. Vortex FD Fan Blades	1.01		1.1				
27. Vortex SA Fan Blades	–		–				
28. SA Depth/Flow (ft/cfm)	-	-	-	-			
29. % FGR	–		0				
30. Total Oil Burned #2/#6	-	-	-	-			
31. Total Gas Burned	–		–				
Diffuser Pos.	2 7/8"		2 7/8"				
Air Atom. Press. psig	26.1		25.9				
steam vented	9.4		9.3				

Data Sheet 6003-16

LOCATION 19

FUEL GAS CHROMATOGRAPHIC ANALYSIS

Test 19-190

March 7, 1977

Oxygen	< 0.009% by volume
Nitrogen	0.29
Carbon Dioxide	0.54
Methane	95.84
C 2	2.92
C 3	0.22
C 4	0.099
C 5	0.039
C 6 plus	0.054
Heating Value	1035 BTU/SCF (dry)

Fuel Date Laboratory No.	#2 Oil 1/6/77 13520	#2 Oil 1/10/77 13520	#2 Oil 1/19/77 14009	#6 Oil 12/15/76 13042	#6 Oil 1/19/77 14009	#6 Oil 2/16/77 14667	#6 Oil 3/2/77 14667	#6 Oil 3/10/77 16554	#6 Oil 3/17/77 16554	#6 Oil 3/21/77 16554	#6 Oil 3/23/77 16554
Carbon, %	86.45	85.62	86.49	87.55	86.91	87.55	87.30	87.23	86.06	86.25	86.55
Hydrogen, %	13.01	12.99	13.17	11.49	11.78	11.40	11.34	11.34	11.11	11.25	11.26
Nitrogen, %	<0.001	<0.001	0.008	0.20	0.20	0.23	0.22	0.23	0.32	0.32	0.30
Sulfur, %	0.16	0.10	0.14	0.56	0.54	0.60	0.60	0.55	1.17	1.18	1.02
Ash, %	<0.001	<0.001	0.001	0.020	0.019	0.034	0.026	0.027	0.025	0.024	0.025
Oxygen, %	0.38	1.09	0.19	0.18	0.55	0.19	0.51	0.62	1.32	0.98	0.85
API Gravity	37.8	37.7	37.5	20.7	20.7	17.0	17.3	17.5	14.3	15.7	15.8
HHV, Btu/lb	19,680	19,680	19,610	18,910	19,000	18,780	18,850	18,850	18,670	18,740	18,750
HHV, kJ/kg	45,775	45,775	45,613	43,984	44,194	43,682	43,845	43,845	43,426	43,589	43,613

110

PLANT
LOCATION 19
OPERATOR G. SOTTER
DATE 1-6-77
RUN NO. 19-5
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR @

Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 10°F
BAROMETRIC PRESSURE 30.25
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/2
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	0935		470	.086	1.45	2210.00		70	370	50
	0950		475	.086	1.45	2223.00		75	365	58
	1005		475	.086	1.45	2235.50		85	360	75
	1020		480	.086	1.45	2249.00		90	365	60
	1035		480	.086	1.45	2261.50		95	365	60
	1048		480	.086	1.45	2272.00		100	365	62
	73 min									
TOTAL			477	.086		6200		AVG.	AVG.	
AVERAGE								AVG.		

PARTICULATE CALCULATION SHEET

Test No. 19-5 Date 1-6-76 Location 19 Test Crew R. PIONESSA
Box No. 1 Sample Probe Position CENTER
Test Description
BASELINE #2 OIL, Method 5

Dry Gas Meter Vol. (ft^3)
Final 2272.00
Initial 2210.00
Total 62.00

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	180	149	2	681.2	1012.2
Initial	100	100	0	659.0	859.0
Δ Vol	80	49	2	22.2	153.2

				H_2O BLANK	ACETONE BLANK	Filter No. 13	Blank No. 14
Beaker No.	1	3	4	5	6		
Date Weighed	1/5/77					1/5/77	1/5/77
Tare Wt. 1	100.0785	101.9848	99.2665	98.9340	100.4849	.8529	.8452
2	100.0782	101.9847	99.2663	98.9338	100.4849	.8529	.8454
3							
4							
5							
6							
Avg	100.0784	101.9848	99.2664	98.9339	100.4849	.8529	.8453
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)	735	485	310	200	200		
Date Weighed or 250 Bake	1/18/77					1/18/77	
Final Wt. 250 1	100.1992	101.9914	99.2727	98.9373	100.4889	.8698	.8452
2	100.1994	101.9919	99.2724	98.9371	100.4884	.8699	.8453
3							
4							
5							
6							
Avg	100.1993	101.9917	99.2726	98.9372	100.4887	.8694	.8453
Residue wt Final 250-Tare	.1209	.0069	.0062	.0033	.0038	.0170	~~0~~
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

TOTAL PARTICULATE EMISSION CALCULATIONS

Test No. 19-5 Date 1/6/77 Location 19 Engr. C. SOTTEL

Unit No. 1 Fuel #2 OIL Sampling Train and Method EPA Method 5

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 30.25 in. Hg

Tot. Liquid Collected, V_{1c} 153.2 ml Total Particulate, M_n 147.6 m gm

Velocity Head, ΔP .086 iwg Stack Temp., Ts 937 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 62.0 ft^3 Stack Press., Psg -.2 iwg Excess O_2, XO_2% 3.2 %

Orifice Press. Diff., H 1.45 iwg Stack Gas Sp. Gravity, Gs 1.00 n.d.

Sample Time, θ 73 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m 546 °R

*1.	Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	62.86	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	7.26	SCF
3.	Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.104	N.D.
4.	Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	.0362	grains/DSCF
		b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	5.178×10^{-6}	lb/DSCF
		c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	8.293×10^{-2}	grams/DSCM
5.	Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	411.8	in. w abs.
6.	Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1288	ft/min
7.	Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3612	WSCF/min
		b. Qsd = Eq. 7a x (1. - Eq. 3)	3236	DSCF/min
8.	Material Flow	Ms = Eq. 7b x Eq. 4b x 60	1.005	lb/hr
9.	XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	118.1	N.D.
10.	Emission	a. E = Eq. 4b x Fe x Eq. 9	5.638×10^{-2}	lb/MMBtu
		b. E = Eq. 4c x Fm x Eq. 9 x 1000	24.24	ng/joule
11.	% Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	95.6	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-5 Date 1-6-77 Location ______ Engr. G. SOTTER

Unit No. 1 Fuel #2 OIL Sampling Train and Method ______

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.25 in. Hg

Tot. Liquid Collected, V_{1c} 153.2 ml ~~Total~~ SOLID Particulate, M_n 15.8 m gm

Velocity Head, ΔP .086 iwg Stack Temp., Ts 937 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 62.0 ft^3 Stack Press., Psg -.2 iwg Excess O_2, XO_2% 3.2 %

Orifice Press. Diff., H 1.45 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 73 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m 546 °R

*1. Sample Gas Volume		$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	62.86	SCF
2. Water Vapor		$Vw_{std} = 0.0474\ V_{1c}$	7.26	SCF
3. Moisture Content		Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.104	N.D.
4. Concentration	a.	$C = 0.0154\ Mn/Vm_{std}$	0.00387	grains/DSCF
	b.	$C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	5.542×10^{-7}	lb/DSCF
	c.	$C = \text{Eq. 4b} \times 16.018 \times 10^3$	8.878×10^{-3}	grams/DSCM
5. Abs. Stack Press.		$Ps = P_{bar} \times 13.6 + Psg$	411.8	in. w abs.
6. Stack Gas Speed		$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1288	ft/min
7. Stack Gas Flow Rate @ 70°F	a.	$Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	36.2	WSCF/min
	b.	Qsd = Eq. 7a x (1. - Eq. 3)	3236	DSCF/min
8. Material Flow		Ms = Eq. 7b x Eq. 4b x 60	1.076×10^{-1}	lb/hr
9. XO_2 factor		$XO_2f = 2090/(20.9 - XO_2\%)$	118.1	N.D.
10. Emission	a.	E = Eq. 4b x Fe x Eq. 9	6.03×10^{-3}	lb/MMBtu
	b.	E = Eq. 4c x Fm x Eq. 9 x 1000	2.595	ng/joule
11. % Isokinetic		$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	95.6	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 1/6/77
RUN NO. 19-7
SAMPLE BOX NO. NA
METER BOX NO. 11-1091
METER H
C FACTOR @

No. 2 0:1

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 26°F
BAROMETRIC PRESSURE 30.06 in. Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

BASELINE

FINAL METER 2302.14
START 2272.14
30.00

ANDERSON CASCADE IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time ~~(θ)~~ Min.	Static Pressure (P_s), ~~In. Hg.~~ iwg	Stack Temperature (T_s) °F	Velocity Head (P_s) iwg	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading ~~(V_m) ft^3~~	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1520	-0.2	475	0.086	0.65	2272.14	85	NA	NA	NA
	1530					2278.24	90			
	1540					2284.40	90			
	1550					2290.30	95			
	1600					2295.60	100			
	1610					2301.00	103			
	1612:20					2302.14				
TOTAL								AVG.	AVG.	
AVERAGE								AVG.		

1-6-77

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-7 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 Filter No. 1

Stack Temperature 475 °F Impactor Flow Rate 0.577 CFM $G = 1.24$

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3058 27.3065 > 27.3061	27.3100	0.0039	16.1	100.0	(12.7) x1.24 = 15.7
2	28.4141 28.[illegible] > 28.4143	28.4180	0.0037	15.3	83.9	(8.0) → 9.9
3	29.2128 29.21[illegible] > 29.2130	29.2163	0.0033	13.6	68.6	(5.3) → 6.6
4	21.9732 21.9735 > 21.9734	21.9760	0.0026	10.7	55.0	(3.7) → 4.6
5	17.8934 17.8934 > 17.8934	17.8964	0.0030	12.4	44.3	(2.3) → 2.8
6	17.9086 17.[illegible] > 17.9085	17.9113	0.0028	11.6	31.9	(1.2) → 1.5
7	17.9875 17.[illegible] > 17.9872	17.9895	0.0023	9.5	20.3	(.73) → .90
8	28.4004 28.4003 > 28.4004	28.4024	0.0020	8.3	10.8	(.49) → .61
Back Up Filter	21.7915 21.7922 > 21.7919	21.7925	0.0006	2.5	2.5	

Total 0.0242 100.0

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-7 Date 1-6-77 Location 19 Engr.

Unit No. Fuel No.2 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 30.06 in. Hg

Tot. Liquid Collected, V_{1c} 74 ml Total Particulate, M_n 24.2 m gm

Velocity Head, ΔP 0.086 iwg Stack Temp., Ts 935 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 30 ft^3 Stack Press., Psg -0.2 iwg Excess O_2, XO_2% 2.95 %

Orifice Press. Diff., H 0.65 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 52.3 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	30.17	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$ .104 $(30.17 + V_{w_{STD}}) = V_{w_{STD}}$	3.50	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.104	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0124	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.77×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.0283	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	408.6	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1295	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3597	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3223	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.342	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	116.4	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.019	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	8.16	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	114	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

$\frac{30.17}{52.3} \frac{SCF}{min} = 0.577$ SCFM

PLANT
LOCATION 19
OPERATOR
DATE 1-19-77
RUN NO. 19-74
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.73
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 1/2
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1120		475	.85	1.45	2302.34		65	310	45
	1121	SHUT DOWN				2303.66		—	—	—
RESTART	1128		475	.85	1.45	2303 66		65	310	46
	1137		480	.85	1.45	2311.5		65	305	50
	1145		480	.85	1.45	2321.00		75	340	70
	1157		480	.85	1.45	2330.0		75	340	75
	1207		480	.85	1.45	2338.00		80	325	60
	1217		480	.85	1.45	2347.50		90	330	50
	1227		485	.85	1.45	2355.00		90	330	50
	1238		490	.85	1.45	2364.09				
	71 MIN									
TOTAL						61.75	AVG.	AVG.		
AVERAGE							AVG.			

PARTICULATE CALCULATION SHEET

Test Crew ______

Test No. 19-74 Date 1-19-77 Location 19

Box No. ______ Sample Probe Position ______

Test Description

Dry Gas Meter Vol. (ft^3)

Final 2364.09

Initial 2302.34

Total 61.75

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	195	150	10	680.5	
Initial	100	100	0	660.0	
Δ Vol	95	50	10	20.5	175.5

						Filter No. 15	Blank No. 16
Beaker No.	7	8	9				
Date Weighed							
Tare Wt. 1	104.0052	99.3368	100.1855			.8512	.7999
2	104.0051	99.3365	100.1855			.8514	.7999
3							.8000
4							
5							
6							
Avg	104.0052	99.3367	100.1855			.8513	.7999
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)	490	175	190				
Date Weighed or 250 Bake							
Final Wt. 250 1	104.0740	99.3465	100.1896			.8768	.7999
2	104.0742	99.3468	100.1895			.8770	.7999
3							
4							
5							
6							
Avg	104.0741	99.3467	100.1896			.8769	.7999
Residue wt Final 250-Tare	.0689	.0100	.0041			.0256	0
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-74 Date 1-19-77 Location 19 Engr. C. SOTTER

Unit No. 1 Fuel #2 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.73 in. Hg

Tot. Liquid Collected, V_{1c} 175.5 ml ~~Total~~ SOLID Particulate, M_n 39.7 m gm

Velocity Head, ΔP .085 iwg Stack Temp., Ts 940 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 61.75 ft^3 Stack Press., Psg -.2 iwg Excess O_2, XO_2% 1.1 %

Orifice Press. Diff., H 1.45 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 71 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m ______ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	61.54	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	8.32	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.119	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0272	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	3.891×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	6.233×10^{-2}	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	404.1	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1296	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3554	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3131	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	7.31×10^{-1}	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	105.6	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	.0138	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	5.95	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	99.4	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

TOTAL PARTICULATE EMISSION CALCULATIONS

Test No. 19-74 Date 1-19-77 Location 19 Engr. G. SOTTER

Unit No. 1 Fuel #2 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.73 in. Hg

Tot. Liquid Collected, V_{1c} 175.5 ml Total Particulate, M_n 108.6 m gm

Velocity Head, ΔP .085 iwg Stack Temp., Ts 940 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 61.75 ft^3 Stack Press., Psg -.2 iwg Excess O_2, XO_2% 1.1 %

Orifice Press. Diff., H 1.45 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 71 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m ____ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	61.54	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	8.32	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.119	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0272	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	3.591×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	6.233×10^{-2}	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	404.1	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1296	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3554	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3131	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	7.31×10^{-1}	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	105.6	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.0379	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	16.29	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	99.4	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 1/19/77
RUN NO. 19-76
SAMPLE BOX NO.
METER BOX NO. 117091
METER H
C FACTOR @

NO.2 oil

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time ~~(θ)Min~~.	Static Pressure (P_s), ~~In. Hg.~~ iwg	Stack Temperature (T_s) °F	Velocity Head (P_s) iwg	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading ~~(V_m) ft~~^{3}	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1415	NA	480	0.085	0.65	2364.08	80	NA	NA	50
	1430					2373.00	80			50
	1445					2382.00	85			55
	1500					2390.50	90			55
	1506					2394.08				
TOTAL								AVG.	AVG.	
AVERAGE								AVG.		

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-76 Location 19 Owner ______

Impactor No. 1 Nozzle Size 3/8 Filter No. ______

Stack Temperature 480 °F Impactor Flow Rate 0.588 CFM

$C_T = 1.245$

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3071	27.3102	0.0031	10.5	100.0	(12.5) 15.6
2	28.4153	28.4180	0.0027	9.2	89.5	(7.9) 9.8
3	29.2111	29.2145	0.0034	11.6	80.3	(5.2) 6.5
4	21.9722	21.9757	0.0035	11.9	68.7	(3.7) 4.6
5	17.8959	17.8992	0.0033	11.2	56.8	(2.3) 2.9
6	17.9064	17.9094	0.0030	10.2	45.6	(1.2) 1.5
7	18.0016	18.0033	0.0027	9.2	35.4	(0.73) 0.91
8	28.4008	28.4036	0.0028	9.5	26.2	(0.40) 0.60
Back Up Filter	21.7920	21.7969	0.0049	16.7	16.7	
		Total	0.0294	100.0		

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-76 Date 1/19/77 Location 19 Engr. ______

Unit No. ______ Fuel No. 2 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 29.73 in. Hg

Tot. Liquid Collected, V_{1c} 85 ml Total Particulate, M_n 29.4 m gm

Velocity Head, ΔP 0.085 iwg Stack Temp., Ts 940 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 30 ft^3 Stack Press., Psg -0.2 iwg Excess O_2, XO_2% 1.08 %

Orifice Press. Diff., H 0.65 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 51 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m 542 °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	29.84	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	4.03	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.119	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.015	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	2.17×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.035	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	404.1	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1296	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3554	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3131	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.408	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	105.4	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.021	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	9.07	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	119.3	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

$\frac{30}{51} \frac{ft^3}{min} = 0.588 \frac{ft^3}{min}$

PLANT
LOCATION 19
OPERATOR
DATE 1-20-77
RUN NO. 19 - 83,84
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 38°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1430		530	.092	1.57	2394.52		80	310	80
	1445		540	.092	1.57	2407.00		88	350	88
	1500		540	.092	1.57	2421.50		95	350	95
	1515		540	.092	1.57	2435.00		105	345	105
	1530		545	.092	1.57	2447.50		110	345	110
	1545		545	.092	1.57	2460.68		115	345	115
	75 MIN									
TOTAL			540			66.16		AVG.	AVG.	
AVERAGE								AVG.		

PARTICULATE CALCULATION SHEET

Test Crew R. PIONESSA

Test No. 19-83, 84 Date 1-20-77 Location
Box No. 1 Sample Probe Position CENTER
Test Description

Dry Gas Meter Vol. (ft^3)
Final 2460.68
Initial 2394.52
Total 66.16

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	210	152	6	682.0	1050.0
Initial	100	100	0	659.0	859.0
Δ Vol	110	52	6	23.0	191.0

				ACETONE BLANK	H_2O BLANK		
Beaker No.	10	11	12	3	1	Filter No. 17	Blank No. 18
Date Weighed	1-5-77	→					→
Tare Wt. 1	100.9386	99.8094	100.9727	101.9838	100.0775	.8505	.8039
2	100.9385	99.8092	100.9725	101.9839	100.0777	.8505	.8040
3							
4							
5							
6							
Avg	100.9386	99.8093	100.9726	101.9839	100.0776	.8505	.8040
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)	775	500	350	200	200		
Date Weighed or 250 Bake	1-24-77	→				1-21-77	→
Final Wt. 250 1	100.9756	99.8140	100.9752	101.9855	100.0800	.8655	.8037
2	100.9752	99.8140	100.9751	101.9855	100.0796	.8656	.8035
3							
4							
5							
6							
Avg	100.9754	99.8140	100.9752	101.9855	100.0798	.8656	.8036
Residue wt Final 250-Tare	.0368	.0047	.0026	.0016	.0022	.0151	-.0004
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-83,84 Date 1-20-77 Location ______ TECH ~~Engr.~~ R. PIONESSA

Unit No. 1 Fuel #2 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.80 in. Hg

Tot. Liquid Collected, V_{1c} 191 ml SOLID ~~Total~~ Particulate, M_n 14.2 m gm

Velocity Head, ΔP .092 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 66.16 ft^3 Stack Press., Psg -.225 iwg Excess O_2, XO_2% .85 %

Orifice Press. Diff., H 1.57 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 75 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m ______ °R

*1.	Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	66.11	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	9.05	SCF
3.	Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.120	N.D.
4.	Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	.0033	grains/DSCF
		b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	$.474 \times 10^{-6}$	lb/DSCF
		c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	$.758 \times 10^{-2}$	grams/DSCM
5.	Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	405	in. w abs.
6.	Stack Gas Speed	$Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1388	ft/min
7.	Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3588	WSCF/min
		b. Qsd = Eq. 7a x (1. - Eq. 3)	3158	DSCF/min
8.	Material Flow	Ms = Eq. 7b x Eq. 4b x 60	$.898 \times 10^{-1}$	lb/hr
9.	XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	103.98	N.D.
10.	Emission	a. E = Eq. 4b x Fe x Eq. 9	$.454 \times 10^{-2}$	lb/MMBtu
		b. E = Eq. 4c x Fm x Eq. 9 x 1000	1.95	ng/joule
11.	% Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	100.4	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

TOTAL PARTICULATE EMISSION CALCULATIONS

Test No. 19-83,84 Date 1-20-77 Location 19 ~~Engr~~ TECH R. PIONESSA

Unit No. 1 Fuel #2 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.80 in. Hg

Tot. Liquid Collected, V_{1c} 191 ml Total Particulate, M_n 42.5 m gm

Velocity Head, ΔP .092 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 66.16 ft^3 Stack Press., Psg -.225 iwg Excess O_2, XO_2% .85 %

Orifice Press. Diff., H 1.57 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 75 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m ______ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	66.11	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	9.05	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.120	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	.0099	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.418×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	2.270×10^{-2}	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	405.0	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1388	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3588	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3158	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	2.687×10^{-1}	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	103.98	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	1.359×10^{-2}	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	5.84	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	100.4	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 1/20/77
RUN NO. 19-85 No.201
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 39°
BAROMETRIC PRESSURE 29.8 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. ~~Hg.~~ H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s) (iwg)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet $(T_{min.})$ °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1602:30		540	0.092	0.7	2461.03	100	NA	NA	60
	1615:00					2468.20	120			60
	1630:00					2477.00	110			60
	1645:00					2486.00	100			63
	1655:30					2491.03				
						30.0				
TOTAL								AVG.	AVG.	
AVERAGE								AVG.		

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-85 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 Filter No.

Stack Temperature °F Impactor Flow Rate CFM

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3108	27.3124	0.0016	13.6	100.0	(12.5) 15.9
2	28.4147	28.4164	0.0017	14.4	86.4	(7.0) 8.9
3	29.2168	29.2183	0.0015	12.7	72.0	(5.2) 6.6
4	21.9719	21.9734	0.0015	12.7	59.3	(3.7) 4.7
5	17.8959	17.8975	0.0016	13.6	46.6	(2.4) 3.1
6	17.9086	17.9097	0.0011	9.3	33.0	(1.2) 1.5
7	17.9875	17.9888	0.0013	11.0	23.7	(0.73) 0.93
8	28.4043	28.4058	0.0015	12.7	12.7	(0.49) 0.62
Back Up Filter	21.7923	21.7923	~~0~~	0	0	0 0
	1-20-77	1-21-77				

Total 0.0118

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-35 Date 1-20-77 Location 19 Engr.______

Unit No. 1 Fuel NO. 2 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 29.80 in. Hg

Tot. Liquid Collected, V_{1c} 86 ml Total Particulate, M_n 11.8 m gm

Velocity Head, ΔP 0.092 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 30.0 ft^3 Stack Press., Psg -0.225 iwg* Excess O_2, XO_2% .68 %

Orifice Press. Diff., H 0.7 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 53 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m 567 °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	29.41	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	4.08	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.120	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.00618	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	0.884×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.0142	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	405.0	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1388	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3588	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3157	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.167	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	103.4	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.00843	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	3.624	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	114	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

$\frac{29.91}{52}$ SCFM = 0.575 Scfm

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated. Data Sheet 6002-4

* Assumed from 462P

PLANT
LOCATION 19
OPERATOR R. PIONESSA
DATE 1-24-77
RUN NO. 19- 97,98
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 17 °F
BAROMETRIC PRESSURE 30.16
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 1/2
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1007		480	.095	1.65	2491.35		80	320	40
	1022		490	.095	1.65	2506.00		85	340	55
	1037		490	.095	1.65	2519.00		90	340	70
	1052		490	.095	1.65	2533.00		95	345	60
	1107		490	.095	1.65	2547.00		100	350	48
	1115					2554.80				
TOTAL	68 min					63.45		AVG.	AVG.	
AVERAGE								AVG.		

PARTICULATE CALCULATION SHEET

Test Crew R. PIONESSA

Test No. 19-97, 98 Date 1-24-77 Location 19

Box No. ______ Sample Probe Position ______

Test Description

Dry Gas Meter Vol. (ft^3)

Final 2554.80

Initial 2491.35

Total 63.45

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	166	146	3	672.5	987.5
Initial	100	100	0	650.5	850.5
Δ Vol	66	46	3	22.0	137.0

Beaker No.	4	5	6	7 ACETONE BLANK	8 H_2O BLANK	Filter No. 14	Blank No. 16
Date Weighed	1-21-77						
Tare Wt. 1	99.2650	98.9319	100.4839	104.0054	99.3369	.8452	.7999
2	99.2650	98.9320	100.4840	104.0054	99.3366	.8454	.7999
3							.8000
4							
5							
6							
Avg	99.2650	98.9320	100.4840	104.0054	99.3368	.8453	.7999
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)	750	550	350	200	200		
Date Weighed or 250 Bake	1-26-77	1-25-77					
Final Wt. 250 1	99.3202	98.9426	100.5026	104.0048	99.3365	.9228	.7999
2	99.3200	98.9427	100.5026	104.0046	99.3365	.9228	.7998
3							
4							
5							
6							
Avg	99.3201	98.9427	100.5026	104.0047	99.3365	.9228	.7999
Residue wt Final 250-Tare	.0551	.0107	.0186	.0007	.0003	.0775	0
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-97,98 Date 1-24-77 Location 19 Engr. G. SOTTER

Unit No. 1 Fuel #6 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 30.16 in. Hg

Tot. Liquid Collected, V_{1c} 137.0 ml ~~Total~~ SOLID Particulate, M_n 171.8 m gm

Velocity Head, ΔP .095 iwg Stack Temp., Ts 950 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 63.45 ft^3 Stack Press., Psg -.225 iwg Excess O_2, XO_2% 3.15 %

Orifice Press. Diff., H 1.65 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 68 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m ______ °R

			Result	Units
*1. Sample Gas Volume		$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	64.17	SCF
2. Water Vapor		$Vw_{std} = 0.0474\ V_{1c}$	6.49	SCF
3. Moisture Content		Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.092	N.D.
4. Concentration	a.	$C = 0.0154\ Mn/Vm_{std}$	.0412	grains/DSCF
	b.	$C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	5.903	lb/DSCF
	c.	$C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.946×10^{-1}	grams/DSCM
5. Abs. Stack Press.		$Ps = P_{bar} \times 13.6 + Psg$	409.95	in. w abs.
6. Stack Gas Speed		$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1367	ft/min
7. Stack Gas Flow Rate @ 70°F	a.	$Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3764	WSCF/min
	b.	Qsd = Eq. 7a x (1. - Eq. 3)	3418	DSCF/min
8. Material Flow		Ms = Eq. 7b x Eq. 4b x 60	1.210	lb/hr
9. XO_2 factor		$XO_2f = 2090/(20.9 - XO_2\%)$	117.7	N.D.
10. Emission	a.	E = Eq. 4b x Fe x Eq. 9	6.406×10^{-2}	lb/MMBtu
	b.	E = Eq. 4c x Fm x Eq. 9 x 1000	27.56	ng/joule
11. % Isokinetic		$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	99.2	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

TOTAL PARTICULATE EMISSION CALCULATIONS

Test No. 19-9798 Date 1-24-77 Location 19 Engr. G SOTTER

Unit No. 1 Fuel #6 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 30.16 in. Hg

Tot. Liquid Collected, V_{1c} 137.0 ml Total Particulate, M_n 225.8 m gm

Velocity Head, ΔP .095 iwg Stack Temp., Ts 950 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 63.45 ft^3 Stack Press., Psg -.225 iwg Excess O_2, XO_2% 3.15 %

Orifice Press. Diff., H 1.65 iwg Stack Gas Sp. Gravity, Gs ____ n.d.

Sample Time, θ 68 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m ____ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	64.17	SCF
2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$	6.49	SCF
3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.092	N.D.
4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$	.0542	grains/DSCF
b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	7.759×10^{-6}	lb/DSCF
c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	1.243×10^{-1}	grams/DSCM
5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$	409.95	in. w abs.
6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1367	ft/min
7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3764	WSCF/min
b. Qsd = Eq. 7a x (1. - Eq. 3)	3418	DSCF/min
8. Material Flow Ms = Eq. 7b x Eq. 4b x 60	1.591	lb/hr
9. XO_2 factor $XO_2f = 2090/(20.9 - XO_2\%)$	117.7	N.D.
10. Emission a. E = Eq. 4b x Fe x Eq. 9	8.42×10^{-2}	lb/MMBtu
b. E = Eq. 4c x Fm x Eq. 9 x 1000	36.21	ng/joule
11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	99.2	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 1/24/77
RUN NO. 17-99
SAMPLE BOX NO. No.6 oil
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 30 °F
BAROMETRIC PRESSURE 30.00 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 3/8
NOZZLE DIAMETER, IN.
PROBE HEATER SETTING

ANDERSON IMPACTOR

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), ~~In. Hg.~~ iwg	Stack Temperature (T_s) °F	Velocity Head (P_s) iwg	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading ~~(V_m) ft^3~~	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{m in.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet ($T_{m out}$) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1430	-0.225	485	1.095	0.74	2553.87	60	NA	NA	50
	1440	↓	↓	↓	↓	2560.00	65	↓	↓	60
	1454					2568.87	70			60
	24					15.00				
TOTAL								AVG.	AVG.	
AVERAGE								AVG.		

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-99 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 Filter No.

Stack Temperature 485 °F Impactor Flow Rate 0.627 CFM

C_T = 1.245

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3086	27.3123	0.0037	14.2	100.0	(12.1) 15.1
2	28.4141	28.4179	0.0038	14.5	85.8	(7.7) 9.6
3	29.2135	29.2167	0.0032	12.3	71.3	(5.1) 6.3
4	21.9703	21.9733	0.0030	11.5	59.0	(3.6) 4.5
5	17.8991	17.9007	0.0016	6.1	47.5	(2.3) 2.9
6	17.9123	17.9148	0.0025	9.6	41.4	(1.15) 1.43
7	17.9869	17.9894	0.0025	9.6	31.8	(0.70) 0.87
8	28.4000	28.4022	0.0022	8.4	22.2	(0.46) 0.57
Back Up Filter	21.7922	21.7958	0.0036	13.8	13.8	

Total 0.0261 100.0

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-99 Date 1-24 77 Location 19 Engr. ______

Unit No. 1 Fuel 110.6 0:1 Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .683 Barometric Pressure, P_{bar} 30.00 in. Hg

Tot. Liquid Collected, V_{1c} ______ ml Total Particulate, M_n 26.1 m gm

Velocity Head, ΔP 0.095 iwg Stack Temp., Ts 945 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 15 ft^3 Stack Press., Psg -0.225 iwg Excess O_2, XO_2% 3.1 %

Orifice Press. Diff., H 0.74 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 24 min Nozzle Dia., Dn 0.375 in. Meter Temp., T_m 65 °R °F

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	15.06	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	1.52	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.092	N.D. *
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0267	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	3.82×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.0612	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	407.78	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1367	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3764	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3417	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.783	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	117.4	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.0414	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	17.78	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	117	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

$\frac{15.06}{24}$ SCFM = 0.627 SCFM

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

*From 11-4P

PLANT
LOCATION 19
OPERATOR
DATE 1-26-77
RUN NO. 19-116
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 26 °F
BAROMETRIC PRESSURE 29.72
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. ½
PROBE HEATER SETTING

METHOD 5

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. ~~Hg~~ H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	5	-.225	500	0.108	1.75	2569.30	80		300	50
	20		505	0.125	1.60	2583.00	85		350	65
	35		510	0.130	1.57	2597.00	92		350	62
	50		510	0.130	1.60	2610.00	100		320	55
	1:05		515	0.130	1.62	2624.00	108		310	55
	1:12		515	0.130	1.60	2629.30	110		310	55
TOTAL	67 min.					60		AVG.	AVG.	
AVERAGE		-0.225	509	0.1255	1.62			AVG.		

PARTICULATE CALCULATION SHEET

Test Crew ____________

Test No. 19-116 Date 1-26-77 Location 19

Box No. 1 Sample Probe Position center

Test Description

Dry Gas Meter Vol. (ft^3)

Final 2629.30

Initial 2569.30

Total 60.0

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	187	142	3	663.0	995.0
Initial	100	100	—	644.8	844.8
Δ Vol	87	42	3	18.2	150.2

Beaker No.	1	3	9	Acetone Blank 10	H_2O Blank 11	Filter No. 16	Blank No. 18
Date Weighed	1-25-77	→	→	→	→	1-25-77	
Tare Wt. 1	100.0776	101.9842	100.1851	100.9366		0.7999	0.8033
2	100.0776	101.9843	100.1850	100.9366		0.7998	0.8035
3							
4							
5							
6							
Avg	100.0776	101.9843	100.1851	100.9366		0.7999	0.8034
Bottle No.	1 & 2	3	4				
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	~~Cyclone (Acetone)~~	~~Flask~~ (Dry)		
Rinse (ml)							
Date Weighed or 250 Bake	2-15-77	2-15-77	2-15-77	1-26-77	1-26-77	1-27-77	1-27-77
Final Wt. 250 1	100.0968	102.0026	100.1885	100.9386	99.8103	0.8375	0.8035
2	100.0969	102.0029	100.1885	100.9384	99.8104	0.8374	0.8037
3							
4							
5							
6							
Avg	100.0969	102.0028	100.1885	100.9385	99.8104	0.8375	0.8036
Residue wt Final 250-Tare	0.0193	0.0185	0.0035	0.0019	0.0010	0.0374	⌀
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 19-116 Date 1-26-77 Location 19 Engr. G. Setter

Unit No. 1 Fuel #2 oil Sampling Train and Method Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 29.72 in. Hg

Tot. Liquid Collected, V_{lc} 150.2 ml Total Particulate, M_n 67.6 m gm Total

Velocity Head, ΔP 0.126 iwg Stack Temp., Ts 969 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 60.0 ft^3 Stack Press., Psg -0.225 iwg Excess O_2, XO_2% 3.1 %

Orifice Press. Diff., H 1.62 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 67 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m ______ °R

			Result	Units
*1.	Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	59.8	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ V_{lc}$	7.12	SCF
3.	Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.106	N.D.
4.	Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0174	grains/DSCF
		b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	2.493×10^{-6}	lb/DSCF
		c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	3.993×10^{-2}	grams/DSCM
5.	Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	403.97	in. w abs.
6.	Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1602	ft/min
7.	Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	4261	WSCF/min
		b. Qsd = Eq. 7a x (1. - Eq. 3)	3809	DSCF/min
8.	Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.5698	lb/hr
9.	XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	117.4	N.D.
10.	Emission	a. E = Eq. 4b x Fe x Eq. 9	2.70×10^{-2}	lb/MMBtu
		b. E = Eq. 4c x Fm x Eq. 9 x 1000	11.60	ng/joule
11.	% Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	84.2	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT ______
LOCATION 17
OPERATOR ______
DATE 2/17/77
RUN NO. 19-132 No.6 oil
SAMPLE BOX NO. ______
METER BOX NO. 4-11-1091
METER H ______
C FACTOR @ ______

ANDERSON IMPACTOR

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 19°C
BAROMETRIC PRESSURE 30.12 in Hg
ASSUMED MOISTURE, % ______
HEATER BOX SETTING ______
PROBE LENGTH, IN. ______
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING ______

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), ~~in Hg~~. inwg	Stack Temperature (T_s) °F	Velocity Head (P_s) inwg	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading ~~(V_m) ft~~^{3}	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1122	NA	475	0.08	0.7	2706.00	110	NA	NA	60
	1132					2712.00	110			55
	1142					2718.00	110			55
	1147					2721.00	115			55
	25 min					15.00				
TOTAL								AVG.	AVG.	
AVERAGE								AVG.		

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-132 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 Filter No.

Stack Temperature 475 °F Impactor Flow Rate 0.605 CFM

temp. correction factor · 1.24

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3071	27.3110	0.0039	11.9	99.9	(12.5) 15.5
2	28.4148	28.4187	0.0039	11.9	88.0	(7.8) 9.7
3	29.2157	29.2194	0.0037	11.3	76.1	(5.2) 6.4
4	21.9716	21.9744	0.0028	8.5	64.8	(3.7) 4.6
5	17.8933	17.8961	0.0028	8.5	56.3	(2.3) 2.9
6	17.9073	17.9102	0.0029	8.8	47.8	(1.2) 1.5
7	18.0006	18.0032	0.0026	7.9	39.0	(0.72) 0.9
8	28.4026	28.4053	0.0027	8.2	31.1	(0.48) 0.6
Back Up Filter	21.7893	21.7968	0.0075	22.9		

0.0328

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-132 Date 7-17-77 Location 19 Engr. SOTTER

Unit No. 1 Fuel #6 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 30.12 in. Hg

Tot. Liquid Collected, V_{1c} ______ ml Total Particulate, M_n 32.8 m gm

Velocity Head, ΔP 1.08 iwg Stack Temp., Ts 935 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 15 ft^3 Stack Press., Psg -0.23 iwg Excess O_2, XO_2% .98 %

Orifice Press. Diff., H 0.7 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 25 min Nozzle Dia., Dn .375 in. Meter Temp., T_m ______ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	15.116	SCF 0.605 SCFM
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	1.81	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2) Meth 5	.1064	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0334	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	4.785×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^{3}$	0.0766	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	409.4	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1245	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3479	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3107	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.892	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	104.9	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.046	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	19.9	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	124	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 2-17-77
RUN NO. 19-132
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 17 °F
BAROMETRIC PRESSURE 30.12
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. ~~Hg.~~ H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	0950	-0.23	465	0.0695	1.46	2645.99	80		320	50
	1005		470	0.0695	1.46	2660.00	85		340	55
	1020		475	0.0695	1.46	2673.0	90		330	62
	1035		475	0.0695	1.46	2686.0	100		330	55
	1050		475	0.0695	1.46	2698.0	105		340	55
	1059:30		490	0.0695	1.46	2705.99	110		340	60
TOTAL	69:30							AVG.	AVG.	
AVERAGE				475		60.0		AVG.		

PARTICULATE CALCULATION SHEET

Test No. 19-132 Date 2-17-77 Location 19 Test Crew R. Pionesso
Box No. 1 Sample Probe Position
Test Description

Dry Gas Meter Vol. (ft^3)
Final 2705.90
Initial 2645.99
Total 60.0

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	185	143	5	673	1006
Initial	100	100	0	653	853
Δ Vol	85	43	5	20	153

				Acetone Blank	H_2O Blank	Filter No.	Blank No.
Beaker No.		4	5	6	7	8	18	19
Date Weighed		1-27-77						
Tare Wt.	1	99.2687	98.9367	100.4858	104.0069	99.3370	0.8033	0.8434
	2	99.2685	98.9366	100.4858	104.0068	99.3311	0.8034	0.8436
	3							
	4							
	5							
	6							
	Avg	99.2686	98.9367	100.4858	104.0069	99.3371	0.8034	0.8435
Bottle No.		1 & 2	3	4				
Content		Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone ~~(Acetone)~~	~~Flask~~ (Dry)		
Rinse (ml)		725	550	350	200	200		
Date Weighed or 250 Bake		2-21-77	2-18-77	2-18-77	2-18-77	2-18-77	→	→
Final Wt. 250	1	99.2890	98.9668	100.4869	104.0062	99.3372	0.9428	0.8435
	2	99.2888	98.9668	100.4865	104.0063	99.3374	0.9428	0.8436
	3							
	4							
	5							
	6							
	Avg	99.2889	98.9668	100.4867	104.0063	99.3373	0.9428	0.8436
Residue wt Final 250-Tare		0.0203	0.0301	0.0009	∅	0.002	0.1394	∅
Date Weighed or 650 Bake								
Final Wt. 650	1							
	2							
	3							
	4							
	5							
	6							
	Avg							
Residue Wt Final 650-Tare								

Comments:

Data Sheet 6002-3

TOTAL & SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-132 Date 2-17-77 Location 19 Engr. Setter

Unit No. 1 Fuel #6 Sampling Train and Method Meth. 5

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.12 in. Hg

Tot. Liquid Collected, V_{lc} 153 ml Total Particulate, M_n 190.7 total / 170.4 solid m gm

Velocity Head, ΔP 0.0695 iwg Stack Temp., Ts 935 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 60.0 ft^3 Stack Press., Psg -0.23 iwg Excess O_2, XO_2% 0.98 %

Orifice Press. Diff., H 1.46 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 69.5 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m ______ °R

		TOTAL	SOLID	
*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$		60.5756	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{lc}$		7.2522	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)		0.1069	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.04848	0.0433	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	6.94×10^{-6}	6.2×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.111	9.935×10^{-2}	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$		409.40	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$		1160.78	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$		3243.12	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)		2896.43	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	1.206	1.0722	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$		104.92	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.0671	0.0600	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	28.87	25.80	ng/joule
11. % Isokinetic	$I = \dfrac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$		108.12	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION
OPERATOR
DATE 2/21/77
RUN NO. 19-143 #6 Oil
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 23°F
BAROMETRIC PRESSURE 29.89 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 3/8
NOZZLE DIAMETER, IN.
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), ~~In. Hg.~~ iwg	Stack Temperature (T_s) °F	Velocity Head (P_s) iwg	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading ~~(V_m) Ft^3~~	Gas Sample Temperature at Dry Gas Meter Inlet ($T_{m in.}$) °F	Gas Sample Temperature at Dry Gas Meter Outlet ($T_{m out}$) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1155	-0.2	485	0.089	0.56	2783.41	108	NA	NA	62
	1205					2789.00	108			58
	1215					2794.00	110			55
	1224					2798.41	110			55
	29					15.00				
TOTAL							AVG.		AVG.	
AVERAGE							AVG.			

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-143 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 in. Filter No.

Stack Temperature 485 °F Impactor Flow Rate 0.51 CFM

temp. corr. factor - 1.25

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3106	27.3150	0.0044	13.0	100.0	(13.5) 16.9
2	28.4205	28.4254	0.0049	14.5	87.0	(8.6) 10.8
3	29.2180	29.2224	0.0044	13.0	72.5	(5.6) 7.0
4	21.9731	21.9762	0.0031	9.2	59.5	(3.9) 4.9
5	17.8976	17.9007	0.0031	9.2	50.3	(2.5) 3.1
6	17.9111	17.9137	0.0026	7.7	41.1	(1.29) 1.6
7	18.0004	18.0029	0.0025	7.4	33.4	(0.80) 1.0
8	28.4043	28.4065	0.0022	6.5	26.0	(0.54) 0.7
Back Up Filter	21.7914	21.7980	0.0066	19.5		

0.0338

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-143 Date 2-21-77 Location 19 Engr. SOTTER

Unit No. 1 Fuel #6 Oil Sampling Train and Method ______

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.89 in. Hg

Tot. Liquid Collected, V_{1c} ____ ml Total Particulate, M_n 33.8 m gm

Velocity Head, ΔP 0.089 iwg Stack Temp., Ts 945 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 15.00 ft^3 Stack Press., Psg -0.2 iwg Excess O_2, XO_2% 3.1 %

Orifice Press. Diff., H 0.56 iwg Stack Gas Sp. Gravity, Gs ____ n.d.

Sample Time, θ 29 min Nozzle Dia., Dn .375 in. Meter Temp., T_m 569 °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	15.0	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	1.57	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2) Meth 5	0.095	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0347	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	4.97×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.0796	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	406.3	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1325	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3636.7	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3291	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.981	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	117.4	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.0538	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	23.13	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	100.4	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 2-21-77
RUN NO. 19-143
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 21
BAROMETRIC PRESSURE 29.86
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. ~~Hg.~~ H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	10:33	-0.2	475	0.089	1.63	2721.38	80		310	50
	10:48		480	0.089	1.63	2736.00	85		330	60
	11:03		483	0.089	1.63	2750.00	92		330	60
	11:18		485	0.089	1.63	2764.00	100		330	57
	11:33		490	0.089	1.63	2777.00	105		340	55
	11:40		490	0.089	1.63	2783.38	106		340	55
TOTAL	67					62.0		AVG.	AVG.	
AVERAGE			487					AVG.		

PARTICULATE CALCULATION SHEET

Test Crew R.R.

Test No. 19-143 Date 2-21-77 Location 19

Box No. 1 Sample Probe Position E

Test Description

Dry Gas Meter Vol. (ft^3)

Final 2783.38

Initial 2721.38

Total 62.00

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	172	142	5	667.2	986.2
Initial	100	100	0	648.0	848.0
Δ Vol	72	42	5	19.2	138.2

Beaker No.	1	3	9			Filter No. 19	Blank No. 20
Date Weighed	2-18-77	———	——→			2-18-77	1-27-77
Tare Wt. 1	100.0790	101.9866	100.1860			0.8435	0.8071
2	100.0788	101.9863	100.1860			0.8436	0.8071
3							
4							
5							
6							
Avg	100.0789	101.9865	100.1860			0.8436	0.8071
Bottle No.	1 & 2	3	4				
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)	750	475	350				
Date Weighed or 250 Bake	2-22-77	2-22-77	2-22-77			2-22-77	2-22-77
Final Wt. 250 1	100.1069	102.0328	100.1969			0.9513	0.8074
2	100.1068	102.0329	100.1967			0.9512	0.8074
3							
4							
5							
6							
Avg	100.1069	102.0329	100.1968			0.9513	0.8074
Residue wt Final 250-Tare	0.028	0.0464	0.0108			0.1077	0.0003
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 19-143 Date 2-21-77 Location 19 Engr. G. Sotter

Unit No. 1 Fuel #6 oil Sampling Train and Method Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 29.86 in. Hg

192.9 Total

Tot. Liquid Collected, V_{1c} 138.2 ml ~~Total~~ Particulate, M_n 164.9 m gm solid

Velocity Head, ΔP 0.089 iwg Stack Temp., Ts 947 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 62.0 ft^3 Stack Press., Psg -0.2 iwg Excess O_2, XO_2% 3.1 %

Orifice Press. Diff., H 1.63 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 67 min Nozzle Dia., Dn 1/2 in. Meter Temp., T_m °R

			TOTAL	SOLID	
*1. Sample Gas Volume		$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$		62.08	SCF
2. Water Vapor		$Vw_{std} = 0.0474\ V_{1c}$		6.55	SCF
3. Moisture Content		Bwo = Eq. 2/(Eq. 1 + Eq. 2)		0.095	N.D.
4. Concentration	a.	$C = 0.0154\ Mn/Vm_{std}$	0.0479	0.041	grains/DSCF
	b.	$C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	6.85×10^{-6}	5.86×10^{-6}	lb/DSCF
	c.	$C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.1097	9.38×10^{-2}	grams/DSCM
5. Abs. Stack Press.		$Ps = P_{bar} \times 13.6 + Psg$		405.9	in. w abs.
6. Stack Gas Speed		$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$		1328	ft/min
7. Stack Gas Flow Rate @ 70°F	a.	$Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$		3631	WSCF/min
	b.	Qsd = Eq. 7a x (1. - Eq. 3)		3286	DSCF/min
8. Material Flow		Ms = Eq. 7b x Eq. 4b x 60		1.155	lb/hr
9. XO_2 factor		$XO_2f = 2090/(20.9 - XO_2\%)$		117.4	N.D.
10. Emission	a.	E = Eq. 4b x Fe x Eq. 9	0.074	0.0635	lb/MMBtu
	b.	E = Eq. 4c x Fm x Eq. 9 x 1000	31.8	27.2	ng/joule
11. % Isokinetic		$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$		101.3	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION
OPERATOR
DATE 2/23/77
RUN NO. 19-159 #6 oil
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 41°F
BAROMETRIC PRESSURE 30.09 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 3/8
NOZZLE DIAMETER, IN.
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), ~~In. Hg.~~ iwg	Stack Temperature (T_s) °F	Velocity Head (P_s) iwg	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading ~~(V_m) ft~~^{3}	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1115	-0.23	530	0.089	0.54	2861.00	125	NA	NA	70
	1125					2866.00	120			62
	1135					2871.00	120			58
	1145					2876.00	118			58
	30					15.00				
TOTAL								AVG.	AVG.	
AVERAGE								AVG.		

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19.159 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 in. Filter No.

Stack Temperature 530 °F Impactor Flow Rate 0.503 CFM

Temp. Correction Factor - 1.225

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3114	27.3163	0.0049	20.4	100.0	(13.5) 16.5
2	28.4161	28.4205	0.0044	18.3	79.6	(8.6) 10.5
3	29.2165	29.2200	0.0035	14.6	61.3	(5.6) 6.9
4	21.9736	21.9759	0.0025	10.4	46.7	(3.9) 4.8
5	17.8966	17.8988	0.0022	9.2	36.3	(2.5) 3.1
6	17.9116	17.9131	0.0015	6.3	27.1	(1.45) 1.8
7	18.0010	18.0018	0.0008	3.3	20.8	(0.80) 1.0
8	28.4047	28.4055	0.0034	14.2		
Back Up Filter						

Total 0.0240

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-159 Date 2-23-77 Location 19 Engr. SCOTTER

Unit No. 1 Fuel #6 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 30.09 in. Hg

Tot. Liquid Collected, V_{1c} ______ ml Total Particulate, M_n 24.0 m gm

Velocity Head, ΔP 0.089 iwg Stack Temp., Ts 990 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 15.00 ft^3 Stack Press., Psg -.23 iwg Excess O_2, XO_2% 1.7 %

Orifice Press. Diff., H 0.54 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 30 min Nozzle Dia., Dn .375 in. Meter Temp., T_m ______ °R

*1.	Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	15.09	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	1.85	SCF
3.	Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.109	N.D.
4.	Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0245	grains/DSCF
		b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	3.507×10^{-6}	lb/DSCF
		c. C = Eq. 4b x 16.018 x 10^3	0.056	grams/DSCM
5.	Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	408.99	in. w abs.
6.	Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1352	ft/min
7.	Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3574	WSCF/min
		b. Qsd = Eq. 7a x (1. - Eq. 3)	3184	DSCF/min
8.	Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.6699	lb/hr
9.	XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	108.85	N.D.
10.	Emission	a. E = Eq. 4b x Fe x Eq. 9	0.035	lb/MMBtu
		b. E = Eq. 4c x Fm x Eq. 9 x 1000	15.1	ng/joule
11.	% Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	101.2	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 2-23-77
RUN NO. 19-159
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

METHOD 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 41°F
BAROMETRIC PRESSURE 30.08
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 4 ft.
NOZZLE DIAMETER, IN. 1/2"
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. ~~Hg~~. H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	0951	-0.23	505	0.089	1.57	2788.64		100	310	60
	1006		530	0.089	1.57			110	320	58
	1021		530	0.089	1.57			115	335	60
	1036		530	0.089	1.57			122	330	55
	1051		530	0.089	1.57			125	350	60
	1103		530	0.089	1.57	2860.64		125	350	60
TOTAL	63					62.0		AVG.	AVG.	
AVERAGE			526					AVG.		

PARTICULATE CALCULATION SHEET

Test Crew R. P.

Test No. 19-159 Date 2-23-77 Location 19

Box No. ______ Sample Probe Position ______

Test Description ______

Dry Gas Meter Vol. (ft^3)

Final	2860.64
Initial	2798.64
Total	62.0

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	209	135	2	659.0	1005.0
Initial	100	100	[illegible]	643.6	843.6
Δ Vol	109	35	2	15.4	161.4

Beaker No.	10	11	12			Filter No. 20	Blank No. 21
Date Weighed	2-18-77 →		→			2-22-77	1-27-77
Tare Wt. 1	100.9370	99.8094	100.9694			0.8074	0.8211
2	100.9372	99.8094	100.9692			0.8074	0.8211
3							
4							
5							
6							
Avg	100.9371	99.8094	100.9693			0.8074	0.8211

Bottle No.	1 & 2	3	4				
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)	750	485	275				
Date Weighed or 250 Bake	2-24-77 →		→			2-24-77	2-24-77
Final Wt. 250 1	100.9565	99.8425	100.9742			0.9623	0.8211
2	100.9566	99.8427	100.9742			0.9623	0.8211
3							
4							
5							
6							
Avg	100.9566	99.8426	100.9742			0.9623	0.8211
Residue wt Final 250-Tare	0.0195	0.0332	0.0049			0.1549	0
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments: 0.193g solids
0.2125g Total

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 19-159 Date 2-23-77 Location 19 Engr. G. S.

Unit No. 1 Fuel #6 oil Sampling Train and Method Meth. 5

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.08 in. Hg

Tot. Liquid Collected, V_{1c} 161.4 ml Total Particulate, M_n 212.5 Total 193 Solid gm

Velocity Head, ΔP 0.089 iwg Stack Temp., Ts 986 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 62 ft^3 Stack Press., Psg -0.23 iwg Excess O_2, XO_2% 1.7 %

Orifice Press. Diff., H 1.57 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 63 min Nozzle Dia., Dn ½ in. Meter Temp., T_m ____ °R

		Total	Solid	
*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$		62.5287	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$		7.6504	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)		0.1090	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0523	0.0463	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	7.494×10^{-6}	6.633×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.120	0.1062	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$		408.858	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$		1349.81	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$		3571.45	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)		3182.12	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60		1.2664	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$		108.85	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.075	0.0683	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	32.33	29.36	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$		112.1	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 3-1-77
RUN NO. 19-170 #6 Oil
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR @

ANDERSON IMPACTOR

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 35°F
BAROMETRIC PRESSURE 29.98 in Hg
ASSUMED MOISTURE, % ~13%
HEATER BOX SETTING
PROBE LENGTH, IN. 3/8
NOZZLE DIAMETER, IN.
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), ~~In. Hg.~~ iwg	Stack Temperature (T_s) °F	Velocity Head (P_s) iwg	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading ~~(V_m) ft^3~~	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1332	-0.22	512	0.115	0.61	2936.560	118	NA	NA	NA
	1342					42.0	119			
	1352					48.0	121			
	1402					2952.350	121			
TOTAL								AVG.	AVG.	
AVERAGE								AVG.		

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-170 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8" Filter No.

Stack Temperature 512 °F Impactor Flow Rate 0.53 CFM

Temp. Corr Factor - 1.25

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3112	27.3164	0.0052	20.0	100.0	(13.5) 16.9
2	28.4177	28.4219	0.0042	16.1	80.0	(8.5) 10.6
3	29.2172	29.2208	0.0036	13.8	63.9	(5.6) 7.0
4	21.9727	21.9752	0.0025	9.6	50.1	(3.8) 4.75
5	17.8941	17.8962	0.0021	8.1	40.5	(2.5) 3.1
6	17.9089	17.9107	0.0018	6.9	32.4	(1.25) 1.6
7	18.0042	18.0057	0.0015	5.8	25.5	(0.76) 0.95
8	28.4035	28.4051	0.0016	6.2	19.7	(0.53) 0.66
Back Up Filter	21.7916	21.7948	0.0035	13.5		

Total 0.0260

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-170 Date 3-1-77 Location 19 Engr. SETTER

Unit No. 1 Fuel #6 Oil Sampling Train and Method ____

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.98 in. Hg

Tot. Liquid Collected, V_{lc} ____ ml Total Particulate, M_n 26.0 m gm

Velocity Head, ΔP 0.115 iwg Stack Temp., Ts 972 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 15.79 ft^3 Stack Press., Psg -.22 iwg Excess O_2, XO_2% 4.2 %

Orifice Press. Diff., H 0.61 iwg Stack Gas Sp. Gravity, Gs ____ n.d.

Sample Time, θ 30 min Nozzle Dia., Dn .375 in. Meter Temp., T_m 580 °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	15.84	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{lc}$	1.31	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.091	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0253	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	3.62×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.058	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	407.5	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1526	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	4082	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3710	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.806	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	125.1	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.0418	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	17.96	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	89.5	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT

LOCATION 19

OPERATOR MBH

DATE 3-1-77

RUN NO. 19-170

SAMPLE BOX NO. 1

METER BOX NO. 1

METER H

C FACTOR @ 0.83

Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 35 °F

BAROMETRIC PRESSURE 29.98

ASSUMED MOISTURE, % ~13

HEATER BOX SETTING

PROBE LENGTH, IN. 72

NOZZLE DIAMETER, IN. 1/2

PROBE HEATER SETTING 5

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. ~~Hg.~~ H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1123	-0.22	515	0.11	1.77	2876.205		90	345	60
	1138		518	0.11	1.77			93	390	72
	1152		520	0.11	1.77			101	405	68
	1207		520	0.11	1.77			108	425	64
	1223		521	0.11	1.77			116	425	65
	1228		521	0.11	1.77	2936.510		120	420	66
TOTAL								AVG.	AVG.	
AVERAGE			519					AVG.		

PARTICULATE CALCULATION SHEET

Test Crew GS, MBH

Test No. 19-170 Date 3-1-77 Location 19

Box No. 1 Sample Probe Position stack, ~15" in

Test Description 100% FGR, Low O_2

Dry Gas Meter Vol. (ft^3)

Final	2936.510
Initial	2876.205
Total	60.305

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	168	137	5	614.0	924
Initial	100	100	⊗	596.4	796.4
Δ Vol	68	37	5	18.4	127.6

				H_2O Blank	Acetone Blank	Filter	Blank
Beaker No.	1	3		5	6	No. 21	No. 22
Date Weighed	2-24-77	→		2-21-77	→	2-24-77	1-27-77
Tare Wt. 1	100.0762	101.9828		98.9317	100.4825	0.8211	0.7942
2	100.0761	101.9828		98.9315	100.4823	0.8211	0.7944
3							
4							
5							
6							
Avg	100.0762	101.9828		98.9316	100.4824	0.8211	0.7943
Bottle No.	1 & 2	3		H_2O	Acet.		
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	~~Cyclone (Acetone)~~	~~Flask (Dry)~~		
Rinse (ml)	765	475		200	200		
Date Weighed or 250 Bake	3-2-77	3-2-77		3-2-77	3-2-77	3-2-77	3-2-77
Final Wt. 250 1	100.1916	102.0269		98.9321	100.4839	0.9181	0.7942
2	100.1916	102.0271		98.9324	100.4838	0.9181	0.7942
3				98.9324			
4							
5							
6							
Avg	100.1916	100.0270		98.9324	100.4838	0.9181	0.7942
Residue wt Final 250-Tare	0.1154	0.0442		+ 0.0008	+0.0014	0.0097	-0.0001
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 19-170 Date 3-1-77 Location 19 Engr. G. S.

Unit No. 1 Fuel #6 oil Sampling Train and Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 29.98 in. Hg

Tot. Liquid Collected, V_{lc} 127.6 ml Total Particulate, M_n 159.7 m gm Solid 50.5

Velocity Head, ΔP 0.11 iwg Stack Temp., Ts 979 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 60.305 ft^3 Stack Press., Psg -0.22 iwg Excess O_2, XO_2% 4.2 %

Orifice Press. Diff., H 1.77 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 65 min Nozzle Dia., Dn 0.5 in. Meter Temp., T_m ______ °R

			Solid	Total	
*1.	Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$		60.65	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ V_{lc}$		6.05	SCF
3.	Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)		0.091	N.D.
4.	Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0128	0.0406	grains/DSCF
		b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.836×10^{-6}	5.806×10^{-6}	lb/DSCF
		c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.0294	9.3×10^{-2}	grams/DSCM
5.	Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$		407.5	in. w abs.
6.	Stack Gas Speed	$Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$		1498	ft/min
7.	Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$		3978	WSCF/min
		b. Qsd = Eq. 7a x (1. - Eq. 3)		3616	DSCF/min
8.	Material Flow	Ms = Eq. 7b x Eq. 4b x 60		1.260	lb/hr
9.	XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$		125.1	N.D.
10.	Emission	a. E = Eq. 4b x Fe x Eq. 9	0.021	0.067	lb/MMBtu
		b. E = Eq. 4c x Fm x Eq. 9 x 1000	9.1	28.795	ng/joule
11.	% Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$		92.7	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 3/3/77
RUN NO. 19-179 #2011
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 50°F
BAROMETRIC PRESSURE 30.27 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), ~~In. Hg~~ iwg	Stack Temperature (T_s) °F	Velocity Head (P_s) iwg	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume Meter Reading ~~(V_m) ft³~~	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1340	-0.23	540	0.11	0.59	3014.51	90	NA	NA	70
	1355					3023.00	90			69
	.1410					3031.00	100			60
	1425					3040.00	105			60
	1440					3048.00	110			61
	1453					3054.51	115			70
	113					40.00				
TOTAL								AVG.	AVG.	
AVERAGE								AVG.		

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-179 Location 19 Owner ____

Impactor No. 1 Nozzle Size 3/8 in. Filter No. ____

Stack Temperature 540 °F Impactor Flow Rate 0.58 CFM

Temp. Corr. Factor - 1.28

Plate	Tare (g)	Final (g)	Net (g)	%	Cum. %	ECD (μ)
1	27.3127	27.3172	0.0045	17.9	100.0	(12.5) 16.0
2	28.4184	28.4228	0.0044	17.5	82.1	(8.0) 10.2
3	29.2183	29.2220	0.0037	14.7	64.6	(5.3) 6.8
4	21.9730	21.9762	0.0032	12.7	49.9	(3.75) 4.8
5	17.8951	17.8981	0.0030	12.0	37.2	(2.35) 3.0
6	17.9106	17.9131	0.0025	10.0	25.2	(1.2) 1.5
7	18.0012	18.0032	0.0020	8.0	15.2	(0.75) 0.96
8	28.4053	28.4071	0.0018	7.2	7.2	(0.50) 0.6
Back Up Filter	21.7935	21.7931	-0.0004			

0.0251

Data Sheet 6002-5

PARTICULATE EMISSION CALCULATIONS

Test No. 19-179 Date 3-3-77 Location 19 Engr. ______

Unit No. ______ Fuel #2 oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 30.34 in. Hg

Tot. Liquid Collected, V_{1c} ______ ml Total Particulate, M_n 25.1 m gm

Velocity Head, ΔP 0.11 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 40. ft^3 Stack Press., Psg -.23 iwg Excess O_2, XO_2% 3.5 %

Orifice Press. Diff., H .59 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 113 min Nozzle Dia., Dn .375 in. Meter Temp., T_m ______ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	40.59	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	6.33	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.135	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.00952	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.364×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.0218	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	412.39	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1505	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3960	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3611	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	0.296	lb/hr.
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	120.1	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.0151	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	6.5	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	66.97	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 3-3-77
RUN NO. 19-179
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE 30.34
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. ~~Hg.~~ H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	10:42	-0.23	530	0.11	1.72	2952.50		95	315	80
	10:57		535	0.11	1.72	66.00		100	330	60
	11:12		540	0.11	1.72	81.00		110	330	58
	11:27		540	0.11	1.72	94.00		115	330	58
	11:45		540	0.11	1.72	3010.00		120	330	60
	11:50					3014.00				
TOTAL	68					62.0		AVG.	AVG.	
AVERAGE			540					AVG.		

PARTICULATE CALCULATION SHEET

Test Crew R.P.

Test No. 19·179 Date 3·3·77 Location 19

Box No. 1 Sample Probe Position

Test Description

Dry Gas Meter Vol. (ft^3)

Final	3014.50
Initial	2952.50
Total	62.0

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	182	126	5	611.0	924
Initial	100	100	0	596.0	796
Δ Vol	82	26	5	15	128.0

Beaker No.	4	7	8	9	3	Filter No. 22	Blank No. 23
Date Weighed	2-24-77	2-21-77	2-21-77	2-24-77	3-4-77	3-2-77	1-27-77
Tare Wt. 1	99.2643	104.0042	99.3352	100.1831	101.9826	0.7942	0.7884
2	99.2644	104.0040	99.3352	100.1830	101.9826	0.7942	0.7885
3							
4							
5							
6							
Avg	99.2644	104.0041	99.3352	100.1831	101.9826	0.7942	0.7884
Bottle No.	1&2	3	4	H_2O Blank	Imp. H_2O		
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	~~Cyclone (Acetone)~~	~~Flask (Dry)~~		
Rinse (ml)	400	475	300	200	175		
Date Weighed or 250 Bake	3-4-77						
Final Wt. 250 1	99.2803	104.0104	99.3425	100.1872	101.9912	0.8138	0.7883
2	99.2803	104.0103	99.3425	100.1871	101.9914	0.8139	0.7882
3							
4							
5							
6							
Avg	99.2803	104.0103	99.3425	100.1871	101.9913	0.8139	0.7883
Residue wt Final 250-Tare	0.0159 0.0119	0.0062	0.0073 0.0033	+0.004	0.0087 0.0047	0.0197	-0-
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 19-179 Date 3-3-77 Location 19 Engr. G.S.

Unit No. 1 Fuel #2 oil Sampling Train and Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.34 in. Hg

Tot. Liquid Collected, V_{1c} 128 ml Total Particulate, M_n 19.9 solid 25.0 total m gm

Velocity Head, ΔP 0.11 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 62 ft^3 Stack Press., Psg -0.23 iwg Excess O_2, XO_2% 3.5 %

Orifice Press. Diff., H 1.72 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 68 min Nozzle Dia., Dn 0.5 in. Meter Temp., T_m ______ °R

		SOLID	TOTAL	
*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$		63.09	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$		6.07	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)		0.088	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0048	0.0061	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	0.696×10^{-6}	8.74×10^{-7}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.0111	0.014	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$		412.39	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$		1505	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$		3960	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)		3611	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60		0.189	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$		120	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.0077	0.0097	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	3.31	4.16	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$		92.3	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 3-7-77
RUN NO. 19-190
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

Method 5

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 35 °F
BAROMETRIC PRESSURE 30.07
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. ~~Hg.~~ H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	10:15	-0.23	510	0.1125	1.76	3054.76		90	330	53
	10:30		510	0.1125	1.76	3069.00		93	325	60
	10:45		515	0.1125	1.76	3084.00		102	330	58
	11:00		515	0.1125	1.76	3097.00		110	335	58
	11:15		515	0.1125	1.76	3112.00		120	335	58
	11:20		515	0.1125	1.76	3116.76		120	335	58
TOTAL	65					62.0		AVG. 103	AVG.	
AVERAGE								AVG		

PARTICULATE CALCULATION SHEET

Test Crew R. P.

Test No. 19-190 Date 3-7-77 Location 19

Box No. 1 Sample Probe Position ¢ Stack

Test Description

Dry Gas Meter Vol. (ft^3)

Final	3116.76
Initial	3054.76
Total	62.00

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	240	144	4	689.0	1077.0
Initial	100	100	0	671.0	871.0
Δ Vol	140	44	4	18.0	206.0

Beaker No.	1	3	5	H_2O Blank 6	Acetone Blank 7	Filter No. 23	Blank No. 25
Date Weighed	3-4-77	3-7-77	3-4-77	3-4-77	3-7-77	1-27-77	1-27-77
Tare Wt. 1	100.0794	101.9823	98.9340	100.4843	104.0024	0.7884	0.8462
2	100.0793	101.9822	98.9338	100.4841	104.0026	0.7885	0.8465
3							
4							
5							
6							
Avg	100.0794	101.9823	98.9339	100.4842	104.0025	0.7885	0.8463
Bottle No.	1 & 2	3	4				
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	~~Cyclone (Acetone)~~	~~Flask (Dry)~~		
Rinse (ml)	825	400	300	200	200		
Date Weighed or 250 Bake	3-8-77	3-8-77					
Final Wt. 250 1	100.0855	101.9857	98.9362	100.4828	104.0037	0.7934	0.8460
2	100.0854	101.9856	98.9363	100.4828	104.0037	0.7933	0.8461
3							
4							
5							
6							
Avg	100.0855	101.9857	98.9363	100.4828	104.0037	0.7934	0.8461
Residue wt Final 250-Tare	0.0061	0.0034	0.0024	0	0.0012	0.0049	0
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 19-190 Date 3-7-77 Location 19 Engr. G.S.

Unit No. 1 Fuel Nat Gas Sampling Train and Method Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.07 in. Hg

Tot. Liquid Collected, V_{1c} 206 ml Total Particulate, M_n 14.4 total 8.3 m gm solid

Velocity Head, ΔP 0.1125 iwg Stack Temp., Ts 975 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 62 ft^3 Stack Press., Psg -0.23 iwg Excess O_2, XO_2% 3.2 %

Orifice Press. Diff., H 1.76 iwg Stack Gas Sp. Gravity, Gs ~1 n.d.

Sample Time, θ 65 min Nozzle Dia., Dn 0.5 in. Meter Temp., T_m ______ °R

		TOTAL	SOLID	
*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$		62.54	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$		9.76	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)		0.135	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.00355	0.00204	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	0.508×10^{-6}	0.2926×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.00813	4.69×10^{-3}	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$		402.04	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$		1522	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$		4004.6	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)		3464	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60		6.08×10^{-2}	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$		118.08	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	.00524	3.02×10^{-3}	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	2.253	1.2992	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$		99.79	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 3-8-77
RUN NO. 19-193
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83
Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE 30.28
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), In. ~~Hg.~~ H_2O	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	10:35	-0.225	495	0.115	1.80	3117.20		85	320	52
	10:50		500	0.115	1.80	3132.00		90	325	52
	11:05		500	0.115	1.80	3146.20		98	330	55
	11:20		500	0.115	1.80	3162.20		110	340	57
	11:35		500	0.115	1.80	3175.00		114	340	58
	11:50		500	0.115	1.80	3189.00		120	345	60
	12:05		505	0.115	1.80	3203.00		125	350	60
	12:20		505	0.115	1.80	3217.20		130	350	60
TOTAL	105					100		AVG.	AVG.	
AVERAGE								AVG.		

PARTICULATE CALCULATION SHEET

Test No. 19-193 Date 3-8-77 Location 19 Test Crew R.P.
Box No. 1 Sample Probe Position ℄ Stack
Test Description

Dry Gas Meter Vol. (ft^3)
Final 3217.2
Initial 3117.2
Total 100.0

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	358	235	10	677.5	1280.5
Initial	100	100	0	650.5	850.5
Δ Vol	258	135	10	27.0	430.0

Beaker No.	8	9	10			Filter No. 24	Blank No. 25
Date Weighed	3-7-77	3-7-77	3-4-77			1-27-77	3-8-77
Tare Wt. 1	99.3352	100.1828	100.9384			0.8006	0.8460
2	99.3351	100.1828	100.9384			0.8005	0.8461
3							
4							
5							
6							
Avg	99.3352	100.1828	100.9384			0.8006	0.8461
Bottle No.	1 & 2	3	4				
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)	1025	450	325				
Date Weighed or 250 Bake	3-10-77	3-9-77	3-9-77			3-9-77	3-9-77
Final Wt. 250 1	99.3510	100.1924	100.9408			0.8111	0.8454
2	99.3510	100.1920	100.9403			0.8111	0.8457
3		100.1918	100.9405			0.8110	0.8454
4							
5							
6							
Avg	99.3510	100.1920	100.9405			0.8111	0.8456
Residue wt Final 250-Tare	0.0158	0.0092	0.0021			0.0105	0
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments: Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 19-193 Date 3-8-77 Location 19 Engr. G. S.

Unit No. 1 Fuel Nat. Gas Sampling Train and Method Meth. 5

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.28 in. Hg

Tot. Liquid Collected, V_{lc} 430 ml Total Particulate, M_n 37.6 Total 21.8 m gm Solid

Velocity Head, ΔP 0.115 iwg Stack Temp., Ts 960 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 100 ft^3 Stack Press., Psg -0.225 iwg Excess O_2, XO_2% 3.2 %

Orifice Press. Diff., H 1.8 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 105 min Nozzle Dia., Dn 0.5 in. Meter Temp., T_m ______ °R

			TOTAL	SOLID	
*1. Sample Gas Volume		$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$		101.577	SCF
2. Water Vapor		$Vw_{std} = 0.0474\ V_{lc}$		20.382	SCF
3. Moisture Content		Bwo = Eq. 2/(Eq. 1 + Eq. 2)		0.167	N.D.
4. Concentration	a.	$C = 0.0154\ Mn/Vm_{std}$	0.00578	0.00335	grains/DSCF
	b.	$C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	0.8273×10^{-6}	0.4807×10^{-6}	lb/DSCF .47323
	c.	$C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.0133	7.7×10^{-3}	grams/DSCM
5. Abs. Stack Press.		$Ps = P_{bar} \times 13.6 + Psg$		404.995	in. w abs.
6. Stack Gas Speed		$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$		1521.17	ft/min
7. Stack Gas Flow Rate @ 70°F	a.	$Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$		4094.8	WSCF/min
	b.	Qsd = Eq. 7a x (1. - Eq. 3)		3410.968	DSCF/min
8. Material Flow		Ms = Eq. 7b x Eq. 4b x 60		9.838×10^{-2}	lb/hr
9. XO_2 factor		$XO_2f = 2090/(20.9 - XO_2\%)$		118.08	N.D.
10. Emission	a.	E = Eq. 4b x Fe x Eq. 9	8.555×10^{-3}	4.961×10^{-3}	lb/MMBtu
	b.	E = Eq. 4c x Fm x Eq. 9 x 1000	3,679	2.133	ng/joule
11. % Isokinetic		$I = \frac{14077 \times Ts\,(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$		101.91	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$ (°R) if meter not temp. compensated.

Data Sheet 6002-4

PLUME OPACITY OBSERVATION RECORD

19-76

Test Run No. ~~2-28~~

LOCATION NO. 19 OBSERVER M. HAGERTY

OWNER BOILER NO. 1 CAPACITY ~ 18 klb/hr

DATE 1-19-77 FUEL TYPE #2 BURNER TYPE

POINT OF EMISSION STACK

POINT OF OBSERVATION ~ 200' FROM STACK AT 90° TO WIND DIRECTION SUN ON RT AT 90° TO OBSERVATION POINT.

TEST			Test Load k#/hr	Opacity %	WIND		Sky Cond.	Sun Position	Comments
No.	Time am/pm	Type			Speed mph	Direct.			
1	1400	LO O_2 #2 OIL	14	0	0-5	S.E.	CLOUDY HAZY	90° TO RT.	
2	1405			0					
3	1410			0					
4	1415			0					THERMAL
5	1420			0					PLUME IS VISIBLE
6	1425			0					AGAINST CLOUDS
7	1430			0					
8	1435			0					
9	1448			5					
10	1509			0-5					
11	1510			5					
12	1511			0-5					
13	1512			0					
14	1513			0-5					
15	1514			0					
16	1515			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-74, 75

LOCATION NO. 19 OBSERVER M. HAGERTY

OWNER ____ BOILER NO. 1 CAPACITY ~18 klb/hr

DATE 1-19-77 FUEL TYPE #2 OIL BURNER TYPE ____

POINT OF EMISSION STACK

POINT OF OBSERVATION ~200' FROM STACK AT 90° TO WIND DIRECTION, SUN ON RT. AT 90° TO OBSERVATION POINT.

TEST No.	Time am/pm	Type	Test Load k#/hr	Opacity %	WIND Speed mph	WIND Direct.	Sky Cond.	Sun Position	Comments
1	1400	LO O_2 #2 OIL	14	0	0-5	S.E	CLOUDY HAZY	90° TO RT.	
2	1405			0					
3	1410			0					
4	1415			0					THERMAL
5	1420			0					PLUME IS VISIBLE
6	1425			0					AGAINST CLOUDS
7	1430			0					
8	1435			0					
9	1448			5					
10	1509			0-5					
11	1510			5					
12	1511			0-5					
13	1512			0					
14	1513			0-5					
15	1514			0					
16	1515			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19- 83, 84

LOCATION NO. 19 OBSERVER M. HAGERTY

OWNER BOILER NO. 1 CAPACITY klb/hr

DATE 1-20-77 FUEL TYPE #2 OIL BURNER TYPE

POINT OF EMISSION STACK

POINT OF OBSERVATION ~ 300' FROM STACT @ 90° TO WIND DIRECTION, SUN @ 90° TO RT. FROM OBSERVATION POINT

TEST No.	TEST Time am/pm	TEST Type	Test Load k#/hr	Opacity %	WIND Speed mph	WIND Direct.	Sky Cond.	Sun Position	Comments
1	1620	20 O2 40% FGR	14	0	0-5	S.E	HAZY	90° TO RT.	ATMOSPHERIC HAZE ~ 5%
2	1625			0					
3	1630			0					
4	1631			0					
5	1632			0					
6	1633			0					
7	1634			0					
8	1635			0					
9	1640			0					
10	1645			0					
11	1650			0					
12	1651			0					
13	1652			0					
14	1653			0					
15	1654			0					
16	1655			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-117

LOCATION NO. 19 OBSERVER SOTTER

OWNER ______ BOILER NO. 1 CAPACITY 17,500 klb/hr

DATE 1-26-77 FUEL TYPE #2 BURNER TYPE FABER

POINT OF EMISSION STACK

POINT OF OBSERVATION ACROSS STREET, 45° TO WIND DIRECTION, SUN 20° TO RT FROM OBSERVATION POINT. ~2 STACK HEIGHTS FROM STACK

TEST			Test		WIND			Sun	
No.	Time am/pm	Type	Load k#/hr	Opacity %	Speed mph	Direct.	Sky Cond.	Position	Comments
1	11 55	HI Ø MIN O_2		20			PARTLY CLOUDY	BEHIND OBSERVER + CLOUDS	OPACITY FLUCTUATING
2				20					
3				0					
4				5					
5				10					
6				15					
7				5					
8				10					
9				5					
10	1158			25					
11				15					
12				30					
13				15					
14				10					
15				10					
16				15					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-117
CONT'D

LOCATION NO. 19 OBSERVER

OWNER BOILER NO. CAPACITY klb/hr

DATE 1/26/77 FUEL TYPE BURNER TYPE

POINT OF EMISSION

POINT OF OBSERVATION

TEST			Test	Opacity	WIND		Sky	Sun	
No.	Time am/pm	Type	Load k#/hr	%	Speed mph	Direct.	Cond.	Position	Comments
17				25					
18				5					
19				5					
20				30					
21				40					
22				0					
23				5					
24				10					
25				5					
		AVE		13					

60-25

PLUME OPACITY OBSERVATION RECORD

19-132

Test Run No. 12 P/S/I

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 2-17-77 FUEL TYPE ______ BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ~150 ft North-East of building

TEST			Test		WIND				
No.	Time am/pm	Type	Load k#/hr	Opacity %	Speed mph	Direct.	Sky Cond.	Sun Position	Comments
1	start 11:58			5	10-15	NW	clear		
2	11:58:15								
3	:30								
4	:45								
5	11:59								
6	:15								
7	:30								
8	:45								
9	12:00								
10	:15								
11	:30								
12	:45								
13	12:01								
14	:15								
15	:30								
16	:45								

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-140

LOCATION NO. 19 OBSERVER M. B. H.

OWNER BOILER NO. CAPACITY klb/hr

DATE 2-21-77 FUEL TYPE BURNER TYPE

POINT OF EMISSION Stack

POINT OF OBSERVATION ~100 ft. North East of stack

TEST			Test	Opacity	WIND		Sky	Sun	
No.	Time am/pm	Type	Load k#/hr	Opacity %	Speed mph	Direct.	Sky Cond.	Posi-tion	Comments
1	14:45			25	15-20		clear sky		
2	:15			25					
3	:30			20					
4	:45			25					
5	14:46			20					
6	:15			25					
7	:30			30					
8	:45			25					
9	14:47			20					
10	:15			20					
11	:30			15					
12	:45			25					
13	14:48			20					
14	:15			20					
15	:30			25					
16	:45			30					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-159

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. 1 CAPACITY ______ klb/hr

DATE 2-23-77 FUEL TYPE #6 BURNER TYPE ______

POINT OF EMISSION stack

POINT OF OBSERVATION 100 feet NE of stack

TEST No.	TEST Time am/pm	TEST Type	Test Load k#/hr	Opacity %	WIND Speed mph	WIND Direct.	Sky Cond.	Sun Position	Comments
1	11:40			0	5-10	W.	clear		
2	:15			0					
3	:30			0					
4	:45			0					
5	11:41			0					
6	:15			0					
7	:30			0					
8	:45			0					
9	11:42			0					
10	:15			0					
11	:30			0					
12	:45			0					
13	11:43			0					
14	:15			0					
15	:30			0					
16	:45			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-165

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3-1-77 FUEL TYPE ______ BURNER TYPE ______

POINT OF EMISSION Stack

POINT OF OBSERVATION ~ 100 ft. NE of stack

TEST No.	TEST Time am/pm	TEST Type	Test Load k#/hr	Opacity %	WIND Speed mph	WIND Direct.	Sky Cond.	Sun Posi-tion	Comments
1	9:23			0	~10	S.E.	clear		
2	:15			0					
3	:30			0					
4	:45			0					
5	9:24			0					
6	:15			0					
7	:30			0					
8	:45			0					
9	9:25			0					
10	:15			0					
11	:30			0					
12	:45			0					
13	9:26			0					
14	:15			0					
15	:30			0					
16	:45			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-170

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. 1 CAPACITY ______ klb/hr

DATE 3-1-77 FUEL TYPE #6 oil BURNER TYPE ______

POINT OF EMISSION Stack

POINT OF OBSERVATION 100 ft. NE of stack

TEST			Test		WIND			Sun	
No.	Time am/pm	Type	Load k#/hr	Opacity %	Speed mph	Direct.	Sky Cond.	Position	Comments
1	14:10			0	15-20	E.	clear		
2	:15			0					
3	:30			0					
4	:45			0					
5	14:11			0					
6	:15			0					
7	:30			0					
8	:45			0					
9	14:12			0					
10	:15			0					
11	:30			0					
12	:45			0					
13	14:13			0					
14	:15			0					
15	:30			0					
16	:45			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-179

LOCATION NO. 19 OBSERVER M.B.H.

OWNER ____ BOILER NO. 1 CAPACITY ____ klb/hr

DATE 3-3-77 FUEL TYPE #2 BURNER TYPE ____

POINT OF EMISSION Stack

POINT OF OBSERVATION ~100 ft. NE of stack

TEST No.	Time am/pm	Type	Test Load k#/hr	Opacity %	WIND Speed mph	WIND Direct.	Sky Cond.	Sun Position	Comments
1	13:43			0	0-5	NW	Hazy clouds		
2	:15			0					
3	:30			0					
4	:45			0					
5	13:44			0					
6	:15			0					
7	:30			0					
8	:45			0					
9	13:45			0					
10	:15			0					
11	:30			0					
12	:45			0					
13	13:46			0					
14	:15			0					
15	:30			0					
16	:45			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-190

LOCATION NO. 19 OBSERVER MBH

OWNER BOILER NO. 1 CAPACITY klb/hr

DATE 3-7-77 FUEL TYPE N.G. BURNER TYPE

POINT OF EMISSION stack

POINT OF OBSERVATION ≈100 ft N.E. of stack

TEST No.	TEST Time am/pm	TEST Type	Test Load k#/hr	Opacity %	WIND Speed mph	WIND Direct.	Sky Cond.	Sun Position	Comments
1	11:24			0	5-10	E	cloudy		
2	:15			0					
3	:30			0					
4	:45			0					
5	11:25			0					
6	:15			0					
7	:30			0					
8	:45			0					
9	11:26			0					
10	:15			0					
11	:30			0					
12	:45			0					
13	11:27			0					
14	:15			0					
15	:30			0					
16	:45			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-1 SASS

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3-10-77 FUEL TYPE #6 OIL BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ~100 feet north of stack

TEST			Test	Opacity	WIND		Sky	Sun	
No.	Time am/pm	Type	Load k#/hr	%	Speed mph	Direct.	Cond.	Position	Comments
1	1115	SASS		0	0-5	S.W.	CLEAR		
2	1130			0					
3	1145			0					
4	1200			0					
5	1215			0					
6	1230			0					
7	1245			0					
8	1300			0					
9	1315			0					
10	1330			0					
11	1345			0					
12	1400			0					
13	1415			0					
14	1430			0					
15	1445			0					
16	1500			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-1SASS

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3-10-77 FUEL TYPE #6 OIL BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ~ 100 feet north of stack

TEST No.	Time am/pm	Type	Test Load k#/hr	Opacity %	WIND Speed mph	Direct.	Sky Cond.	Sun Position	Comments
17	1515	SASS		0	0-5	SW	CLEAR		
18	1530			0					
19	1545			0					
20	1620			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-2 SASS

LOCATION NO. 19 OBSERVERS MBH / HJB

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3-17-77 FUEL TYPE ______ BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ~100' EAST OF TRAILER

TEST			Test		WIND			Sun	
No.	Time am/pm	Type	Load k#/hr	Opacity %	Speed mph	Direct.	Sky Cond.	Posi-tion	Comments
1	1000			5	10-15	E	CLEAR		
2	1100			5					
3	1200			0					
4	1300			0					
5	1400			5					
6	1500			0					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-3 SASS

LOCATION NO. 9 OBSERVER MBH/HJB

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3-21-77 FUEL TYPE ______ BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ~100 feet East

TEST			Test	Opacity	WIND		Sky	Sun	
No.	Time am/pm	Type	Load k#/hr	%	Speed mph	Direct.	Cond.	Position	Comments
1	1030	SASS		5	10-15	W	CLEAR		
2	1130			10					
3	1230			5					
4	1330			10					
5	1430			10					
6	1530			5					

60-25

PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-4/5055

LOCATION NO. 19 OBSERVER MBH /HJB

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3/23/77 FUEL TYPE ______ BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ~100' East of emission point

TEST			Test		WIND			Sun	
No.	Time am/pm	Type	Load k#/hr	Opacity %	Speed mph	Direct.	Sky Cond.	Position	Comments
1	09:30			5	20-30 (50 MPH GUSTS)	S.W.	CLEAR		
2	10:30			5					
3	11:30			5					
4	12:30			5					
5	13:30			5					
6	14:30			5					

60-25

VELOCITY TRAVERSE

Project: ____________________ Test Description: ____

Date: ____________________

Location: 19

Unit: /

Test: 19-1,3 Personnel: ____________

Fuel: #2 OIL

Barometric Press. (in. Hg): ____________________

Absolute Static Press. in Stack (in. Hg): ____________ (P_s)

Pitot Tube Coefficient: .83 (C_p)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_s	M_s	V_s	
	0		.060	460	920			3.17
	2		.085	450	910		25.5	3.20
	4							3.15
	6		.085	462	922		25.7	3.16
	8							3.16
	10							3.17
	12		.085	470	930		25.8	3.13
	14							3.13
	16							3.14
	18		.090	475	935		26.6	3.13
	20							3.10
	22							3.08
	24		.085	460	920		25.6	3.08
	26							3.08
	28							3.07

6002-13

VELOCITY TRAVERSE

Project: ____________ Test Description: ____

Date: 1-19-77

Location: 19

Unit: 1

Test: 19-74, 75 Personnel: ____________

Fuel: #2 OIL

Barometric Press. (in. Hg): ____________

Absolute Static Press. in Stack (in. Hg): ____________ (P_S)

Pitot Tube Coefficient: ____________ (C_P)

$$V_S = 85.48\ C_P \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_S	M_S	V_S	
		2	.08					1.33
		7	.085					1.30
		12	.085					1.25
		17	.085	465	925			1.24
		22	.085					1.30
		27	.07					1.40

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 1-20-77

Location: 19

Unit: 1

Test: 19-83, 84 Personnel: ______

Fuel: # 2 OIL

Barometric Press. (in. Hg): 29.8

Absolute Static Press. in Stack (in. Hg): ______ (P_s)

Pitot Tube Coefficient: .83 (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_S	M_S	V_S	
		2	.09	505	965			
		7	.1	520	980			
		12	.095	520	980			
		17	.09	530	990			
		22	.085	525	985			

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 1-24-77

Location: 19

Unit: 1

Test: 19- 97, 98 Personnel: R. PIONESSA

Fuel: #6 OIL

Barometric Press. (in. Hg): 30.16

Absolute Static Press. in Stack (in. Hg): ______ (P_S)

Pitot Tube Coefficient: .83 (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_S	M_S	V_S	
		2	.095	485	945			2.89
		7	.095	485	945			2.94
		12	.095	485	945			2.97
		17	.100	485	945			3.00
		22	.095					3.00
		27	.105	485	945			3.00

6002-13

VELOCITY TRAVERSE

Project: ________ Test Description: ________

Date: 1-26-77

Location: 19

Unit: 1

Test: 19-116 Personnel: ________

Fuel: #2 oil

Barometric Press. (in. Hg): 29.72

Absolute Static Press. in Stack (in. ~~Hg~~ H_2O): -.225 (P_s)

Pitot Tube Coefficient: 0.83 (C_p)

$$V_S = 85.48\, C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		inch.	ΔP		T_S	M_S	V_S	
		2	0.105	485				
		7	0.109	490				
		12	0.106	495				
		17	0.112	497				
		22	0.116	498				
		27	0.102	480				
		Av.	0.108	491	951			

6002-13

VELOCITY TRAVERSE

Project: ____________ Test Description: ____

Date: 2-17-77

Location: 19

Unit: 1

Test: 19-132 Personnel: G. Sotter

Fuel: #6 oil

Barometric Press. (in. Hg): 30.12

Absolute Static Press. in Stack (in. ~~Hg~~ H_2O): -0.23 (P_s)

Pitot Tube Coefficient: 0.83 (C_p)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		inch.	ΔP		T_S	M_S	V_S	
		2	0.07	445				
		7	0.065	455				
		12	0.07	460				
		17	0.072	460				
		22	0.08	460				
		27	0.06	460				

6002-13

VELOCITY TRAVERSE

Project:

Date: 2-21-77

Location: 19

Unit:

Test: 19-143

Fuel: #6 oil

Test Description:

Personnel:

Barometric Press. (in. Hg): 29.81

Absolute Static Press. in Stack (in. ~~Hg~~ H_2O): -0.2 (P_S)

Pitot Tube Coefficient: 0.83 (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		inch	ΔP		T_S	M_S	V_S	
		2	0.09	460				
		7	0.09	465				
		12	0.085	470				
		17	0.095	470				
		22	0.1	470				
		27	0.075	460				
	Avg.		0.089	467				

6002-13

VELOCITY TRAVERSE

Project: ____________________ Test Description: Meth 5

Date: 2-23-77

Location: 19

Unit: 1

Test: 19-159 Personnel: R.P.

Fuel: ____________________

Barometric Press. (in. Hg): 30.08

Absolute Static Press. in Stack (in. ~~Hg~~ H_2O): -.23 (P_s)

Pitot Tube Coefficient: 0.83 (C_p)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		inch.	ΔP		T_S	M_S	V_S	
	1	-2	0.085	485				
		-7	0.095	500				
		-12	0.09	510				
		-17	0.09	515				
		-22	0.09	515				
		-27	0.085	500				

6002-13

VELOCITY TRAVERSE

Project: 19-170 Test Description: ___

Date: 3-1-77

Location: 19

Unit: 1

Test: 19-170 Personnel: ___

Fuel: #6 oil

Barometric Press. (in. Hg): 29.98

Absolute Static Press. in Stack (in. ~~Hg~~ H_2O): -0.22 (P_s)

Pitot Tube Coefficient: 0.83 (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		inch.	ΔP		T_S	M_S	V_S	
		2	0.11	500				
		7	0.12	510				
		12	0.12	512				
		17	0.11	512				
		22	0.12	512				
		27	0.10	500				

6002-13

VELOCITY TRAVERSE

Project:

Date: 3-3-77

Location: 19

Unit: 1

Test: 19-179

Fuel: #2 oil

Test Description:

Personnel: G.S.

Barometric Press. (in. Hg): 30.34

Absolute Static Press. in Stack (in. ~~Hg~~ H_2O): -0.23 (P_s)

Pitot Tube Coefficient: 0.83 (C_p)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Port	Point Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		inch	ΔP		T_S	M_S	V_S	
		2	0.11	495				
		7	0.12	505				
		12	0.11	520				
		17	0.11	520				
		22	0.10	520				
		27	0.10	520				

6002-13

VELOCITY TRAVERSE

Project: ____________________ Test Description: ____

Date: 3-7-77

Location: 19

Unit: 1

Test: 19-190 Personnel: ________

Fuel: Nat. Gas

Barometric Press. (in. Hg): 30.07

Absolute Static Press. in Stack (in. Hg): -0.23 (P_s)

Pitot Tube Coefficient: 0.83 (C_p)

$$(V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		inch.	ΔP		T_S	M_S	V_S	
		2	0.11	510				
		7	0.11	510				
		12	0.115	510				
		17	0.12	505				
		22	0.11	500				
		27	0.11	500				

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 3-8-77

Location: 19

Unit: 1

Test: 19-193 Personnel: ______

Fuel: Nat. Gas

Barometric Press. (in. Hg): 30.28

Absolute Static Press. in Stack (in. ~~Hg~~ H_2O): -0.225 (P_s)

Pitot Tube Coefficient: 0.83 (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		inch.	ΔP		T_S	M_S	V_S	
		2	0.11	480				
		7	0.115	490				
		12	0.115	495				
		17	0.12	495				
		22	0.12	495				
		27	0.11	495				

6002-13

Date 1/5/77

K V B. INC.

Test No. 19-3

SOx DATA SHEET

TEST NO. 19-3 UNIT NO.____ FUEL____ LOAD______klb/hr____Location 19

CAL. BOTTLE 1120 ppm ± 2%

Box No.	X-1	X-1			
Time	1105	1125			
Temp. in Gas Meter	62	69			
Press. in Gas Meter	0	0			
Meter Reading	0.000	1.000			
Barom. Press.	30.08	30.08			
Percent Oxygen					
N_2 Purge Time	1210	1230			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ______%

	SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample =	26.50	2.7	
B = Ml of lead perchlorate used for bland =	2.45		
N = Normality of lead perchlorate titrant =			
F = Dilution factor =	10	1	
T = Average temp. in gas meter =			
V = Volume of gas sample ft^3 =			
P = Barometric pressure =			
p = Pressure in gas meter =			
Concentration, C, ppm =	1087	1.1	
, gm/dscm =			
Emission, E, g/Mcal =			
lb/MBtu =			
ng/J =			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________dscm/10^4 cal

__________dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1/5/77

K V B. INC.

Test No. 19-3

SOx DATA SHEET

TEST NO. 19-3 UNIT NO._____ FUEL_____ LOAD______klb/hr____ Location 19

CAL BOTTLE 1120ppm ±2%

Box No.	X-2	X-2			
Time	1130	1144			
Temp. in Gas Meter	68	72			
Press. in Gas Meter					
Meter Reading	0.000	1.000			
Barom. Press.					
Percent Oxygen					
N_2 Purge Time	1145	1205			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 _______%

	SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample =	27.7	2.65	
B = Ml of lead perchlorate used for bland =			
N = Normality of lead perchlorate titrant =			
F = Dilution factor =			
T = Average temp. in gas meter =			
V = Volume of gas sample ft^3 =			
P = Barometric pressure =			
p = Pressure in gas meter =			
Concentration, C, ppm =	1156	0.91	
,gm/dscm =			
Emission ,E, g/Mcal =			
lb/MBtu =			
ng/J =			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________dscm/10^4 cal

__________dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1/6/77

K V B. INC.

Test No. 19-5

SOx DATA SHEET

TEST NO. 19-5 UNIT NO.____ FUEL #2OIL LOAD____klb/hr____ Location 19

	START	FINISH			
Box No.	X-1	X-1			
Time	0930	0953			
Temp. in Gas Meter	29	36			
Press. in Gas Meter	6	6			
Meter Reading	0.000	3.000			
Barom. Press.	30.19	30.19			
Percent Oxygen	3.12	3.12			
N_2 Purge Time	1000	1020			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ______%

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	9.0	3.2	
B = Ml of lead perchlorate used for bland	=	2.50		
N = Normality of lead perchlorate titrant	=	0.01079		
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=			
V = Volume of gas sample ft^3	=			
P = Barometric pressure	=			
p = Pressure in gas meter	=			
Concentration, C, ppm	=	91.6	1.0	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________dscm/10^4 cal

________dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1/6/77

KVB, INC.

Test No. 19-5

SOx DATA SHEET

TEST NO. 19-5 UNIT NO. _____ FUEL #2 OIL LOAD _______klb/hr____Location_______

Box No.	x-2	x-2			
Time	0958	1029			
Temp. in Gas Meter	34	34			
Press. in Gas Meter	0	0			
Meter Reading	0.000	3.000			
Barom. Press.	30.19	30.19			
Percent Oxygen	3.12	3.12			
N_2 Purge Time	1035	1055			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.12 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	9.0	3.10	
B = Ml of lead perchlorate used for bland	=			
N = Normality of lead perchlorate titrant	=			
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=			
V = Volume of gas sample ft^3	=			
P = Barometric pressure	=			
p = Pressure in gas meter	=			
Concentration, C, ppm	=	91.6	0.85	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ___________dscm/10^4 cal

___________dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1/6/77

K V B. INC.

Test No. 19-5

SOx DATA SHEET

TEST NO. 19-5 UNIT NO.____ FUEL #2 oil LOAD_____ klb/hr____ Location_____

Box No.	X-1	X-1			
Time	1030	1055			
Temp. in Gas Meter	34	38			
Press. in Gas Meter	0	0			
Meter Reading	0.000	3.000			
Barom. Press.	30.19	30.19			
Percent Oxygen	3.12	3.12			
N_2 Purge Time	1100	1125			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ______%

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	8.7	3.5	
B = Ml of lead perchlorate used for bland	=			
N = Normality of lead perchlorate titrant	=			
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=			
V = Volume of gas sample ft^3	=			
P = Barometric pressure	=			
p = Pressure in gas meter	=			
Concentration, C, ppm	=	82.9	1.4	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = _________ dscm/10^4 cal

_________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-19-77

K V B. INC.

Test No. 19-74

SOx DATA SHEET

TEST NO. 19-74 UNIT NO. ____ FUEL #2OIL LOAD ____ klb/hr ____ Location 19

Box No.	X-1	X-1			
Time	1115	1130			
Temp. in Gas Meter	70	72			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.73	29.73			
Percent Oxygen					
N_2 Purge Time	1134	1201			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ____ %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	10.2	32.6	
B = Ml of lead perchlorate used for bland	=	9.5	9.5	
N = Normality of lead perchlorate titrant	=	0.01079	0.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter (°R)	=	531	531	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.73	29.73	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	33	106.8	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/10^4 cal

________ dscf/10^4 Btu

BAD PURGE : DELETE

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-19-77

K V B. INC.

Test No. 19-74

SOx DATA SHEET

TEST NO. 19-74 UNIT NO. ____ FUEL #2 OIL LOAD ____ klb/hr ____ Location 19

	START	FINISH			
Box No.	X-2	X-2			
Time	1143	1200			
Temp. in Gas Meter	80	78			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.73	29.73			
Percent Oxygen					
N_2 Purge Time	1205	1231			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ______ %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	12.2	10.1	
B = Ml of lead perchlorate used for bland	=	9.5	9.5	
N = Normality of lead perchlorate titrant	=	0.01079	0.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter (°R)	=	539	539	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.73	29.73	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	126.7	2.8	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/10^4 cal

________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-19-77

KVB, INC.

Test No. 19-74

SOx DATA SHEET

TEST NO. 19-74 UNIT NO. ______ FUEL #2OIL LOAD ______ klb/hr ______ Location 19

Box No.	X-1	X-1			
Time	1215	1230			
Temp. in Gas Meter	80	80			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.73	29.73			
Percent Oxygen					
N_2 Purge Time	1235	1305			

Calculation: SO_3 or SO_2, ppm $= \frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ______ %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	10.9	31.5	
B = Ml of lead perchlorate used for bland	=	9.5	9.5	
N = Normality of lead perchlorate titrant	=	0.01079	0.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter (°R)	=	540	540	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.73	29.73	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	65.8	103.4	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ______ dscm/10^4 cal

______ dscf/10^4 Btu

BAD PURGE: DELETE

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-20-77

K V B. INC.

Test No. 19-78

SOx DATA SHEET

TEST NO. 19-78 UNIT NO._____ FUEL #2 OIL LOAD______klb/hr____Location 19

CAL BOTTLE 1120 PPM ± 2%

Box No.	X-1	X-1			
Time	0822	0835			
Temp. in Gas Meter	71	70			
Press. in Gas Meter	0	0			
Meter Reading	0	1.05			
Barom. Press.	29.80	29.80			
Percent Oxygen	0	0			
N_2 Purge Time	0847	0913			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess O_2 0 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	36.4	10.7	
B = Ml of lead perchlorate used for bland	=	9.0	9.0	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	531 °R	531 °R	
V = Volume of gas sample ft^3	=	1.05	1.05	
P = Barometric pressure	=	29.80	29.80	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	1204	7	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________dscm/10^4 cal

____________dscf/10^4 Btu

·from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-20-78

K V B. INC.

Test No. 19-78

SOx DATA SHEET

TEST NO. 19-78 UNIT NO. ____ FUEL #2 OIL LOAD ____ klb/hr ____ Location 19

Box No.	X-2	X-2			
Time	0924	0937			
Temp. in Gas Meter	78	76			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.80	29.80			
Percent Oxygen	0	0			
N_2 Purge Time	0944	1007			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 0 %

	SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample =	33.6	10.1	
B = Ml of lead perchlorate used for bland =	9.0	9.0	
N = Normality of lead perchlorate titrant =	.01079	.01079	
F = Dilution factor =	10	1	
T = Average temp. in gas meter =	537	537	
V = Volume of gas sample ft^3 =	1.0	1.0	
P = Barometric pressure =	29.80	29.80	
p = Pressure in gas meter =	0	0	
Concentration, C, ppm =	1147	5	
, gm/dscm =			
Emission, E, g/Mcal =			
lb/MBtu =			
ng/J =			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/10^4 cal

____________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-20-77

K V B. INC.

Test No. 19-83

SOx DATA SHEET

TEST NO. 19-83 UNIT NO. _____ FUEL #2 OIL LOAD 14.5 klb/hr ____ Location 19

Box No.	2-1	2-1			
Time	1420	1434			
Temp. in Gas Meter	83	83			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.80	29.80			
Percent Oxygen	.9	.9			
N_2 Purge Time	1440	1500			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 0.9 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	5.9	4.8	
B = Ml of lead perchlorate used for bland	=	3.5	3.5	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	543	543	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.80	29.80	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	113	6.1	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-20-77

K V B, INC.

Test No. 19-83

SOx DATA SHEET

TEST NO. 19-83 UNIT NO. ____ FUEL #2 oil LOAD 14.5 klb/hr ____ Location 19

Box No.	X-2	X-2			
Time	1444	1458			
Temp. in Gas Meter	84	88			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.80	29.80			
Percent Oxygen	.9	.9			
N_2 Purge Time	1503	1525			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess O_2 .9 %

	SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample =	5.8	4.6	
B = Ml of lead perchlorate used for bland =	3.5	3.5	
N = Normality of lead perchlorate titrant =	.01079	.01079	
F = Dilution factor =	10	1	
T = Average temp. in gas meter =	546	546	
V = Volume of gas sample ft^3 =	1.0	1.0	
P = Barometric pressure =	29.80	29.80	
p = Pressure in gas meter =	0	0	
Concentration, C, ppm =	109	5.2	
, gm/dscm =			
Emission, E, g/Mcal =			
lb/MBtu =			
ng/J =			

$$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-20-77

K V B. INC.

Test No. 19-83

SOx DATA SHEET

TEST NO. 19-83 UNIT NO. ____ FUEL #2 OIL LOAD 14.5 klb/hr ____ Location 19

Box No.	X-1	X-1			
Time	1512	1524			
Temp. in Gas Meter	90	88			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.80	29.80			
Percent Oxygen	.9	.9			
N_2 Purge Time					

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 .9 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	5.2	4.6	
B = Ml of lead perchlorate used for bland	=	3.5	3.5	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	549	549	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.80	29.80	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	81	5.2	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/10^4 cal

________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-24-77

K V B. INC.

Test No. 19-97

SOx DATA SHEET

TEST NO. 19-97 UNIT NO. ____ FUEL #6 OIL LOAD 13.8 klb/hr ____ Location 19

Box No.	X-1	X-1			
Time	1022	1055			
Temp. in Gas Meter	86	87			
Press. in Gas Meter	0	0			
Meter Reading	0	2.700			
Barom. Press.	30.16	30.16			
Percent Oxygen					
N_2 Purge Time	1104	1125			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ______%

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	22.1	6.1	
B = Ml of lead perchlorate used for bland	=	4.1	4.1	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	547	547	
V = Volume of gas sample ft^3	=	2.700	2.700	
P = Barometric pressure	=	30.16	30.16	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	313	3.5	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-24-77

K V B. INC.

Test No. 19-97

SOx DATA SHEET

TEST NO. 19-97 UNIT NO. _____ FUEL #6 LOAD 13.8 klb/hr _____ Location _____

Box No.	X-2	X-2			
Time	1100	1130			
Temp. in Gas Meter	87	88			
Press. in Gas Meter	0	0			
Meter Reading	0	2.200			
Barom. Press.	30.16	30.16			
Percent Oxygen					
N_2 Purge Time	1135	1155			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 _______ %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	15.0	5.8	
B = Ml of lead perchlorate used for bland	=	4.1	4.1	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	548	548	
V = Volume of gas sample ft^3	=	2.200	2.200	
P = Barometric pressure	=	30.16	30.16	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	297	3.6	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-24-77

K V B. INC.

Test No. 19-97

SOx DATA SHEET

TEST NO. 19-97 UNIT NO._____ FUEL #6 OIL LOAD 13.8 klb/hr ____ Location _____

Box No.	X-1	X-1			
Time	1135	1136			
Temp. in Gas Meter	89	90			
Press. in Gas Meter	0	0			
Meter Reading	0	2.700			
Barom. Press.	30.16	30.16			
Percent Oxygen					
N_2 Purge Time	1157				

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ________%

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	23.1	6.C	
B = Ml of lead perchlorate used for bland	=	4.1	4.1	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	550	550	
V = Volume of gas sample ft^3	=	2.700	2.700	
P = Barometric pressure	=	30.16	30.16	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	332	3.3	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-26-77

K V B, INC.

Test No. 19-116

SOx DATA SHEET

TEST NO. 19-116 UNIT NO. ____ FUEL #2 oil LOAD 14.5 klb/hr ____ Location 19

Box No.	2	2			
Time	0957	1020			
Temp. in Gas Meter	77	77			
Press. in Gas Meter	0	0			
Meter Reading	0	3.000			
Barom. Press.	29.72	29.72			
Percent Oxygen					
N_2 Purge Time	1025	1045			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ____%

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	8.2	3.7	
B = Ml of lead perchlorate used for bland	=	2.6	2.6	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	537	537	
V = Volume of gas sample ft3	=	3.000	3.000	
P = Barometric pressure	=	29.72	29.72	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	87	1.7	
,gm/dscm	=			
Emission ,E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-26-77

K V B. INC.

Test No. 19-116

SOx DATA SHEET

TEST NO. 19-116 UNIT NO. ____ FUEL #2 OIL LOAD 14.5 klb/hr ____ Location 19

Box No.	1	1			
Time	1025	1055			
Temp. in Gas Meter	78	80			
Press. in Gas Meter	0	0			
Meter Reading	0	3.000			
Barom. Press.	29.72	29.72			
Percent Oxygen					
N_2 Purge Time	1100	1120			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ____ %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	8.0	3.4	
B = Ml of lead perchlorate used for bland	=	2.6	2.6	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	539	539	
V = Volume of gas sample ft^3	=	3.000	3.000	
P = Barometric pressure	=	29.72	29.72	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	84	1.25	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/10^4 cal

________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-26-77

K V B, INC.

Test No. 19-116

SOx DATA SHEET

TEST NO. 19-116 UNIT NO. ____ FUEL #2 OIL LOAD 14.5 klb/hr ____ Location 19

Box No.	1	1			
Time	1057	1125			
Temp. in Gas Meter	81	93			
Press. in Gas Meter	0	0			
Meter Reading	0	2.017			
Barom. Press.	29.72	29.72			
Percent Oxygen					
N_2 Purge Time	1125	1145			

Calculation: SO_3 or SO_2, ppm = $\dfrac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 ______ %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	5.5	2.8	
B = Ml of lead perchlorate used for bland	=	2.6	2.6	
N = Normality of lead perchlorate titrant	=	.01079	.01079	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	546	546	
V = Volume of gas sample ft^3	=	2.017	2.017	
P = Barometric pressure	=	29.72	29.72	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	50	.47	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\dfrac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ $dscm/10^4$ cal

__________ $dscf/10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-17-77

K V B. INC.

Test No. 19-132

SOx DATA SHEET

TEST NO. 19-132 UNIT NO. ____ FUEL #6 LOAD 14.5 klb/hr ____ Location 19

Box No.	Z-2	Z-2			
Time	0938	0957			
Temp. in Gas Meter	68	72			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	30.12	30.12			
Percent Oxygen	.98	.98			
N_2 Purge Time	1004	1029			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 .98 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	11.76	3.4	
B = Ml of lead perchlorate used for bland	=	2.4	2.4	
N = Normality of lead perchlorate titrant	=	.0107	.0107	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	530	530	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	30.12	30.12	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	423	4.5	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ______ $dscm/10^4$ cal

______ $dscf/10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-17-77

K V B. INC.

Test No. 19-132

SOx DATA SHEET

TEST NO. 19-132 UNIT NO. ____ FUEL #6 LOAD 14.5 klb/hr ____ Location 19

Box No.	Z-1	Z-1			
Time	1011	1026			
Temp. in Gas Meter	78	82			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	30.12	30.12			
Percent Oxygen	.95	.95			
N_2 Purge Time	1032	1113			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 .95 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	11.8	3.4	
B = Ml of lead perchlorate used for bland	=	2.4	2.4	
N = Normality of lead perchlorate titrant	=	.0107	.0107	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	540	540	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	30.12	30.12	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	434	4.6	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-17-77

KVB, INC.

Test No. 19-132

SOx DATA SHEET

TEST NO. 19-132 UNIT NO. ____ FUEL #6 LOAD 14.5 klb/hr ____ Location 19

Box No.	X-2	X-2			
Time	1043	1104			
Temp. in Gas Meter	82	83			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	30.12	30.12			
Percent Oxygen	.95	.95			
N_2 Purge Time	1115	1142			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 .95 %

	SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample =	13.0	3.7	
B = Ml of lead perchlorate used for bland =	2.4	2.4	
N = Normality of lead perchlorate titrant =	.0107	.0107	
F = Dilution factor =	10	1	
T = Average temp. in gas meter =	542	542	
V = Volume of gas sample ft^3 =	1.0	1.0	
P = Barometric pressure =	30.12	30.12	
p = Pressure in gas meter =	0	0	
Concentration, C, ppm =	489	6	
, gm/dscm =			
Emission, E, g/Mcal =			
lb/MBtu =			
ng/J =			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ $dscm/10^4$ cal

________ $dscf/10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-21-77

K V B. INC.

Test No. 19-143

SOx DATA SHEET

TEST NO. 19-143 UNIT NO. ____ FUEL #6 LOAD 13.6 klb/hr ____ Location 19

Box No.	Z-2	Z-2			
Time	1017	1034			
Temp. in Gas Meter	80	80			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.81	29.81			
Percent Oxygen	3.1	3.1			
N_2 Purge Time	1037	1106			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.1 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	11.9	5.4	
B = Ml of lead perchlorate used for bland	=	4.5	4.5	
N = Normality of lead perchlorate titrant	=	.0107	.0107	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	540	540	
V = Volume of gas sample ft3	=	1.0	1.0	
P = Barometric pressure	=	29.81	29.81	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	344	4.2	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/10^4 cal

____________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-21-77

K V B. INC.

Test No. 19-143

SOx DATA SHEET

TEST NO. 19-143 UNIT NO. ____ FUEL #6 LOAD 13.6 klb/hr ____ Location 19

Box No.	Z-1	Z-1			
Time	1045	1104			
Temp. in Gas Meter	80	81			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.81	29.81			
Percent Oxygen	3.1	3.1			
N_2 Purge Time					

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.1 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	12.0	5.1	
B = Ml of lead perchlorate used for bland	=	4.5	4.5	
N = Normality of lead perchlorate titrant	=	.0107	.0107	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	540	540	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.81	29.81	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	348	2.7	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ $dscm/10^4$ cal

________ $dscf/10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-21-77

K V B. INC.

Test No. 19-143

SOx DATA SHEET

TEST NO. 19-143 UNIT NO. _____ FUEL #6 LOAD 13.6 klb/hr _____ Location 19

Box No.	Z-2	Z-2			
Time	1119	1141			
Temp. in Gas Meter	84	90			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	29.81	29.81			
Percent Oxygen	3.1	3.1			
N_2 Purge Time	1146	1215			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.1 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	12.6	5.6	
B = Ml of lead perchlorate used for bland	=	4.5	4.5	
N = Normality of lead perchlorate titrant	=	.0107	.0107	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	547	547	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.81	29.81	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	381	5.2	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-23-77

K V B. INC.

Test No. 19-159

SOx DATA SHEET

TEST NO. 19-159 UNIT NO. ____ FUEL #6 LOAD 14.0 klb/hr ____ Location 19

Box No.	Z-1	Z-1			
Time	0942	0959			
Temp. in Gas Meter	108	109			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	30.08	30.08			
Percent Oxygen	1.75	1.75			
N_2 Purge Time	1005	1033			

Calculation: SO_3 or SO_2, ppm $= \frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 1.75 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	14.0	7.4	
B = Ml of lead perchlorate used for bland	=	6.7	6.7	
N = Normality of lead perchlorate titrant	=	.0107	.0107	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	568	568	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	30.08	30.08	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	354	3.3	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/10^4 cal

________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-23-77

KVB, INC.

Test No. 19-159

SOx DATA SHEET

TEST NO. 19-159 UNIT NO. ____ FUEL #6 LOAD 14.0 klb/hr ____ Location 19

Box No.	X-2	X-2			
Time	1012	1030			
Temp. in Gas Meter	109	109			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	30.08	30.08			
Percent Oxygen	1.7	1.7			
N_2 Purge Time	1035	1105			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess O_2 1.7 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	14.4	7.2	
B = Ml of lead perchlorate used for bland	=	6.7	6.7	
N = Normality of lead perchlorate titrant	=	.0107	.0107	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	569	569	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	30.08	30.08	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	374	2.4	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-23-74

K V B. INC.

Test No. 19-159

SOx DATA SHEET

TEST NO. 19-159 UNIT NO. ______ FUEL #6 LOAD 14.0 klb/hr ____ Location 19

Box No.	Z-1	Z-1			
Time	1044	1104			
Temp. in Gas Meter	110	110			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	30.08	30.08			
Percent Oxygen	1.7	1.7			
N_2 Purge Time	1107	1129			

Calculation: SO_3 or SO_2, ppm $= \frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 1.7 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	14.2	7.1	
B = Ml of lead perchlorate used for bland	=	6.7	6.7	
N = Normality of lead perchlorate titrant	=	.0107	.0107	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	570	570	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	30.08	30.08	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	331	1.7	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/10^4 cal

____________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-1-77

KVB. INC.

Test No. 19-170

SOx DATA SHEET

TEST NO. 19-170 UNIT NO. ____ FUEL #6 LOAD 14.1 klb/hr ____ Location 19

Box No.	2	2			
Time	1103	1123			
Temp. in Gas Meter	105	109			
Press. in Gas Meter	0	0			
Meter Reading	0	1.00			
Barom. Press.	29.98	29.98			
Percent Oxygen	4.2	4.2			
N_2 Purge Time	1126	1156			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 4.2 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	16.2	8.6	
B = Ml of lead perchlorate used for bland	=	6.9	6.9	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	567	567	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.98	29.98	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	426	7.8	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/10^4 cal

____________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-1-77

K V B. INC.

Test No. 19-170

SOx DATA SHEET

TEST NO. 19-170 UNIT NO. ____ FUEL #6 LOAD 141 klb/hr ____ Location 19

Box No.	1	1			
Time	1136	1155			
Temp. in Gas Meter	111	112			
Press. in Gas Meter	0	0			
Meter Reading	0	1.000			
Barom. Press.	29.98	29.98			
Percent Oxygen	4.2	4.2			
N_2 Purge Time	1202	1232			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess O_2 4.2 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	13.2	8.4	
B = Ml of lead perchlorate used for bland	=	6.9	6.9	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	571	571	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	29.98	29.98	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	290	6.9	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ $dscm/10^4$ cal

____________ $dscf/10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-1-77

K V B, INC.

Test No. 19-170

SOx DATA SHEET

TEST NO. 19-170 UNIT NO. ____ FUEL #6 LOAD 14.1 klb/hr ____ Location 19

Box No.	2	2			
Time	1211	1231			
Temp. in Gas Meter	113	116			
Press. in Gas Meter	0	0			
Meter Reading	0	1.000*			
Barom. Press.	29.98	29.98			
Percent Oxygen	4.2	4.2			
N_2 Purge Time	1325	1325			

* METER STUCK ON THIS TEST

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 4.2 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	12.7	7.0	
B = Ml of lead perchlorate used for bland	=	6.9	6.9	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	574	574	
V = Volume of gas sample ft3	=	1.00	1.00	
P = Barometric pressure	=	29.98	29.98	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	269	.4	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

DO NOT USE THIS TEST IN AVE.

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-3-77

K V B, INC.

Test No. 19-179

SOx DATA SHEET

TEST NO. 19-179 UNIT NO. ____ FUEL #2 Oil LOAD ____ klb/hr ____ Location 19

Box No.	X-1	X-1			
Time	1032	1050			
Temp. in Gas Meter	90	98			
Press. in Gas Meter	0	0			
Meter Reading	0	1.000			
Barom. Press.	30.34	30.34			
Percent Oxygen	3.6	3.6			
N_2 Purge Time	1052	1122			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.6 %

	SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample =	8.4	6.4	
B = Ml of lead perchlorate used for bland =	6.2	6.2	
N = Normality of lead perchlorate titrant =	.0101	.0101	
F = Dilution factor =	10	1	
T = Average temp. in gas meter =	554	554	
V = Volume of gas sample ft^3 =	1.0	1.0	
P = Barometric pressure =	30.34	30.34	
p = Pressure in gas meter =	0	0	
Concentration, C, ppm =	97	8.8	
, gm/dscm =			
Emission, E, g/Mcal =			
lb/MBtu =			
ng/J =			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/10^4 cal

____________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-3-77

KVB. INC.

Test No. 19-179

SOx DATA SHEET

TEST NO. 19-179 UNIT NO._____ FUEL #2 oil LOAD______klb/hr____Location 19

Box No.	X-2	X-2			
Time	1102	1120			
Temp. in Gas Meter	99	100			
Press. in Gas Meter	0	0			
Meter Reading	0	1.000			
Barom. Press.	30.34	30.34			
Percent Oxygen	3.6	3.6			
N_2 Purge Time	1124	1153			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.6 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	8.4	6.4	
B = Ml of lead perchlorate used for bland	=	6.2	6.2	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	560	560	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	30.34	30.34	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	98	8.9	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = __________dscm/10^4 cal

__________dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-3-77

K V B, INC.

Test No. 19-179

SOx DATA SHEET

TEST NO. 19-179 UNIT NO. ____ FUEL #2 OIL LOAD ____ klb/hr ____ Location 19

Box No.	Z-1	Z-1			
Time	1139	1150			
Temp. in Gas Meter	100	100			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	30.34	30.34			
Percent Oxygen	3.5	3.5			
N_2 Purge Time	1156	1315			

Calculation: SO_3 or SO_2, ppm $= \frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.5 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	8.5	6.4	
B = Ml of lead perchlorate used for bland	=	6.2	6.2	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	560	560	
V = Volume of gas sample ft^3	=	1.0	1.0	
P = Barometric pressure	=	30.34	30.34	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	102	8.9	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/10^4 cal

____________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-190

SOx DATA SHEET

TEST NO. 19-190 UNIT NO. _____ FUEL NAT. GAS LOAD _______ klb/hr _____ Location 19

Box No.	X-2	X-2			
Time	0952	1009			
Temp. in Gas Meter	99	99			
Press. in Gas Meter	0	0			
Meter Reading	0	1.0			
Barom. Press.	30.07	30.07			
Percent Oxygen	3.2	3.2			
N_2 Purge Time	1015	1040			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess O_2 3.2 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	6.3	5.6	
B = Ml of lead perchlorate used for bland	=	5.5	5.5	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	559	559	
V = Volume of gas sample ft3	=	1.0	1.0	
P = Barometric pressure	=	30.07	30.07	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	37	.6	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-190

SOx DATA SHEET

TEST NO. 19-190 UNIT NO. _____ FUEL NAT. GAS LOAD _______ klb/hr _____ Location 19

Box No.	X-1	X-1			
Time	1021	1037			
Temp. in Gas Meter	99	100			
Press. in Gas Meter	0	0			
Meter Reading	0	1.00			
Barom. Press.	30.07	30.07			
Percent Oxygen	3.2	3.2			
N_2 Purge Time	1092	1115			

Calculation: SO_3 or SO_2, ppm $= \frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.2 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	6.9	6.0	
B = Ml of lead perchlorate used for bland	=	5.5	5.5	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	560	560	
V = Volume of gas sample ft^3	=	1.00	1.00	
P = Barometric pressure	=	30.07	30.07	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	66	2	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-190

SOx DATA SHEET

TEST NO. 19-190 UNIT NO.____ FUEL NAT. GAS LOAD______ klb/hr____ Location 19

Box No.	X-2	X-2			
Time	1055	1112			
Temp. in Gas Meter	102	102			
Press. in Gas Meter	0	0			
Meter Reading	0	1.00			
Barom. Press.	30.07	30.07			
Percent Oxygen	3.2	3.2			
N_2 Purge Time	1118	1140			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 3.2 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	6.3	5.8	
B = Ml of lead perchlorate used for bland	=	5.5	5.5	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	562	562	
V = Volume of gas sample ft^3	=	1.00	1.00	
P = Barometric pressure	=	30.07	30.07	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	38	1.5	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-192

SOx DATA SHEET

TEST NO. 19-192 UNIT NO. _____ FUEL #6 LOAD _____ klb/hr ____ Location _____

Box No.	X-1	X-1			
Time	1522	1540			
Temp. in Gas Meter	101	103			
Press. in Gas Meter	0	0			
Meter Reading	0	1.000			
Barom. Press.	30.07	30.07			
Percent Oxygen	4.2	4.2			
N_2 Purge Time	1546	1611			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 4.2 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	12.6	5.8	
B = Ml of lead perchlorate used for bland	=	5.6	5.6	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	562	562	
V = Volume of gas sample ft^3	=	1.000	1.000	
P = Barometric pressure	=	30.07	30.07	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	317	9	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/10^4 cal

__________ dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-192

SOx DATA SHEET

TEST NO. 19-192 UNIT NO._____ FUEL #6 LOAD______klb/hr____Location 19

Box No.	X-2	X-2			
Time	1552	1609			
Temp. in Gas Meter	104	104			
Press. in Gas Meter	0	0			
Meter Reading	0	1.00			
Barom. Press.	30.07	30.07			
Percent Oxygen	4.1	4.1			
N_2 Purge Time	1613	1641			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 4.1 %

		SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample	=	12.1	5.1	
B = Ml of lead perchlorate used for bland	=	5.6	5.6	
N = Normality of lead perchlorate titrant	=	.0101	.0101	
F = Dilution factor	=	10	1	
T = Average temp. in gas meter	=	564	564	
V = Volume of gas sample ft^3	=	1.00	1.00	
P = Barometric pressure	=	30.07	30.07	
p = Pressure in gas meter	=	0	0	
Concentration, C, ppm	=	296	0	
, gm/dscm	=			
Emission, E, g/Mcal	=			
lb/MBtu	=			
ng/J	=			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________dscm/10^4 cal

__________dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-192

SOx DATA SHEET

TEST NO:_____ UNIT NO._____ FUEL_____ LOAD_______klb/hr____Location______

Box No.	X-3	X-3			
Time	1623	1639			
Temp. in Gas Meter	105	107			
Press. in Gas Meter	0	0			
Meter Reading	0	1.000			
Barom. Press.	30.07	30.07			
Percent Oxygen	4.1	4.1			
N_2 Purge Time	1643	1710			

Calculation: SO_3 or SO_2, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess O_2 4.1 %

	SO_2	SO_3	SO_x
A = Ml of lead perchlorate used for sample =	11.8	8.1	
B = Ml of lead perchlorate used for bland =	5.6	5.6	
N = Normality of lead perchlorate titrant =	.0101	.0101	
F = Dilution factor =	10	1	
T = Average temp. in gas meter =	566	566	
V = Volume of gas sample ft^3 =	1.00	1.00	
P = Barometric pressure =	30.07	30.07	
p = Pressure in gas meter =	0	0	
Concentration, C, ppm =	283	11	
, gm/dscm =			
Emission, E, g/Mcal =			
lb/MBtu =			
ng/J =			

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________dscm/10^4 cal

____________dscf/10^4 Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

KVB

SASS SAMPLING CONDITIONS

Test Site Location 19

Sample Port Location Stack Exit (Test 19-1 SASS)

Stack Conditions: Stack Velocity ______ ft/min ÷ 60 = V_s = 24.9 ft/sec

Stack Temp. 513 °F + 460 = T_s = 973 °R

Stack Moisture; B_{wo} = 0.10 est.

Particulate Loading (Method 5), C = N.A. grams/DSm^3

Probe Nozzle Size for 4.0 ACFM (wet) through cyclones at 400 °F:

Isokinetic Size = $0.1192 \times \sqrt{T_s/V_s}$ = 0.745 inches

Closest Actual Nozzle Size, D_n = 0.75 inches

% Isokinetic @ 4 WACFM, Actual Nozzle = $1.421 \times T_s/(V_s x D_n^2)$ = 98.71 %

If % Iso not in range of 90 to 110%, Adjust Cyclone Flow by:

$Q_{cyc} = 2.814 \times (\%\ Iso) \times V_s \times D_n^2/T_s$ = 4.0 wet ACFM (4.05 for 100%)

If % Iso @ 4 WACFM is greater than 110, use (% Iso) = 110
If % Iso @ 4 WACFM is less than 90, use (% Iso) = 90

Orifice Pressure Differential, H

Meter Temp., T_m = 151 °F + 460 = 612 °R (use 560 °R for estimate)

Meter Flow Rate, $Q_m = Q_{cyc} \times T_m \times (1. - B_{wo})/860$ = 2.56 DCFM

Orifice No. (1, 2, 3) = 2, J = 0.78, D_o = 0.281, $J \times D_o^2$ = 0.062

Orifice Press Diff., $H = 1.108 \times (Q_m/J\ D_o^2)^2/T_m$ = 2.82 in. H_2O

Dry Gas Volume to be Collected (5 hour run)

$V_m = Q_m \times 60 \times 5$ = 702 DCF (683.63)

Estimated Condensate Collection

$V_{lc} = V_m \times 530 \times B_{wo}/[0.0474 \times T_m \times (1. - B_{wo})]$ = 1557 ml (1208)

Estimated Particulate Collection

$M_n = C \times V_m \times 530/(T_m \times 35.3)$ = — grams 0.4289 by SASS

Data Sheet 6002-17

KVB

SASS SAMPLING CONDITIONS

Test Site Location 19

Sample Port Location Stack Exit (Test 19-2 SASS)

Stack Conditions: Stack Velocity ______ ft/min ÷ 60 = V_s = 23.8 ft/sec

$\Delta p = 0.1$

$T_s = 515°F$

Stack Temp. 515 °F + 460 = T_s = 975 °R

Stack Moisture; B_{wo} = 0.090 est. (new oil)

Particulate Loading (Method 5), C = — grams/DSm^3

Probe Nozzle Size for 4.0 ACFM (wet) through cyclones at 400 °F:

Isokinetic Size = $0.1192 \times \sqrt{T_s/V_s}$ = 0.76 inches

Closest Actual Nozzle Size, D_n = 0.75 inches

% Isokinetic @ 4 WACFM, Actual Nozzle = $1.421 \times T_s/(V_s x D_n^2)$ = 103.5 %

If % Iso not in range of 90 to 110%, Adjust Cyclone Flow by:

$Q_{cyc} = 2.814 \times (\%\ Iso) \times V_s \times D_n^2/T_s$ = 4.0 wet ACFM

If % Iso @ 4 WACFM is greater than 110, use (% Iso) = 110
If % Iso @ 4 WACFM is less than 90, use (% Iso) = 90

Orifice Pressure Differential, H

Meter Temp., T_m = 128 °F + 460 = 588 °R (use 560 °R for estimate)

Meter Flow Rate, $Q_m = Q_{cyc} \times T_m \times (1. - B_{wo})/860$ = 2.37 DCFM

Orifice No. (1, 2, 3) = 2, J = 0.78, D_o = 0.281, J x D_o^2 = 0.062

Orifice Press Diff., $H = 1.108 \times (Q_m/J\ D_o^2)^2/T_m$ = 2.89 in. H_2O

Dry Gas Volume to be Collected (5 hour run)

$V_m = Q_m \times 60 \times 5$ = 711 DCF (700)

Estimated Condensate Collection

$V_{lc} = V_m \times 530 \times B_{wo}/[0.0474 \times T_m \times (1. - B_{wo})]$ = 1404 ml (1222)

Estimated Particulate Collection

$M_n = C \times V_m \times 530/(T_m \times 35.3)$ = — grams 2.7416 g

Data Sheet 6002-17

KVB

SASS SAMPLING CONDITIONS

Test Site Location 19

Sample Port Location Stack Exit 19-3 SASS

Stack Conditions: Stack Velocity ________ ft/min ÷ 60 = V_s = 24.19 ft/sec

$\Delta P = 0.1$
$T_s: 550°F$

Stack Temp. 550 °F + 460 = T_s = 1010 °R

Stack Moisture; B_{wo} = 0.09

Particulate Loading (Method 5), C = — grams/DSm³

Probe Nozzle Size for 4.0 ACFM (wet) through cyclones at 400 °F:

Isokinetic Size = $0.1192 \times \sqrt{T_s/V_s}$ = 0.77 inches

Closest Actual Nozzle Size, D_n = 0.75 inches

% Isokinetic @ 4 WACFM, Actual Nozzle = $1.421 \times T_s/(V_s x D_n^2)$ = 105.5 %

If % Iso not in range of 90 to 110%, Adjust Cyclone Flow by:

$Q_{cyc} = 2.814 \times (\% \text{ Iso}) \times V_s \times D_n^2/T_s$ = 4.0 wet ACFM

If % Iso @ 4 WACFM is greater than 110, use (% Iso) = 110
If % Iso @ 4 WACFM is less than 90, use (% Iso) = 90

Orifice Pressure Differential, H

Meter Temp., T_m = 100 °F + 460 = 560 °R (use 560 °R for estimate)

Meter Flow Rate, $Q_m = Q_{cyc} \times T_m \times (1. - B_{wo})/860$ = 2.37 DCFM

Orifice No. (1, 2, 3) = 2, J = 0.78, D_o = 0.281, $J \times D_o^2$ = 0.062

Orifice Press Diff., $H = 1.108 \times (Q_m/J\ D_o^2)^2/T_m$ = 2.89 in. H_2O use 2.9

Dry Gas Volume to be Collected (5 hour run)

$V_m = Q_m \times 60 \times 5$ = 711 DCF

Estimated Condensate Collection

$V_{lc} = V_m \times 530 \times B_{wo}/[0.0474 \times T_m \times (1. - B_{wo})]$ = 1404 ml

Estimated Particulate Collection

$M_n = C \times V_m \times 530/(T_m \times 35.3)$ = — grams

KVB

SASS SAMPLING CONDITIONS

Test Site Location 19 TEST 19-4 SASS

Sample Port Location STACK EXIT

Stack Conditions: Stack Velocity ______ ft/min ÷ 60 = V_s = 22.11 (22.75) ft/sec

Δp = 0.085

Δp CHANGED TO 1.09 DURING TEST

Stack Temp. 533 °F + 460 = T_s = 993 °R

Stack Moisture; B_{wo} = .09

Particulate Loading (Method 5), C = — grams/DSm^3

Probe Nozzle Size for 4.0 ACFM (wet) through cyclones at 400 °F:

Isokinetic Size = $0.1192 \times \sqrt{T_s/V_s}$ = .798 inches (.7875)

Closest Actual Nozzle Size, D_n = .75 inches

% Isokinetic @ 4 WACFM, Actual Nozzle = $1.421 \times T_s/(V_s x D_n^2)$ = 113.5 (110.2) %

If % Iso not in range of 90 to 110%, Adjust Cyclone Flow by:

$Q_{cyc} = 2.814 \times (\% \text{ Iso}) \times V_s \times D_n^2/T_s$ = 3.88 wet ACFM (3.99)

If % Iso @ 4 WACFM is greater than 110, use (% Iso) = 110
If % Iso @ 4 WACFM is less than 90, use (% Iso) = 90

Orifice Pressure Differential, H

Meter Temp., T_m = 100 °F + 460 = 560 °R (use 560 °R for estimate)

Meter Flow Rate, $Q_m = Q_{cyc} \times T_m \times (1. - B_{wo})/860$ = 2.299 DCFM (2.364)

Orifice No. (1, 2, 3) = 2, J = 0.78, D_o = 0.281, J x D_o^2 = 0.062

Orifice Press Diff., $H = 1.108 \times (Q_m/J\ D_o^2)^2/T_m$ = 2.72 (2.87) in. H_2O

Dry Gas Volume to be Collected (5 hour run)

$V_m = Q_m \times 60 \times 5$ = 689.7 DCF

Estimated Condensate Collection

$V_{lc} = V_m \times 530 \times B_{wo}/[0.0474 \times T_m \times (1. - B_{wo})]$ = 1361 ml

Estimated Particulate Collection

$M_n = C \times V_m \times 530/(T_m \times 35.3)$ = — grams

Data Sheet 6002-17

KVB, INC. TRACE SPECIES AND ORGANICS SAMPLING DATA

Project: EPA
Personnel: R. PIONESSA, M. HAGERTY
Barometric Press: 30.17
Date: 3-10-77
Location: 19
Unit:
Probe Nozzle Diameter (inches): 0.750 (Dn)
Test: 19-1 SASS
Absolute Static Press. in Stack (in. H_2O ~~Hg~~): -0.21 (Ps)
Fuel: #6 OIL
Pitot Tube Coefficient: 0.83 (Cp)

TIME Real	TIME Elapsed	Traverse Point Depth	Pitot ΔP (in H_2O)	Orifice ΔP (in H_2O)	Cum. Meter Volume (ft^3)	Pump Suction (in. Hg)	TEMPERATURE (°F) Stack	Probe	XAD-2	Impinger Out	Oven	Meter In	Meter Out	O_2 Conc. % dry
1115	0	Center 15" in	0.11	2.82	814.107	5.9	513	400?	61	98	400	119	111	
1145	30				882.000	6.2	511	395	64	86	394	141	124	
1215	60				949.000	6.5	513	400	62	82	399	148	132	
1245	90				016.000	7.0	512	400	62	80	401	155	139	
1315	120				084.000			OUT OF SERVICE						
					CHANGED		DESSICANT							
1320	120		*0.18/0.11		084.000	7.0	513 I OOS	VERY HOT TO TOUCH	62	112	406	153	143	
1350	150		0.11		156.000	7.0	LOOSE CONNECTION	BROKEN T/C WIRE	62	100	400	156	145	
1420	180				224.000	7.5	508	POSSIBLE SHORT IN	64	88	401	158	147	
1450	210				290.000	7.7	509	HEATER LINES	58	91	403	157	145	
1520	240				364.000	8.0	510		63	79	405	157	146	
1550	270				430.000	8.0	510		64	77	406	157	145	
1620	300				497.700	8.5	510		70	76	405	157	146	

* NOW USING JOY PITOT PROBE & INCLINE MANOMETER/POSSIBLE HOLE IN STATIC (ACUTHERM) PROBE DUE TO SHORT

KVB 6002-12

KVB, INC. TRACE SPECIES AND ORGANICS SAMPLING DATA

Project: EPA PHASE III SASS
Personnel: R. PIDNESSA, M. HAGERTY
Barometric Press: 29.99 – 1000 HRS; 29.92 – 1500 HRS
Date: 3-17-77
Location: 19
Unit:
Probe Nozzle Diameter (inches): 3/4 (Dn)
Test: 19- 2-SASS
Absolute Static Press. in Stack (in. Hg): -0.20 (Ps)
Fuel: #6 OIL
Pitot Tube Coefficient: 0.83 (Cp)

TIME		Traverse Point Depth	Pitot ΔP (in H_2O)	Orifice ΔP (in H_2O)	Cum. Meter Volume (ft^3)	Pump Suction (in. Hg)	TEMPERATURE (°F)							O_2 Conc. % dry
Real	Elapsed						Stack	Probe	XAD-2	Impinger Out	Oven	Meter In	Meter Out	
0955	0	15" IN	0.10	2.9	500.532	7.2	515	387	61	67	401	97	92	
1025	30				568.000	8.2	511	398	64	77	400	119	102	
1055	60				639.000	9.0	512	399	61	80	402	126	109	
1125	90				709.000	9.9	512	408	64	77	402	130	114	
1155	120				779.000	10.9	514	409	65	78	402	132	118	
1225	150				849.109	11.7	513	406	66	74	403	131	119	
1227	150				849.109	11.7	513	406	66	74	403	131	119	
1257	180				921.000	13.0	516	409	65	87	403	132	119	
1327	210				988.000	14.0	515	410	64	81	403	135	120	
1357	240				058.000	15.0	512	404	62	81	403	136	122	
1427	270				129.000	16.0	521	407	62	83	405	139	125	
1457	300				199.167	16.5	510	402	64	79	404	145	130	

KVB 6002-12

KVB, INC. TRACE SPECIES AND ORGANICS SAMPLING DATA

Project: EPA PHASE III SASS
Date: 3-21-77
Location: 19
Unit:
Test: LO NOx 19-3 SASS
Fuel: #6 OIL

Personnel: [illegible]
[illegible]

Barometric Press: 30.19 [illegible]

Probe Nozzle Diameter (inches): .75 (Dn)
Absolute Static Press. in Stack (in. ~~Hg~~ H_2O): -.22 (Ps)
Pitot Tube Coefficient: .83 (Cp)

TIME		Traverse Point Depth	Pitot ΔP (in H_2O)	Orifice ΔP (in H_2O)	Cum. Meter Volume (ft^3)	Pump Suction (in. Hg)	TEMPERATURE (°F)							O_2 Conc. % dry
Real	Elapsed						Stack	Probe	XAD-2	Impinger Out	Oven	Meter In	Meter Out	
1030	0	15" in	.10	2.9	203.052	7.4	553	402	60	86	405	112	109	
1100	30	"	.10	2.9	272.500	8.0	553	403	61	81	403	134	118	
1130	60	"	.10	2.9	342.200	8.5	559	409	54	78	403	141	126	
1200	90	"	.10	2.9	412.000	9.8	562	411	61	88	405	146	131	
1230	120	"	.10	2.9	486.000	11.5	561	409	62	86	405	145	133	
1300	150	"	.10	2.9	552.950	12.1	559	407	62	86	404	140	134	
				CHANGED DESSICANT										
1302	150	15" in	.10	2.9	552.950	12.5	559	404	60	107	406	146	135	
1332	180	"	.10	2.9	624.400	13.1	554	406	57	108	407	150	138	
1402	210	"	.10	2.9	691.400	13.9	564	406	70	102	405	133	129	
1432	240	"	.10	2.9	765.300	15.0	557	407	66	98	404	133	122	
1502	270	"	.10	2.9	835.100	16.0	544	408	61	95	407	146	130	
1532	300	"	.10	2.9	905.500	16.6	545	409	66	95	404	149	135	

KVB 6002-12

KVB, INC. TRACE SPECIES AND ORGANICS SAMPLING DATA

Project: EPA PHASE III **Personnel:** PIONESSA [illegible] **Barometric Press:** 29.83 1200 HRS

Date: 3-23-77

Location: 19

Unit: **Probe Nozzle Diameter (inches):** .75 (Dn)

Test: 19-4 SASS **Absolute Static Press. in Stack (in. Hg):** -.21 (Ps)

Fuel: #6 OIL **Pitot Tube Coefficient:** .83 (Cp)

TIME							TEMPERATURE (°F)							
Real	Elapsed	Traverse Point Depth	Pitot ΔP (in H_2O)	Orifice ΔP (in H_2O)	Cum. Meter Volume (ft^3)	Pump Suction (in. Hg)	Stack	Probe	XAD-2	Impinger Out	Oven	Meter In	Meter Out	O_2 Conc. % dry
0930	0	15" in	.10	2.9	907.074	7.5	524	402	54	67	395	100	94	
1000	30	"	.085	2.72	978.000	8.0	532	400	59	78	398	124	106	
1030	60	"	.09	2.87	046.200	8.2	532	397	59	74	399	129	113	
1100	90	"	.09	2.87	114.500	9.2	533	400	61	75	400	131	117	
1130	120	"	.09	2.87	186.000	10.0	533	402	60	74	399	132	119	
1200	150	"	.09	2.87	255.930	10.9	540	401	59	89	401	136	122	
				CHANGED DESSICANT										
1202	150	15" in	.09	2.87	255.930	11.0	538	407	58	96	403	131	121	
1232	180	"	.09	2.87	327.000	11.4	537	402	59	91	402	136	122	
1302	210	"	.09	2.87	397.600	12.0	538	402	59	86	401	137	123	
1332	240	"	.09	2.87	468.200	12.5	532	395	60	76	400	137	123	
1402	270	"	.09	2.87	539.700	13.0	533	398	60	84	401	140	126	
1432	300	"	.09	2.87	610.537	13.6	533	397	60	90	402	139	126	

T = 174°F

PARTICULATE EMISSION CALCULATIONS

Test No. 19-1 SASS Date 3-10-77 Location 19 Engr. HB

Unit No. ______ Fuel #6 OIL Sampling Train and Method SASS Train

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.17 in. Hg

Tot. Liquid Collected, V_{lc} 1208 (1) ml Total Particulate, M_n 428.9 (2) m gm

Velocity Head, ΔP 0.11 iwg Stack Temp., Ts 971 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 683.6 ft^3 Stack Press., Psg -0.21 iwg Excess O_2, XO_2% 2.9 %

Orifice Press. Diff., H 2.82 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 300 min Nozzle Dia., Dn 0.75 in. Meter Temp., T_m 604 °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	643.6	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{lc}$	57.2	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.076	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0095	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.36×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	2.18×10^{-2}	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	410.1	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1487	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	4007	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3702	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60		lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	116.1	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	1.46×10^{-2}	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	6.26	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	99.7	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

(1) does not include moisture from dessicant
(2) From TS&O data sheet 6002-15

PARTICULATE EMISSION CALCULATIONS

Test No. M-2 SASS Date 3-17-77 Location 19 Engr. HB

Unit No. ______ Fuel #6 OIL Sampling Train and Method SASS Train

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 29.99 in. Hg

Tot. Liquid Collected, V_{1c} 1327 ml Total Particulate, M_n 2741.6 m gm

Velocity Head, ΔP 0.10 iwg Stack Temp., Ts 974 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 698.6 ft^3 Stack Press., Psg -0.20 iwg Excess O_2, XO_2% 3.0 %

Orifice Press. Diff., H 2.90 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 300 min Nozzle Dia., Dn 0.75 in. Meter Temp., T_m ______ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	704.7	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	62.9	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.082	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0599	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	8.578×10^{-6}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.137	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	407.66	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1424	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3803	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3492	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	1.797	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	116.8	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.092	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	39.6	ng/joule
11. % Isokinetic	$I = \dfrac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	107.4	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

(1) does not include H_2O in dessicant

PARTICULATE EMISSION CALCULATIONS

Test No. 19-3 SASS Date 3-21-77 Location 19 Engr. HB

Unit No. ______ Fuel #6 OIL Sampling Train and Method SASS Train

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.19 in. Hg

Tot. Liquid Collected, V_{1c} 1384 ml Total Particulate, M_n 4698.1 m gm

Velocity Head, ΔP 0.10 iwg Stack Temp., Ts 1016 °R Stack Area, As 4.90 ft^2

Sample Volume, Vm 702.4 ft^3 Stack Press., Psg -0.22 iwg Excess O_2, XO_2% 1.8 %

Orifice Press. Diff., H 2.9 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 300 min Nozzle Dia., Dn 0.75 in. Meter Temp., T_m 134 °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	713.3	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	65.6	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.084	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.1014	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.452×10^{-5}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.233	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	410.4	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1450	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3736	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	3422	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	2.982	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	109.4	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	0.146	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	63.1	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	110.9	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PARTICULATE EMISSION CALCULATIONS

Test No. 19-4 SASS Date 3-23-77 Location 19 Engr. #B

Unit No. ______ Fuel #6 oil Sampling Train and Method SASS Train

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 29.83 in. Hg

Tot. Liquid Collected, V_{lc} 1295 ml Total Particulate, M_n 3844.6 m gm

Velocity Head, ΔP 0.09 iwg Stack Temp., Ts 994 °R Stack Area, As 4.9 ft^2

Sample Volume, Vm 703.46 ft^3 Stack Press., Psg −0.21 iwg Excess O_2, XO_2% 1.5 %

Orifice Press. Diff., H 2.87 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 300 min Nozzle Dia., Dn 0.75 in. Meter Temp., T_m 584 °R

*1. Sample Gas Volume		$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	705.8	SCF
2. Water Vapor		$Vw_{std} = 0.0474\ V_{lc}$	61.4	SCF
3. Moisture Content		Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.080	N.D.
4. Concentration	a.	$C = 0.0154\ Mn/Vm_{std}$	0.0839	grains/DSCF
	b.	$C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.201×10^{-5}	lb/DSCF
	c.	$C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.1924	grams/DSCM
5. Abs. Stack Press.		$Ps = P_{bar} \times 13.6 + Psg$	405.48	in. w abs.
6. Stack Gas Speed		$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	1368	ft/min
7. Stack Gas Flow Rate @ 70°F	a.	$Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	3562	WSCF/min
	b.	Qsd = Eq. 7a x (1. − Eq. 3)	3277	DSCF/min
8. Material Flow		Ms = Eq. 7b x Eq. 4b x 60	2.36	lb/hr.
9. XO_2 factor		$XO_2f = 2090/(20.9 - XO_2\%)$	107.7	N.D.
10. Emission	a.	E = Eq. 4b x Fe x Eq. 9	0.119	lb/MMBtu
	b.	E = Eq. 4c x Fm x Eq. 9 x 1000	51.28	ng/joule
11. % Isokinetic		$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	114.7	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

KVB

TRACE SPECIES AND ORGANICS TEST
SAMPLE RECOVERY LOG

Test No. 19-1 Date 3/10/77 Location 19

Sample Port Position MID-POINT / STACK / ~15" IN

Container Number	Sample Description	Container Type	Net wt/vol.	Comment
674	H_2O BLANK	NAL	1000 ml	
675	IPA BLANK	NAL	1000 ml	
684	50-50 BLANK	NAL	950 ml	
685	SIL. NIT. / AM. PER. SU.	NAL	1000 ml	BLANK
571	XAD-2 BLANK	NAL	402 ml	
715	PROBE / 10 M	NAL	0.0605 g	SOLIDS
592	"	GL	289 ml	H_2O wash
591	"	GL	385 ml	50-50 wash
725	3M	NAL	0.0457 g	SOLIDS
589	"	GL	163 ml	H_2O
730	1M	NAL	0.0037 g	SOLIDS
485	"	GL	175 ml	50-50
491	"	GL	190 ml	H_2O
463	FILTER	P/D	0.3190 g	SOLIDS
478	"	GL	72 ml	50-50
484	"	GL	130 ml	H_2O
522	1ST IMPINGER	NAL	891 ml	SOLUTION
590	"	GL	289 ml	IPA
667	2nd IMPINGER	NAL	792 ml	SOLUTION
588	"	GL	258 ml	IPA
586	"	GL	240 ml	H_2O
668	3rd IMPINGER	NAL	725 ml	SOLUTION
585	"	GL	300 ml	IPA
584	"	GL	238 ml	H_2O
536	XAD-2	GL	150 g	RESIN
676	"	NAL	895 ml	CONDENSATE
486	"	GL	200 ml	"
583	"	GL	260 ml	RINSE 50-50
497	"	GL	150 ml	H_2O
19-1LF	No. 6 OIL	GL	500 ml	OIL SAMPLE

Data Sheet KVB 6002-15

Keeler Boiler

TEST 19 FUELS TABLE

POLLUTANT	SAMPLE NUMBER							
	19-1 LF+	19-1 LF+ dup	19-2 LF+	19-2 LF dup	19-3 LF+	19-3 LF+ dup	19-4 LF+	19-4 LF+ dup.
Antimony	<25	<25	<25	<25	<25	<25	<25	<25
Arsenic	<2	<2	<2	<2	<2	<2	<2	<2
Barium	<5	<5	<5	<5	<5	<5	15	10
Beryllium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Cadmium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Calcium	31	30	31	43	<10	<10	<10	<10
Chromium	<5	<5	<5	<5	<5	<5	<5	<5
Cobalt	<10	<10	<10	<10	<10	<10	<10	<10
Copper	<3	<3	<3	<3	<3	<3	<3	<3
Iron	35	25	12	15	7	13	30	14
Lead	<3	<3	<3	<3	<3	<3	6	<3
Manganese	0.5	0.1	1.4	0.8	<0.5	<0.5	<0.5	<0.5
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	3.5	3.5	14	15	<10	<10	<10	<10
Selenium	<1	<1	<1	<1	<1	<1	<1	<1
Tellurium	<25	<25	<25	<25	<25	<25	<25	<25
Tin	<25	<25	<25	<25	<25	<25	<25	<25
Titanium	<250	<250	<250	<250	<250	<250	<250	<250
Vanadium	25	25	40	40	50	55	55	45
Zinc	6	4	3	4	5	<5	<5	5
Chloride	<18.3	—	<11.6	— —	<34.4	—	<46.3	—
Fluoride	38.7	—	45.8	—	34.6	—	41.0	—
Nitrates	—	—	—	—	—	—	—	—
Sulfates	—	—	—	—	—	—	—	—

+ μg/g

KEELER BOILER

TEST 19-1 TABLE STACK - #6 OIL BASELINE

POLLUTANT	SAMPLE NUMBER				
	571+	685*	674*	684*	675*
Antimony	<27	<0.5	<0.5	<0.5	<0.5
Arsenic	<1	<0.005	<0.005	<0.005	<0.005
Barium	<11	<0.1	<0.1	<0.1	<0.1
Beryllium	<0.5	<0.005	<0.005	<0.005	<0.005
Cadmium	<0.5	0.01	<0.005	<0.005	<0.005
Calcium	9.3	0.49	0.12	0.25	0.16
Chromium	2.7	0.05	0.05	0.05	0.05
Cobalt	5.9	<0.2	<0.2	<0.2	<0.2
Copper	1.6	0.03	<0.02	<0.02	<0.02
Iron	20	0.23	0.12	0.17	0.15
Lead	<2.7	0.06	<0.05	<0.05	<0.05
Manganese	0.5	0.02	<0.01	<0.01	0.02
Mercury	<0.02	<0.005	<0.005	<0.005	<0.005
Nickel	<2.7	<0.05	<0.05	<0.05	<0.05
Selenium	<1	<0.01	<0.01	<0.01	<0.01
Tellurium	<27	<0.3	<0.3	<0.3	<0.3
Tin	<54	<1	<1	<1	<1
Titanium	<16	<1	<1	<1	<1
Vanadium	<11	<0.1	<0.1	<0.1	<0.1
Zinc	1.6	0.20	0.10	0.11	0.08
Chloride	25.5	83.4	<0.5	<0.5	0.54
Fluoride	28.8	0.77	0.12	<0.1	<0.1
Nitrates	<0.2	2.0	<0.01	0.08	0.06
Sulfates	<50	31200	4.0	4.0	2.0

+µg/g
*µg/ml

KVB

TRACE SPECIES AND ORGANICS TEST
SAMPLE RECOVERY LOG

Test No. 19-2 Date 3-17-77 Location 19

Sample Port Position MID-POINT STACK / ~15' IN

Container Number	Sample Description	Container Type	Net wt/vol.	Comment
566	NO_2 / PROBE / 10M	NAL	1.6620	SOLIDS
493	"	GL	115	50/50
489	"	GL	210	"
629	"	GL	140	H_2O
483	"	GL	225	"
716	3 M	NAL	0.4443	SOLIDS
619	"	GL	190	50/50
620	"	GL	200	H_2O
720	1M	NAL	0.2196	SOLIDS
621	"	GL	140	50/50
622	"	GL	165	H_2O
538	FILTER	PETRI	0.4157	SOLIDS
625	"	GL	90	50/50
626	"	GL	130	H_2O
521	1ST IMP.	NAL	985	SOLUTION
499	"	GL	232	IPA
481	"	GL	205	H_2O
666	2nd IMP.	NAL	782	SOLUTION
477	"	GL	125	IPA
487	"	GL	200	H_2O
670	3rd IMP.	NAL	755	SOLUTION
617	"	GL	165	IPA
623	"	GL	198	H_2O
533	XAD-2	WMGL		RESIN
520	"	NAL	950	CONDENSATE
490	"	GL	105	"
495	"	GL	230	50/50
618	"	GL	230	H_2O

Data Sheet KVB 6002-15

KEELER BOILER

TEST 19-2 TABLE STACK - #6 OIL BASELINE

POLLUTANT	SAMPLE NUMBER							
	566+	716+	720+	538+	A*	B*	B *duplicate	533+
Antimony	<38	<210	<250	<500	<0.5	<0.5	<0.5	<25
Arsenic	<1.5	33	<10	200	0.018	<0.005	0.01	<1
Barium	38	460	6000	800	<0.1	<0.1	<0.1	<10
Beryllium	<0.8	<4.2	<5	<10	<0.005	<0.005	<0.005	<0.5
Cadmium	0.8	<4.2	<5	<10	0.005	0.34	0.33	<1
Calcium	1900	1900	3500	4800	0.67	0.34	0.30	40
Chromium	72	140	310	240	0.14	14	14	8.5
Cobalt	120	310	940	1600	<0.2	0.3	0.3	1
Copper	46	50	100	460	0.06	0.14	0.13	<1
Iron	5400	7200	32000	21000	2.7	69	68	28
Lead	150	<20	<25	1000	0.14	<0.05	<0.05	<2
Manganese	51	75	210	250	0.17	0.70	0.69	2
Mercury	<0.03	<0.17	<0.2	<0.4	<0.005	<0.005	<0.005	<0.02
Nickel	1900	2200	9000	30000	0.77	8.9	8.7	<2
Selenium	<1.5	<8	<10	<20	<0.01	<0.01	<0.01	<1
Tellurium	<38	<210	<250	<500	<0.3	<0.3	<0.3	<25
Tin	<76	<420	<500	<1000	<1	<1	<1	<50
Titanium	460	<1200	2500	<3000	<1	<1	<1	<150
Vanadium	6300	10000	43000	87000	2.5	0.2	0.2	<10
Zinc	400	400	1300	4900	1.8	0.13	0.14	10
Chloride	279	—	—	11600	2.12	<0.5	<0.5	<10
Fluoride	205	134	909	<2	<0.1	0.16	0.23	15
Nitrates	113	—	—	39.5	0.28	0.88	3.80	3.61
Sulfates	14200	—	—	457000	11.0	262	250	66.6
					489,493, 483,629, 619,620, 621,622, 625,626	495, 618		

KEELER BOILER

TEST 19-2 TABLE STACK - #6 OIL BASELINE

POLLUTANT	SAMPLE NUMBER 533[+] duplicate	C_1*	C*	C* duplicate				
Antimony	<25	no metal analyses on sub-one samples	<0.5	<0.5				
Arsenic	<1		<0.005	<0.005				
Barium	50		<0.1	<0.1				
Beryllium	<0.5		<0.005	<0.005				
Cadmium	<0.5		0.02	0.015				
Calcium	10		0.14	0.10				
Chromium	7		1.4	1.3				
Cobalt	2		<0.2	<0.2				
Copper	1		0.04	0.05				
Iron	27		4.3	4.0				
Lead	<2		<0.05	<0.05				
Manganese	2		0.08	0.07				
Mercury	<0.02		<0.005	<0.005				
Nickel	<2		0.7	0.7				
Selenium	<1		<0.01	<0.01				
Tellurium	<25		<0.3	<0.3				
Tin	<50		<1	<1				
Titanium	<150		<1	<1				
Vanadium	<10		<0.1	<0.1				
Zinc	1.5		0.09	0.12				
Chloride	<11	—	61.2	59.0				
Fluoride	18	—	0.70	0.65				
Nitrates	2.20	0.40	—	—				
Sulfates	69.9	19600	—	—				
		520,490, 521,499, 481	520,490, 521,499, 481,666, 477,487, 670,617, 623					

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 D 566, 716, 720, 538 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium	≤0.7	Terbium	0.3	Ruthenium		Vanadium	MC
Thorium	1	Gadolinium	1	Molybdenum	MC	Titanium	330
Bismuth	0.3	Europium	0.3	Niobium	0.4	Scandium	0.2
Lead	380	Samarium	2	Zirconium	5	Calcium	MC
Thallium		Neodymium	19	Yttrium	1	Potassium	MC
Mercury	NR	Praseodymium	11	Strontium	110	Chlorine	32
Gold		Cerium	22	Rubidium	1	Sulfur	MC
Platinum		Lanthanum	190	Bromine	0.7	Phosphorus	MC
Iridium		Barium	MC	Selenium	10	Silicon	MC
Osmium		Cesium	0.1	Arsenic	18	Aluminum	MC
Rhenium		Iodine	0.4	Germanium	0.8	Magnesium	MC
Tungsten	0.8	Tellurium	0.3	Gallium	12	Sodium	MC
Tantalum		Antimony	26	Zinc	MC	Fluorine	≈59
Hafnium	0.5	Tin	3	Copper	280	Oxygen	NR
Lutetium	0.1	Indium	STD	Nickel	MC	Nitrogen	NR
Ytterbium	0.7	Cadmium	0.6	Cobalt	MC	Carbon	NR
Thulium	0.1	Silver	7	Iron	MC	Boron	18
Erbium	0.5	Palladium		Manganese	140	Beryllium	0.4
Holmium	0.7	Rhodium		Chromium	96	Lithium	4
Dysprosium	1					Hydrogen	NR

NR — Not Reported
All elements not reported <0.1 ppm

Approved: [signature]

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 E 533 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium		Terbium		Ruthenium		Vanadium	0.2
Thorium		Gadolinium		Molybdenum	11	Titanium	2
Bismuth		Europium		Niobium		Scandium	<0.1
Lead	≤2	Samarium		Zirconium	3	Calcium	46
Thallium		Neodymium		Yttrium		Potassium	28
Mercury	NR	Praseodymium		Strontium	0.2	Chlorine	3
Gold		Cerium	≤0.6	Rubidium	≤0.1	Sulfur	93
Platinum		Lanthanum		Bromine	2	Phosphorus	6
Iridium		Barium	1	Selenium		Silicon	39
Osmium		Cesium		Arsenic	0.4	Aluminum	6
Rhenium		Iodine	0.5	Germanium		Magnesium	5
Tungsten		Tellurium		Gallium	≤0.3	Sodium	14
Tantalum		Antimony	1	Zinc	3	Fluorine	≈6
Hafnium		Tin	≤1	Copper	2	Oxygen	NR
Lutetium		Indium	STD	Nickel	0.6	Nitrogen	NR
Ytterbium		Cadmium	≤0.7	Cobalt	<0.1	Carbon	NR
Thulium		Silver	≤0.8	Iron	6	Boron	11
Erbium		Palladium		Manganese	0.1	Beryllium	
Holmium		Rhodium		Chromium	0.5	Lithium	INT
Dysprosium						Hydrogen	NR

NR — Not Reported
All elements not reported <0.4 ppm weight

Approved: [signature]

INT-Interference Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucible prior to analysis.

COMMERCIAL TESTING & ENGINEERING CO.

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

Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 5, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 F Composites B & C 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN μg/ml

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium	≤0.005	Terbium		Ruthenium		Vanadium	0.03
Thorium	≤0.006	Gadolinium		Molybdenum	0.2	Titanium	0.006
Bismuth		Europium		Niobium		Scandium	≤0.001
Lead	0.009	Samarium		Zirconium	0.004	Calcium	≥8
Thallium		Neodymium		Yttrium		Potassium	3
Mercury	NR	Praseodymium	<0.001	Strontium	0.003	Chlorine	0.1
Gold	<0.001	Cerium	0.001	Rubidium	<0.001	Sulfur	MC
Platinum		Lanthanum	0.002	Bromine	0.04	Phosphorus	0.9
Iridium		Barium	0.02	Selenium	0.003	Silicon	1
Osmium		Cesium	0.002	Arsenic	0.005	Aluminum	0.05
Rhenium		Iodine	0.005	Germanium		Magnesium	0.08
Tungsten		Tellurium		Gallium	<0.001	Sodium	>1
Tantalum		Antimony		Zinc	0.08	Fluorine	≈0.04
Hafnium		Tin	0.002	Copper	0.06	Oxygen	NR
Lutetium		Indium	STD	Nickel	0.8	Nitrogen	NR
Ytterbium		Cadmium	0.03	Cobalt	0.04	Carbon	NR
Thulium		Silver	MC	Iron	5	Boron	0.001
Erbium		Palladium		Manganese	0.2	Beryllium	
Holmium		Rhodium		Chromium	4	Lithium	≤0.001
Dysprosium						Hydrogen	NR

NR – Not Reported

All elements not reported <0.001 μg/ml

Approved:

Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucible

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 14, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 G LF #6 Fuel Oil 5-18-77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium		Terbium		Ruthenium		Vanadium	250
Thorium		Gadolinium		Molybdenum	6	Titanium	0.8
Bismuth		Europium		Niobium		Scandium	≤0.1
Lead	0.8	Samarium		Zirconium	0.9	Calcium	210
Thallium		Neodymium		Yttrium		Potassium	23
Mercury	NR	Praseodymium		Strontium	1	Chlorine	3
Gold		Cerium		Rubidium		Sulfur	MC
Platinum		Lanthanum		Bromine		Phosphorus	29
Iridium		Barium	8	Selenium	≤0.5	Silicon	23
Osmium		Cesium		Arsenic	0.4	Aluminum	19
Rhenium		Iodine		Germanium		Magnesium	24
Tungsten		Tellurium		Gallium		Sodium	210
Tantalum		Antimony		Zinc	3	Fluorine	≈5
Hafnium		Tin	≤0.4	Copper	2	Oxygen	NR
Lutetium		Indium	STD	Nickel	56	Nitrogen	NR
Ytterbium		Cadmium		Cobalt	3	Carbon	NR
Thulium		Silver		Iron	63	Boron	0.6
Erbium		Palladium		Manganese	0.3	Beryllium	
Holmium		Rhodium		Chromium	0.4	Lithium	<0.1
Dysprosium						Hydrogen	NR

NR — Not Reported
All elements not reported <0.1 ppm weight
Approved:
Sample was thermally ashed @ 350°C for one hour in a laboratory furnace in a quartz crucible prior to analysis

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 14, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 G LF #6 Fuel Oil Duplicate
5-18-77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium		Terbium		Ruthenium		Vanadium	430
Thorium		Gadolinium		Molybdenum	6	Titanium	1
Bismuth		Europium		Niobium		Scandium	≤0.1
Lead	≤1	Samarium		Zirconium	≤0.4	Calcium	190
Thallium		Neodymium		Yttrium		Potassium	63
Mercury	NR	Praseodymium		Strontium	0.3	Chlorine	1
Gold		Cerium		Rubidium		Sulfur	MC
Platinum		Lanthanum		Bromine		Phosphorus	11
Iridium		Barium	2	Selenium	≤1	Silicon	19
Osmium		Cesium		Arsenic	0.2	Aluminum	8
Rhenium		Iodine		Germanium		Magnesium	27
Tungsten		Tellurium		Gallium		Sodium	≥650
Tantalum		Antimony		Zinc	4	Fluorine	≈3
Hafnium		Tin	≤0.5	Copper	2	Oxygen	NR
Lutetium		Indium	STD	Nickel	47	Nitrogen	NR
Ytterbium		Cadmium		Cobalt	2	Carbon	NR
Thulium		Silver		Iron	19	Boron	1
Erbium		Palladium		Manganese	0.3	Beryllium	
Holmium		Rhodium		Chromium	0.4	Lithium	0.4
Dysprosium						Hydrogen	NR

NR – Not Reported
All elements not reported <0.2 ppm weight

Approved:

Sample was thermally ashed @ 350°C for one hour in a laboratory furnace in a quartz crucible

COMMERCIAL TESTING & ENGINEERING CO.

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

Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
P. O. Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.:

Sample No.: Test 19-1 H

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium		Terbium		Ruthenium		Vanadium	0.1
Thorium		Gadolinium		Molybdenum	9	Titanium	0.9
Bismuth		Europium		Niobium		Scandium	<0.1
Lead	≤1	Samarium		Zirconium	2	Calcium	16
Thallium		Neodymium		Yttrium		Potassium	26
Mercury	NR	Praseodymium		Strontium	0.5	Chlorine	7
Gold		Cerium		Rubidium	0.2	Sulfur	2
Platinum		Lanthanum		Bromine	1	Phosphorus	4
Iridium		Barium	1	Selenium		Silicon	24
Osmium		Cesium	≤0.1	Arsenic	≤0.3	Aluminum	3
Rhenium		Iodine	≤0.3	Germanium		Magnesium	6
Tungsten		Tellurium		Gallium	≤0.2	Sodium	9
Tantalum		Antimony		Zinc	9	Fluorine	~4
Hafnium		Tin		Copper	2	Oxygen	NR
Lutetium		Indium	STD	Nickel	2	Nitrogen	NR
Ytterbium		Cadmium		Cobalt	≤0.1	Carbon	NR
Thulium		Silver	≤0.3	Iron	2	Boron	12
Erbium		Palladium		Manganese	<0.1	Beryllium	
Holmium		Rhodium		Chromium	2	Lithium	<0.1
Dysprosium						Hydrogen	NR

NR – Not Reported
All elements not reported <0.3ppm weight

Approved: M Yaeoh

Sample was thermally ashed @350° C for one hour in a laboratory furnace in a quartz crucible prior to analysis

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 5, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-1 I 685 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN µg/ml

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium	0.01	Terbium		Ruthenium		Vanadium	0.004
Thorium	≤0.01	Gadolinium		Molybdenum	0.1	Titanium	0.4
Bismuth		Europium		Niobium		Scandium	≤0.001
Lead	0.02	Samarium		Zirconium	*0.08	Calcium	6
Thallium		Neodymium		Yttrium		Potassium	5
Mercury	NR	Praseodymium		Strontium	0.01	Chlorine	0.2
Gold		Cerium		Rubidium	<0.001	Sulfur	MC
Platinum		Lanthanum	0.01	Bromine	0.009	Phosphorus	4
Iridium		Barium	0.03	Selenium	≤0.02	Silicon	1
Osmium		Cesium	0.007	Arsenic	0.01	Aluminum	0.1
Rhenium		Iodine	0.003	Germanium	≤0.001	Magnesium	0.4
Tungsten	0.02	Tellurium		Gallium		Sodium	>3
Tantalum		Antimony	≤0.003	Zinc	1	Fluorine	≈6
Hafnium		Tin	0.05	Copper	0.04	Oxygen	NR
Lutetium		Indium	STD	Nickel	0.7	Nitrogen	NR
Ytterbium		Cadmium	0.002	Cobalt	0.09	Carbon	NR
Thulium		Silver	MC	Iron	0.2	Boron	0.009
Erbium		Palladium		Manganese	0.004	Beryllium	
Holmium		Rhodium		Chromium	2	Lithium	0.02
Dysprosium						Hydrogen	NR

*Heterogeneous
NR — Not Reported
All elements not reported <0.001 µg/ml

Approved: [signature]

Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucible

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 5, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-1 J674 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN µg/ml

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium	≤0.05	Terbium		Ruthenium		Vanadium	0.002
Thorium	≤0.06	Gadolinium		Molybdenum	0.08	Titanium	0.1
Bismuth		Europium		Niobium		Scandium	≤0.004
Lead	0.03	Samarium		Zirconium	0.04	Calcium	MC
Thallium		Neodymium		Yttrium		Potassium	MC
Mercury	NR	Praseodymium		Strontium	0.09	Chlorine	0.2
Gold	≤0.005	Cerium	0.009	Rubidium	0.001	Sulfur	MC
Platinum		Lanthanum	0.02	Bromine	0.02	Phosphorus	MC
Iridium		Barium	0.02	Selenium	≤0.009	Silicon	0.9
Osmium		Cesium	≤0.002	Arsenic	≤0.003	Aluminum	0.8
Rhenium		Iodine	0.007	Germanium		Magnesium	1
Tungsten		Tellurium		Gallium		Sodium	MC
Tantalum		Antimony		Zinc	0.09	Fluorine	≈3
Hafnium		Tin		Copper	0.03	Oxygen	NR
Lutetium		Indium	STD	Nickel	0.02	Nitrogen	NR
Ytterbium		Cadmium	≤0.01	Cobalt	≤0.01	Carbon	NR
Thulium		Silver	≤0.007	Iron	0.1	Boron	0.006
Erbium		Palladium		Manganese	0.01	Beryllium	
Holmium		Rhodium		Chromium	0.02	Lithium	≤0.001
Dysprosium						Hydrogen	NR

NR – Not Reported
All elements not reported <0.1 ppm weight

Approved: M. J. Jacobs

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-1 K 684 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN μg/ml

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium		Terbium		Ruthenium		Vanadium	0.002
Thorium		Gadolinium		Molybdenum	0.2	Titanium	0.08
Bismuth		Europium		Niobium		Scandium	≤0.002
Lead	≤0.04	Samarium		Zirconium	0.02	Calcium	2
Thallium		Neodymium		Yttrium		Potassium	0.5
Mercury	NR	Praseodymium		Strontium	0.07	Chlorine	1
Gold		Cerium	≤0.01	Rubidium	≤0.002	Sulfur	6
Platinum		Lanthanum		Bromine	0.06	Phosphorus	2
Iridium		Barium	0.2	Selenium	≤0.01	Silicon	0.6
Osmium		Cesium	≤0.003	Arsenic	≤0.004	Aluminum	0.04
Rhenium		Iodine	0.008	Germanium		Magnesium	0.9
Tungsten		Tellurium		Gallium		Sodium	3
Tantalum		Antimony		Zinc	0.2	Fluorine	≈3
Hafnium		Tin		Copper	0.05	Oxygen	NR
Lutetium		Indium	STD	Nickel	0.06	Nitrogen	NR
Ytterbium		Cadmium		Cobalt	≤0.001	Carbon	NR
Thulium		Silver	≤0.02	Iron	0.09	Boron	0.008
Erbium		Palladium		Manganese	0.004	Beryllium	
Holmium		Rhodium		Chromium	0.04	Lithium	<0.001
Dysprosium						Hydrogen	NR

NR — Not Reported
All elements not reported <0.01 μg/ml

Approved: [signature]

Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucibl

COMMERCIAL TESTING & ENGINEERING CO.

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

Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-1 L 675 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN µg/ml

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium		Terbium		Ruthenium		Vanadium	≤0.01
Thorium		Gadolinium		Molybdenum	0.4	Titanium	0.2
Bismuth		Europium		Niobium		Scandium	≤0.007
Lead	≤0.2	Samarium		Zirconium	≤0.1	Calcium	0.9
Thallium		Neodymium		Yttrium		Potassium	1
Mercury	NR	Praseodymium		Strontium	0.02	Chlorine	2
Gold		Cerium		Rubidium	0.01	Sulfur	3
Platinum		Lanthanum		Bromine	0.09	Phosphorus	0.6
Iridium		Barium	≤0.1	Selenium	≤0.06	Silicon	1
Osmium		Cesium	≤0.02	Arsenic	≤0.02	Aluminum	0.2
Rhenium		Iodine		Germanium		Magnesium	0.4
Tungsten		Tellurium		Gallium	≤0.03	Sodium	0.8
Tantalum		Antimony		Zinc	0.1	Fluorine	≈1
Hafnium		Tin		Copper	0.05	Oxygen	NR
Lutetium		Indium	STD	Nickel	0.07	Nitrogen	NR
Ytterbium		Cadmium		Cobalt		Carbon	NR
Thulium		Silver		Iron	0.2	Boron	0.03
Erbium		Palladium		Manganese	0.006	Beryllium	
Holmium		Rhodium		Chromium	0.04	Lithium	0.003
Dysprosium						Hydrogen	NR

NR — Not Reported
All elements not reported <0.04 µg/ml
*Heterogeneous

Approved: M. J. Jacobs

KVB Analysis Data

Test	Sample Number	POM's	PCB's
19-1	LF	*	*
19-2	533	< 0.1 ug/g	< 1 ug/g
	533 (duplicate)	< 0.1 ug/g	< 1 ug/g
	C	< 1 ug/l	< 1 ug/l
	C (duplicate)	< 1 ug/l	< 1 ug/l
	LF	*	*

*Sample extracts too concentrated to be able to determine an analytical value.

KVB

TRACE SPECIES AND ORGANICS TEST
SAMPLE RECOVERY LOG

Test No. 19-3 Date 3-21-77 Location 19

Sample Port Position MID-POINT/STACK/~15"IN

Container Number	Sample Description	Container Type	Net wt/vol.	Comment
722	NOZ/PROBE/10m	NAL	2.4163	SOLIDS
633	" " "	GL	160	50/50
628	" " "	GL	225	"
639	" " "	GL	210	H_2O
638	" " "	GL	210	"
723	3m	NAL	1.0724	SOLIDS
634	"	GL	206	50/50
640	"	GL	208	H_2O
726	1m	NAL	.2120	SOLIDS
641	"	GL	187	50/50
642	"	GL	187	H_2O
539	FILTER	P.D.	.9974	SOLIDS
643	"	GL	82	50/50
644	"	GL	164	H_2O
673	IMPINGER #1	NAL	938	SOLUTION
635	"	GL	191	IPA
630	"	GL	162	H_2O
519	IMPINGER #2	NAL	787	SOLUTION
631	"	GL	180	IPA
636	"	GL	160	H_2O
686	IMPINGER #3	NAL	737	SOLUTION
637	"	GL	149	IPA
632	"	GL	140	H_2O
537	XAD-2	GL	–	RESIN
665	"	NAL	1020	CONDENSATE
624	"	GL	152	"
627	"	GL	205	50/50
647	"	GL	215	"
653	"	GL	58	H_2O
659	"	GL	225	"
688	H_2O BLANK	NAL	1000	BLANK

Data Sheet KVB 6002-15

MH&RP

KEELER BOILER

TEST 19-3 TABLE STACK - #6 OIL LOW NO_x COND.

POLLUTANT	SAMPLE NUMBER							
	722^+	723^+	726^+	539^+	A*	B*	537^+	C_1*
Antimony	<50	<2500	<830	<170	<0.5	<0.5	<25	
Arsenic	4	<100	<33	33	0.01	0.005	7	
Barium	480	<1000	<330	730	<0.1	<0.1	75	
Beryllium	<1	<50	<17	<3.3	<0.005	<0.005	<0.5	
Cadmium	<1	<50	<17	<3.3	<0.005	0.015	<0.5	
Calcium	1900	3500	3000	3100	15	0.20	<5.0	
Chromium	69	950	300	180	0.05	8.4	8	
Cobalt	104	450	300	807	<0.2	<0.2	1.5	
Copper	43	<50	<150	200	0.11	0.11	0.5	
Iron	5200	4400	6500	20000	1.9	38	31	
Lead	—	—	—	—	0.11	<0.05	—	
Manganese	49	200	117	160	0.16	0.57	2.0	
Mercury	0.5	<2.0	<0.67	<0.13	<0.005	<0.005	<0.02	
Nickel	970	1700	3000	13000	0.5	5.9	<2.5	
Selenium	<2.0	<5000	<33	<6.7	0.04	0.04	<1.0	
Tellurium	<50	<2500	<830	<170	<0.3	<0.3	<25	
Tin	<100	<5000	<1700	<330	<1	<1	<50	
Titanium	600	<15,000	5000	<1000	<1	<1	<150	
Vanadium	5400	7000	14000	43000	1.4	<0.1	<10	
Zinc	281	250	350	3000	0.59	0.08	1.5	
Chloride	<30	<97	—	1710	<0.5	1.6	<11	—
Fluoride	54	—	—	<1	<0.1	<0.1	18	—
Nitrates	43.0	67.0	—	46.1	0.30	0.92	<0.2	0.42
Sulfates	8910	14000	—	170,000	16.0	135	289	10200
					633,628, 639,638, 634,640, 641,642, 643,644	627,647 653,659		665,624 673,635, 630

KEELER BOILER

TEST 19-3 TABLE STACK - #6 OIL LOW NO_x COND.

POLLUTANT	SAMPLE NUMBER							
	C*	C* duplicate						
Antimony	<0.5	<0.5						
Arsenic	0.005	<0.005						
Barium	<0.1	<0.1						
Beryllium	<0.005	<0.005						
Cadmium	0.020	0.010						
Calcium	0.11	0.20						
Chromium	1.5	1.4						
Cobalt	<0.2	<0.2						
Copper	0.05	<0.02						
Iron	5.1	4.9						
Lead	<0.05	<0.05						
Manganese	0.12	0.11						
Mercury	<0.005	<0.005						
Nickel	2.0	0.72						
Selenium	0.020	<0.010						
Tellurium	<0.3	<0.3						
Tin	<1	<1						
Titanium	<1	<1						
Vanadium	<0.1	<0.1						
Zinc	4.9	0.10						
Chloride	27.2	26.0						
Fluoride	0.40	0.44						
Nitrates	——	——						
Sulfates	——	——						
	665,624, 673,635, 630,519, 631,636, 686,637, 632							

COMMERCIAL TESTING & ENGINEERING CO.

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

Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-3 D 722, 723, 726, 539

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium	2	Terbium	0.2	Ruthenium		Vanadium	MC
Thorium	≤1	Gadolinium	0.7	Molybdenum	970	Titanium	300
Bismuth		Europium	0.3	Niobium	0.7	Scandium	0.2
Lead	160	Samarium	2	Zirconium	7	Calcium	MC
Thallium		Neodymium	12	Yttrium	2	Potassium	MC
Mercury	NR	Praseodymium	7	Strontium	42	Chlorine	160
Gold		Cerium	19	Rubidium	0.8	Sulfur	>800
Platinum		Lanthanum	60	Bromine	2	Phosphorus	MC
Iridium		Barium	460	Selenium	3	Silicon	MC
Osmium		Cesium	0.8	Arsenic	7	Aluminum	>130
Rhenium		Iodine	1	Germanium	0.6	Magnesium	MC
Tungsten	≤0.7	Tellurium	0.8	Gallium	11	Sodium	>330
Tantalum		Antimony	*20	Zinc	570	Fluorine	≈46
Hafnium		Tin	5	Copper	70	Oxygen	NR
Lutetium		Indium	STD	Nickel	MC	Nitrogen	NR
Ytterbium		Cadmium	0.4	Cobalt	400	Carbon	NR
Thulium		Silver	5	Iron	MC	Boron	1
Erbium	0.2	Palladium		Manganese	44	Beryllium	0.1
Holmium	0.4	Rhodium		Chromium	33	Lithium	2
Dysprosium	0.8					Hydrogen	NR

*Heterogeneous
NR — Not Reported
All elements not reported <0.1 ppm weight

Approved: M. Jacobs

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
P. O. Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.:

Sample No.: Test 19-3 E 537

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium	≤1	Terbium		Ruthenium		Vanadium	0.6
Thorium	≤1	Gadolinium		Molybdenum	*18	Titanium	2
Bismuth		Europium		Niobium		Scandium	≤0.1
Lead	1	Samarium		Zirconium	1	Calcium	25
Thallium		Neodymium		Yttrium		Potassium	20
Mercury	NR	Praseodymium		Strontium	0.1	Chlorine	21
Gold	1	Cerium	0.2	Rubidium	<0.1	Sulfur	21
Platinum		Lanthanum	0.4	Bromine	1	Phosphorus	11
Iridium		Barium	0.4	Selenium	≤0.4	Silicon	45
Osmium		Cesium	≤0.1	Arsenic	1	Aluminum	3
Rhenium		Iodine	0.3	Germanium		Magnesium	16
Tungsten		Tellurium		Gallium	≤0.1	Sodium	47
Tantalum		Antimony	17	Zinc	3	Fluorine	≃26
Hafnium		Tin	0.4	Copper	4	Oxygen	NR
Lutetium		Indium	STD	Nickel	3	Nitrogen	NR
Ytterbium		Cadmium	≤0.3	Cobalt	<0.1	Carbon	NR
Thulium		Silver	0.7	Iron	10	Boron	4
Erbium		Palladium		Manganese	0.2	Beryllium	
Holmium		Rhodium		Chromium	5	Lithium	<0.1
Dysprosium						Hydrogen	NR

NR – Not Reported
All elements not reported <0.2ppm weight
Approved:
*Heterogeneous Sample was thermally ashed @350° C for one hour in a laboratory furnace in a quartz crucible prior to analysis.

COMMERCIAL TESTING & ENGINEERING CO.

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

Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 5, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-3 F Composite B & C 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN μg/ml

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium	0.1	Terbium		Ruthenium		Vanadium	0.02
Thorium	≤0.06	Gadolinium		Molybdenum	0.3	Titanium	2
Bismuth		Europium		Niobium	≤0.02	Scandium	≤0.009
Lead	0.05	Samarium		Zirconium	0.04	Calcium	MC
Thallium		Neodymium		Yttrium	≤0.008	Potassium	MC
Mercury	NR	Praseodymium		Strontium	1	Chlorine	8
Gold	≤0.02	Cerium	0.01	Rubidium	0.003	Sulfur	MC
Platinum		Lanthanum	0.03	Bromine	0.3	Phosphorus	MC
Iridium		Barium	2	Selenium	0.4	Silicon	3
Osmium		Cesium	0.03	Arsenic	0.02	Aluminum	>7
Rhenium		Iodine	0.02	Germanium		Magnesium	MC
Tungsten		Tellurium		Gallium	≤0.006	Sodium	MC
Tantalum		Antimony	0.1	Zinc	2	Fluorine	≈0.3
Hafnium		Tin	≤0.03	Copper	0.4	Oxygen	NR
Lutetium		Indium	STD	Nickel	1	Nitrogen	NR
Ytterbium		Cadmium	≤0.01	Cobalt	0.01	Carbon	NR
Thulium		Silver	MC	Iron	4	Boron	0.002
Erbium		Palladium		Manganese	0.2	Beryllium	0.001
Holmium		Rhodium		Chromium	2	Lithium	0.04
Dysprosium						Hydrogen	NR

NR – Not Reported
All elements not reported <0.006 μg/ml

Approved: M.Y. [signature]

COMMERCIAL TESTING & ENGINEERING CO.

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

Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 14, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-3 G LF #6 Fuel Oil 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium		Terbium		Ruthenium		Vanadium	140
Thorium		Gadolinium		Molybdenum	8	Titanium	1
Bismuth		Europium		Niobium	≤0.4	Scandium	≤0.2
Lead	≤1	Samarium		Zirconium	0.6	Calcium	48
Thallium		Neodymium		Yttrium		Potassium	8
Mercury	NR	Praseodymium		Strontium	1	Chlorine	2
Gold		Cerium		Rubidium	≤0.1	Sulfur	MC
Platinum		Lanthanum		Bromine	≤0.5	Phosphorus	11
Iridium		Barium	6	Selenium	1	Silicon	19
Osmium		Cesium		Arsenic	0.5	Aluminum	2
Rhenium		Iodine		Germanium		Magnesium	27
Tungsten		Tellurium		Gallium		Sodium	72
Tantalum		Antimony		Zinc	2	Fluorine	≈4
Hafnium		Tin		Copper	2	Oxygen	NR
Lutetium		Indium	STD	Nickel	26	Nitrogen	NR
Ytterbium		Cadmium		Cobalt	2	Carbon	NR
Thulium		Silver	2	Iron	13	Boron	0.7
Erbium		Palladium		Manganese	0.6	Beryllium	
Holmium		Rhodium		Chromium	3	Lithium	≤0.1
Dysprosium						Hydrogen	NR

NR — Not Reported

All elements not reported <0.2 ppm weight

Approved:

Sample was thermally ashed @ 350^{0} C for one hour in a laboratory furnace in a quartz crucible prior to analysis.

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 14, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-3 G LF #6 Fuel Oil Duplicate
5-18-77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.	ELEMENT	CONC.
Uranium		Terbium		Ruthenium		Vanadium	150
Thorium		Gadolinium		Molybdenum	10	Titanium	1
Bismuth		Europium		Niobium	≤0.2	Scandium	≤0.1
Lead	≤0.8	Samarium		Zirconium	0.6	Calcium	38
Thallium		Neodymium		Yttrium		Potassium	16
Mercury	NR	Praseodymium		Strontium	0.8	Chlorine	0.9
Gold		Cerium		Rubidium	0.04	Sulfur	MC
Platinum		Lanthanum		Bromine		Phosphorus	8
Iridium		Barium	2	Selenium	0.8	Silicon	17
Osmium		Cesium		Arsenic	0.3	Aluminum	1
Rhenium		Iodine		Germanium		Magnesium	17
Tungsten		Tellurium		Gallium		Sodium	50
Tantalum		Antimony		Zinc	3	Fluorine	≈2
Hafnium		Tin		Copper	1	Oxygen	NR
Lutetium		Indium	STD	Nickel	20	Nitrogen	NR
Ytterbium		Cadmium		Cobalt	2	Carbon	NR
Thulium		Silver	≤0.2	Iron	15	Boron	0.8
Erbium		Palladium		Manganese	0.3	Beryllium	
Holmium		Rhodium		Chromium	0.2	Lithium	≤0.1
Dysprosium						Hydrogen	NR

NR – Not Reported
All elements not reported <0.2 ppm weight

Approved: [signature]

Sample was thermally ashed @ 350°C for one hour in a laboratory furnace in a quartz crucible prior to analysis.

KVB Analysis Data (Cont.)

Test	Sample Number	POM's	PCB's
19-3	537	< 0.1 ug/g	< 1 ug/g
	537 (duplicate)	< 0.1 ug/g	< 1 ug/g
	722	< 1 ug/g	< 1 ug/g
	B	— 1450 ug/l	< 1 ug/l
	C	2 ug/l	< 1 ug/l
	LF	*	*
	LF (duplicate)	*	*

*Sample extracts too concentrated to be able to determine an analytical value.

KVB

TRACE SPECIES AND ORGANICS TEST
SAMPLE RECOVERY LOG

Test No. 19-4SASS Date 3-23-77 Location 19

Sample Port Position STACK CENTER 15" in

Container Number	Sample Description	Container Type	Net wt/vol.	Comment
728	NOZ/PROBE/10 M	NAL	1.5802	SOLIDS
645	"	GL	215	50/50
646	"	GL	210	"
649	"	GL	230	H_2O
650	"	GL	225	"
732	3 M	NAL	.9878	SOLIDS
651	"	GL	190	50/50
652	"	GL	165	H_2O
734	1 M	NAL	.3263	SOLIDS
654	"	GL	165	50/50
655	"	GL	150	H_2O
540	FILTER	P. DISH	.9503	SOLIDS
656	"	GL	125	50/50
657	"	GL	85	H_2O
695	#1 IMPINGER	NAL	890	SOLUTION
658	"	GL	165	IPA
660	"	GL	180	H_2O
696	#2 IMPINGER	NAL	875	SOLUTION
661	"	GL	170	IPA
662	"	GL	180	H_2O
698	#3 IMPINGER	NAL	605	SOLUTION
663	"	GL	80	IPA
664	"	GL	140	H_2O
535	XAD-2	GL	—	RESIN
697	"	NAL	1000	CONDENSATE
648	"	GL	175	"
581	"	GL	230	50/50
582	"	GL	305	H_2O

Data Sheet KVB 6002-15

KEELER BOILER

TEST 19-4 TABLE STACK - #6 OIL LOW NO_x COND.

POLLUTANT	SAMPLE NUMBER							
	728+	732+	734+	540+	A*	B*	535+	C_1*
Antimony	<50	<100	<125	<100	<0.5	<0.5	<22	
Arsenic	20	20	50	46.3	0.005	<0.005	6.2	
Barium	140	2400	625	652	<0.1	<0.1	85	
Beryllium	<1.0	<2.0	<2.5	<2	<0.005	<0.005	<0.45	
Cadmium	<1.0	<2.0	<2.5	<2	<0.005	0.040	<0.45	
Calcium	2000	840	4700	<60000	0.35	0.12	<4.5	
Chromium	37	56	115	109	0.10	8.3	6.2	
Cobalt	95	110	270	<24	<0.2	<0.2	3.1	
Copper	28	30	33	156	0.05	0.54	7.6	
Iron	2700	2440	8600	11600	1.2	46	29	
Lead	—	—	—	—	<0.05	<0.05	—	
Manganese	30	34	73	114	0.16	0.62	1.3	
Mercury	<0.04	<0.08	<0.1	<0.08	<0.005	<0.005	<0.02	
Nickel	1000	1320	8800	12600	1.1	20	<2.2	
Selenium	<2.0	<4.0	<5.0	<4	<0.01	<0.01	<0.89	
Tellurium	<50	<100	<125	<100	<0.3	<0.3	<22	
Tin	<100	<200	<250	<250	<1	<1	<45	
Titanium	<300	<600	<750	~420	<1	<1	<130	
Vanadium	<20	5800	14000	36800	1.1	<0.1	<0.89	
Zinc	3.0	174	300	2170	2.7	27	5.4	
Chloride	<28	<53	—	446	<0.5	<0.5	30.0	—
Fluoride	—	274	323	<1	<0.1	0.17	25	—
Nitrates	49.5	35.0	—	<20	0.16	0.76	1.87	0.28
Sulfates	7870	12700	—	199000	10	212	449	16500
					645,646, 649,650, 651,652, 654,655, 656,657	581, 582		697,648, 695,658, 660

KEELER BOILER

TEST 19-4	TABLE	STACK - #6 OIL LOW NO_x COND.					
POLLUTANT	SAMPLE NUMBER						
	C*						
Antimony	<0.5						
Arsenic	<0.005						
Barium	<0.1						
Beryllium	<0.005						
Cadmium	<0.005						
Calcium	0.77						
Chromium	1.2						
Cobalt	<0.2						
Copper	0.08						
Iron	3.1						
Lead	<0.05						
Manganese	0.08						
Mercury	<0.005						
Nickel	3.2						
Selenium	<0.010						
Tellurium	<0.3						
Tin	<1						
Titanium	<1						
Vanadium	<0.1						
Zinc	9.7						
Chloride	41.0						
Fluoride	0.10						
Nitrates	—						
Sulfates	—						

697,648,
695,658,
660,696,
661,662,
698,663,
664

KVB Analysis Data (Cont.)

Test	Sample Number	POM's	PCB's
19-4	535 LF	< 0.1 ug/g *	< 1 ug/g *

*Sample extracts too concentrated to be able to determine an analytical value.

POM QUANTIFICATION

Component	Blank 684	Blank-K 571	Test 19-2 #533	Test 19-3 #537
Anthracene	0.71 ng	10.0 ng	367 ng	57.8 ng
Phenanthrene	--	--	--	2.3
Methyl Anthracenes	--	1.9	24.1	15.4
Fluoranthene	0.21	1.0	136	16.3
Pyrene	--	--	6.1	6.3
Benzo(c)phenanthrene	--	--	0.26	--
Chrysene	--	--	2.9	0.52
Benz(a)anthracene	--	--	--	--
Methyl Chrysenes	--	--	--	--
Benzo Fluoranthenes	--	--	0.80	0.87
Benz(a)pyrene	--	--	0.48	--
Benz(e)pyrene	--	--	0.49	--
Perylene	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	--	--	--
Benzo(ghi)perylene	--	--	--	--

INDUSTRIAL BOILER DESIGN DATA

Location No. 38 Unit No.

Unit Description

VERTICAL CE WATERTUBE BOILER

Steam Output (lb/hr x 10^3)	45
Final Steam Temp., °F	SATURATED
Burner Description	1 PEABODY GAS RING
Test Fuel	NATURAL GAS ; #6 OIL
Primary Air Temp, °F	~350
Stack Temp, °F	430-550

Comments:

THE UNIT WAS MODIFIED TO INCORPORATE SIDEFIRE CAPABILITY.

MOBILE LABORATORY DATA

Test No.________

Test No. 200-23,24 Date 5/24/76 Location 38 Engr.________

Unit No.________ Fuel NO. 6 Capacity 45 K#/hr

FURNACE ~~Unit~~ Type C.E. VERTICAL Burner Type PEABODY STEAM

1. Test No.	200-23		200-24							
2. Date										
3. Time										
4. Load K#/hr	38		38							
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) HOT/COLD	2.95	2.9	2.9	2.9						
9. NOx (hot) read/3% O_2 (ppm)*			271	297						
10. NO (hot) read/3% O_2 (ppm)*	245	268	270	296						
11. NO_2 (hot) read/3% O_2 (ppm)*			1	1						
12. NO (cold) read/3% O_2 (ppm)*	300	298	298	296						
13. Carbon Dioxide (%) (BOILER EXIT)	13.8		13.8							
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*										
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C) DRY/WET	70/56		70/57							
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	29.8		29.75							
21. Relative Humidity (%)										
22. STACK O_2	6.8		6.75							
23. WATER CONTENT (% VOL.)	10		10							
24. NO STACK	233	295	245	309						
25. CO HOT/COLD/STACK	- 258 -		22 22 16							
26.										
27.										
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 5/25/76 Location 38 Engr.________

Unit No.________ Fuel NO. 6 Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY STEAM

1. Test No.	200-25	201-12	202-4	202-4A	
2. Date					
3. Time					
4. Load					
5. Process Rate					
6. Flue Diam. or Size, ft					
7. Probe Position					
8. Oxygen (%) HOT / COLD	2.9 / 2.8	1.55 / 1.55	/ 2.6	2.65 / 2.7	
9. NOx (hot) read/3% O_2 (ppm)*	260 / 285	232 / 238		185 / 200	
10. NO (hot) read/3% O_2 (ppm)*	260 / 285	232 / 238		185 / 200	
11. NO_2 (hot) read/3% O_2 (ppm)*	0 / 0	0 / 0		0 / 0	
12. NO (cold) read/3% O_2 (ppm)*	288 / 285	245 / 227	265 / 259	230 / 226	
13. Carbon Dioxide (%) BOILER EXIT	14.0	15.0	14.1	14.1	
14. Carbon Monoxide (ppm) uncor/cor*					
15. Hydrocarbon (ppm) uncor/cor*					
16. Sulfur Dioxide (ppm) uncor/cor*					
17. Smoke Spot (Bacharach)					
18. Atmos. Temp. (°F/°C) DRY/WET	58 / 51	59 / 51		58 / 52	
19. Dew Point Temp. (°F/°C)					
20. Atmos. Pressure (in. Hg)		29.93			
21. Relative Humidity (%)					
22. STACK O_2	6.7	5.7	6.2	6.4	
23. WATER CONTENT (% VOL.)	10	10.7		10.1	
24. NO STACK	220 / 277	188 / 221	220 / 268	185 / 228	
25. CO HOT / COLD / STACK	26 / 22 / 16	46-80 60 / 50-80 / 40-120 80	/ / 30	55 / 32 / 29	
26.					
27.					
28.					
29.					
30.					

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.______

Test No.______ Date 5/26/76 Location 38 Engr.______

Unit No.______ Fuel NO. 6 Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY STEAM

1. Test No.	200-26		201-13		201-14		202-5		
2. Date									
3. Time									
4. Load									
5. Process Rate									
6. Flue Diam. or Size, ft									
7. Probe Position									
8. Oxygen (%) HOT/COLD		2.4		1.6		1.5	2.55	2.45	
9. NOx (hot) read/3% O_2 (ppm)*							225	242	
10. NO (hot) read/3% O_2 (ppm)*							220	237	
11. NO_2 (hot) read/3% O_2 (ppm)*							5	5	
12. NO (cold) read/3% O_2 (ppm)*	277	268	250	232	248	229	235	228	
13. Carbon Dioxide (%) BOILER EXIT			15		15		14.4		
14. Carbon Monoxide (ppm) uncor/cor*									
15. Hydrocarbon (ppm) uncor/cor*									
16. Sulfur Dioxide (ppm) uncor/cor*									
17. Smoke Spot (Bacharach)									
18. Atmos. Temp. (°F/°C) DRY/WET			58	52			67	56	
19. Dew Point Temp. (°F/°C)									
20. Atmos. Pressure (in. Hg)			30.05				29.87		
21. Relative Humidity (%)									
22. STACK O_2	6.5		5.8		6.05		6.4		
23. WATER CONTENT (% VOL)							10.2		
24. NO (STACK)	227	282	195	231	195	235	140	173	
25.									
26.									
27.									
28.									
29.									
30.									

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 5/27/76 Location 38 Engr.

Unit No. Fuel NO. 6 Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY STEAM

1. Test No.	200-27		201-15		203-28			
2. Date								
3. Time								
4. Load								
5. Process Rate								
6. Flue Diam. or Size, ft								
7. Probe Position								
8. Oxygen (%) HOT/COLD	2.3	2.3	1.55	1.6	3.3	3.35		
9. NOx (hot) read/3% O_2 (ppm)*	175	185	220	226	155	173		
10. NO (hot) read/3% O_2 (ppm)*	172	182	220	226	155	173		
11. NO_2 (hot) read/3% O_2 (ppm)*	3	3	0	0	0	0		
12. NO (cold) read/3% O_2 (ppm)*	290	279	270	251	180	184		
13. Carbon Dioxide (%) BOILER EXIT	14.6		15.0		13.2			
14. Carbon Monoxide (ppm) uncor/cor*								
15. Hydrocarbon (ppm) uncor/cor*								
16. Sulfur Dioxide (ppm) uncor/cor*								
17. Smoke Spot (Bacharach)								
18. Atmos. Temp. (°F/°C) DRY/WET			65	57	75	60		
19. Dew Point Temp. (°F/°C)								
20. Atmos. Pressure (in. Hg)			30.10		30.16			
21. Relative Humidity (%)								
22. STACK O_2	6.25		5.85		7.0			
23. WATER CONTENT (% VOL.)	10.3		10.7		9.8			
24. NO (STACK)	135	165	209	248	147	189		
25.								
26.								
27.								
28.								
29.								
30.								

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 2006-1,2 / 2016-1,2,3 Date 6-01-76 / 6-02-76 Location 38 Engr. WN, T.D.

Unit No.________ Fuel GAS Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY - RING

1. Test No.	2006-1	2006-2	2016-1	2016-2	2016-3
2. Date		6/02/76			
3. Time					
4. Load (k#/hr)	41.5	40.0	40.0	40.0	39.8
5. Process Rate					
6. Flue Diam. or Size, ft	-				
7. Probe Position					
8. Oxygen (%) COLD LINE/HEATED LINE	1.25 / 1.40	1.6 / 1.5	4.0 / 4.1	2.5 / 2.5	3.95
9. NOx (hot) read/3% O_2 (ppm)*	144	162	148	165	
10. NO (hot) read/3% O_2 (ppm)*	144	162	148	164	
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	1	
12. NO (cold) read/3% O_2 (ppm)*	157 / 143	174 / 161	160 / 169	180 / 175	162
13. Carbon Dioxide (%)	11	10.5	9.5	10	
14. Carbon Monoxide (ppm) uncor/cor*					
15. Hydrocarbon (ppm) uncor/cor*					
16. Sulfur Dioxide (ppm) uncor/cor*					
17. Smoke Spot (Bacharach)					
18. Atmos. Temp. (°F/°C) DRY/WET	66 / 65	58.5 / 55	64 / 56	66 / 57.5	
19. Dew Point Temp. (°F/°C)					
20. Atmos. Pressure (in. Hg)	29.85	30.04	30.15	30.16	
21. Relative Humidity (%)					
22. STACK O_2	5.8	6.2	8.0	6.6	7.75
23. NO (STACK)	122 / 144	131 / 159	122 / 169	138 / 172	124
24. CO COLD LINE/HOT LINE/STACK				12 / 12 / 10	20 / - / 11
25. CO_2 COLD LINE/HOT LINE, STACK	11.0 / 11.0 / 8.3	10.5 / 10.5 / 7.8	9.5 / 9.5 / 7.1	10 / 10 / 7.4	
26.					
27.					
28.					
29.					
30.					

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. 2016-4,5,6 Date 6-2-76 Location 38 Test No.____ Engr.____

Unit No.____ Fuel GAS Capacity 45 k#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY - RING

1. Test No.	2016-4		2016-5		2016-6					
2. Date										
3. Time										
4. Load (k#/hr)	40.0		39.2		40.5					
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	2.9	2.9	1.25		1.45	1.50				
9. NOx (hot) read/3% O_2 (ppm)*	156				148					
10. NO (hot) read/3% O_2 (ppm)*	156				148					
11. NO_2 (hot) read/3% O_2 (ppm)*	0				0					
12. NO (cold) read/3% O_2 (ppm)*	166	165	152	139	164	151				
13. Carbon Dioxide (%)	10		10.5		11.0					
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*										
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C) DRY/WET	68	58								
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.15									
21. Relative Humidity (%)										
22. STACK O_2	7.0		5.85		6.0					
23. NO (STACK)	129	166	114	135	124	149				
24. CO COLD LINE / HOT LINE	10	10	2000		280	130-250				
25. CO (STACK)	7		2000		300					
26. CO_2 COLD LINE / HOT LINE	10	10	10.5		11.0	11.0				
27. CO_2 (STACK)	7.6		8		8.3					
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ________

Test No. ________ Date 6/3/76 Location 38 Engr. ________

Unit No. ________ Fuel GAS Capacity 45 k#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY – RING

1. Test No.	2006-3		204-1		204-2		204-3		204-4	
2. Date										
3. Time										
4. Load (k#/hr)	39.0		38.0		38.0		38.3		38.5	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	2.7	2.7	2.95	2.80	2.6	2.6	2.9	3.05	3.0	2.95
9. NOx (hot) read/3% O_2 (ppm)*	154		112		114		136		136	
10. NO (hot) read/3% O_2 (ppm)*	154		112		114		136		134	
11. NO_2 (hot) read/3% O_2 (ppm)*	0		0		0		0		2	
12. NO (cold) read/3% O_2 (ppm)*	166	163	125	125	130	127	152	151	164	164
13. Carbon Dioxide (%)	10		12.6		12.6		12.6		12.6	
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*										
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER	0		1		0		0		0	
18. Atmos. Temp. (°F/°C) DRY/WET	53	52	60.5	55	67	57	76	69	75	58
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.24		30.24		30.24		30.24		30.23	
21. Relative Humidity (%)										
22. STACK O_2	6.9		7.0		6.8		7.0		6.95	
23. STACK NO	129	165	95	122	103	131	118	152	126	161
24. CO COLD LINE/HOT LINE	8	6	18	16	8	11	6	4	7	8
25. STACK CO	4		16		7		4		3	
26. CO_2 COLD LINE/HOT LINE	10	10	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
27. STACK CO_2	7.6		9.8		9.8		9.8		10	
28. PORTS OPEN			SCA PORTS 14+15		SCA PORTS 12+13		SCA PORTS 10+11		SCA PORTS 8+9	
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.______

Test No.______ Date 6/3/76 Location 38 Engr.______

Unit No.______ Fuel GAS Capacity 45 k#/hr

Unit Type C.E. VERTICAL Burner Type RING

1. Test No.	204-5		204-6		2006-4					
2. Date										
3. Time										
4. Load										
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	2.75	2.75	2.7		2.7	2.8				
9. NOx (hot) read/3% O_2 (ppm)*	108				136					
10. NO (hot) read/3% O_2 (ppm)*	107				136					
11. NO_2 (hot) read/3% O_2 (ppm)*	1				0					
12. NO (cold) read/3% O_2 (ppm)*	134	132	144	142	179	176				
13. Carbon Dioxide (%)	12.6		10		10					
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*										
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C) DRY/WET	69	62	69	62						
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)	30.23		30.23							
21. Relative Humidity (%)										
22. STACK O_2	6.75		6.75		6.7					
23. STACK NO	103	130	110	139	138	174				
24. CO COLD LINE/HOT LINE	11	12	26		6	6				
25. STACK CO	10		35		5					
26. CO_2 COLD LINE/HOT LINE	12.6	12.6	10		10	10				
27. STACK CO_2	10		7.4		7.6					
28. PORTS OPEN	SCA 6+7		SCA 12+13		BASELINE					
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. ______ Date 6-4-76 Location 38 Engr. ______

Unit No. ______ Fuel GAS Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type ______

1. Test No.	200-G-5		201-G-7		201-G-8		204-7		204-8	
2. Date										
3. Time										
4. Load #/hr	41,000		40,500		40,000		39,500		39,500	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HEATED LINE	2.3	2.3	2.78	2.53	3.4	3.35	2.7	2.7	2.95	3.00
9. NOx (hot) read/3% O_2 (ppm)*	148	172	156	181	142	172	110	129	109	130
10. NO (hot) read/3% O_2 (ppm)*	148	172	148	172	146	176	108	126	106	126
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	8	9	0	0	2	3	3	4
12. NO (cold) read/3% O_2 (ppm)*	184	177	186	184	176	180	134	132	140	140
13. Carbon Dioxide (%)	10.5		10.5		10.0		10.25		10.00	
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*										
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER	1									
18. Atmos. Temp. (°F/°C)	62.5		64		66		75		75	
19. Dew Point Temp. (°F/°C)	53.5		55		57		60		60	
20. Atmos. Pressure (in. Hg)	30.37		30.37		30.37		30.37		30.37	
21. Relative Humidity (%)										
22. STACK O_2	6.5		6.9		7.2		6.9		7.0	
23. NO (ROOF) / CORR.	142	176	144	184	137	179	106	135	108	139
24. CO COLD LINE/HOT LINE	3	5	5	6	6	8	6	6	22	22
25. CO (ROOF LINE)	3		3		6		4		22	
26. CO_2 COLD LINE/HOT LINE	10.5	10.5	10.5	10.5	10.0	10.0	10.25	10.25	10.00	10.00
27. CO_2 (ROOF LINE)	8.0		8.0		7.4		7.6		7.6	
28. WATER CONTENT (% Vol.)	16.4		16.2		15.5		16.1		15.8	
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 6/7 Location 38 Engr. W. NAZIMOWITZ

Unit No.________ Fuel GAS Capacity________

Unit Type C.E. VERTICAL Burner Type________

1. Test No.	200-6-6		204-9		204-10		204-11		204-12	
2. Date										
3. Time										
4. Load (#/hr)	39K		39K		39K		39K		38.5K	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	2.3	2.3	2.25		2.5	2.6	2.4	2.45	2.35	2.35
9. NOx (hot) read/3% O_2 (ppm)*	152	175			94	110	111	129	94	109
10. NO (hot) read/3% O_2 (ppm)*	152	175			92	107	111	129	93	108
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0			2	3	0	0	1	1
12. NO (cold) read/3% O_2 (ppm)*	170	164	114	111	114	111	141	137	118	114
13. Carbon Dioxide (%)	10.5		10.5		10.25		10.0		10.0	
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*					8		4		8	
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER					0		0		0	
18. Atmos. Temp. (°F/°C)	63.5		69		69		78		81	
19. Dew Point Temp. (°F/°C)	61.0		63		63		68		68	
20. Atmos. Pressure (in. Hg)	30.00						29.90		29.90	
21. Relative Humidity (%)										
22. STACK O_2	6.45		6.4		6.6		6.5		6.5	
23. WATER CONTENT (% VOL.)	16.4				16.1		16.3		16.4	
24. NO (ROOF) /CORR	131	179	88	109	88	110	111	138	94	117
25. CO COLD LINE/HOT LINE	35	12	122		58	42	11	10	6	6
26. CO ROOF LINE	6		100		55		8		5	
27. CO_2 COLD LINE/HOT LINE	10.5	10.5	10.5	10.5	10.25	10.00	10.0	10.0	10.0	10.0
28. CO_2 ROOF LINE	7.8		7.8		7.8		7.8		7.8	
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 204 Date 2/7/76 Location 38 Engr. W.N. & R.P.

Unit No. ________ Fuel GAS Capacity ________

Unit Type C.E. VERTICAL Burner Type RING

1. Test No.	204-13		204-14		204-15		204-16		204-17	
2. Date										
3. Time										
4. Load #/hr	39K		39K		39K		38500		38500	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	1.7	1.7	1.25	1.45	4.1	4.15	3.0	3.0	1.9	1.95
9. NOx (hot) read/3% O_2 (ppm)*	105	118	116	129	105	132	106	126	92	105
10. NO (hot) read/3% O_2 (ppm)*	104	117	116	129	103	129	106	126	94	107
11. NO_2 (hot) read/3% O_2 (ppm)*	1	1	0	0	2	3	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	135	126	145	132	129	137	128	128	116	109
13. Carbon Dioxide (%)	10.5		11.0		9.1		9.75		10.5	
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*	7		7		2		3		3	
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER	0		0		0		0		0	
18. Atmos. Temp. (°F/°C)	83		83						79	
19. Dew Point Temp. (°F/°C)	68		68						69	
20. Atmos. Pressure (in. Hg)	29.9		29.9						29.9	
21. Relative Humidity (%)										
22. STACK	6.0		5.7		7.8		6.95		6.25	
23. WATER CONTENT (% VOL.)	16.9		17.2		14.8		15.8		16.8	
24. NO (ROOF) / CORR.	104	124	112	132	101	138	100	128	92	112
25. CO COLD LINE/HOT LINE	39	29	216	58	6	6	5	6	66	66
26. CO ROOF LINE	39		49		3		3		39	
27. CO_2 COLD LINE/HOT LINE	10.5	10.5	11.0	11.0	9.1	9.1	9.75	9.75	10.5	10.5
28. CO_2 ROOF LINE	8.3		8.3		7.1		7.4		8.0	
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ________

Test No. ________ Date 6-8-76 Location 38 Engr. W. [illegible]

Unit No. ________ Fuel GAS Capacity ________

Unit Type C.E. VERTICAL Burner Type ________

1. Test No.	205-1		205-2		205-3		205-4		205-5	
2. Date										
3. Time										
4. Load #/hr	40,000		40,000		40,000		40,000		40,000	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	2.25	2.55	2.2	2.25	2.45	2.45	2.2	2.15	2.55	
9. NOx (hot) read/3% O_2 (ppm)*	151	175	157	181	165	191	103	117		
10. NO (hot) read/3% O_2 (ppm)*	149	173	156	180	165	191	102	116		
11. NO_2 (hot) read/3% O_2 (ppm)*	2	2	1	1	0	0	1	1		
12. NO (cold) read/3% O_2 (ppm)*	190	185	205	196	205	199	127	122	122	119
13. Carbon Dioxide (%)	10.75		10.5		10.5		10.5			
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*	5		4		4		2			
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER	0		1				1			
18. Atmos. Temp. (°F/°C)	74				83		86			
19. Dew Point Temp. (°F/°C)	66				66		70			
20. Atmos. Pressure (in. Hg)	30.02				30.00		29.95			
21. Relative Humidity (%)										
22. STACK O_2 %	6.55		6.25		6.35		6.05		6.2	
23. WATER CONTENT (% VOL.)	16.2		16.5		16.3		16.5			
24. NO (ROOF) / CORR.	149	186	159	194	160	197	98	118	96	117
25. CO COLD LINE/HOT LINE	11	11	10	10	12	12	10	8	6	
26. CO ROOF LINE	10		10		11		8		6	
27. CO_2 COLD LINE/HOT LINE	10.75	10.75	10.5	10.5	10.5	10.5	10.5	10.5	10.5	
28. CO_2 ROOF LINE	8.3		8.0		8.0		8.3		8.3	
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 6/8, 6/9 Location 38 Engr. W. NAZIMOWITZ

Unit No. Fuel GAS Capacity

Unit Type CE VERTICAL Burner Type

6/9

1. Test No.	205-6		205-7		205/4-8		2006-8		2006-9	
2. Date										
3. Time										
4. Load (#/hr)	40,500		39,500		38,500		40,000		40,300	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	1.7	1.7	2.35	2.25	2.4	2.4	2.3	2.35	2.35	2.45
9. NOx (hot) read/3% O_2 (ppm)*	104	117	117	134	88	102	152	176	126	146
10. NO (hot) read/3% O_2 (ppm)*	104	117	119	137	88	102	152	176	126	146
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	125	117	154	149	108	105	170	164	144	139
13. Carbon Dioxide (%)	10.75		10.5		10.5		10.5		10.5	
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*										
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER	1									
18. Atmos. Temp. (°F/°C)			86				66		69	
19. Dew Point Temp. (°F/°C)			70				63		64	
20. Atmos. Pressure (in. Hg)	29.94		29.89		29.87		29.97		29.99	
21. Relative Humidity (%)										
22. STACK O_2 %	5.55		6.4		6.5		6.45		6.5	
23. WATER CONTENT (% VOL)	16.9		16.5		16.4		16.4		16.3	
24. NO (ROOF) / CORR.	98	114	118	146	84	104	130	161	110	137
25. CO COLD LINE/HOT LINE	16	6	6	5	5	5	19	19	19	20
26. CO ROOF LINE	3		4		2		12		12	
27. CO_2 COLD LINE/HOT LINE	10.75	10.75	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
28. CO_2 ROOF LINE	8.3		7.8		8.0		7.8		7.8	
29.					VPH +		BASELINE		VARIABLE REGISTER	
30.					SCA 6+7				FULL OPEN	

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.__________

Test No.__________ Date 6/9/76 Location 38 Engr. W. NAZIMOWITZ

Unit No.__________ Fuel GAS Capacity__________

Unit Type CE VERTICAL Burner Type__________

1. Test No.	200G-10		200G-11		200G-12		200G-13		200G-14	
2. Date										
3. Time										
4. Load (k#/hr)	38.0		39.5		40.5		40.7		40.7	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	1.0		1.35		2.5		1.55		1.8	1.8
9. NOx (hot) read/3% O_2 (ppm)*									160	180
10. NO (hot) read/3% O_2 (ppm)*									160	180
11. NO_2 (hot) read/3% O_2 (ppm)*									0	0
12. NO (cold) read/3% O_2 (ppm)*	110	99	126	115	186	181	178	165	205	192
13. Carbon Dioxide (%)	9.7		10.5		10.25		10.75		10.75	
14. Carbon Monoxide (ppm) uncor/cor*	2000>		2000>		29		250			
15. Hydrocarbon (ppm) uncor/cor*	8		6		6		8			
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)										
19. Dew Point Temp. (°F/°C)										
20. Atmos. Pressure (in. Hg)			29.99				29.99		29.99	
21. Relative Humidity (%)										
22. STACK O_2 %									6.25	
23. WATER CONTENT (% VOL.)									16.8	
24. NO (ROOF) / CORR.									157	192
25. CO COLD LINE/HOT LINE	2000>		2000>		29		250		26	28
26. CO ROOF LINE									28	
27. CO_2 COLD LINE/HOT LINE	9.7		10.5		10.25		10.75		10.75	10.75
28. CO_2 ROOF LINE									8.0	
29.	VR low		VR low							
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 6/9 Location 38 Engr. W. NAZIMOWITZ

Unit No. Fuel GAS Capacity 45 k#/hr

Unit Type CE VERTICAL Burner Type

1. Test No.	200G-15		200G-16		204-18		204-19		204-20	
2. Date										
3. Time										
4. Load (k#/hr)	40.5		40.5		40.0		39.8		40.0	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE / HEATED LINE	2.35	2.45	2.4	2.4	2.25	2.35	3.45	3.55	2.8	2.85
9. NOx (hot) read/3% O_2 (ppm)*	178	207	152	176	88	102	112	137	96	113
10. NO (hot) read/3% O_2 (ppm)*	180	209	157	182	88	102	112	137	96	113
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0	0	0	0	0	0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	212	205	198	192	107	103	140	144	120	119
13. Carbon Dioxide (%)	10.5		10.5		10.5		9.75		10.25	
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*	5		4		2		2		3	
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)	79		87		80		81		83	
19. Dew Point Temp. (°F/°C)	68		70		71		70		70	
20. Atmos. Pressure (in. Hg)	29.98		29.96		29.93		29.93		29.92	
21. Relative Humidity (%)										
22. STACK O_2 %	6.75		6.7		6.4		7.35		6.8	
23. WATER CONTENT (% VOL.)	16.3		16.4		16.4		15.3		15.9	
24. NO (ROOF) / CORR.	165	208	150	189	80	99	109	144	92	117
25. CO COLD LINE / HOT LINE	19	26	10	10	286	200	12	12	29	29
26. CO ROOF LINE	16		6		200		10		26	
27. CO_2 COLD LINE / HOT LINE	10.5	10.25	10.5	10.5	10.5	10.5	9.75	9.75	10.25	10.25
28. CO_2 ROOF LINE	8.0		7.8		8.0		7.4		7.8	
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.______

Test No.______ Date 6/10 Location 38 Engr. W. NAZIV[illegible]

Unit No.______ Fuel GAS Capacity 45 K#/hr

Unit Type CE VERTICAL Burner Type______

1. Test No.	200G-17		200G-17A		200G-17B		200G-17C		200G-17D	
2. Date										
3. Time										
4. Load (K#/hr)	39.5		39.5		39.5		39.5		39.5	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	2.2	2.3	4.4		2.9		2.25		2.4	
9. NOx (hot) read/3% O_2 (ppm)*	154	177								
10. NO (hot) read/3% O_2 (ppm)*	154	177								
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0								
12. NO (cold) read/3% O_2 (ppm)*	169	162	152	165	171	170	178	171	157	152
13. Carbon Dioxide (%)	10.5		8.7		10.25		10.5		10.5	
14. Carbon Monoxide (ppm) uncor/cor*			10		6		10		12>	
15. Hydrocarbon (ppm) uncor/cor*	3									
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER	1									
18. Atmos. Temp. (°F/°C)	72									
19. Dew Point Temp. (°F/°C)	69									
20. Atmos. Pressure (in. Hg)	30.07									
21. Relative Humidity (%)										
22. STACK O_2 %	6.5		6.45							
23. WATER CONTENT (% VOL.)	16.45									
24. NO (ROOF)/CORR.	130	162	135	167						
25. CO COLD LINE/HOT LINE	12	10	10		6		10		12>	
26. CO ROOF LINE	10		6							
27. CO_2 COLD LINE/HOT LINE	10.5	10.5	8.7		10.25		10.25		10.5	
28. CO_2 ROOF LINE	8.0		8.0							
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No. ______

Test No. ______ Date 6/10 Location 38 Engr. W. NAZIMOWITZ

Unit No. ______ Fuel GAS Capacity 45 k#/hr

Unit Type CE VERTICAL Burner Type ______

	BASELINE									
1. Test No.	2006-17E		204-21		204-22		204/5-23		204/5-24	
2. Date										
3. Time										
4. Load (k#/hr)	39.5		39.6		39.6		39.0		39.0	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	3.2		2.83	2.85	2.75	2.9	2.45	2.5	2.45	
9. NOx (hot) read/3% O_2 (ppm)*			93	110	110	131	68	79		
10. NO (hot) read/3% O_2 (ppm)*			92	108	109	130	68	79		
11. NO_2 (hot) read/3% O_2 (ppm)*			1	2	1	1	0	0		
12. NO (cold) read/3% O_2 (ppm)*	151	153	108	107	128	126	83	81	76	74
13. Carbon Dioxide (%)	10.5		10.25		10.00		10.25		10.25	
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*										
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)	78		82.5		87		90.5		92	
19. Dew Point Temp. (°F/°C)	69		71.5		72.5		71.5		71	
20. Atmos. Pressure (in. Hg)	30.05		30.00		29.99		29.94		29.90	
21. Relative Humidity (%)										
22. STACK O_2%	6.5		6.85		6.9		6.45		6.5	
23. WATER CONTENT (% VOL.)			16		15.9		16.3			
24. NO (ROOF) /CORR.	140	174	82	104	98	125	64	79	60	75
25. CO COLD LINE/HOT LINE	12		35	32	29	32	166	137/232	18	
26. CO ROOF LINE	6		46		<92>		470		72	
27. CO_2 COLD LINE/HOT LINE	10.5		10.25	10.25	10.0	10.0	10.25	10.25	10.25	
28. CO_2 ROOF LINE	8.0		7.8		7.6		8.00		7.8	
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date *6/10* Location *38* Engr. *W. NAZIMOWITZ*

Unit No.________ Fuel *GAS* Capacity *45 k#/hr*

Unit Type *CE VERTICAL* Burner Type________

1. Test No.	204/5-25		204/5-26		204/5-27		204/5-28		204/5-29	
2. Date										
3. Time										
4. Load (k#/hr)	39.0		39.4		39.0		39.0		39.0	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD LINE/HOT LINE	2.6		2.55		2.52		2.3	2.4	2.3	
9. NOx (hot) read/3% O_2 (ppm)*							42	49		
10. NO (hot) read/3% O_2 (ppm)*							42	49		
11. NO_2 (hot) read/3% O_2 (ppm)*							0	0		
12. NO (cold) read/3% O_2 (ppm)*	76	74	48	47	49	48	52	50	58	56
13. Carbon Dioxide (%)	10.0		10.0		10.0		10.0		10.25	
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*	4		4		4		3			
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER	1									
18. Atmos. Temp. (°F/°C)	90		86		84		79.5		79	
19. Dew Point Temp. (°F/°C)	71		71		70		68		67	
20. Atmos. Pressure (in. Hg)	29.89		29.89		29.88		29.88		29.88	
21. Relative Humidity (%)										
22. STACK O_2 %	6.55		6.15		6.35		6.25		6.35	
23. WATER CONTENT (% VOL.)							16.4			
24. NO (ROOF) /CORR.	61	76	38	46	37	46	40	49	44	54
25. CO COLD LINE/HOT LINE	39		810		910/1250		49/72	58	26	
26. CO ROOF LINE	49		470		550/730		100/174		26/35	
27. CO_2 COLD LINE/HOT LINE	10.0		10.0		10.0		10.0	10.25	10.25	
28. CO_2 ROOF LINE	7.8		8.0		8.0		8.0		8.0	
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

6/10/76 MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date 6/11/76 Location 38 Engr. W. NAZIMOWITZ

Unit No.__________ Fuel GAS Capacity 45 k#/hr

Unit Type CE VERTICAL Burner Type__________

6/11

1. Test No.	204/5-30		204/5-31		204/5-32		200G-18		200G-19	
2. Date										
3. Time										
4. Load (k#/hr)	39.0		39.0		39.0		39.5		39.5	
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD/HEATED	2.25		2.0		1.9		2.05	2.1	1.98	1.98
9. NOx (hot) read/3% O_2 (ppm)*							145	166	118	135
10. NO (hot) read/3% O_2 (ppm)*							145	166	118	135
11. NO_2 (hot) read/3% O_2 (ppm)*							0	0	0	0
12. NO (cold) read/3% O_2 (ppm)*	49	47	52	49	68	64	164	156	138	131
13. Carbon Dioxide (%)	10.25		10.5		10.5		10.5		10.5	
14. Carbon Monoxide (ppm) uncor/cor*	58	56								
15. Hydrocarbon (ppm) uncor/cor*										
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke ~~Spot (Bacharach)~~ NUMBER							1			
18. Atmos. Temp. (°F/°C)							74		77.5	
19. Dew Point Temp. (°F/°C)							68.5		69.0	
20. Atmos. Pressure (in. Hg)							29.78		29.77	
21. Relative Humidity (%)										
22. STACK O_2 %			6.15		6.18		6.5		6.35	
23. NO (ROOF) /CORR.	47	45	42	51	54	66	126	156	104	128
24. CO COLD LINE/HOT LINE	58	56	106/152		450		16	12		
25. CO ROOF LINE			66/137		160		10			
26. CO_2 COLD LINE/HOT LINE	10.25		10.5		10.5		10.5	10.5		
27. CO_2 ROOF LINE			8.0		8.0		7.8			
28.										
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date 6/11/76 Location 38 Engr. W. NAZIMOWITZ

Unit No.__________ Fuel GAS Capacity 45 k#/hr

Unit Type CE VERTICAL Burner Type__________

1. Test No.	2006-20		2006-21		2006-22		2006-23			
2. Date										
3. Time										
4. Load (k#/hr)	39.5									
5. Process Rate										
6. Flue Diam. or Size, ft										
7. Probe Position										
8. Oxygen (%) COLD/HEATED	2.8	2.85	4.05	—	2.4	—	1.8	—		
9. NOx (hot) read/3% O_2 (ppm)*	110	130								
10. NO (hot) read/3% O_2 (ppm)*	110	130								
11. NO_2 (hot) read/3% O_2 (ppm)*	0	0								
12. NO (cold) read/3% O_2 (ppm)*	137	136	132	140	152	147	152	143		
13. Carbon Dioxide (%)	10.0									
14. Carbon Monoxide (ppm) uncor/cor*										
15. Hydrocarbon (ppm) uncor/cor*	4									
16. Sulfur Dioxide (ppm) uncor/cor*										
17. Smoke Spot (Bacharach)										
18. Atmos. Temp. (°F/°C)	81		83		83		84			
19. WET BULB ~~Dew Point~~ Temp. (°F/°C)	69		70		70		70			
20. Atmos. Pressure (in. Hg)	29.75		29.73		29.73		29.73			
21. Relative Humidity (%)										
22. STACK O_2 %	6.95		7.8		6.6		6.2			
23. WATER CONTENT (% VOL.)	16.0									
24. NO (ROOF) /CORR.	107	137	103	141	118	148	116	141		
25. CO COLD LINE/HOT LINE	10	10	6		6		232			
26. CO ROOF LINE	6		3		6		470			
27. CO_2 COLD LINE/HOT LINE	10.0	10.0								
28. CO_2 ROOF LINE	7.6									
29.										
30.										

*Correction to 3% O_2 should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

KVB

Test No. ____________

Engr. ____________

CONTROL ROOM DATA

Test Number 202 + 203   Date 5/19/76 - 5/20/76

Unit Number ____________   Owner ____________

Fuel #6   Location 38

Capacity (K#/hr) 45

Furnace Type ____________   Burner Type ____________

	5/19/76				5/20/76
TIME OF DAY EDT			1100	1530	1100
1. Test Number	202-3	200-22	203-26A	203-26B	203-27A
2. Load (K#/hr)	35-34	38	38	39	38
3. Control Method Auto/Hand	LOW PREHEAT	TODAY'S	SCA SO_x + PARTICULATE	PARTIC.	SCA SO_x + PARTICAL SIZE
4. Staged Air Port Open	BYPASS FULLY OPEN	BASELINE	14 + 15		14 + 15
5. STACK O_2	129 °F	—	15% THRU SCA		7.1
6. Oxygen/Air Level (%) FURN. EXIT HOT / COLD	2.6 / 2.6	- / 3.4	3.5 / 3.5	3.1 / 3.2	/ 3.3
7. ~~LWS Drum~~ Pressure (psig)	133	—	139		
8. Final Steam Press/Temp (psig/°F)	140 / —	— /	142 /	— /	/
9. Fuel-Air Ratio Setting OIL LOADING	45 / 57	38 / 77	38 / 64	36 / 65	38 / 65
10. Feedwater Press/Temp (psig/°F)	- / 260	— /	/ 267	— /	/
11. Air Flow Primary/Secondary ( )	— /	— /	— /	/	— /
12. Air Temp Primary/Secondary (°F)	— /	— /	— /	/	— /
13. Fan Setting FD/ID	62 / 84	65 / 77	50 / 77	53 / 77	54 / 80
14. Register Setting (%open C.C.)	—	—	—	—	—
15. Fuel Flow (~~lb/hr~~)* GAL/MIN	5.90	6.0	5.9	5.9	5.83
16. Fuel Press/Temp (psig/°F)	90 / 218	90 / 220	91 / 220	90 / 220	91 / 220
17. Fuel Atomization Press (psig)	112	112	114	115	114
18. Pressure Furnace/Windbox (iwg)	-.2 / 1.3	-.2 / 1.7	-.2 / 1.15	-.18 / 1.1	-.20 / 1.2
19. Smoke ~~Meter~~ SPOT	8	—	7	—	7
20. Stack Temp. (°F)	518	—	424	426	427
21. Boiler Outlet Press (iwg)	-.73	-.70	-.7	-.7	-.8
22. Boiler Outlet Temp. (°F)	635	—	630	640	635
23. FD FAN/ Air Heater Inlet Temp. (°F)	80 / 252	—	86 / —	92 / —	92 / —
24. Air Heater Outlet Temp. (°F)/IWG	/ -1.8	/ -1.8	— / -1.9	/ -1.8	/ -1.9
25. Windbox Temperature (°F) 1 / 2 / 3	120 / 125 / 124	275 / 275 / 190*	300 / 296 / 210*	315 / — / 230*	305 / — / 220*
26. 4 / 5 / AVG.	130 / 140 / 128	290 / 295 /	340 / — /	330 / — /	320 / — /
27. MASTER	83	32	28	27	42
28. NO FURNACE EXIT (COLD) PPM	225 / 220			ANALYZER	BROKEN DOWN

*Fuel flow in lb/hr needed for efficiency calculation.

* BOILER TEMP. - CONTROLLER READOUT

4/76
60-33

KVB

Test No. ____________
Engr. W.N.

CONTROL ROOM DATA

Test Number ____________ Date 5/24/76

Unit Number ____________ Owner ____________

Fuel NO. 6 Location 38

Capacity (K#/hr) 45

Furnace Type CE VERTICAL Burner Type ____________

	5/24/76				5/24/76		5/25/76		525 1100	
1. Test Number	200-23				200-24		200-25		201-12	
2. Load (K#/hr)	38				38		38.2		38.8	
3. Control Method Auto/Hand	HAND				✓		✓		✓	
4. Staged Air Port Open	NONE				✓		✓		✓	
5.	BASELINE PARTIC. + SO_x				BASELINE IMPACTOR		BASELINE		LOW O_2	
6. Oxygen/Air Level (%)										
7. LINE ~~Drum~~ Pressure (psig)	139				139		138		137	
8. Final Steam Press/Temp(psig/°F)	146				147		145		145	
9. Fuel-Air Ratio Setting /OIL LOAD	30/84		✓		✓		34/78		34/72	
10. Feedwater Press/Temp(psig/°F)	272				278		274		275	
11. Air Flow Primary/Secondary( )										
12. Air Temp Primary/Secondary(°F)	86				84		74		76	
13. Fan Setting FD/ID	64	76			64	76	62	75	57	64
14. Register Setting (%open C.C.)	100%				100%		100%		100%	
15. Fuel Flow (lb/hr)*	5.8				5.8		5.9		5.9	
16. Fuel Press/Temp (psig/°F)	91	218			91	218	92	217	91	217
17. Fuel Atomization Press (psig)	115				115		115		115	
18. Pressure Furnace/Windbox (iwg)	-0.2	1.6			-0.2	1.6	-0.2	1.5	-1.9	1.35
19. Smoke Meter	3 Δ				4 Δ		3 Δ		7	
20. Stack Temp. (°F)	430*				442*		437		427	
21. Boiler Outlet Press (iwg)	-.75				-.75		-.76		-.65	
22. Boiler Outlet Temp. (°F)	650				650		645		630	
23. Air Heater Inlet Temp.(°F)										
24. Air Heater Outlet Temp. (°F)/iwg	/-1.8				/-1.8		/-1.85		/-1.6	
25. Windbox Temperature (°F) 1/4	283/298				281/298		272/290		275/292	
26.										
27. MASTER CONTROL	18				26		40		40	
28.										

*Fuel flow in lb/hr needed for efficiency calculation.
* HARD TO READ. NO AMBER LIGHT. I 5-10 DEG.

Δ GREENISH

4/76
60-33

KVB

Test No. ____________

Engr. W.N.

CONTROL ROOM DATA

Test Number 202, 200, 201 Date 5/25/75, 5/26/75

Unit Number ____________ Owner ____________

Fuel NO. 6 Location ____________

Capacity (K#/hr) 45

Furnace Type CE VERTICAL Burner Type PEABODY STAN. ATOM.

	1450		1500		5/26					
1. Test Number	202-4		202-4A		200-26		201-13		201-14	
2. Load (K#/hr)	34.0		34		38.5		38.5		39.0	
3. Control Method Auto/Hand	HAND		✓		HAND		✓		✓	
4. Staged Air Port Open	NONE		✓		NONE		✓		✓	
5.	LOW TEMP.		✓		BASELINE		LOW O_2		LOW O_2	
6. Oxygen/Air Level (%)	MAX BYPASS						IMPACTOR		SO_2	
7. ~~Drum~~ (LINE) Pressure (psig)			138		137		137		137	
8. Final Steam Press/Temp(psig/°F)			145		145		145		145	
9. Fuel-Air Ratio Setting	34/68		✓ ✓				28/78		28/80	
10. Feedwater Press/Temp(psig/°F)			278		275		275		276	
11. Air Flow Primary/Secondary( )										
12. Air Temp Primary/Secondary(°F)			76		77		80		81	
13. Fan Setting FD/ID	68	80	61	84	60	72	56	61	58	66
14. Register Setting (%open C.C.)	100%		100%		100%		100%		100%	
15. Fuel Flow (lb/hr)*			5.85				5.9		5.85	
16. Fuel Press/Temp (psig/°F)	92	216	92	216	92	216	90	217	92	218
17. Fuel Atomization Press (psig)	115		115		115		114		115	
18. Pressure Furnace/Windbox (iwg)	-0.03	1.55	-0.2	1.2	-0.2	1.4	-0.2	1.2	-0.2	1.35
19. Smoke Meter	3		4				6		6	
20. Stack Temp. (°F)	550		550				430		430	
21. Boiler Outlet Press (iwg)			-.75				-.7		-.65	
22. Boiler Outlet Temp. (°F)	650		650		635		630		640	
23. Air Heater Inlet Temp.(°F)										
24. Air Heater Outlet Temp. (°F)			-1.85				-1.7		-1.7	
25. Windbox Temperature (°F) 1/4			120/130				270/287		280/295	
26.										
27. BOILER MASTER	32		32				46		32	
28.										

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ____________
Engr. W. N.

CONTROL ROOM DATA

Test Number 202, 200, 201, 203 Date 5/26/76, 5/27/76

Unit Number ____________ Owner ____________

Fuel NO. 6 Location 38

Capacity (K#/hr) 45

Furnace Type C E VERTICAL Burner Type PEABODY - STAN, ATOM.

		5/26		5/27						
1.	Test Number	202-5		200-27		201-15		203-28		
2.	Load (K#/hr)	34.0		38.0		38.8		38.5		
3.	Control Method Auto/Hand	HAND		HAND		✓		✓		
4.	Staged Air Port Open	NONE		NONE		✓		14 + 15		
5.		VPH LOW TEMP		BASELINE		LOW O_2				
6.	Oxygen/Air Level (%)	IMPACTOR + SOx				METHOD 5 PARTIC.		IMPACTOR		
7.	LINE ~~Drum~~ Pressure (psig)	138		137		137		138		
8.	Final Steam Press/Temp(psig/°F)	145		144		145		145		
9.	Fuel-Air Ratio Setting /OIL LOADER	28/76		37/71		—		—		
10.	Feedwater Press/Temp(psig/°F)	277		273		275		277		
11.	Air Flow Primary/Secondary( )									
12.	Air Temp Primary/Secondary(°F)	82		76		80 TO 85		89 TO 90		
13.	Fan Setting FD/ID	62	84	60	71	58	66	50	80	
14.	Register Setting (%open C.C.)	100%		100%		100%		100%		
15.	Fuel Flow (lb/hr)*	5.8 +						5.98		
16.	Fuel Press/Temp (psig/°F)	92	217	92	218	92	218	91	218	
17.	Fuel Atomization Press (psig)	115		115		115		115		
18.	Pressure Furnace/Windbox (iwg)	-0.2	1.2	-0.2	1.5	-0.2	1.35	-0.2	1.1	
19.	Smoke Meter	3		4						
20.	Stack Temp. (°F)	540				430		450		
21.	Boiler Outlet Press (iwg)	-.72		-.73		-.6		.8		
22.	Boiler Outlet Temp. (°F)	650		638		630		650		
23.	Air Heater Inlet Temp.(°F)									
24.	Air Heater Outlet Temp. (°F)	-1.85		-1.8		-1.5		-2.0		
25.	Windbox Temperature (°F) 1/4			272/285		276/293				
26.	1/2/4	126/127/135				TO 280/297		313/326		
27.	MASTER CONTROL	60		46						
28.										

*Fuel flow in lb/hr needed for efficiency calculation.

BEGIN AND END OF TEST

4/76
60-33

Test No. ____
Engr. W. N.

KVB

CONTROL ROOM DATA

Test Number 200G-1 Date 6/1/76

Unit Number ____ Owner ____

Fuel NATURAL GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type PEABODY - RING

		6/1/76		6/2/76							
1.	Test Number	200G-1		200G-2		201G-1		201G-2		201G-3	
2.	Load (K#/hr)	41.5		40.0		40.0		40.0		39.8	
3.	Control Method Auto/Hand	HAND		HAND		✓		✓		✓	
4.	Staged Air Port Open	NONE		NONE		✓		✓		✓	
5.		BASELINE		BASELINE		MAX O_2		MID O_2		HIGH O_2	
6.	Oxygen/Air Level (%)	1.25		1.6		4.0		2.65		4.0	
7.	LINE ~~Drum~~ Pressure (psig)	138		136		137		137		137	
8.	Final Steam Press/Temp(psig/°F)	146		145		145		145		146	
9.	Fuel-Air Ratio Setting										
10.	Feedwater Press/Temp(psig/°F)	270		272		272		274		275	
11.	Air Flow Primary/Secondary( )										
12.	Air Temp Primary/Secondary(°F)	80		79		80		86		85	
13.	Fan Setting FD/ID	88	90	69	77	94	96	74	84	84	96
14.	Register Setting (%open C.C.)	73		73		✓		✓			
15.	Fuel Flow (lb/hr)*										
16.	Fuel Press/Temp (psig/°F)	3.8	68	3.5	68	3.5	68	3.5	70	3.5	70
17.	Fuel Atomization Press (psig)										
18.	Pressure Furnace/Windbox (iwg)	-0.15	3.3	-.2	2.7	-.2	3.3	-.2	2.95	-.2	3.2
19.	Smoke Meter			1		0		0		0	
20.	Stack Temp. (°F)			434		452		440		454	
21.	Boiler Outlet Press (iwg)	-.8		-.75		-.88		-.8		-.88	
22.	Boiler Outlet Temp. (°F)	668		650		670		660		670	
23.	Air Heater Inlet Temp.(°F)										
24.	Air Heater Outlet ~~Temp. (°F)~~ PRESS (iwg)	-2.05		-1.85		-2.2		-2.0		-2.2	
25.	Windbox Temperature (°F) 1/4	270/285		275/290		271/285		280/292		276/290	
26.											
27.	GAS SETTINGS AUTO/MAN	46/38		41/34		/34		/34		/34	
28.	CONTROL SUPPLY PRESS psig	9		8.5		8.5		8.5		8.5	

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ______

Engr. W.N.

CONTROL ROOM DATA

Test Number 2016-4 Date 6/2/76

Unit Number ______ Owner ______

Fuel NATURAL GAS Location ______

Capacity (K#/hr) 45 K

Furnace Type C.E. VERTICAL Burner Type RING

		6/2/76 →						6/3		6/3	
1.	Test Number	2016-4		2016-5		2016-6		2006-3		204-1	
2.	Load (K#/hr)	40.0		39.2		40.5		39.0		38.0	
3.	Control Method Auto/Hand	HAND		✓		HAND		✓		✓	
4.	Staged Air Port Open	NONE		✓		NONE		✓			
5.		MID O_2		LOW O_2		LOW O_2		BASELINE		SCA	
6.	Oxygen/Air Level (%)	2.9		1.25		1.45		2.7		2.95	
7.	Drum Pressure (psig)	138		138		139		136		137	
8.	Final Steam Press/Temp(psig/°F)	146		146		148		144		145	
9.	Fuel-Air Ratio Setting										
10.	Feedwater Press/Temp(psig/°F)	275		275		275		270		272	
11.	Air Flow Primary/Secondary( )										
12.	Air Temp Primary/Secondary(°F)	84		86		86		64		78	
13.	Fan Setting FD/ID	75	85	65	72	67	74	71	80	54	82
14.	Register Setting (%open C.C.)	73%		73		73		73		73	
15.	Fuel Flow (lb/hr)*										
16.	Fuel Press/Temp (psig/°F)	3.5	70	3.5	70	3.5	70	3.3	66	3.5	68
17.	Fuel Atomization Press (psig)										
18.	Pressure Furnace/Windbox (iwg)	-0.2	3.0	-0.22	2.5	-.21	2.6	-.17	3.0	-0.2	2.2
19.	Smoke Meter	0				1		0		1	
20.	Stack Temp. (°F)	—		—		432		435		444	
21.	Boiler Outlet Press (iwg)	-0.8		-0.7		-0.7		-.72		-.79	
22.	Boiler Outlet Temp. (°F)	665		640		645		650		650	
23.	Air Heater Inlet Temp.(°F)										
24.	Air Heater Outlet ~~Temp. (°F)~~ PRESS	-2.0		-1.75		-1.75		-1.9		-2.0	
25.	Windbox Temperature (°F) 1 / 4	280/292		281/294		281/295		267/281		295/310	
26.											
27.	GAS SETTING	34		✓		34		32		32	
28.	CONTROL PRESS	8.5		✓		8.5		8.1		8.0	

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ______

Engr. ______

CONTROL ROOM DATA

Test Number ______ Date 6/3/76

Unit Number ______ Owner ______

Fuel NATURAL GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

1.	Test Number	204-2		204-3		204-4		204-5		204-6	
2.	Load (K#/hr)	38.0		38.3		38.5		38.5		38.5	
3.	Control Method Auto/Hand	HAND		HAND		✓		✓		✓	
4.	Staged Air Port Open	12 + 13		10 + 11		8 + 9		6 + 7		12 + 13	
5.		SCA		SCA		SCA		SCA		SCA	
6.	Oxygen/Air Level (%)	2.6		2.9		3.0		2.75		2.7	
7.	Drum Pressure (psig)	137		137		138		138		✓	
8.	Final Steam Press/Temp(psig/°F)	145		145		146		146		✓	
9.	Fuel-Air Ratio Setting										
10.	Feedwater Press/Temp(psig/°F)	272		274		275		275		✓	
11.	Air Flow Primary/Secondary( )iwg	3.3		3.3		3.3		3.4		3.5	
12.	Air Temp Primary/Secondary(°F)	81		89		87		87		84	
13.	Fan Setting FD/ID	54	81	54	81	54	81	✓	✓	54	83
14.	Register Setting (%open C.C.)	73% →									
15.	Fuel Flow (lb/hr)*										
16.	Fuel Press/Temp (psig/°F)	3.3	70	3.3	73	3.3	72	3.3	72	3.3	70
17.	Fuel Atomization Press (psig)										
18.	Pressure Furnace/Windbox (iwg)	-.2	2.1	-.2	2.1	-.2	2.1	-.2	2.2	-.2	2.15
19.	Smoke Meter	0		0		0		0		0	
20.	Stack Temp. (°F)	450		454		453		452		—	
21.	Boiler Outlet Press (iwg)	-.77		-.77		-.78		-.78		-.78	
22.	Boiler Outlet Temp. (°F)	665		660		662		660		668	
23.	Air Heater Inlet Temp.(°F)										
24.	Air Heater Outlet ~~Temp. (°F)~~ PRESS.	-1.9		-1.9		-1.9		-1.9		-1.95	
25.	Windbox Temperature (°F) 1/4	305/316		311/324		310/326		312/328		311/325	
26.											
27.	GAS CONTROL SETTING/PRESS	31/8.1		32/8.1		32/8.1		✓/✓		✓/✓	
28.											

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ______________
Engr. WN

CONTROL ROOM DATA

Test Number ______________ Date 6/3/76, 6/4/76

Unit Number ______________ Owner ______________

Fuel NATURAL GAS Location ______________

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

	6/3/76			6/4/76					
1. Test Number	200G-4			200G-5		201G-7		201G-8	
2. Load (K#/hr)	39.2			41.0		40.5		40.0	
3. Control Method Auto/Hand	HAND			HAND		HAND		HAND	
4. Staged Air Port Open	NONE			NONE		NONE		NONE	
5.	BASELINE			BASELINE		O_2 RANGE		O_2 RANGE	
6. Oxygen/Air Level (%)	2.7			2.3		2.8		3.4	
7. Drum Pressure (psig)	137			132.5		137		138	
8. Final Steam Press/Temp(psig/°F)	146			143		145		146	
9. Fuel-Air Ratio Setting									
10. Feedwater Press/Temp(psig/°F)	275			261		262		262	
11. Air Flow Primary/Secondary( ) iwg	4.7			4.8		4.9		5.2	
12. Air Temp Primary/Secondary(°F)	82			81		82		84	
13. Fan Setting FD/ID	70	80		70	82	73	83	78	89
14. Register Setting (%open C.C.)	73% →								
15. Fuel Flow (lb/hr)*									
16. Fuel Press/Temp (psig/°F)	3.3	69		3.5	69	3.5	69	3.5	70
17. Fuel Atomization Press (psig)									
18. Pressure Furnace/Windbox (iwg)	-0.2	2.9		-0.22	2.9	-0.20	3.0	-0.20	3.2
19. Smoke Meter				1					
20. Stack Temp. (°F)				436		443		452	
21. Boiler Outlet Press (iwg)	-.75			-.80		-.79		-.82	
22. Boiler Outlet Temp. (°F)	650			655		660		670	
23. Air Heater Inlet Temp.(°F)									
24. Air Heater Outlet ~~Temp. (°F)~~ PRESS	-1.9			-1.95		-2.0		-2.2	
25. Windbox Temperature (°F) 1/4	280/296			275/290		275/290		275/294	
26.									
27. GAS SETTING/CONTROL PRESS	32/8.2			34/8.8		34/8.7		34/8.7	
28.									

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ________

Engr. ________

CONTROL ROOM DATA

Test Number 204-7 Date 6-4-76

Unit Number ________ Owner ________

Fuel NATURAL GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

1.	Test Number	204-7		204-8							
2.	Load (K#/hr)	39.5		39.5							
3.	Control Method Auto/Hand	HAND		HAND							
4.	Staged Air Port Open	6 + 7		4 + 15							
5.		SCA		SCA							
6.	Oxygen/Air Level (%)	2.7		2.95							
7.	Drum Pressure (psig)	138		138							
8.	Final Steam Press/Temp(psig/°F)	145		145							
9.	Fuel-Air Ratio Setting										
10.	Feedwater Press/Temp(psig/°F)	266		269							
11.	Air Flow Primary/Secondary( ) iwg	3.5		3.7							
12.	Air Temp Primary/Secondary(°F)	88		88							
13.	Fan Setting FD/ID	58	85	58	85						
14.	Register Setting (%open C.C.)	73 →									
15.	Fuel Flow (lb/hr)*										
16.	Fuel Press/Temp (psig/°F)	3.5	71	3.5	71						
17.	Fuel Atomization Press (psig)										
18.	Pressure Furnace/Windbox (iwg)	-0.2	2.4	-0.2	2.3						
19.	Smoke Meter										
20.	Stack Temp. (°F)	463		459							
21.	Boiler Outlet Press (iwg)	-0.80		-0.81							
22.	Boiler Outlet Temp. (°F)	667		660							
23.	Air Heater Inlet Temp.(°F)										
24.	Air Heater Outlet ~~Temp. (°F)~~ PRESS	-2.0		-2.0							
25.	Windbox Temperature (°F) 1/4	305/325		305/322							
26.											
27.	GAS CONTROL SETTING/PRESS.	34/8.9		34/8.8							
28.											

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ______

Engr. ______

CONTROL ROOM DATA

Test Number ______ Date 6-7-76

Unit Number ______ Owner ______

Fuel NATURAL GAS Location 38

Capacity (K#/hr) 45 K

Furnace Type C.E. VERTICAL Burner Type RING

1. Test Number	2006-6		204-9		204-10		204-11		204-12	
2. Load (K#/hr)	39.0		39.0		39.0		39.0		38.5	
3. Control Method Auto/Hand	HAND		HAND		HAND		HAND		HAND	
4. Staged Air Port Open	NONE		14+15		14+15		8+9		6+7	
5.			SCA		SCA		SCA		SCA	
6. Oxygen/Air Level (%)	2.3		2.25		2.5		2.4		2.35	
7. LINE ~~Drum~~ Pressure (psig)	137		136		137		136		138	
8. Final Steam Press/Temp(psig/°F)	145		145		145		145		145	
9. Fuel-Air Ratio Setting										
10. Feedwater Press/Temp(psig/°F)	275		275		276		277		277	
11. Air Flow Primary/Secondary( ) iwg	4.6		3.3		3.3		3.3		3.3	
12. Air Temp Primary/Secondary(°F)	82		81		86		90		92	
13. Fan Setting FD/ID	70	80	55	81	55	82	55	82	55	82
14. Register Setting (%open C.C.)	73%									
15. Fuel Flow (lb/hr)*										
16. Fuel Press/Temp (psig/°F)	3.5	69	3.5	68	3.5	71	3.5	72	3.5	74
17. Fuel Atomization Press (psig)										
18. Pressure Furnace/Windbox (iwg)	-0.2	2.9	-0.2	2.2	-0.2	2.2	-0.2	2.2	-0.2	2.2
19. Smoke Meter	0		0		0		0		0	
20. Stack Temp. (°F)	435				450		455		459	
21. Boiler Outlet Press (iwg)	-0.75		-7.5		-.79		-.79		-.79	
22. Boiler Outlet Temp. (°F)	650		652		654		660		660	
23. Air Heater Inlet Temp.(°F)										
24. Air Heater Outlet ~~Temp. (°F)~~ PRESS	-1.9		-1.9		-1.95		-1.95		-1.95	
25. Windbox Temperature (°F) 1 / 4	275/292		299/315		302/318		310/325		315/332	
26.										
27. GAS SETTING/CONTROL PRESS.	335/8.5		33.5/8.5		34/8.5		34/8.5		34/8.5	
28.			30.13							

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ______

Engr. W.N.

CONTROL ROOM DATA

Test Number ______ Date 6-7-76

Unit Number ______ Owner ______

Fuel NATURAL GAS Location ______

Capacity (K#/hr) 45

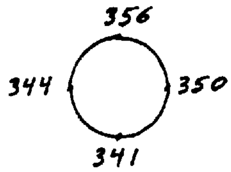
Furnace Type C E VERTICAL Burner Type RING BURNER

6/7/76

1. Test Number	204-13	204-14	204-15	204-16	204-17
2. Load (K#/hr)	39.0	39.0	39.0	38.5	38.5
3. Control Method Auto/Hand	HAND	HAND	HAND	HAND	HAND
4. Staged Air Port Open	6 + 7	6 + 7	6 + 7	6 + 7	6 + 7
5.	SCA	SCA	SCA	SCA	SCA
6. Oxygen/Air Level (%)	1.7	1.25	4.1	3.0	1.9
7. Drum Pressure (psig)	138	138	138	140	141
8. Final Steam Press/Temp(psig/°F)	148 /	146 /	146 /	149 /	149 /
9. Fuel-Air Ratio Setting					
10. Feedwater Press/Temp(psig/°F)	276 /	278 /	279 /	279 /	279 /
11. Air Flow Primary/Secondary( )	3.4 /	3.3 /	4.0 /	3.6 /	3.2 /
12. Air Temp Primary/Secondary(°F)	94 /	94 /	94 /	95 /	94 /
13. Fan Setting FD/ID	55 / 77	55 / 74	66 / 98	59 / 85	54 / 80
14. Register Setting (%open C.C.)	73% →	→	→	→	→
15. Fuel Flow (lb/hr)*					
16. Fuel Press/Temp (psig/°F)	3.5 / 74	3.5 / 74	3.5 / 74	3.5 / 74	3.5 / 74
17. Fuel Atomization Press (psig)					
18. Pressure Furnace/Windbox (iwg)	-.2 / 2.2	-.18 / 2.2	-.20 / 2.65	-.20 / 2.40	-.2 / 2.2
19. Smoke Meter					
20. Stack Temp. (°F)	448	444	475		460
21. Boiler Outlet Press (iwg)	-.71	-.69	-.89	-.79	-.75
22. Boiler Outlet Temp. (°F)	645	641	670	662	655
23. Air Heater Inlet Temp.(°F)					
24. Air Heater Outlet ~~Temp. (°F)~~ PRESS.	-1.8	-1.75	-2.25	-2.0	-1.05
25. Windbox Temperature (°F) 1/4	310/325	306/322	310/330	315/335	319/337
26.					
27. GAS SETTING / CONTROL PRESS.	33.5/8.5	33.5/8.5	33.5/8.5	33.5/8.5	33.5/8.5
28.					

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33



KVB

CONTROL ROOM DATA

Test No. ______
Engr. ______

Test Number ______ Date 6-8-76

Unit Number ______ Owner ______

Fuel NATURAL GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

	6/8	Stm. Preheat →			Full By Pass
1. Test Number	2006-7	205-1	205-2	205-3	205-4
2. Load (K#/hr)	39.5	40.0	40.0	40.0	35.0
3. Control Method Auto/Hand	HAND	HAND	HAND	HAND	HAND
4. Staged Air Port Open	NONE	NONE	NONE	NONE	NONE
5.	BASELINE	VPH	VPH	VPH	VPH
6. Oxygen/Air Level (%)	2.55	2.25	2.2	2.45	2.2
7. LINE ~~Drum~~ Pressure (psig)	138	138	134.5	134.5	135
8. Final Steam Press/Temp(psig/°F)	147 /	145 /	143 /	143 /	144 /
9. Fuel-Air Ratio Setting					
10. Feedwater Press/Temp(psig/°F)	265 /	275 /	273 /	274 /	274 /
11. Air Flow Primary/Secondary( )	4.6 /	4.8 /	4.7 /	4.8 /	2.8 /
12. Air Temp Primary/Secondary(°F)	83 /	91 /	92 / 198	93 / 198	95 / 430
13. Fan Setting FD/ID	70 / 80	70 / 80	70 / 80	73 / 82	73 / 91
14. Register Setting (%open C.C.)	73% →				
15. Fuel Flow (lb/hr)*					
16. Fuel Press/Temp (psig/°F)	3.5 / 69	3.4 / 70	3.4 / 72	3.4 / 73	3.4 / 74
17. Fuel Atomization Press (psig)					
18. Pressure Furnace/Windbox (iwg)	-.2 / 2.9	-.2 / 2.8	-.22 / 2.8	-.20 / 3.0	-.20 / 2.4
19. Smoke Meter	1		1		1
20. Stack Temp. (°F)	440	461	463	465	533
21. Boiler Outlet Press (iwg)	-.75	-.75	-.75	-.73	-.73
22. Boiler Outlet Temp. (°F)	650	650	649	650	650
23. Air Heater Inlet Temp.(°F)					
24. Air Heater Outlet ~~Temp. (°F)~~ PRESS.	-1.9	-1.85	-1.85	-1.85	-1.9
25. Windbox Temperature (°F) 1/4	275/290	336/345	344/350	344/350	136/145
26. 2/3/5		340/340/358	341/–/356	341/ /357	142/–/156
27. GAS SETTING/CONTROL PRESSURE	33.5/8.5	33.5/8.5	33.5/8.5	33.5/8.3	32.5/8.4
28.					

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ____________
Engr. ____________

CONTROL ROOM DATA

Test Number ____________ Date 6-8-76

Unit Number ____________ Owner ____________

Fuel NATURAL GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

	Full By Pass	——>	½ By-pass	½ By Pass	
1. Test Number	205-5	205-6	205-7	205/4-8	
2. Load (K#/hr)	34.6	40.5	39.5	38.5	
3. Control Method Auto/Hand	HAND	HAND	HAND	HAND	
4. Staged Air Port Open	NONE	NONE	NONE	6 + 7	
5.	VPH	VPH	VPH	SCA + VPH	
6. Oxygen/Air Level (%)	2.55	1.7	2.35		
7. LINE ~~Drum~~ Pressure (psig)	136	136	136	140	
8. Final Steam Press/Temp (psig/°F)	144 /	144 /	144 /	149 /	
9. Fuel-Air Ratio Setting					
10. Feedwater Press/Temp (psig/°F)	274 /	274 /	275 /	279 /	
11. Air Flow Primary/Secondary ( ) iwg	2.9 /		3.8 /	2.9 /	
12. Air Temp Primary/Secondary (°F)	95 /	96 /	98 / 102	97 /	
13. Fan Setting FD/ID	76 / 96	85 / 98	74 / 84	59 / 88	
14. Register Setting (%open C.C.)	73%	——>			
15. Fuel Flow (lb/hr)*					
16. Fuel Press/Temp (psig/°F)	3.4 / 74	3.7 / 75	3.4 / 75	3.5 / 75	
17. Fuel Atomization Press (psig)					
18. Pressure Furnace/Windbox (iwg)	-.20 / 2.5	-.20 / 2.6	-.22 / 2.7	-.20 / 2.2	
19. Smoke Meter		1			
20. Stack Temp. (°F)		545	464	487	
21. Boiler Outlet Press (iwg)	-.75	-.78	-.80	-.79	
22. Boiler Outlet Temp. (°F)	656	661	650	660	
23. Air Heater Inlet Temp. (°F)					
24. Air Heater Outlet ~~Temp. (°F)~~ PRESS.	-1.95	-2.0	-1.95	-2.0	
25. Windbox Temperature (°F) 1/4	135/140	135/140	225/280	240/300	
26. 2/5	140/152	138/150	229/286	240/298	
27. GAS SETTING/CONTROL PRESSURE	32.5/8.2	35.5/9.1	33/8.4	33/8.5	
28.					

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. 200G-8, 9, 10, 11, 12

Engr. ______

CONTROL ROOM DATA

Test Number ______ Date 6-9-76

Unit Number ______ Owner ______

Fuel GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

1.	Test Number	200G-8	200G-9	200G-10	200G-11	200G-12
2.	Load (K#/hr)	40.0	40.3	38.0	39.5	40.5
3.	Control Method Auto/Hand	HAND	HAND	HAND	HAND	HAND
4.	Staged Air Port Open	NONE	NONE	NONE	NONE	NONE
5.		BASELINE	REGISTER SETTINGS	REGISTER SETTING CHANGE		
6.	Oxygen/Air Level (%)	2.3	2.35			
7.	LINE ~~Drum~~ Pressure (psig)	135	135	135	135	135
8.	Final Steam Press/Temp(psig/°F)	144 /	144 /	143 /	144 /	144 /
9.	Fuel-Air Ratio Setting					
10.	Feedwater Press/Temp(psig/°F)	275 /	273 /	274 /	274 /	274 /
11.	Air Flow Primary/Secondary( ) iwg	4.6 /	4.5 /	6.0 /	6.0 /	5.7 /
12.	Air Temp Primary/Secondary(°F)	83 /	83 /	88 /	89 /	89 /
13.	Fan Setting FD/ID	72 / 82	72 / 82	83 / 69	83 / 82	97 / 98
14.	Register Setting (%open C.C.)	73.2%	100%	39.7%	39.7%	46.4%
15.	Fuel Flow (lb/hr)*					
16.	Fuel Press/Temp (psig/°F)	3.5 / 70	3.5 / 71	3.5 / 72	3.5 / 72	3.5 / 72
17.	Fuel Atomization Press (psig)					
18.	Pressure Furnace/Windbox (iwg)	-.2 / 2.9	-.2 / 2.75	-.2 / 4.58	-.45 / 4.4	-.60 / 4.0
19.	Smoke Meter	1				
20.	Stack Temp. (°F)	434	436	429		450
21.	Boiler Outlet Press (iwg)	-.80	-.78	-.65	-.90	-1.16
22.	Boiler Outlet Temp. (°F)	650	650	630	650	665
23.	Air Heater Inlet Temp.(°F)					
24.	Air Heater Outlet ~~Temp. (°F)~~ PRESS.	-1.95	-1.95	-1.6	-2.0	-2.4
25.	Windbox Temperature (°F) 1/4	275/290	279/291	279/293	284/297	288/300
26.	2/5	275/297	275/299	283/301	288/305	291/310
27.	GAS SETTING/CONTROL PRESSURE	34/8.7	34/8.7	34/8.7	34/8.7	34/8.7
28.						

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ______
Engr. ______

CONTROL ROOM DATA

Test Number ______ Date 6-9-76

Unit Number ______ Owner ______

Fuel GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

1. Test Number	200G-13		200G-14		200G-15		200G-16		204-18	
2. Load (K#/hr)	40.7		40.7		40.5		40.5		40.0	
3. Control Method Auto/Hand	HAND		HAND		HAND		HAND		HAND	
4. Staged Air Port Open	NONE		NONE		NONE		NONE		14 + 15	
5.										
6. Oxygen/Air Level (%)	1.55		1.8						2.25	
7. LINE ~~Drum~~ Pressure (psig)	135		135		135		135		135	
8. Final Steam Press/Temp(psig/°F)	144		144		144		144		144	
9. Fuel-Air Ratio Setting										
10. Feedwater Press/Temp(psig/°F)	274		274		274		274		275	
11. Air Flow Primary/Secondary( ) iwg	5.7		5.5		5.5		5.3		3.4	
12. Air Temp Primary/Secondary(°F)	92		93		94		98		96	
13. Fan Setting FD/ID	97	84	97	81	97	87	97	85	58	83
14. Register Setting (%open C.C.)	46.4%		53.1%		53.1%		59.8%		73.2%	
15. Fuel Flow (lb/hr)*										
16. Fuel Press/Temp (psig/°F)	3.5	72	3.5	73	3.5	74	3.5	75	3.5	75
17. Fuel Atomization Press (psig)										
18. Pressure Furnace/Windbox (iwg)	-.35	4.0	-.20	3.8	-.30	3.75	-.20	3.5	-.20	2.25
19. Smoke Meter										
20. Stack Temp. (°F)	443		441		448		449		450	
21. Boiler Outlet Press (iwg)	-.90		-.75		-.90		-.79		-.75	
22. Boiler Outlet Temp. (°F)	661		665		670		665		653	
23. Air Heater Inlet Temp.(°F)										
24. Air Heater Outlet ~~Temp. (°F)~~ PRESS.	-2.0		-1.9		-2.1		-2.0		-1.9	
25. Windbox Temperature (°F) 1/4	295/300		290/299		295/300		290/300		310/325	
26. 2/5	292/308		290/302		293/294		294/306		310/329	
27. GAS SETTING/CONTROL PRESS	34/8.8		34/8.7		34/8.7		34/8.7		34/8.8	
28.										

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ______________

Engr. ______________

CONTROL ROOM DATA

Test Number ______________ Date ______________

Unit Number ______________ Owner ______________

Fuel GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

		6-9-76	6-9-76	6-10-76 →	→	→
1.	Test Number	204-19	204-20	200G-17	200G-17E	204-21
2.	Load (K#/hr)	39.8	40.0	39.5	40.0	39.6
3.	Control Method Auto/Hand	HAND	HAND	HAND	✓	HAND
4.	Staged Air Port Open	14 + 15	14 + 15	NONE	✓	14 + 15
5.				BASELINE	✓	5CA
6.	Oxygen/Air Level (%)	3.45	2.8	2.2		
7.	LINE ~~Drum~~ Pressure (psig)	135.5	135.5	135	✓	135
8.	Final Steam Press/Temp(psig/°F)	144 /	144 /	144 /	144 /	143 /
9.	Fuel-Air Ratio Setting					
10.	Feedwater Press/Temp(psig/°F)	275 /	275 /	274 /	✓ /	274 /
11.	Air Flow Primary/Secondary( )iwg	3.8 /	3.5 /	4.5 /	4.5 /	3.3 /
12.	Air Temp Primary/Secondary(°F)	98 /	98 /	88 /	92 /	94 /
13.	Fan Setting FD/ID	65 / 90	60 / 86	71 / 80	✓ / ✓	58 / 84
14.	Register Setting (%open C.C.)	73.2	73.2	73.2	✓	73.2
15.	Fuel Flow (lb/hr)*					
16.	Fuel Press/Temp (psig/°F)	3.5 / 75	3.5 / 75	3.5 / 72	3.5 / 76	3.5 / 76
17.	Fuel Atomization Press (psig)					
18.	Pressure Furnace/Windbox (iwg)	-.2 / 2.5	-.2 / 2.3	-.2 / 2.85	-.22 / 2.80	-.19 / 2.2
19.	Smoke Meter					
20.	Stack Temp. (°F)	455	456	434		450
21.	Boiler Outlet Press (iwg)	-.81	-.80	-.75	-.75	-.78
22.	Boiler Outlet Temp. (°F)	660	655	650	651	657
23.	Air Heater Inlet Temp.(°F)					
24.	Air Heater Outlet ~~Temp. (°F)~~ PRESS.	-2.05	-2.0	-1.9	-1.9	-2.0
25.	Windbox Temperature (°F) 1/4	310/325	310/325	278/293	281/296	306/321
26.	2/5	306/331	310/335	276/301	/288	306/327
27.	GAS SETTING/CONTROL PRESS.	34/9.7	34/8.7	34/8.9		34/8.8
28.						

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ____________

Engr. ____________

CONTROL ROOM DATA

Test Number 204-22 Date 6/10/76

Unit Number ____________ Owner ____________

Fuel NATURAL GAS Location 38

Capacity (K#/hr) 45

Furnace Type CE VERTICAL Burner Type RING

6/10/76

1. Test Number	204-22		204/5-23		204/5-24		-25		-26	
2. Load (K#/hr)	39.6		39.0		39.0		39.0		39.4	
3. Control Method Auto/Hand	HAND		✓		✓		✓		✓	
4. Staged Air Port Open	12 + 13		12 + 13		14 + 15		14+15, 12+13 1/3		14+15, 12+13 FO	
5.	SCA		ByPass Full Open →							
6. Oxygen/Air Level (%)	2.75									
7. LINE ~~Drum~~ Pressure (psig)	135		135		✓		✓		135	
8. Final Steam Press/Temp(psig/°F)	143		143		✓		✓		143	
9. Fuel-Air Ratio Setting										
10. Feedwater Press/Temp(psig/°F)	273		272		✓		✓		275	
11. Air Flow Primary/Secondary( )iwg	3.3		2.1 ByPass		2.1 ByPass				1.8 ByPass	
12. Air Temp Primary/Secondary(°F)	96		100		100		100		100	
13. Fan Setting FD/ID	58	86	58	99	✓	✓	✓	✓	58	99
14. Register Setting (%open C.C.)	73.2%		73		✓				73.2	
15. Fuel Flow (lb/hr)*										
16. Fuel Press/Temp (psig/°F)	3.5	76	3.5	78	✓	✓	✓	79	3.5	78
17. Fuel Atomization Press (psig)										
18. Pressure Furnace/Windbox (iwg)	-.20	2.2	-.20	1.8	-.22	1.8	-.17	1.8	-.15	1.6
19. Smoke Meter			1						1	
20. Stack Temp. (°F)	458		553		547				565	
21. Boiler Outlet Press (iwg)	-.82		-.78		-.81		-.73		-.75	
22. Boiler Outlet Temp. (°F)	675		672		660		662		685	
23. Air Heater Inlet Temp.(°F)										
24. Air Heater Outlet ~~Temp. (°F)~~ PRESS.	-2.0		-2.0		-2.05		-2.0		-2.0	
25. Windbox Temperature (°F) 1/4	318/330		144/151		141/150		139/149		139/145	
26. 2/5	320/325		155/146		154/144		152/143		142/152	
27. GAS SETTING/CONTROL PRESSURE	34/8.9		34/8.8		✓				34/8.9	
28.										

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ______________
Engr. ______________

CONTROL ROOM DATA

Test Number ______________ Date 6-10-76

Unit Number ______________ Owner ______________

Fuel NAT. GAS Location 38

Capacity (K#/hr) 45

Furnace Type C E VERTICAL Burner Type ______________

				VERY SLIGHT BOILER VIBRATION	
1. Test Number	204/5-27	204/5-28	204/5-29	204/5-30	-31
2. Load (K#/hr)	39.0	39.5	39.0	39.0	39.0
3. Control Method Auto/Hand	HAND	HAND	HAND	HAND	✓
4. Staged Air Port Open	14+15 OPEN (12+13) ⅓ OPEN	½ (6+7)	6+7 OPEN	6+7	6+7 FULL OPEN
5.	(6+7) ⅓	14+15	14+15 OPEN	14+15	14+15 ⅓ OPEN
6. Oxygen/Air Level (%)					
7.LIVE ~~Drum~~ Pressure (psig)	134	134	136.5	137	✓
8. Final Steam Press/Temp(psig/°F)	143 /	145 /	146 /	145 /	✓ /
9. Fuel-Air Ratio Setting					
10. Feedwater Press/Temp(psig/°F)	275 /	272 /	280 /	277 /	✓ /
11. Air Flow Primary/Secondary( )	1.8 /	1.8 /	1.8 /	1.8 /	2.1 /
12. Air Temp Primary/Secondary(°F)	98 /	93 /	92 /	92 /	92 /
13. Fan Setting FD/ID	48 / 98	48 / 98	48 / 98	44 / 98	46 / 98
14. Register Setting (%open C.C.)	73.2	73.2	73.2	73.2	✓
15. Fuel Flow (lb/hr)*					
16. Fuel Press/Temp (psig/°F)	3.5 / 76	3.6 / 75	3.6 / 75	3.6 / 75	3.5 / 75
17. Fuel Atomization Press (psig)					
18. Pressure Furnace/Windbox (iwg)	-.14 / 1.6	-.15 / 1.65	-.10 / 1.75	-.14 / 1.6	-.2 / 1.65
19. Smoke Meter					
20. Stack Temp. (°F)			556		
21. Boiler Outlet Press (iwg)	-.72	-.72	-.70	-.74	.78
22. Boiler Outlet Temp. (°F)	671	675	678	680	676
23. Air Heater Inlet Temp.(°F)					
24. Air Heater Outlet ~~Temp. (°F)~~ PRESSURE (iwg)	-2.0	-2.0	-2.0	-2.0	-2.1
25. Windbox Temperature (°F) 1/4	140/145	130/140	130/140	130/140	130/139
26. 2/5	140/150	134/147	133/144	134/135	144/132
27. GAS SETTING/CONTROL PRESSURE	34/8.9	34/9.0	34/9.0	34/9.0	✓/8.9
28.					

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

KVB

Test No. ____________

Engr. ____________

CONTROL ROOM DATA

Test Number ____________ Date *6/10/76, 6/11/76*

Unit Number ____________ Owner ____________

Fuel *NAT. GAS* Location *38*

Capacity (K#/hr) *45*

Furnace Type *CE VERTICAL* Burner Type *RING*

	6/10/76		6/11/76		6/11/76 →					
1. Test Number	204/5-32		200G-18		200G-19		200G-20		200G-21	
2. Load (K#/hr)	39.2		39.5		39.5		39.5		39.5	
3. Control Method Auto/Hand	HAND		HAND		HAND		HAND		HAND	
4. Staged Air Port Open	6 + 7		NONE		NONE		NONE		NONE	
5.										
6. Oxygen/Air Level (%)			2.05		1.98		2.8		4.05	
7. Drum Pressure (psig)	137		134.5		136		136.5		130.5	
8. Final Steam Press/Temp(psig/°F)	145		144		145		145		144	
9. Fuel-Air Ratio Setting										
10. Feedwater Press/Temp(psig/°F)	278		273		262		267		269	
11. Air Flow Primary/Secondary( )	1.8		4.5		4.0		4.5		5.0	
12. Air Temp Primary/Secondary(°F)	91		89		91		94		96	
13. Fan Setting FD/ID	54	100	70	78	68	77	72	82	97	93
14. Register Setting (%open C.C.)					100%		100%		100%	
15. Fuel Flow (lb/hr)*										
16. Fuel Press/Temp (psig/°F)	3.5	75	3.4	73	3.4	73	3.4	74	3.4	
17. Fuel Atomization Press (psig)										
18. Pressure Furnace/Windbox (iwg)	-.2	+1.8	-.2	+2.7	-.22	+2.4	-.19	2.65	-.2	2.95
19. Smoke Meter			1							
20. Stack Temp. (°F)			425		425		430			
21. Boiler Outlet Press (iwg)	-.8		-.70		-.76		-.75		-.85	
22. Boiler Outlet Temp. (°F)	670		645		642		650		660	
23. Air Heater Inlet Temp.(°F)										
24. Air Heater Outlet ~~Temp. (°F)~~ Pressure iwg	-2.0		-1.8		-1.8		-1.9		-2.15	
25. Windbox Temperature (°F) 1/4	129/138		282/295		285/299		286/300		285/300	
26. 2/5	143/132		287/291		290/296		290/296		290/296	
27. GAS SETTING/CONTROL PRESSURE	34/9		33.5/8.5		33.5/8.5		33/8.5		33/8.4	
28.										

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

Test No. ____________

Engr. ____________

KVB

CONTROL ROOM DATA

Test Number ____________ Date 6/11/76

Unit Number ____________ Owner ____________

Fuel NAT. GAS Location 38

Capacity (K#/hr) 45

Furnace Type CE VERTICAL Burner Type RING

6/11/76 →

1. Test Number	2006-22	2006-23			
2. Load (K#/hr)	39.5	39.4			
3. Control Method Auto/Hand	HAND	✓			
4. Staged Air Port Open	NONE	✓			
5.					
6. Oxygen/Air Level (%)					
7. LINE ~~Drum~~ Pressure (psig)	136.5	✓			
8. Final Steam Press/Temp(psig/°F)	145 /	✓ /	/	/	/
9. Fuel-Air Ratio Setting					
10. Feedwater Press/Temp(psig/°F)	265 /	275 /	/	/	/
11. Air Flow Primary/Secondary( )	4.2 /	4.0 /	/	/	/
12. Air Temp Primary/Secondary(°F)	100 /	101 /	/	/	/
13. Fan Setting FD/ID	70 / 78	67 / 74	/	/	/
14. Register Setting (%open C.C.)	100%	100%			
15. Fuel Flow (lb/hr)*					
16. Fuel Press/Temp (psig/°F)	3.4 / 76	3.4 / 78	/	/	/
17. Fuel Atomization Press (psig)					
18. Pressure Furnace/Windbox (iwg)	-.2 / 2.5	-.2 / 2.4	/	/	/
19. Smoke Meter					
20. Stack Temp. (°F)					
21. Boiler Outlet Press (iwg)	-.71	-.70			
22. Boiler Outlet Temp. (°F)	643	640			
23. Air Heater Inlet Temp.(°F)					
24. Air Heater Outlet ~~Temp. (°F)~~ PRESSURE Iwg	-1.85	-1.76			
25. Windbox Temperature (°F) 1/4	294/305	295/306			
26. 2/5	296/302	303/298			
27. GAS SETTING/CONTROL PRESSURE	33/8.4	✓/✓			
28.					

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

Location 38

Fuel Gas Analysis

Gas	Concentration, % by Volume
Methane	96.99
Ethane	1.98
Propane	0.10
Butanes	.04
Pentanes	.01
Hexanes	.00
Carbon Dioxide	.60
Oxygen	.00
Nitrogen	.28
Water Vapor	.00

Higher Heating Value = 1,011 Btu/SCF

Location 38

Fuel Oil Analysis

TESTS		RESULTS LAB.NO.G3393	RESULTS LAB.NO.G3430
GRAVITY, API @ 60°F		15.2	15.2
FLASH, PM CC		214°F	218°F
VISC., SU @ 160°F		359 SEC.	358 SEC.
VISC. SU @ 220°F		118 SEC.	119 SEC.
SULFUR, ASTM		1.88%	1.88%
B.T.U. PER POUND	NET	17425	17462
	GROSS	18449	18484
CARBON		86.21%	86.26%
HYDROGEN		11.22%	11.20%
NITROGEN		0.32%	0.30%
OXYGEN		0.34%	0.29%
ASH		0.03%	0.07%

PLANT 38
LOCATION 38
OPERATOR R.P. & G.C.
DATE 5-7-77
RUN NO. 201-7
SAMPLE BOX NO.
METER BOX NO.
METER H 1.72
C FACTOR @ 0.9

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.30
ASSUMED MOISTURE, % 11.0
HEATER BOX SETTING
PROBE LENGTH, IN. 72" 304
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING
UPPER LOCATION

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
20"	1653	−0.21	420	.25	1.1	803.4007	74	76	320	50
INSIDE STACK	1708		420	.25	1.1	812.9000	90	78	320	50
	1720		420	.25	1.1	820.1000	100	82	320	50
	1735		420	.25	1.1	828.6000	102	88	320	50
	1810		420	.25	1.1	850.5000	115	98	320	60
	1834		420	.25	1.1	864.4007	115	100	320	50
TOTAL						61.0000	99	87 AVG.	AVG.	
AVERAGE			420	.25	1.1		93	AVG.	320	50

PARTICULATE CALCULATION SHEET

Test No. 201-7 Date 5-7-76 Location 38 Test Crew RR

Box No. ______ Sample Probe Position 20" INSIDE OF DUCT

Test Description

Dry Gas Meter Vol. (ft^3)

Final ______

Initial ______

Total ______

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	345	58	2	659.2	
Initial	100	100	0	646.6	
Δ Vol	245	-42	2	12.6	217.6

Beaker No.	2	1				Filter No. 1	Blank No.
Date Weighed							
Tare Wt. 1	84.6649	85.9114				.6886	
2	84.6582	85.9113				.6886	
3	84.6571					.6886	
4							
5							
6							
Avg	84.6601	85.9114				.6886	
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)							
Date Weighed or 250 Bake							
Final Wt. 250 1	84.8751	86.1104				.8641	
2	84.8751	86.1104				.8641	
3						.8641	
4							
5							
6							
Avg	84.8751	86.1104				.8641	
Residue wt Final 250-Tare	.2150	.1990				.1755	
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

LOW AIR.

PARTICULATE EMISSION CALCULATIONS

Test No. 201-7 Date 5-7-76 Location 38 Engr. R.P.

Unit No. 2 Fuel #6 Sampling Train and Method METHOD #5

Pitot Factor, Fs .89 Barometric Pressure, P_{bar} 29.30 in. Hg

Tot. Liquid Collected, V_{1c} 217.6 ml Total Particulate, M_n 589.5 m gm

Velocity Head, ΔP 0.25 iwg Stack Temp., Ts 880 °R Stack Area, As 11.0 ft^2

Sample Volume, Vm 61 ft^3 Stack Press., Psg -0.01 iwg Excess O_2, XO_2% 2.6 %

Orifice Press. Diff., H 1.1 iwg Stack Gas Sp. Gravity, Gs 1.05 n.d.

Sample Time, θ 101 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m 553 °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	59.86	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	10.31	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.1469	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.1517	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	.00002171	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.3476	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	398.2	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	2264	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	14,708	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	12,548	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	16.34	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	114.2	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	.2285	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	98.25	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	68	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 38
OPERATOR RP, Sr
DATE MAY 12, 1976
RUN NO. 200-14
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H 1.72
C FACTOR @ 0.84

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.27
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN. 6 ft. Joy
NOZZLE DIAMETER, IN. 3/8"
PROBE HEATER SETTING

CONCENTRATION

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), ~~In. Hg.~~ iwg	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
		0.09	350	.25	1.25	904.6020	62	58	320	50
	13	↓	370	.26	1.25	912.6000	70	60	320	55
	15		375	.25	1.25	922.1000	77	66	320	60
	15		390	.25	1.25	931.6000	75	68	310	60
	15		395	.25	1.25	941.4000	72	67	320	60
	15		392	.25	1.25	951.1000	73	67	320	60
	15		385	.25	1.25	960.6000	73	66	320	57
	8	↓	385	.25	1.25	965.6020	76	67	320	60
			NOTE: ALL OTHER T_s MEASUREMENTS ARE 420-430 °F.							
			THESE MUST BE IN ERROR							
TOTAL	96					61.0000		64.88 AVG.	AVG.	
AVERAGE			380				72.25	AVG. 68		

PARTICULATE CALCULATION SHEET

Test Crew K.C.

Test No. 200-14 Date 5/12/76 Location 38

Box No. ______ Sample Probe Position ______

Test Description

Dry Gas Meter Vol. (ft^3)

Final ______

Initial ______

Total ______

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	240	81	1		
Initial	100	100	0		
Δ Vol	140	-19	1		136.5

Beaker No. 4		3			Filter No. 2	Blank No.
Date Weighed						
Tare Wt. 1 102.0466		103.1887			.6871	
2 102.0455		103.1898			.6871	
3						
4						
5						
6						
Avg 102.0460		103.1892			.6871	
Bottle No.						
Content Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)						
Date Weighed or 250 Bake						
Final Wt. 250 1 102.2178		103.3032			.8552	
2 102.2178		103.3032			.8563	
3						
4						
5						
6						
Avg 102.2178		103.3032			.8558	
Residue wt Final 250-Tare .1718		.1140			.1687	
Date Weighed or 650 Bake						
Final Wt. 650 1						
2						
3						
4						
5						
6						
Avg						
Residue Wt Final 650-Tare						

Comments:

Data Sheet 6002-3

BASELINE

PARTICULATE EMISSION CALCULATIONS

Test No. 200-14 Date 5/12/76 Location 38 Engr. FF

Unit No. ______ Fuel #6 Sampling Train and Method ______

Pitot Factor, Fs 0.89 Barometric Pressure, P_{bar} 29.27 in. Hg

Tot. Liquid Collected, V_{1c} 136.5 ml Total Particulate, M_n 454.5 m gm

Velocity Head, ΔP 0.25 iwg Stack Temp., Ts 880 (1) °R Stack Area, As 11.0 ft^2

Sample Volume, Vm 61 ft^3 Stack Press., Psg 0.09 iwg Excess O_2, XO_2% 2.6 %

Orifice Press. Diff., H 1.25 iwg Stack Gas Sp. Gravity, Gs 1.05 n.d.

Sample Time, θ 96 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m ______ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	59.82	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	6.47	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.098	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.1170	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	0.00001675	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.2683	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	400.7	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	2259	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	14734	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	13290	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	13.36	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	114.2	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	.1764	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	75.83	ng/joule
11. % Isokinetic	$I = \dfrac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	67	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

1) USE 420 °F, 380 °F OF FIELD DATA SHEET DECLARED TO BE IN ERROR

PLANT ____
LOCATION 38
OPERATOR ____
DATE 5/12
RUN NO. 200-14
SAMPLE BOX NO. ____
METER BOX NO. ____
METER H ____
C FACTOR @ ____

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 70
BAROMETRIC PRESSURE 29.40
ASSUMED MOISTURE, % 11
HEATER BOX SETTING ____
PROBE LENGTH, IN. 20"
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING ____

SCHEMATIC OF STACK CROSS SECTION

CASCADE IMPACTOR

Traverse Point Number	~~Sampling~~ Time ~~(e) Min.~~	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
	1542	0.09	NOT MEAS.	—	2.0	965.7080	68	60	—	50
	1552			—	1.8	975.1	72	62	—	55
	1602			—	1.4	979.9	75	65	-	55
	1612			—	1.6	988.3	76	67	—	55
TOTAL						20.6		AVG. 64	AVG.	
AVERAGE							73	AVG. 68		

338

Test No. 200-14

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 200-14 LOCATION 38 DATE 5-11-76

IMPACTOR NO. 1 CYCLONE NO. NONE OPERATOR RP + GC

SAMPLE POINT LOCATION EAST UPPER PORT, 20" INSIDE

SUBSTRATE COATING NONE FUEL #6 TEST LOAD 40 klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR 0.69 CFM

FLUE STATIC PRESSURE 0.09 inH_2O, VELOCITY ______

NOZZLE DIA. 3/8 INCH IMPACTOR PRESSURE DROP — END TIME 1612

GAS METER END 986.3 CF START TIME 1542

GAS METER START 965.7 CF DURATION 30 MIN

GAS VOLUME 20.6 CF FLOW RATE 0.67 CFM

AMBIENT TEMPERATURE 80 °F PRESSURE 29.40 IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. 428 °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

	Stage Number 1	2	3	4	5	6		Stage Blank
Foil + Sample, g	.7529	.7513	.7448	.7456	.7522	.7572		.7668
Unused Foil, g	.7529	.7492	.7406	.7422	.7589	.7616		.7668
Sample, g	0	.0021	.0042	.0034	—	—		0
Correction for Blank, g	0	0	0	0	0	0		
Final Sample, g	0	.0021	.0042	.0034	—	—		
D_{50}	29.5	14.0	5.3	2.4	1.35	0.60		

FILTER NO. 2	Sample #2	Blank #3
FILTER + SAMPLE, g	.1621	.1361
FILTER TARE, g	.1438	.1361
SAMPLE, g	.0183	0
CORRECTION FOR BLANK, g	0	
FINAL SAMPLE, g	.0183	

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

PLANT 38
LOCATION 38
OPERATOR R.P.
DATE 5-14-76
RUN NO. 200-18
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H 1.72
C FACTOR @ .9

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 82
BAROMETRIC PRESSURE 30.06
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING
UPPER LOCATION

340

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter Outlet (T_{mout}) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
20"	1600	.25			.48	988.8013	77	75		60
INSIDE STACK	1610				.48	992.5000	82	77		60
	1620				.48	996.4000	88	80		60
	1630				.48	1000.2000	92	82		60
	1640				.48	1004.1000	94	85		60
	1645		390		.48	1006.0064	94	85		60
						17.2051				
TOTAL							AVG.		AVG.	
AVERAGE							AVG.			

Test No. 200 - 18

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 200 - 18 LOCATION 38 DATE 5-14-76

IMPACTOR NO. 1 CYCLONE NO. NONE OPERATOR R P

SAMPLE POINT LOCATION EAST UPPER PORT, 20" INSIDE

SUBSTRATE COATING NONE FUEL # 6 TEST LOAD 38 klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ inH_2O, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME 1645

GAS METER END 1006.0064 CF START TIME 1600

GAS METER START 988.8013 CF DURATION 45 MIN

GAS VOLUME 17.2051 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. 395 °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

	Stage Number 1	2	3	4	5	6		Stage Blank
Foil + Sample, g	.7647	.7466	.7519	.7549	.7503	.7624		.7668
Unused Foil, g	.7592	.7489	.7509	.7484	.7504	.7669		
Sample, g	.0055	—	.0010	.0065	—	—		0
Correction for Blank, g	0	0	0	0	0	0		
Final Sample, g								

FILTER NO.	Sample	Blank
FILTER + SAMPLE, g	.1619	.1320
FILTER TARE, g	.1361	1320
SAMPLE, g	.0251	0
CORRECTION FOR BLANK, g	0	
FINAL SAMPLE, g	.0251	

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

60-20

PLANT 38
LOCATION 38
OPERATOR RP
DATE 5-20-76
RUN NO. 203-26A
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
IN 20"	1115		425	.35	1.0	7.0000	VACUUM PUMP BAD.			
	STOP 1116		—	—		7.5000				
	RESTART 1150		425	.35	4.0	8.3000	70	64	320	55
	1200		425	.35	4.0	17.2000	82	67	320	60
	1210		425	.35	4.0	27.6000	90	71	320	60
	1220		425	.35	4.0	38.1000	94	75	320	60
	1230		429	.35	4.0	49.5000	86	76	310	60
	1240		428	.35	4.0	60.9000	88	73	320	60
	1248		428	.35	4.0	68.8000	90	75	320	60
TOTAL							AVG.	AVG.		
AVERAGE							AVG.			

PARTICULATE CALCULATION SHEET

Test No. 203-26A Date 5-20-76 Location 38 Test Crew ____

Box No. ____ Sample Probe Position ____

Test Description

Dry Gas Meter Vol. (ft^3)

Final ____

Initial ____

Total ____

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	230	67	2	668.85	
Initial	100	100	0	654.25	
Δ Vol	130	-33	2	14.60	113.6

Beaker No.	7	5	6			Filter No. 3	Blank No. 4
Date Weighed							
Tare Wt. 1	102.4673	100.4803	100.0144			.6693	.6704
2	102.4674	100.4805	100.0148			.6694	.6706
3							
4							
5							
6							
Avg	102.4674	100.4804	100.0146			.6694	.6705
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)							
Date Weighed or 250 Bake							
Final Wt. 250 1	102.5500	100.4963	100.0706			.8276	.6706
2	102.5503	100.4963	100.0708			.8278	.6705
3	102.5505	100.4964	100.0710			.8279	
4							
5							
6							
Avg	102.5503	100.4963	100.0708			.8278	.6706
Residue wt Final 250-Tare	.0829	.0159	.0562			.1584	0
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 203-26A Date 5-20-76 Location 38 Engr. ______

Unit No. ______ Fuel ______ Sampling Train and Method ______

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 29.72 in. Hg

Tot. Liquid Collected, V_{1c} 113.6 ml Total Particulate, M_n 313.4 m gm

Velocity Head, ΔP .35 iwg Stack Temp., Ts 886 °R Stack Area, As 7.47 ft^2

Sample Volume, Vm 61 ft^3 Stack Press., Psg 0.09 iwg Excess O_2, XO_2% 3.3 %

Orifice Press. Diff., H 4.0 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 59 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m ______ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	61.15	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	5.38	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.0809	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0789	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.13×10^{-5}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	1.81×10^{-1}	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	404.2	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	2551	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	11,132	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	10,231	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	6.936	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	118.8	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	1.22×10^{-1}	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	5.26×10^{1}	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	97.0	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR R.P.
DATE 5-20-76
RUN NO. 203-26-B
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN. 72"
NOZZLE DIAMETER, IN. 3/8"
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
IN 20"	1600		434	.35	4.0	70.6056	81	78	320	60
	1610		435	.35	4.0	81.6000	98	80	320	60
	1620		446	.35	4.0	94.4000	105	84	320	60
	1630		447	.35	4.0	109.3000	106	86	320	60
	1640		442	.35	4.0	115.0000	104	86	320	60
	1650		443	.35	4.0	127.3000	108	87	250	60
	1655					131.6056				
TOTAL	55					61.0000		AVG.	AVG.	
AVERAGE								AVG.		

PARTICULATE CALCULATION SHEET

Test Crew

Test No. 203-26B Date 5-20-76 Location 38

Box No. Sample Probe Position

Test Description

Dry Gas Meter Vol. (ft³)

Final

Initial

Total

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	197	105	3	619.52	
Initial	100	100	0	605.50	
Δ Vol	97	5	3	14.02	119.02

Beaker No. 10	8	9			Filter No. 4	Blank No. 5
Date Weighed						
Tare Wt. 1 103.1676	99.2092	98.8323			.6706	.5803
2 103.1676	99.2094	98.8323			.6705	.5804
3						
4						
5						
6						
Avg 103.1676	99.2093	98.8323			.6706	.5804
Bottle No.						
Content Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)						
Date Weighed or 250 Bake						
Final Wt. 250 1 103.3000	99.2230	98.8760			.8501	.5802
2 103.3000	99.2231	98.8763			.8503	.5804
3 103.3002	99.2233	98.8764			.8506	
4						
5						
6						
Avg 103.3001	99.2232	98.8762			.8503	.5803
Residue wt Final 250-Tare .1325	.0139	.0439			.1797	0
Date Weighed or 650 Bake						
Final Wt. 650 1						
2						
3						
4						
5						
6						
Avg						
Residue Wt Final 650-Tare						

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 203-26B Date 5-20-76 Location 38 Engr. ______

Unit No. ______ Fuel ______ Sampling Train and Method ______

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.72 in. Hg

Tot. Liquid Collected, V_{1c} 119.02 ml Total Particulate, M_n 370.0 m gm

Velocity Head, ΔP .35 iwg Stack Temp., Ts 901 °R Stack Area, As 7.47 ft^2

Sample Volume, Vm 61.0 ft^3 Stack Press., Psg .09 iwg Excess O_2, XO_2% 3.1 %

Orifice Press. Diff., H 4.0 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 55 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m ______ °R

*1. Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	61.15	SCF
2. Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	5.64	SCF
3. Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	.084	N.D.
4. Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	.093	grains/DSCF
	b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.33×10^{-5}	lb/DSCF
	c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	2.14×10^{-1}	grams/DSCM
5. Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	404.3	in. w abs.
6. Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	2573	ft/min
7. Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	11,232	WSCF/min
	b. Qsd = Eq. 7a x (1. - Eq. 3)	10,288	DSCF/min
8. Material Flow	Ms = Eq. 7b x Eq. 4b x 60	8.21	lb/hr
9. XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	117.4	N.D.
10. Emission	a. E = Eq. 4b x Fe x Eq. 9	1.44×10^{-1}	lb/MMBtu
	b. E = Eq. 4c x Fm x Eq. 9 x 1000	62.2	ng/joule
11. % Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	105.3	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR RP
DATE 5-21-76
RUN NO. 203-27
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.6
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING
1 impinger ok

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
STACK,	1116		426	.35	.83	147.8084	91	90	—	60
EAST LOWER PORT	1126		427	.35	.83	152.7000	96	90	—	60
	1136		428	.35	.83	157.9000	96	90	—	65
	1146		427	.35	.83	162.9000	91	87		65
	1156		427	.35	.83	168.1000	89	84		65
	1201		427	.35	.83	170.8032	92	84		65
TOTAL								AVG.	AVG.	
AVERAGE	45 min		427	.35	.83	22.9948		AVG.		

Test No. 203-27

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 203-27 LOCATION 38 DATE MAY 21, 1976

IMPACTOR NO. ______ CYCLONE NO. NONE OPERATOR RP, ST

SAMPLE POINT LOCATION STACK EAST LOWER PORT

SUBSTRATE COATING GREASE FUEL ______ TEST LOAD ______ klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ inH_2O, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME ______

GAS METER END ______ CF START TIME ______

GAS METER START ______ CF DURATION 45 MIN

GAS VOLUME 22.9948 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. ______ °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

	Stage Number 1	2	3	4	5	6		Stage Blank
Foil + Sample, g	.7618	.7490	.7595	.7482	.7596	.7553		.7517
Unused Foil, g	.7609	.7466	.7563	.7461	.7590	.7548		.7518
Sample, g	.0009	.0024	.0032	.0021	.0006	.0005		0
Correction for Blank, g	0	0	0	0	0	0		
Final Sample, g	.0009	.0024	.0032	.0021	.0006	.0005		

FILTER NO.	4 Sample	5 Blank
FILTER + SAMPLE, g	.1616	.1343
FILTER TARE, g	.1323	.1343
SAMPLE, g	.0293	0
CORRECTION FOR BLANK, g	0	
FINAL SAMPLE, g	.0293	

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

60-20

PLANT 38
LOCATION 38
OPERATOR RP
DATE 5-24-76
RUN NO. 200-24
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @ .89

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

350

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
STACK EAST	1410		426	.48	5.4	182.2010	82	74	320	60
LOWER PORT	1425		425	.48	4.8	200.4000	93	76	320	75
STOP	1426		—	.45	—	201.4017	—	—	—	—
RESTART	1456		425	.45	4.8	201.9034	85	74	320	60
	1511		425	.45	4.6	219.6000	90	76	320	70
	1526		425	.45	4.5	238.0000	90	76	320	68
	1532					243.7027				
TOTAL	52					61.0000		AVG.	AVG.	
AVERAGE								AVG.		

PARTICULATE CALCULATION SHEET

Test No. 200-24 Date 5-24-76 Location 38 Test Crew

Box No. Sample Probe Position

Test Description

Dry Gas Meter Vol. (ft^3)

Final

Initial

Total 61.~~0000~~

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	167	115	3	656.62	
Initial	100	100	0	630.42	
Δ Vol	67	15	3	26.20	111.20

Beaker No.		13	11	12			Filter No. 5	Blank No. 6
Date Weighed								
Tare	1	99.4123	81.6736	101.3034			.5803	.5851
Wt.	2	99.4124	81.6736	101.3035			.5804	.5851
	3							
	4							
	5							
	6							
	Avg	99.4124	81.6736	101.3035			.5804	.5851
Bottle No.								
Content		Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)								
Date Weighed or 250 Bake								
Final	1	99.5923	81.6831	101.3686			.7282	.5850
Wt. 250	2	99.5925	81.6831	101.3689			.7284	.5851
	3	99.5926		101.3700			.7286	
	4							
	5							
	6							
	Avg	99.5925	81.6831	101.3688			.7284	.5851
Residue wt Final 250-Tare		.1801	.0095	.0633			.1480	0
Date Weighed or 650 Bake								
Final	1							
Wt. 650	2							
	3							
	4							
	5							
	6							
	Avg							
Residue Wt Final 650-Tare								

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 200-24 Date 5-24-76 Location ____ Engr. ____

Unit No. ____ Fuel ____ Sampling Train and Method ____

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.75 in. Hg

Tot. Liquid Collected, V_{lc} 111.20 ml Total Particulate, M_n 400.9 m gm

Velocity Head, ΔP .45 iwg Stack Temp., Ts 885 °R Stack Area, As 7.47 ft^2

Sample Volume, Vm 61.0 ft^3 Stack Press., Psg .09 iwg Excess O_2, XO_2% 2.9 %

Orifice Press. Diff., H 4.8 iwg Stack Gas Sp. Gravity, Gs ____ n.d.

Sample Time, θ 52 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m ____ °R

*1. Sample Gas Volume		$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	61.33	SCF
2. Water Vapor		$Vw_{std} = 0.0474\ V_{lc}$	5.27	SCF
3. Moisture Content		Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.079	N.D.
4. Concentration	a.	$C = 0.0154\ Mn/Vm_{std}$	0.101	grains/DSCF
	b.	$C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.44×10^{-5}	lb/DSCF
	c.	$C = \text{Eq. 4b} \times 16.018 \times 10^3$	2.31×10^{-1}	grams/DSCM
5. Abs. Stack Press.		$Ps = P_{bar} \times 13.6 + Psg$	404.7	in. w abs.
6. Stack Gas Speed		$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	2890	ft/min
7. Stack Gas Flow Rate @ 70°F	a.	$Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	12,857	WSCF/min
	b.	Qsd = Eq. 7a x (1. - Eq. 3)	11,841	DSCF/min
8. Material Flow		Ms = Eq. 7b x Eq. 4b x 60	10.23	lb/hr
9. XO_2 factor		$XO_2f = 2090/(20.9 - XO_2\%)$	116.1	N.D.
10. Emission	a.	E = Eq. 4b x Fe x Eq. 9	0.154	lb/MMBtu
	b.	E = Eq. 4c x Fm x Eq. 9 x 1000	66.38	ng/joule
11. % Isokinetic		$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	97.0	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR R.P.
DATE 5-24-76
RUN NO. 200-24
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4"
PROBE HEATER SETTING

IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter Outlet (T_{mout}) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
EAST PORT	1647		435	.45	.68	261.0000	78	75		55
LOWER	1657		442	.45	.68	265.5000	79	74		55
	1707		442	.45	.68	270.0000	79	74		55
	1717		442	.45	.68	274.1000	78	74		55
	1727		442	.45	.68	278.9000	79	75		60
	1732		442			281.3058	82	76		60
TOTAL	45					20.3058		AVG.	AVG.	
AVERAGE								AVG.		

Test No. 200-24

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 200-24 LOCATION 38 DATE 5-24-76

IMPACTOR NO. ______ CYCLONE NO. NONE OPERATOR R.P. Sr.

SAMPLE POINT LOCATION LOWER EAST PORT (STACK)

SUBSTRATE COATING NONE FUEL ______ TEST LOAD ______ klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ inH_2O, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME ______

GAS METER END ______ CF START TIME ______

GAS METER START ______ CF DURATION 45 MIN

GAS VOLUME 20.3058 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. ______ °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

	Stage Number							Stage Blank
	1	2	3	4	5	6		
Foil + Sample, g	.7451	.7432	.7492	.7482	.7410	.7493		.7516
Unused Foil, g	.7447	.7427	.7485	.7467	.7401	.7487		.7516
Sample, g	.0004	.0005	.0007	.0015	.0009	.0006		0
Correction for Blank, g	0	0	0	0	0	0		
Final Sample, g	.0004	.0005	.0007	.0015	.0009	.0006		

FILTER NO.	5 Sample	6 Blank
FILTER + SAMPLE, g	.1591	.1375
FILTER TARE, g	.1343	.1375
SAMPLE, g	.0248	0
CORRECTION FOR BLANK, g	0	
FINAL SAMPLE, g	.0248	

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

PLANT 38
LOCATION 38
OPERATOR
DATE 5-25-76
RUN NO. 201-12
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
LOWER EAST STACK	1100		426	.31	3.5	324.6025	90	82	320	50
	1110		426	.31	3.5	334.2000	110	87	320	50
	1120		426	.31	3.5	345.2000	112	90	320	70
	1130		427	.31	3.5	354.6000	112	90	320	70
	1140		428	.31	3.5	364.9000	117	92	320	70
	1150		428	.31	3.5	375.2000	117	92	320	70
	1159		428	.31	3.5	385.6025	114	92	320	70
TOTAL	59					61.0000		AVG.	AVG.	
AVERAGE								AVG.		

355

PARTICULATE CALCULATION SHEET

Test Crew ______________

Test No. 201-12 Date 5-25-76 Location ______________

Box No. ______________ Sample Probe Position ______________

Test Description

Dry Gas Meter Vol. (ft^3)

Final ______

Initial ______

Total ______

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	172	130	3	689.82	
Initial	100	100	0	669.00	
Δ Vol	72	30	3	20.82	125.82

Beaker No.		17	14	15			Filter No. 6	Blank No. 7
Date Weighed								
Tare Wt.	1	85.9074	84.6185	77.4904			.5851	.5849
	2	85.9078	84.6184	77.4904			.5851	.5849
	3							
	4							
	5							
	6							
	Avg	85.9076	84.6185	77.4904			.5851	.5849
Bottle No.								
Content		Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)								
Date Weighed or 250 Bake								
Final Wt. 250	1	85.9681	84.6451	77.5356			.7620	.5849
	2	85.9683	84.6451	77.5357			.7621	.5849
	3	85.9684					.7624	
	4							
	5							
	6							
	Avg	85.9683	84.6451	77.5357			.7622	.5849
Residue wt Final 250-Tare			.0266	.0453			.1771	0
Date Weighed or 650 Bake								
Final Wt. 650	1							
	2							
	3							
	4							
	5							
	6							
	Avg							
Residue Wt Final 650-Tare								

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 201-12 Date 5-25-76 Location ____ Engr. ____

Unit No. ____ Fuel ____ Sampling Train and Method ____

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.93 in. Hg

Tot. Liquid Collected, V_{1c} 125.82 ml Total Particulate, M_n 309.7 m gm

Velocity Head, ΔP .31 iwg Stack Temp., Ts 887 °R Stack Area, As 7.47 ft^2

Sample Volume, Vm 61.0 ft^3 Stack Press., Psg 0.09 iwg Excess O_2, XO_2% 1.55 %

Orifice Press. Diff., H 3.5 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 59 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m ____ °R

*1.	Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	61.50	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	5.96	SCF
3.	Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.088	N.D.
4.	Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0776	grains/DSCF
		b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.11×10^{-5}	lb/DSCF
		c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	.1779	grams/DSCM
5.	Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	407.1	in. w abs.
6.	Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	2394	ft/min
7.	Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	10,690	WSCF/min
		b. Qsd = Eq. 7a x (1. - Eq. 3)	9,750	DSCF/min
8.	Material Flow	Ms = Eq. 7b x Eq. 4b x 60	6.49	lb/hr
9.	XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	108.0	N.D.
10.	Emission	a. E = Eq. 4b x Fe x Eq. 9	0.110	lb/MMBtu
		b. E = Eq. 4c x Fm x Eq. 9 x 1000	47.6	ng/joule
11.	% Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	104.2	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR
DATE 5-25-76
RUN NO. 202-4
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e)Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
LOWER EAST	1515		550	.34	3.3	414.2005	68	67	320	50
STACK IN 20"	1525		550	.34	3.3	423.0000	74	67	320	50
	1535		550	.34	3.3	433.9000	75	67	320	50
	1545		550	.34	3.3	444.4000	77	67	320	50
	1555		550	.34	3.3	453.5000	77	67	320	50
	1605		550	.34	3.3	463.4000	78	67	320	50
	1618		550	.34	3.3	475.2005				
TOTAL						61.0		AVG.	AVG.	
AVERAGE								AVG.		

358

PARTICULATE CALCULATION SHEET

Test No. 202-4 Date 5-25-76 Location ________ Test Crew ________

Box No. ________ Sample Probe Position ________

Test Description

Dry Gas Meter Vol. (ft^3)

Final ________

Initial ________

Total ________

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	204	117	2	629.30	
Initial	100	100	0	614.62	
Δ Vol	104	17	2	14.68	137.68

Beaker No.	20	18	19			Filter No. 7	Blank No. 8
Date Weighed						.5849	.5770
Tare Wt. 1	102.0406	103.1827	86.5893			.5849	.5772
2	102 0408	103.1833	86.5894				
3							
4							
5							
6							
Avg	102.0407	103.1825	86.5894			.5849	.5771
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)							
Date Weighed or 250 Bake							
Final Wt. 250 1	102.1437	103.2023	86.6395			.7464	.5771
2	102.1440	103.2025	86.6396			.7464	.5771
3	102.1441	103.2024				.7466	
4							
5							
6							
Avg	102.1439	103.2024	86.6396			.7465	.5771
Residue wt Final 250-Tare	.1032	.0199	.0502			.1616	0
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 202-4 Date 5-25-76 Location 38 Engr.

Unit No. Fuel Sampling Train and Method

Pitot Factor, Fs .83 Barometric Pressure, P_{bar} 29.93 in. Hg

Tot. Liquid Collected, V_{1c} 137.68 ml Total Particulate, M_n 334.9 m gm

Velocity Head, ΔP .34 iwg Stack Temp., Ts 1010 °R Stack Area, As 7.47 ft^2

Sample Volume, Vm 61.0 ft^3 Stack Press., Psg 0.09 iwg Excess O_2, XO_2% 2.6 %

Orifice Press. Diff., H 3.3 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 63 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m °R

*1.	Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	61.47	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	6.53	SCF
3.	Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.096	N.D.
4.	Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.084	grains/DSCF
		b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.20×10^{-5}	lb/DSCF
		c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	1.924×10^{-1}	grams/DSCM
5.	Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	407.1	in. w abs.
6.	Stack Gas Speed	$Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	2676	ft/min
7.	Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	10,490	WSCF/min
		b. Qsd = Eq. 7a x (1. - Eq. 3)	9,483	DSCF/min
8.	Material Flow	Ms = Eq. 7b x Eq. 4b x 60	6.83	lb/hr
9.	XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	114.2	N.D.
10.	Emission	a. E = Eq. 4b x Fe x Eq. 9	.126	lb/MMBtu
		b. E = Eq. 4c x Fm x Eq. 9 x 1000	54.38	ng/joule
11.	% Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	100.2	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR
DATE 5/26/76
RUN NO. 201-13
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING
IMPACTOR

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter Inlet $(T_{min.})$ °F	Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
LOWER EAST	1114		423	.32	.74	480.2024	67	64		50
STACK IN 20"	1124		422	.32	.74	485.2000	73	68		50
	1134		421	.32	.74	490.2000	76	71		50
	1144		421	.32	.74	494.8000	78	73		50
	1154		424	.32	.74	499.6000	76	73		50
	1159		424	.32	.74	502.3065	74	72		50
TOTAL								AVG.	AVG.	
AVERAGE						22.1041		AVG.		

Test No. 38

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 201-13 LOCATION 38 DATE MAY 26, 1976

IMPACTOR NO. ______ CYCLONE NO. NONE OPERATOR R. P. Sr.

SAMPLE POINT LOCATION STACK LOWER EAST PORT

SUBSTRATE COATING NONE FUEL ______ TEST LOAD ______ klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ inH_2O, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME ______

GAS METER END ______ CF START TIME ______

GAS METER START ______ CF DURATION 45 MIN.

GAS VOLUME 22.1041 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. ______ °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

	Stage Number 1	2	3	4	5	6		Stage Blank
Foil + Sample, g	.7511	.7652	.7637	.7466	.7480	.7523		.7595
Unused Foil, g	.7476	.7594	.7583	.7441	.7470	.7516		.7595
Sample, g	.0035	.0058	.0054	.0025	.0010	.0007		0
Correction for Blank, g	0	0	0	0	0	0		
Final Sample, g	.0035	.0058	.0054	.0025	.0010	.0007		

FILTER NO.	6 Sample	7 Blank
FILTER + SAMPLE, g	.1621	.1341
FILTER TARE, g	.1375	.1342
SAMPLE, g	.0246	0
CORRECTION FOR BLANK, g	0	
FINAL SAMPLE, g	.0246	

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

363

PLANT 38
LOCATION 38
OPERATOR
DATE 5-26-76
RUN NO. 202-5
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING

IMPACTOR

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F	Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
EAST LOWER	1600		530	.30	.6	724.7019	85	82		50
STACK IN 20"	1610		538	.30	.6	729.3000	80	80		50
	1620		542	.30	.6	733.3000	81	79		55
	1630		542	.30	.6	737.5000	80	78		55
	1640		546	.30	.6	741.7000	80	77		55
	1645		547	.30	.6	744.0000	80	78		55
TOTAL	45 MIN							AVG.	AVG.	
AVERAGE						19.2981		AVG.		

Test No. 202-5

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 202-5 LOCATION 38 DATE 5-26-76

IMPACTOR NO. 1 CYCLONE NO. NONE OPERATOR R.P. Sr.

SAMPLE POINT LOCATION LOWER PORT STACK EAST

SUBSTRATE COATING NONE FUEL ______ TEST LOAD ______ klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ inH_2O, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME ______

GAS METER END ______ CF START TIME ______

GAS METER START ______ CF DURATION 45 MIN.

GAS VOLUME 19.2981 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. ______ °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

	Stage Number							Stage Blank
	1	2	3	4	5	6		
Foil + Sample, g	.7417	.7543	.7408	.7583	.7453	.7384		.7595
Unused Foil, g	.7404	.7516	.7397	.7571	.7448	.7380		.7595
Sample, g	.0013	.0027	.0011	.0012	.0005	.0004		0
Correction for Blank, g	0	0	0	0	0	0		
Final Sample, g	.0013	.0027	.0011	.0012	.0005	.0004		

FILTER NO.	7 Sample	8 Blank
FILTER + SAMPLE, g	.1607	.1350
FILTER TARE, g	.1342	.1350
SAMPLE, g	.0265	0
CORRECTION FOR BLANK, g	0	
FINAL SAMPLE, g	.0265	

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

60-20

PLANT 38
LOCATION 38
OPERATOR
DATE 5-27-76
RUN NO. 201-15
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

365

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F	Gas Sample Temperature at Dry Gas Meter: Outlet (T_{mout}) °F	Sample Box Temprtature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
LOWER EAST	1010		417	.31	3.6	825.2049	85	80	320	57
STACK W 20"	1020		422	.34	3.9	835.6000	94	83	320	55
	1030		422	.34	3.9	846.5000	97	85	320	55
	1040		422	.34	3.9	857.5000	104	89	320	55
	1050		426	.34	3.9	869.2000	102	91	320	60
	1100		428	.34	3.9	880.0000	98	90	320	60
	1107		428	.34	3.9	886.2049	97	90	320	60
TOTAL	57					61.0000		AVG.	AVG.	
AVERAGE								AVG.		

PARTICULATE CALCULATION SHEET

Test Crew ____________

Test No. 201-15 Date 5-27-76 Location ____________

Box No. ________ Sample Probe Position ____________

Test Description

Dry Gas Meter Vol. (ft^3)

Final ________

Initial ________

Total ________

Impinger Water Vol (ml)

	1	2	3	S. Gel	Total
Final	198	120	2	689.85	
Initial	100	100	0	671.80	
Δ Vol	98	20	2	18.05	138.05

Beaker No.	23	21	22			Filter No. 8	Blank No. 9
Date Weighed							
Tare Wt. 1	101.6364	84.6563	102.3461			.5770	.5642
2	101.6365	84.6555	102.3461			.5772	.5642
3							.5641
4							
5							
6							
Avg	101.6365	84.6559	102.3461			.5771	.5642
Bottle No.							
Content	Impinger (Water)	Probe (Acetone)	Probe (Water)	Cyclone (Acetone)	Flask (Dry)		
Rinse (ml)							
Date Weighed or 250 Bake							
Final Wt. 250 1	101.6690	84.6896	102.3868			.7554	.5641
2	101.6690	84.6897	102.3869			.7554	.5642
3	101.6692		102.3868			.7556	.5644
4							
5							
6							
Avg	101.6691	84.6897	102.3868			.7555	.5642
Residue wt Final 250-Tare	.0326	.0338	.0407			.1784	0
Date Weighed or 650 Bake							
Final Wt. 650 1							
2							
3							
4							
5							
6							
Avg							
Residue Wt Final 650-Tare							

Comments:

Data Sheet 6002-3

PARTICULATE EMISSION CALCULATIONS

Test No. 201-15 Date 5-27-76 Location ________ Engr. ________

Unit No. ________ Fuel ________ Sampling Train and Method ________

Pitot Factor, Fs 0.83 Barometric Pressure, P_{bar} 30.16 in. Hg

Tot. Liquid Collected, V_{1c} 138.05 ml Total Particulate, M_n 285.5 m gm

Velocity Head, ΔP .34 iwg Stack Temp., Ts 888 °R Stack Area, As 7.47 ft^2

Sample Volume, Vm 61.0 ft^3 Stack Press., Psg 0.09 iwg Excess O_2, XO_2% 1.6 %

Orifice Press. Diff., H 3.9 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 57 min Nozzle Dia., Dn 3/8 in. Meter Temp., T_m ________ °R

*1.	Sample Gas Volume	$Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$	62.03	SCF
2.	Water Vapor	$Vw_{std} = 0.0474\ V_{1c}$	6.54	SCF
3.	Moisture Content	Bwo = Eq. 2/(Eq. 1 + Eq. 2)	0.095	N.D.
4.	Concentration	a. $C = 0.0154\ Mn/Vm_{std}$	0.0708	grains/DSCF
		b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$	1.015×10^{-5}	lb/DSCF
		c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$	0.163	grams/DSCM
5.	Abs. Stack Press.	$Ps = P_{bar} \times 13.6 + Psg$	410.3	in. w abs.
6.	Stack Gas Speed	$Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$	2499	ft/min
7.	Stack Gas Flow Rate @ 70°F	a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$	11,231	WSCF/min
		b. Qsd = Eq. 7a x (1. - Eq. 3)	10,164	DSCF/min
8.	Material Flow	Ms = Eq. 7b x Eq. 4b x 60	6.190	lb/hr
9.	XO_2 factor	$XO_2f = 2090/(20.9 - XO_2\%)$	108.3	N.D.
10.	Emission	a. E = Eq. 4b x Fe x Eq. 9	0.101	lb/MMBtu
		b. E = Eq. 4c x Fm x Eq. 9 x 1000	43.7	ng/joule
11.	% Isokinetic	$I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$	104.3	%

	Oil	Gas	Coal
Fe SC Feet/10^4 Btu	92.2	87.4	98.2
Fm SC Meters/10^4 joules	0.002475	0.002346	0.002636

*Multiply Vm_{std} by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR
DATE 5-27-76
RUN NO. 203-28
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING

Traverse Point Number	Sampling Time (e) Min.	Static Pressure (P_s), In. Hg.	Stack Temperature (T_s) °F	Velocity Head (P_s)	Pressure Differential Across Orifice Meter (ΔH), In. H_2O	Gas Sample Volume (V_m) ft^3	Gas Sample Temperature at Dry Gas Meter		Sample Box Temperature °F	Temperature of Gas Leaving Condenser on Last Impinger °F
							Inlet ($T_{min.}$) °F	Outlet (T_{mout}) °F		
LOWER EAST	1400		450	.35	.78	918.7000	85	87		65
STACK IN 20"	1410		450	.35	.78	923.3000	86	86		60
	1420		450	.35	.78	928.3000	86	84		60
	1430		450	.35	.78	933.2000	86	83		60
	1440		449	.35	.78	938.3000	87	83		60
	1445		449	.35	.78	940.6068				
TOTAL	45					21.9068		AVG.	AVG.	
AVERAGE								AVG.		

Test No. 203-28

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 203-28 LOCATION 38 DATE 5-27-76

IMPACTOR NO. 1 CYCLONE NO. NONE OPERATOR R. P. Sr.

SAMPLE POINT LOCATION STACK LOWER EAST PORT

SUBSTRATE COATING NONE FUEL ______ TEST LOAD ______ klb/hr

IMPACTOR ORIENTATION ______ FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ inH_2O, VELOCITY ______

NOZZLE DIA. 1/4 INCH ~~mm~~ IMPACTOR PRESSURE DROP ______ END TIME ______

GAS METER END ______ CF START TIME ______

GAS METER START ______ CF DURATION 45 MIN.

GAS VOLUME 21.9068 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. ______ °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

	Stage Number							Stage Blank
	1	2	3	4	5	6		
Foil + Sample, g	.7364	.7405	.7602	.7521	.7472	.7358		.7595
Unused Foil, g	.7349	.7384	.7578	.7503	.7467	.7355		.7595
Sample, g	.0015	.0021	.0024	.0018	.0005	.0003		0
Correction for Blank, g	0	0	0	0	0	0		
Final Sample, g	.0015	.0021	.0024	.0018	.0005	.0003		

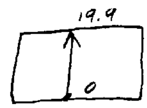
FILTER NO.	8 Sample	9 Blank
FILTER + SAMPLE, g	.1602	1334
FILTER TARE, g	.1350	.1335
SAMPLE, g	.0252	0
CORRECTION FOR BLANK, g	0	
FINAL SAMPLE, g	.0252	

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

60-20



BYPASS DUCT

VELOCITY TRAVERSE

Stack Cross Section

Project: ______________________ **Test Description:** ____

Date: 5/26/76

Location: 38

Unit: ______________________

Test: 202-5 **Personnel:** ____________

Fuel: ______________________

Barometric Press. (in. Hg): ______________________

Absolute Static Press. in Stack (in. Hg): ____________ (P_S)

Pitot Tube Coefficient: ______________________ (C_p)

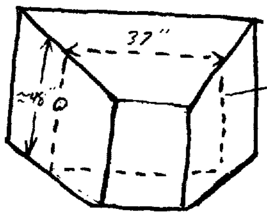
$$V_S = 85.48\, C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

NEAREST DOWNSTREAM DISTURBANCE: WINDBOX 1.2 FURNACE -.2

INLET TEMP · 76° FD SETTING 61° ID 84

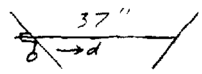
Time	Traverse Point Port	Depth	Velocity Head (in. H_2O) ΔP	Gas Temp. (°F)	Gas Temp. (°R) T_S	Molecular Wt. M_S	Velocity (ft/sec) V_S	O_2 Conc. (% Dry)
		0	1.1 1.2					
		1						
		2	1.3 1.3					
		4	1.2 1.2					
		6	0.9 .9					
		8	.85 .82					
		10	.85 .82					
		12	.82 .72					
		14	.71 .68					
		16	.76 .77					
		18	.80					
		18.5	.7					
		19.5	.48					

6002-13



SAMPLING PLANE

ED OUTLET



VELOCITY TRAVERSE

Project:

Date: 5/27/76

Location: 38

Unit:

Test: 201-15

Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):

Absolute Static Press. in Stack (in. Hg): (P_s)

Pitot Tube Coefficient: (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

201-15 87°   203-28 91°

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O) ΔP	Gas Temp. (°F)	Gas Temp. (°R) T_S	Molecular Wt. M_S	Velocity (ft/sec) V_S	O_2 Conc. (% Dry)
		0	.05	.025				
		2	.05					
		4	.05	.03				
		6	.05					
		8	.05	.04				
		10	.05					
		12	.05	.025				
		14	.05					
		16	.05	.03				
		18	.05	.02-	.03			
		20	.05	.03				
		22	.05					
		24	.05	.025				
		26	.05					
		28	.05	.015-.025				
		30	.05					
		32	.05	.02-.03	.015-.03			
		34	.05					
		36.	.05					

6002-13

VELOCITY TRAVERSE

Project: ______________ Test Description: ______

Date: ______________

Location: 38

Unit: ______________

Test: 203-28 Personnel: ______________

Fuel: ______________

Barometric Press. (in. Hg): ______________

Absolute Static Press. in Stack (in. Hg): ______________ (P_s)

Pitot Tube Coefficient: ______________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

$T_{16} = 100\,°F$

Stack Cross Section

SCR DUCTS

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			#17 ΔP	#18		T_S	M_S	V_S	
		.4	.19 .18	.14 .16					
		1.5	.21 .21	.17 .18					
		3.0	.21 .21	.19 .19					
		7.0	.21 .20	.18 .18					
		8.5	.21 .20	.16 .16					
		9.1	.15	.14 .14					
		Avg ΔP	.195	.166					

6002-13

VELOCITY TRAVERSE

Project: ____________ Test Description: ____

Date: 6/3/76

Location: 38

Unit: ____________

Test: 204-2 Personnel: ____________

Fuel: ____________

Barometric Press. (in. Hg): ____________

Absolute Static Press. in Stack (in. Hg): ____________ (P_s)

Pitot Tube Coefficient: ____________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			=19 ΔP =17		T_S	M_S	V_S	
		.4	.24 .18					
		1.5	.25 .20					
		3.0	.26 .20					
		7	.23 .20					
		8.5	.21 .20					
		9.1	.17 .13					
		AVG.	.227 .27					

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 6/3/76

Location: 38

Unit: ______

Test: 204-3 Personnel: ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_s)

Pitot Tube Coefficient: ______ (C_p)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			#18 ΔP	#17		T_S	M_S	V_S	
		.4	.17	.13					
		1.5	.18	.15					
		3.0	.19	.17					
		7	.17	.16					
		8.5	.17	.15					
		9.1	.15	.09					
		AVG.	.172	.142					

6002-13

VELOCITY TRAVERSE

Project: ______ **Test Description:** ______

Date: 6/3/76

Location: ______

Unit: ______

Test: 204-6 **Personnel:** ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_S)

Pitot Tube Coefficient: ______ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Port	Point Depth	Velocity Head (in. H_2O) 1st ΔP	2nd	Gas Temp. (°F)	Gas Temp. (°R) T_S	Molecular Wt. M_S	Velocity (ft/sec) V_S	O_2 Conc. (% Dry)
		1	.61	.45					
		3	.47	.36					
		5	.39	.32					
		7	.35	.30					
		9	.34	.27					
		11	.35	.25					
		13	.31	.23					
		15	.20	.18					
		17	.26	.27					
		19	.26	.30					
		21	.26	.33					
		23	.3	.34					
		25	.28	.35					
		27	.28	.34					
		29	.23	.33					
		31	.21	.22					

6002-13

VELOCITY TRAVERSE

Project: ____

Date: 6-4-76

Location: 38

Unit: ____

Test: 204-7

Fuel: ____

Test Description: ____

Personnel: ____

Barometric Press. (in. Hg): ____

Absolute Static Press. in Stack (in. Hg): ____ (P_s)

Pitot Tube Coefficient: ____ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

SCA

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			18 ΔP	17		T_S	M_S	V_S	
		.4	.19	.19					
		1.5	.23	.21					
		3.0	.24	.22					
		7.0	.21	.21					
		8.5	.19	.21					
		9.4	.17	.16					
		AVG.	.205	.20					

6002-13

VELOCITY TRAVERSE

Project: ____________ Test Description: ____

Date: 6/4/76

Location: 38

Unit: ____________

Test: 2016-8 Personnel: ____________

Fuel: ____________

Barometric Press. (in. Hg): ____________

Absolute Static Press. in Stack (in. Hg): 5.2 (P_s)

Pitot Tube Coefficient: ____________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

FD

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			1 ΔP 2		T_S	M_S	V_S	
		1	.87 .59 .70	84.5				
		3	.80 .56 .65					
		5	.70 .50 .60					
		7	.61 .47 .52					
		9	.52 .45 .48					
		11	.48 .28 .47					
		13	.49 .35 .45					
		15	.46 .30 .28					
		17	.20 .37 .28					
		19	.40 .45 .38					
		21	.67 .50 .46					
		23	.56 .59 .48					
		25	.54 .70 .55					
		27	.54 .62					
		29	.62 .75					
		31	.67 .80					

6002-13

VELOCITY TRAVERSE

Project: ____________ Test Description: ____

Date: 6/7/77

Location: 38

Unit: ____________

Test: 204-11 Personnel: ____________

Fuel: ____________

Barometric Press. (in. Hg): ____________

Absolute Static Press. in Stack (in. Hg): ____________ (P_S)

Pitot Tube Coefficient: ____________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

SCA

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			#17 ΔP #18		T_S	M_S	V_S	
		.4	.14 .19					
		1.5	.20 .21					
		3	.20 .23					
		7	.21 .22					
		8.5	.10 .21					
		9.1	.15 .20					

6002-13

VELOCITY TRAVERSE

Project:

Date: 6/7/76

Location: 78

Unit:

Test: 204-11

Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):

Absolute Static Press. in Stack (in. Hg): (P_s)

Pitot Tube Coefficient: (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

F D

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			(1) ΔP	(2)		T_S	M_S	V_S	
		1	.56	.40					
		5	.37	.33					
		9	.34	.30					
		13	.32	.25					
		17	.24	.30					
		21	.30	.34					
		25	.28	.32					
		29	.32	.35					
1"	FROM WALL	31"	.32	.34					

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 6/7/76

Location: 38

Unit: ______

Test: 204-13 Personnel: ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_s)

Pitot Tube Coefficient: ______ (C_p)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

SCA

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			#17 ΔP #18		T_s	M_s	V_s	
		.4	.07 .1					
		1.5	.1 .11					
		3	.1 .12					
		7	.09 .12					
		8.5	.1 .13					
		9.1	.08 .13					

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 6/7/76

Location: 38

Unit: ______

Test: 204-14 Personnel: ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_s)

Pitot Tube Coefficient: ______ (C_p)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

FD

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			1 ΔP	2		T_S	M_S	v_S	
		1	.52	.36					
		5	.39	.31					
		9	.31	.28					
		13	.28	.23					
		17	.23	.29					
		21	.27	.30					
		25	.28	.33					
		29	.21	.32					
1" FROM	WALL	31	.30	.33					

6002-13

VELOCITY TRAVERSE

Project: ____ Test Description: ____

Date: 6/7/76

Location: 38

Unit: ____

Test: 204-14 Personnel: ____

Fuel: ____

Barometric Press. (in. Hg): ____

Absolute Static Press. in Stack (in. Hg): ____ (P_s)

Pitot Tube Coefficient: ____ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

SCA

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			#17 ΔP #18		T_S	M_S	V_S	
		.4	.06 .08					
		1.5	.07 .09					
		3	.07 .10					
		7	.07 .09					
		8.5	.08 .10					
		9.1	.05 .09					

6002-13

VELOCITY TRAVERSE

Project: ______________ **Test Description:** ______________

Date: 6/7/76

Location: ______________

Unit: ______________

Test: 204-15 **Personnel:** ______________

Fuel: ______________

Barometric Press. (in. Hg): ______________

Absolute Static Press. in Stack (in. Hg): ______________ (P_s)

Pitot Tube Coefficient: ______________ (C_p)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		~~Gas Temp. (°F)~~	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		in.	① ΔP	②		T_S	M_S	V_S	
		1	.69	.52	.51				
		5	.56	.39					
		9	.43	.36	.35				
		13	.35	.36					
	FD	17	.22	.36	.34				
		21	.29	.39					
		25	.31	.38	.35				
		29	.43	.49					
		31	.44	.46	.47				
			#7	#18					
		.4	.19	.14					
		1.5	.16	.17					
	SCA	3.0	.16	.19					
		7	.16	.17					
		8.5	.15	.16					
		9.1	.11	.14					

6002-13

VELOCITY TRAVERSE

Project: ____________________ Test Description: ___

Date: 6/7/76

Location: ____________________

Unit: ____________________

Test: 204-16

Personnel: ____________________

Fuel: ____________________

Barometric Press. (in. Hg): ____________________

Absolute Static Press. in Stack (in. Hg): __________ (P_B)

Pitot Tube Coefficient: ____________________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		in.	1 ΔP	2		T_S	M_S	V_S	
		1	.62	.46					
		5	.57	.38					
		9	.43	.32					
		13	.37	.32					
	FD	17	.29	.31					
		21	.30	.30					
		25	.22	.33					
		29	.26	.38					
		31	.32	.36					
			#7	#8					
		.4	.14						
		1.5	.16						
	SCA	3.0	.18						
		7	.17						
		8.5	.16						
		9.1	.13						

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 6/7/76

Location: ______

Unit: ______

Test: 204-17 Personnel: ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_S)

Pitot Tube Coefficient: ______ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
		in.	1 ΔP	2		T_S	M_S	V_S	
		1	.61	.38					
		5	.37	.30					
		9	.31	.27					
		13	.30	.26					
	FD	17	.24	.26					
		21	.26	.32					
		25	.25	.33					
		29	.23	.27					
		31	.23	.25					
			#17						
		.4	.13						
		1.5	.16						
	SCA	3.0	.18						
		7	.18						
		8.5	.17						
		9.1	.13						

6002-13

VELOCITY TRAVERSE

Project: ____________________ Test Description: ____

Date: 6/8/76

Location: ____________________

Unit: ____________________

Test: 205-6 Personnel: __________

Fuel: ____________________

Barometric Press. (in. Hg): ____________________

Absolute Static Press. in Stack (in. Hg): __________ (P_s)

Pitot Tube Coefficient: ____________________ (C_p)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

BYPASS DUCT FULL OPEN

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_s	M_s	V_s	
		1	1.5					
		3	1.6					
		5	1.5					
		7	1.2					
		9	1.1					
		11	.92					
		13	.72					
		15	.65					
		17	.83					
		18	.90					

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 6/8/76

Location: ______

Unit: ______

Test: 205-7 Personnel: ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_s)

Pitot Tube Coefficient: ______ (C_p)

Stack Cross Section

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

½ BYPASS

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_s	M_s	V_s	
		1	0					
		3	0					
		5	0					
		7	0					
		9	.06					
		11	.3					
		13	.75					
		15	1.3					
		17	1.7					
		18	1.8					

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 6/8/76

Location: ______

Unit: ______

Test: 205/4-8 Personnel: ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_s)

Pitot Tube Coefficient: ______ (C_p)

$$V_S = 85.48\ C_P \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			ΔP		T_S	M_S	V_S	
		1	0					
		3	0					
		5	0					
		7	0					
		9	.04					
		11	.22					
		13	.53					
		15	0.95					
		17	1.2					
		18	1.3					

6002-13

VELOCITY TRAVERSE

Project: ______

Date: 6/8'76

Location: ______

Unit: ______

Test: 205/4-8

Fuel: ______

Test Description: ______

Personnel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_s)

Pitot Tube Coefficient: ______ (C_p)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)		Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			#17 ΔP	#18		T_S	M_S	V_S	
		.4	.13	.16					
		1.5	.16	.21					
		3	.16	.21					
		7	.16	.18					
		8.5	.15	.18					
		9.1	.11	.16					

6002-13

VELOCITY TRAVERSE

Project: ______ **Test Description:** ______

Date: 6-9-76

Location: ______

Unit: ______

Test: 2006-15 **Personnel:** ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ (P_S)

Pitot Tube Coefficient: ______ (C_P)

$$V_S = 85.48\ C_P \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O) ① ΔP	②	Gas Temp. (°F)	Gas Temp. (°R) T_S	Molecular Wt. M_S	Velocity (ft/sec) V_S	O_2 Conc. (% Dry)
		1	.85	.48					
		5	.70	.50					
		9	.53	.45					
		13	.43	.44					
		17	.30	.27					
		21	.59	.40					
		25	.63	.48					
		29	.75	.58					
		32	.77	.70					

6002-13

VELOCITY TRAVERSE

Project: ____________ Test Description: ____________

Date: 6/10/76

Location: ____________

Unit: ____________

Test: 204-21 Personnel: ____________

Fuel: ____________

Barometric Press. (in. Hg): ____________

Absolute Static Press. in Stack (in. Hg): ____________ (P_s)

Pitot Tube Coefficient: ____________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Traverse Point Depth	Velocity Head (in. H_2O) #17 ΔP	#18	Gas Temp. (°F)	Gas Temp. (°R) T_S	Molecular Wt. M_S	Velocity (ft/sec) V_S	O_2 Conc. (% Dry)
		.4	.19	.20					
		1.5	.22	.23					
		3.0	.23	.25					
		7.0	.23	.24					
		8.5	.23	.22					
		9.6	.15	.20					

6002-13

VELOCITY TRAVERSE

Project:______________ Test Description:___

Date: 6/10/76

Location:______________

Unit:______________

Test: 204-22 Personnel:__________

Fuel:______________

Barometric Press. (in. Hg):______________

Absolute Static Press. in Stack (in. Hg):__________ (P_s)

Pitot Tube Coefficient:______________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O) #17 ΔP	#18	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
						T_S	M_S	V_S	
		.4	.18	.21					
		1.5	.24	.24					
		3.0	.25	.26					
		7.0	.25	.25					
		8.5	.24	.24					
		9.6	.19	.22					
			1	2					
		1"	.61	.47					
		5	.42	.36					
		9	.36	.31					
		13	.33	.30					
	FD	17	.22	.32					
		21	.27	.34					
		25	.30	.37					
		29	.32	.21					
		33	.33	.38					

6002-13

VELOCITY TRAVERSE

Project: ____________________ Test Description: ____

Date: 6/10/76

Location: ____________________

Unit: ____________________

Test: 204-25 Personnel: ____________

Fuel: ____________________

Barometric Press. (in. Hg): ____________________

Absolute Static Press. in Stack (in. Hg): ____________ (P_S)

Pitot Tube Coefficient: ____________________ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			#17 ΔP #19		T_S	M_S	V_S	
		.4	.34 .44					
		1.5	.47 .49					
		3.0	.51 .54					
		7.0	.50 .52					
		8.5	.45 .47					
		9.6	.34 .39					
		1"	.55					
		3"	.61					
		5	.63					
		7	.59					
	BYPASS DUCT	9	.67					
		11	.66					
		13	.59					
		15	.59					
		17	.70					
		18	.67					

6002-13

VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 6/10/76

Location: ______

Unit: ______

Test: 204/5-29 Personnel: ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): 2.1 (P_S)

Pitot Tube Coefficient: ______ (C_p)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

Time	Traverse Point Port	Depth	Velocity Head (in. H_2O)	Gas Temp. (°F)	Gas Temp. (°R)	Molecular Wt.	Velocity (ft/sec)	O_2 Conc. (% Dry)
			#17 ΔP #18		T_S	M_S	V_S	
			.39 .41	95°				
			.47 .47					
			.48 .48					
			.48 .48					
			.45 .44					
			.33 .40					
	BYPASS DUCT	1	.56					
		3	.61					
		5	.60					
		7	.56					
		9	.61					
		11	.64					
		13	.65					
		15	.60					
		17	.66					
		18	.67					

6002-13

STAGED COMBUSTION AIR FLOW DATA

KVB

Test No.__________

Test No. 203-26 Date 5/20/76 Test Type __________

Boiler No. _____ Location No. 38 Capacity _____ 10^3 lb/hr Burner Type __________

Test Fuel No 6 Test Load _____ 10^3 lb/hr

P_∞ 29.720"

PITOT TRAVERSE @ 11.45 5/27

Test No.	203-26		DIST INTO DUCT	TEST 17	POINT	TEST 18	POINT				203 -28	
Windbox °F/iwg			.4"	.16 .15	AVG. .155	.18 .21	.21 .20	AVG .205				
T_1/P_1			1.5	.16 .17	.165	.18 .23	.24 .23	.23				
T_2/P_2			3.0	.18 .18	.18	.19 .24	.23 .29	.23				
T_3/P_3			7.0	.18 .17	.175	.20 .23	.24 .24	.23				
T_4/P_4			8.5	.16 .16	.16	.19 .23	.21 .22	.22				
Furnace °F/iwg			9.1	.13 .12	.125	.15 .17	.13 .18	.16				
		AVEC.			.16			.213				
SC Ports °F/iwg												
T_6/P_6												
T_7/P_7												
T_8/P_8												
T_9/P_9												
T_{10}/P_{10}												
T_{11}/P_{11}												
T_{12}/P_{12}												
T_{13}/P_{13}												
T_{14}/P_{14} iwg	15										15	
T_{15}/P_{15}	14										14	
T_{16}/P_{16}	103										100	
T_{17}/P_{17}	102											
T_{18}/P_{18}												
T_{19}/P_{19}												
T_{20}/P_{20}												

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

KVB

Test No.____________

Test No. 203-27 Date 5/21/76 Test Type____________

Boiler No. ______ Location No. ______ Capacity ______ 10^3 lb/hr Burner Type__________

Test Fuel No 6 Test Load________ 10^3 lb/hr

Test No.	POINT ΔP	# 17		# 13 ΔP								
Windbox °F/iwg .4"	.11	.12	.115	.16	.15	.155						
T_1/P_1 1.5	.15	.16	.155	.17	.17	.17						
T_2/P_2 3	.15	.16	.155	.18	.18	.18						
T_3/P_3 7	.16	.15	.155	.19	.18	.185						
T_4/P_4 8.5	.14	.14	.14	.14	.16	.15						
Furnace °F/iwg 9.1	.08	.10	.09	.13	.12	.125						
AVG.			.135			.161						
SC Ports °F/iwg												
T_6/P_6												
T_7/P_7 P_∞ 29.60"												
T_8/P_8 CONTROL RM.												
T_9/P_9 T DRY 83												
T_{10}/P_{10} WET 68												
T_{11}/P_{11} R.H. 50												
T_{12}/P_{12}												
T_{13}/P_{13}												
T_{14}/P_{14}												
T_{15}/P_{15}												
T_{16}/P_{16}												
T_{17}/P_{17}												
T_{18}/P_{18}												
T_{19}/P_{19}												
T_{20}/P_{20}												

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

KVB

Test No. 204-

Test No. 204-2 Date 6/3/76, 6/4 Test Type ______

Boiler No. ______ Location No. ______ Capacity 45 10^3 lb/hr Burner Type R-VG

Test Fuel N. GAS Test Load 38 10^3 lb/hr

Test No.	204-1	204-2	204.3	204-4	204-5	204-6	204-7					
Windbox °F/iwg												
T_1/P_1												
T_2/P_2												
T_3/P_3												
T_4/P_4												
Furnace °F/iwg												
SC Ports °F/iwg												
T_6/P_6					15.5		15.5					
T_7/P_7					100 15		100 14.5					
T_8/P_8				/15								
T_9/P_9				100/15.5								
T_{10}/P_{10}			/17									
T_{11}/P_{11}			102/15									
T_{12}/P_{12}		92/15										
T_{13}/P_{13}		15										
T_{14}/P_{14}												
T_{15}/P_{15}												
T_{16}/P_{16}		96/21	104/21	/21			102/21					
T_{17}/P_{17}												
T_{18}/P_{18}												
T_{19}/P_{19}												
T_{20}/P_{20}												

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

KVB

Test No.__________

Test No. 204-10 Date 6/7/76 Test Type SCA

Boiler No. _____ Location No. 58 Capacity 45 10^3 lb/hr Burner Type FWG

Test Fuel N.G. Test Load _____ 10^3 lb/hr

Test No.		204-10	204-11	204-12	204-13	204-14	204-15	-16	-17			
Windbox °F/iwg												
T_1/P_1												
T_2/P_2												
T_3/P_3												
T_4/P_4												
Furnace °F/iwg												
SC Ports °F/iwg												
T_6/P_6					9.0	7.5	15.5	15.5	15.2			
T_7/P_7				15.0	8.9	7.0	15.0	15.0	14.9			
T_8/P_8			15.0									
T_9/P_9			15.0									
T_{10}/P_{10}												
T_{11}/P_{11}												
T_{12}/P_{12}												
T_{13}/P_{13}												
T_{14}/P_{14}		15.5										
T_{15}/P_{15}		13.5										
T_{16}/P_{16} °F/iwg		102/21	106		108	110	109	109	109			
T_{17}/P_{17}			20.8		12.2	10.0	20.5	20.7	20.5			
T_{18}/P_{18}												
T_{19}/P_{19}												
T_{20}/P_{20}												

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

KVB

Test No.__________

Test No. 204 8-26 Date 6/9-6/10/76 Test Type __________

Boiler No. ______ Location No. 38 Capacity ______ 10^3 lb/hr Burner Type ́ ́ ́ ́G

Test Fuel NAT. GAS Test Load ≈40 10^3 lb/hr

							6/10					
Test No.	205/4-8		204-18	204-19	204-20		204-21	204-22	-23	-24	-25	-26
Windbox °F/iwg												
T_1/P_1												
T_2/P_2												
T_3/P_3												
T_4/P_4												
Furnace °F/iwg												
SC Ports °F/iwg												
T_6/P_6	15.5											
T_7/P_7	14.9											
T_8/P_8												
T_9/P_9												
T_{10}/P_{10}												
T_{11}/P_{11}												
T_{12}/P_{12}							0.1	14.0		0	1.5	11.0
T_{13}/P_{13}							0.1	14.0		-0.1	1.5	11.0
T_{14}/P_{14}			15.2	15.5	15.4		15.0	0		15.0	14.0	12.0
T_{15}/P_{15}			13.2	13.2	13.2		12.8	0		13.0	12.3	10.0
T_{16}/P_{16}	114/20.5		112/	114/	114/		110/	110		117	118	116
T_{17}/P_{17}								19.8				
T_{18}/P_{18}	20.5		/20.4	20.4	20.4		19.9	19.8		20	19	16
T_{19}/P_{19}												
T_{20}/P_{20}												

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

KVB

Test No. ____________

Test No. ____________ Date 6/10/76 Test Type ____________

Boiler No. ______ Location No. 38 Capacity ______ 10^3 lb/hr Burner Type RING

Test Fuel NAT. GAS Test Load ≈40 10^3 lb/hr

	6/10												
Test No.	204/5 -27	204/5 -28	-29	-30	-31	-32							
Windbox °F/iwg													
T_1/P_1													
T_2/P_2													
T_3/P_3													
T_4/P_4													
Furnace °F/iwg													
SC Ports °F/iwg													
T_6/P_6 OPEN/	1/3 1		11.5		13								
T_7/P_7 "	1/3 2		10.8	~~12~~	12								
T_8/P_8													
T_9/P_9													
T_{10}/P_{10}													
T_{11}/P_{11}													
T_{12}/P_{12} 1/2	5												
T_{13}/P_{13} 1/2 OPEN	3												
T_{14}/P_{14} FULL	12	12.5	11.5		4								
T_{15}/P_{15} FULL OPEN	10	10.5	9.8		3.5								
T_{16}/P_{16}	115	112	111		110	110							
T_{17}/P_{17}													
T_{18}/P_{18}		16.0	15.0		17	19							
T_{19}/P_{19}													
T_{20}/P_{20}													

4/76
60-32

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-600/7-78-099b	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Emission Reduction on Two Industrial Boilers with Major Combustion Modifications (Data Supplement)		5. REPORT DATE December 1978
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) K.T.Fisher, J.J.Buening, W.A.Carter, and S.C.Hunter		8. PERFORMING ORGANIZATION REPORT NO. KVB 6004-734a
9. PERFORMING ORGANIZATION NAME AND ADDRESS KVB, Inc. 17332 Irvine Boulevard Tustin, California 92680		10. PROGRAM ELEMENT NO. EHE624A
		11. CONTRACT/GRANT NO. 68-02-2144
12. SPONSORING AGENCY NAME AND ADDRESS EPA, Office of Research and Development Industrial Environmental Research Laboratory Research Triangle Park, NC 27711		13. TYPE OF REPORT AND PERIOD COVERED Supplement; 1/76 - 1/78
		14. SPONSORING AGENCY CODE EPA/600/13

15. SUPPLEMENTARY NOTES IERL-RTP project officer is Robert E. Hall, Mail Drop 65, 919/541-2477. The supplement documents detailed test data reported in the final report, EPA-600/7-78-099a.

16. ABSTRACT The report provides raw data from a study of the effects on air pollutant emissions of extensive combustion modifications on two industrial boilers. The supplement is intended for researchers who wish to perform their own detailed calculations.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group	
Air Pollution	Particle Size	Air Pollution Control	13B	14B
Combustion	Flue Gases	Stationary Sources	21B	
Boilers	Circulation	Combustion Modification	13A	
Burners	Fuel Oil	Industrial Boilers		
Nitrogen Oxides	Natural Gas	Particulate; Excess Air	07B	
Smoke	Trace Elements	Staged Combustion		06A
Fossil Fuels	Organic Compounds	Trace Species	21D	07C

18. DISTRIBUTION STATEMENT Unlimited	19. SECURITY CLASS (This Report) Unclassified	21. NO. OF PAGES 411
	20. SECURITY CLASS (This page) Unclassified	22. PRICE

EPA Form 2220-1 (9-73)