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FIXED-BED GASIFICATION RESEARCH USING U.S. COALS, VOLUME 8 GASIFICATION OF RIVER KING ILLINOIS No. 6 BITUMINOUS COAL

Contract H0222001

Black, Sivalls, and Bryson, Incorporated

**BUREAU OF MINES
UNITED STATES DEPARTMENT OF THE INTERIOR**

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FOREWORD

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TABLE OF CONTENTS

	TABLES.....	6
	FIGURES.....	7
	INTRODUCTION.....	8
SECTION 1	TEST SUMMARY.....	9
SECTION 2	TEST OBJECTIVES	
2.1	Selection of Coal to be Tested.....	11
2.2	Test Objectives.....	11
2.3	Test Plan.....	11
SECTION 3	DESCRIPTION OF FUEL TESTED.....	14
SECTION 4	FACILITY DESCRIPTION	
4.1	Test Facility.....	18
4.2	Gas Sampling and Conditioning System....	20
4.3	Gas Analysis Equipment.....	20
SECTION 5	TEST PROCEDURES	
5.1	Test Teams.....	24
5.2	Gasifier Sampling and Data Acquisition Procedures.....	25
SECTION 6	CONDUCT OF TEST.....	27
SECTION 7	TEST RESULTS	
7.1	Data Summary	
7.1.1	Continuous Output Transducer Data.	32
7.1.2	Coal, Ash, and Dust Data.....	32
7.1.3	Gas Analysis Data.....	37
7.1.4	Tar and Water Yield Data.....	46
7.2	Material Balance and Thermal Efficiency Calculations.....	53
7.3	Grate Performance Model.....	53
7.4	Tar/oil Yield Correlations.....	69
7.5	Combustion Emissions Monitoring.....	69
7.6	Retort Particle Sampling.....	74
SECTION 8	CONCLUSIONS AND RECOMMENDATIONS.....	76
	REFERENCES.....	78
	APPENDICES.....	80

TABLES

- 1-1 Design Point Characteristics for Gasification of River King Illinois Bituminous #6 Coal

- 3-1 Average Analysis of River King Illinois #6 Coal
- 3-2 Characteristics of River King Illinois #6 Coal with Regard to the Coal Test Objective Matrix.

- 4-1 Principal Features of HP5880A Gas Chromatograph

- 7-1 Data Acquisition Gaps during BOM/FGT 007.
- 7-2 Summary of Coal, Ash, and Cyclone Dust Analyses Performed
- 7-3 Physical and Chemical Properties of Coal and Dust
- 7-4 Elemental Analyses of Moisture-free Ash
- 7-5 Operation Summary for Gas Sampling System
- 7-6 Condensed Material Analyses
- 7-7 Material Balance and Thermal Efficiency Calculation
+3/4 inch, 0.82 tn/hr, 150 F
- 7-8 Material Balance and Thermal Efficiency Calculation
+3/4 inch, 1.01 tn/hr, 148 F
- 7-9 Material Balance and Thermal Efficiency Calculation
+3/4 inch, 1.02 tn/hr, 145 F
- 7-10 Material Balance and Thermal Efficiency Calculation
+3/4 inch, 1.02 tn/hr, 142 F
- 7-11 Material Balance and Thermal Efficiency Calculation
+3/4 inch, 0.51 tn/hr, 147 F
- 7-12 Material Balance and Thermal Efficiency Calculation
+3/4 inch, 1.93 tn/hr, 148 F
- 7-13 Material Balance and Thermal Efficiency Calculation
+1/4 inch, 0.98 tn/hr, 144 F
- 7-14 Material Balance and Thermal Efficiency Calculation
+1/4 inch, 0.78 tn/hr, 142 F
- 7-15 Material Balance and Thermal Efficiency Calculation
+1/4 inch, 0.79 tn/hr, 141 F
- 7-16 Material Balance and Thermal Efficiency Calculation
+1/4 inch, 1.03 tn/hr, 141 F
- 7-17 Material Balance and Thermal Efficiency Calculation
+1/4 inch, 0.99 tn/hr, 147 F
- 7-18 Material Balance and Thermal Efficiency Calculation
+1/4 inch, 1.89 tn/hr, 144 F
- 7-19 Material Balance and Thermal Efficiency Calculation
+1/4 inch, 2.07 tn/hr, 143 F
- 7-20 Material Balance and Thermal Efficiency Calculation
+1/4 inch, 2.14 tn/hr, 145 F
- 7-21 Material Balance and Thermal Efficiency Calculation
River King Illinois #6 Overall Average

FIGURES

- 2-1 Proposed Test Plan, BOM/FGT 007
- 3-1 Location of River King Illinois #6 Mine
- 4-1 Coal Gasifier Process Flow Schematic, U.S. Bureau of Mines, Twin Cities Research Center.
- 4-2 Schematic Diagram of the Quench/ESP
- 4-3 Schematic Diagram of the Gas Sampling and Conditioning System
- 6-1 Test History, BOM/FGT-007
- 7-1 Physical Characteristics of the Gasifier Operation
- 7-2 Gasifier Response to Step Changes in Blast Air Flow
- 7-3 Feed Coal Size Distribution Analysis
- 7-4 Geometrical Mean Coal Particle Size
- 7-5 Average Particle Size Distribution of Feed Coal
- 7-6 Ash Size Distribution Analysis
- 7-7 Geometrical Mean Ash Particle Size
- 7-8 Ash Characteristics and Operating Conditions
- 7-9 Major Gas Species Measured by the Gas Chromatograph.
- 7-10 Minor Gas Species Measured by the Gas Chromatograph.
- 7-11 Dry Gas HHV, Major Gas Species and Gasifier Operational Parameters.
- 7-12 Tar/Oil Yield and Water Yield with Operating Conditions
- 7-13 Comparison of the Geometrical Grate Performance Model with Daily Average Ash Removal Rates.
- 7-14 Comparison of the Geometrical Grate Performance Model with Daily Average Ash Removal Rates.
- 7-15 Tar/oil Yield Comparison with Volatile Matter-Oxygen Correlation
- 7-16 Tar/oil Yield Comparison with Volatile BTU Correlation
- 7-17 Dust Carryover vs. Gas Face Velocity

INTRODUCTION

The United States Department of Interior, Bureau of Mines, Twin Cities Research Center, Minneapolis, Minnesota is the site of a 6.5 foot diameter Wellman-Galusha gasifier, installed in 1977-78. This gasifier, combustor/incinerator, and flue gas scrubber system in the past had been operated jointly by Bureau of Mines personnel, personnel from member companies of the Mining and Industrial Fuel Gas Group (MIFGa), and United States Department of Energy (DOE) personnel-consultants. Numerous tests using a variety of coals have to date been performed.

In May of 1982, Black, Sivalls & Bryson, Incorporated (BS&B) was awarded the contract to plan, execute, and report gasification test performance data from this small industrial fixed-bed gasification test facility. BS&B is responsible for program administration, test planning, test execution, and all documentation of program activities and test reports. The University of Minnesota, Particle Technology Laboratory (UMPTL) is subcontractor to BS&B to monitor process parameters, and provide analysis for material inputs and outputs.

This report is the eighth volume in a series of reports describing the fixed-bed gasification of U.S. coals at the Bureau of Mines, Twin Cities Research Center. This report covers the test period identified as BOM/FGT-007, gasification of River King Illinois #6 Bituminous Coal. The time period covered is July 28 - August 19, 1983.

Section 1 gives a brief summary of test. Section 2 identifies test objectives. Section 3 contains a description of the fuels. Sections 4 and 5 describe the facility and monitoring systems. Sections 6 and 7 describe the conduct and results of the tests. Section 8 presents conclusions. Test data is included in the Appendices.

SECTION 1

TEST SUMMARY

River King Illinois # 6 is a moderate-swelling, bituminous coal mined in large quantities in the Illinois basin. Its swelling properties are midway between other coals gasified previously as part of this program. The coal is a low-ash, medium-moisture, medium ash fusion temperature high-volatile C bituminous coal. The coal has been used in other fixed-bed gasification programs.

Testing of this coal involved gasification in a Wellman-Galusha gas producer and combustion of the hot, raw gas in a combustion chamber. The products of combustion were water quenched, cleaned of sulfur oxides and particles and exhausted.

A slipstream of the coal gas was cooled and cleaned of tar by a water quench and electrostatic precipitator. This equipment, however, encountered severe operating difficulties and was in operation only about 12 hours.

The coal gasified well during the test. Gas quality was fairly steady and very high throughputs were achieved. After 13 days of operation, dust blown out of the retort had accumulated in the downstream ductwork to a point that back pressure on the gasifier was excessive. The test was interrupted to allow the ductwork to burn out. The test was resumed five days later and continued for another 4 days. Table 1-1 gives design point data for gasification of this coal at a throughput of 2.07 tons/hour and a blast saturation temperature of 143 F (61.7 C).

The swelling properties of the coal are not great enough to cause problems which cannot be managed with the existing agitator design. An agitator is required, however, to manage coal agglomeration. Due to high throughputs achievable and high gas quality, the coal is recommended as a fixed-bed gasification feedstock on the basis of this test.

Table 1-1

Design Point Characteristics for Gasification
of River King Illinois #6 Bituminous Coal

Coal Throughput - 2.07 tons/hour (125 lb/hr/sq ft grate)		
Air/Coal	2.172	lb/lb
Steam/Coal	.371	lb/lb
Blast Saturation Temperature	143	deg F
Gas Offtake Temperature	902	deg F
Wet Gas/Coal	52.5	scf/lb
Gas Dewpoint	125	deg F
Tar Yield	13.7	lb/100lb coal
Tar Analysis		
HHV (dry)	15352	Btu/lb
Pourpoint	65	deg F
Viscosity (210 F)	122.	SUS
Specific Gravity (60/60 F)	1.1544	
Dry Gas Composition (mol%)		
Hydrogen	16.5	
Carbon Monoxide	23.7	
Methane	1.62	
Ethane	.183	
Ethylene	.171	
Propane	.050	
Propylene	.065	
Carbon Dioxide	7.22	
Nitrogen + Argon	49.5	
Water	6.94	lb/1000 dscf
Dry Gas HHV	160	Btu/dscf
Dry Gas LHV	149	Btu/dscf
Thermal Efficiencies		
Hot, Raw	92	%
Cold, with Tar	81	%
Cold, without Tar	63	%

SECTION 2

TEST OBJECTIVES

2.1 Selection of Coal for Testing

River King Illinois #6 coal is a moderate swelling Illinois basin bituminous coal mined in very large quantities. The coal has been used extensively in fixed-bed gasification research and testing conducted by others. Results from gasification of this coal under this program can be thus compared to these other results.

The coal has a moderate free swelling index ($FSI = 3 \frac{1}{2}$), somewhat lower than the Piney Tipple bituminous (Volume 7, Thimsen, Maurer et al, 1985) and somewhat higher than the Jetson bituminous (Volume 2, Thimsen, Maurer et al, 1985) coals tested earlier. The coal was selected to continue the effort to gauge the swelling characteristics of coals that make them acceptable or unacceptable as deep, fixed-bed gasification feedstocks.

2.2 Test Objectives

- A. Evaluate the suitability of a moderately agglomerating coal ($FSI = 3.5$) for gasification in a deep, fixed-bed gasifier with agitation.
- B. Determine gasifier performance (including throughput, conversion efficiency) gasifying this high-volatile C bituminous coal.
- C. Identify operational requirements for gasifying moderately swelling coals.
- D. Investigate the influence of coal bottom size on maximum throughput and conversion efficiency.
- E. Obtain detailed product yields for comparison with results obtained from other test programs that have gasified this coal.
- F. Evaluate a slip stream quench/ESP tar scrubber for gas cooling and tar removal.

2.3 Test Plan

The proposed test plan is given in Figure 2-1. Several load levels are shown along with various blast saturation temperatures. Agitator rate and vertical position are left to the facility manager's judgment based on observed operations, as were establishment of maximum throughput and minimum blast

Figure 2-1

Proposed Test Plan, BOM/FGT 007

saturation temperature.

The grate spacings were set at 5.5 inches each at the beginning of the test. Midway through the test the lower grate spacing was increased to 6 inches as described in Section 6.1.

SECTION 3

DESCRIPTION OF FUEL TESTED

The Illinois No. 6 bituminous coal gasified during BOM/FGT 007 came originally from the Peabody River King Mines in St. Clair County, Illinois. A map with the location of the mine is given in Figure 3-1. The coal was mined in 1982 and shipped by barge to Northern States Power Company (NSP) Highbridge Generating Plant in St. Paul, Minnesota. The coal was unloaded from the barge and spread on the pile. Movement of scrapers over the pile compacted the coal. The coal remained in uncovered storage for approximately 1 year.

For this test the coal was reclaimed from inventory, passed over a 3/4 inch screen at the NSP Highbridge plant, and trucked 7 miles to the test site during the period July 22 to August 8. Additional screening on site was done under water spray, which removed silty material that was attached to the coal lumps.

Table 3-1 shows an average analysis of the coal gasified during this test. Table 3-2 shows how this coal fits into the coal test objective matrix. The coal is a high-sulfur, high-volatile C bituminous coal with moderate swelling properties and ash fusion temperatures.

Figure 3-1

Location of River King Illinois #6 Mine

Table 3-1

Average Analysis of River King Illinois #6 Coal

Proximate Analysis (%)

Volatile Matter	35.30
Fixed Carbon	45.06
Ash	9.34
Moisture	10.30

Sulfur	3.37
--------	------

Heating Value (Btu/lb)	11389
------------------------	-------

Ultimate Analysis (%)

Carbon	63.10
Hydrogen	4.56
Nitrogen	1.13
Sulfur	3.37
Oxygen	8.20
Ash	9.34
Moisture	10.30

Ash Fusion Temperatures (deg F):

	Oxidizing	Reducing
Initial deformation	2390	2037
Softening	2450	2105
Hemispherical	2482	2178
Fluid	2580	2297

Free Swelling Index:	3 1/2
----------------------	-------

Table 3-2

Characteristics of River King Illinois #6 Coal with Regard to
the Coal Test Objective Matrix.

COAL TEST OBJECTIVE MATRIX									
PHYSICAL CHARACTERISTICS		COAL RANK							
TYPE	RANGE	BITUMINOUS	SUB-BITUMINOUS			LIGNITE	PEAT/BIOMASS	PETROLEUM COKE	BRIQUETTES
			A	B	C				
ASH CONTENT	H + 20%								
	M 10 - 20%								
	L - 10%	007							
ASH FUSION	H + 2700 F								
	M 2300-2700 F	007							
	L - 2300 F								
FREE SWELLING INDEX	H 3 +	007							
	M 1 - 3								
	L 0 - 1								
MOISTURE CONTENT	H + 15%								
	M 5 - 15%	007							
	L - 5 %								
FRIABILITY (GRINDABILITY)	H								
	M								
	L	007							

SECTION 4

FACILITY DESCRIPTION

The USBM/TCRC gasification facility is described in detail in Volume 1 of this series (Thimsen, Maurer et al, 1984). A brief description of the equipment and monitoring systems is given here.

4.1 Test Facility

The gasification test facility includes a 6.5 foot diameter Wellman-Galusha gas producer, a combustion chamber and a wet caustic scrubber. The site also includes an iron ore pelletizing kiln which was not used during this test. The entire stream of producer gas was consumed in the combustion chamber. A process flow schematic is shown in Figure 4-1. A bottom size screen removes fine material prior to transport to the overhead storage bin by bucket elevator.

The facility is equipped with standard industrial monitoring equipment for measurement of temperatures, pressures, flows, and process conditions. These are recorded by an automatic data acquisition system for subsequent process analysis.

4.1.1 Gas Producer

The gas producer is a 6.5 foot ID Wellman-Galusha, single-staged, fixed-bed, atmospheric pressure gasifier. The gasifier has a gravity fuel feed system, a rotating water-cooled agitator for managing coal agglomeration, and an eccentric step type grate for ash removal. The retort is water jacketed and has no refractory lining. Steam generated in the water jacket is mixed with blast air. Steam/air ratio in the blast is measured and controlled by the temperature of the saturated steam/air mixture. Steam is imported if that generated in the water jacket is not adequate.

4.1.2 Gas Combustor

The gas combustor includes a baffle burner and a refractory-lined combustion chamber, and is designed to burn the full gas output of the gasifier at a rated capacity of 30 MMBTU/hour. The combustion products exhaust through an impingement tray-type wet caustic scrubber for sulfur dioxide and particulate removal. An induced draft fan is used to exhaust the scrubbed products of combustion through a flue stack.

4.1.3 Quench/ESP

A slipstream of the gas is sent to a water spray quench tank. In this tank, the gas is brought near its adiabatic saturation temperature and heavy tars and oils are condensed. The tar fog

Figure 4-1

Coal Gasifier Process Flow Schematic,
U.S. Bureau of Mines, Twin Cities Research Center.

generated is removed in an electrostatic precipitator. The detarred gas is returned to the main gas duct. Figure 4-2 shows this cleaning system in schematic. The tar and oil collected by this system is atomized and burned in the coal gas combustion chamber with a steam atomizing nozzle normally used for heavy fuel oil.

4.2 Gas Sampling and Conditioning System

Figure 4-3 is a schematic of the gas sampling and conditioning system. The sampling port is thermally insulated to prevent condensation. The hot producer gas is quenched rapidly upon entering the surface condenser, which is cooled by cold water or cold, compressed air. The rapid quenching causes tar, oil, and water to condense on the inner surface of the condenser tube. The tar fog generated during cooling is removed in the electrostatic precipitator. The detarred gas is refrigerated and dessicated to remove water remaining in the gas stream. The dry, detarred gas is metered and transported to the instruments. Condensate samples are collected from traps in the condenser, electrostatic precipitator, and refrigerator.

4.3 Gas Analysis Equipment

Carbon dioxide and carbon monoxide concentrations are continuously measured with individual Beckman 864 non-dispersive infrared (NDIR) analyzers. Oxygen is monitored continuously with a Beckman 755 paramagnetic oxygen analyzer. Higher heating value of the sample gas is measured with a SIGMA continuous flow calorimeter. These signals are all recorded by the automatic data acquisition system.

Detailed gas composition is determined every 18 minutes with a Hewlett-Packard model 5880A gas chromatograph. The principal features of this chromatograph are listed in Table 4-1.

Figure 4-2
Schematic Diagram of the Quench/ESP

Figure 4-3

Schematic Diagram of the Gas Sampling and Conditioning System

Table 4-1

Principal Features of HP5880A Gas Chromatograph

1. Columns used:
 - a. 1-10 ft x 1/8 inch SS Porapak Q
 - b. 1-10 ft x 1/8 inch SS Molecular Sieve 5A
 - c. 2-18 ft x 1/8 inch SS 2% OV-101 on WHP
2. Dual detectors - flame ionization detector in series with thermal conductivity detector
3. Set up for analysis of the following species:
Hydrogen, Carbon dioxide, Ethylene, Ethane, Propane, Propylene, Oxygen, Nitrogen, Methane, and Carbon monoxide
4. Argon Carrier Gas - flow rate of 28 ml/min
5. Programmed Temperature from 75 C to 165 C to 135 C
6. 1.0 ml sample
7. 18 minute analysis time

SECTION 5

TEST PROCEDURES

Test procedures are described in detail in Volume 1 of this series (Thimsen et al, 1984). The following is a summary of the procedures including specific procedures used in this test only.

5.1 Test Teams

5.1.1 Gasifier Operation and Overall Coordination

The gasifier operations team was organized by Black, Sivalis & Bryson, Incorporated (BS&B) and consisted of the facility manager, facility engineers, three shift lead operators and additional helpers as required. The gasifier was staffed with a lead operator and two helpers, three shifts each day.

The gasifier operations team was responsible for overall operation of the gasifier and associated process equipment and coordination of all activities. This includes: gasifier start up, gas handling and incineration, exhaust gas cleanup, coal addition and sample collection, fire bed monitoring, process equipment maintenance and repair, operation of the boiler, changes in process conditions, sampling of waste streams, and measurement of retort temperature and pressure profiles.

5.1.2 Gasifier Monitoring

The gas sampling and data retrieval/monitoring team was organized by the University of Minnesota Particle Technology Laboratory, and consisted of persons with individual responsibility for:

- 1) sample gas cleanup
- 2) gas chromatograph
- 3) continuous gas analysis and SIGMA continuous calorimeter
- 4) data acquisition system

and such equipment operators as were necessary. The monitoring systems were staffed 24 hours per day.

The monitoring team was responsible for recording continuous process signals, operations of the gas chromatographs and continuous gas analysis equipment, operation of the gas sampling and conditioning system, collection of tar and oil samples, analysis of coal, ash, and cyclone dust samples, retort exhaust particle sampling and evaluation of health and safety measures.

5.1.3 Stack Gas Sampling

Interpoll, Incorporated, Circle Pines, Minnesota, a subcontractor to the University of Minnesota, brought a two-man team on site on August 3, 1983. They sampled for exhaust emissions from the gas combustor.

5.2 Gasifier Sampling and Data Acquisition Procedures

5.2.1 Continuous Data

An Analog Devices, Incorporated MACSYM 350 data acquisition system was installed for this test. Previously a MACSYM 2 system had been used. Continuous process signals are sampled once a minute. Ten-minute signal averages are recorded on floppy disc. Thirty-minute signal averages are printed by line printer. The operations team also logs these signals hourly along with some twenty parameters not sampled by the data acquisition system.

5.2.2 Gas Analysis Data

The continuous gas analyzers are calibrated daily, according to the manufacturer's recommendations. Output signals are recorded by the data acquisition system.

The HP 5880A gas chromatograph is calibrated using a mixture of oxygen, carbon monoxide, carbon dioxide, hydrogen, methane, ethane, ethylene, propane, propylene, and nitrogen at concentrations which nearly duplicate the gasifier offgas. Another calibration mixture with the concentrations of all the species except nitrogen increased by about 50%, and the nitrogen correspondingly reduced, is used to check the linearity of the detectors.

5.2.3 Tar and Oil Data

The condensed tar, oil, and water are removed from the accumulation reservoirs twice daily. Water collected in the surface condenser and sample electrostatic precipitator is decanted from the tar and combined with the water from the refrigerator. Tar from the surface condenser is combined with tar and oil collected in the sample electrostatic precipitator. Condensate yields are measured by weighing both the tar/oil sample and the water sample.

5.2.4 Coal Data

Coal samples are taken from each of the two weigh bin legs by the operations team during coal addition to the lock hopper four times each shift. These four samples are stored in a sealed bucket and submitted as a composite shift sample for each weigh bin leg. Detailed chemical analysis of the coal is performed on a composite of the shift samples.

5.2.5 Ash Data

An ash sample is taken by the operations team each time the ash is discharged and stored in a sealed container. For each ash sample the bulk density, particle size distribution, and carbon, sulfur, and moisture content of the ash are tabulated by the monitoring team. The carbon and sulfur content of each sample is determined from milled samples submitted by the monitoring team. The ash samples on which detailed elemental analyses are performed are composited over the same time periods used for compositing the coal samples.

5.2.6 Dust Data

Samples of cyclone dust are grabbed from the dust accumulation bin and composited into one sample over the entire test period.

5.2.7 Exhaust Gas Sampling

The gas combustor exhaust is analysed by EPA methods 5 and 6 for sulfur dioxide, nitrogen oxides, and particulates once during the test.

5.2.8 Retort Particle Sampling

Sampling of the product gas for particulate loading was performed periodically during the test. Particulate size distribution was measured for three of these samplings.

SECTION 6

CONDUCT OF TEST

6.1 Gasifier Operation

BOM/FGT-007, gasification of Illinois No. 6 bituminous coal began at 9:25 AM on July 28, 1983. The modified start-up procedure was used. This procedure involves laying the wick boxes on top of the ash bed rather than through it. The wicks are lit from the side doors of the retort. A more detailed description of this start-up procedure is given by Volume 1 of this series (Thimsen, Maurer et al, 1984). 8.34 tons of metallurgical coke were charged to the system for start-up. The flare was lit at 9:50 AM and the gas combustor was lit at 10:55 AM. From gasifier light off to combustor light off was 1 1/2 hours for this cold start procedure. The Illinois No. 6 coal (screened at 3/4") reached the retort at 2:15 PM and fully occupied the retort by about 6:00 PM. All coal gasified during this test was wet screened. The test history is shown in Figure 6-1.

For the first three days of the test, the blast air flow rate was set at 1000 cfm resulting in a coal consumption of 1.0 ton/hour. The saturation temperature was varied between 64 C and 58 C during the first three days to identify the optimum steam/air ratio. A saturation temperature of 60 C was found to be acceptable. Crusting and clinkering occurred at a blast saturation temperature of 58 C. During this period there was some agglomeration of coal in the top of the retort as evidenced by resistance to insertion of the poke bars. The agglomeration was sticky, not crusty, and some of the poke bars had to be pounded through. Agitator rate was about 10 sweeps/hour, to maintain a distance of 36 to 38 inches between the coal bed top and the top of the retort access ports (RAPs), and agitator height varied from 34 to 36 inches below the top of the RAPs.

The fire tests during this period showed no appreciable ash clinkering. The firebed was very uneven, however. Some holes showed strong fire, while others showed multiple fire zones. There did not appear to be any pattern from fire test to fire test. Fire loss pressure was very low (3-5 inches wg).

On the morning of July 31, a series of transient tests was undertaken. The blast saturation temperature was maintained at 58 C. At 9:00 AM the blast air flow was dropped from 1000 scfm to 400 scfm. It was brought back up to 1000 cfm at 10:10 AM and dropped back again to 400 cfm at 12:10 PM. No change in ash conditions could be observed during these swings. Gas quality remained good during this period.

A blast air flow of 400 cfm was maintained for 20 hours. It was then dropped to 200 cfm for 3 hours. Again, operation was

Figure 6-1
Test History, BOM/FGT-007

steady and there were no problems managing the ash layer.

The blast air flow was increased to 2000 cfm from 10:30 to 4:30 PM on August 1, 1983. Resulting coal consumption was just under two tons per hour. This load was held for 48 hours. The blast air flow was reduced to 1900 cfm for two hours in the middle of this period to mitigate high offtake temperatures due to burning through.

Blast saturation temperature was difficult to control during this period. High heat loss to the water jacket required large water jacket flow rates. The blast saturation temperature varied between 61 and 64 C. Fire loss pressure was modest (10-12 inches wg). Offtake temperatures were around 500 C, but gas quality was good (150 BTU/dscf). Ash was fused, but mostly in small chunks. Some 6 inches clinkers were removed.

On August 3, the 3/4 inch screen was replaced with a 1/4 inch mesh screen. Water also was sprayed on this coal to remove the silty material clinging to the coal. The plus 1/4 inch coal reached the retort at 3:50 PM. The blast air flow was set at 1200 cfm initially, with a blast saturation temperature of 59 C. These conditions were maintained for 20 hours and resulted in a coal consumption of 1.1 tons per hour. Coal consumption was lower during the first part of this period as was gas quality. Some crusting in the ash zone was noted.

The blast air flow was reduced to 800 cfm on August 4. This was done to conserve coal while efforts were undertaken to troubleshoot and bring on line the tar scrubber. The blast saturation temperature was maintained at 59 C. These conditions were held for 88 hours. Gas quality varied during this period from a high of 150 BTU/dscf to a low of 120 BTU/dscf. Corresponding swings in offtake temperature were from 450 C to 350 C. The swings had a period of 6-8 hours. These swings may have been related to unmanaged coal agglomeration with resultant gas channeling. Some clinkering of ash occurred, but no pounding was required to break up clinkers.

Blast air flow was brought up to 1000 scfm at 10:00 AM on May 8, and held there for 28 hours with blast saturation temperature of 59 C. It was then raised to 1400 scfm at 54 C on May 9-10. During this period the top gas pressure increased from 4" wg to 25" wg, indicating a severe blockage in the gas duct downstream of the cyclone. This situation caused unacceptable gas leakage and the gasifier was shut down and dumped at 12:30 PM on August 10.

The hot gas ductwork was opened up and dust accumulations were allowed to burn, cleaning the duct work. At this time the spacing between the bottom and middle grate levels was increased from 5 to 6 inches.

The gasifier was cold started on August 15, after the retort had

been laid with 14 inches of ash, the wick boxes, 6 inches of charcoal, 18 inches of coke and 24 inches of Illinois No. 6 coal. Light off was at 9:55 AM, and gas was sent to the combustor at 11:10 AM. By 11:55 the fire loss pressure had risen to more than 30 in wg. A pressure probe was performed which indicated that the pressure drop from 36 inches above the grate to 42 inches above the grate was 22 in wg. There was a severe restriction to gas flow at this location. This is approximately where the coke-coal interface was located. It is surmised that the coal swelled upon being heated during start up. The high pressure drop continued until about 2:30 PM, at which time the fire loss pressure had decreased to about 12 in wg.

At 4:30 PM on August 15, power was lost through out the area, and was restored at 5:15 PM. The gasifier banked automatically during this period. The gasifier was brought back to load without incident when power was restored.

The blast air flow was set at 1200 scfm with a blast saturation temperature of 61 C. These conditions were held for twelve hours at which time the blast air flow was increased to 2000 cfm over 8 hours, and held for 16 hours. The saturation air flow was then increased to 2100 cfm for 26 hours, and 2700 cfm for 19 hours. Maximum coal consumption during this period averaged 2.4 tons per hour (50 million BTU/hour input). No additional air flow could be obtained from the blast blower at this point. The import steam delivery valve was also wide open, indicating no further control over the blast saturation temperature.

At these high load levels, some crusting and ash fusing was detected, but no difficulties were encountered removing ash through the grate.

Gas quality varied slowly between 180 BTU/dscf and 160 BTU/dscf with a period of 6-8 hours. Offtake temperature varied between 450 C and 600 C, but no spiking was observed, and very little glowing was observed on top of the coal bed. It may be likely that with greater fan capacity, coal throughput could be increased above that observed.

Almost all fire tests taken during BOM/FGT-007 had some anomaly associated with them. Generally, there were multiple zones on a few bars. Seldom was there a single cold bar, but often there was a single excessively hot bar. Ash discharge to the ash cone was reddish in nature and often fused into 1 to 4 inch chunks.

Dust collected by the cyclone was moderate in quantity. Obviously, not all of the dust was being collected by the cyclone as the ductwork downstream was plugged severely on August 10. Cleaning a trap located at a right angle bend in the gas duct yielded tar on each occasion. The tar exhibited plastic behavior.

The gasifier was operated throughout the test to maintain a distance of 34-36 inches from the top of the coal bed to the top of the RAPs. The vertical agitator travel was between 34 and 36 inches below the RAP tops. Two pressure probes performed on August 17 and August 18 showed very even pressure drop until the top 12 inches of the coal bed. The vertical pressure gradient was approximately double in this region compared to the lower regions of the retort. This indicates some swelling of the coal at the top of the coal bed.

6.2 Quench/ESP Operation

Two attempts were undertaken to operate the quench/ESP system during this test. Neither attempt was met with any long term success.

On August 3, hot raw gas was admitted to the quench tank and the system was operated at low flow (200-400 dscfm) for about 8 hours. During this time period there were several nuisance trips of the blower, caused by a faulty oxygen analyzer. The system was voluntarily taken out of service due to visible arcing on the high voltage control board and suspicion of an electrical breakdown in a high voltage insulator. Subsequent inspection confirmed an electrical fault in the insulator and also a fault in the high voltage transformer/rectifier set. These were replaced, along with the high voltage control board.

The second attempt to operate the system took place on August 16. After 4 hours of operation, another high voltage insulator indicated a short, which was confirmed by later inspection as a crack in the ceramic. Total operational time during this attempt was 5.5 hours.

Neither attempt lasted long enough to obtain any meaningful data.

SECTION 7

TEST RESULTS

7.1 Data Summary

7.1.1 Continuous Output Transducer Data

Some problems were encountered in the operation of the MACSYM 350 Data acquisition, (This system was installed new in July 1983.) but the problems encountered in the previous test (Volume 7, Thimsen, Maurer et al, 1985) were largely solved. In all, about 28 hours of data were not collected. Table 7-1 shows these periods and the problems encountered.

Figure 7-1 shows the offtake temperature, fire loss pressure, and dry gas heating value, along with operating parameters observed during the test period. Offtake temperature was relatively steady throughout the test, but it was higher during the very high load periods. It appears to be relatively unaffected by blast saturation temperature or coal particle size. The same is true of the fire loss pressure. At the very high air flow rates, fire loss pressure was higher, as could be expected. Dry gas HHV is higher at higher airflow rates.

On July 31, a series of step changes in blast air flow were made. The results of these changes are shown in Figure 7-2. Blast saturation temperature dropped on a rise in air flow and increased on a drop in air flow. These transients disappeared in less than 7 minutes, and are undoubtedly a characteristic of the control system. Fire loss pressure was proportional to blast air flow, but appeared to increase gradually over the period shown. Offtake temperature tended to be higher during higher air flows and lower during lower air flows, but no strong immediate response in offtake temperature can be seen.

The carbon monoxide and carbon dioxide concentrations show a first order response to the step changes in air flow. Upon a drop in air flow, the carbon monoxide concentration goes up and carbon dioxide concentration goes down. The opposite is true on a rise in air flow. These transient responses are modest and disappear within 15 minutes. (The concentration changes at 11:15 are due to maintenance on the gas sampling and conditioning system and do not represent real changes in gas composition.)

7.1.2 Coal, Ash and Dust Data

A complete list of the tests performed on the bulk coal, ash, and cyclone dust samples collected during BOM/FGT 007, together with the number of samples analyzed, is presented in Table 7-2.

Table 7-1

Data Acquisition Gaps During BOM/FGT 007

<u>Date</u>	<u>Time</u>	<u>Length, hr</u>	<u>Reasons</u>
8/1/83	5:00	12.5	Hardware memory errors
8/2/83	12:00	7.0	New Memory board installation and checkout
8/9/83	17:00	5.0	Hardware memory problems
8/15/83	14:00	1.5	Hardware memory problems
8/16/83	10:00	2.0	Diagnostics

Figure 7-1
Physical Characteristics of the Gasifier Operation

Figure 7-2

Gasifier Response to Step Changes in Blast Air Flow

Table 7-2

Summary of Coal, Ash and Cyclone Dust Analyses Performed

Material Analyzed	Type of Analysis	Number of Samples Collected and	Number of Composite Samples Analyzed
Coal	Particle size distribution	50	-
	Proximate analysis	-	3
	Ultimate analysis	-	3
	Ash fusion temperature	-	3
	Free swelling index	-	3
Ash	Particle size distribution	121	-
	Bulk density	121	-
	Moisture content	121	-
	Carbon content	121	3
	Sulfur content	121	3
	Chemical analysis	-	3
Cyclone dust	Proximate analysis	-	1 (*)
	Ultimate analysis	-	1

(*) 1 Composite of 21 cyclone dust samples.

7.1.2.1 Coal Data

The mass fraction of coal less than each of five indicated mesh sizes and the mean particle size are presented in Figures 7-3 and 7-4. The bottom size screen change on August 3 is evident from these figures. As indicated by Figure 7-5, while 15-20% of the coal screened at $3/4$ inch is less than $3/4$ inch, most of it is greater than $1/2$ inch. The $-1/4$ inch fraction is very low from both screens.

The results of the chemical and physical analyses of three composite coal samples are given in Table 7-3. No significant differences were noted between the three analyses.

7.1.2.2 Ash Data

The mass fraction of ash less than each of five indicated mesh sizes and the mean ash particle size are given in Figures 7-6 and 7-7. The mean ash particle size was relatively constant throughout the test. Under the very high load conditions at the end of the test, some larger ash particles were produced.

Figure 7-8 shows the physical and chemical characteristics of the ash along with operating parameters. These parameters vary in a somewhat random way. Ash sulfur tends to follow ash carbon content. The rise in both of these values on August 10 is unexplained.

Table 7-4 gives the chemical analyses of three composite dry ash samples. Variations between samples are minor.

7.1.2.3 Cyclone Dust

The chemical analysis of one cyclone dust sample is given in Table 7-3. The volatile matter to fixed carbon ratio of the dust is 0.139. The same ratio for the feed coal is 0.783. This decrease in volatile matter relative to fixed carbon is consistent with partial devolatilization of this material in the high temperatures of the offtake duct.

This partial devolatilization is not adequate to explain the dry basis increase in ash content of the cyclone dust compared to the coal. The ash to fixed carbon ratio of the cyclone dust is 50% greater than the ash to fixed carbon ratio in the coal. High ash materials are, apparently, preferentially blown over. These materials may come from the lower region of the retort where the materials have lost some fixed carbon due to gasification.

7.1.3 Gas Analysis Data

The NDIR carbon monoxide and carbon dioxide analyzers and the paramagnetic oxygen analyzer operated well throughout the test. The SIGMA calorimeter showed a daily drift of about 1%. The HP

Figure 7-3
Feed Coal Size Distribution Analysis

Figure 7-4.
Geometrical Mean Coal Particle Size

Figure 7-5

Average Particle Size Distribution of Feed Coal

Table 7-3

Physical and Chemical Properties of Coal and Dust

Material	Coal			Cyclone Dust (dry basis)	
Screen Mesh Size, Inch	+3/4 7/28-8/3	+1/4 8/3-8/10	+1/4 8/15-8/19	Average	---
Type of Analysis					
Proximate Analysis, wt %:					
Moisture	10.10	10.35	10.52	10.30	--
Volatile Matter	34.41	36.01	35.44	35.30	9.68
Ash	10.15	8.13	9.72	9.34	20.81
Fixed Carbon	45.34	45.51	44.32	45.06	69.51
Ultimate Analysis, wt %:					
Hydrogen	4.50	4.60	4.55	4.56	1.69
Carbon	62.60	64.17	62.52	63.10	70.59
Nitrogen	1.13	1.13	1.14	1.13	1.11
Sulfur	3.52	3.20	3.36	3.37	2.70
Oxygen	8.90	8.42	8.19	8.20	3.10
Ash	10.15	8.13	9.72	9.34	20.81
Mositure	10.10	10.35	10.52	10.30	--
Heating Value, Btu/lb:					
As Received	11,259	11,589	11,319	11,389	--
Moisture Free	12,524	12,926	12,651	12,700	11,118
Ash Fusion Temp., F:					
(Oxidizing Atmosphere)					
Initial Def., IT	2,420	2,370	2,380	2,390	-
Softening, ST	2,490	2,430	2,430	2,450	-
Softening, HT	2,510	2,465	2,470	2,482	-
Fluid, FT	2,590	2,565	2,585	2,580	-
(Reducing Atmosphere)					
Initial Def., IT	2,055	2,015	2,040	2,037	-
Softening, ST	2,140	2,065	2,110	2,105	-
Softening, HT	2,230	2,120	2,135	2,178	-
Fluid, FT	2,335	2,250	2,305	2,297	-
Free Swelling Index	3.5	3.5	3.5	3.5	-

All values "as received" unless otherwise noted.

Figure 7-6
Ash Size Distribution Analysis

Figure 7-7
Geometrical Mean Ash Particle Size

Figure 7-8

Ash Characteristics and Operating Conditions

BOM/FGT-007

Table 7-4

Elemental Analysis of Moisture-free Ash

Mass Fraction, % (*), for Compositied Samples
from Samples Numbers:

Element	002-047 7/28-8/3	048-091 8/3-8/10	092-121 8/15-8/19	Average
Fe	23.30	21.10	15.90	20.10
Fe2+	8.60	8.30	5.70	7.54
Si	21.70	22.50	21.60	21.93
Al	9.50	10.30	10.00	9.93
C	6.90	6.67	18.10	10.55
Ca	3.20	2.90	2.20	2.77
Mg	0.71	0.70	0.65	0.69
K	1.30	1.30	1.30	1.30
P	0.013	<0.010	<0.010	0.01
Na	0.38	0.39	0.37	0.38
S	0.41	0.32	0.49	0.41
Ti	0.57	0.59	0.59	0.59

(*) Unaccounted for mass is presumed to be oxygen bound
onto metals as oxides.

5880A gas chromatograph operated for the entire test period, except for a 4-5 hour period on August 8 due to a valve switching error.

The valve switching problem tended to clip the carbon monoxide peak over a 2-day period prior to failing completely. During this period NDIR carbon monoxide values are used for the mass and energy balances (Section 7.2).

The concentrations of the various species measured by the gas chromatograph are shown in Figures 7-9 and 7-10. The spikes in gas composition occurring on August 2 and 3 correspond to higher offtake temperatures and burning through noted by the operators. Concentrations of minor gas species were relatively constant, but appear to be slightly higher under high load operation. (The drop in carbon monoxide concentration on August 8 corresponds to a drop in total molar % accounted for and is probably associated with the valve problem described above.

The major gas species, along with operating parameters and dry gas HHV are shown in Figure 7-11. The hydrogen concentration appears to respond to changes in blast saturation temperature according to the water-gas shift reaction, but it is difficult to separate this from the increased blast air flow rates during periods when high steam/air ratios were used. The noise in gas composition from August 1-4 is undoubtedly due to the corresponding noise in blast saturation temperature.

7.1.4 Tar and Water Yield Data

The gas sampling and conditioning system experienced several shutdowns during the test. Only one of these was longer than one hour. This involved replacement of the electrostatic precipitator's high voltage insulator on August 18. Table 7-5 shows these shutdowns and their causes. In all, clean gas samples were unavailable to the analyzers for less than 11 hours.

Two composite condensate samples were prepared for analysis. One composite was prepared from tar collected during high throughput operation (August 2, 3, 17, 18 & 19). The other composite sample was made from tar collected during the remaining time periods. Table 7-6 shows the results of the analyses.

The tar and water yields with operating parameters are shown in Figure 7-12. There was little variation in yield during the first part of the test. The variations observed during the last part of the test are unexplained. The last data point was from the period during which the high voltage insulator problems were experienced with the sample electrostatic precipitator.

Figure 7-9

Major Gas Species Measured by the Gas Chromatograph.

Figure 7-10
Minor Gas Species Measured by the Gas Chromatograph

Figure 7-11

Dry gas HHV, Major Gas Species and
Gasifier Operational Parameters.

BOM/FGT-007

Table 7-5
Operation Summary for Gas Sampling System

<u>Date</u>	<u>Down Time Period</u>	<u>Remarks</u>
7/29	1615-1645	Install water jacketed cooler before refrigeration unit
8/1	1615-1625	Rod clean horizontal inlet pipe
8/2	0300-0315	Rod clean horizontal inlet pipe
8/2	0830-0905	Steam clean condenser
8/2	2030-2100	Steam clean condenser
8/3	0700-0720	Steam clean condenser
8/3	1400-1430	Steam clean condenser
8/3	1709-1735	Steam clean condenser
8/4	0900-0915	Steam clean condenser
8/4	1100-1110	Steam clean main ball valve
8/4	1330-1440	Steam clean condenser
8/8	0845-0857	Replace refrigeration unit
8/10	0030-0040	Rod main ball valve
8/16	1710-1715	Rod horizontal inlet pipe
8/17	0400-0410	Rod main ball valve
8/18	1100-1720	ESP electrical problems

Table 7-6
Condensed Material Analyses

Water

Total organics, % 0.41

<u>Tar</u>	7/29 - 8/2 Low load	8/17 - 8/19 High Load
Heating value, Btu/lb (*)	13565 (15427)	14520 (15352)
Flash point, F	199	202
Water by distillation, %	12.07	5.42
Specific gravity, 60/60 F	1.1318	1.1544
Pour point, F	60	65
Cold (solid) point, F	55	60

Viscosity at:

122 F Saybolt Furol, s	203.3	--
122 F Kinematic, centistokes	430.7	--
210 F Saybolt Universal, s	32.7	122.0
210 F Kinematic, centistokes	16.21	25.42

Ultimate Analysis, WT% (*)

Hydrogen	6.40 (7.28)	5.65 (7.03)
Carbon	69.83 (79.42)	76.96 (81.37)
Nitrogen	1.16 (1.32)	1.11 (1.17)
Oxygen (by difference)	8.04 (9.14)	7.45 (9.66)
Sulfur	2.22 (2.52)	2.31 (2.44)
Moisture, Total	12.07	5.42 (5.73)
Ash	0.28 (0.32)	0.09 (0.10)

(*) Dry basis values in parentheses

Figure 7-12

Tar/Oil Yield and Water Yield with Operating Conditions

BOM/FGT-007

7.2 Material and Energy Balances

The material and energy balance calculation procedures are described in Volume 1 of this series (Thimsen, Maurer et al, 1984). A brief description follows.

The measured data used to calculate the balances around the gasifier include process temperatures, pressures and flows, tar/water yields, material ultimate analyses, gas compositions, and dust carryover from the retort (see Section 7.6). All sulfur in the coal not reporting to the tar, ash, or dust is reported as hydrogen sulfide in the gas. No direct measurements of sulfur species in the gas were made during this test.

The balances were calculated over various time periods representing relatively steady operation. Each time period is characterized by a coal throughput, blast saturation temperature and coal sizing. Tables 7-7 through 7-20 show the results of the calculations. Table 7-21 shows the results of the calculations over the entire test period.

There is a small systematic error in the material and energy balances that shows more material and slightly more energy leaving the gasifier than entering it. Close inspection of the hydrogen and oxygen atomic balances indicate that the imbalance is essentially more water vapor leaving the gasifier than entering it. There are three possible sources for this error:

- 1) The water entering the gasifier may not be represented by the blast saturation temperature due to formation of a mist upon steam injection.
- 2) There may have been unmetered steam entering the product gas from steam sealed retort access ports, other steam connections, or from the evaporation of water during cyclone dumps, etc. A steam flow of 50-200 lb/hr would be required to make up the imbalance.
- 3) There may have been a small steam leak into the gas sampling and conditioning system. This is unlikely, however, as steam connections are made only when cleaning is done.

At this point, it is not possible to distinguish between these possibilities.

7.3 Grate Performance Model

A geometrical grate performance model was prepared and is described in Volume 1 of this series (Thimsen, Maurer et al, 1984). The model calculates the void volume swept by the grate and compares it to the volume of ash rejected by the grate. During this test, two different grate spacings were used.

Table 7-7

Material Balance and Thermal Efficiency Calculation
+3/4 inch, 0.82 tn/hr, 150 F

Input Data

Time period: 7/28/83 16:00 - 7/29/83 8:00 (16.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 0.82
Blast air flow (dry) , Scfm = 993.
Saturated air temperature, F = 150.
Steam/Air Ratio (lb./lb.) = 0.22
Ambient air temperature, F = 81.
Off-take temperature, F = 855.

Coal Data:

Type = N.S.P. Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 8.27
Tar yield, lb./1000 SCF = 1.34
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 195.
Ash carbon ,percent = 13.9
Ash sulfur ,percent = 0.70
Ash moisture (wet),percent = 16.8
Cyclone dust,lb/hour(est.) = 6.

Gas Composition (Dry): (normalized to 99.90)

H2	%	= 15.9	CH4	%	= 1.35	H2S	(est ppm)	= 7189
CO	%	= 19.7	C2H4	%	= 0.130			
CO2	%	= 9.44	C2H6	%	= 0.145			
N2	%	= 51.8	C3H6	%	= 0.049			
O2	%	= 0.00	C3H8	%	= 0.035	HHV,	Btu/SCF	= 140
Molec. Weight		= 25.10	Argon(est. %)		= 0.616	LHV,	Btu/SCF	= 130

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: 0.94)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 1640.	22.5	Dry gas	= 6090.	84.5
Steam (total)	= 998.	13.7	Water in gas	= 761.	10.6
Air(calc,dry)	= 4638.	63.7	Oil and tar	= 123.	1.7
			Ash(calc,dry)	= 227.	3.1
			Dust	= 6.	0.1
Total	= 7276.		Total	= 7208.	

Energy Balance (Percent unaccounted for: 3.92)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 18.9	Dry coal gas	= 12.9	68.7
Air	= 0.036	Oil and tar	= 1.39	10.1
Steam(import)	= 0.391	Sensible	= 1.73	9.2
Cooling water	= 0.135	Latent	= 0.817	4.4
		Ash	= 0.451	2.4
		Dust	= 0.071	0.4
		Cooling water	= 0.901	4.8
Total	= 19.5	Total	= 18.7	

Performance Data

Cold gas efficiency, percent = 66.0
Cold gas with tar efficiency, percent = 75.7
Hot gas without tar efficiency percent = 78.5
Hot gas with tar efficiency, percent = 88.7
Air/Coal (lb./lb.) = 2.828
Steam/Coal (lb./lb.) = 0.608
Air/Fixed Carbon (lb./lb.) = 6.266
Coal/Gasifier Area (lb./hr./sqft) = 49.4
Fixed Carbon/Area (lb./hr./sqft) = 22.3
Producer Gas/Coal (SCF/lb.) = 66.0
Producer Gas/Fixed Carbon (SCF/lb.) = 146.2
Tar Yield (lb./lb. coal) = 0.075

Table 7-8

Material Balance and Thermal Efficiency Calculation
+3/4 inch, 1.01 tn/hr, 148 F

Input Data

Time period: 7/29/83 8:00 - 7/29/83 16:00 (8.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 1.01
Blast air flow (dry) , Scfm = 987.
Saturated air temperature, F = 148.
Steam/Air Ratio (lb./lb.) = 0.20
Ambient air temperature, F = 88.
Off-take temperature, F = 799.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 7.45
Tar yield, lb/1000 SCF = 2.71
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 312.
Ash carbon ,percent = 7.1
Ash sulfur ,percent = 0.51
Ash moisture (wet),percent = 19.0
Cyclone dust,lb/hour(est.) = 8.

Gas Composition (Dry): (normalized to 99.90)

H2 % = 17.4	CH4 % = 1.44	H2S (est ppm) = 7877
CO % = 22.8	C2H4 % = 0.129	
CO2 % = 7.85	C2H6 % = 0.190	
N2 % = 48.6	C3H6 % = 0.059	
O2 % = 0.00	C3H8 % = 0.048	
Molec. Weight = 24.48	Argon(est. %) = 0.579	
	HHV, Btu/SCF = 157	
	LHV, Btu/SCF = 146	

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.52)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 2025.	26.2	Dry gas	= 6471.	83.4
Steam (total)	= 948.	12.3	Water in gas	= 747.	9.6
Air(calc,dry)	= 4745.	61.5	Oil and tar	= 272.	3.5
			Ash(calc,dry)	= 259.	3.3
			Dust	= 8.	0.1
Total	= 7718.		Total	= 7758.	

Energy Balance (Percent unaccounted for: -0.39)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 23.4	Dry coal gas	= 15.7	66.0
Air	= 0.063	Oil and tar	= 4.17	17.5
Steam(import)	= 0.068	Sensible	= 1.82	7.6
Cooling water	= 0.153	Latent	= 0.815	3.4
		Ash	= 0.266	1.1
		Dust	= 0.090	0.4
		Cooling water	= 0.966	4.0
Total	= 23.7	Total	= 23.9	

Performance Data

Cold gas efficiency, percent = 66.5
Cold gas with tar efficiency, percent = 84.2
Hot gas without tar efficiency percent = 76.7
Hot gas with tar efficiency, percent = 95.2
Air/Coal (lb./lb.) = 2.343
Steam/Coal (lb./lb.) = 0.468
Air/Fixed Carbon (lb./lb.) = 5.192
Coal/Gasifier Area (lb./hr./sqft) = 61.0
Fixed Carbon/Area (lb./hr./sqft) = 27.5
Producer Gas/Coal (SCF/lb.) = 57.5
Producer Gas/Fixed Carbon (SCF/lb.) = 127.4
Tar Yield (lb./lb. coal) = 0.134

Table 7-9

Material Balance and Thermal Efficiency Calculation
+3/4 inch, 1.02 tn/hr, 145 F

Input Data

Time period: 7/29/83 16:00 - 7/30/83 10:00 (18.0 hours)

Gasifier Operation:	Coal Data:
Coal feed, Ton/hour = 1.02	Type = Illinois No.6
Blast air flow (dry) , Scfm = 944.	Mass Fraction Carbon % = 63.9
Saturated air temperature, F= 145.	Mass Fraction Fixed Carbon = 45.13
Steam/Air Ratio (lb./lb.) = 0.19	Mass Fraction Moisture % = 9.57
Ambient air temperature, F = 84.	Mass Fraction nitrogen % = 1.21
Off-take temperature, F = 773.	Mass Percent sulfur = 3.70
	Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):	Ash and Dust Data:(dry basis)
Water yield, lb./1000 SCF = 7.08	Ash discharge ,lb/hour = 322.
Tar yield, lb/1000 SCF = 2.71	Ash carbon ,percent = 8.3
Carbon in Tar (percent) = 81.4	Ash sulfur ,percent = 0.25
Sulfur in Tar (percent) = 2.44	Ash moisture (wet),percent = 7.2
Tar HHV, thou. Btu/lb = 15.35	Cyclone dust,lb/hour(est.) = 8.

Gas Composition (Dry): (normalized to 99.90)

H2 % = 16.7	CH4 % = 1.63	H2S (est ppm) = 8087
CO % = 24.0	C2H4 % = 0.118	
CO2 % = 7.08	C2H6 % = 0.176	
N2 % = 48.7	C3H6 % = 0.050	
O2 % = 0.00	C3H8 % = 0.046	HHV, Btu/SCF = 160
Molec. Weight= 24.52	Argon(est. %)= 0.580	LHV, Btu/SCF = 149

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.16)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 2036.	26.7	Dry gas	= 6427.	84.2
Steam (total)	= 875.	11.5	Water in gas	= 704.	9.2
Air(calc,dry)	= 4714.	61.8	Oil and tar	= 269.	3.5
			Ash(calc,dry)	= 228.	3.0
			Dust	= 8.	0.1
Total	= 7624.		Total	= 7636.	

Energy Balance (Percent unaccounted for: -0.77)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 23.5	Dry coal gas	= 15.9	66.4
Air	= 0.048	Oil and tar	= 4.14	17.3
Steam(import)	= 0.049	Sensible	= 1.72	7.2
Cooling water	= 0.185	Latent	= 0.769	3.2
		Ash	= 0.272	1.1
		Dust	= 0.087	0.4
		Cooling water	= 1.065	4.4
Total	= 23.3	Total	= 24.0	

Performance Data

Cold gas efficiency,	percent = 66.9
Cold gas with tar efficiency,	percent = 84.3
Hot gas without tar efficiency	percent = 76.4
Hot gas with tar efficiency,	percent = 94.7
Air/Coal	(lb./lb.) = 2.316
Steam/Coal	(lb./lb.) = 0.430
Air/Fixed Carbon	(lb./lb.) = 5.131
Coal/Gasifier Area	(lb./hr./sqft) = 61.3
Fixed Carbon/Area	(lb./hr./sqft) = 27.7
Producer Gas/Coal	(SCF/lb.) = 56.3
Producer Gas/Fixed Carbon	(SCF/lb.) = 124.8
Tar Yield	(lb./lb. coal) = 0.132

Table 7-10

Material Balance and Thermal Efficiency Calculation
+3/4 inch, 1.02 tn/hr, 142 F

Input Data

Time period: 7/30/83 10:00 - 7/31/83 9:00 (23.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 1.02
Blast air flow (dry) , Scfm = 991.
Saturated air temperature, F= 142.
Steam/Air Ratio (lb./lb.) = 0.16
Ambient air temperature, F = 81.
Off-take temperature, F = 807.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 6.50
Tar yield, lb/1000 SCF = 2.93
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 187.
Ash carbon ,percent = 8.1
Ash sulfur ,percent = 0.51
Ash moisture (wet),percent = 20.3
Cyclone dust,lb/hour(est.) = 8.

Gas Composition (Dry): (normalized to 99.90)

H2	%	= 16.0	CH4	%	= 1.73	H2S	(est ppm)	= 3073
CO	%	= 24.6	C2H4	%	= 0.123			
CO2	%	= 6.41	C2H6	%	= 0.179			
N2	%	= 49.4	C3H6	%	= 0.053			
O2	%	= 0.00	C3H8	%	= 0.048	HHV,	Btu/SCF	= 161
Molec. Weight=		24.58	Argon(est. %)	=	0.588	LHV,	Btu/SCF	= 150

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.31)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 2042.	27.1	Dry gas	= 6357.	84.1
Steam (total)	= 777.	10.3	Water in gas	= 638.	8.4
Air(calc,dry)	= 4718.	62.6	Oil and tar	= 287.	3.8
			Ash(calc,dry)	= 270.	3.6
			Dust	= 8.	0.1
Total	= 7537.		Total	= 7561.	

Energy Balance (Percent unaccounted for: -1.44)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 23.6	Dry coal gas	= 15.8	65.1
Air	= 0.039	Oil and tar	= 4.41	18.2
Steam(import)	= 0.056	Sensible	= 1.78	7.4
Cooling water	= 0.213	Latent	= 0.700	2.9
		Ash	= 0.313	1.3
		Dust	= 0.088	0.4
		Cooling water	= 1.149	4.7
Total	= 23.9	Total	= 24.2	

Performance Data

Cold gas efficiency,	percent	= 66.1
Cold gas with tar efficiency,	percent	= 84.5
Hot gas without tar efficiency	percent	= 75.4
Hot gas with tar efficiency,	percent	= 94.8
Air/Coal	(lb./lb.)	= 2.311
Steam/Coal	(lb./lb.)	= 0.381
Air/Fixed Carbon	(lb./lb.)	= 5.121
Coal/Gasifier Area	(lb./hr./sqft)	= 61.5
Fixed Carbon/Area	(lb./hr./sqft)	= 27.8
Producer Gas/Coal	(SCF/lb.)	= 54.8
Producer Gas/Fixed Carbon	(SCF/lb.)	= 121.5
Tar Yield	(lb./lb. coal)	= 0.141

Table 7-11

Material Balance and Thermal Efficiency Calculation
+3/4 inch, 0.51 tn/hr, 147 F

Input Data

Time period: 7/31/83 13:00 - 8/01/83 8:00 (19.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 0.51
Blast air flow (dry) , Scfm = 561.
Saturated air temperature, F= 147.
Steam/Air Ratio (lb./lb.) = 0.20
Ambient air temperature, F = 82.
Off-take temperature, F = 690.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 6.98
Tar yield, lb/1000 SCF = 2.28
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 127.
Ash carbon ,percent = 4.6
Ash sulfur ,percent = 0.39
Ash moisture (wet),percent = 21.4
Cyclone dust,lb/hour(est.) = 2.

Gas Composition (Dry): (normalized to 99.90)

H2	%	= 15.4	CH4	%	= 1.73	H2S	(est ppm)= 7708
CO	%	= 23.2	C2H4	%	= 0.106		
CO2	%	= 7.12	C2H6	%	= 0.172		
N2	%	= 50.7	C3H6	%	= 0.044		
O2	%	= 0.00	C3H8	%	= 0.047	HHV,	Btu/SCF = 154
Molec. Weight= 24.83			Argon(est. %)= 0.604		LHV,	Btu/SCF = 143	

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: 1.69)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 1018.	24.7	Dry gas	= 3437.	94.7
Steam (total)	= 516.	12.5	Water in gas	= 367.	9.0
Air(calc,dry)	= 2591.	62.8	Oil and tar	= 120.	3.0
			Ash(calc,dry)	= 131.	3.2
			Dust	= 2.	0.0
Total	= 4125.		Total	= 4056.	

Energy Balance (Percent unaccounted for: -0.81)

Input,	MM Btu/hr		Output,	MM Btu/hr	% Total
Coal	= 11.7		Dry coal gas	= 8.1	66.9
Air	= 0.023		Oil and tar	= 1.84	15.2
Steam(import)	= 0.030		Sensible	= 0.78	6.5
Cooling water	= 0.156		Latent	= 0.399	3.3
			Ash	= 0.088	0.7
			Dust	= 0.022	0.2
			Cooling water	= 0.870	7.2
Total	= 12.0		Total	= 12.1	

Performance Data

Cold gas efficiency, percent = 67.4
Cold gas with tar efficiency, percent = 82.8
Hot gas without tar efficiency percent = 76.5
Hot gas with tar efficiency, percent = 92.5
Air/Coal (lb./lb.) = 2.544
Steam/Coal (lb./lb.) = 0.506
Air/Fixed Carbon (lb./lb.) = 5.638
Coal/Gasifier Area (lb./hr./sqft) = 30.7
Fixed Carbon/Area (lb./hr./sqft) = 13.9
Producer Gas/Coal (SCF/lb.) = 59.3
Producer Gas/Fixed Carbon (SCF/lb.) = 131.4
Tar Yield (lb./lb. coal) = 0.118

Table 7-12

Material Balance and Thermal Efficiency Calculation
+3/4 inch, 1.93 tn/hr, 148 F

Input Data

Time period: 8/1/83 16:00 - 8/3/83 16:00 (48.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 1.93
Blast air flow (dry) , Scfm = 1721.
Saturated air temperature, F = 148.
Steam/Air Ratio (lb./lb.) = 0.20
Ambient air temperature, F = 85.
Off-take temperature, F = 903.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 7.77
Tar yield, lb/1000 SCF = 2.62
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 353.
Ash carbon ,percent = 5.6
Ash sulfur ,percent = 0.43
Ash moisture (wet), percent = 34.0
Cyclone dust, lb/hour (est.) = 31.

Gas Composition (Dry): (normalized to 99.90)

H2	%	= 16.8	CH4	%	= 1.92	H2S	(est ppm) = 7921
CO	%	= 22.5	C2H4	%	= 0.194		
CO2	%	= 7.78	C2H6	%	= 0.187		
N2	%	= 49.0	C3H6	%	= 0.081		
O2	%	= 0.00	C3H8	%	= 0.038	HHV,	Btu/SCF = 160
Molec. Weight = 24.57			Argon(est. %)= 0.583		LHV,	Btu/SCF = 149	

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.99)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 3861.	26.1	Dry gas	= 12314.	82.5
Steam (total)	= 1849.	12.5	Water in gas	= 1478.	9.9
Air(calc,dry)	= 9066.	61.4	Oil and tar	= 498.	3.3
			Ash(calc,dry)	= 600.	4.0
			Dust	= 31.	0.2
Total	= 14776.		Total	= 14922.	

Energy Balance (Percent unaccounted for: -1.57)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 44.5	Dry coal gas	= 30.5	66.7
Air	= 0.103	Oil and tar	= 7.65	16.7
Steam(import)	= 0.105	Sensible	= 4.00	8.8
Cooling water	= 0.211	Latent	= 1.608	3.5
		Ash	= 0.489	1.1
		Dust	= 0.345	0.8
		Cooling water	= 1.113	2.4
Total	= 45.0	Total	= 45.7	

Performance Data

Cold gas efficiency, percent = 67.8
Cold gas with tar efficiency, percent = 84.8
Hot gas without tar efficiency percent = 79.1
Hot gas with tar efficiency, percent = 97.1
Air/Coal (lb./lb.) = 2.348
Steam/Coal (lb./lb.) = 0.479
Air/Fixed Carbon (lb./lb.) = 5.203
Coal/Gasifier Area (lb./hr./sqft) = 116.4
Fixed Carbon/Area (lb./hr./sqft) = 52.5
Producer Gas/Coal (SCF/lb.) = 57.5
Producer Gas/Fixed Carbon (SCF/lb.) = 127.4
Tar Yield (lb./lb. coal) = 0.129

Table 7-13

Material Balance and Thermal Efficiency Calculation
+1/4 inch, 0.98 tn/hr, 144 F

Input Data

Time period: 8/3/83 20:00 - 8/4/83 15:00 (19.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 0.98
Blast air flow (dry) , Scfm = 1140.
Saturated air temperature, F = 144.
Steam/Air Ratio (lb./lb.) = 0.18
Ambient air temperature, F = 85.
Off-take temperature, F = 857.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 7.64
Tar yield, lb./1000 SCF = 2.66
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data: (dry basis)

Ash discharge ,lb/hour = 239.
Ash carbon ,percent = 4.2
Ash sulfur ,percent = 0.32
Ash moisture (wet), percent = 25.0
Cyclone dust, lb/hour (est.) = 8.

Gas Composition (Dry): (normalized to 99.90)

H2	%	= 14.7	CH4	%	= 1.73	H2S	(est ppm) = 7601
CO	%	= 19.8	C2H4	%	= 0.134		
CO2	%	= 9.20	C2H6	%	= 0.164		
N2	%	= 52.6	C3H6	%	= 0.073		
O2	%	= 0.00	C3H8	%	= 0.072	HHV,	Btu/SCF = 143
Molec. Weight = 25.34			Argon (est. %)	= 0.626	LHV,	Btu/SCF = 132	

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.20)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 1961.	24.4	Dry gas	= 6754.	83.7
Steam (total)	= 912.	11.3	Water in gas	= 772.	9.6
Air (calc, dry)	= 5176.	64.3	Oil and tar	= 269.	3.3
			Ash (calc, dry)	= 262.	3.2
			Dust	= 8.	0.1
Total	= 8049.		Total	= 8066.	

Energy Balance (Percent unaccounted for: -0.30)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 22.6	Dry coal gas	= 14.4	62.0
Air	= 0.058	Oil and tar	= 4.13	17.8
Steam (import)	= 0.054	Sensible	= 2.01	3.6
Cooling water	= 0.290	Latent	= 0.841	3.6
		Ash	= 0.163	0.7
		Dust	= 0.092	0.4
		Cooling water	= 1.587	6.8
Total	= 23.0	Total	= 23.2	

Performance Data

Cold gas efficiency,	percent = 62.5
Cold gas with tar efficiency,	percent = 80.4
Hot gas without tar efficiency,	percent = 73.8
Hot gas with tar efficiency,	percent = 92.7
Air/Coal	(lb./lb.) = 2.640
Steam/Coal	(lb./lb.) = 0.465
Air/Fixed Carbon	(lb./lb.) = 5.849
Coal/Gasifier Area	(lb./hr./sqft) = 59.1
Fixed Carbon/Area	(lb./hr./sqft) = 26.7
Producer Gas/Coal	(SCF/lb.) = 60.0
Producer Gas/Fixed Carbon	(SCF/lb.) = 133.1
Tar Yield	(lb./lb. coal) = 0.137

Table 7-14

Material Balance and Thermal Efficiency Calculation
+1/4 inch, 0.78 tn/hr, 142 F

Input Data

Time period: 8/4/83 16:00 - 8/5/83 10:00 (18.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 0.78
Blast air flow (dry) , Scfm = 845.
Saturated air temperature, F= 142.
Steam/Air Ratio (lb./lb.) = 0.16
Ambient air temperature, F = 79.
Off-take temperature, F = 753.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF, = 7.82
Tar yield, lb/1000 SCF = 2.40
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 174.
Ash carbon ,percent = 4.2
Ash sulfur ,percent = 0.31
Ash moisture (wet),percent = 28.0
Cyclone dust,lb/hour(est.) = 5.

Gas Composition (Dry): (normalized to 99.90)

H2 % = 14.9	CH4 % = 1.54	H2S (est ppm) = 7620
CO % = 21.4	C2H4 % = 0.105	
CO2 % = 8.41	C2H6 % = 0.160	
N2 % = 51.9	C3H6 % = 0.058	
O2 % = 0.00	C3H8 % = 0.072	HHV, Btu/SCF = 145
Molec. Weight= 25.20	Argon(est. %)= 0.618	LHV, Btu/SCF = 135

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -1.62)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 1568.	24.6	Dry gas	= 5409.	83.7
Steam (total)	= 677.	10.6	Water in gas	= 636.	9.8
Air(calc,dry)	= 4117.	64.7	Oil and tar	= 195.	3.0
			Ash(calc,dry)	= 219.	3.4
			Dust	= 5.	0.1
Total	= 6361.		Total	= 6464.	

Energy Balance (Percent unaccounted for: 0.16)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 18.1	Dry coal gas	= 11.8	64.3
Air	= 0.026	Oil and tar	= 3.00	16.4
Steam(import)	= 0.042	Sensible	= 1.37	7.5
Cooling water	= 0.211	Latent	= 0.691	3.8
		Ash	= 0.135	0.7
		Dust	= 0.055	0.3
		Cooling water	= 1.303	7.1
Total	= 18.4	Total	= 18.3	

Performance Data

Cold gas efficiency, percent = 64.2
Cold gas with tar efficiency, percent = 80.5
Hot gas without tar efficiency percent = 74.5
Hot gas with tar efficiency, percent = 91.6
Air/Coal (lb./lb.) = 2.626
Steam/Coal (lb./lb.) = 0.432
Air/Fixed Carbon (lb./lb.) = 5.818
Coal/Gasifier Area (lb./hr./sqft) = 47.2
Fixed Carbon/Area (lb./hr./sqft) = 21.3
Producer Gas/Coal (SCF/lb.) = 60.7
Producer Gas/Fixed Carbon (SCF/lb.) = 134.4
Tar Yield (lb./lb. coal) = 0.125

Table 7-15

Material Balance and Thermal Efficiency Calculation
+1/4 inch, 0.79 tn/hr, 141 F

Input Data

Time period: 8/5/83 10:00 - 8/8/83 8:00 (70.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 0.79
Blast air flow (dry) , Scfm = 844.
Saturated air temperature, F= 141.
Steam/Air Ratio (lb./lb.) = 0.16
Ambient air temperature, F = 86.
Off-take temperature, F = 749.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 7.23
Tar yield, lb/1000 SCF = 2.88
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 168.
Ash carbon ,percent = 7.2
Ash sulfur ,percent = 0.27
Ash moisture (wet),percent = 17.8
Cyclone dust,lb/hour(est.) = 5.

Gas Composition (Dry): (normalized to 99.90)

H2	%	= 15.6	CH4	%	= 1.50	H2S	(est ppm)	= 7768
CO	%	= 22.2	C2H4	%	= 0.118			
CO2	%	= 7.43	C2H6	%	= 0.167			
N2	%	= 51.4	C3H6	%	= 0.047			
O2	%	= 0.00	C3H8	%	= 0.046	HHV,	Btu/SCF	= 149
Molec. Weight=		24.85	Argon(est. %)	= 0.611	LHV,	Btu/SCF	= 139	

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.50)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 1579.	25.5	Dry gas	= 5204.	83.8
Steam (total)	= 631.	10.2	Water in gas	= 574.	9.2
Air(calc,dry)	= 3970.	64.2	Oil and tar	= 229.	3.7
			Ash(calc,dry)	= 199.	3.2
			Dust	= 5.	0.1
Total	= 6180.		Total	= 6211.	

Energy Balance (Percent unaccounted for: -1.56)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 18.2	Dry coal gas	= 11.8	63.0
Air	= 0.049	Oil and tar	= 3.51	18.7
Steam(import)	= 0.035	Sensible	= 1.34	7.1
Cooling water	= 0.221	Latent	= 0.628	3.3
		Ash	= 0.207	1.1
		Dust	= 0.054	0.3
		Cooling water	= 1.230	6.5
Total	= 18.5	Total	= 18.8	

Performance Data

Cold gas efficiency, percent = 63.9
Cold gas with tar efficiency, percent = 82.9
Hot gas without tar efficiency percent = 73.6
Hot gas with tar efficiency, percent = 93.4
Air/Coal (lb./lb.) = 2.515
Steam/Coal (lb./lb.) = 0.400
Air/Fixed Carbon (lb./lb.) = 5.573
Coal/Gasifier Area (lb./hr./sqft) = 47.6
Fixed Carbon/Area (lb./hr./sqft) = 21.5
Producer Gas/Coal (SCF/lb.) = 58.2
Producer Gas/Fixed Carbon (SCF/lb.) = 129.0
Tar Yield (lb./lb. coal) = 0.145

Table 7-16

Material Balance and Thermal Efficiency Calculation
+1/4 inch, 1.03 tn/hr, 141 F

Input Data

Time period: 8/8/83 10:00 - 8/9/83 14:00 (28.0 hours)

Gasifier Operation:		Coal Data:	
Coal feed, Ton/hour	= 1.03	Type = Illinois No. 6	
Blast air flow (dry) , Scfm	= 981.	Mass Fraction Carbon %	= 63.9
Saturated air temperature, F	= 141.	Mass Fraction Fixed Carbon	= 45.13
Steam/Air Ratio (lb./lb.)	= 0.16	Mass Fraction Moisture %	= 9.57
Ambient air temperature, F	= 81.	Mass Fraction nitrogen %	= 1.21
Off-take temperature, F	= 749.	Mass Percent sulfur	= 3.70
		Heating value, Btu/lb	= 11537

Tar and Water Yield (dry basis):		Ash and Dust Data:(dry basis)	
Water yield, lb./1000 SCF	= 7.25	Ash discharge ,lb/hour	= 258.
Tar yield, lb/1000 SCF	= 3.07	Ash carbon ,percent	= 8.5
Carbon in Tar (percent)	= 81.4	Ash sulfur ,percent	= 0.28
Sulfur in Tar (percent)	= 2.44	Ash moisture (wet),percent	= 17.6
Tar HHV, thou. Btu/lb	= 15.35	Cyclone dust,lb/hour(est.)	= 8.

Gas Composition (Dry): (normalized to 99.90)

H2 %	= 16.2	CH4 %	= 1.62	H2S (est ppm)	= 8165
CO %	= 25.1	C2H4 %	= 0.148		
CO2 %	= 5.82	C2H6 %	= 0.173		
N2 %	= 49.3	C3H6 %	= 0.050		
O2 %	= 0.00	C3H8 %	= 0.050	HHV, Btu/SCF	= 163
Molec. Weight	= 24.44	Argon(est. %)	= 0.587	LHV, Btu/SCF	= 152

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -1.00)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 2067.	27.3	Dry gas	= 6361.	83.1
Steam (total)	= 771.	10.2	Water in gas	= 716.	9.4
Air(calc,dry)	= 4738.	62.5	Oil and tar	= 303.	4.0
			Ash(calc,dry)	= 264.	3.5
			Dust	= 8.	0.1
Total	= 7577.		Total	= 7652.	

Energy Balance (Percent unaccounted for: -2.15)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 23.8	Dry coal gas	= 16.0	65.0
Air	= 0.038	Oil and tar	= 4.65	18.8
Steam(import)	= 0.050	Sensible	= 1.67	6.8
Cooling water	= 0.239	Latent	= 0.785	3.2
		Ash	= 0.323	1.3
		Dust	= 0.087	0.4
		Cooling water	= 1.139	4.6
Total	= 24.2	Total	= 24.7	

Performance Data

Cold gas efficiency,	percent	= 66.3
Cold gas with tar efficiency,	percent	= 85.6
Hot gas without tar efficiency	percent	= 75.5
Hot gas with tar efficiency,	percent	= 95.6
Air/Coal	(lb./lb.)	= 2.292
Steam/Coal	(lb./lb.)	= 0.373
Air/Fixed Carbon	(lb./lb.)	= 5.079
Coal/Gasifier Area	(lb./hr./sqft)	= 62.3
Fixed Carbon/Area	(lb./hr./sqft)	= 28.1
Producer Gas/Coal	(SCF/lb.)	= 55.3
Producer Gas/Fixed Carbon	(SCF/lb.)	= 122.5
Tar Yield	(lb./lb. coal)	= 0.147

Table 7-17

Material Balance and Thermal Efficiency Calculation
+1/4 inch, 0.99 tn/hr, 147 F

Input Data

Time period: 8/15/83 20:00 - 8/16/83 8:00 (12.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 0.99
Blast air flow (dry) , Scfm = 1132.
Saturated air temperature, F = 147.
Steam/Air Ratio (lb./lb.) = 0.19
Ambient air temperature, F = 82.
Off-take temperature, F = 970.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 7.81
Tar yield, lb/1000 SCF = 1.71
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 250.
Ash carbon ,percent = 24.0
Ash sulfur ,percent = 0.59
Ash moisture (wet),percent = 22.5
Cyclone dust,lb/hour(est.) = 9.

Gas Composition (Dry): (normalized to 99.90)-

H2	%	= 16.0	CH4	%	= 1.60	H2S	(est ppm) = 7964
CO	%	= 22.3	C2H4	%	= 0.198		
CO2	%	= 8.09	C2H6	%	= 0.161		
N2	%	= 50.0	C3H6	%	= 0.062		
O2	%	= 0.00	C3H8	%	= 0.037	HHV,	Btu/SCF = 153
Molec. Weight = 24.84			Argon(est. %)	= 0.595	LHV,	Btu/SCF = 143	

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.72)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 1983.	25.5	Dry gas	= 6511.	83.3
Steam (total)	= 942.	12.1	Water in gas	= 777.	9.9
Air(calc,dry)	= 4838.	62.3	Oil and tar	= 170.	2.2
			Ash(calc,dry)	= 352.	4.5
			Dust	= 9.	0.1
Total	= 7763.		Total	= 7819.	

Energy Balance (Percent unaccounted for: -0.57)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 22.9	Dry coal gas	= 15.2	64.6
Air	= 0.043	Oil and tar	= 2.61	11.1
Steam(import)	= 0.131	Sensible	= 2.18	9.3
Cooling water	= 0.346	Latent	= 0.838	3.6
		Ash	= 1.201	5.1
		Dust	= 0.100	0.4
		Cooling water	= 1.395	5.9
Total	= 23.4	Total	= 23.5	

Performance Data

Cold gas efficiency, percent = 65.0
Cold gas with tar efficiency, percent = 76.2
Hot gas without tar efficiency percent = 77.1
Hot gas with tar efficiency, percent = 89.0
Air/Coal (lb./lb.) = 2.439
Steam/Coal (lb./lb.) = 0.475
Air/Fixed Carbon (lb./lb.) = 5.405
Coal/Gasifier Area (lb./hr./sqft) = 59.8
Fixed Carbon/Area (lb./hr./sqft) = 27.0
Producer Gas/Coal (SCF/lb.) = 58.5
Producer Gas/Fixed Carbon (SCF/lb.) = 129.6
Tar Yield (lb./lb. coal) = 0.086

Table 7-18

Material Balance and Thermal Efficiency Calculation
+1/4 inch, 1.89 tn/hr, 144 F

Input Data

Time period: 8/16/83 16:00 - 8/17/83 8:00 (16.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 1.89
Blast air flow (dry) , Scfm = 1722.
Saturated air temperature, F = 144.
Steam/Air Ratio (lb./lb.) = 0.18
Ambient air temperature, F = 75.
Off-take temperature, F = 938.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 6.92
Tar yield, lb/1000 SCF = 2.50
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data: (dry basis)

Ash discharge ,lb/hour = 514.
Ash carbon ,percent = 13.5
Ash sulfur ,percent = 0.49
Ash moisture (wet), percent = 24.4
Cyclone dust, lb/hour (est.) = 30.

Gas Composition (Dry): (normalized to 99.90)

H2 % = 16.5	CH4 % = 1.61	H2S (est ppm) = 8094
CO % = 23.5	C2H4 % = 0.187	
CO2 % = 7.40	C2H6 % = 0.178	
N2 % = 49.0	C3H6 % = 0.068	
O2 % = 0.00	C3H8 % = 0.042	HHV, Btu/SCF = 159
Molec. Weight = 24.61	Argon (est. %) = 0.583	LHV, Btu/SCF = 148

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.84)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 3789.	26.9	Dry gas	= 11895.	83.6
Steam (total)	= 1586.	11.2	Water in gas	= 1268.	8.9
Air (calc, dry)	= 8733.	61.9	Oil and tar	= 458.	3.2
			Ash (calc, dry)	= 574.	4.0
			Dust	= 30.	0.2
Total	= 14107.		Total	= 14225.	

Energy Balance (Percent unaccounted for: -0.32)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 43.7	Dry coal gas	= 29.2	66.0
Air	= 0.033	Oil and tar	= 7.04	15.9
Steam (import)	= 0.089	Sensible	= 3.94	8.9
Cooling water	= 0.234	Latent	= 1.383	3.1
		Ash	= 1.110	2.5
		Dust	= 0.332	0.8
		Cooling water	= 1.220	2.8
Total	= 44.1	Total	= 44.2	

Performance Data

Cold gas efficiency, percent = 66.2
Cold gas with tar efficiency, percent = 82.2
Hot gas without tar efficiency percent = 77.2
Hot gas with tar efficiency, percent = 94.1
Air/Coal (lb./lb.) = 2.305
Steam/Coal (lb./lb.) = 0.418
Air/Fixed Carbon (lb./lb.) = 5.107
Coal/Gasifier Area (lb./hr./sqft) = 114.2
Fixed Carbon/Area (lb./hr./sqft) = 51.5
Producer Gas/Coal (SCF/lb.) = 55.6
Producer Gas/Fixed Carbon (SCF/lb.) = 123.2
Tar Yield (lb./lb. coal) = 0.121

Table 7-19

Material Balance and Thermal Efficiency Calculation
+1/4 inch, 2.07 tn/hr, 143 F

Input Data

Time period: 8/17/83 8:00 - 8/18/83 10:00 (26.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 2.07
Blast air flow (dry) , Scfm = 1810.
Saturated air temperature, F = 143.
Steam/Air Ratio (lb./lb.) = 0.17
Ambient air temperature, F = 76.
Off-take temperature, F = 902.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 6.94
Tar yield, lb/1000 SCF = 3.01
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 451.
Ash carbon ,percent = 20.6
Ash sulfur ,percent = 0.52
Ash moisture (wet),percent = 25.4
Cyclone dust,lb/hour(est.) = 33.

Gas Composition (Dry): (normalized to 99.90)

H2 % = 16.5	CH4 % = 1.62	H2S (est ppm) = 8430
CO % = 23.7	C2H4 % = 0.171	
CO2 % = 7.22	C2H6 % = 0.183	
N2 % = 48.9	C3H6 % = 0.065	
O2 % = 0.00	C3H8 % = 0.050	HHV, Btu/SCF = 160
Molec. Weight = 24.59	Argon(est. %) = 0.582	LHV, Btu/SCF = 149

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -1.47)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 4142.	28.2	Dry gas	= 12258.	82.3
Steam (total)	= 1538.	10.5	Water in gas	= 1312.	8.8
Air(calc,dry)	= 8998.	61.3	Oil and tar	= 569.	3.8
			Ash(calc,dry)	= 722.	4.8
			Dust	= 33.	0.2
Total	= 14678.		Total	= 14894.	

Energy Balance (Percent unaccounted for: 0.17)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 47.8	Dry coal gas	= 30.3	63.0
Air	= 0.042	Oil and tar	= 8.74	18.2
Steam(import)	= 0.075	Sensible	= 3.97	8.3
Cooling water	= 0.197	Latent	= 1.439	3.0
		Ash	= 2.112	4.4
		Dust	= 0.364	0.8
		Cooling water	= 1.128	2.3
Total	= 48.1	Total	= 48.0	

Performance Data

Cold gas efficiency, percent = 62.9
Cold gas with tar efficiency, percent = 81.1
Hot gas without tar efficiency percent = 73.0
Hot gas with tar efficiency, percent = 92.2
Air/Coal (lb./lb.) = 2.172
Steam/Coal (lb./lb.) = 0.371
Air/Fixed Carbon (lb./lb.) = 4.813
Coal/Gasifier Area (lb./hr./sqft) = 124.8
Fixed Carbon/Area (lb./hr./sqft) = 56.3
Producer Gas/Coal (SCF/lb.) = 52.5
Producer Gas/Fixed Carbon (SCF/lb.) = 116.4
Tar Yield (lb./lb. coal) = 0.137

Table 7-20

Material Balance and Thermal Efficiency Calculation
+1/4 inch, 2.14 tn/hr, 145 F

Input Data

Time period: 8/18/83 8:00 - 8/19/83 8:00 (24.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 2.14
Blast air flow (dry) , Scfm = 2140.
Saturated air temperature, F = 145.
Steam/Air Ratio (lb./lb.) = 0.18
Ambient air temperature, F = 86.
Off-take temperature, F = 943.

Coal Data:

Type = Illinois No. 6
Mass Fraction Carbon % = 63.9
Mass Fraction Fixed Carbon = 45.13
Mass Fraction Moisture % = 9.57
Mass Fraction nitrogen % = 1.21
Mass Percent sulfur = 3.70
Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 4.54
Tar yield, lb./1000 SCF = 3.97
Carbon in Tar (percent) = 81.4
Sulfur in Tar (percent) = 2.44
Tar HHV, thou. Btu/lb = 15.35

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 322.
Ash carbon ,percent = 19.9
Ash sulfur ,percent = 0.50
Ash moisture (wet),percent = 24.3
Cyclone dust,lb/hour(est.) = 33.

Gas Composition (Dry): (normalized to 99.90)

H2	%	= 16.4	CH4	%	= 1.66	H2S	(est ppm) = 8628
CO	%	= 22.8	C2H4	%	= 0.208		
CO2	%	= 7.78	C2H6	%	= 0.180		
N2	%	= 49.3	C3H6	%	= 0.069		
O2	%	= 0.00	C3H8	%	= 0.042	HHV,	Btu/SCF = 158
Molec. Weight = 24.69			Argon(est. %)	= 0.586	LHV,	Btu/SCF = 147	

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: 2.50)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 4273.	28.8	Dry gas	= 12106.	83.8
Steam (total)	= 1629.	11.0	Water in gas	= 845.	5.9
Air(calc,dry)	= 8911.	60.2	Oil and tar	= 738.	5.1
			Ash(calc,dry)	= 721.	5.0
			Dust	= 33.	0.2
Total	= 14814.		Total	= 14443.	

Energy Balance (Percent unaccounted for: 0.45)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 49.3	Dry coal gas	= 29.4	59.3
Air	= 0.107	Oil and tar	= 11.34	22.9
Steam(import)	= 0.084	Sensible	= 4.13	8.3
Cooling water	= 0.236	Latent	= 0.958	1.9
		Ash	= 2.040	4.1
		Dust	= 0.366	0.7
		Cooling water	= 1.326	2.7
Total	= 49.8	Total	= 49.5	

Performance Data

Cold gas efficiency, percent = 59.0
Cold gas with tar efficiency, percent = 81.8
Hot gas without tar efficiency percent = 67.6
Hot gas with tar efficiency, percent = 91.9
Air/Coal (lb./lb.) = 2.085
Steam/Coal (lb./lb.) = 0.381
Air/Fixed Carbon (lb./lb.) = 4.621
Coal/Gasifier Area (lb./hr./sqft) = 128.8
Fixed Carbon/Area (lb./hr./sqft) = 58.1
Producer Gas/Coal (SCF/lb.) = 47.9
Producer Gas/Fixed Carbon (SCF/lb.) = 106.2
Tar Yield (lb./lb. coal) = 0.173

Table 7-21

Material Balance and Thermal Efficiency Calculation
River King Illinois #6 Overall Average

Input Data

Time period: Overall Average (326.0 hours)

Gasifier Operation:	Coal Data:
Coal feed, Ton/hour = 1.26	Type = Illinois No. 6
Blast air flow (dry) , Scfm =1221.	Mass Fraction Carbon % = 63.9
Saturated air temperature, F= 144.	Mass Fraction Fixed Carbon = 45.13
Steam/Air Ratio (lb./lb.) = 0.18	Mass Fraction Moisture % = 9.57
Ambient air temperature, F = 82.	Mass Fraction nitrogen % = 1.21
Off-take temperature, F = 853.	Mass Percent sulfur = 3.70
	Heating value, Btu/lb = 11537

Tar and Water Yield (dry basis):	Ash and Dust Data:(dry basis)
Water yield, lb./1000 SCF = 6.97	Ash discharge ,lb/hour = 267.
Tar yield, lb/1000 SCF = 2.83	Ash carbon ,percent = 11.2
Carbon in Tar (percent) = 81.4	Ash sulfur ,percent = 0.43
Sulfur in Tar (percent) = 2.44	Ash moisture (wet),percent = 24.5
Tar HHV, thou. Btu/lb = 15.35	Cyclone dust,lb/hour(est.) = 13.

Gas Composition (Dry): (normalized to 99.90)

H2 % = 16.3	CH4 % = 1.66	H2S (est ppm)= 8027
CO % = 22.9	C2H4 % = 0.161	
CO2 % = 7.48	C2H6 % = 0.176	
N2 % = 49.7	C3H6 % = 0.062	
O2 % = 0.00	C3H8 % = 0.045	HHV, Btu/SCF = 157
Molec. Weight= 24.68	Argon(est. %) = 0.591	LHV, Btu/SCF = 146

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: -0.32)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 2522.	26.5	Dry gas	= 7956.	83.5
Steam (total)	= 1069.	11.2	Water in gas	= 853.	8.9
Air(calc,dry)	= 5914.	62.2	Oil and tar	= 346.	3.6
			Ash(calc,dry)	= 367.	3.8
			Dust	= 13.	0.1
Total	= 9504.		Total	= 9534.	

Energy Balance (Percent unaccounted for: -0.67)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 29.1	Dry coal gas	= 19.1	64.6
Air	= 0.055	Oil and tar	= 5.30	17.9
Steam(import)	= 0.080	Sensible	= 2.39	8.0
Cooling water	= 0.213	Latent	= 0.933	3.1
		Ash	= 0.587	2.0
		Dust	= 0.140	0.5
		Cooling water	= 1.156	3.9
Total	= 29.5	Total	= 29.7	

Performance Data

Cold gas efficiency,	percent = 65.0
Cold gas with tar efficiency,	percent = 83.0
Hot gas without tar efficiency	percent = 75.1
Hot gas with tar efficiency,	percent = 94.2
Air/Coal	(lb./lb.) = 2.345
Steam/Coal	(lb./lb.) = 0.424
Air/Fixed Carbon	(lb./lb.) = 5.197
Coal/Gasifier Area	(lb./hr./sqft) = 76.0
Fixed Carbon/Area	(lb./hr./sqft) = 34.3
Producer Gas/Coal	(SCF/lb.) = 55.8
Producer Gas/Fixed Carbon	(SCF/lb.) = 123.7
Tar Yield	(lb./lb. coal) = 0.137

Figures 7-13 and 7-14 show the experimental data and the theoretical predictions for the two time periods, respectively. The model generally predicts ash removal, but further refinements are necessary to account for data that vary widely from predictions.

7.4 Tar Yield Correlations

The overall tar yield measured during gasification of River King Illinois #6 coal was 13.7 lb/100 lb coal. This value varied from 7.5 to 17.3. This tar yield can be compared to Fischer-Schrader Assays of Similar Coals (Selvig and Ode, 1957). The Fischer-Schrader Assay tar/oil yield correlations described by Ode and Selvig (1944) and Goodman et al (1958) have predicted tar/oil yields from past gasification tests within acceptable error bounds.

There is no Fischer Assay available for this coal. As can be seen from Figures 7-15 and 7-16, the correlations of tar/oil yields of similar coals predict a tar oil yield of 11.1 to 11.8 lb/100 lb coal (as received). The tar/oil yield measured during this test is higher, but within the scatter of the correlations.

7.5 Combustion Emissions Monitoring

Emissions from the gas combustion chamber were monitored on August 3. A full report on this monitoring is included in Appendix J. The report is abstracted here.

Particulate loadings averaging .042 grains/dscf were observed. These correspond to mass rates averaging 6.1 lb/hr and particulate emission factor of .14 lb/million Btu input. Assuming the particulate is ash, it corresponds to 1.4% of the ash flow entering the gasifier. Corresponding dust flow rates leaving the cyclone would be 5% of the coal feed rate. This is somewhat higher than measured dust rates leaving the retort (Section 7.6).

Sulfur dioxide concentrations averaging 1926 pm (dry) were measured. This corresponds to a mass flow averaging 322 lb/hr and a sulfur dioxide emission factor of 7.73 lb/million Btu input. If all coal sulfur were ultimately converted to sulfur dioxide, the sulfur dioxide mass flow would be 283 lb/hr. This indicates essentially complete conversion of coal sulfur to the overhead product stream and is confirmed by the low sulfur flows out the ash pit.

Nitric oxide concentrations averaged 172 ppm (dry).

Figure 7-13

Comparison of the Geometrical Grate Performance Model
with Average Ash Removal Rates I

Figure 7-14

Comparison of the Geometrical Grate Performance Model
with Average Ash Removal Rates II

Figure 7-15

Tar/oil Yield Comparison with Volatile Matter-Oxygen Correlation

Reference: Ode and Selvig, 1944

Figure 7-16

Tar/oil Yield Comparison with Volatile BTU Correlation

Reference: Gomez et al, 1958

7.6 Retort Particle Sampling

Development efforts continued in regard to measurement of total particle mass loadings, leaving the retort and particle size distributions. The procedures are described in Volume 1 of this series (Thimsen, Maurer et al, 1984).

Thirteen sets of valid data were collected at various times through the test. The data are included in Appendix K. The particle loading data was found to correlate best with product gas face velocity (ft/sec). This could be expected as elutriation of particles from the retort is a function of this parameter. The particle carryover correlated weakly with agitator rate and agitator position. Figure 7-17 shows the dust yield data as a function of gas face velocity as it leaves the coal bed. The correlation equation was used to calculate particle mass loadings for the material and energy balances in Section 7.2.

Three of the particulate samples representing three coal throughput rates were analyzed by sieving and optical microscopy for their size distributions. The particle size distributions were then subjected to modal fitting analysis. The coal consumption rates were 1.3, 2.0, and 2.2 tn/hr throughput.

Appendix K includes the results of these particulate sizing analyses. The mass median diameters are 200, 450, and 480 μm for the respective coal rates listed above. The size distributions can be best fitted with bimodal size distribution functions. The particle size corresponding to the larger mode in each volume (mass) distribution increases from 286 to 903 to 1400 μm for the respective coal rates listed above.

Figure 7-17

Dust Carryover vs. Gas Face Velocity

SECTION 8

CONCLUSIONS

1. The maximum throughput observed was 2.4 ton/hour for 16 hours. Throughputs in excess of 1.9 tons per hour were observed for more than 105 hours.
2. A coal throughput of 2.1 ton/hour (127 lb/hour/square foot grate) is recommended for design purposes. Based on this throughput and a blast saturation temperature of 143 F (61.7 C) the following material and energy flows can be expected:

Material in (lb/lb coal)		Energy In (million Btu/hr)	
Air	2.172	Coal	48.4
Steam	.371	Steam (import)	.1
Material out (lb/lb coal)		Energy Out (million Btu/hr)	
Dry Gas	2.959	Dry Coal Gas	30.6
Tar/Oil	.137	Tar/Oil	8.8
Water	.316	Sensible, Latent Heat	5.5
Dust	.008	Dust	.4
Ash	.174	Ash	2.1
		Cooling Water	1.1

3. The mass weighted average tar/oil yield was 13.7 lb/100 lb coal. This represents 18% of the energy in the coal. The tar/oil yield varied from 7.5 to 17.3 lb/100 lb coal.
4. The ash removal is generally predicted by a geometrical grate model.
5. Blast saturation temperatures between 137 F and 149 F (58 C and 65 C) were used. Some crusting was noted at the lower blast saturation temperatures. Control of blast saturation temperature at high throughputs was poor.
6. Agglomerations of coal char were detected, but the agitator was adequate to keep large agglomerations of char from forming in the upper zone of the retort.
7. Higher coal throughputs were achieved gasifying the +1/4 inch coal than were achieved gasifying the +3/4 inch coal.
8. Particle emissions from the coal gas flame were 0.14 lb/million Btu input. Sulfur dioxide emissions were 7.23 lb/million Btu input; essentially all of the sulfur in the coal.
9. Particle loss as a fraction of coal throughput could be

characterized as a power function of the produced gas flow rate. Mass median particle sizes measured averaged from 200 um to 480 um. The particle size distributions could be fitted well to a bimodal size distribution function.

10. Based on this test, the River King Illinois #6 coal is recommended as a fixed-bed gasifier fuel with agitation. Very high throughputs are possible and gas quality is good.

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APPENDICES

A. Gasifier Operator's Log.....	A-1
B. Weather Data for Testing Days.....	B-1
C. Coal Analysis Data.....	C-1
D. Coal Addition Log.....	D-1
E. Ash Analysis Data.....	E-1
F. Ash Removal Log.....	F-1
G. Operator Logged Data.....	G-1
H. Gas Chromatograph Data.....	H-1
I. Continuous Output Transducer Data.....	I-1
J. Stack Sampling Report.....	J-1
K. Retort Particle Sampling Data.....	K-1

APPENDIX A

Gasifier Operator's Log

These are the comments recorded by the gasifier operators during the course of the test.

TEST LOG

July 28, 1983

- 0850 Metallurgical coke weight is 8.34 tons.
- 0925 Lit the gasifier.
- 0930 Smoke is coming out of the roof vent.
- 0945 Started the caustic and scrubber pumps.
- 0953 Vent is ignited.
- 1045 Started the induced draft fan and combustor.
- 1055 Gas has gone to the combustor. Increased the saturation air flow to 1000 cfm.
- 1115 Increased the primary blower to 4000 cfm. and the secondary blower to 1000 cfm.
- 1220 Increased the saturation temperature from 61 degrees C. to 64 degrees C.
- 1230 Ran the agitator one full turn.
- 1250 Started the agitator at 2.5 sweeps/hour.
- 1300 Heard a loud noise and the coal weight went from 9 tons to .38 tons. The coal bin weight cells fell out of place. The manhole for the upper bin is leaking gas.
- 1400 The grate drive is working at the rate of 2/2.00.
- 1415 Illinois #6 just entered the retort. The coal pipes are empty.
- 1455 Increased the agitator speed to 6.0. Initial weight for Illinois #6 coal into the retort is not known due to the coal weigh cell problem. The bin had to be jacked up and the cells realigned.
- 1515 The weigh cells have been repositioned under the bin and it now shows 4.94 tons.
- 1600 During this firetest the bars hit crust about 6 inches down. Only bar number 1 went in easily. Increased the grate speed to 2/2.50.

- 1630 Both the saturation and offtake temperatures are holding steady. Jacket water is at 17 gpm. and 40 psi.
- 1720 The ash weight indicator is now reading correctly. It was never turned off "calibrate" on the downstairs wall panel.
- 1800 The firebed is very even and there is a mild glow in holes number 2 & 3. The bars are going in with a little difficulty about 4-5 feet below the poke holes. There is a crust at this level, but no crust on the ash layer. Leaving the grate speed at 2/2.50.
- 1815 Increasing the agitator to 7.5 sweeps/hour in attempt to hold the freeboard at 38 inches.
- 1820 Dumped the cyclone and found no dust.
- 1900 Found the steam to be on for retort access port number 6. It apparently has been on for an hour. This has affected the CO/CO₂.
- 1905 During this freeboard a glowing was again noted on holes number 2 & 3. These were raked and poked.
- 1930 Slowed the agitator to 5.5 sweeps/hour.
- 1940 The saturation temperature has begun to swing between 62 & 68 degrees C. The jacket water control valve is 100% open. This gives 18 gpm on automatic. The off-take temperature is 476 degrees C. Increased the jacket water flow to 20 gpm at 50 psi. Raked and poked holes #2 & #3.
- 1948 Offtake temperature is now at 424 degrees C.
- 1950 Offtake pressure and cyclone outlet pressure are now at 0.7 and 0.5 inches w.g. respectively. The gas valve is 10% open. Reduced the furnace pressure from 50 to 40 in attempt to maintain a 1.0 and 0.8 inches w.g on the offtake pressure and cyclone outlet pressure.
- 2000 During this fire test the bars had to be hammered in.
- 2020 Offtake temperature is 500 degrees C. We are continuing to poke and rake the holes number 2 & 3. We are doing this every 15-20 minutes. The offtake temperature dropped 40 degrees C.
- 2030 Coal consumption continues to fall. Now it is only taking 0.70 tons/hour.
- 2100 Dumped 53 pounds of ash. Used the upper nozzles spraying about 10 gallons each. The largest particles of ash are 1.5 inches, but mostly a fine silt.

- 2110 The grate speed control is down. We wired it directly. It is running full out at 5 teeth.
- 2200 During this fire test the bars still had to be pounded down about 4 feet.
- 2300 Continuing to rake holes number 2 & 3.
- 2320 We have had about 1/2 hour of stable saturation temperature at 64 degrees C. The offtake has also been fairly steady.
- 2330 Offtake temperature is 496 degrees C. The saturation temperature is running between 63 & 64 degrees C.

July 29, 1983

- 0030 Increased the agitator speed to 11.0 sweeps/hour.
- 0130 Dumped ash. Slowed the grate to 3 teeth.
- 0215 Slowed the agitator to 9.0 sweeps/hour.
- 0347 Opened up the downcomer tee. Liquid tar flowed out like "Black Texas Tea".
- 0350 Changed the caustic drum.
- 0730 Dumped the cyclone and found very little particulate.
- 0800 Had to use the sledge on bars number 3,4 & 6 during this fire test.
- 0820 Put the saturation temperature controller on 62 degrees C. and we are using steam to get better control. The jacket water flow is 15 gpm.
- 0900 Increased the induced draft fan 120 to get negative pressure at the clean out hole. Increased the primary air to 4800 cfm and the secondary air to 13500 cfm. Closed the gas supply valve to 5% open to increase gas supply pressure. Number 2 scrubber pump valve was closed, but now is open.
- 0910 Minnesota Bearing rep is in to check the grate drive controller.
- 0940 Reduced the induced draft fan to 80 to increase the gas offtake pressure.
- 0945 The pH is 4.0. Increased the pump setting to 40/40.
- 0950 Lowered the induced draft fan to 60 to increase the offtake pressure. It is still positive at the combustor.

1000 During this fire test we had to use the sledge on bars number 4 & 5.

1020 Started the grate up with automatic control at 3/4.00, with the grate motor at 4 amps.

1100 Dumped 749 pounds of ash. The ash was dry with some large clinkers 6-8 inches in size.

1115 Noticed the offtake temperature wires were loose.

1130 Increased the agitator speed to 10.0 sweeps/hour.

1205 The Bureau of Mines just brought a tour group through the facility.

1215 The offtake temperature is recording a straight line. The CO and CO2 changes by increasing or slowing the agitator.

1310 Gas quality has been steadily improving over the past 5 hours. The GC data shows the lower heating value to be +140 BTU and the higher heating value at +150 BTU. This is up 10 BTU from this morning.

1315 Changed the grate counter so it will count once every rph. It was striking once and twice every rph.

1330 Increased the agitator speed to 11.5 sweeps/hour.

1340 The offtake temperature has dropped from 470 to 412 degrees C.

1415 Dumped 769 pounds of mostly fine particles of ash. There were a few 1-6 inch clinkers.

1430 Increased the agitator speed to 14.0 sweeps/hour. Coal up weight - 1.41 tons.

1530 The freeboard swung 5.5 inches in the last half hour. Reduced the agitator speed to 15.0 sweeps/hour. The coal is now feeding at a rate of 1.4 tons/hour. The saturation air flow is 1000 cfm. Saturation temperature is 62 degrees C. The cyclone particulate is very light both on top and on the bottom. Gas is leaking from the slide valve packing on the cyclone and from the number 2 & 3 retort access ports. The offtake temperature is 388 degrees C.

1553 The offtake temperature is back up to 400 degrees C.

1555 Leaving the agitator speed at 15.0 sweeps/hour.

1600 During this fire test we tried two bars with the sledge on hole number one and found some very stubborn clink-

- ers. There were no hot bars. Shut the agitator off for 5 minutes to remove the pinched number 6 bar.
- 1615 The fusion temperature of the coal appears to be higher than expected. Reducing the saturation temperature to 60 degrees C. The saturation air flow is still 1000 cfm.
- 1620 Leaving the grate speed at 4/4.00.
- 1630 Reducing the agitator to 12.5 sweeps/hour.
- 1730 Coal feed has now dropped to just under 1 ton/hour. CO is 22% and CO2 is 8%. The offtake temperature is 440-455 degrees C.
- 1800 Leaving the grate at 4/4.00. Slowing the agitator to 12.0 sweeps/hour.
- 1855 Dumped 828 pounds of ash.
- 1930 Offtake temperature is 416 degrees C. CO is 24% and CO2 is 6.7% and Hydrogen is 16%. Increasing the agitator to 12.5 sweeps/hour.
- 1936 Lower heating value is 141 BTU/cubic foot. Higher heating value is 151 BTU/FT3. Offtake temperature is 395 degrees C. Fire loss pressure continues to decline (3.3 inches w.g.)
- 2000 Increased the agitator speed to 12.5 sweeps/hour. Leaving the grate speed at 4/4.00.
- 2030 Increased the jacket water to 18 gpm to maintain a 60 degree C. saturation temperature. Closed the steam control valve slightly from 20 to 18% open.
- 2100 Washing the coal. Started coaling up at 2.69 tons. Offtake temperature is 456 degrees C. Ash weight is 550 pounds. Will empty it after completion of coaling up.
- 2145 Dumped 943 pounds of ash. Noticed one huge chunk 9" X 9" X 5" with a circumference of 23 inches!!! It weighed 5 pounds! Found many smaller chunks 3-4 inches long and 2 inches wide.
- 2150 The pH is 4.0. The caustic barrel was empty, so changed and put on a partially full one. Will check it again in 2 hours.
- 2200 Increased the grate to 5/4.00. Had to turn off the agitator for 5 minutes to winch out number 7 bar.
- 2230 Coal leg temperature is 80 degrees C. The offtake

temperature is 336 degrees C.

2330 Coal leg temperature is 81 degrees C. Dropped one ton of coal and the legs are choked full.

July 30, 1983

0200 Slowed the grate to 4/4.00.

0230 Coal up weight 1.04 tons.

0330 Coal up weight 1.08 tons.

0420 Started loading coal.

0428 Dumped ash.

0530 Coal up weight .81 tons.

0600 During this fire test the bars went in easily with no clinkers evident.

0830 Number 2 scrubber drain is 1/2 open and found the valve 3/4 plugged. The secondary blower is making some noise. Took the cover off and greased the bearings. The motor was running hot, so took out the plugs and greased it. Checked the downcomer and found mostly loose or soft tar.

0900 Dumped 780 pounds of ash. Used the upper nozzles to flush. There was very little water in the ash. There were some clinkers, mostly 1.5 inches with just a few in the 6 inch range.

1000 Increased the grate to 3/4.00.

1030 The secondary combustion fan is cooling down. The noise level is also on the decline. Found the chart feed arms were in backwards.

1106 The bed condition is very good. Gas quality is good. It appears that 60 degrees C is ideal for the saturation temperature for this coal at a saturation air flow of 1000 cfm. We will reduce the saturation air temperature to 58 degrees C. to seek the lower limit. If the bed deteriorates or the gas quality starts to decline, we will return to 60 degrees C. We will maintain the 1000 cfm saturation air flow until Monday morning.

1115 Lowered the saturation temperature to 58 degrees C. Cleaned the shaker screen as it was 1/4 plugged. Increased the agitator to 11.0 sweeps/hour.

1200 Slowed the grate to 3/3.50.

- 1230 Dumped 815 pounds of ash. The clinkers seem to be larger and all over. Very few of the clinkers are smaller than one inch.
- 1245 Started coaling up at 4.8 tons. Repaired the leaky water hose for the shaker spray.
- 1250 Ash pit and fire loss pressures each dropped 2 inches w.g. after we dumped ash. Flushed the cyclone and got very little particulate (only 1/2 inch of floating silt and nothing on the bottom).
- 1325 The gas quality appears to be changing. The CO is 22% and the CO2 is 8%.
- 1330 Increased the jacket water flow to 20 gpm to give us better control with the steam saturation.
- 1415 Coal up weight 11.85 tons.
- 1445 Ash pit and fire loss pressure is down to 3.0 and 2.1 inches w.g. respectively. The offtake temperature made a sudden rise to 450 degrees C. from 400 degrees C.
- 1530 The fire loss pressure is low at 1.5 inches w.g. The offtake temperature is 471 degrees C. Regarding gas quality, the CO is 24.7%, CO2 is 6.7% and H2 is 16.7%. The lower heating value is 143 BTU/FT3 and the higher heating value is 153 BTU/FT3. We are using about 1 ton of coal per hour at a saturation air flow of 1000 cfm and saturation temperature of 58 degrees C. The pH is 6.5. The cyclone was clean upon checking it, with only a small amount of floating particulate and only 2-3 scoops on the bottom. Slowed the agitator to 10.5 sweeps/hour. We are still trying to maintain a 36 inch freeboard.
- 1600 Leaving the grate speed at 3/3.50.
- 1630 Fire loss pressure continues to stay in the range of 1.6-1.7 inches w.g. The CO is still running a little over 24% and the CO2 is running 6.8%. Offtake temperature is ranging between 440 & 450 degrees C.
- 1700 The caustic barrel ran dry. The pH is 4.0. Changed barrels.
- 1720 Dumped 611 pounds of ash. Still getting some big ones.
- 1800 Increased the grate speed to 3/3.90.
- 1830 Still feeding a little over 1 ton per hour. Fire loss pressure has come up to 2.1 inches w.g. Offtake temperature is between 418 & 423 degrees C. The gas quality is down a little. The CO is 24.3%, CO2 is 7.1% and

the H₂ is 15.5%. The lower heating value is 136 BTU/FT³ and the higher heating value is 146 BTU/FT³. The pH is 6.2.

- 1920 The CO alarm is going off. It has run for 6-7 minutes. There is a very heavy gas smell outside and on the upper levels. Found nothing unusual outside upon inspection. No obvious coal bin leaks. Must have been a change in the wind direction.
- 1930 The pH is 6.2. Coal feed is still a little over 1 ton per hour.
- 1952 The CO alarms are going off again. This usually only occurs after coal feeds.
- 2000 Slowed the grate to 3/3.65. Very dirty bars on this fire test.
- 2018 Went upstairs to check the CO alarm. It is going off all during the firetest. Gas is coming from the south coal leg slide valve. Shut the window on the east side of the building and the alarm went off.
- 2025 Dumped 750 pounds of ash. There were a few fist sized chunks. Trying to get a representative size distribution with each ash sample. There was very little water in the ash cone.
- 2030 The offtake temperature is in the 450-470 degree C. range.
- 2125 Started coaling up at 4.863 tons. Still washing the coal.
- 2130 The pH is 6.2. There seems to be excessive vibration from the new section of stainless running to the stack from the induced draft fan.
- 2200 The bed appears to have evened out. Slowed the grate to 3/3.30. The grate has really been churning out the ash. It is already up to 630 pounds in 25 minutes.
- 2220 Stopped coaling up at 11.17 tons.
- 2230 The pH is 6.2-6.5. The CO is 30.4%, the CO₂ is 6.5% and the H₂ is 18.5%. Offtake temperature is 465 degrees C. Coal feed is just under 1 ton/hour.

July 31, 1983

- 0000 The bars went in easily during this fire test with no obvious clinkers.

0100 Dumped 698 pounds of ash.

0130 Coal up - 1 ton.

0230 Coal up - 1 ton.

0330 Coal up - .94 ton.

0340 Slowed the agitator to 9.5 sweeps/hour in attempt to drop the freeboard.

0420 Increased the agitator speed to 10 sweeps/hour.

0422 Started loading coal at 5.18 tons. Increased the caustic pump speed by 5 on both load and swing.

0515 Finished loading coal at 11.92 tons.

0535 Dumped ash.

0538 CO alarm on the 4th floor is going off. Suspect it is out of calibration. There is gas coming from the south coal leg, but the meter only shows 60 ppm.

0600 During this fire test the bars went in with a little difficulty. It feels like a crust forming.

0630 Coal up - 1 ton.

0730 Offtake temperature is a bit erratic. Found a loose wire on the thermocouple. Offtake temperature now is reading 410 degrees C from 475 degrees C. The shaker screen is 1/4 plugged. Will clean it before coal up. The induced draft fan is vibrating the upper elbow. The secondary fan sounds good.

0825 Fire test bars indicate the 58 degree saturation temperature is too low for the saturation air flow of 1000 cfm. Clinkering has increased to the point that the firebed is deteriorating and slightly more channeling is evident. It is getting progressively more difficult to penetrate the firebed with the poke rods. The University is programing the MACSYM to sample and write to the disc every minute. At 0900 we will drop the saturation air flow to 400 cfm. The gas quality will be carefully monitored. Gas quality vs. load swing will be monitored through the day with several rapid increases and decreases in load. The saturation temperature will be held at 58 degrees C. for the first initial load drop to 400 cfm.

0855 Dumped 585 pounds of ash. This was mostly fine clinkers.

0900 The saturation air flow is 400 cfm. The primary air is 4000 cfm and the secondary air is 9000 cfm. The gas

supply valve is closed.

- 0930 Jacket water flow is 15 gpm.
- 1000 Firebed looks fairly even. The bars went in easily except for number 1. Could not see any appreciable difference in the bed from a saturation air flow of 1000 cfm to 400 cfm. The gas quality improved. The CO is at 27%.
- 1010 The saturation air flow is 1000 cfm. The primary air is 4500 cfm and the secondary air is 10,000 cfm.
- 1025 The jacket water flow is 17 gpm. Water is slopping over the scrubber tanks at 20 gpm. Changed the induced draft fan spray nozzle as the old one was plugged.
- 1100 Increased the agitator to 11.0 sweeps/hour. Opened the gas supply valve to 15%. Lowered the outlet pressure to 1.0 inches w.g.
- 1130 The agitator is at 10.0 sweeps/hour. The caustic pump is set at 40/40.
- 1200 The bars went in with some effort on this fire test.
- 1210 The saturation air flow is down to 400 cfm. Saturation temperature is 58 degrees C. Jacket water flow is 15 gpm. Leaving the grate speed at 3/2.30.
- 1230 Dumped 550 pounds of ash. It was mostly clinkers 1 inch in size.
- 1250 Started coaling up at 4.38 tons.
- 1300 Jacket water is flowing at 12.0 gpm.
- 1330 The agitator setting is 6.5 sweeps/hour.
- 1400 Increased the grate speed to 3/2.40.
- 1530 The pH is 6.5. Saturation air flow is 400 cfm. Saturation temperature is 58 degrees C. Coal feed appears to be averaging 0.6 tons/hour now.
- 1630 Offtake temperature is 344 degrees C. The gas quality is not bad with the CO at 23.8%, CO₂ at 5.8% and the H₂ at 14.0%. Lower heating value is 129.56 BTU/FT³ and the higher heating value is 138.74 BTU/FT³.
- 1700 Dumped and sampled 738 pounds of ash. The ash was fairly moist.
- 1800 During this fire test the bars went in easily. Leaving the grate speed at 3/2.40.

- 2000 Reduced the agitator to 5.8 sweeps/hour. Reduced the grate to 3/2.20.
- 2100 Dumped and sampled 678 pounds of ash. The pH is 6.5.
- 2200 The bed is very uneven. Must use the hammer a little to get the bars in. Increasing the grate speed to 2.50.
- 2230 Coal in the upper bin is down to 4.54 tons. At a saturation air flow of 400 cfm at a saturation temperature of 58 degrees C, the coal feed averaged 0.56 tons/hour.
- 2300 P-703 through P-706 are all about .5 inches w.g.
- 2320 Saturation temperature is fluctuating between 57 & 59 degrees C.
- 2323 Reducing the furnace pressure to 37. The gas supply valve is now 15% open. Still trying to maintain pressures of approximately .5 inches w.g. P-703 through P-706 are 0.7, 0.3, 0.4, and 0.6 inches w.g. respectively. Jacket outlet temperature is now at 91 degrees C.
- 2340 Gas quality is as follows: CO= 2.3%, CO2= 7.2% and H2= 15.2%. The higher heating value is 145 BTU/FT3 and the lower heating value is 135 BTU/FT3.
- 2355 The pH has been running between 6.2 and 6.5. Gas is no longer leaking from the combustor poke cover. It had been pouring out two hours ago.

August 1, 1983

- 0000 Reduced the grate to 3/2.30. The bed is fairly even, but some bars are still going in with difficulty.
- 0100 Dump ash.
- 0200 Slowed the agitator to 4.0 sweeps/hour.
- 0400 Changed the grate speed to 2/3.00.
- 0500 Dumped 528 pounds of ash.
- 0730 North slide gate is empty. South slide gate still has coal coming down with a bin weight of .40. The pH is 6.5. Changed the caustic barrel.
- 0810 Dropped the saturation air flow to 200 cfm. We are attempting to determine the low load limit.

0815 The grate is at 1/3.00.

0820 Started scraping up all remaining Illinois #6 off the pad. We do not expect the next load of coal until 1000.

0840 Cycled the coal valve. (.38 ton of coal went in the lower bin.

0845 Closed the gas supply valve. We were getting a negative reading on the offtake pressure. Increased the secondary air 20% and the offtake pressure is .2 inches w.g. The induced draft fan is vibrating more today than yesterday.

0930 South slide valve is empty showing a weight of .15 tons. We used .37 tons in the last hour.

0940 Dumped 545 pounds of ash. Ash particulate was running 1-6 inches in size. (the majority on the smaller end of the scale. The color of the ash is reddish-brown. Flushed with the upper nozzles.

1000 Had to use the sledge hammer for this fire test.

1025 More coal has arrived.

1030 Started coaling up at .15 ton. CO is 23% and CO2 is 8%. Lower heating value is 121 BTU/FT3 and the higher heating value is 129 BTU/FT3. The delta p has leveled off. Ashpit pressure is 2.8 inches w.g. Fire loss pressure is 2.5 inches w.g. Gas offtake pressure is .5 inches w.g. Gas supply pressure is .6 inches w.g.

1050 Increased the saturation air flow to 1000 cfm. Saturation temperature is 60 degrees C. Primary air is 4500 cfm and the secondary is 9500 cfm. Agitator speed is 8.0 sweeps/hour. Jacket water flow is 16 gpm. Opened the gas supply valve 20%. Gas outlet pressure is 1.5 inches w.g.

1110 Saturation air flow is 1400 cfm. Saturation temperature is 62 degrees C. Agitator speed is 11.5 sweeps/hour. Grate speed is 2/3.00. Jacket water flow is 20 gpm.

1135 Increased the jacket water flow to 25 gpm. Opened the gas control valve to 35%. Cyclone pressure is 1.1 inches w.g.

1215 Increased the saturation air flow to 1600 cfm. Increased the gratae to 5/3.00. The agitator is at 14.0 sweeps/hour.

1230 Dumped 740 pounds of ash and water (300 pounds water

and 440 pounds of ash.

- 1300 Increased the grate to 6/3.00. The pH is 4.0. Increased the caustic pump to 50/50.
- 1340 Dumped 779 pounds of ash and water (about 1/2 and 1/2) The ash varied from 1.5" to 6" in size.
- 1400 Increased the agitator to 16.0 sweeps/hour.
- 1410 Flushed the cyclone. Results were one inch of floating particulate and four rakesful on the bottom.
- 1415 Increased the saturation air flow to 1800 cfm. Increased the agitator to 18.0 sweeps/hour. Jacket water flow is 27 gpm. Grate speed is 6/3.50.
- 1500 Increased the agitator 19.5 sweeps/hour. Starting to burn through on hole number 3. Drained 100 pounds of water from the ash. Slowed the jacket water flow to 25 gpm. Saturation steam valve is 95% open.
- 1510 Saturation temperature is 60 degrees C. Reduced the jacket water flow to 22 gpm.
- 1540 Reduced the jacket water flow to 18 gpm. Saturation temperature is 60 degrees C.
- 1600 Slowed the grate to 6/3.10. The bars went in easily with no clinkering during this fire test. Slowed the agitator to 18.3 sweeps/hour.
- 1623 Bumped the saturation air flow to 2000 cfm. Saturation temperature is 62 degrees C. The response was immediate. The offtake temperature rose 5 degrees C. to 500 degrees C. Saturation temperature dropped to 61 degrees C digital (59 degrees C actual). P-705 went from 2.5 to 3.9 inches w.g. Cyclone outlet pressure went up 1 inch w.g. Opened the gas control valve to 65% open.
- 1635 Cut jacket water flow to 11 gpm.
- 1647 Reduce jacket water to 7 gpm. Still trying to maintain a 62 degree C. saturation temperature.
- 1650 Higher heating value is 164 BTU/FT³ and the lower heating value is 154 BTU/FT³.
- 1656 Finally acheived the target of 62 degrees C. saturation temperature. Offtake temperature is 480 degrees C. Jacket water outlet temperature is 90 degrees C. Cyclone outlet presure is up to 1.9 inches w.g. Opened the gas control valve to 50% open.

- 1700 Dumped and sampled 1260 pounds of ash. Found very little water in the cone.
- 1710 Increasing the jacket water flow to 12 gpm. Offtake temperature is 467 degrees C. Offtake pressure is 3.9 inches w.g. Jacket water outlet temperature is 90 degrees C. Neither the combustor end nor the combustor exhaust thermocouples are working properly. The combustor end thermocouple completely quit working at 1430 and the combustor exhaust thermocouple gave a reading of +0002 (1002 degrees C??) The burner inlet temperature is 422 degrees C. and the scrubber inlet temperature is 931 degrees C.
- 1720 It seems the best jacket water flow under these conditions is 12 gpm to maintain a 62 degree C. saturation temperature.
- 1722 The burner inlet temperature is now reading 264 degrees C. It appears to still be out of order. Combustor end thermocouple is reading 999 degrees C. It appears to be back on line.
- 1745 The offtake temperature is on the downward slide. It is now reading 432 degrees C. Saturation temperature is back up to 62.5 degrees C. Adding 2 more gpm to the jacket water flow (14 gpm total).
- 1755 Increasing the jacket water flow to 16 gpm. The saturation temperature is now reading 63 degrees C. CO is 26% and CO2 is 6.2%. Offtake temperature is 422 degrees C.
- 1800 Slowed the grate to 6/3.00. Increased the agitator to 18.5 sweeps/hour.
- 1815 Another adjustment of the jacket water flow, up to 20 gpm has ben made. The saturation temperature is slightly over 63 degrees C.
- 1825 Checked number 5 hole and found 18 inches of ash. Broke up a large clinker.
- 1830 Hit 2.18 tons coal feed. The pH is 6.5.
- 1840 Dumped 1200 pounds of ash. Used the upper nozzles to flush the grate underside.
- 1845 Started putting coal up on top at 3.09 tons.
- 1846 The CO alarm is going off.
- 1851 Opened the gas control valve to 80% open. CO alarm went off as expected.

- 1857 The CO alarm went off again. Opened the gas control valve to 100% open.
- 1900 CO alarm continues to go off every 30 seconds. Opened the steam valve to 100%. Cut the jacket water flow to 15 gpm. Offtake temperature is 533 degrees. Saturation temperature is 63 degrees C. We are having trouble finding the correct combination to keep the saturation temperature at 62 degrees C.
- 1925 The CO alarm continues to scream at us. Have reduced the gas supply pressure to 1.5 inches w.g.
- 1930 The pH is 6.5. The coal feed only took 1.74 tons this time.
- 1940 Turned off the CO monitor noise. We are monitoring the gas level at the U of M monitor. It is presently at 300 ppm.
- 1945 Checked the downcomer tee. There was liquid tar coming through the seal. Upon opening it, the gas build up was terrific. Checked the combustor port and poked 6-8 inches of buildup into the combustor. There was liquid tar buildup 4-6 inches wide on the bottom portion of the burner inlet area.
- 2000 Increased the grate to 6/3.50.
- 2030 Dumped 1360 pounds of ash. Coal feed again tops 2 tons. Agitator speed is 20.0 sweeps/hour.
- 2105 Saturation temperature peaks at 65 degrees C. Steam valve is 100% open. Increasing the jacket water flow to 18 gpm. Jacket water outlet temperature is 93 degrees C. Offtake temperature is 467 degrees C. Gas quality has completely deteriorated. CO is approaching 20% and the CO₂ is over 10%.
- 2120 Increased the jacket water flow to 21 gpm as the saturation temperature had only come down to 64 degrees C.
- 2130 Started coaling up. (second time at 4.34 tons) Increased the jacket water flow to 24 gpm. Steam valve is 100% open. Finally we are getting the saturation temperature back to 62 degrees C. The gas quality has started improving again. Slowed the agitator down to 18.8 sweeps/hour. The ash weight is again over 1250 pounds. Have cracked the lower valve to allow the water to run out.
- 2200 The bed is showing much clinkering on holes 1,3 & 6 on this fire test. Must bring the saturation temperature up or the blast air down! Increased the grate speed to 6/4.80.

- 2220 The caustic barrel was empty and the pH was 4.0 so we changed the barrels. Stopped coaling up at 11.67 tons. Dumped ash again and found it top be mostly water.
- 2230 Saturation temperature is now running between 62 and 63 degrees C. The steam valve is on automatic at 94% open. Jacket water flow is down to 12 gpm.
- 2245 The pH is still at 4.0. After checking, we found the caustic tube was not plugged. Increased the speed at stroke to 70/70.
- 2300 Slowed the agitator to 18.0 sweeps/hour. Setting the jacket water at 14 gpm.

August 2, 1983

- 0000 Increased the grate to 9/4.50. Checked the cyclone and found it to be full of particulate.
- 0040 Increased the jacket water flow to 15 gpm.
- 0050 Increased the jacket water flow to 20 gpm.
- 0200 Increased the grate to 9/5.27.
- 0230 Dumped ash.
- 0235 Started loading coal.
- 0330 We are still getting a large amount of particulate in the cyclone.
- 0430 Dump ash.
- 0510 The agitator kicked out.
- 0512 Reset and started the agitator. The offtake temperature is 659 degrees C.
- 0530 Since the agitator kicked out, the offtake temperature has climbed to 726 degrees C. and is burning through.
- 0600 There is burning through on holes number 2,3,5 & 6. Even with raking, we are having a rough time controlling the saturation temperature.
- 0615 We are starting to get control of the saturation temperature. It is down to 66 degrees C. from 70 degrees C. The offtake temperature is starting to settle down, but we are still burning through. Slowed the grate to 9/2.70.

0623 Lowered the saturation air flow to 1900 cfm.

0652 Slowed the agitator to 19.0 sweeps/hour.

0730 Grate speed is at 9 teeth and the stroke varies from 7-9 teeth. Flushed the cyclone and found some fairly hard chunks floating on the water.

0800 Increased the agitator to 18.0 sweeps/hour. There no longer seems to be any channeling through. The glow seems to be uniform. Changed the cap on the number 2 retort access port.

0815 Dumped 1700 pounds of ash. The ash was mostly fine particles with a few 6 inch clinkers.

0830 Reduced the jacket water flow to 25 gpm. The gas control valve is 90% open. The cyclone ouotlet pressure is at 1.0 inches w.g.

0845 Saturation temperature has stabilized at 62 degrees C. The CO is at 20% and the CO2 is 9.5%. The offtake temperature is 471 degrees C. Changed the cap on the number 3 retort access port.

0900 Leaving the grate at 9/2.75.

0915 Boosted the saturation air flow to 2000 cfm. Cleaned out the downcomer and found mostly fine dry material.

0930 Slowed the agitator to 17.5 sweeps/hour. Flushed the cyclone. Found a large amount of fine and 1-2 inch floating particles. It 42 rakesful to clean the tank.

0935 Slowing the jacket water flow to 20 gpm. Changed the cap on the number 1 retort access port. Tightened the agitator main seal, where there had been a gas leak.

1000 Slowed the grate to 7/3.00.

1030 Increased the agitator to 19.0 sweeps/hour. The steam valve is 100% open. Slowed the jacket water to 17 gpm.

1045 Dumped 700 pounds of fine ash.

1100 Saturation temperature is 65 degrees C. Closed the saturation steam valve to 40%. Increased the jacket water flow to 18 gpm.

1130 Flushed the cyclone and found 1 inch of floating particulate with 4 rakesful on the botom of the tank.

1200 Increased the agitator to 20.0 sweeps/hour.

1215 Ash weight is 1135 tons. We drained 520 pounds of water

off.

- 1230 The gas quality has improved. The CO is 28% and the CO₂ is 32%.
- 1245 The jacket water flow is 16 gpm. The steam valve is 95% open.
- 1300 Increased the agitator speed to 21.5 sweeps/hour. Increased the grate to 8/3.00.
- 1330 Increased the agitator speed to 22 sweeps/hour. Increased the jacket water flow to 19 gpm.
- 1400 Noticed glowing on holes number 2 & 3. The last 18 inches in holes number 3 & 4 were clinkers. Saturation temperature is leveling off at 62 degrees C again. The jacket water flow is 19 gpm. The steam valve is 35% open.
- 1415 Flushed the cyclone. Found 1-2 inches of floating particulate and 7 rakesful on the bottom.
- 1430 Slowed the agitator to 21 sweeps/hour. Dumped 1385 pounds of ash.
- 1445 Agitator just stopped and was restarted. The offtake temperature is 580 degrees C. Ran the agitator at a speed of 28 sweeps/hour for 10 minutes and then went back to a speed of 21 sweeps/hour.
- 1510 Offtake temperature shot up to 680 degrees C. Noticed the agitator had quit running. Restarted the agitator and the offtake immediately dropped back down to 440 degrees C.
- 1530 Coal feed was only 1.57 tons.
- 1600 Freeboard and fire test are temporarily suspended until the University of Minnesota completes their top gas particle testing.
- 1620 Slowed the grate to 8/2.90.
- 1630 Dumped 1500 pounds of ash.
- 1640 Decreased the jacket water flow to 16 gpm. The steam valve is 100% open. Saturation temperature is 60 degrees C.
- 1645 Saturation temperature is 61 degrees C.
- 1707 Dropped the jacket water flow to 13 gpm. Saturation temperature is 60 degrees C. Higher heating value is 165 BTU/FT³ and the lower heating value is 153 BTU/FT³.

CO is 26%, CO2 is 6% and H2 is 17%. The grate is pushing 10 teeth not 8 as is indicated on the log. The grate is 10/2.90.

- 1730 Coal feed took 2.16 tons.
- 1737 Shut the grate down temporarily to reattach a spring. Both stroke rod guide and spring had fallen off.
- 1745 Trying to find the middle ground on the jacket water flow. Increased the jacket water flow to 15 gpm. Saturation temperature is 62.5 degrees C.
- 1800 Increased the grate speed to 10/3.20.
- 1830 Cyclone dump showed much more floating particulate and very little on the bottom of the tank. Saturation temperature is 63.5 degrees C. Raised the jacket water flow to 19 gpm. Coal feed hits 2.20 tons. Started coaling up at 2.40 tons. Noted a shift in gas quality after the last fire test. CO2 is near 9% and CO is down to 22%. Saturation temperature is ranging between 63 & 64 degrees C. Offtake temperature is staying near 500 degrees C. The pH is running 5.9-6.2.
- 1850 Steam valve is 100% open. Having difficulty controlling the saturation temperature. It is running between 63.5 & 64 degrees C. Increased the jacket water flow to 22 gpm.
- 1945 Gas quality continues to deteriorate. CO is 20% and CO2 is 9%.
- 1958 We found 62 degrees C for saturation temperature again! Jacket water is still 22 gpm and the steam valve is 46%.
- 2000 Slowed the agitator a bit to allow more time for the fire test. Slowed the grate from 10/3.20 to 10/2.65.
- 2028 Discovered that the spring on the grate had snapped again. Turned the grate off to reattach the spring. Upon trying to restart the grate, the variable control kicked out. It apparently could not handle the increased start up load. It will not go past 1.15. Tried various combinations of switching wiring and attempting to restart it at different strokes from the gear. Still unsuccessful.
- 2056 Wired straight through and the grate is pushing 8 teeth full out.
- 2135 Dumped 1254 pounds of ash. Continued to coal up outside at 5.09 tons.

2147 Continuously adjusting the jacket water flow as the steam will not hold the saturation temperature at 62 degrees C. Jacket water flow is currently at 13 gpm.

2200 The grate is running full out at 10/full.

2230 The agitator is at 20.0 sweeps/hour.

2235 Changed caustic barrels.

2240 Stopped coaling up at 11.36 tons. Combustor terminus temperature is over 1400 degrees C.

2300 Saturation temperature is 64 degrees C. Steam valve is 100% open. Jacket water flow is 10 gpm. The pH is 6.2.

2345 Dumped 1186 pounds of ash.

August 3, 1983

0035 Increased the agitator speed to 21.0 sweeps/hour.

0145 Adjusted the jacket water flow upwards to 20 gpm. Saturation temperature is drifting.

0400 Increased the agitator to 22.5 sweeps/hour.

0430 Increased the agitator to 23.5 sweeps/hour.

0500 Increased the jacket water flow to 25 gpm.

0730 Saturation temperature is 61 degrees C. Offtake temperature is wandering over a 100 degree C range. Checked all poke holes and found channeling through. Automatic steam saturation will not hold the saturation temperature at 62 degrees C. Will manually regulate jacket water flow. Slowed the jacket water flow down to 20 gpm. Interpoll is here to take gas samples.

0735 Flushed the cyclone and found 2 inches of black floating silt and 15 rakesful on the bottom of the tank.

0800 Cut 4 inches off the adjusting dog plate to allow better control of the grate at around 8 teeth.

0830 The grate is at 8 teeth with the automatic controller at 3.50.

0900 Jacket water flow is back to 14 gpm.

0930 Increased the agitator to 23.5 sweeps/hour. Jacket water flow is 19 gpm. Saturation temperature is 64 degrees C.

1015 Offtake temperature is 540 degrees C. There is some channeling through on hole number 6.

1100 Slowed the agitator down to 22.0 sweeps/hour. Started changing the screen from 3/4" to 1/4".

1135 Changed the offtake thermocouples. Temperature stopped jumping around. It is holding at 480 degrees C.

1200 Slowing the grate down to 7/2.70.

1205 Opened the valve to the ESP.

1235 The secondary fan is making noise. The starter was on and HC-803 was reading 10000 cfm. It seems to have straightened out.

1300 Slowed the jacket water down to 14 gpm. Still having difficulty keeping the saturation temperature at 62 degrees C. Saturation steam is 100% open. Gas quality is improving. CO is 20% and CO2 is 3.2%. Higher heating value is 157 BTU/FT3 and lower heating value is 146 BTU/FT3.

1330 Used the last of the coal in the bins. (.89 tons) Weight indicator still reads .16 when it is empty.

1345 Dumped 1464 pounds of ash. It was all clinkers 1-6 inches in size. Flushed the ash cone with the upper nozzles. This flushed out a lot of build up.

1400 Slide valve controls are off. Slowed the grate down to 6/2.50.

1405 Started coaling up at .16 with the 1/4" screen.

1435 Stopped coaling up at 10.29. Jacket water flow is 16 gpm.

1530 The offtake temperature has increased markedly to 712 degrees C. Cycled the coal valves and got an immediate response. The offtake temperature fell to 430 degrees C. Coal leg temperature is running 30-33 degrees C. The north coal leg is emptying out. Cycled the coal valves again and more coal came down. The north leg is hot.

1540 The offtake has shot up again to 742 degrees C. The north coal leg is empty. Coal leg temperature is 44 degrees C.

1548 Offtake temperature is 652 degrees C. Coal leg temperature is 39 degrees C. The south coal leg remains choked with 3/4" coal. Decided to drop 1/4" coal and per plan reduce the saturation air flow to 1000 cfm

from 2000 cfm. Trying to keep the same saturation temperature (62 degrees C.)

- 1550 Dropped 1/4" coal into the retort. Cycled the valves twice. Dropped 5.86 tons into the retort.
- 1553 Made the change in saturation air flow to 1000 cfm.
- 1600 Offtake temperature is down to 223 degrees C. Reduced the gas control valve to 22% open. Reduced the furnace pressure to 60. Offtake pressure is 1.5 inches w.g. with the valve 32% open. Reduced both the primary and secondary blowers to 80%.
- 1607 Offtake temperature is 173 degrees C.
- 1615 Increased the grate to 8/3.60.
- 1617 Increased the jacket water to 24 gpm. Ashpit air inlet temperature is 64.5 degrees C. Jacket water outlet temperature is 94 degrees C.
- 1625 Offtake temperature is 400 degrees C. Jacket water temperature is 94 degrees C. Saturation temperature is running 63 degrees C. Set the jacket water flow at 26 gpm and the steam to 20%.
- 1630 Dropped 1.25 tons of coal. Dumped 1600 pounds of ash. Started coaling up at 3.18 tons.
- 1747 Reduced the grate speed to 5/3.00.
- 1758 Slowed the agitator to 9.0 sweeps/hour.
- 1800 Slowed the grate to 5/2.50.
- 1815 Opened the larger bypass valve part way. Needing 30+ gpm to bring the saturation temperature below 64 degrees C.
- 1900 Need at least 1.5 inches w.g. on the gas supply pressure. Trying the combination of reducing the furnace pressure to 35 inches w.g. The valve is 25% open. The ESP is running.
- 2000 Reduced the grate to 2/2.80.
- 2130 Saturation temperature is 59 degrees C. The steam valve is 20% open. Jacket water is still above 30 gpm.
- 2200 Increased the grate to 2/3.00.
- 2210 Dumped 570 pounds of ash. Started coaling up at 6.48 tons. Gas is pouring out of the coal bin on the 4th level.

2230 Stopped coaling up at 11.17 tons. Dropped 0.90 tons. Agitator speed is 10.0 sweeps/hour. Gas quality continues to be poor at a saturation temperature of 59 degrees C. and saturation air flow of 1200 cfm. CO is 16%, CO2 is 11% and H2 is 13%. Lower heating value is 117 BTU/FT3 and the higher heating value is 127 BTU/FT3

August 4, 1983

0030 Decreased the agitator to 8.5 sweeps/hour.

0100 Dumped ash.

0225 Increased the grate to 4/3.00.

0300 Dumped ash.

0400 Slowed the grate to 2/3.00.

0415 Increased the agitator speed to 12.5 sweeps/hour.

0500 Finished coaling up at 13.0 tons. Dumped ash.

0730 Slowed the jacket water flow down to 25 gpm.

0800 Slowed the jacket water flow to 22 gpm. Agitator speed is 12.5 sweeps/hour. Increased the grate to 3/3.00.

0830 Increased the induced draft fan to 50. The gas control valve is 20% open.

0845 Positive pressure for the combustion induced draft fan at 60. Noticed positive pressure at downcomer. Will leave the control valve at 20% to maintain around 2.0 inches w.g. for the quench system. Secondary fan is making noise. It must be the belt. Cyclone is leaking more air than is normal.

0900 Steam saturation valve is 20% open. Will leave the jacket water flow at 22 gpm.

1015 Dumped 825 pounds of ash. The size of the ash particles was in the range of 1/4" to 1", with just a few 3" clinkers. Flushed the cone with the upper nozzles and this flushed out some fine build up.

1030 Increased the agitator to 13.5 sweeps/hour.

1100 Offtake temperature is 440 degrees C.

1200 Increased the agitator speed to 14.0 sweeps/hour. Increased the grate speed to 5/3.00.

- 1300 Dumped 916 pounds of ash. Ash seems to be larger than that seen in the 1015 dump (1-3 inches). Dumped the cyclone and found some black floating silt and about 3/4 inch in the bottom of the tank.
- 1335 Started coaling up at 3.4 tons. The first two spray nozzles were off and the last two sets were 3/4 off. Opened all the nozzles wide open.
- 1400 The offtake temperature is down to 375 degrees C. Increased the grate speed to 5/3.50.
- 1410 Coal up weight 11.30 tons.
- 1430 Slowed the agitator down to 13.5 sweeps/hour.
- 1515 Started the reduction of the saturation air flow to 800 cfm from 1200 cfm. We are adjusting it in 200 cfm increments each half hour. Dropped it to 1000 cfm and holding the saturation temperature at 59 degrees C. Put the grate at 3/3.20. The agitator is running at a speed of 12.0 sweeps/hour. Furnace pressure is up to 50 inches w.g. and the valve is 35-45% open. Gas control valve is between 18 & 20% open.
- 1530 Dropped 1.20 tons of coal.
- 1545 Dropped the saturation air flow another 200 cfm to 800 cfm. The saturation temperature is 59 degrees C. Closed the gas control valve to 12% open. The furnace pressure is 40 inches w.g. and the valve is open 20%. Slowed the grate to 3/2.75.
- 1600 Put the grate at 3/3.00.
- 1630 Reduced the agitator to 10.8 sweeps/hour. Checked the cyclone and found very little particulate in the tank.
- 1650 The CO and CO2 are approaching each other on the strip chart. CO is 25.2%, CO2 is 5.9% and the H2 is 16.3%. Lower heating value is 153 BTU/FT3 and the higher heating value is 163.9 BTU/FT3.
- 1700 The agitator is running at 10.0 sweeps/hour.
- 1730 Increased the agitator to 11.0 sweeps/hour.
- 1800 The ash was slightly higher this fire test and the bed appears to be compressing. Increased the agitator to 17.0 sweeps/hour for 1/2 hour then reduce it to 12.0 sweeps/hour. Increased the grate to 4/2.85.
- 1830 Reduced the agitator speed to 12 sweeps/hour. Coal feed was considerably higher than the last feed (0.89 at 1730 and 1.37 now). Gas quality seems to have

peaked around 1800 and is coming back as the fire loss pressure increases and the offtake pressure straightens out at 5.0 inches w.g. Offtake temperature is 320 degrees C. The CO is 26.4%, CO₂ is 5.3% and the H₂ is 15.1%. The lower heating value is 148.5 BTU/FT³ and the higher heating value is 158.3 BTU/FT³.

- 1900 The agitator is running at 12.0 sweeps/hour.
- 1930 Increased the agitator to 13.0 sweeps/hour. The pH is 4.0 and the caustic tubing is plugged. Corrected this situation.
- 2000 The agitator is 13.4 sweeps/hour. Changed the grate speed to 5/2.95.
- 2030 The cyclone particulate is becoming chunky.
- 2100 Started loading coal at 3.56 tons. Dumped and sampled 1215 pounds of ash. The pH is 6.2. Agitator is at 14.2 sweeps/hour.
- 2127 Stopped coaling up at 12.19 tons.
- 2130 Dropped 1 ton. The gas quality has deteriorated steadily since 1830. The best gas seems to be produced with a more compressed bed and a higher delta p with a freeboard of 36 inches and an offtake temperature of 310-320 degrees C.
- 2200 Fire and freeboard tests indicate that the fire bed has become elongated. Lowered the agitator speed to 9.5 sweeps/hour. Decreased the grate to 5/2.40. We no longer have an inclined cross section for an ash bed and the holes evened out.
- 2230 The pH is 6.2. Changed the caustic barrels. Delta p has started its turn around. CO and CO₂ straight lined instead of retreating. Now we need the offtake temperature to come down.
- 2300 Slowed the grate to 9.5 sweeps/hour. Having difficulty getting the delta p to increase. Trying to lower the furnace pressure and slightly reduce the opening on the gas control valve. The furnace pressure is 25 inches w.g.
- 2313 Reduced the jacket water flow to 20 gpm.
- 2317 Put the agitator at 8.5 sweeps/hour.
- 2320 Fire loss pressure is 3.5 inches w.g. Top gas pressure is 2.0 inches w.g. Gas supply pressure is 1.8 inches w.g. The offtake temperature is 379 degrees C.

2325 The agitator rate is 8.3 sweeps/hour.
2330 Dropped only 0.72 tons.
2345 Gas quality has not improved. Will go back to a furnace pressure of 35 inches w.g. Gas control valve is 10% open. Jacket water is 22 gpm.
2355 Agitator speed is 8.1 sweeps/hour.

August 5, 1983

0000 Slowing the grate to 2/2.30.
0030 Coal useage has declined each hour since 1830. It is now at 0.65 tons/hour. Fire loss pressure is down to 2.5 inches w.g. Offtake temperature is 413 degrees F.
0100 Shut off the grate. The grate had been running at 2/2.30.
0230 Coal up weight .50 tons.
0330 Coal up weight .52 tons
0415 Restarted the grate at 2/2.30.
0430 Coal up weight .51 tons.
0500 Started loading coal.
0730 Slowed the jacket water flow down to 14 gpm. The combustor is leaking gas. Increased the presure to 60 inches w.g.
0815 Cleaned the control room.
0830 Increased the jacket water flow to 16 gpm. Closed the steam valve.
0945 Lowered the saturation temperature to 58 degrees C.
0950 Increased the jacket water flow to 18 gpm.
1000 Increased the grate to 2/3.75.
1100 Dumped 817 pounds of ash. There was some water in the ash, but mostly 1-1.5 inch clinkers. Checked the cyclone and found very little particulate.
1200 Slowed the grate to 2/2.50.
1335 Opened the gas supply valve to 50%. Quench/ESP is down.

- 1345 CO is 22% and CO₂ is 4.4%. Started coaling up at 6.24 tons.
- 1400 Increased the grate to 2/3.00.
- 1410 Finished coaling up at 10.75 tons. Cleaned the first set of nozzles.
- 1530 Agitator speed is 9.0 sweeps/hour. Saturation air flow is 800 cfm and saturation temperature is 58 degrees C. Grate speed is 2/3.00. Dumped 604 pounds of ash. Gas control valve is 50% open. Gas control pressure is low. Gas quality is tolerable. CO is 20%, CO₂ is 8% and H₂ is 15%. Lower heating value is 123 BTU/FT³ and the higher heating value is 132 BTU/FT³.
- 1600 Agitator speed is 8.8 sweeps/hour. During this fire test we noticed a very uneven bed. Grate speed is 2/3.15.
- 1700 Decreased the agitator to 8.5 sweeps/hour. The pH is 6.2.
- 1730 Coal feed was 0.78 tons. CO is 21.5%, CO₂ is 7.8% and H₂ is 14.7%. Lower heating value is 127 BTU/FT³ and the higher heating value is 136 BTU/FT³.
- 1800 Leaving the agitator at 8.5 sweeps/hour. Increased the grate speed to 2/3.00.
- 1810 Noticed the strip chart indicator for the Offtake temperature is running a straight vertical line, without the horizontal movement caused by revolutions of the agitator. The agitator is moving at a rate of 8.5 sweeps/hour. The offtake temperature stayed in a range of 427-437 degrees C during this time period.
- 1830 Cyclone particulate is quite light.
- 1845 Strip chart for the offtake temperature is now in sync again. Offtake temperature is 425 degrees C.
- 1900 Dumped 1024 pounds of ash.
- 1930 The pH is 5.7. Increased the speed and stroke on the caustic pump to 45/45. Gas quality is a little better. CO is 21.8%, CO₂ is 7.4% and H₂ is 15.2%. Lower heating value is 129 BTU/FT³ and the higher heating value is 138 BTU/FT³. Strip charts for both the steam and water saturation are not showing the normal fluctuations. Instead they are giving the same straight line the offtake temperature gave.
- 2000 Agitator speed is 8.2 sweeps/hour. Grate speed is

3/3.65.

- 2030 Agitator speed is 8.5 sweeps/hour.
- 2055 Started coaling up at 5.74 tons.
- 2130 The pH is 6.5. Returned the caustic pump to 40/40.
Dropped 0.79 tons of coal.
- 2140 Stopped coaling up at 11.30 tons.
- 2200 Agitator speed is 9.0 sweeps/hour. Changed the grate
speed to 3/2.50.
- 2230 The pH is 6.5. Dropped 0.86 tons of coal this hour.
Gas quality remained about the same. CO is 22%, CO2 is
7.6% and H2 is 14.3%. Lower heating value is 125
BTU/FT3 and the higher heating value is 134 BTU/FT3.

August 6, 1983

- 0000 Decreased the agitator.
- 0500 Dumped ash.
- 0615 Increased the agitator speed to 8.0 sweeps/hour.
- 0730 The pH is 4.0. Increased the caustic pump to 50/50.
The ground around the induced draft fan is vibrating
and it sounds louder than normal.
- 0800 The pH is 6.2 and the pump is now at 40/40.
- 0830 Increased the agitator to 9.0 sweeps/hour.
- 0900 CO2 went to 7.8% from 8.2% after increasing the agitator
to 9.0 sweeps/hour. Ash pit pressure has been in-
creasing steadily from 3.4 to 4.8 inches w.g.
- 1000 The pH is 5.9.
- 1200 Increased the grate speed to 3/3.25.
- 1215 Offtake temperature is 350 degrees C. Gas quality is
improving. CO is 23%. The delta p has leveled off
with an ash pit pressure of 5.9 inches w.g., fire loss
pressure of 4.4 inches w.g. and a gas offtake pressure
of 1.7 inches w.g.
- 1300 Increased the agitator to 10.0 sweeps/hour.
- 1315 Started coaling up at 7.42 tons. Dumped 1370 pounds of
ash. Size consist was 1/2-1 inch. There were a few 6
inch clinkers. The first water nozzle was plugged.

1400 Ash bed appeared even at this fire test and the bars are going in easily.

1530 Slowed the agitator to 9.5 sweeps/hour. Saturation air flow is 800 cfm and the saturation temperature is 58 degrees C. The pH is 6.5.

1600 The grate speed is 3/3.25.

1630 CO is 24%, CO2 is 6% and H2 is 16%. Lower heating value is 140 BTU/FT3 and the higher heating value is 150 BTU/FT3.

1700 The agitator speed is 9.0 sweeps/hour.

1730 Coal feed was .75 ton.

1830 Coal feed was .90 ton. Offtake temperature is 345-350 degrees C. Gas quality has steadily improved over the last three hours. CO is 24.8%, CO2 is 5.7% and H2 is 16.1%. Lower heating value is 144 BTU/FT3 and the higher heating value is 154 BTU/FT3.

1900 Agitator speed is 9.3 sweeps/hour.

1910 Dumped 1230 pounds of ash.

1913 CO and CO2 have abruptly changed. The offtake temperature is 385 degrees C.

1930 Coal feed is 0.91 ton. Agitator speed is 9.5 sweeps/hour. The pH is 6.2.

2000 Agitator speed is 10.0 sweeps/hour.

2030 Coal feed is 0.94 tons.

2100 Started coaling up at 6.60 tons.

2118 Stopped coaling up at 11.65 tons.

2130 Ashpit pressure is 2.7 inches w.g. Fire loss pressure is 1.2 inches w.g.

2200 Changed the grate speed to 4/3.25.

2230 Agitator speed is 10.5 sweeps/hour. The pH is in the range of 5.9-6.2.

2300 The pH is 5. The caustic barrel is empty so a change was made.

August 7, 1983

0130 Coal up .95 ton.

0145 Increased the agitator speed to 12.5 sweeps/hour.

0415 Increased the agitator to 14.5 sweeps/hour.

0430 Started coaling up at 4.23 tons.

0515 Stopped loading coal at 13.62 tons.

0730 Slowed the agitator to 8.5 sweeps/hour.

0800 Decreased the agitator speed to 8.0 sweeps/hour.
Slowed the grate to 4/2.50.

0930 The saturation temperature is 60 degrees C. CO is 26%.
Ash pit pressure is 6.5 inches w.g. Fire loss pressure
is 4.7 inches w.g. Gas offtake pressure is 1.9 inches
w.g.

1000 Increased the agitator speed to 10.0 sweeps/hour. In-
creased the grate to 4/3.25.

1015 The offtake temperature is down to 346 degrees C. The
delta p is increasing. The ashpit pressure is 7.5
inches w.g. The fire loss pressure is 5.7 inches w.g.
The offtake pressure is 1.9 inches w.g. Gas quality
dropped when the saturation temperature went to 60
degrees C. It has returned, however, to where it was
before we increased the saturation temperature.

1030 Dropped 1.18 tons of coal. Increased the agitator to
12.0 sweeps/hour.

1110 Dumped 1066 pounds of ash very fine ash.

1130 CO is 26% and CO2 is 3.6%. Lower heating value is 138
BTU/FT3 and the higher heating value is 150 BTU/FT3.

1135 Lowered the saturation temperature to 56 degrees C.
There is evidence of some channeling through between
holes number 2 & 3. Dropped 1.12 tons of coal.

1200 CO has steadily dropped from 26% to 23% with the 60
degree C saturation temperature.

1300 Started coaling up with 6.54 tons. Increased the jac-
ket water flow to 23 gpm. The steam saturation valve
is 5% open. CO is now 22%.

1400 The grate drive is working with some difficulty.

1415 Saturation temperature is 58 degrees C.

1430 Slowed the agitator to 10.0 sweeps/hour. Cleaned some
ash out of the bunker making room for more.

1530 It is over 100 degrees F outside!!! Put the agitator speed at 7.9 sweeps/hour.

1600 Slowed thte grate to 2/2.25.

1630 Coal feed was 0.67 ton. The pH is 6.5. Repaired the shaker nozzle water hose.

1700 Dumped 1230 pounds of ash.

1800 Ash averages have doubled over the last two hour period by dropping one tooth on the stroke and cutting the speed from 2.37 to 2.25. Adjusted the agitator to 8.4 sweeps/hour.

1930 Agitator speed is 8.4 sweeps/hour. Slowed the grate to 3/2.40.

2000 Slowed the grate to 3/2.10.

2030 The pH is 6.5. Decreased the jacket water flow to 20 gpm. The outside temperataure has cooled down to 93.2 degrees F. CO is 18%, CO2 is 7.8% and H2 is 14.8%. The higher heating value is 127 BTU/FT3 and the lower heating value is 118 BTU/FT3. The offtake temperature has done some minor shifting between 380 & 430 degrees C. Fire loss pressure has continued its gradual downward slide to a current 1.9 inches w.g.

2055 Started coaling up at 6.58 tons. Dumped 670 pounds of ash.

2113 Stopped coaling up at 11.94 tons.

2130 Fire loss pressure bottoms out at 1.4 inches w.g. Saturation temperature is back up to 58 degrees C. Jacket water flow is 20 gpm. Grate speed is 3/2.50.

2200 Agitator speed is 8.4 sweeps/hour. Grate speed is 3/2.40.

August 8, 1983

0000 No clinkers on this fire test, but there is a definite crust.

0030 Increased the grate drive.

0345 Decreased the agitator speed to 9.5 sweeps/hour.

0815 Slowed the grate down to 2/3.00.

0820 Saturation blower is down. Flooded the cyclone and vented the gas through the roof flare.

- 0900 Restarted the gas going downstream. Combustor flame went out. Safety valve will not close by 2".
- 1010 Saturation air flow is 1000 cfm. Increased the agitator to 10.0 sweeps/hour and the grate to 3/3.00.
- 1030 Coal leg temperature is 52 degrees C. Coal seems to be hanging up in the pipe.
- 1035 Cyclone outlet pressure is 3.5 inches w.g.
- 1100 Increased the agitator to 11.0 sweeps/hour.
- 1200 Slowed the grate down to 3/2.50. Gas quality has not improved from 800 cfm load to this 1000 cfm load. CO is 22%.
- 1310 Dumped 1135 pounds of ash (mostly 1" clinkers with a few 4-6" clinkers).
- 1315 Coaling up at 6.29 tons. Gas quality is starting to improve. CO is 24%. Higher heating value is 140 BTU/FT3 and the lower heating value is 131 BTU/FT3. The offtake temperature is steady at 434 degrees C.
- 1340 Finished coaling up at 12.34 tons.
- 1415 Flushed the cyclone and noticed an increase in particulate build up. There was one inch of floating material and three rakesful on the bottom.
- 1600 The grate speed is 4/2.55.
- 1630 The cyclone water is not exiting with the velocity previously noticed when opening the valve. The gas leak is also quite a bit worse at the present load. We tried various tensions on the packing around the slide valve. This has not solved the problem. We, apparently, will need another layer of packing.
- 1700 The agitator speed is 11.6 sweeps/hour.
- 1710 Dumped 990 pounds of fine ash. There were a few chunks 1.5-2.5 inches and a couple of clinkers the size of footballs. The ash seems very dry.
- 1730 The agitator is at 11.9 sweeps/hour. Slowed the grate to 4/2.30.
- 1822 Gas quality is pretty good. CO is 24.2%, CO2 is 6.7% and H2 is 15.6%. The lower heating value is 142 BTU/FT3 and the higher heating value is 152 BTU/FT3.
- 1900 Gas quality is improving. CO is 25.0%, CO2 is 6.2% and H2 is 16.0%. The lower heating value is 146 BTU/FT3

and the higher heating value is 156 BTU/FT3.

- 2000 Slowed the grate down to 4/2.12. The ash has somewhat evened out. The bars went in without difficulty this fire test.
- 2030 Both the top gas pressure and the gas supply pressure are up over 5.5 inches w.g.
- 2100 Started coaling up at 6.04 tons. Dumped 980 pounds of ash.
- 2118 Both the top gas and the gas supply pressures are over 6.0 inches w.g. The gas quality continues to improve. CO is 27% and CO2 is 5.6%.
- 2121 Stopped coaling up at 12.27 tons.
- 2130 Agitator speed is 12.0 sweeps/hour.
- 2155 The fire loss pressure is 1.9 inches w.g. Top gas pressure is 6.4 inches w.g. Gas supply pressure is 5.8 inches w.g. The gas control valve is open 75%. Gas quality is outstanding! CO is approximately 27.5% and the CO2 is 5.4%.
- 2200 Increase the grate speed to 4/3.00 as the ash is building up too quickly. Leaving the agitator speed at 12.0 sweeps/hour. The SIGMA calorimeter has the gas at 160 BTU/FT3 (lower heating value).
- 2230 Coal feed has averaged .90 over the last 8 hours.
- 2300 Increased the agitator speed to 12.5 sweeps/hour. The SIGMA now shows the gas at 164 BTU/FT3 (lower heating value). The pH was 4.7. Changed caustic barrels. The CO is 28.3% and the CO2 is 5.0%.
- 2309 Opened the gas control valve 100%. Increased both the primary and the secondary blowers to 60%. The furnace pressure is at 90.

August 9, 1983

- 0015 Increased the agitator speed to 14.0 sweeps/hour.
- 0030 Coal up at 1.20 tons.
- 0100 Dumped 1059 pounds of ash. Increased the agitator speed to 15.5 sweeps/hour in attempt to raise the freeboard.
- 0130 Decreased the agitator speed to 14.5 sweeps/hour.

0215 Increased the grate speed to 4/3.50.

0216 Increased the agitator speed to 15.0 sweeps/hour to compensate for the grate increase.

0230 Coal up at 1.05 tons.

0300 Dumped 626 pounds of ash.

0330 Coal up weight is 1.14 tons.

0410 Increased the agitator speed to 16.5 sweeps/hour.

0415 Increased the grate drive to 6/3.00.

0430 Coal up at 1.23 tons.

0500 Decreased the agitator to 16.0 sweeps/hour.

0510 Started loading coal.

0520 Dumped ash.

0530 Coal up weight is .93 tons.

0545 Finished loading coal at 12.80 tons. Decreased the agitator to 15.5 sweeps/hour.

0630 Coal up is 1.15 tons/hour.

0650 Dumped 560 pounds of ash.

0730 Gas supply pressure is 7.9 inches w.g. Closed the gas supply valve to 55% open. This brought the gas supply pressure down to 7.0 inches.

0745 Gas quality is good.

0800 The bars went in easily with no dirty bars. Tightened the agitator main seal as it was leaking a large amount of gas. Readjusted the orifice for the retort access ports. Increased the grate speed to 6/3.35. Flushed the upper cone to clean out possible build up.

0835 Slowed the jacket water to 18 gpm.

0900 Slowed the agitator down to 14.5 sweeps/hour.

0930 Agitator speed was reduced to 8.0 sweeps/hour. The offtake temperature is 400 degrees C.

0935 Had a power blink and the grate drive stopped. It restarted without any problem.

0955 The offtake temperature is 486 degrees C.

- 1010 Dumped 1235 pounds of ash. This ash was mostly clinkers from 1-2 inches in size. Flushed the upper cone again.
- 1030 Agitator speed is 10.0 sweeps/hour.
- 1110 Lower heating value is 146 BTU/FT³ and the higher heating value is 156 BTU/FT³. The offtake temperature is 445 degrees C.
- 1120 University of Minnesota is doing their particle sampling.
- 1145 Set the grate control on automatic, hoping to get better control of increases and decreases in speed. Set the speed so it will not exceed maximum amps.
- 1200 The agitator speed is 16.0 sweeps/hour. Slowed the grate to 6/2.75.
- 1215 Gas supply pressure is 6.9 inches w.g.
- 1245 Dumped 1545 pounds of ash and water (700 pounds was water). Ash pit pressure is now at 16.5 inches w.g.
- 1250 Started coaling up at 4.93 tons. Closed the coal valve from the hopper to the belt halfway. The spray system could not handle the full volume of coal.
- 1300 Agitator speed is 18.0 sweeps/hour.
- 1315 Agitator speed is 16 sweeps/hour.
- 1345 Finished coaling up at 12.66 tons. The induced draft fan is working at 55%.
- 1500 Increased the saturation air flow to 1100 cfm.
- 1530 Increased the saturation air flow to 1200 cfm. Saturation temperature is 60 degrees C. Opened the gas control valve to 70% open. Gas supply pressure is up to 17 inches w.g.
- 1545 Holding off on any load increases as the gas supply pressure is at 20 inches w.g.
- 1555 Fire loss pressure went from 20 inches w.g. to 9 inches w.g. Top gas pressure went from 8.8 inches w.g. to 20.1 inches w.g. Plugging the cyclone water column outlet until the pressure corrects.
- 1600 Holding off the fire test until the University of Minnesota is through with their particulate testing. Reduced the grate to 4/2.70.

1615 Agitator speed is 9.5 sweeps/hour.

1630 Gas supply pressure is down to 18.1 inches w.g. at an offtake temperature of 500 degrees C. We will not increase the saturation air flow until the gas supply pressure is down to 4 inches w.g. Gas continues to bubble through the cyclone tank water.

1700 Agitator speed is 10.0 sweeps/hour. Dumped 1740 pounds of ash. Gas supply pressure is down to 18 inches w.g. at 482 degrees C.

1715 The coal leg temperature is running between 51 & 58 degrees C.

1730 Gas supply pressure is 18.1 inches w.g. at 518 degrees C.

1800 Agitator speed is 8.8 sweeps/hour. The grate is 4/2.00.

1815 Tried the cyclone slide valve in the open position. Getting excessive concentrations of gas on all levels. Returned it to the closed position.

1830 Increased the saturation air flow to 1300 cfm at a saturation temperature of 60 degrees C. Increasing the load to keep the offtake temperature over 500 degrees C.

1840 Gas supply pressure and top gas pressure are over 20 inches w.g. The system is plugged up.

1900 Dumped 1200 pounds of ash and water (mostly water).

1930 Gas supply pressure is 21.5 inches w.g. and top gas pressure is 22 inches w.g.

2000 Slowed the grate to 2/2.40.

2100 Started coaling up at 6.18 tons. Offtake temperature has swung back to 499-500 degrees C. Top gas and gas supply pressures are steady at 22 & 21.5 inches respectively. Opened the gas supply valve to 75% open. This only dropped the top gas and gas supply pressures 0.2 & 0.3 inches w.g., respectively.

2115 Back pressure continues. Gas is heavy throughout the area. Cyclone continues to leak and the fans are pulling gas out of the bin area above.

2125 Stopped coaling up at 12.10 tons.

2200 Have shutdown the grate and will leave it dormant for an hour. The ash pit pressure is over 26 inches.

There is not enough steam to keep the gas in the retort when inserting the rods for the fire tests.

2225 Top gas and gas supply pressures are over 22 inches w.g. Offtake temperature is at 533 degrees C.

2230 Dumped 1400 pounds of ash and water (70% water).

2300 Grate is back on now at a speed of 2/2.25.

2320 Increased the saturation air flow to 1400 cfm in attempt to loosen the blockage. Increased the saturation temperature to 64 degrees C.

2340 Dump ash.

August 10, 1983

0000 There is a tremendous amount of gas coming out of the poke holes during the fire test. The cyclone outlet pressure is 25.1 inches w.g. The ashpit pressure is 30.2 inches w.g. Offtake temperature is 536 degrees C.

0100 Dump ash.

0215 Lowered the jacket water flow to 15 gpm. Steam is 100%.

0217 Increased the grate speed to 2/3.00.

0304 Drained 1200 pounds of water from the ash cone.

0310 Lowered the jacket water flow to 14 gpm.

0325 The induced draft fan has reached its maximum capabilities and has developed a severe vibration.

0330 Dumped the cyclone. When doing this, the gas that is released fills the building in 7 seconds.

0410 Increased the grate to 4/3.00.

0411 Increased the agitator speed to 16.0 sweeps/hour.

0415 Decreased the jacket water flow to 12 gpm.

0435 No improvement in the gas supply pressure. It is currently reading 25 inches w.g. The saturation air flow is 1305 cfm. Saturation blowoff is wide open. The induced draft fan is still working at maximum level and the belts are screaming.

0438 Lowered the jacket water flow to 11 gpm. Having difficulty keeping the saturation temperature up. Steam is

still 100%. The offtake temperature is 449 degrees C.

0500 Dump ash. Start loading coal.

0527 Lowered the jacket water to 10 gpm.

0530 Coal up weight 1.27 tons.

0535 Lower heating value is 150 BTU/FT³.

0630 Coal up weight is 1.35 tons.

0730 Checked the combustor and fire was in the 24 inch incoming gas line and around the elbow. That is the farthest the fire has gone during this run. The ash pit pressure is 31.6 inches w.g. Fire loss pressure is 6.2 inches w.g. Gas offtake pressure is 24.8 inches w.g. Air flow control is at 1400 cfm and is reading 1300 cfm inlet air flow.

0845 We are using a magnahelic guage at several locations in the gas duct to the combustor to determine the exact location of the pressure drop. The pressure upstream of the safety valve is 9 inches w.g. Vacuum downstream of the safety valve is +24 inches w.g. (at the gas duct where the U of M does its sampling just upstream of the venturi).

0905 We are now opening a port to check the delta p across the venturi.

0915 There was 9 inches w.g. gas pressure downstream of the venturi.

1000 Increased the grate speed to 7/2.50.

1015 Saturation temperature is 62 degrees C.

1045 Increased the jacket water flow to 16 gpm. The steam valve is 30% open.

1200 Increased the grate speed to 7/4.00. Dumped 1157 pounds of ash.

1230 Shutdown the gasifier. We will retart the gasifier on approximately 8-15-83. We need to clean out the badly plugged lines and thus reduce the pressure problems we have been having.

August 15, 1983

Changed the bottom grate spacing to 6 inches. Loaded by hand 2,000+ pounds of metallurgical coke.

0955 Lit the wicks.

1040 Pilot lit at the retort coal feed tube.

1041 Lit the vent flare.

1110 Gas through the combustor....combustor lit.

1150 Saturation temperature is 60 degrees C. on automatic.

1155 Ashpit pressure has been greater than 30 inches w.g. for the last half hour. The air flow is down to 400-500 cfm. and not under manual control. The fan is at its limit. Poking through the holes does not help much. A pressure probe test was done in hole #5 to see where the flow restriction is. The results are below:

<u>inches above grate</u>	<u>Delta p - ashpit (in. w.g.)</u>
0	0.5
6	1.0
12	1.0
18	1.0
24	1.0
30	1.5
36	8.0
42	+30.0

The restriction is approximately 3 feet above the grate. This is approximately above the coal/coke level. Perhaps coal charged to the retort on start up swelled during start up. We will wait it out using the agitator and poking.

1230 Steam drum header valve is broken. No steam is available for saturation temperature control. Will shut down the boiler for repairs. Saturation temperature is on manual control.

1300 Air flow is improving. It is now up to 600 cfm from 400 cfm. The offtake temperature is 97 degrees C.

1345 Removed steam regulator diaphragm.

1415 Coal up weight is 1.38 tons.

1430 The offtake temperature is over 600 degrees C. and burning through is evident on one side. Will drop the saturation air flow to 1200 cfm from 1400 cfm until the bed condition stabilizes and the bed is uniform.

1505 Saturation air flow is now 1000 cfm and the offtake temperature is up over 700 degrees C.

1515 Saturation temperature is down under 400 degrees C. We

are increasing the saturation air flow to 1200 cfm to maintain an offtake temperature of at least 500 degrees C. Turned the agitator on and set it at a speed of 10.0 sweeps/hour to even out the bed. The south side has continued to burn through.

1600 During this fire test all poke rods with exception of #3 & #7 had to be hammered down. Leaving the agitator and grate as they were.

1620 South coal leg is hot. Opened the poke valves and roded out the pipe. The offtake temperature is down some. Coal leg temperature is 68 degrees C.

1627 Power is out throughout the complex. Shutdown procedure is in effect. Manually lit the flare on the roof.

1716 Power is back on!! Start up procedure is in effect. Saturation air flow is at 200 cfm. The flare is still lit. Combustion chamber pilot is lit. Cyclone drain is plugged. Very little water is coming out when the dipleg valve is open.

1754 Have positive gas supply pressure at only +0.3 inches w.g. vs. only +0.6 inches w.g. on top gas pressure. Have tried to unclog the build up at the cyclone outlet. Have tried to flush the system twice. Results were poor. Water is still not exiting properly. Excess gas is still escaping from the cyclone valve.

1800 Opened the side valves on the cyclone and pushed the rods in from both sides. Loosened much debris from the cone bottom. Water comes out a little faster.

1815 Leaving the grate at 3/2.70.

1900 The saturation air flow is 1100 cfm.

1915 The saturation air flow is 1200 cfm.

1930 Cyclone is still not emptying properly. The south coal leg is still running warm. Continuing the hammering, rodding and vibrating.

2000 Slowed the grate to 3/2.35.

2015 Dumped 1045 pounds of ash. Used the upper nozzles to flush.

2110 Started coaling up at 4.82 tons.

2115 Increased the jacket water to 27 gpm to maintain a 60 degree C. saturation temperature.

2143 Stopped coaling up at 1.20 tons.

2145 CO is 22.06%, CO₂ is 7.98% and H₂ is 15.99%. Lower heating value is 137.6 BTU/FT³ and the higher heating value is 147.8 BTU/FT³.

2200 Grate speed is 3/2.35. The bed was somewhat looser during this freeboard test.

2230 Dumped 1060 pounds of ash and water. It was mostly water. Coal feed for the last 3 hours has averaged 0.913 tons/hour.

2300 The pH is 4. Repositioned the hose in the caustic barrel. Gas continues to leak badly anywhere it can (coal valves, downcomer, etc.).

2340 Decreased the agitator speed to 9.5 sweeps/hour.

August 16, 1983

0010 Increased the agitator speed to 12.5 sweeps/hour.

0030 Coal up weight - 1.30 tons. Slowed the agitator to 11.5 sweeps/hour.

0040 Drained 600 pounds of water from the ashpit.

0103 Dumped 650 pounds of ash.

0105 Decreased the agitator speed to 10.5 sweeps/hour.

0109 Changed the caustic barrel.

0130 Coal up weight - 0.84 ton.

0211 Slowed the agitator to 9.5 sweeps/hour.

0230 Coal up weight - 0.86 ton.

0300 Drained 600 pounds of water from the ash pit.

0330 Coal up weight - 0.91 ton.

0335 Removed, cleaned and adjusted the insert in retort access port number 7.

0430 Coal up weight - 0.96 ton.

0500 Dumped 607 pounds of ash.

0502 Started loading coal.

0530 Coal up weight - 1.10 tons.

0545 Gas quality has improved. Lower heating value is 142 BTU/FT3. CO is 24% and CO2 is 26%.

0551 Stopped loading coal at 12.41 tons.

0610 Increased the grate speed to 3/3.00.

0621 Increased the agitator to 10.5 sweeps/hour.

0630 Coal up weight 1.20 tons.

0634 Increased the agitator speed to 11.5 sweeps/hour.

0730 We will increase the saturation air flow 100 cfm every half hour until we determine what the maximum is for 1/4" X 2" Illinois #6.

0745 Saturation air flow is 1300 cfm. Increased the grate to 3/3.50 and the agitator to 12.0 sweeps/hour. Slowed the jacket water down to 25 gpm. The steam valve is 62% open.

0800 Saturation air flow is 1400 cfm.

0815 We will hold the saturation air flow at 1400 cfm until the freeboard levels off. Started the reclamation of the jacket water to the scrubber tanks. Opened the upper spray for the scrubber and the spray nozzle for the induced draft fan.

0830 Poked and raked numbers 1,2 & 3. Increased the agitator to 13.0 sweeps/hour.

0900 Poked and raked numbers 1,2 & 3 again.

0930 Increased the agitator to 14.0 sweeps/hour. The Quench system is running. The downcomer material is dry.

1000 Increased the agitator to 15.0 sweeps/hour. Increased the grate drive to 5/2.50.

1030 Channeling through is evident in holes number 2 & 3. The pH in the number 1 tank is 5.9 and that of the number 2 tank is 4.5. Increased the caustic pump to 50/75.

1100 Increased the agitator to 16.0 sweeps/hour. Dumped 1220 pounds of mostly dry ash. The ash consisted mainly of 2-3 inch clinkers.

1130 Top of the bed is glowing, and no channeling is apparent.

1210 The saturation air flow is up to 1500 cfm. The off-take temperature is 476 degrees C.

- 1240 Increased the saturataion air flow to 1600 cfm. Increased the grate to 5/3.50.
- 1305 Started coaling up at 3.28 tons.
- 1310 Increased the saturation air flow to 1700 cfm. The induced draft fan is running smoothly at 110.
- 1340 Increased the saturation air flow to 1800 cfm. Increased the agitator to 17.5 sweeps/hour and the grate to 7/3.00. Finished coaling up at a weight of 12.75 tons.
- 1400 During this fire test, some channeling was noted around the #2 hole.
- 1410 Increased the saturation air flow to 1900 cfm and slowed the grate to 7/3.00.
- 1415 Dumped 1435 pounds of ash. The ash was mostly 1-2 inch clinkers. Increased the agitator to 18.0 sweeps/hour.
- 1530 The storm is over. Skies are starting to clear after the heavy rains. Winds were gusting at over 45 knots. Increased the agitator to 19 sweeps/hour. Decreased the jacket water to 22 gpm. Trying to maintain a saturation temperature of 62 degrees C. Gas quality is improving. Offtake temperature is 500 degrees C. Dropped 1.72 tons of coal. Ash weight went to 1400 pounds in 2.5 hours.
- 1600 The agitator is now running at 19.5 sweeps/hour. Trying to maintain a 36 inch freeboard. Increased the grate speed to 7/3.00.
- 1610 Increased the saturation air flow to 2000 cfm with a saturation temperature of 60 degrees C.
- 1630 Dropped 1.9 tons of coal this hour. The offtake temperature is ranging between 490 & 530 degrees C. Back pressure is building up. Gas line back pressure is 3.2 inches w.g. Induced draft fan will not pull more. Gas control valves are wide open. Both combustion blowers are working at maximum. The induced draft fan is rated at 180 amps and it is only pulling 110.
- 1640 Dumped over 2000 pounds of ash and water (at least 800 pounds was water). Found a few shoe sized clinkers, but the consist was mostly 1.5-2.5 inch pieces.
- 1700 Agitator speed is 19.0 sweeps/hour.
- 1718 The offtake temperature is 600 degrees C. Fire loss pressure is 12.4 inches w.g. Increasing the jacket water flow to 25 gpm as the saturation temperature is

62 degrees C.

- 1730 The whole bed shows some glowing. Coal useage is only 1.7 tons this hour. Can see a small amount of gas escaping from the combustor port. Gas concentration in the building is bad. CO monitor indicates 500 ppm on the upper levels.
- 1800 Reduced the grate to 6/2.30. Have noted the ash weight has climbed to 1500 pounds over the last 1.3 hour.
- 1820 Finally able to throttle the ash cone valve. Dropping over 800 pounds of water.
- 1830 Offtake temperature has evened out at 575 degrees C. Dropped 1.73 tons of coal. The south coal leg has been warm all day.
- 1930 Offtake temperature is 535 degrees C. Dropped 1.9 tons of coal. Gas quality has improved significantly. CO is 24.6%, CO₂ is 6.6% and H₂ is 16.0%. Lower heating value is 145 BTU/FT³ and the higher heating value is 155 BTU/FT³.
- 2000 Increased the grate speed to 6/2.85.
- 2015 Started coaling up at 2.24 tons.
- 2030 Coal feed is 1.97 tons.
- 2045 Dumped 1400 pounds of ash. Found dozens of large clinkers in the neighborhood of 2600 grams (6" X 8").
- 2110 Stopped coaling up at 11.57 tons.
- 2140 Top gas pressure is 5.3 inches w.g. and the gas supply pressure is 4.3 inches w.g. The offtake temperature is down to 470 degrees C. Decreased the jacket water flow to 23 gpm.
- 2215 Dumped 1850 pounds of ash.
- 2220 Steam valve is 100% open. Saturation temperature falls to 58-59 degrees C. Decreasing the jacket water flow to 16 gpm.
- 2330 Coal up weight - 1.84 tons.

August 17, 1983

- 0010 Changed the caustic barrels.
- 0030 Coal up weight - 1.75 tons.

0045 Dumped 1080 pounds of ash.

0130 Coal up 2.33 tons.

0140 Dumped 400 pounds of water from the ashpit.

0210 Increased the grate speed to 7/3.00.

0230 Coal up weight - 2.29 tons.

0240 Slowed the agitator to 22.0 sweeps/hour.

0311 Dumped ash.

0330 Coal up weight - 1.75 tons.

0341 Slowed the agitator to 20.5 sweeps/hour.

0409 Slowed the grate to 7/2.50.

0410 Slowed the agitator to 19.5 sweeps/hour.

0430 Coal up weight - 1.57 tons.

0445 The saturation air flow pen on the strip chart dropped to 1800 cfm, but the readout indicates 2000 cfm. The saturation air flow controller is working properly.

0450 The gas quality is better. The lower heating value is 142.5 BTU/FT³.

0455 Lowered the jacket water flow to 20.0 gpm. The steam valve is still 100% open.

0504 The strip chart pen for the saturation air flow just moved back up to 2000 cfm!

0530 Coal up weight - 1.94 tons.

0535 Started loading coal at .98 ton.

0541 Increased the agitator speed to 20.5 sweeps/hour.

0612 Increased the grate speed to 7/3.00.

0630 Coal up at 2.11 tons.

0631 Increased the agitator speed to 22.0 sweeps/hour.

0645 Removed 25 scoops of material from the cyclone.

0650 Dumped 1869 pounds of ash.

0815 Increased the saturation air flow to 2100+ cfm. Increased the grate to 7/3.75. Increased the agitator to

23.0 sweeps/hour.

- 0900 Dumped 1235 pounds of ash and water. There was a large amount of water. The average size of the ash was 1-2 inches. Flushed the cyclone. There was 2 inches of floating particulate in the cyclone.
- 0910 Closed the gas control valve from 100% open to 80% open. Gas supply pressure dropped to 1.5 inches w.g. Gas quality is dropping. CO is running in the range of 20-23% and CO₂ is running in the range of 7.6-8.0%. Leaving the supply valve at 90% open giving a pressure of 3.0 inches w.g.
- 1000 Slowed the grate to 7/3.50. Tightened the agitator seal and repaired retort access ports numbers 3 & 4.
- 1030 Flushed the cyclone. The valve was sticking so we lubricated it. The cyclone is plugged with particulate. Opened the 1.5 inch pipe caps and drove a bar down through it. Drained 1500 pounds of water from the ash pit.
- 1045 Started coaling up at 2.60 tons. Changed caustic barrel. The pH is 4.0.
- 1100 The welded seams on the induced draft fan are leaking just above the elbow.
- 1200 Slowed the grate down to 7/3.00.
- 1220 Dumped 1765 pounds of ash. The ash scale showed over 2000 pounds and the saturation temperature went to 62 degrees C. The offtake temperature went to 550 degrees C. Slowed the grate to 7/2.50.
- 1345 Started coaling up at 5.32 tons. Atomizing the tar into the combustor.
- 1415 Finished coaling up at 12.21 tons.
- 1430 Dumped 1200 pounds of ash. Very little water was present in the fine ash.
- 1530 Saturation air flow is 2100 cfm and the saturation temperature is 60 degrees C. Unplugged the smaller jacket water trap. Getting a tremendous amount of water overflowing into the ash cone.
- 1600 During this fire test it was noted that the bars from the southeast retort access ports came out cold, while the bars from the northwest retort access ports were bright red! The grate speed is 7/2.75.
- 1610 Closed the gas control valve from 100% open to 67%

- open. This adjustment dropped the top gas and gas supply pressures each about 3 inches w.g.
- 1630 Dumped 1065 pounds of ash, after draining approximately 360 pounds of water.
- 1640 Readjusted the gas control valve to 83% open as the cyclone outlet pressure was at 0.0. This change added about 1.5 inches w.g. to the top gas and gas supply pressures.
- 1645 CO is 24.4%, CO₂ is 6.5% and H₂ is 16.3%.
- 1730 Coal feed is now at 1.8 tons this hour. Scrubber inlet thermocouple is once again functional. It is reading 85 degrees C. Increased the jacket water flow to 20 gpm. Dumped 1990 pounds of ash. There were numerous fist size and larger clinkers. The largest clinker was 9" X 6" X 6" and weighed 2980 grams.
- 1830 Slowed the agitator to 20.5 sweeps/hour. Coal drop this hour was 1.7 tons. Started coaling up at 2.63 tons. Gas quality has improved. The lower heating value is 159.9 BTU/FT³. CO is 24.5%, CO₂ is 6.4% and H₂ is 16.8%.
- 1915 Stopped coaling up at 11.13 tons.
- 1930 Coal feed is back to 1.97 tons. The pH is 6.2. Changed the caustic barrels. Dumped the ash cone again.
- 2000 Grate speed is 6/2.50.
- 2110 Lower heating value is 162.0 BTU/FT³. CO is 25.6%, CO₂ is 5.8% and H₂ is 16.9%.
- 2200 Increased the grate to 6/3.25.
- 2210 Started loading coal at 5.41 tons.
- 2215 Increased the jacket water flow to 21 gpm. Saturation temperature is 62 degrees C.
- 2220 Jacket water flow is 23 gpm. Closed the steam valve to 32% open. Saturation temperature is still 62 degrees C.
- 2223 Dumped 1300 pounds of ash.
- 2225 Stopped coaling up at 12.09 tons.
- 2230 Coal feed was 2.19 tons. The agitator speed is 22.0 sweeps/hour. Saturation temperature finally leveled off at 60 degrees C.

2320 Lowered the jacket water flow to 22.0 gpm.

2330 Coal up weight - 1.98 tons.

August 18, 1983

0030 Coal up weight - 1.87 tons.

0100 Dumped 1500 pounds of ash.

0130 Coal up weight - 1.87 tons.

0230 Coal up weight - 1.93 tons.

0300 Dumped ash.

0330 Coal up weight - 1.59 tons.

0340 Dropped the jacket water flow to 20.0 gpm.

0410 Dropped the jacket water flow to 18.0 gpm.

0430 Coal up weight - 1.65 tons.

0500 Dumped 1066 pounds of ash.

0510 Started loading coal.

0530 Coal up weight - 1.65 tons.

0540 Slowed the agitator to 21.0 sweeps/hour.

0610 Increased the grate speed to 6/3.75.

0611 Increased the agitator speed to 22.5 sweeps/hour.

0630 Coal up weight - 22.7 tons.

0645 The grate drive is getting worse.

0720 Changed the grate to 10/2.75 from 6/3.75. The noise has diminished. The top slide valve was left shut from the last ash dump. It opened up O.K. We were only getting 60 pounds of ash.

0735 Increased the jacket water flow to 19 gpm from 14 gpm. The steam valve is 10% open.

0745 Straightening bars for the fire test.

0750 Increased the jacket water flow to 21 gpm. The steam is on automatic and adjusting slowly. Decided to put it on manual until it gets back under control.

0800 Gas quality has steadily gotten worse. The offtake temperature has gone up to 470 degrees C. The gas control valve is 50% open and the pressure is 1.3 inches w.g.

0915 Saturation temperatue is 57 degrees C. Just returned the control to automatic and set it for 60 degrees C.

0945 Dumped 1571 pounds of ash. The hopper was full. Flushed the ash cone with the upper nozzles. The ash had some good sized clinkers in it (6+"). Gas control valve is 60% open and showing a pressure of 1.74 inches w.g.

1015 Saturation air flow is 2200+ cfm. Increased the saturation temperature to 61 degrees C.

1035 Started coaling up at 2.41 tons. The holes in the scrubber exhaust elbow just before the induced draft fan are much worse than at start up. Noticed some holes in the stack.

1115 Saturataion air flow is 2300 cfm.

1130 Increased the jacket water flow to 25 gpm. The steam valve is closed and the saturation temperature is 62.5 degrees C. Coal up weight - 12.27 tons. Increased the grate speed to 10/2.75 and the agitator speed to 23.5 sweeps/hour.

1215 Increased the saturation air flow to 2400 cfm.

1230 Offtake temperature is 515 degrees C.

1245 Dumped 1635 pounds of ash. This was made up of mostly 1-3 inch clinkers. Flushed the upper cone with three nozzles. Increased the caustic pump to 60-60.

1315 Increased the saturation air flow to 2500 cfm. Changed the caustic barrel. The pH is 4.0.

1330 The pH is now 6.5.

1335 Started coaling up at 6.01 ton.

1355 Increased the agitator to 24.0 sweeps/hour.

1415 Increased the saturation air flow to 2600 cfm. The saturation air flow valve is 60% open.

1420 Dumped 1000 pounds of ash.

1530 Slowed the agitator down to 23.5 sweeps/hour.

1545 Increased the saturation air flow to 2650 cfm. The

offtake temperature is 495 degrees C. The top gas pressure is 3.0 inches w.g. and the gas supply pressure is 1.3 inches w.g. Leaving the gas control valve at 60% open. This seems to provide the least back pressure.

- 1600 Increased the saturation air flow to 2700 cfm. Slowed the grate to 10/2.25.
- 1640 The offtake temperature hit 540 degrees C. Number 3 hole is glowing. The coal leg temperature is 54 degrees C.
- 1700 The offtake temperature is back down to 498 degrees C. Coal leg temperature is down to 42 degrees C. The top gas pressure is 4.0 inches w.g. and the gas supply pressure is 2.1 inches w.g.
- 1710 The SIGMA calorimeter is working again!
- 1715 The offtake temperature hit a momentary peak of 630 degrees C., but quickly returned to 550 degrees C.
- 1740 Decreased the jacket water flow to 22.5 gpm.
- 1800 During this fire test it was noted that the bed is very uneven. The south side is high and the north side is low. There is a hard crust on top. Increasing the grate to 10/2.60. Slowed the agitator to 21.5 sweeps/hour.
- 1810 Seem to be having difficulty holding the saturation temperature where we want it. The offtake temperature is in a gradual decline.
- 1830 The agitator speed is 21.6 sweeps/hour. Started coaling up at 1.62 tons. Successive coal feeds since 1530 have reduced in size. We are now down to around 2 tons/hour.
- 1930 Gas quality is going down hill. This coal feed was 2.48 tons. The offtake temperature is steady at 500 degree C.
- 2000 Slowed the grate to 10/2.20.
- 2010 The offtake temperature is rising and in the neighborhood of 630 degrees C. We are raking the bed as we are burning through on holes number 2,3 & 4.
- 2020 Having difficulty holding the saturation temperature at 61 degrees C. It swings from 59 degrees C to 63 degrees C.
- 2030 The coal feed is 2.37 tons. Dumped 160 pounds of ash.

2045 Started coaling up at 5.59 tons.

2055 Both the jacket water outlet and the coal leg temperatures continue to run high at 92 and 84 degrees C., respectively. Neither coal leg is warm to the touch.

2100 The steam valve is now 18% open. Increasing the jacket water flow to 27 gpm. Still trying to maintain a 61 degree C. saturation temperature and lower the jacket outlet temperature. The back pressure is building up. The top gas pressure is 4.6 inches w.g. and the gas supply pressure is 2.3 inches w.g. All fans are wide open and the gas control valve will not decrease the pressure significantly.

2125 The offtake temperature has evened off at 530 degrees C. over the last 15-20 minutes. The top gas pressure, however, is up to 5.0 inches w.g. Gas quality is coming back.

2130 Coal feed dropped to 2.09 tons. The coal leg temperature continues to read in the low 80's C., but are still not warm to the touch.

2200 The bed has evened out somewhat. Had to turn off the agitator for 4-5 minutes to remove a rod which got caught during the fire test. The offtake temperature immediately jumped to 683 degrees C. Recovery, however, was just as fast once the agitator was turned back on. The grate speed is 10/2.45.

2230 The coal feed is back to 2.38 tons.

2300 The agitator speed is 23.0 sweeps/hour. The pH is 4.0. Changed the caustic barrel.

August 19, 1983

0030 Coal up weight - 2.37 tons.

0045 Dumped ash.

0130 Coal up weight - 2.37 tons.

0230 Coal up weight - 2.74 tons.

0245 Dumped ash.

0250 Started loading coal.

0320 Stopped loading coal.

0330 Coal up weight - 2.51 tons.

APPENDIX B

Weather Data for Testing Days

These data were taken from NOAA weather station 72658
approximately 3 miles from the test site.

Note: Barometric pressure has been adiabatically normalized to
sea level from 840 feet elevation and ambient temperature.

Temperature in degrees Fahrenheit

Relative Humidity in %

Barometric Pressure in inches mercury

Precipitation in inches

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SNOW
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DATE: JULY 28, 1983

0900	73	87	29.055	
1000	80	74	29.055	
1100	80	72	29.055	
1200	81	72	29.055	
1300	85	61	29.035	
1400	85	59	29.005	
1500	85	63	29.015	
1600	84	65	29.025	
1700	83	65	29.035	
1800	83	72	29.035	
1900	82	74	29.045	
2000	80	74	29.045	
2100	80	74	29.055	
2200	78	77	29.060	
2300	78	72	29.055	
2350	76	79	29.055	

General Conditions: Foggy sunrise and cloudy sunset. 543 minutes of sunshine (61%). Maximum wind speed is 13 mph.

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SN
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DATE: July 29, 1983

0100	73	88	29.080	
0200	74	85	29.100	
0300	73	88	29.095	
0400	72	88	29.125	
0500	73	88	29.145	
0600	73	88	29.150	
0700	77	82	29.160	
0800	80	76	29.170	
0900	84	65	29.180	
1000	87	54	29.200	
1100	90	47	29.210	
1200	91	43	29.210	
1300	93	37	29.220	
1400	94	31	29.220	
1500	93	32	29.230	
1600	94	29	29.230	
1700	92	37	29.230	
1800	91	38	29.220	
1900	87	50	29.230	
2000	86	48	29.290	
2100	82	59	29.250	
2200	81	61	29.250	
2300	77	72	29.250	
2350	76	71	29.280	

General Conditions: Foggy sunrise and cloudy sunset. 771 minutes of sunshine (87%). Maximum wind speed is 14 mph.

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SNOW
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DATE: July 31, 1983

0100	74	76	29.280	
0200	73	81	29.270	
0300	71	81	29.270	
0400	71	81	29.270	
0500	70	84	29.260	
0600	71	84	29.255	
0700	76	76	29.260	
0800	78	67	29.270	
0900	81	63	29.270	
1000	85	59	29.260	
1100	89	52	29.250	
1200	89	45	29.240	
1300	92	43	29.235	
1400	82	61	29.230	
1500	78	76	29.200	
1600	80	67	29.210	
1700	78	72	29.190	
1800	80	65	29.170	
1900	79	69	29.150	
2000	75	79	29.150	
2100	74	79	29.160	
2200	72	82	29.160	
2300	73	81	29.170	
2350	71	84	29.160	

General Conditions: Cloudy sunrise and clear sunset. 769 minutes of sunshine (87%). Maximum wind speed is 17 mph.

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SNOW
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DATE: July 31, 1983

0100	70	87	29.130	
0200	69	87	29.105	
0300	71	84	29.105	
0400	71	84	29.095	
0500	71	82	29.115	
0600	70	71	29.130	
0700	71	68	29.140	
0800	72	64	29.150	
0900	75	58	29.160	
1000	76	58	29.160	
1100	79	50	29.150	
1200	81	43	29.140	
1300	81	44	29.130	
1400	83	41	29.125	
1500	81	44	29.125	
1600	79	46	29.115	
1700	79	49	29.115	
1800	77	52	29.115	
1900	76	54	29.115	
2000	72	61	29.125	
2100	70	66	29.144	
2200	69	69	29.150	
2300	67	71	29.150	
2351	67	73	29.165	

General Conditions: Clear sunrise and clear sunset. 905 minutes of sunshine (100%). Maximum wind speed is 23 mph.

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SNOW
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DATE: August 1, 1983

0100	67	73	29.165	
0200	65	75	29.175	
0300	63	78	29.190	
0400	61	84	29.200	
0500	62	81	29.210	
0600	62	84	29.225	
0700	69	73	29.250	
0800	72	66	29.255	
0900	76	60	29.260	
1000	80	54	29.265	
1100	81	49	29.260	
1200	83	44	29.245	
1300	82	46	29.250	
1400	83	46	29.235	
1500	84	45	29.225	
1600	86	42	29.220	
1700	84	48	29.220	
1800	83	49	29.220	
1900	80	54	29.220	
2000	77	56	29.240	
2100	74	62	29.250	
2200	72	66	29.240	
2300	71	66	29.250	
2351	70	68	29.260	

General Conditions: Clear sunrise and sunset. 882 minutes of sunshine (100%). Maximum wind speed is 12 mph.

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SN
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DATE: August 2, 1983

0100	69	70	29.260	
0200	68	70	29.260	
0300	66	75	29.260	
0400	65	75	29.260	
0500	64	78	29.260	
0600	66	75	29.260	
0700	71	66	29.260	
0800	75	62	29.250	
0900	78	54	29.230	
1000	82	51	29.220	
1100	84	48	29.200	
1200	87	47	29.170	
1300	90	44	29.150	
1400	90	46	29.140	
1500	91	46	29.115	
1600	91	47	29.095	
1700	92	49	29.075	
1800	89	54	29.065	
1900	87	57	29.045	
2000	85	61	29.045	
2100	84	61	29.045	
2200	83	67	29.035	
2300	83	67	29.025	
2350	83	67	29.015	

General Conditions: Clear sunrise and cloudy sunset. 811 minutes of sunshine (92%). Maximum wind speed is 21 mph.

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SNOW
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DATE: August 3, 1983

0100	83	63	28.975	
0200	84	63	28.955	T
0300	80	77	28.970	0.03
0400	79	74	28.965	T
0500	78	71	28.980	
0600	76	79	29.000	0.08
0700	76	82	28.995	T
0800	80	74	29.015	
0900	84	65	28.995	
1000	88	66	29.015	
1100	89	64	29.025	
1200	91	64	29.025	
1300	90	62	29.035	
1400	92	56	29.045	
1500	91	58	29.055	
1600	88	61	29.055	
1700	89	60	28.070	
1800	89	60	29.075	
1900	87	60	29.095	
2000	85	65	29.105	
2100	83	70	29.125	
2200	81	72	29.130	
2300	80	74	29.140	
2351	79	74	29.160	

General Conditions: Cloudy sunrise and clear sunset. 767 minutes of sunshine (89%). Maximum wind speed is 20 mph.

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SNOW
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DATE: August 4, 1983

0100	78	76	29.170	
0200	76	76	29.180	
0300	75	76	29.190	
0400	74	76	29.190	
0500	73	79	29.200	
0600	73	76	29.220	
0700	75	69	29.230	
0800	77	67	29.240	
0900	80	62	29.250	
1000	82	59	29.250	
1100	85	51	29.250	
1200	86	51	29.240	
1300	87	52	29.230	
1400	86	56	29.220	
1500	88	54	29.220	
1600	85	55	29.240	
1700	84	57	29.230	
1800	83	61	29.225	
1900	80	67	29.215	
2000	80	65	29.220	
2100	75	74	29.245	
2200	75	74	29.260	
2300	73	76	29.280	
2353	73	76	29.280	

General Conditions: Clear sunrise and clear sunset. 859 minutes of sunshine (98%). Maximum wind speed is 15 mph.

HOUR TEMP RELATIVE BAROMET RAIN
 HUMIDITY PRESS SNOW

DATE: August 5, 1983

0100	71	79	29.265
0200	70	81	29.260
0300	69	84	29.260
0400	68	87	29.260
0500	69	84	29.270
0600	70	84	29.290
0700	70	84	29.305
0800	73	79	29.310
0900	77	71	29.300
1000	79	69	29.310
1100	82	63	29.290
1200	83	63	29.280
1300	84	63	29.280
1400	85	57	29.255
1500	88	54	29.250
1600	88	54	29.240
1700	87	55	29.230
1800	87	55	29.220
1900	84	61	29.210
2000	82	63	29.210
2100	79	69	29.225
2200	77	74	29.240
2300	77	74	29.240
2351	75	76	29.240

General Conditions: Cloudy sunrise and cloudy sunset. 694 minutes of sunshine (80%). Maximum wind speed is 10 mph.

HOUR TEMP RELATIVE BAROMET RAIN
 HUMIDITY PRESS SNOW

DATE: August 6, 1983

0100	74	79	29.240
0200	74	79	29.240
0300	72	82	29.230
0400	73	82	29.230
0500	74	79	29.250
0600	73	82	29.250
0700	76	79	29.280
0800	80	69	29.290
0900	83	67	29.260
1000	87	61	29.260
1100	91	54	29.260
1200	93	47	29.250
1300	95	39	29.250
1400	95	36	29.230
1500	96	29	29.230
1600	95	28	29.220
1700	94	28	29.220
1800	92	30	29.220
1900	88	39	29.220
2000	85	43	29.220
2100	83	46	29.240
2200	79	56	29.250
2300	75	67	29.240
2350	72	73	29.235

General Conditions: Cloudy sunrise and clear sunset. 780 minutes of sunshine (90%). Maximum wind speed is 17 mph.

HOUR TEMP RELATIVE BAROMET RAIN
 HUMIDITY PRESS SNOW

DATE: August 7, 1983

0100	72	71	29.220
0200	69	81	29.210
0300	69	81	29.210
0400	66	84	29.210
0500	68	89	29.215
0600	67	81	29.220
0700	73	76	29.230
0800	79	60	29.220
0900	83	57	29.200
1000	86	55	29.180
1100	90	50	29.170
1200	93	48	29.150
1300	95	46	29.130
1400	96	46	29.115
1500	97	45	29.095
1600	96	45	29.075
1700	95	46	29.065
1800	94	48	29.055
1900	90	56	29.055
2000	86	57	29.035
2100	83	61	29.035
2200	83	59	29.035
2300	82	59	29.025
2351	81	60	29.035

General Conditions: Clear sun-
 rise and clear sunset. 867 min-
 utes of sunshine (100%). Maxi-
 mum wind speed is 17 mph.

HOUR TEMP RELATIVE BAROMET RAIN
 HUMIDITY PRESS SNOW

DATE: August 8, 1983

0100	74	79	29.240
0200	74	79	29.240
0300	72	82	29.230
0400	73	82	29.230
0500	74	79	29.250
0600	73	82	29.250
0700	76	79	29.280
0800	80	69	29.290
0900	83	67	29.260
1000	87	61	29.260
1100	91	54	29.260
1200	93	47	29.250
1300	95	39	29.250
1400	95	36	29.230
1500	96	29	29.230
1600	95	28	29.220
1700	94	28	29.220
1800	92	30	29.220
1900	88	39	29.220
2000	85	43	29.220
2100	83	46	29.240
2200	79	56	29.250
2300	75	67	29.240
2340	72	73	29.235

General Conditions: Cloudy sun-
 rise and cloudy sunset. 780 min-
 utes of sunshine (90%). Maximum
 wind speed is 17 mph

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SNOW
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DATE: August 9, 1983

0100	66	70	29.210	
0200	68	68	29.210	
0300	64	75	29.210	
0400	67	70	29.220	
0500	64	78	29.230	
0600	66	76	29.235	
0700	69	76	29.250	
0800	74	62	29.260	
0900	77	59	29.260	
1000	79	50	29.260	
1100	79	49	29.255	
1200	81	44	29.250	
1300	82	43	29.230	
1400	80	46	29.220	
1500	79	50	29.190	T
1600	78	52	29.140	T
1700	79	52	29.160	
1800	78	54	29.150	
1900	77	56	29.140	
2000	74	62	29.140	
2100	73	64	29.135	
2200	71	68	29.120	
2300	72	61	29.105	
2342	70	66	29.080	

General Conditions: Cloudy sunrise and cloudy sunset. 537 minutes of sunshine (62%). Maximum wind speed is 15 mph.

HOUR	TEMP	RELATIVE HUMIDITY	BAROMET PRESS	RAIN SNOW
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DATE: August 10, 1983

0100	70	68	29.050	
0200	72	64	29.020	
0300	71	66	28.985	
0400	71	68	28.960	
0500	75	64	28.920	
0600	76	67	28.920	
0700	78	62	28.880	
0800	83	55	28.865	
0900	83	57	28.860	
1000	84	55	28.850	
1100	84	59	28.855	
1200	85	57	28.860	
1300	86	57	28.880	
1400	85	55	28.905	
1500	83	53	28.925	
1600	83	53	28.945	
1700	80	52	28.975	
1800	78	56	28.985	
1900	77	60	28.995	
2000	75	64	29.015	
2100	74	64	29.035	
2200	72	57	29.055	
2300	70	55	29.055	
2350	68	61	29.070	

General Conditions: Cloudy sunrise and clear sunset. 727 minutes of sunshine (85%). Maximum wind speed is 22 mph.

APPENDIX C
Coal Analysis Data

Feed Coal Size Distribution

Sample Number	Date	Shift Start Time	Screen Mesh Size inch	Cumulative Mass Fraction, % less than stated mesh size, inch				
				1/4	1/2	3/4	1	1 1/2
1	7/28/84	16:00	+3/4	1.1	3.9	22.0	64.8	92.9
3	7/29/84	0:00	+3/4	0.9	2.4	18.5	61.0	90.5
4	7/29/84	8:00	+3/4	0.9	2.8	18.1	52.5	94.1
5	7/29/84	16:00	+3/4	1.1	3.3	20.2	62.5	94.6
6	7/30/84	0:00	+3/4	1.3	3.2	19.8	64.2	96.5
7	7/30/84	8:00	+3/4	1.3	3.7	22.5	66.5	99.1
8	7/30/84	16:00	+3/4	0.8	2.1	14.2	54.1	92.0
9	7/31/84	0:00	+3/4	0.9	2.9	19.8	59.4	92.6
10	7/31/84	8:00	+3/4	0.8	1.6	13.9	56.2	90.5
11	7/31/84	16:00	+3/4	1.7	4.2	20.0	60.4	80.4
12	8/ 1/84	0:00	+3/4	1.0	2.2	15.7	59.0	94.1
13	8/ 1/84	8:00	+3/4	2.1	4.7	14.2	53.7	91.6
14	8/ 1/84	16:00	+3/4	1.0	2.0	10.8	41.3	88.4
15	8/ 2/84	0:00	+3/4	1.0	2.6	13.5	44.6	84.7
16	8/ 2/84	8:00	+3/4	1.5	3.9	20.8	62.7	96.4
17	8/ 2/84	16:00	+3/4	0.9	2.2	16.6	55.9	91.0
18	8/ 3/84	0:00	+3/4	0.8	2.1	12.3	48.4	93.5
19	8/ 3/84	8:00	+3/4	3.2	7.4	23.2	62.6	92.5
20	8/ 3/84	16:00	+1/4	3.4	17.5	48.9	79.3	97.4
21	8/ 4/84	0:00	+1/4	1.7	17.8	50.5	77.9	97.5
21	8/ 4/84	16:00	+1/4	1.4	16.2	50.2	75.1	97.2
22	8/ 4/84	8:00	+1/4	1.3	13.7	40.3	69.8	95.2
22	8/ 5/84	0:00	+1/4	1.9	18.7	49.1	75.3	96.2
23	8/ 5/84	8:00	+1/4	1.1	10.9	34.9	62.4	92.7
24	8/ 5/84	16:00	+1/4	1.5	13.0	42.4	72.2	93.7
25	8/ 6/84	0:00	+1/4	1.4	9.3	32.0	61.2	88.0
26	8/ 6/84	8:00	+1/4	1.7	11.4	45.0	73.4	95.1
27	8/ 6/84	16:00	+1/4	1.6	8.3	33.2	61.6	83.3
28	8/ 7/84	0:00	+1/4	1.5	8.4	29.6	64.5	95.1
29	8/ 7/84	8:00	+1/4	1.9	10.5	39.3	67.9	90.3
30	8/ 7/84	16:00	+1/4	2.3	11.9	38.7	66.6	94.2
31	8/ 8/84	0:00	+1/4	1.6	8.1	34.0	68.8	93.1
32	8/ 8/84	8:00	+1/4	1.4	9.2	35.4	62.0	91.7
33	8/ 8/84	16:00	+1/4	1.5	9.8	37.5	65.6	93.8
34	8/ 9/84	0:00	+1/4	1.5	11.8	34.7	59.5	87.4
35	8/ 9/84	8:00	+1/4	1.7	11.2	39.8	67.6	91.2
36	8/ 9/84	16:00	+1/4	2.2	11.6	41.0	68.5	91.0
37	8/10/84	0:00	+1/4	1.1	9.8	39.9	69.1	90.3
38	8/10/84	8:00	+1/4	1.0	8.1	35.9	69.7	93.7
39	8/15/84	8:00	+1/4	2.0	21.5	57.4	80.5	94.1
40	8/15/84	16:00	+1/4	1.7	15.0	41.7	67.4	87.3
41	8/16/84	0:00	+1/4	2.0	17.3	52.4	76.1	92.4
42	8/16/84	8:00	+1/4	1.4	17.5	52.3	78.4	96.1
43	8/16/84	16:00	+1/4	1.9	12.7	42.7	68.2	90.8
44	8/17/84	0:00	+1/4	2.6	20.1	48.6	70.5	95.4
45	8/17/84	8:00	+1/4	2.9	24.5	61.6	83.4	97.2

HOURLY	TEMP	RELATIVE HUMIDITY	BAROMETRIC PRESS	RAIN SNOW
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DATE: August 15, 1983

0900	81	56	29.065	
1000	84	51	29.105	
1100	88	47	29.105	
1200	88	54	29.105	
1300	90	54	29.085	
1400	91	52	29.075	
1500	93	51	29.065	
1600	92	51	29.055	
1700	92	51	29.165	
1800	89	56	29.065	
1900	82	62	29.085	
2000	78	69	29.025	
2100	76	71	29.095	
2200	75	74	29.105	
2300	74	76	29.105	
2351	75	74	29.105	

General Conditions: Clear sunrise and cloudy sunset. 741 minutes of sunshine (88%). Maximum wind speed is 17 mph.

HOURLY	TEMP	RELATIVE HUMIDITY	BAROMETRIC PRESS	RAIN SNOW
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DATE: August 16, 1983

0100	73	79	29.105	
0200	73	79	29.105	
0300	73	79	29.095	
0400	72	79	29.095	
0500	71	79	29.105	
0600	72	79	29.105	
0700	76	74	29.105	
0800	80	67	29.085	
0900	83	63	29.085	
1000	87	57	29.055	
1100	91	49	29.045	
1200	91	52	29.015	
1300	89	57	28.985	
1400	87	63	28.995	0.03
1500	73	76	29.025	0.39
1600	72	76	29.005	T
1700				

Sample Number	Date	Shift Start Time	Screen Mesh Size inch	Cumulative Mass Fraction, % <u>less than stated mesh size, inch</u>				
				1/4	1/2	3/4	1	1 1/2
46	8/17/84	16:00	+1/4	2.3	21.3	51.8	72.3	82.1
47	8/18/84	0:00	+1/4	2.5	19.5	53.9	81.5	98.1
48	8/18/84	8:00	+1/4	2.2	14.1	41.0	65.1	85.9
49	8/18/84	16:00	+1/4	2.3	15.0	47.0	70.6	90.5
50	8/19/84	0:00	+1/4	3.1	18.7	52.4	77.1	98.8
Averages			+3/4	1.1	3.0	17.4	57.2	91.6
			+1/4	1.9	13.8	42.8	70.1	92.3

APPENDIX D
Coal Consumption Log

Coal Weights are given in short tons.

BOM/FGT 007 ILLINOIS NO. 6

COAL FEED

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
07-28	0900	coke	.75	no	8.39	.05	8.34
07-28	1530	007-C1	.75	yes	4.94	3.99	.95
07-28	1630	007-C1	.75	yes	3.99	3.02	.97
07-28	1730	007-C1	.75	yes	3.02	2.18	.84
07-28	1830	007-C1	.75	yes	2.17	1.34	.83
07-28	1930	007-C1	.75	yes	11.57	10.77	.80
07-28	2030	007-C1	.75	yes	10.77	10.07	.70
07-28	2130	007-C1	.75	yes	10.07	9.52	.55
07-28	2230	007-C1	.75	yes	9.52	8.73	.79
07-28	2330	007-C1	.75	yes	8.73	7.90	.83
07-29	0030	007-C3	.75	yes	7.90	7.04	.86
07-29	0130	007-C3	.75	yes	7.04	6.10	.94
07-29	0230	007-C3	.75	yes	6.09	5.22	.87
07-29	0330	007-C3	.75	yes	5.22	4.59	.63
07-29	0430	007-C3	.75	yes	4.58	3.83	.75
07-29	0530	007-C3	.75	yes	11.43	10.68	.75
07-29	0630	007-C3	.75	yes	10.68	9.70	.98
07-29	0730	007-C4	.75	yes	9.70	8.67	1.03
07-29	0830	007-C4	.75	yes	8.67	7.75	.92
07-29	0930	007-C4	.75	yes	7.75	6.88	.87
07-29	1030	007-C4	.75	yes	6.88	5.99	.89
07-29	1130	007-C4	.75	yes	5.99	5.14	.85
07-29	1230	007-C4	.75	yes	5.14	4.32	.82
07-29	1330	007-C4	.75	yes	10.84	9.90	.94
07-29	1430	007-C4	.75	yes	10.82	9.41	1.41
07-29	1530	007-C5	.75	yes	9.41	8.01	1.40
07-29	1630	007-C5	.75	yes	8.01	7.00	1.01
07-29	1730	007-C5	.75	yes	7.00	6.04	.96
07-29	1830	007-C5	.75	yes	6.04	5.08	.96
07-29	1930	007-C5	.75	yes	5.08	3.84	1.24
07-29	2030	007-C5	.75	yes	3.84	2.69	1.15
07-29	2130	007-C5	.75	yes	6.72	5.69	1.03
07-29	2230	007-C5	.75	yes	8.87	7.74	1.13
07-29	2330	007-C5	.75	yes	7.74	6.74	1.00
07-30	0030	007-C6	.75	yes	6.73	5.71	1.02
07-30	0130	007-C6	.75	yes	5.69	4.59	1.10
07-30	0230	007-C6	.75	yes	4.59	3.50	1.09
07-30	0330	007-C6	.75	yes	3.50	2.42	1.08
07-30	0430	007-C6	.75	yes	2.42	1.49	.93
07-30	0530	007-C6	.75	yes	10.66	9.85	.81
07-30	0630	007-C6	.75	yes	12.04	11.09	.95
07-30	0730	007-C7	.75	yes	11.09	10.11	.98
07-30	0830	007-C7	.75	yes	10.11	9.20	.91
07-30	0930	007-C7	.75	yes	9.20	8.23	.97
07-30	1030	007-C7	.75	yes	8.23	7.19	1.04
07-30	1130	007-C7	.75	yes	7.19	6.07	1.12
07-30	1230	007-C7	.75	yes	6.07	4.89	1.18
07-30	1330	007-C7	.75	yes	10.74	9.73	1.01

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
07-30	1430	007-C7	.75	yes	11.85	10.88	.97
07-30	1530	007-C8	.75	yes	10.88	9.95	.93
07-30	1630	007-C8	.75	yes	9.95	8.95	1.00
07-30	1730	007-C8	.75	yes	8.95	7.93	1.02
07-30	1830	007-C8	.75	yes	7.93	6.92	1.01
07-30	1930	007-C8	.75	yes	6.92	5.86	1.06
07-30	2030	007-C8	.75	yes	5.86	4.87	.99
07-30	2130	007-C8	.75	yes	5.83	4.81	1.02
07-30	2230	007-C8	.75	yes	11.17	10.19	.98
07-30	2330	007-C9	.75	yes	10.18	9.18	1.00
07-31	0030	007-C9	.75	yes	9.18	8.12	1.06
07-31	0130	007-C9	.75	yes	8.12	7.12	1.00
07-31	0230	007-C9	.75	yes	7.12	6.12	1.00
07-31	0330	007-C9	.75	yes	6.12	5.18	.94
07-31	0430	007-C9	.75	yes	6.88	5.87	1.01
07-31	0530	007-C9	.75	yes	11.92	10.84	1.08
07-31	0630	007-C9	.75	yes	10.84	9.84	1.00
07-31	0730	007-C10	.75	yes	9.84	8.77	1.07
07-31	0830	007-C10	.75	yes	8.77	7.78	.99
07-31	0930	007-C10	.75	yes	7.78	6.99	.79
07-31	1030	007-C10	.75	yes	6.99	6.23	.76
07-31	1130	007-C10	.75	yes	6.23	5.26	.97
07-31	1230	007-C10	.75	yes	5.26	4.39	.87
07-31	1330	007-C10	.75	yes	9.59	9.02	.57
07-31	1430	007-C10	.75	yes	9.60	9.03	.57
07-31	1530	007-C11	.75	yes	9.03	8.41	.62
07-31	1630	007-C11	.75	yes	8.41	7.84	.57
07-31	1730	007-C11	.75	yes	7.84	7.28	.56
07-31	1830	007-C11	.75	yes	7.28	6.68	.60
07-31	1930	007-C11	.75	yes	6.68	6.10	.58
07-31	2030	007-C11	.75	yes	6.10	5.67	.43
07-31	2130	007-C11	.75	yes	5.67	5.10	.57
07-31	2230	007-C11	.75	yes	5.10	4.5	.55
07-31	2330	007-C12	.75	yes	4.55	4.07	.48
08-01	0030	007-C12	.75	yes	4.07	3.57	.50
08-01	0130	007-C12	.75	yes	3.55	3.07	.48
08-01	0230	007-C12	.75	yes	3.07	2.61	.46
08-01	0330	007-C12	.75	yes	2.61	2.04	.56
08-01	0430	007-C12	.75	yes	2.04	1.48	.56
08-01	0530	007-C12	.75	yes	1.48	1.01	.47
08-01	0630	007-C12	.75	yes	1.01	.65	.36
08-01	0730	007-C13	.75	yes	.65	.40	.25
08-01	0830	007-C13	.75	yes	.90	.52	.38
08-01	0930	007-C13	.75	yes	.52	.15	.37
08-01	1030	007-C13	.75	yes	cycle coal valves		
08-01	1050	007-C13	.75	yes	4.22	2.93	1.29
08-01	1130	007-C13	.75	yes	8.23	7.70	.53
08-01	1230	007-C13	.75	yes	7.70	6.65	1.05
08-01	1330	007-C13	.75	yes	11.40	10.07	1.33
08-01	1430	007-C13	.75	yes	11.88	10.38	1.50
08-01	1530	007-C14	.75	yes	10.38	8.72	1.66

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
08-01	1630	007-C14	.75	yes	8.72	7.11	1.61
08-01	1730	007-C14	.75	yes	7.11	5.27	1.84
08-01	1830	007-C14	.75	yes	5.27	3.09	2.18
08-01	1930	007-C14	.75	yes	10.17	8.43	1.74
08-01	2030	007-C14	.75	yes	8.43	6.40	2.03
08-01	2130	007-C14	.75	yes	6.40	4.34	2.06
08-01	2230	007-C14	.75	yes	11.67	9.91	1.76
08-01	2330	007-C15	.75	yes	9.90	8.01	1.89
08-02	0030	007-C15	.75	yes	8.00	5.96	2.04
08-02	0130	007-C15	.75	yes	5.96	3.74	2.22
08-02	0230	007-C15	.75	yes	3.73	1.96	1.77
08-02	0330	007-C15	.75	yes	8.49	6.54	1.95
08-02	0430	007-C15	.75	yes	7.89	5.88	2.01
08-02	0530	007-C15	.75	yes	11.99	10.03	1.96
08-02	0630	007-C15	.75	yes	12.15	10.15	2.00
08-02	0730	007-C16	.75	yes	10.14	8.74	1.40
08-02	0830	007-C16	.75	yes	8.74	7.32	1.42
08-02	0930	007-C16	.75	yes	7.32	5.79	1.53
08-02	1030	007-C16	.75	yes	5.79	4.11	1.68
08-02	1130	007-C16	.75	yes	9.61	7.83	1.78
08-02	1230	007-C16	.75	yes	7.83	6.01	1.82
08-02	1330	007-C16	.75	yes	11.64	9.35	2.29
08-02	1430	007-C16	.75	yes	12.24	10.24	2.00
08-02	1530	007-C17	.75	yes	10.24	8.67	1.57
08-02	1630	007-C17	.75	yes	8.67	6.76	1.91
08-02	1730	007-C17	.75	yes	6.76	4.60	2.16
08-02	1830	007-C17	.75	yes	4.60	2.40	2.20
08-02	1930	007-C17	.75	yes	10.61	8.55	2.06
08-02	2030	007-C17	.75	yes	8.55	6.75	1.80
08-02	2130	007-C17	.75	yes	6.75	5.09	1.66
08-02	2230	007-C17	.75	yes	11.17	9.36	1.81
08-02	2330	007-C18	.75	yes	11.35	9.12	2.23
08-03	0030	007-C18	.75	yes	9.12	6.68	2.44
08-03	0130	007-C18	.75	yes	6.66	4.96	1.70
08-03	0230	007-C18	.75	yes	4.96	3.28	1.68
08-03	0330	007-C18	.75	yes	3.28	1.33	1.95
08-03	0430	007-C18	.75	yes	5.02	2.73	2.29
08-03	0530	007-C18	.75	yes	11.86	9.67	2.19
08-03	0630	007-C18	.75	yes	12.45	10.84	1.61
08-03	0730	007-C19	.75	yes	10.84	9.24	1.60
08-03	0830	007-C19	.75	yes	9.24	7.57	1.67
08-03	0930	007-C19	.75	yes	7.57	5.42	2.15
08-03	1030	007-C19	.75	yes	5.42	2.91	2.51
08-03	1130	007-C19	.75	yes	4.84	2.82	2.02
08-03	1230	007-C19	.75	yes	2.82	1.09	1.73
08-03	1330	007-C19	.75	yes	1.09	.20	.89
08-03	1430	007-C19	.75	yes	cycle coal valves		
08-03	1530	007-C19	.75	yes	cycle coal valves		
08-03	1555	007-C20	.25	yes	10.29	4.43	5.86
08-03	1630	007-C20	.25	yes	4.43	3.18	1.25
08-03	1730	007-C20	.25	yes	10.17	9.08	1.09

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
08-03	1830	007-C20	.25	yes	9.08	8.42	.66
08-03	1930	007-C20	.25	yes	8.42	7.85	.57
08-03	2030	007-C20	.25	yes	7.85	7.12	.73
08-03	2130	007-C20	.25	yes	7.12	6.48	.64
08-03	2230	007-C20	.25	yes	11.17	10.27	.90
08-03	2330	007-C21	.25	yes	10.27	9.42	.85
08-04	0030	007-C21a	.25	yes	9.41	8.59	.82
08-04	0130	007-C21a	.25	yes	8.59	7.95	.64
08-04	0230	007-C21a	.25	yes	7.95	7.19	.76
08-04	0330	007-C21a	.25	yes	7.19	6.07	1.12
08-04	0430	007-C21a	.25	yes	6.07	4.62	1.45
08-04	0530	007-C21a	.25	yes	13.00	12.00	1.00
08-04	0630	007-C21a	.25	yes	12.00	10.97	1.03
08-04	0730	007-C22a	.25	yes	10.97	9.96	1.01
08-04	0830	007-C22a	.25	yes	9.96	8.81	1.15
08-04	0930	007-C22a	.25	yes	8.81	7.74	1.07
08-04	1030	007-C22a	.25	yes	7.74	6.62	1.12
08-04	1130	007-C22a	.25	yes	6.62	5.59	1.03
08-04	1230	007-C22a	.25	yes	5.59	4.55	1.04
08-04	1330	007-C22a	.25	yes	4.55	3.44	1.10
08-04	1430	007-C22a	.25	yes	11.31	10.14	1.17
08-04	1530	007-C21b	.25	yes	10.14	8.94	1.20
08-04	1630	007-C21b	.25	yes	8.94	8.12	0.82
08-04	1730	007-C21b	.25	yes	8.12	7.23	0.89
08-04	1830	007-C21b	.25	yes	7.23	5.86	1.37
08-04	1930	007-C21b	.25	yes	5.86	4.68	1.18
08-04	2030	007-C21b	.25	yes	4.68	3.56	1.12
08-04	2130	007-C21b	.25	yes	12.19	11.19	1.00
08-04	2230	007-C21b	.25	yes	11.19	10.42	0.77
08-04	2330	007-C22b	.25	yes	10.42	9.70.	0.72
08-05	0030	007-C22b	.25	yes	9.70	9.05	0.65
08-04	0130	007-C22b	.25	yes	9.05	8.47	.58
08-05	0230	007-C22b	.25	yes	8.47	7.97	.50
08-05	0330	007-C22b	.25	yes	7.97	7.45	.52
08-05	0430	007-C22b	.25	yes	7.45	6.94	.51
08-05	0530	007-C22b	.25	yes	12.53	12.02	.51
08-05	0630	007-C22b	.25	yes	12.12	11.43	.69
08-05	0730	007-C23	.25	yes	11.42	10.65	.77
08-05	0830	007-C23	.25	yes	10.65	9.89	.76
08-05	0930	007-C23	.25	yes	9.89	9.14	.75
08-05	1030	007-C23	.25	yes	9.14	8.34	.80
08-05	1130	007-C23	.25	yes	8.34	7.62	.72
08-05	1230	007-C23	.25	yes	7.62	6.92	.70
08-05	1330	007-C23	.25	yes	6.92	6.24	.68
08-05	1430	007-C23	.25	yes	10.75	10.08	.67
08-05	1530	007-C24	.25	yes	10.08	9.43	.65
08-05	1630	007-C24	.25	yes	9.43	8.76	.67
08-05	1730	007-C24	.25	yes	8.76	7.98	.78
08-05	1830	007-C24	.25	yes	7.98	7.26	.72
08-05	1930	007-C24	.25	yes	7.26	6.52	.74
08-05	2030	007-C24	.25	yes	6.52	5.75	.77

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
08-05	2130	007-C24	.25	yes	11.47	10.68	.79
08-05	2230	007-C24	.25	yes	11.30	10.44	.86
08-05	2330	007-C25	.25	yes	10.44	9.61	.83
08-06	0030	007-C25	.25	yes	9.61	8.93	.68
08-06	0130	007-C25	.25	yes	8.91	8.25	.66
08-06	0230	007-C25	.25	yes	8.25	7.50	.75
08-06	0330	007-C25	.25	yes	7.50	6.75	.75
08-06	0430	007-C25	.25	yes	6.75	6.08	.67
08-06	0530	007-C25	.25	yes	6.08	5.36	.72
08-06	0630	007-C25	.25	yes	8.13	7.52	.61
08-06	0730	007-C26	.25	yes	12.10	11.30	.80
08-06	0830	007-C26	.25	yes	11.30	10.48	.82
08-06	0930	007-C26	.25	yes	10.48	9.70	.78
08-06	1030	007-C26	.25	yes	9.70	8.95	.75
08-06	1130	007-C26	.25	yes	8.95	8.21	.74
08-06	1230	007-C26	.25	yes	8.21	7.45	.76
08-06	1330	007-C26	.25	yes	8.67	7.94	.73
08-06	1430	007-C26	.25	yes	12.12	11.40	.72
08-06	1530	007-C27	.25	yes	11.40	10.78	.62
08-06	1630	007-C27	.25	yes	10.78	10.10	.68
08-06	1730	007-C27	.25	yes	10.10	9.35	.75
08-06	1830	007-C27	.25	yes	9.35	8.45	.90
08-06	1930	007-C27	.25	yes	8.45	7.54	.91
08-06	2030	007-C27	.25	yes	7.54	6.60	.94
08-06	2130	007-C27	.25	yes	11.65	10.87	.78
08-06	2230	007-C27	.25	yes	10.87	10.01	.86
08-06	2330	007-C28	.25	yes	10.01	9.21	.80
08-07	0030	007-C28	.25	yes	9.21	8.31	.90
08-07	0130	007-C28	.25	yes	8.31	7.36	.95
08-07	0230	007-C28	.25	yes	7.36	6.39	.97
08-07	0330	007-C28	.25	yes	6.39	5.28	1.11
08-07	0430	007-C28	.25	yes	5.26	4.23	1.03
08-07	0530	007-C28	.25	yes	13.62	12.63	.99
08-07	0630	007-C28	.25	yes	12.62	11.90	.72
08-07	0730	007-C29	.25	yes	11.90	11.09	.81
08-07	0830	007-C29	.25	yes	11.09	10.39	.70
08-07	0930	007-C29	.25	yes	10.39	9.69	.70
08-07	1030	007-C29	.25	yes	9.69	8.51	1.18
08-07	1130	007-C29	.25	yes	8.51	7.39	1.12
08-07	1230	007-C29	.25	yes	7.39	6.55	.84
08-07	1330	007-C29	.25	yes	12.18	11.43	.75
08-07	1430	007-C29	.25	yes	11.42	10.59	.83
08-07	1530	007-C30	.25	yes	10.59	10.02	.57
08-07	1630	007-C30	.25	yes	10.02	9.35	.67
08-07	1730	007-C30	.25	yes	9.35	8.71	.64
08-07	1830	007-C30	.25	yes	8.71	8.05	.66
08-07	1930	007-C30	.25	yes	8.05	7.31	.74
08-07	2030	007-C30	.25	yes	7.31	6.58	.73
08-07	2130	007-C30	.25	yes	11.94	1.31	.63
08-07	2230	007-C30	.25	yes	11.31	10.57	.74
08-07	2330	007-C31	.25	yes	10.57	9.83	.74

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
08-08	0030	007-C31	.25	yes	9.83	9.08	.75
08-08	0130	007-C31	.25	yes	9.08	8.33	.75
08-08	0230	007-C31	.25	yes	8.32	7.58	.74
08-08	0330	007-C31	.25	yes	7.58	6.83	.75
08-08	0430	007-C31	.25	yes	6.83	6.11	.72
08-08	0530	007-C31	.25	yes	12.22	11.49	.73
08-08	0630	007-C31	.25	yes	11.49	10.77	.72
08-08	0730	007-C32	.25	yes	10.77	10.00	.77
08-08	0830	007-C32	.25	yes	10.00	9.18	.82
08-08	0930	007-C32	.25	yes	9.18	8.96	.22
08-08	1030	007-C32	.25	yes	8.96	8.17	.79
08-08	1130	007-C32	.25	yes	8.17	7.26	.91
08-08	1230	007-C32	.25	yes	7.26	6.29	.97
08-08	1330	007-C32	.25	yes	12.27	11.36	.91
08-08	1430	007-C32	.25	yes	12.34	1.42	.92
08-08	1530	007-C33	.25	yes	11.42	10.54	.88
08-08	1630	007-C33	.25	yes	10.54	9.65	.89
08-08	1730	007-C33	.25	yes	9.65	8.77	.88
08-08	1830	007-C33	.25	yes	8.77	7.87	.90
08-08	1930	007-C33	.25	yes	7.87	6.92	.95
08-08	2030	007-C33	.25	yes	6.92	6.04	.88
08-08	2130	007-C33	.25	yes	12.27	11.41	.86
08-08	2230	007-C33	.25	yes	11.41	10.47	.94
08-08	2330	007-C34	.25	yes	10.46	9.36	1.10
08-09	0030	007-C34	.25	yes	9.36	8.16	1.20
08-09	0130	007-C34	.25	yes	8.14	7.03	1.11
08-09	0230	007-C34	.25	yes	7.03	5.98	1.05
08-09	0330	007-C34	.25	yes	5.97	4.83	1.14
08-09	0430	007-C34	.25	yes	4.81	3.58	1.23
08-09	0530	007-C34	.25	yes	13.34	12.41	.93
08-09	0630	007-C34	.25	yes	12.80	11.65	1.15
08-09	0730	007-C35	.25	yes	11.65	10.46	1.19
08-09	0830	007-C35	.25	yes	10.46	9.26	1.20
08-09	0930	007-C35	.25	yes	9.26	8.32	.94
08-09	1030	007-C35	.25	yes	8.32	7.64	.68
08-09	1130	007-C35	.25	yes	7.64	6.65	.99
08-09	1230	007-C35	.25	yes	6.65	4.93	1.72
08-09	1330	007-C35	.25	yes	11.75	10.12	1.63
08-09	1430	007-C35	.25	yes	12.66	11.58	1.08
08-09	1530	007-C36	.25	yes	11.58	10.61	.97
08-09	1630	007-C36	.25	yes	10.61	9.80	.81
08-09	1730	007-C36	.25	yes	9.80	8.93	.87
08-09	1830	007-C36	.25	yes	8.93	8.11	.82
08-09	1930	007-C36	.25	yes	8.11	7.17	.94
08-09	2030	007-C36	.25	yes	7.17	6.19	.98
08-09	2130	007-C36	.25	yes	12.10	11.18	.92
08-09	2230	007-C36	.25	yes	11.18	10.19	.99
08-09	2330	007-C37	.25	yes	10.18	9.04	1.14
08-10	0030	007-C37	.25	yes	9.04	7.79	1.27
08-10	0130	007-C37	.25	yes	7.75	6.64	1.11
08-10	0230	007-C37	.25	yes	6.63	5.50	1.13

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
08-10	0330	007-C37	.25	yes	5.50	4.25	1.25
08-10	0430	007-C37	.25	yes	4.25	2.93	1.32
08-10	0530	007-C37	.25	yes	9.14	7.87	1.27
08-10	0630	007-C37	.25	yes	11.70	10.33	1.37
08-10	0730	007-C38?	.25	yes	10.33	9.17	1.16
08-10	0830	007-C38?	.25	yes	9.14	7.92	1.22
08-10	0930	007-C38?	.25	yes	7.92	6.65	1.27
08-10	1030	007-C38?	.25	yes	6.65	5.41	1.24
08-10	1130	007-C38?	.25	yes	5.41	4.23	1.18

SHUTDOWN-High back pressure caused by plugged gas ducts

08-15	0930	007-C39	.25	yes	11.31	2.00	9.31
08-15	1130	007-C39	.25	yes	2.00	1.70	.30
08-15	1230	007-C39	.25	yes	1.70	1.46	.24
08-15	1330	007-C39	.25	yes	1.46	1.38	.08
08-15	1430	007-C39	.25	yes	4.30	2.50	1.80
08-15	1530	007-C40	.25	yes	8.50	7.67	.83
08-15	1630	007-C40	.25	yes	POWER	FAILURE	
08-15	1747	007-C40	.25	yes	7.72	6.80	.92
08-15	1830	007-C40	.25	yes	6.80	6.38	.42
08-15	1930	007-C40	.25	yes	6.38	5.72	.66
08-15	2030	007-C40	.25	yes	5.72	4.83	.89
08-15	2130	007-C40	.25	yes	9.42	8.46	.96
08-15	2230	007-C40	.25	yes	11.20	10.31	.89
08-15	2330	007-C41	.25	yes	10.31	9.51	.80
08-16	0030	007-C41	.25	yes	9.51	8.21	1.30
08-16	0130	007-C41	.25	yes	8.21	7.37	.84
08-16	0230	007-C41	.25	yes	7.37	6.51	.86
08-16	0330	007-C41	.25	yes	6.48	5.57	.91
08-16	0430	007-C41	.25	yes	5.57	4.61	.96
08-16	0530	007-C41	.25	yes	12.05	10.95	1.10
08-16	0630	007-C41	.25	yes	12.42	11.22	1.20
08-16	0730	007-C42	.25	yes	11.22	10.03	1.19
08-16	0830	007-C42	.25	yes	10.03	8.80	1.23
08-16	0930	007-C42	.25	yes	8.80	7.40	1.40
08-16	1030	007-C42	.25	yes	7.40	6.06	1.34
08-16	1130	007-C42	.25	yes	6.06	4.67	1.39
08-16	1230	007-C42	.25	yes	4.67	3.28	1.39
08-16	1330	007-C42	.25	yes	10.03	8.46	1.57
08-16	1430	007-C42	.25	yes	12.73	11.16	1.57
08-16	1530	007-C43	.25	yes	11.16	9.44	1.72
08-16	1630	007-C43	.25	yes	9.44	7.54	1.90
08-16	1730	007-C43	.25	yes	7.54	5.85	1.69
08-16	1830	007-C43	.25	yes	5.85	4.12	1.73
08-16	1930	007-C43	.25	yes	4.12	2.23	1.89
08-16	2030	007-C43	.25	yes	5.57	3.60	1.97
08-16	2130	007-C43	.25	yes	11.57	9.65	1.92
08-16	2230	007-C43	.25	yes	11.66	9.84	1.82
08-16	2330	007-C44	.25	yes	9.88	7.90	1.98
08-17	0030	007-C47	.25	yes	7.90	6.03	1.87

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
08-17	0130	007-C47	.25	yes	6.01	4.14	1.87
08-17	0230	007-C47	.25	yes	4.11	2.18	1.93
08-17	0330	007-C47	.25	yes	9.09	7.50	1.59
08-17	0430	007-C47	.25	yes	7.50	5.85	1.65
08-17	0530	007-C47	.25	yes	12.04	10.26	1.78
08-17	0630	007-C47	.25	yes	12.79	10.52	2.27
08-17	0730	007-C48	.25	yes	10.52	8.07	2.45
08-17	0830	007-C48	.25	yes	8.07	6.10	1.97
08-17	0930	007-C48	.25	yes	6.10	4.24	1.86
08-17	1030	007-C48	.25	yes	4.24	2.41	1.83
08-17	1130	007-C48	.25	yes	12.27	10.25	2.02
08-17	1230	007-C48	.25	yes	10.25	8.12	2.13
08-17	1330	007-C48	.25	yes	8.12	6.01	2.11
08-17	1430	007-C48	.25	yes	12.33	10.12	2.21
08-17	1530	007-C49	.25	yes	10.12	7.90	2.22
08-17	1630	007-C49	.25	yes	7.90	5.72	2.18
08-17	1730	007-C49	.25	yes	5.72	3.62	2.10
08-17	1830	007-C49	.25	yes	3.62	1.62	2.00
08-17	1930	007-C49	.25	yes	10.44	7.96	2.48
08-17	2030	007-C49	.25	yes	7.96	5.59	2.37
08-17	2130	007-C49	.25	yes	11.68	9.59	2.09
08-17	2230	007-C49	.25	yes	11.51	9.13	2.38
08-17	2330	007-C44	.25	yes	11.44	9.60	1.84
08-18	0030	007-C44	.25	yes	9.58	7.83	1.75
08-18	0130	007-C44	.25	yes	7.81	5.48	2.33
08-18	0230	007-C44	.25	yes	5.46	3.17	2.29
08-18	0330	007-C44	.25	yes	6.27	4.52	1.75
08-18	0430	007-C44	.25	yes	4.51	2.94	1.57
08-18	0530	007-C44	.25	yes	2.92	.98	1.94
08-18	0630	007-C44	.25	yes	13.16	11.05	2.11
08-18	0730	007-C45	.25	yes	11.05	8.93	2.12
08-18	0830	007-C45	.25	yes	8.93	6.85	2.08
08-18	0930	007-C45	.25	yes	6.85	4.73	2.12
08-18	1030	007-C45	.25	yes	4.73	2.60	2.13
08-18	1130	007-C45	.25	yes	11.47	9.22	2.25
08-18	1230	007-C45	.25	yes	9.22	7.33	1.89
08-18	1330	007-C45	.25	yes	7.33	5.32	2.01
08-18	1430	007-C45	.25	yes	12.20	9.99	2.21
08-18	1530	007-C46	.25	yes	9.99	8.07	1.92
08-18	1630	007-C46	.25	yes	8.07	6.19	1.88
08-18	1730	007-C46	.25	yes	6.19	4.37	1.82
08-18	1830	007-C46	.25	yes	4.37	2.63	1.74
08-18	1930	007-C46	.25	yes	11.13	9.16	1.97
08-18	2030	007-C46	.25	yes	9.16	7.28	1.88
08-18	2130	007-C46	.25	yes	7.28	5.41	1.87
08-18	2230	007-C46	.25	yes	12.09	9.90	2.19
08-18	2330	007-C50	.25	yes	12.20	9.60	2.60
08-19	0030	007-C50	.25	yes	9.60	7.23	2.37
08-19	0130	007-C50	.25	yes	7.23	4.86	2.37
08-19	0230	007-C50	.25	yes	4.86	2.12	2.74
08-19	0330	007-C50	.25	yes	7.47	4.96	2.16

DATE	TIME	SAMPLE NUMBER	SCREEN IN	WASH?	START WT.	STOP WT.	NET WT.
08-19	0430	007-C50	.25	yes	4.95	2.79	2.16
08-19	0530	007-C50	.25	yes	2.79	.71	2.08
08-19	0630	007-C50	.25	yes	6.17	3.95	2.22
08-19	0730	007-C51	.25	yes	3.95	1.33	2.62

END OF BOM/FGT 007 ILLINOIS NO. 6

APPENDIX E
Ash Analysis Data

ASH ANALYSIS FOR BOM/FGT-007

Sample Number	Date	Time	Cumulative Mass Fraction, % less than stated size, inch					Bulk Density gm/cc	Moisture content %	Carbon content %	Sulfur content %
			1/4	1/2	3/4	1	2				
1	7/28/84	16:35	23.2	42.8	55.8	66.2	84.4	0.72	17	14.7	0.38
2	7/28/84	21:00	25.8	58.3	76.9	90.0	100.0	0.72	35	21.6	0.53
3	7/28/84	23:50	35.4	59.0	80.5	86.0	98.8	0.74	14	13.8	0.23
4	7/29/84	1:39	20.9	44.9	66.9	76.4	100.0	0.71	8	13.5	0.34
5	7/29/84	6:40	5.0	7.9	11.0	14.1	27.4	—	4	12.5	0.60
6	7/29/84	11:00	16.7	33.5	46.7	57.4	83.0	0.63	23	8.1	0.50
7	7/29/84	14:30	12.2	27.3	38.3	44.5	61.6	0.80	18	4.2	0.33
8	7/29/84	16:26	15.3	41.6	59.8	76.4	94.4	0.63	21	11.1	0.73
9	7/29/84	19:00	17.5	39.5	58.6	69.7	100.0	0.71	18	5.9	0.48
10	7/29/84	21:45	3.8	6.2	9.6	12.9	24.9	0.89	3	1.1	0.20
11	7/30/84	1:00	13.5	18.2	22.4	24.8	28.1	—	9	29.9	16.30
12	7/30/84	7:30	1.1	1.6	1.9	4.8	29.5	—	2	1.7	0.24
13	7/30/84	7:30	12.9	35.5	61.3	79.9	100.0	—	19	4.9	0.24
14	7/30/84	12:30	19.8	42.3	58.4	67.6	81.5	0.71	15	3.8	0.32
15	7/30/84	15:00	56.3	70.7	81.7	87.9	100.0	0.81	29	7.4	0.47
16	7/30/84	17:20	16.6	51.7	77.9	87.6	100.0	0.65	8	7.3	0.45
17	7/30/84	20:29	27.2	49.0	62.7	69.8	85.3	0.81	30	5.0	0.37
18	7/30/84	22:29									
19	7/31/84	1:00	35.4	53.1	63.2	69.5	77.0	0.89	27	8.5	0.52
20	7/31/84	5:30	6.0	18.5	32.7	47.3	53.9	—	10	8.9	0.61
21	7/31/84	9:00	15.1	34.7	54.3	67.5	89.8	0.70	19	9.3	0.61
22	7/31/84	12:30	17.4	43.5	66.2	79.2	99.6	0.63	19	10.0	0.54
23	7/31/84	17:20	17.3	48.0	68.8	78.9	99.6	0.78	16	4.2	0.52
24	7/31/84	21:20	28.6	61.9	78.9	81.8	99.7	0.77	35	4.5	0.53
25	8/ 1/84	1:00	17.3	34.3	44.2	49.6	53.3	—	19	3.1	0.20
26	8/ 1/84	5:15	23.1	48.4	59.4	65.0	76.9	—	12	1.4	0.15
27	8/ 1/84	9:30	23.0	49.1	64.6	72.2	85.7	—	14	4.3	0.41
28	8/ 1/84	13:22	7.4	17.7	30.6	44.0	74.7	—	20	2.2	0.26
29	8/ 1/84	14:30	17.5	45.6	66.9	77.4	100.0	0.77	26	4.2	0.60
30	8/ 1/84	18:45	16.5	37.1	60.4	75.8	100.0	1.09	39	5.4	0.63
31	8/ 1/84	21:29	15.2	37.4	58.6	73.9	93.1	0.79	86	4.8	0.43
32	8/ 1/84	22:29									
33	8/ 2/84	0:30	38.7	56.7	71.8	86.8	100.0	—	37	11.7	0.62
34	8/ 2/84	2:29									
35	8/ 2/84	4:44	24.3	51.5	66.9	79.1	86.8	—	31	5.1	0.41
36	8/ 2/84	6:30	26.2	49.9	62.8	72.5	89.6	0.75	35	7.8	0.54
37	8/ 2/84	8:00	—	—	—	—	—	—	42	—	—
38	8/ 2/84	10:30	17.2	39.8	62.6	77.9	100.0	0.76	23	4.8	0.56
39	8/ 2/84	12:30	—	—	—	—	—	0.66	12	—	—
40	8/ 2/84	16:29	25.6	58.2	79.5	91.3	100.0	0.80	23	3.2	0.29
41	8/ 2/84	19:00	37.6	63.0	77.2	87.9	96.3	0.82	22	6.5	0.47
42	8/ 2/84	21:29	13.5	30.4	44.8	54.0	66.3	0.72	40	3.1	0.34
43	8/ 2/84	23:25	—	—	—	—	—	—	4	—	—
44	8/ 3/84	1:29	25.5	52.0	70.4	85.6	100.0	0.71	43	5.6	0.23
45	8/ 3/84	4:09	6.6	10.2	21.6	34.0	77.0	0.66	22	8.2	0.59
46	8/ 3/84	6:32	17.5	38.3	53.5	65.4	71.9	1.21	27	7.3	0.44
47	8/ 3/84	7:30									
48	8/ 3/84	11:00	37.7	67.6	83.8	92.8	100.0	1.66	23	2.8	0.28

Sample Number	Date	Time	Cumulative Mass Fraction, % less than stated size, inch				Bulk Density gm/cc	Moisture content %	Carbon content %	Sulfur content %	
			1/4	1/2	3/4	1					
49	8/ 3/84	13:30									
50	8/ 3/84	16:29	22.1	46.5	64.0	76.8	90.3	0.82	24	1.8	0.22
51	8/ 3/84	19:00	25.3	54.5	72.8	79.6	100.0	0.71	23	5.7	0.41
52	8/ 3/84	22:29	27.1	57.0	72.9	85.0	98.1	0.78	23	3.9	0.32
53	8/ 4/84	1:00	18.0	47.5	66.6	79.5	100.0	1.49	31	—	—
54	8/ 4/84	3:00									
55	8/ 4/84	5:00	5.0	12.6	19.1	26.0	35.3	0.83	18	3.6	0.25
56	8/ 4/84	10:00	18.3	47.9	70.3	81.0	100.0	0.71	20	3.7	0.26
57	8/ 4/84	13:00	25.0	51.4	66.9	80.2	100.0	0.78	19	6.3	0.43
58	8/ 4/84	17:00	17.8	35.6	47.8	56.2	75.9	0.80	34	3.9	0.30
59	8/ 4/84	21:00	19.4	43.2	57.5	66.0	79.3	0.73	24	4.7	0.28
60	8/ 5/84	1:00	21.3	54.5	73.9	82.8	100.0	0.74	39	3.9	0.30
61	8/ 5/84	11:14	26.1	58.7	74.0	82.5	100.0	0.78	21	4.0	0.34
62	8/ 5/84	19:00	23.0	55.9	72.8	84.2	94.2	0.71	23	6.9	0.30
63	8/ 6/84	1:00	3.4	13.0	31.4	51.4	87.1	0.70	0	3.0	0.30
64	8/ 6/84	3:00	8.5	30.6	52.1	63.7	91.9	0.64	0	9.1	0.63
65	8/ 6/84	6:09	3.7	23.0	42.5	51.5	66.5	0.63	16	8.0	0.32
66	8/ 6/84	13:00	26.4	58.5	74.8	87.1	100.0	0.84	23	4.4	0.14
67	8/ 6/84	19:00	26.0	52.9	68.4	78.9	100.0	0.90	18	4.4	0.23
68	8/ 7/84	1:00	19.2	35.7	48.8	66.5	100.0	—	21	4.0	0.17
69	8/ 7/84	5:00	14.0	32.4	51.8	64.9	81.9	0.73	8	7.8	0.17
70	8/ 7/84	6:40	22.2	36.9	50.5	60.8	74.8	0.76	27	6.2	0.18
71	8/ 7/84	11:00	7.8	28.1	50.6	64.8	93.5	0.63	10	10.1	0.28
72	8/ 7/84	17:00	26.0	57.7	73.7	83.4	95.2	0.74	22	17.3	0.33
73	8/ 7/84	21:00	14.9	40.3	58.8	73.2	95.6	0.74	17	7.8	0.28
74	8/ 8/84	3:00	3.2	14.8	36.6	52.3	87.7	0.61	7	5.1	0.26
75	8/ 8/84	6:15	22.1	47.1	64.0	73.8	100.0	0.76	18	5.3	0.27
76	8/ 8/84	13:00	31.2	52.6	64.0	74.5	93.8	0.86	21	5.7	0.22
77	8/ 8/84	17:00	18.5	49.1	70.7	80.0	100.0	0.79	14	11.2	0.42
78	8/ 8/84	21:00	19.6	49.2	68.0	78.9	94.2	0.77	28	7.9	0.18
79	8/ 9/84	1:00	24.6	51.4	74.0	83.1	100.0	0.87	15	5.7	0.18
80	8/ 9/84	3:00	16.7	38.8	52.5	57.3	75.0	0.81	11	4.8	0.18
81	8/ 9/84	5:30	14.4	37.5	58.9	71.5	100.0	0.69	8	4.8	0.28
82	8/ 9/84	6:44	24.8	59.4	75.6	86.7	97.4	0.75	16	5.6	0.23
83	8/ 9/84	10:00	8.0	24.8	42.7	58.2	86.0	0.65	9	7.4	0.20
84	8/ 9/84	12:30	10.4	23.8	45.7	64.0	100.0	0.56	32	17.9	0.50
85	8/ 9/84	17:00	21.4	54.1	74.8	84.2	94.7	0.74	25	11.2	0.35
86	8/ 9/84	19:29	18.6	47.5	62.5	72.4	94.9	0.76	23	8.0	0.37
87	8/ 9/84	23:39	10.8	23.1	34.0	44.1	61.4	0.87	21	6.4	0.35
88	8/10/84	1:00	13.8	33.2	45.7	55.0	66.2	0.83	19	19.9	0.58
89	8/10/84	5:00	21.8	48.4	65.8	80.2	94.7	0.70	28	—	—
90	8/10/84	9:00	15.2	42.6	63.4	72.7	91.4	0.82	24	33.4	0.83
91	8/10/84	12:30	33.4	61.9	77.4	84.0	95.2	0.82	27	10.2	0.51
93	8/15/84	1:00	10.8	22.5	33.2	48.8	76.7	—	31	6.7	0.29
92	8/15/84	20:14	29.3	51.1	66.1	75.1	84.7	0.88	23	19.1	0.23
94	8/16/84	5:00	24.1	50.1	64.5	77.0	88.8	0.62	25	32.4	0.72
95	8/16/84	11:00	15.5	44.4	66.8	81.6	96.3	0.62	20	15.6	0.46
96	8/16/84	14:00	15.4	34.2	53.6	65.6	85.3	0.64	26	14.3	0.41
97	8/16/84	17:00	14.9	29.9	44.7	56.8	83.0	0.70	25	8.0	0.40
98	8/16/84	20:20	17.0	37.0	54.6	68.2	80.3	0.85	23	4.7	0.42

Sample Number	Date	Time	Cumulative Mass Fraction, % less than stated size, inch					Bulk Density gm/cc	Moisture content %	Carbon content %	Sulfur content %
			1/4	1/2	3/4	1	2				
99	8/16/84	22:29	23.0	45.5	64.3	78.7	96.0	0.75	24	16.6	0.58
100	8/17/84	0:40	1.4	2.2	2.6	2.9	8.9	0.60	8	6.6	0.45
101	8/17/84	3:00	3.0	5.8	16.9	31.3	61.1	0.55	10	12.9	0.45
102	8/17/84	5:00	19.1	38.4	47.3	52.5	60.1	0.78	35	20.0	0.47
103	8/17/84	6:30	2.5	10.4	24.9	35.8	54.1	0.55	20	25.7	0.68
104	8/17/84	9:00	16.6	34.8	52.1	67.5	94.9	0.62	47	9.7	0.35
105	8/17/84	12:14	25.5	55.9	75.5	88.8	100.0	0.62	28	12.2	0.37
106	8/17/84	14:30	19.2	43.2	62.7	75.4	100.0	0.70	25	11.2	0.42
107	8/17/84	16:29	21.8	50.3	70.6	86.5	100.0	0.74	29	5.9	0.37
108	8/17/84	17:29	20.0	42.5	57.5	70.1	82.3	0.77	23	11.5	0.58
109	8/17/84	19:00	23.6	47.5	62.3	73.6	89.6	0.70	27	13.2	0.50
110	8/17/84	22:00	18.4	40.2	59.0	71.3	90.8	0.80	30	20.2	0.49
111	8/18/84	1:00	11.3	28.4	48.3	61.1	93.2	0.67	16	26.1	0.57
112	8/18/84	3:00	8.9	13.6	21.3	29.4	49.4	—	20	41.2	0.66
113	8/18/84	5:00	11.4	34.4	58.8	74.8	100.0	0.63	25	38.3	0.89
114	8/18/84	6:44	10.4	29.4	50.2	66.2	88.8	0.65	19	35.1	0.64
115	8/18/84	10:00	14.0	34.4	55.4	70.5	100.0	0.63	31	17.7	0.42
116	8/18/84	12:30	38.9	63.4	77.9	88.6	100.0	0.72	32	14.3	0.32
117	8/18/84	14:30	25.1	41.4	58.4	65.3	76.4	0.78	27	24.0	0.50
118	8/18/84	17:00	19.1	40.2	55.2	66.6	88.3	0.76	28	19.6	0.44
119	8/18/84	20:29	17.7	37.8	52.5	66.9	91.4	0.74	23	19.3	0.53
120	8/19/84	0:10	28.9	41.9	49.4	54.3	58.2	0.75	17	18.7	0.43
121	8/19/84	2:29	25.5	37.7	49.5	59.7	81.8	0.76	19	23.5	0.76
AVERAGES											
5-52			20.1	40.7	56.1	66.2	82.4	0.80	23.1	6.3	0.82
53-91			17.7	41.5	58.7	69.9	89.6	0.77	20.6	8.0	0.32
92-121			17.7	36.3	51.9	63.7	82.0	0.70	24.6	18.1	0.49
GRAND AVERAGE			18.6	39.8	55.8	66.8	84.8	0.76	22.7	10.2	0.56

APPENDIX F

Ash Removal Log

Ash weights are given in pounds.

Flush water is given in gallons.

BOM/FGT 007

ILLINOIS NO. 6

RAW ASH

DATE	TIME	SAMPLE NUMBER	INITIAL DRY	FINAL DRY	NET DRY	INITIAL WET	FINAL WET	NET WET	NET DRY +NET WET	FLUSH WATER
07-28	1630	A-1	1462	1430	32	1770	1415	355	387	30
07-28	2100	A-2	460	51	409	370	30	340	749	30
07-28	2350	A-3	735	24	71	435	31	404	1115	30
07-29	0140	A-4	680	30	650	485	30	455	1105	30
07-29	0635	A-5	663	33	630	385	26	359	989	30
07-29	1100	A-6	737	30	707	538	25	513	1220	30
07-29	1430	A-7	850	32	818	429	26	403	1221	30
07-29	1620	A-8	650	30	620	370	25	345	965	30
07-29	1900	A-9	830	42	788	430	15	415	1203	30
07-29	2145	A-10	943	28	915	426	58	368	1283	30
07-30	0100	A-11	1000	31	969	437	66	371	1340	30
07-30	0430	A-12	995	28	967	400	24	376	1343	30
07-30	0900	A-13	764	27	737	338	24	314	1051	30
07-30	1230	A-14	800	32	768	419	23	396	1104	30
07-30	1500	A-15	812	54	758	366	24	342	1100	30
07-30	1720	A-16	625	27	598	350	21	329	927	30
07-30	2030	A-17	747	25	722	353	24	329	1051	30
07-30	2230	A-18	640	28	612	345	25	320	932	30
07-31	0100	A-19	675	21	654	355	21	334	988	30
07-31	0530	A-20	925	22	903	421	23	398	1301	30
07-31	0900	A-21	585	27	558	366	20	346	904	30
07-31	1230	A-22	550	40	510	344	19	325	835	30
07-31	1720	A-23	740	34	706	385	20	365	1071	30
07-31	2100	A-24	670	40	630	401	21	380	1010	30
08-01	0100	A-25	678	23	655	440	22	418	1073	33.5
08-01	0515	A-26	522	24	498	350	22	328	826	30
08-01	0930	A-27	545	23	522	330	21	309	831	30
08-01	1330	A-28	795	24	771	520	20	500	1271	30
08-01	1645	A-29	1220	85	1135	450	18	432	1567	30
08-01	1840	A-30	1200	20	1180	560	26	534	1714	30
08-01	2030	A-31	1265	20	1245	465	22	443	1688	30
08-01	2220	A-32*	1620	21	1599	569	19	550	2149	30
		*	all water !!!!!							
08-02	0030	A-33	945	11	934	560	22	538	1472	30
08-02	0230	A-34	1307	12	1295	522	20	502	1797	30
08-02	0445	A-35	1800	21	1779	632	20	612	2391	30
08-02	0650	A-36	1861	25	1836	563	21	542	2378	30
08-02	0815	A-37	1700	17	1683	700	21	679	2362	30
08-02	1030	A-38	850	18	832	470	16	454	1286	30
08-02	1430	A-39	1385	57	1328	600	20	580	1908	30
08-02	1630	A-40	1502	20	1482	495	17	478	1960	30
08-02	1900	A-41	1212	12	1200	530	12	518	1718	30
08-02	2130	A-42	1245	10	1235	535	12	523	1758	30
08-02	2325	A-43	1186	21	1165	551	07	54	1709	30
08-03	0130	A-44	1500	15	1485	510	11	499	1984	30
08-03	0410	A-45	2100	13	2087	543	11	532	2619	30
08-03	0630	A-46	1510	15	1495	494	9	485	1980	32
08-03	0730	A-47	1030	8	1022	500	6	494	1516	30
08-03	1100	A-48	1150	22	1128	641	5	636	1764	30

DATE	TIME	SAMPLE NUMBER	INITIAL DRY	FINAL DRY	NET DRY	INITIAL WET	FINAL WET	NET WET	NET DRY +NET WET	FLUSH WATER
08-03	1330	A-49	1464	6	1458	513	4	509	1967	30
08-03	1630	A-50	1610	5	1605	520	0	520	2125	30
08-03	1900	A-51	699	7	692	600	0	600	1292	30
08-03	2230	A-52	525	7	518	376	3	373	891	30
08-04	0100	A-53	525	7	518	376	3	373	891	30
08-04	0300	A-54	550	8	542	372	11	361	903	30
08-04	0500	A-55	573	4	569	438	5	433	1002	30
08-04	1000	A-56	885	10	875	420	11	409	1284	30
08-04	1300	A-57	900	12	888	450	12	438	1326	30
08-04	1700	A-58	1247	4	1203	425	13	412	1615	30
08-04	1900	A-59	1185	17	1168	400	14	386	1554	30
08-05	0100	A-60	1214	12	1202	358	13	345	1547	30
08-05	1115	A-61	783	18	765	447	14	433	1198	30
08-05	1900	A-62	1025	74	951	470	70	400	1351	30
08-06	0100	A-63	1225	75	1150	525	73	452	1602	30
08-06	0300	A-64	577	78	501	486	81	405	906	30
08-06	0610	A-65	801	75	726	481	74	407	1133	30
08-06	1300	A-66	1355	71	1284	450	76	374	1658	30
08-06	1900	A-67	1237	74	163	562	71	491	1654	30
08-07	0100	A-68	1455	75	1380	505	72	433	1813	30
08-07	0500	A-69	997	81	916	416	80	336	1252	30
08-07	0640	A-70	532	82	450	418	76	342	792	30
08-07	1100	A-71	1066	82	984	517	77	440	1424	30
08-07	1700	A-72	1208	76	1132	421	76	345	1477	30
08-07	2100	A-73	633	65	568	410	62	348	916	30
08-08	0300	A-74	1101	68	1033	462	69	393	1426	30
08-08	0615	A-75	572	64	508	442	61	381	889	30
08-08	1300	A-76	1173	65	1108	440	60	380	1488	30
08-08	1700	A-77	940	66	874	410	60	350	1224	30
08-08	2100	A-78	912	67	845	490	63	427	1272	30
08-09	0100	A-79	1035	68	967	562	60	502	1469	30
08-09	0300	A-80	594	66	528	429	62	367	895	30
08-09	0530	A-81	760	80	680	470	60	410	1090	30
08-09	0645	A-82	488	68	420	475	60	415	835	30
08-09	1000	A-83	1200	55	1145	420	59	361	1506	30
08-09	1230	A-84	830	60	770	560	58	502	1272	30
08-09	1700	A-85	1579	62	1517	480	56	424	1941	30
08-09	1970	A-86	1201	61	1140	510	62	448	1588	30+
08-09	2300	A-87	128	61	67	508	57	451	518	30+
08-10	0500	A-88	786	39	747	538	61	476	1223	30+
08-10	0900	A-90	1046	55	991	453	57	396	1387	30
08-10	1230	A-91	984	58	926	510	55	455	1381	30+
SHUTDOWN BACK PRESSURE CAUSED PLUGGING OF THE LINES										
08-15	2015	A-92	1045	75	970	421	19	402	1372	30
08-16	0100	A-93	624	23	601	406	18	385	989	30
08-16	0500	A-94	592	19	573	368	20	348	921	30
08-16	1100	A-95	1220	40	1180	680	24	656	1836	50
08-16	1400	A-96	1360	13	1347	420	22	398	1745	30
08-16	1700	A-97	1878	18	1860	535	20	515	2375	30
08-16	2030	A-98	1413	47	1366	505	18	487	1853	30
08-16	2230	A-99	1733	10	1723	457	12	445	2168	30
08-17	0040	A-100	1080	4	1076	465	4	461	1537	30

DATE	TIME	SAMPLE NUMBER	INITIAL DRY	FINAL DRY	NET DRY	INITIAL WET	FINAL WET	NET WET	NET DRY +NET WET	FLUSH WATER
08-17	0300	A-101	1255	8	1247	465	11	454	1701	30
08-17	0500	A-102	1085	17	1068	502	13	489	1557	30
08-17	0645	A-103	1730	12	1718	469	11	458	2176	30
08-17	0900	A-104	1211	20	1191	650	12	638	1829	30U
08-17	1215	A-105	1780	30	1750	700	24	676	2426	30
08-17	1430	A-106	1200	30	1170	560	9	551	1721	30
08-17	1630	A-107	1065	23	1042	546	21	525	1567	30
08-17	1730	A-108	1935	32	1903	566	30	536	2439	30
08-17	1900	A-109	2172	24	2148	448	10	438	2586	30
08-17	2200	A-110	1215	25	1190	585	23	562	1752	30
08-18	0100	A-111	1419	72	1347	750	24	726	2073	30
08-18	0300	A-112	1465	27	1438	416	24	392	1830	30
08-18	0500	A-113	962	23	939	576	24	552	1491	30
08-18	0645	A-114	800	23	777	699	28	671	1448	30
08-18	0940	A-115	1550	30	1520	680	30	650	2170	30
08-18	1230	A-116	1530	90	1440	650	33	617	2147	30
08-18	1430	A-117	900	25	875	600	30	570	1445	30
08-18	1700	A-118	1780	27	1753	610	30	580	2335	30
08-18	2030	A-119	1602	31	1571	1542	35	1507	3078	30
08-19	0010	A-120	1740	76	1664	782	108	674	2338	30
08-19	0230	A-121	1450	35	1415	550	29	521	1936	30
08-19	0500	A-122	1315	43	1272	738	35	703	1975	30
08-19	0645	A-123	970	26	944	595	31	564	1508	30

END OF BOM/FGT 007 ILLINOIS NO. 6

APPENDIX G

Operator Logged Data

Included are three tables of data:

G-1. Freeboard Data

G-2. Firetest Data

G-3. Operator Logged Data I

Water flows in gpm.

Water totals in gallons.

Steam flows in lb/min.

G-4. Operator Logged Data II

Agitator counter in (total revolutions * 2)

Grate Gear counter in (total grate revolutions * 116)

Further description of these data are given in Volume 1 of this series (Thimsen, Maurer et al, 1984).

TABLE G-1

FREEBOARD MEASUREMENTS

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
07-28	1230	44			44			44
07-28	1335	39			39			39
07-28	1400		31			31		31
07-28	1500			43			43	43
07-28	1530	41			42			41.5
07-28	1600		41			40		40.5
07-28	1630			41			40	40.5
07-28	1700	40			39.5			39.75
07-28	1730		40	39.5		39.5		39.67
07-28	1800			36			38	37
07-28	1830	40			38			39
07-28	1900		40			38		39
07-28	2000			38			37	37.5
07-28	2030	38			38			38
07-28	2100		37.5			37.5		37.5
07-28	2130			38			38	38
07-28	2200	37			35			36
07-28	2230		36			36		36
07-28	2300			38			37	37.5
07-28	2330	36			36			36
07-29	0030		38			40		39
07-29	0100			38			38	38
07-29	0130	37			40			38.5
07-29	0200		36			37		36.5
07-29	0230			36			34	35
07-29	0300	36			35			35.5
07-29	0330		35			36		35.5
07-29	0400			36			36	36
07-29	0430	36			37			36.5
07-29	0500		38			36		37.
07-29	0530			37			37	37
07-29	0600	36			37			36.5
07-29	0630		37			38		37.5
07-29	0700			36			36	36
07-29	0730	35			36			35.5
07-29	0800		39			38		38.5
07-29	0830			36			36	36
07-29	0900	35			35			35
07-29	0930		36			37		36.5
07-29	1000			34			34	34
07-29	1030	34			30			32
07-29	1100		35			35		35
07-29	1130			36			36	36
07-29	1200	36			37			36.5
07-29	1230		34			34		34
07-29	1300			35			34	34.5
07-29	1330	38			38			38
07-29	1400		37			38		37.5
07-29	1430			38			39	38.5

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
07-29	1500	40			38			39
07-29	1530		34.5	33.5		32.5	34	33.63
07-29	1600			32.5		32.5		32.5
07-29	1630		32			30		31
07-29	1700			33			34	33.5
07-29	1730	33			35			34
07-29	1800		34			34		34
07-29	1830			35			36	35.5
07-29	1900	36			37			36.5
07-29	1930		36.5			37.5		37.0
07-29	2000			37.5			37.5	37.5
07-29	2030	36.5			36			36.25
07-29	2100		36			36		36
07-29	2130			36			36	36
07-29	2200	37			36			36.5
07-29	2230		36			38		37
07-29	2300			36			36	36
07-29	2330	33			32			32.5
07-30	0000	33			34			33.5
07-30	0030		36			36		36
07-30	0100			33			37	35
07-30	0130	36			38			37
07-30	0200		35			36		35.5
07-30	0230			36			37	36.5
07-30	0300	36			34			35
07-30	0330		34			34		34
07-30	0400			35			33	34
07-30	0430	35			34			34.5
07-30	0500		35			35		35
07-30	0530			36			35	35.5
07-30	0600	36			36			36
07-30	0630		36			36		36
07-30	0700			36			37	36.5
07-30	0730	34			34			34
07-30	0800		35			35		35
07-30	0830			36			37	36.5
07-30	0900	35			36			35.5
07-30	0930		38			35		36.5
07-30	1000			36			36	36
07-30	1030	37			37			37
07-30	1100		38			38		38
07-30	1130			37			35	36.5
07-30	1200	37			37			37
07-30	1230		35			35		35
07-30	1300			36			37	36.5
07-30	1330	35			36			35.5
07-30	1400		35			35		35
07-30	1430			36			35	35.5
07-30	1500	36			36			36
07-30	1530	35	34	35.5	34	34.5	33	34.25
07-30	1600		36	35.5		34	36.5	35.5
07-30	1630	36			36			36

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
07-30	1700		35			37		36
07-30	1730			35			36.5	35.75
07-30	1800	36.5			37.5			37
07-30	1830		35.5			37		36.25
07-30	1900			36			36	36
07-30	1930	36		38	37		34.5	36.38
07-30	2000		37			35		36
07-30	2030			35			36	35.5
07-30	2100	34.5			36.5			35.5
07-30	2130		36.5			34		35.5
07-30	2200			36.5			37	36.75
07-30	2230	35			37			36
07-30	2300		37			37		37
07-30	2330			34			37	35.5
07-31	0000	37			35			36
07-31	0030		36			36		36
07-31	0100			35			37	36
07-31	0130	36			36			36
07-31	0200		36			37		36.5
07-31	0230			36			35	35.5
07-31	0300	35			36			35.5
07-31	0330		34			34		34
07-31	0400			36			36	36
07-31	0430	36			36			36
07-31	0500		36			36		36
07-31	0530			36			37	36.5
07-31	0600	36			36			36
07-31	0630		36			36		36
07-31	0700			36			36	36
07-31	0730	37			36			36.5
07-31	0830		36			36		36
07-31	0900			35			35	35
07-31	0930	35			36			35.5
07-31	1000		35			36		35.5
07-31	1030			35			35	35
07-31	1100	37			37			37
07-31	1130		35			34		34.5
07-31	1200			37			35	36
07-31	1230	36			36			36
07-31	1300		34			35		34.5
07-31	1330			34			35	34.5
07-31	1400	34			35			34.5
07-31	1430		36			36		36
07-31	1500			36			34	35
07-31	1530	35.5			35.5			35.5
07-31	1600		36.5			35.5		36
07-31	1630			35.5			35.5	35.5
07-31	1700	35.5			35			35.25
07-31	1730		36			36		36
07-31	1800			36			34.5	35.25
07-31	1830	36			36			36
07-31	1900		36.5			34.5		35.5

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
07-31	1930			35.5			34	34.75
07-31	2000	33.5			33.5			33.5
07-31	2030		34			33.5		33.75
07-31	2100			35			34.5	34.75
07-31	2130	35			35			35
07-31	2200		36			34.5		35.25
07-31	2230			36			35.5	35.75
07-31	2300	35.5			36.5			36
07-31	2330		36			37		36.5
08-01	0000			34.5			36	35.25
08-01	0030	36			36			36
08-01	0100		36			36		36
08-01	0130			36			36	36
08-01	0200	34			34			34
08-01	0230		35			36		35.5
08-01	0300			36			37	36.5
08-01	0330	34			36			35
08-01	0400		36			36		36
08-01	0430			36			36	36
08-01	0500	36			36			36
08-01	0530		36			36		36
08-01	0600			36			36	36
08-01	0630	36			36			36
08-01	0700		35			34		34.5
08-01	0730			35			36	35.5
08-01	0800	34			35			34.5
08-01	0830		34			34		34
08-01	0900			35			35	35
08-01	0930	34			36			35
08-01	1000		35			34		34.5
08-01	1030			35			36	35.5
08-01	1100	36			37			36.5
08-01	1130		36			36		36
08-01	1200			35			35	35
08-01	1230	37			36			36.5
08-01	1300		36			36		36
08-01	1330			36			37	36.5
08-01	1400	38			38			38
08-01	1430		35			37		36
08-01	1500			37			37	37
08-01	1530	36			36			36
08-01	1600		34			33.5		33.75
08-01	1630			36			35	35.5
08-01	1700	36.5			37.5			37
08-01	1730	-	36			36.5		36.25
08-01	1800			36.5			36	36.25
08-01	1830	36.5			36.5			36.5
08-01	1900		35			36.5		35.75
08-01	1930			36.5			36.5	36.5
08-01	2000	37.5			37.5			37.5
08-01	2030		38.5			39.5		39
08-01	2100			37			36	36.5

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-01	2130	34.5			35			34.75
08-01	2200		36			38		37
08-01	2230			38			36	37
08-01	2330	37			37			37
08-02	0000		40			41		40.5
08-02	0030			40			39	39.5
08-02	0100	39			39			39
08-02	0130		38			36		37
08-02	0200			41			40	40.5
08-02	0230							
08-04	1230		34			34		34
08-04	1300			34			33	33.5
08-04	1330	34			34			34
08-04	1400		33			34		33.5
08-04	1430			33			33	33.
08-04	1500	32			33			32.5
08-04	1530		37			35.5		36.25
08-04	1600			34			34	34.
08-04	1630	30			33			31.5
08-04	1700		33.5			32.5		33.
08-04	1730			36			37	36.5
08-04	1800	38			38			38.
08-04	1830		36			35		35.5
08-04	1900			34.5			35	34.75
08-04	1930	36			36			36.
08-04	2000		35			33.5		34.25
08-04	2030			35			35	35.
08-04	2100	33			33			33.
08-04	2130		34			32.5		33.25
08-04	2200			33.5			31.5	32.5
08-04	2230	34			33			33.5
08-04	2300		33.5			32.5		33.
08-04	2330			34			35	34.5
08-04	0000		36			36		36.
08-04	0030			36			36	36.
08-04	0100	34			30.5			32.25
08-04	0130		34			35		34.5
08-04	0200	37			36			36.5
08-04	0230		37			33		35.
08-04	0300			36			35	35.5
08-04	0330	37			38			37.5
08-04	0400		39			41		40.
08-04	0430			36			36	36.
08-04	0500	36			36			36.
08-04	0530		36			36		36.
08-04	0600			36			36	36.
08-04	0630							
08-04	0700							
08-04	0730	35			32			33.5
08-04	0800		34			34		34.
08-04	0830			36			36	36.
08-04	0900	34			34			34.

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-04	0930		34			34		34.
08-04	1000			36			35	35.5
08-04	1030	35			35			35.
08-04	1100		34			35		34.5
08-04	1130			36			34	35.
08-04	1200	36			34			35.
08-04	1230		34			34		34
08-04	1300			34			33	33.5
08-04	1330	34			34			34
08-04	1400		33			34		33.5
08-04	1430			33			33	33
08-04	1500	32			33			32.5
08-04	1530		37			35.5		36.25
08-04	1600			34			34	34
08-04	1630	30			33			31.5
08-04	1700		33.5			32.5		33
08-04	1730			36			37	36.5
08-04	1800	38			38			38
08-04	1830		36			35		35.5
08-04	1900			34.5			35	34.75
08-04	1930	36			36			36
08-04	2000		35			33.5		34.25
08-04	2030			35			35	35
08-04	2100	33			33			33
08-04	2130		34			32.5		33.25
08-04	2200			33.5			31.5	32.5
08-04	2230	34			33			33.5
08-04	2300		33.5			32.5		33.0
08-04	2330			34			35	34.5
08-05	0000	34.5			35			34.75
08-05	0030		33			34		33.5
08-05	0100			34			34.5	34.25
08-05	0130	32			32			32
08-05	0200		35			34		34.5
08-05	0230			34			34	34
08-05	0300	34			34			34
08-05	0330		34			34		34
08-04	0400			34			34	34
08-04	0430	34			34			34
08-05	0500		34			34		34
08-05	0530			34			35	34.5
08-05	0600	36			36			36
08-05	0630		34			34		34
08-05	0700			35			35	35
08-05	0730	33			34			33.5
08-05	0800		33			33		33
08-05	0830			36			33	34.5
08-05	0900	34			33			33.5
08-05	0930		32			33		32.5
08-05	1000			33			33	33
08-05	1030	34			32			33
08-05	1100		34			32		33

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-05	1130			34			33	33.5
08-05	1200	34			34			34
08-05	1230		32			34		33
08-05	1300			34			34	34
08-05	1330	34			32			33
08-05	1400		34			34		34
08-05	1430			34			34	34
08-05	1500	34			34			34
08-05	1530		33.75			34.75		34
08-05	1600			34			34	34
08-05	1630	34.5			34.5			34.5
08-05	1700		34.75			34.75		34.75
08-05	1730			35.5			36.5	36
08-05	1800	35			35			35
08-05	1830		35.5			35.5		35.5
08-05	1900			36			35.5	35.75
08-05	1930	35.75			36			35.75
08-05	2000		35.5			35.5		35.5
08-05	2030			36			37	36.5
08-05	2100	35			37			36
08-05	2130		36.5			36		36.25
08-05	2200			36.5			36.5	36.5
08-05	2230	36			37			36.5
08-05	2300		36.5			35.5		36
08-06	0000	33			33			33
08-06	0030		36			36		36
08-06	0100			36			36	36
08-06	0130	36			36			36
08-06	0200		36			36		36
08-06	0230			36			37	36.5
08-06	0300	36			36			36
08-06	0330		37			36		36.5
08-06	0400			36			36	36.
08-06	0500	36			37			36.5
08-06	0530		36			37		36.5
08-06	0600			36			38	37
08-06	0630	36			36			36
08-06	0700		36			36		36
08-06	0730		34			34		34
08-06	0800			34			35	34.5
08-06	0830	37			37			37
08-06	0900		36			36		36
08-06	0930			34				34
08-06	1000	34			34			34
08-06	1030		33			35		34
08-06	1100			34			36	35
08-06	1130	34			34			34
08-06	1200			34		37		35.5
08-06	1230		35				36	35.5
08-06	1300	36			36			36
08-06	1330		33			33		33
08-06	1400			34			34	34

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-06	1430	34			34			34
08-06	1500		33			33		33
08-06	1530	32	31.5	32	28.5	33	32	31.5
08-06	1600			33.5			33.5	33.5
08-06	1630		35.5			33.5		34.5
08-06	1700			34			33	33.5
08-06	1730		34.5			34.5		34.5
08-06	1800	34			06			35
08-06	1830		34			35.5		34.75
08-06	1900			36.5			36	36.25
08-06	1930	36			37			36.5
08-06	2000		36			36.5		36.25
08-06	2030			35.5			35.5	35.5
08-06	2100	33			34			33.5
08-06	2130		33.5			34.5		34
08-06	2200			34.5			36	35.25
08-06	2230	36			36			36
08-06	2300		34			34.5		34.25
08-06	2330	34			35			34.5
08-07	0000		34			36		35
08-07	0030			34			36	35
08-07	0100	35			35			35
08-07	0130		36			36		36
08-07	0200			36			34	35
08-07	0230	34			36			35
08-07	0300			35			35	35
08-07	0330		36			35		35.5
08-07	0400	36			36			36
08-07	0430		36			35		35.5
08-07	0500			34			34	34
08-07	0530	34			34			34
08-07	0600		34			34		34
08-07	0630			33			35	34
08-07	0700	34			35			34.5
08-07	0730		30			30		30
08-07	0800			34			34	34
08-07	0830	35			35			35
08-07	0900		33			34		33.5
08-07	0930			35			36	35.5
08-07	1000	38			38			38
08-07	1030		38			38		38
08-07	1100			36			37	36.5
08-07	1130	35			36			35.5
08-07	1200		34			34		34
08-07	1230			33			33	33
08-07	1300	33			33			33
08-07	1330		33			33		33
08-07	1400			35			35	35
08-07	1430	33			33			33
08-07	1500		30			31		30.5
08-07	1530			32			33.5	32.75
08-07	1600		34.5			34.5		34.5

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-07	1630	33			34			33.5
08-07	1700		34			34.5		34.25
08-07	1730			34.5			34	34.25
08-07	1800	33			34			33.5
08-07	1830		32			33.5		32.75
08-07	1900			34			33.5	33.75
08-07	1930	34			34			34
08-07	2000		34			34.5		34.25
08-07	2030			35			33.5	34.25
08-07	2100	33			35			34
08-07	2130		33			35		34
08-07	2200			34.5			34	34.25
08-07	2230	33.5			35.5			34.5
08-07	2300		35			34.5		34.75
08-07	2330	34			36			35
08-08	0000		35			36		35.5
08-07	0030			34			36	35
08-08	0100	34			36			35
08-08	0130		34			34		34
08-08	0200			34			35	34.5
08-08	0230	34			34			34
08-08	0300		34			35		34.5
08-08	0330			34			34	34
08-08	0400	32			34			33
08-08	0430		34			34		34
08-08	0500			34			34	34
08-08	0530	33			35			34
08-08	0600		34			34		34
08-08	0630			34			35	34.5
08-08	0700	35			34			34.5
08-08	0730		33			34		33.5
08-08	0830			34			35	34.5
08-08	0900	SHUT DOWN						
08-08	0930	34			34			34
08-08	1000		33			33		33
08-08	1030			35			34	34.5
08-08	1100	34			36			35
08-08	1130		34			35		34.5
08-08	1200			35			34	34.5
08-08	1230	34			35			34.5
08-08	1300		33			34		33.5
08-08	1330			34			34	34
08-08	1400	34			34			34
08-08	1430		34			34		34
08-08	1500			34			32	33
08-08	1530	33			34.5			33.75
08-08	1600		34			34		34
08-08	1630			33.5			33.5	33.5
08-08	1700	33			33.5			33.25
08-08	1730		35.5			35.5		35.5
08-08	1800			34			35.5	34.75
08-08	1830	34.5			34			34.25

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-08	1900		34.5			34.5		34.5
08-08	1930			34			35	34.5
08-08	2000	34			34			34
08-08	2030		33.5			34		33.75
08-08	2100			34.5			35	34.75
08-08	2130	34			35			34.5
08-08	2200		34				35	34.5
08-08	2230			33			37	35
08-08	2300	36			37			36.5
08-08	2330	37			38			37.5
08-09	0000		36			36		36
08-09	0030			33			36	34.5
08-09	0100	38			36			37
08-09	0130		34			32		33
08-09	0200			34			32	33
08-09	0230	32			35			33.5
08-08	0300		34			34		34
08-08	0330			33			36	34.5
08-08	0400	36			36			36
08-08	0430		32			33		32.5
08-09	0500			34			33	33.5
08-09	0530	34			34			34
08-09	0600		34			35		34.5
08-09	0630			34			36	35
08-09	0700	34			35			34.5
08-09	0730		35			35		35
08-09	0800			34			35	34.5
08-09	0830	34			34			34
08-09	0900		32			32		32
08-09	0930			26			30	28
08-09	1030	32			32			32
08-09	1100		34			33		33.5
08-09	1130			36			38	37
08-09	1200	38			38			38
08-09	1230		36			34		35
08-09	1300			38			36	37
08-09	1330	33			34			33.5
08-09	1400		34			32		33
08-09	1430			33			33	33
08-09	1500	34			31			32.5
08-09	1515		34			32		33
08-09	1530		34			30		32
08-09	1545			35			33	34
08-09	1600	37			35			36
08-09	1615		35			35.5		35.25
08-09	1630	37.5			37.5			37.5
08-09	1700		38.5			38.5		38.5
08-09	1730			35			35	35
08-09	1800	38			37.5			37.75
08-09	1830		38			36		37
08-09	1900			41			36	38.5
08-09	1930	40			38			39

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-09	2000		39			38		38.5
08-09	2030			40			38	39
08-09	2100	38			37			37.5
08-09	2130		38			36		37
08-09	2200			38			36	37
08-09	2230	38.5			37.5			38
08-09	2300		40			36		38
08-09	2330	44			41			42.5
08-10	0000		38			34		36
08-10	0030			36			35	35.5
08-10	0100	34			32			33
08-10	0130		32			34		33
08-10	0200			34			33	33.5
08-10	0230	36			36			36
08-10	0300		34			34		34
08-10	0330			36			38	37
08-10	0400	37			37			37
08-10	0430		39			36		38
08-10	0500			39			39	39
08-10	0530	37			36			36.5
08-10	0600		35			36		35.5
08-10	0630			36			36	36
08-10	0700	37			38			37.5
08-10	0730		33			35		34
08-10	0800			37			35	36
08-10	0900	37			37			37
08-10	0930		37			38		37.5
08-10	1000			38			39	38.5
08-10	1030	38			38			38
08-10	1100		37			36		36.5
08-10	1130			37			36	36.5
SHUT DOWN BACK PRESSURE CAUSED PLUGGING OF LINES								
08-15	1130		41			42		41.5
08-15	1200			41			41	41
08-15	1230	40			40			40
08-15	1400		38			38		38
08-15	1430			40			20	30
08-15	1500	20			20			20
08-15	1530		33			23		28
08-15	1600			37			23	30
POWER OUTAGE FROM 1627 TO 1716								
08-15	1800	32.5			31			31.75
08-15	1830		34			32		33
08-15	1900			35.5			31.5	33.5
08-15	1930	36			32.5			34.25
08-15	2000		40.5			32.5		36.5
08-15	2030			40			31	35.5
08-15	2100	34.5			36			35.25
08-15	2130		36.5			34.75		35.625
08-15	2200			38			33	35.5
08-15	2230		37			31		34
08-15	2300			34			33	33.5

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-15	2330	31			33			32
08-16	0000		37			39		38
08-16	0030			35			36	35.5
08-16	0100	34			30			32
08-16	0130		35			34		34.5
08-16	0200			33			34	33.5
08-16	0230	35			36			35.5
08-16	0300		35			37		36
08-16	0330			36			36	36
08-16	0400	35			37			36
08-16	0430		38			36		37
08-16	0500			36			36	36
08-16	0530	36			36			36
08-16	0600		38			36		37
08-16	0630			39			40	39.5
08-16	0700	38			38			38
08-16	0730		38			38		38
08-16	0800			36			34	35
08-16	0820	40			38			39
08-16	0900		36			38		37
08-16	0930			38			36	37
08-16	1000	37			37			37
08-16	1030		35			36		35.5
08-16	1100			38			36	37
08-16	1130	35			35			35
08-16	1200		33			33		33
08-16	1230			37			34	35.5
08-16	1300	34			35			34.5
08-16	1330		36			36		36
08-16	1400			36			36	36
08-16	1430	36			37			36.5
08-16	1500		36			37		36.5
08-16	1530			37			38.5	37.75
08-16	1600	38			37			37.5
08-16	1630		37			35		36
08-16	1700			36			35	35.5
08-16	1730	35.75			35.75			35.75
08-16	1800		37			35		36
08-16	1830			37			36	36.5
08-16	1900	38			37			37.5
08-16	1930		37			37		37
08-16	2000			37			36	36.5
08-16	2030	37			36			36.5
08-16	2100		36			36.5		36.25
08-16	2130			36			34	35
08-16	2200	37			36			36.5
08-16	2230		34			36		35
08-16	2300			37			37	37
08-16	2330	34			36			35
08-17	0000		36			36		36
08-17	0030			35			36	35.5
08-17	0100	40			41			40.5

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-17	0130		39			40		39.5
08-17	0200			39			38	38.5
08-17	0230	36			36			36
08-17	0300		37			34		35.5
08-17	0330			31			33	32
08-17	0400	36			36			36
08-17	0430		36			37		36.5
08-17	0530			38			37	37.5
08-17	0600	36			38			37
08-17	0630		39			40		39.5
08-17	0700			37			37	37
08-17	0730	36			36			36
08-17	0800		37			35		36
08-17	0830			34			34	34
08-17	0900	36			35			35.5
08-17	0930		34			34		34
08-17	1000			36			36	36
08-17	1030	36			36			36
08-17	1100		36			35		35.5
08-17	1130			34			35	34.5
08-17	1200	34			36			35
08-17	1230		36			36		36
08-17	1300			37			38	37.5
08-17	1330	35			37			36
08-17	1400		36			36		36
08-17	1430			34			36	35
08-17	1500	36			36			36
08-17	1530		36			36		36
08-17	1600			36			36.5	36.25
08-17	1630	36			35.5			35.75
08-17	1700		35			36.5		35.75
08-17	1730			36			37	36.5
08-17	1800	34			34			34
08-17	1830		34			33.5		33.75
08-17	1900			36			36	36
08-17	1930	37			35			36
08-17	2000		31			35		33
08-17	2030			35			33	34
08-17	2100	35			35			35
08-17	2130		35			35.5		35.25
08-17	2200			36.5			36.5	36.5
08-17	2230	37			37.5			37.25
08-17	2300		36			36.5		36.25
08-17	2330	36			37			36.5
08-18	0000		36			36		36
08-18	0030			37			33	35
08-18	0100	36			37			36.5
08-18	0130		37			36		36.5
08-18	0200			37			36	36.5
08-18	0230	37			35			36
08-18	0300		36			37		36.5
08-18	0330			36			38	37

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-18	0400	36			37			36.5
08-18	0430		34			37		35.5
08-18	0500			37			36	36.5
08-18	0530	34			35			34.5
08-18	0600		38			38		38
08-18	0630			37			36	36.5
08-18	0700	36			36			36
08-18	0730		36			36		36
08-18	0800			34			34	34
08-18	0830	35			35			35
08-18	0900		34			35		34.5
08-18	0930			36			36	36
08-18	1000	36			36			36
08-18	1030		33			36		34.5
08-18	1100			37			36	36.5
08-18	1130	36			37			36.5
08-18	1200		37			36		36.5
08-18	1230	36			36			36
08-18	1300		36			36		36
08-18	1330			36			37	36.5
08-18	1400	36			37			36.5
08-18	1430		35			35		35
08-18	1500			36			37	36.5
08-18	1530	35			35			35
08-18	1600		36.5			36.5		36.5
08-18	1630			37			36.5	36.75
08-18	1700	35			34.5			34.75
08-18	1730		34			28		31
08-18	1800			35			34.5	34.75
08-18	1830	38			37			37.5
08-18	1900		37			34		35.5
08-18	1930			36			36.5	36.25
08-18	2000	37			37			37
08-18	2030		36			35.5		35.75
08-18	2100			36			34	35
08-18	2130	35.5			36			35.75
08-18	2200		38			36		37
08-18	2230			38			38	38
08-18	2300	36			36			36
08-18	2330	36			38			37
08-19	0000		35			39		37
08-19	0030			37			35	36
08-19	0100	34			37			35.5
08-19	0130		38			39		38.5
08-19	0200			39			40	39.5
08-19	0230	41			40			40.5
08-19	0300		38			38		38
08-19	0330			37			38	37.5
08-19	0400	37			37			37
08-19	0430		36			37		36.5
08-19	0500			37			35	36
08-19	0530	37			37			37

DATE	TIME	#1	#2	#3	#4	#5	#6	AVE
08-19	0600		35			34		34.5
08-19	0630			36			35	35.5
08-19	0730	36			35			35.5
08-19	0800		35			34		34.5

END OF BOM/FGT 007 ILLINOIS NO.6

TABLE G-2

FIRETEST RESULTS

Date	Time	#1	#2	#3	#4	#5	#6	#7	Average
07-28	1600	15	17	19	14	12	12	10	14.1
07-28	1800	14	15	15	15	16	15	8	14.0
07-28	2000	13	29d	17d	10	15	12	11	15.3
07-28	2200	20	20	19d	9	13	13	3	13.9
07-29	0000	26d	14	6d	11d	8	3d	9	11.0
07-29	0200	15	32	22	6	4	8d	6	13.3
07-29	0400	30	30	7d	8	2	26d	6	15.6
07-29	0600	27	8	14	12	12	6d	10	12.7
07-29	0800	11	12	9	9	14	26	5	15.1
07-29	1000	15	12	9	8	27d	12d	3	11.4
07-29	1200	12d	12	12	14	16	34	1	14.4
07-29	1400	14	15	8	29	33	3	1	14.7
07-29	1600	21	14	13	14	15	12	12	14.4
07-29	1800	11d	24d	11d	5d	20d	14d	13d	14.0
07-29	2000	13	31d	27d	3d	6	5	19	14.9
07-29	2200	7d	20	22	13	31	13d	2d	15.4
07-30	0000	23d	20	30	31d	12	10	7	19.0
07-30	0200	9	10	5	9	10	4	15	8.9
07-30	0400	14	19	6	4	8	3	2	8.0
07-30	0600	21	16	8	22	5	12	4	12.6
07-30	0800	9	11	15	14d	11	20	4	12.0
07-30	1000	15	13	16	30d	11	19	7	15.9
07-30	1200	9	16	12	6	10d	16	4	10.4
07-30	1400	9	22	8	10d	13	9	10	11.6
07-30	1600	12	5d	16	20d	17	7	7	12.0
07-30	1800	4	14	17	25	9d	22	12	14.7
07-30	2000	3d	12	12d	11	20	7d	10d	10.7
07-30	2200	8d	14	13	13	16d	4d	8c	10.9
07-31	0000	10	25	14d	16	7	9	2	11.9
07-31	0200	13	16	12	18	9	6d	2	10.9
07-31	0400	10	4	17	9	12	6d	0	9.3
07-31	0600	12	4	12	17	24	22	2	13.3
07-31	0800	19	4d	8d	23	11	11	8	12.0
07-31	1000	9	23d	13	14	10	6	8	11.9
07-31	1200	17	18	22	12d	17	10	17	16.1
07-31	1400	17	19	16	12	14	19	1	14.0
07-31	1600	11d	10	29	9	11	11d	12	13.3
07-31	1800	7d	15d	41	7	14	20d	7	15.9
07-31	2000	7d	28	17	9d	3d	3	11	11.1
07-31	2200	3	31	27d	12	21	4d	7	15.0
08-01	0000	7d	10	13	10	4	14d	1	8.4
08-01	0200	14	14	10d	7	10	8	8	10.1
08-01	0400	2	3	10	19	18	4	7	9.0
08-01	0600	18	10	6	18	20	10	5	12.4
08-01	0800	9	7d	13d	16	11	1	1	8.3
08-01	1000	12	16	13	11	11	9	12	12.0
08-01	1200	20	10d	26	21	22	21	7	18.1
08-01	1400	32	22	20	14	10d	17	14c	18.4
08-01	1600	7d	15d	27	12	4d	11	3	11.3

Date	Time	#1	#2	#3	#4	#5	#6	#7	Average
08-01	1800	12c	12d	29	5	3d	13	7d	11.6
08-01	2000	16	17d	24	16d	13d	13	23	17.4
08-01	2200	38	21d	13	29	33	36	7	25.3
08-02	0000	34	31	42	17	36	44	9	30.4
08-02	0200	38	36	38	29	15	21	23	28.6
08-02	0400	31	34	30	13	10	27	22	23.9
08-02	0600	12	10	8	18	8	12	2	10.0
08-02	0800	13	16	17	6	18	23	8	14.4
08-02	1000	12	5	9	7d	25	10	6	10.6
08-02	1200	16	9	9	16	9	9	5	10.4
08-02	1400	17	14	16	14d	9	12	9	13.0
08-02	1600	14d	14d	10d	18d	6	8	2	10.3
08-02	1800	12d	16d	14	17d	24	16	2	14.4
08-02	2000	21	19d	13	8	6	5d	4	10.9
08-02	2200	30	17	17	26	20d	6d	6d	17.4
08-03	0000	34	31	42	17	36	44	9	30.4
08-03	0200	38	36	38	29	15	21	23	28.6
08-03	0400	31	34	30	13	10	27	22	23.9
08-03	0600	12	10	8	18	8	12	2	10.0
08-03	0800	13	16	17	6	18	23	8	14.4
08-03	1000	12	5	9	7d	25	10	6	10.6
08-03	1200	16	9	9	16	9	9	5	10.4
08-03	1400	17	14	16	14d	9	12	9	13.0
08-03	1600	14d	14d	10d	18d	6	8	2	10.3
08-03	1800	12d	16d	14	17d	24	16	2	14.4
08-03	2000	21	19d	13	8	6	5d	4	10.9
08-03	2200	30	17	17	26	20d	6d	6d	17.4
08-04	0000	12	4d	16d	4d	23d	46	16d	17.3
08-04	0200	46	20	6	12	29	6	28	21.0
08-04	0400	8	9	0	9	8	10	10	9.0
08-04	0600	21	19	9	6	8	10	9	11.7
08-04	0800	8	10	10	22	26	20d	17	16.1
08-04	1000	11	15d	10d	17	25	13	1	13.1
08-04	1200	11	11	36	14d	11d	24	6	16.1
08-04	1400	11	36	1	14	19	16	11	16.8
08-04	1600	13	14	1	21	11	7d	23	14.3
08-04	1800	5	16d	30d	21	9	8d	18	15.3
08-04	2000	28	31	16	6d	7	6d	18	15.3
08-04	2200	12	13	11	12	10d	7	10	10.7
08-05	0000	9	7	4	9d	9d	5	6	7.0
08-05	0200	8	13	6	12	9	6	5	8.4
08-05	0400	10	34	23	14	13	16	7	16.7
08-05	0600	8	18	22	18	9	23	8	15.1
08-05	0800	12	9d	9	12	4d	34	2c	11.7
08-05	1000	3	23	14	6d	14	15	8c	11.9
08-05	1200	9	10d	3d	15	22	10	0	9.9
08-05	1400	7d	30	10d	11	11d	10	4	11.9
08-05	1600	10	4	24	21	11	8d	18	13.7
08-05	1800	12	13d	20	15	18d	4	15	13.9
08-05	2000	24	17d	12	14	5	22	7d	14.4
08-05	2200	7	23	7d	8	12d	18	6	11.6
08-06	0000	5	15	18	12	12	24	9	13.6

Date	Time	#1	#2	#3	#4	#5	#6	#7	Average
08-06	0200	4d	8d	19	13	20	22	13	14.1
08-06	0400	4d	2	24	9	6	9	14	12.6
08-06	0600	6	23	28	23	8	3	2	13.3
08-06	0800	32	3d	13	3	8d	10	5	10.6
08-06	1000	20	10	7d	6	13	10	7	10.4
08-06	1200	9	14	7d	27	23	20	9	15.6
08-06	1400	10	8	6d	23	14	15	12	12.6
08-06	1600	12	10	15	18	18	9d	9	13.0
08-06	1800	18	15	24	9	7d	16	2	13.0
08-06	2000	19	28	36	3d	12	22	3d	17.6
08-06	2200	23	6	31	11	21d	12	7	15.9
08-07	0000	9	12	13	22	32	9	7	14.9
08-07	0200	18	12	9	24d	20	11	2	13.7
08-07	0400	12	15	12	14	13	20	5	13.0
08-07	0600	1	8	26	1	14	21	3	13.4
08-07	0800	9	5d	14	10	8	13	6	9.3
08-07	1000	13	14	29	14	5d	8	17	14.3
08-07	1200	14	25	24	11	7	8	3	13.1
08-07	1400	19	10	4	6d	4	4	2	7.0
08-07	1600	5	7d	15	9	3	8	2	7.0
08-07	1800	27d	22	22	17d	10	14	3	16.4
08-07	2000	11d	12	17	11	8	2d	6	9.6
08-07	2200	24d	14d	6	15	20	10d	2	13.0
08-08	0000	26	22	17	9	5	12	11	14.6
08-08	0200	27	10	25	12	9	7	8	14.0
08-08	0400	23	21	16	10	8	5	12	13.6
08-08	0600	25	20	18	11	9	8	9	14.3
08-08	0800	8	11	12	8	8	11	0	8.3
08-08	1000	13d	13d	9d	8d	21	15	2d	11.6
08-08	1200	29	20	6	13	6	6	0	11.4
08-08	1400	6	20	17	11	8d	7	0	9.9
08-08	1600	26	31	9	12	5d	12	2	13.9
08-08	1800	4d	16	14d	19	12d	8d	4d	11.0
08-08	2000	7	11d	8	21	19	8d	1	10.7
08-08	2200	24d	6d	17	18d	19	19df	0	14.7
08-09	0000	10	19	11	13	22d	22	2	14.1
08-09	0200	6	18	15	19	21	28d	9	16.6
08-09	0400	25	15	24	26	26	21	1	21.1
08-09	0600	18	18	13	14	22	16	26	18.1
08-09	0800	10	15	19	23	8	23	18	16.6
08-09	1000	25	25	11d	2d	12	7d	2	12.0
08-09	1200	20	12d	6d	11	12	11	5	11.0
08-09	1400	18	13	18	14	15	8	1	12.4
08-09	1600	14d	8d	5d	14	2.5	2.5	0d	6.6
08-09	1800	22	23	7	3d	3c	0	0	8.3
08-09	2000	8d	9	10d	1	5	2	3	5.4
08-09	2200	1	3	5	26	6	4	8	7.6
08-10	0000	0c	26	22	6	28	11	7	14.3
08-10	0200	19	42	11	14	16	0c	6	15.4
08-10	0400	38	28	44	20	33	42	12	31.0
08-10	0600	23	19	18	17	21	58	21	25.3
08-10	0800	42	27	29d	29d	36c	50c	26d	34.1

Date	Time	#1	#2	#3	#4	#5	#6	#7	Average
08-10	1000	49	34	30	47	55	56	40	44.4
08-10	1200	40	36	49	37	46	59	34	43.0

SHUTDOWN-high back pressure caused by plugged gas ducts.

08-15	1200	11	14	11d	14	18	27	10	15.0
08-15	1400	10c	6	3	7	13c	5	11	7.9
08-15	1600	8c	8c	7	9	5	7c	10	7.7
08-15	1815	4	14d	12d	4d	7c	7	12d	8.6
08-15	2000	9	13d	13	5	1	4c	1	6.6
08-15	2200	5	12	17	4	1	5c	24	9.7
08-16	0000	4	22	34	16	6	6	22	15.7
08-16	0200	18	36	30	2	6	0	6	14.0
08-16	0400	12	28	33	6	10	8	18	16.4
08-16	0600	28	42	36	10	14	14	24	24.0
08-16	0800	32	46	40	18	11	8	8	23.3
08-16	1000	40	33	16	28	23	25	7	24.6
08-16	1200	20	15d	10d	29	32	17	4c	18.1
08-16	1400	7	12	22	12	18	9	12	13.1
08-16	1600	12	13c	17	16	16	16d	11	14.4
08-16	1800	9c	5d	8d	7	16	8d	16	9.9
08-16	2000	11	17d	13d	18	21	12d	8c	14.3
08-16	2200	2	18d	21	14	17	26	5d	17.6
08-17	0000	10	10	14	21	19	13	0	12.4
08-17	0200	17	20	25	37	32	13	10	22.0
08-17	0400	10	10	30	10	10	16	6	13.1
08-17	0600	17	42	27	27	20	6	20	22.7
08-17	0800	18	21	21	16	17	23	0	16.6
08-17	1000	11	24	16	2	3d	21	17	13.4
08-17	1200	4	1d	5	17	10	19	4	8.6
08-17	1400	10	13	14	13	2d	12	12	10.9
08-17	1600	10	8d	11	22	8	11	3d	10.4
08-17	1800	11	14	10	5	3d	3	15	8.7
08-17	2000	11d	7	11	11d	4	21	9	10.6
08-17	2200	9d	14	15d	16d	24	8d	13	14.1
08-18	0000	9	16	18	10	11	13	8	12.1
08-18	0200	18	13	13	12	14	12	7	12.7
08-18	0400	16	7	20	18	12	14	8	13.6
08-18	0600	26	25	26	18	14	16	13	19.7
08-18	0800	10	12	22	7d	24	8	6	12.7
08-18	1000	8	13	16	8	17	6	16	12.0
08-18	1200	16	10d	22	1	11	12	8	12.9
08-18	1400	14d	19	16	19	7d	10	9	13.4
08-18	1600	9	7d	10	19	19	7	8c	11.3
08-18	1800	26	15d	43	14	3d	8d	0d	15.6
08-18	2000	11d	2	13	16	9	12	6	9.9
08-18	2200	18	11	14	20	15d	22	8	15.4
08-19	0000	17	28	23	15	20	14	12	18.4
08-19	0200	22	23	19	20	7	12	14	16.7
08-19	0400	17	21	20	12	17	12	8	15.3
08-19	0600	19	26	21	16	18	13	13	18.0
08-19	0800	22d	36	35	4d	16	29	7	26.4

TABLE G-3

OPERATOR LOGGED DATA I

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT.
0728	1105	6		14817		-2.42				2.0
0728	1130	6	11	14817	0					
0728	1230	6	8	14821	400					
0728	1330	6	11	14828	700					
0728	1430	6	11	14834	600					
0728	1530	6	15	14841	700					
0728	1630	6	15	14851	1000					
0728	1730	6	18	14862	1100					
0728	1830	6	18	14873	1100					
0728	1930	6	18	14882	900					
0728	2030	6	17	14893	1100					
0728	2130	6	8	14901	800					
0728	2230	6	10	14909	800					
0728	2330	6	9.5	14915	600					
0729	0030	6	10	14919	400					
0729	0130	6	12	14926	700					
0729	0230	6	12	14933	700					
0729	0330	6	13	14941	800					
0729	0430	6	12	14949	800					
0729	0530	6	12	14954	500					
0729	0630	6	9	14959	500					
0729	0730	6	8	14963	400					
0729	0830	6	15	14968	500	-2.40	13.0	2.0	12.0	20.0
0729	0930	6	15	14977	900	5.0	13.5	11.5	4.0	26.0
0729	1030	6	15	14985	800	5.0	13.0	12.0	4.0	26.0
0729	1130	6	15	14993	800	5.0	13.0	13.0	4.5	28.0
0729	1230	6	15	15002	900	5.0	13.0	13.0	5.0	26.0
0729	1330	6	15	15011	900	5.0	13.0	12.0	5.0	26.0
0729	1430	6	15	15020	900	4.5	13.0	12.0	3.0	22.0
0729	1530	6	15	15029	900	4.0	13.0	12.0	3.1	23.0
0729	1630	6	15	15037	900	1.5	13.0	12.5	1.9	19.0
0729	1730	6	15	15046	900	-2.40	13.0	12.3	1.4	19.0
0729	1830	6	15	15054	800	3.0	12.5	11.6	2.7	22.0
0729	1930	6	15	15064	1000	-2.40	12.5	12.0	1.6	19.0
0729	2030	6	18	15073	900	-2.40	13.0	12.0	2.5	23.0
0729	2130	6	18	15083	1000	-2.40	12.4	11.5	2.1	20.0
0729	2230	6	18	15094	1100	3.5	12.5	11.8	3.2	24.0
0729	2330	6	17.5	15108	1400	4.0	13.0	12.0	4.0	26.0
0730	0030	6	17.5	15114	600	4.0	13.0	12.0	4.0	22.0
0730	0130	6	17.5	15125	900	4.0	13.0	12.0	4.0	26.0
0730	0230	6	17.5	15134	900	4.0	13.0	12.0	4.0	22.0
0730	0330	6	17.5	15144	1000	4.0	13.0	11.5	3.5	24.0

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT.
0730	0430	6	17.5	15155	1100	4.0	12.5	11.5	2.5	20.0
0730	0530	6	17.5	15165	1000	4.0	12.5	11.5	2.5	20.0
0730	0630	6	17	15176	1100	4.0	13.0	12.0	3.0	22.0
0730	0730	6	18	15185	900	3.0	13.0	13.0	3.0	22.0
0730	0830	6	18	15195	1000	3.0	12.5	11.5	3.0	22.0
0730	0930	6	18	15205	1000	3.0	13.0	12.0	3.5	24.0
0730	1030	6	18	15216	1100	4.0	13.5	11.5	3.0	24.0
0730	1130	6	18	15226	1000	2.42	12.0	12.5	1.0	20.0
0730	1230	6	18	15236	1000	-2.42	13.0	12.0	1.0	18.0
0730	1330	6	18	15246	1000	-2.42	13.0	13.0	0	16.0
0730	1430	6	20	15258	1200	-2.42	13.0	12.0	0	20.0
0730	1530	6	20	15270	1200	-2.42	12.6	11.7	2.1	22.0
0730	1630	6	20	15284	1400	4.3	12.3	11.5	2.9	24.0
0730	1730	6	20	15294	1000	3.8	13.0	12.0	3.1	24.0
0730	1830	6	20	15305	1100	3.8	12.2	11.5	3.0	24.0
0730	1930	6	20	15317	1200	3.8	12.8	12.0	2.9	24.0
0730	2030	6	20	15329	1200	3.5	12.2	12.1	2.4	21.0
0730	2130	6	20	15341	1200	3.1	12.4	11.5	2.6	23.0
0730	2230	6	20	15352	1100	3.1	12.2	11.4	2.7	23.0
0730	2330	6	20	15366	1400	4.0	12.5	11.5	3.0	24.0
0731	0030	6	20	15377	1100	4.0	12.5	11.5	3.0	24.0
0731	0130	6	20	15387	1000	4.0	12.5	11.0	3.0	24.0
0731	0230	6	20	15399	1200	4.0	12.5	11.5	3.0	26.0
0731	0330	6	21	15410	1100	4.0	12.5	11.0	3.0	25.0
0731	0430	6	21	15423	1300	4.0	12.5	11.5	3.5	25.0
0731	0530	6	21	15436	1300	4	12.5	11.5	3.0	25.0
0731	0630	6	21	15544	800	4.0	12.0	11.0	3.5	26.0
0731	0730	6	20	15457	1300	4.5	12.5	12.5	4.0	26.0
0731	0830	6	20	15468	1100	5.0	13.0	12.0	4.0	26.0
0731	0930	6	20	15480	1200	-2.42	12.0	11.0	1.0	20.0
0731	1030	6	17	15491	1100	4.5	13.0	12.0	3.5	24.0
0731	1130	6	17	15501	1000	3.0	13.5	12.0	2.0	22.0
0731	1230	6	15	15510	900	-2.42	12.5	12.0	0	18.0
0731	1330	6	15	15518	800	-2.42	12.5	11.5	1.0	20.0
0731	1430	6	12	15526	800	-2.42	13.0	12.5	1.0	18.0
0731	1530	6	12.5	15533	700	-2.42	12.0	12.4	1.1	18.0
0731	1630	6	12.5	15540	700	-2.42	12.8	12.2	1.0	16.0
0731	1730	6	12.5	15548	800	-2.42	12.4	12.0	0	17.0
0731	1830	6	12.5	15555	700	-2.42	12.9	12.4	0	16.0
0731	1930	6	12.5	15562	700	-2.42	13.0	12.7	0	14.0
0731	2030	6	12.5	15569	700	-2.42	12.8	12.3	0	16.0
0731	2130	6	12.5	15576	700	-2.42	12.6	12.2	0	16.0
0731	2230	6	12.5	15584	800	-2.42	12.8	12.2	0	15.0
0731	2330	6	12.5	15590	600	-2.42	12.9	12.5	0	15.0
0801	0030	6	13.0	15597	700	1.25	12.0	12.5	0	16.0
0801	0130	6	13.0	15605	800	1.25	12.0	12.5	0	16.0
0801	0230	6	12.5	15612	700	1.3	12.0	12.5	0	16.0
0801	0330	6	12.5	15620	800	1.25	12.0	12.5	0	16.0
0801	0430	6	12.5	15626	600	1.25	12.0	12.5	0	16.0
0801	0530	6	12.5	15633	700	1.25	12.0	12.5	0	15.0

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT.
0801	0630	6	12.5	15641	800	1.5	13.0	12.5	0	16.0
0801	0730	6	12.0	15648	700	-2.42	12.5	12.0	0	16.0
0801	0830	6	12.0	15655	700	-2.42	12.5	12.0	0	16.0
0801	0930	6	12.0	15662	700	-2.42	13.0	12.5	0	16.0
0801	1030	6	12.0	15669	700	-2.42	12.5	12.0	0	16.0
0801	1130	6	25.0	15679	1000	-2.42	12.0	11.5	1.0	18.0
0801	1230	6	25.0	15695	1600	4.5	12.0	1.5	3.5	24.0
0801	1330	6	25.0	15710	1500	5.0	12.0	11.0	5.0	28.0
0801	1430	6	27.0	15725	1500	7.5	12.0	11.5	10.0	64.0
0801	1530	6	22.0	15740	1500	7.0	12.0	11.4	10.7	100.0
0801	1630	6	18.0	15751	1100	8.0	12.0	11.4	10.7	100.0
0801	1730	6	12.0	15756	500	8.8	12.5	12.0	10.8	85.0
0801	1830	6	20.0	15767	1100	8.0	12.5	11.8	10.8	72.0
0801	1930	6	15.0	15776	900	7.9	12.3	11.6	11.0	100.0
0801	2030	6	15.0	15785	900	8.0	12.4	11.5	11.0	100.0
0801	2130	6	21.0	15795	1000	8.0	12.5	11.6	11.1	100.0
0801	2230	6	11.0	15807	1200	7.9	12.4	11.6	11.0	100.0
0801	2330	6	14.0	15814	700	8.0	12.5	12.0	11.5	100.0
0802	0030	6	15.0	15822	800	8.0	12.5	12.0	11.5	86.0
0802	0130	6	20.0	15834	1200	8.0	12.5	11.5	10.0	86.0
0802	0230	6	20.0	15845	1100	8.0	12.5	11.5	10.0	86.0
0802	0330	6	20.0	15856	1100	8.0	12.5	11.5	10.0	86.0
0802	0430	6	20.0	15867	1100	8.0	12.5	11.5	10.0	88.0
0802	0530	6	20.0	15879	1200	8.0	12.5	12.0	12.0	90.0
0802	0630	6	30.0+	15886	700					
0802	0730	6	30.0	15905	1900	-2.42				
0802	0830	6	30.0	15922	1700	-2.42	12.4	11.5	4.0	24.0
0802	0930	6	25.0	15937	1500	3.0	12.0	11.5	10.0	52.0
0802	1030	6	20.0	15949	1200	8.0	12.0	11.5	10.5	100.0
0802	1130	6	20.0	15960	1100	5.0	13.0	12.5	5.0	36.0
0802	1230	6	18.0	15972	1200	8.0	12.0	11.5	11.5	86.0
0802	1330	6	19.0	15982	1000	7.5	12.5	12.0	8.5	40.0
0802	1430	6	18.5	15993	1100	4.0	13.5	12.5	2.5	20.0
0802	1530	6	19.0	16004	1100	6.8	12.5	11.5	9.2	44.0
0802	1630	6	19.0	16015	1100	7.5	12.0	11.4	10.5	94.0
0802	1730	6	13.0	16024	900	8.3	12.1	11.5	10.6	100.0
0802	1830	6	16.0	16032	800	7.9	12.5	11.9	10.5	68.0
0802	1930	6	22.0	16044	1200	8.0	12.5	11.9	11.0	80.0
0802	2030	6	22.5	16058	1400	7.5	12.2	11.6	9.6	50.0
0802	2130	6	15.0	16068	1000	8.0	12.0	11.4	10.7	100.0
0802	2230	6	11.0	16075	700	8.0	12.1	11.4	10.8	100.0
0802	2330	6	17.0	16082	700	8.0	12.5	11.5	10.0	80.0
0803	0030	6	20.0	16093	1100	5.0	12.5	11.5	6.0	24.0
0803	0130	6	20.0	16105	1200	6.0	12.5	11.5	8.0	40.0
0803	0230	6	20.0	16116	1100	8.0	12.5	11.5	10.0	100.0
0803	0330	6	19.0	16127	1100	8.0	12.5	11.5	10.0	90.0
0803	0430	6	17.0	16131	500					
0803	0530	6	25.0	16144	1300	2.0	13.0	12.0	2.0	18.0
0803	0630	6	22.0	16158	1400	3.0	12.5	1.5	7.0	34.0
0803	0730	6	21.0	16170	1200	12.0	7.0	11.5	10.0	70.0

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT.
0803	0830	6	17.0	16181	1100	7.5	12.5	12.0	11.0	100.0
0803	0930	6	14.0	16190	900	7.5	12.0	11.5	10.5	87.0
0803	1030	6	21.0	16200	1000	5.5	12.5	12.0	4.0	24.0
0803	1130	6	20.0	16212	1200	5.0	12.0	12.0	6.0	30.0
0803	1230	6	18.0	16224	1200	7.5	12.0	11.5	10.5	100.0
0803	1330	6	14.0	16233	1100	7.5	12.5	11.5	11.0	85.0
0803	1430	6	16.0	16241	800	7.5	12.5	12.0	10.0	50.0
0803	1530	6	18.0	16251	1000	-2.42	12.4	11.9	0	15.0
0803	1630	6	26.0	16263	1200	-2.42	12.2	12.0	1.4	16.0
0803	1730	6	26.0	16279	1600	-2.42	12.4	13.2	0	11.0
0803	1830	6	30.0+	16296	1700					
0803	1930	6	30.0+	16316	2000					
0803	2030	6	30.0+	16337	2100					
0803	2130	6	30.0+	16353	1600	-2.42	12.5	12.4	0	14.0
0803	2230	6	30.0+	16375	2200	-2.42	12.2	11.5	2.0	20.0
0803	2330	6	30.0+	16395	2000	2.5	12.5	11.5	2.5	20.0
0804	0030	6	30.0+	16417	2200	3.0	12.0	11.5	4.0	22.0
0804	0130	6	30.0+	16432	1500	5.0	12.5	12.0	6.0	30.0
0804	0230	6	30.0+	16453	2100	5.0	12.5	12.0	6.0	30.0
0804	0330	6	30.0+	16471	1800	6.0	12.5	12.0	5.0	30.0
0804	0430	6	30.0+	16490	1900	4.0	12.5	12.0	4.0	22.0
0804	0530	6	30.0+	16512	2200	2.5	12.5	11.5	2.5	20.0
0804	0630	6	30.0+	16535	2300	2.5	12.5	11.5	2.5	20.0
0804	0730	6	30.0+	16552	1700	5.0	12.5	11.5	6.0	30.0
0804	0830	6	22.0	16565	1300	4.0	13.5	12.0	4.0	24.0
0804	0930	6	21.0	16577	1200	3.0	12.5	12.0	2.5	20.0
0804	1030	6	21.0	16590	1300	3.0	12.0	12.0	2.0	20.0
0804	1130	6	22.0	16602	1200	3.0	13.0	12.0	3.0	22.0
0804	1230	6	22.0	16615	1300	3.0	13.0	12.0	4.0	24.0
0804	1330	6	21.0	16629	1400	4.0	13.0	12.0	4.0	26.0
0804	1430	6	21.5	16640	1100	4.5	12.5	12.0	4.0	26.0
0804	1530	6	22.0	16653	1300	4.2	12.4	12.0	3.1	24.0
0804	1630	6	22.0	16666	1300	4.1	12.6	12.0	4.5	26.0
0804	1730	6	22.0	16679	1300	4.3	12.7	12.1	4.0	23.0
0804	1830	6	22.0	16692	1300	4.2	12.4	11.9	3.5	24.0
0804	1930	6	22.0	16704	1200	3.5	12.7	12.1	2.5	22.0
0804	2030	6	22.0	16717	1300	2.9	12.1	11.6	2.0	20.0
0804	2130	6	22.0	16729	1200	-2.42	13.0	12.7	0	15.0
0804	2230	6	22.0	16742	1300	-2.42	12.9	12.5	1.2	18.0
0804	2330	6	20.5	16754	1200	-2.42	13.0	12.6	1.0	15.0
0805	0030	6	22.0	16767	1300	-2.42	12.5	12.4	0	16.0
0805	0130	6	22.0	16781	1400	-2.42	12.5	12.2	0	17.0
0805	0230	6	22.0	16792	1100	-2.42	12.5	12.0	0	16.0
0805	0330	6	22.0	16804	1200	-2.42	12.5	12.0	0	16.0
0805	0430	6	22.0	16817	1300	-2.42	12.5	12.2	0	16.0
0805	0530	6	22.0	16830	1300	-2.42	12.5	12.0	0	16.0
0805	0630	6	21.0	16843	1300	-2.42	12.5	12.0	0	16.0
0805	0730	6	22.0	16856	1300	-2.42	12.5	12.0	1.0	20.0
0805	0830	6	14.0	16865	900	-2.42	13.0	12.5	0	14.0
0805	0930	6	16.0	16874	900	-2.42	13.0	12.5	0	14.0

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT.
0805	1030	6	19.0	16884	1000	-2.42	12.5	12.5	0	12.0
0805	1130	6	18.5	16895	1100	-2.42	13.0	13.0	0	14.0
0805	1230	6	18.5	16906	1100	-2.42	13.0	13.0	0	12.0
0805	1330	6	19.0	16917	1100	-2.42	12.5	12.5	0	12.0
0805	1430	6	19.0	16928	1100	-2.42	12.5	12.5	0	14.0
0805	1530	6	19.0	16939	1100	-2.42	12.4	12.1	0	16.0
0805	1630	6	19.0	16950	1100	-2.42	12.2	12.0	0	17.0
0805	1730	6	19.0	16961	1100	-2.42	12.4	12.5	0	16.0
0805	1830	6	19.0	16972	1100	-2.42	12.5	12.2	1.0	17.0
0805	1930	6	19.0	16983	1100	-2.42	12.1	12.4	1.0	18.0
0805	2030	6	19.0	16994	1100	-2.42	12.7	12.5	1.0	17.0
0805	2130	6	19.0	17005	1100	-2.42	12.7	12.4	1.0	18.0
0805	2230	6	19.0	17016	1100	-2.42	12.8	12.5	1.1	17.0
0805	2330	6	19.0	17028	1200	11.0	13.0	12.5	0	16.0
0806	0030	6	19.0	17037	900	-2.42	13.0	12.5	0	16.0
0806	0130	6	19.0	17048	1100	1.0	13.0	11.5	0	14.0
0806	0230	6	19.0	17059	1100	1.0	13.0	12.0	0	14.0
0806	0330	6	20.0	17071	1200	1.0	12.5	12.0	0	16.0
0806	0430	6	20.0	17083	1200	1.0	12.5	12.0	0	16.0
0806	0530	6	19.5	17095	1200	1.0	12.5	12.0	0	16.0
0806	0630	6	20.0	17107	1200	1.0	12.5	12.0	0	16.0
0806	0730	6	19.0	17117	1000	-2.42	12.0	12.0	0	16.0
0806	0830	6	19.0	17128	1100	-2.42	13.0	12.0	0	18.0
0806	0930	6	19.0	17138	1000	-2.42	13.0	12.5	0	14.0
0806	1030	6	19.0	17149	1100	-2.42	12.5	12.5	0	16.0
0806	1130	6	19.0	17161	1200	-2.42	13.0	12.5	0	14.0
0806	1230	6	19.0	17172	1100	-2.42	13.0	12.5	0	16.0
0806	1330	6	19.0	17182	1000	-2.42	13.0	12.5	0	18.0
0806	1430	6	19.0	17193	1100	-2.42	13.0	12.5	0	18.0
0806	1530	6	19.0	17205	1200	-2.42	12.8	12.1	1.9	19.0
0806	1630	6	19.0	17216	1100	2.1	12.6	11.5	2.8	21.0
0806	1730	6	19.0	17227	1100	2.1	12.2	11.4	2.6	23.0
0806	1830	6	19.0	17238	1100	2.1	12.0	11.5	2.6	23.0
0806	1930	6	19.0	17249	1100	3.0	12.7	12.0	2.4	22.0
0806	2030	6	19.0	17260	1100	2.0	12.5	12.0	2.0	21.0
0806	2130	6	19.0	17271	1100	-2.42	12.1	11.6	1.6	21.0
0806	2230	6	19.0	17282	1100	-2.42	12.8	12.1	1.7	19.0
0806	2330	6	19.0	17293	1100	1.0	13.0	12.0	1.0	18.0
0807	0030	6	19.0	17303	1000	2.42	12.5	11.5	2.0	20.0
0807	0130	6	19.0	17315	1200	2.42	12.0	11.5	2.0	22.0
0807	0230	6	19.0	17325	1000	3.0	12.0	11.5	2.5	22.0
0807	0330	6	19.0	17336	1100	3.5	12.0	11.5	3.0	22.0
0807	0430	6	19.0	17347	1100	4.0	12.0	11.5	3.0	23.0
0807	0530	6	19.0	17359	1200	3.5	13.0	12.0	3.0	23.0
0807	0630	6	19.0	17371	1200	3.5	12.5	12.0	3.0	23.0
0807	0730	6	19.0	17381	1000	2.42	12.0	11.5	2.0	20.0
0807	0830	6	19.0	17393	1200	2.42	12.5	12.0	2.0	20.0
0807	0930	6	19.0	17404	1100	2.42	12.0	12.5	2.0	22.0
0807	1030	6	19.0	17415	1100	3.0	12.0	12.0	3.0	22.0
0807	1130	6	19.0	17426	1100	2.42	12.0	12.0	1.0	18.0

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT
0807	1230	6	19.0	17437	1100	-2.42	14.0	14.0	0	10.0
0807	1330	6	23.0	17450	1300	-2.42	27.5	26.0	0	8.0
0807	1430	6	23.0	17464	1400	-2.42	13.3	12.0	0	12.0
0807	1530	6	23.0	17478	1400	-2.42	12.5	12.4	0	26.0
0807	1630	6	23.0	17492	1400	-2.42	13.0	12.9	0	12.0
0807	1730	6	22.0	17504	1200	-2.42	12.5	12.5	0	12.0
0807	1830	6	22.0	17517	1300	-2.42	12.8	12.6	0	15.0
0807	1930	6	22.0	17530	1300	-2.42	12.1	12.0	0	16.0
0807	2030	6	24.0	17543	1300	-2.42	12.7	12.1	1.6	20.0
0807	2130	6	20.0	17655	1200	-2.42	12.9	12.5	1.0	16.0
0807	2230	6	20.0	17667	1200	-2.42	12.6	12.3	1.3	19.0
0807	2330	6	20.0	17579	1200	1.0	13.0	12.5	0	14.0
0808	0030	6	20.0	17591	1200	1.0	13.0	12.5	0	14.0
0808	0130	6	19.5	17601	1000	1.0	13.0	12.5	0	15.0
0808	0230	6	20.0	17613	1200	1.0	12.0	12.5	0	16.0
0808	0330	6	20.0	17624	1100	1.0	13.0	12.5	0	15.0
0808	0430	6	20.0	17636	1200	1.0	12.5	12.0	1.0	17.0
0808	0530	6	20.0	17648	1200	1.0	12.5	12.0	0	16.0
0808	0630	6	20.0	17660	1200	2.42	13.0	12.0	1.0	18.0
0808	0730	6	20.0	17671	1100	-2.42	12.0	11.5	1.0	20.0
0808	0830	SHUT DOWN DUE TO POWER BLINK								
0808	0930	6	20.0	17694	2300	3.5	12.0	11.5	2.5	22.0
0808	1030	6	20.0	17706	1200	-2.42	12.5	12.0	1.0	20.0
0808	1130	6	20.0	17717	1100	-2.42	12.5	12.5	0	18.0
0808	1230	6	20.0	17729	1200	-2.42	13.0	13.0	0	12.0
0808	1330	6	20.0	17740	1100	-2.42	12.0	12.0	0	16.0
0808	1430	6	20.0	17752	1200	-2.42	12.5	12.0	1.0	18.0
0808	1530	6	19.5	17763	1100	-2.42	12.2	11.5	1.9	20.0
0808	1630	6	20.0	17774	1100	-2.42	12.5	11.5	2.1	21.0
0808	1730	6	20.0	17786	1200	-2.42	12.6	12.0	2.7	23.0
0808	1830	6	20.0	17798	1200	2.429	12.0	11.5	2.5	22.0
0808	1930	6	19.5	17809	1100	2.429	12.5	11.9	3.0	22.0
0808	2030	6	19.5	17821	1200	3.5	12.0	11.4	3.3	25.0
0808	2130	6	19.5	17831	1000	3.8	12.5	11.6	3.9	24.0
0808	2230	6	20.0	17843	1200	3.9	12.4	11.7	4.2	25.0
0808	2330	6	20.0	17854	1100	4.0	12.5	12.0	5.0	26.0
0809	0030	6	20.0	17865	1100	4.5	12.5	12.0	4.0	24.0
0809	0130	6	20.0	17877	1200	4.5	12.0	12.5	3.0	26.0
0809	0230	6	20.0	17889	1200	4.0	13.0	12.0	4.0	24.0
0809	0330	6	20.0	17901	1200	4.0	12.5	12.0	3.5	22.0
0809	0430	6	20.5	17912	1100	4.0	12.0	11.5	4.0	24.0
0809	0530	6	20.0	17925	1300	4.0	12.0	11.5	4.0	24.0
0809	0630	6	20.0	17936	1100	4.0	12.0	11.5	4.0	24.0
0809	0730	6	20.0	17947	1100	4.0	12.0	11.5	3.0	24.0
0809	0830	6	20.0	17960	1300	4.0	12.5	12.0	3.0	24.0
0809	0930	6	17.5	17971	1100	4.0	12.0	11.5	3.0	21.0
0809	1030	6	17.5	17980	900	3.5	12.5	12.0	3.0	22.0
0809	1130	6	17.5	17990	1000	4.0	12.5	12.0	3.5	22.0
0809	1230	6	17.5	18001	1100	2.42	12.5	12.0	3.5	22.0
0809	1330	6	17.0	18010	900	-2.42	13.0	13.0	0	20.0

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT.
0809	1430	6	17.0	18021	1100	-2.42	12.0	12.0	0	24.0
0809	1530	6	18.0	18031	1000	-2.42	12.0	11.4	2.5	20.0
0809	1630	6	18.0	18042	1100	2.2	12.3	11.5	3.4	24.0
0809	1730	6	18.0	18052	1000	3.4	12.1	11.4	3.9	25.0
0809	1830	6	18.0	18062	1000	3.3	12.0	11.5	3.5	22.0
0809	1930	6	18.0	18073	1100	3.7	12.6	12.0	4.0	24.0
0809	2030	6	18.0	18084	1100	2.9	12.8	12.1	3.1	22.0
0809	2130	6	18.0	18093	900	3.0	12.1	11.4	3.4	24.0
0809	2230	6	18.0	18104	1100	3.5	12.2	11.5	3.5	24.0
0809	2330	6	18.0	18114	1000	6.0	12.0	11.5	8.0	38.0
0810	0030	6	18.0	18126	1200	7.0	12.5	11.5	10.5	64.0
0810	0130	6	17.0	18135	900	7.0	12.5	12.0	10.0	52.0
0810	0230	6	15.0	18145	1000	7.0	12.5	12.0	10.3	100.0
0810	0330	6	14.0	18152	700	7.5	12.5	11.5	11.0	100.0
0810	0430	6	11.5	18159	700	7.5	12.0	11.5	11.0	100.0
0810	0530	6	10.5	18165	600	7.5	12.0	12.0	11.0	82.0
0810	0630	6	10.0	18170	500	6.0	12.5	12.0	11.5	82.0
0810	0730	6	11.0	18177	700	7.5	12.0	11.5	10.5	92.0
0810	0830	6	12.0	18183	600	7.5	12.0	11.5	10.5	100.0
0810	0930	6	11.0	18190	700	7.5	12.0	10.5	10.5	100.0
0810	1030	6	10.0	18196	600	7.5	12.5	12.0	11.0	70.0
0810	1130	6	16.0	18203	700	7.0	12.0	12.0	9.0	46.0
0810				SHUT DOWN FOR CLEAN OUT DUE TO PLUGGED LINES						
0815	1230	6.0	7.0	18381	17800					
0815	1330	6.0	18.0	18388	700					
0815	1430	6.0	27.0	18401	1300	-2.42	3.0	11.5	2.0	20.0
0815	1530	6.0	30.0	18418	1700	-2.42	3.1	12.9	1.0	16.0
0815	1630			SHUT DOWN DUE TO POWER OUTAGE						
0815	1830	6.0	26.0	18462	4400	3.9	4.2	12.0	4.7	27.0
0815	1930	6.0	26.0	18477	1500	2.3	3.2	12.0	4.0	26.0
0815	2030	6.0	26.0	18494	1700	2.0	4.2	11.8	5.5	29.0
0815	2130	6.0	28.0	18508	1400	1.8	5.2	11.4	7.0	34.0
0815	2230	6.0	29.0	18524	1600	1.9	5.4	11.5	7.0	32.0
0815	2330	6.0	30.0+	18542	1800	6.0	1.0	11.5	9.0	40.0
0816	0030	6.0	30.0+	18561	1900	6.5	2.0	11.5	8.5	38.0
0816	0130	6.0	30.0+	18577	1600	6.0	1.5	12.0	8.5	36.0
0816	0230	6.0	30.0+	18594	1700	6.0	2.0	11.5	8.5	38.0
0816	0330	6.0	30.0+	18615	2100	6.0	2.0	12.0	9.0	48.0
0816	0430	6.0	30.0+	18631	1600	7.0	1.5	11.5	10.0	50.0
0816	0530	6.0	30.0+	18649	1800	7.0	1.0	11.5	10.0	50.0
0816	0630	6.0	30.0+	18668	1900	7.0	0.5	12.0	13.0	60.0
0816	0730	6.0	30.0+	18686	1800	7.0	1.0	12.0	10.0	62.0
0816	0830	6.0	23.0	18701	1500	7.0	1.0	11.5	10.5	70.0
0816	0930	6.0	22.5	18714	1300	7.0	1.0	11.5	10.0	70.0
0816	1030	6.0	23.0	18727	1300	7.0	2.0	12.0	9.0	40.0
0816	1130	6.0	23.0	18741	1400	6.5	2.0	12.0	8.0	40.0
0816	1230	6.0	23.0	18755	1400	6.5	2.0	10.5	9.0	45.0
0816	1330	6.0	20.0	18768	1300	6.0	2.0	11.5	7.0	30.0
0816	1430	6.0	23.0	18780	1200	6.0	2.0	11.5	7.0	30.0
0816	1530	6.0	23.5	18794	1400	5.6	12.6	11.5	6.8	31.0

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT
0816	1630	6.0	22.0	18808	1400	5.7	12.5	11.6	7.0	31.0
0816	1730	6.0	25.0	18820	1200	5.3	12.5	11.8	5.9	29.0
0816	1830	6.0	25.0	18835	1500	5.8	12.6	11.6	8.0	36.0
0816	1930	6.0	25.0	18851	1600	6.3	12.4	11.5	9.8	50.0
0816	2030	6.0	25.0	18865	1400	7.0	12.6	11.3	10.4	76.0
0816	2130	6.0	25.0	18881	1600	7.0	12.1	11.6	11.0	80.0
0816	2230	6.0	16.0	18893	1200	7.0	12.0	11.5	11.0	100.0
0816	2330	6.0	19.0	18904	1100	7.0	12.0	11.5	11.0	88.0
0817	0030	6.0	19.0	18915	1100	7.0	12.0	11.5	1.0	56.0
0817	0130	6.0	19.0	18926	1100	4.0	12.0	12.0	4.5	24.0
0817	0230	5.5	21.0	18938	1200	2.0	11.5	11.5	2.5	18.0
0817	0330	6.0	21.0	18951	1300	6.0	12.0	11.5	8.0	36.0
0817	0430	6.0	21.0	18963	1200	6.2	11.5	12.0	10.0	58.0
0817	0530	6.0	19.0	18976	1300	7.0	11.5	11.5	11.0	100.0
0817	0630	6.0	19.0	18986	1000	6.0	12.0	11.5	7.0	32.0
0817	0730	6.0	19.0	18997	1100	6.0	12.0	11.5	8.0	36.0
0817	0830	6.0	19.0	19008	1100	5.0	12.0	11.5	4.0	24.0
0817	0930	6.0	19.0	19019	1100	3.5	11.5	11.5	4.0	24.0
0817	1030	6.0	18.0	19030	1100	4.0	11.5	11.5	4.0	24.0
0817	1130	6.0	19.0	19040	1000	4.0	11.5	12.0	5.0	26.0
0817	1230	6.0	19.0	19051	1100	3.0	11.5	11.5	4.0	24.0
0817	1330	6.0	19.0	19063	1200	4.0	11.5	12.0	4.0	26.0
0817	1430	6.0	19.0	19074	1100	3.0	11.5	11.5	3.0	22.0
0817	1530	6.0	19.0	19085	1100	3.8	11.3	11.6	3.9	24.0
0817	1630	6.0	19.5	19096	1100	5.9	11.5	11.4	8.5	41.0
0817	1730	6.0	19.5	19108	1200	6.3	11.5	11.7	8.4	37.0
0817	1830	6.0	19.0	19119	1100	6.7	11.5	11.5	10.5	64.0
0817	1930	6.0	19.0	19130	1100	7.0	11.5	11.5	10.5	64.0
0817	2030	6.0	19.0	19141	1100	7.0	11.4	11.5	10.0	52.0
0817	2130	6.0	19.0	19152	1100	7.0	11.3	11.5	10.8	82.0
0817	2230	6.0	24.5	19164	1200	5.4	11.1	11.5	6.3	30.0
0817	2330	6.0	21.0	19176	1200	2.42	11.0	11.5	3.0	22.0
0818	0030	6.0	22.0	19188	1200	4.0	11.0	12.0	5.0	26.0
0818	0130	6.0	22.0	19201	1300	5.0	11.5	12.0	6.0	30.0
0818	0230	6.0	21.5	19214	1300	5.0	11.0	11.5	7.0	30.0
0818	0330	6.0	22.0	19226	1200	7.0	11.0	11.0	11.0	86.0
0818	0430	6.0	18.0	19238	1200	7.0	11.0	11.5	11.0	100.0
0818	0530	6.0	17.0	19240	1000	7.0	11.0	11.0	11.0	42.0
0818	0630	6.0	14.0	19259	1100	5.0	10.5	10.5	11.0	26.0
0818	0730	6.0	18.0	19267	800	3.0	10.5	16.0	0	9.0
0818	0830	6.0	21.0	19281	1400	-2.42	11.5	12.5	1.0	18.0
0818	0930	6.0	21.0	19292	1100	4.0	11.5	12.5	4.0	24.0
0818	1030	6.0	21.0	19305	1300	3.0	11.5	12.0	3.0	22.0
0818	1130	6.0	25.0	19317	1200	-2.42	12.5			4.0
0818	1230	6.0	26.0	19332	1500	4.0	12.0	12.0	5.0	28.0
0818	1330	6.0	25.0	19347	1500	6.0	12.0	12.0	8.0	34.0
0818	1430	6.0	25.0	19363	1600	6.0	12.0	12.0	5.0	28.0
0818	1530	6.0	25.5	19377	1400	3.5	11.7	12.0	4.0	25.0
0818	1630	6.0	26.0	19393	1600	5.1	11.6	11.7	6.7	30.0
0818	1730	6.0	26.0	19408	1500	7.0	11.5	11.3	10.5	77.0

DATE	TIME	AGIT. WATER FLOW	JACKET WATER FLOW	JACKET W. F. TOTAL	JACKET WATER HRLY USE	STEAM RATE FLOW	METER INLET PRESS.	INLET VALVE PRESS.	OUTLET VALVE PRESS.	VALVE POSIT.
0818	1830	6.0	22.5	19421	1300	7.0	11.4	11.5	10.7	77.0
0818	1930	6.0	25.0	19435	1400	4.0	11.2	12.0	3.8	24.0
0818	2030	6.0	25.5	19450	1500	-2.42	12.4			2.0
0818	2130	6.0	24.0	19466	1600	6.9	11.7	11.4	9.9	60.0
0818	2230	6.0	23.0	19479	1300	7.0	11.5	11.5	10.6	72.0
0818	2330	6.0	24.0	19494	1500	7.0	11.5	11.5	11.0	100.0
0819	0030	6.0	24.0	19509	1500	7.0	11.5	11.5	11.0	100.0
0819	0130	6.0	24.0	19524	1500	7.0	11.5	12.0	11.0	100.0
0819	0230	6.0	24.0	19536	1200	7.0	11.0	12.0	11.5	100.0
0819	0330	6.0	25.0	19546	1000	7.0	11.5	12.0	11.0	100.0
0819	0430	6.0	19.0	19555	900	7.0	11.0	11.0	11.5	100.0
0819	0530	6.0	17.0	19565	1000	7.0	11.0	11.5	11.0	100.0
0819	0630	6.0	15.0	19574	900	7.0	11.0	11.5	11.0	100.0
0819	0730	6.0	13.0	19582	800	7.0	10.0	11.5	11.0	100.0
0819	0830	6.0	10.0	19588	600	7.0	10.0	11.5	10.0	100.0

END OF BOM/FGT 007 ILLINOIS #6

TABLE G-4

OPERATOR LOGGED DATA II

DATE	TIME	AGIT. COUNT RDING	AGIT SWEEP PER HR	AGIT DRIVE SETNG	GRATE GEAR COUNTER READING	GRATE GEAR RPH	GRATE DRIVE SETNG	FLUE	GAS	SCRUBBER
								pH	REAGENT PUMP SPEED	REAGEN PUMP STROKE
0728	1105						2/3.0		35	35
0728	1130				3	3	2/3.0	7.0	35	35
0728	1330				6	3	2/2.0			
0728	1430	8	8	2.7	15	9	2/2.0			
0728	1530	13	5	6.0	35	20	2/2.0	7.0	35	35
0728	1630	19	6	6.0	59	24	2/2.5	7.0	35	35
0728	1730	25	6	6.0	115	56	2/2.5	7.0	25	35
0728	1830	32	7	7.5	122	7	2/2.5	7.0	25	35
0728	1930	38	6	5.5	136	14	2/2.5	7.0	25	35
0728	2030	44	6	5.5	163	27	3/3.0	7.0	25	35
0728	2130	50	6	5.5	195	32	5/FULL	7.0	25	35
0728	2230	55	5	5.5	233	38	5/FULL	6.5	25	35
0728	2330	61	6	5.5	329	96	5/FULL	6.8	25	35
0729	0030	66	5	5.6	397	68	5/FULL	6.8	25	35
0729	0130	73	7	11.5	489	92	5/FULL	6.5	25	35
0729	0230	83	10	8.0	535	46	3/FULL	6.5	25	35
0729	0330	89	6	5.0	581	46	3/FULL	6.8	25	35
0729	0430	97	8	8.0	633	52	3/FULL	6.4	25	35
0729	0530	104	7	10.0	685	52	3/FULL	6.6	25	35
0729	0630	114	10	11.0	737	52	3/FULL	6.4	25	35
0729	0730	124	10	9.0	791	54	3/FULL	6.5	25	35
0729	0830	133	9	11.0	836	45	3/FULL	6.5	25	30
0729	0930	145	12	11.0	889	53	3/FULL	4.0	25	30
0729	1030	155	10	11.0	937	48	3/4.0	4.0	50	40
0729	1130	164	9	9.0	996	59	3/4.0	6.5	45	45
0729	1230	174	10	10.0	1060	64	3/4.0	6.5	45	45
0729	1330	182	8	10.0	1113	53	4/4.0	6.5	45	45
0729	1430	195	13	14.0	1200	87	4/4.0	6.5	45	45
0729	1530	211	16	15.0	1288	88	4/4.0	6.5	45	45
0729	1630	223	12	15.0	1367	89	4/4.0	6.5	45	45
0729	1730	236	13	12.5	1450	83	4/4.0	6.5	45	45
0729	1830	247	11	12.0	1530	80	4/4.0	6.5	45	45
0729	1930	260	13	12.0	1621	91	4/4.0	6.5	45	45
0729	2030	271	11	12.5	1697	76	4/4.0	6.5	45	45
0729	2130	284	13	12.5	1779	82	4/4.0	6.5	45	45
0729	2230	296	12	12.5	1870	91		4.0	45	45
0729	2330	312	16	12.5	1997	127	4/4.0	7.0	45	45
0730	0030	319	7	12.5	2094	97	4/4.0	6.8	45	45
0730	0130	330	11	12.5	2196	102	4/4.0	6.8	45	45
0730	0230	342	12	12.5	2235	39	4/4.0	6.8	45	45
0730	0330	354	12	12.5	2314	79	4/4.0	6.8	45	45
0730	0430	366	12	12.5	2382	68	2/4.0	6.8	45	45
0730	0530	377	11	10.0	2429	47	2/4.0	6.4	45	
0730	0630	387	10	11.5	2467	38	2/4.0	6.5	45	
0730	0730	397	10	10.0	2501	34	2/4.0	6.5	55	45

DATE	TIME	AGIT. COUNT	AGIT SWEEP PER HR	AGIT DRIVE SETNG	GRATE GEAR COUNTER READING	GRATE GEAR RHP	GRATE DRIVE SETNG	FLUE GAS SCRUBBER		
								PH	REAGENT PUMP SPEED	REAGENT PUMP STROKE
0730	0830	407	10	10.0	2542	41	2/4.0	6.5	55	45
0730	0930	416	9	10	2585	43	2/4.0	6.5	55	45
0730	1030	426	10	10.0	2624	39	3/4.0	6.5	55	45
0730	1130	437	11	11.0	2688	64	3/4.0	6.5	55	45
0730	1230	447	10	11.0	2746	58	3/3.5	6.5	55	45
0730	1330	458	11	11.0	2799	53	3/3.5	6.5	55	45
0730	1430	469	11	11.0	2854	55	3/3.5	6.5	55	45
0730	1530	479	10	11.0	2910	56	3/3.5	6.5	55	45
0730	1630	490	11	11.0	2967	57	3/3.5	6.5	55	45
0730	1730	500	10	10.5	3019	52	3/3.5	4.0	55	45
0730	1830	511	11	10.5	3075	56	3/3.9	6.2	55	45
0730	1930	521	10	10.5	3136	61	3/3.9	6.2	55	45
0730	2030	531	10	10.5	3195	59	3/3.65	6.2	55	45
0730	2130	542	11	10.5	3256	61	3/3.65	6.2	55	45
0730	2230	551	9	10.5	3307	51	3/3.3	6.2	55	45
0730	2330	564	13	10.5	3371	64	3/3.3	6.2	55	45
0731	0030	574	10	10.5	3421	50	3/3.3	5.8	35	40
0731	0130	584	10	10.5	3464	43	3/3.3	6.0	35	40
0731	0230	594	10	10.5	3526	62	3/3.3	6.0	35	40
0731	0330	603	9	10.5	3567	41	3/3.3	6.0	35	40
0731	0430	613	10	10.0	3626	59	3/3.3	6.0	40	45
0731	0530	623	10	10.0	2685	59	3/3.3	5.5	50	50
0731	0630	631	8	10.0	3713	28	3/3.3	6.0	50	45
0731	0730	642	11	10.0	3770	57	3/3.3	5.9	50	45
0731	0830	651	9	10.0	3820	50	3/3.3	6.5	50	45
0731	0930	659	8	7.5	3849	29	3/2.3	6.5	50	45
0731	1030	668	9	10.0	3887	38	3/2.3	7.0	40	40
0731	1130	678	10	11.0	3921	34	3/2.3	6.5	40	40
0731	1230	687	9	7.5	3958	37	3/2.3	6.5	40	40
0731	1330	694	7	6.5	3994	36	3/2.3	6.5	40	40
0731	1430	701	7	6.5	4033	39	3/2.4	6.5	40	40
0731	1530	707	6	6.5	4072	39	3/2.4	6.5	40	40
0731	1630	714	7	6.5	4109	37	3/2.4	6.5	40	40
0731	1730	720	6	6.5	4146	37	3/2.4	6.5	40	40
0731	1830	727	7	6.5	4183	37	3/2.4	6.5	40	40
0731	1930	733	6	6.5	4222	39	3/2.4	6.5	40	40
0731	2030	739	6	5.8	4249	27	3/2.2	6.5	40	40
0731	2130	745	6	5.8	4292	43	3/2.2	6.2	40	40
0731	2230	751	6	5.8	4328	36	3/2.5	6.2	40	40
0731	2330	756	5	5.8	4363	35	3/2.5	6.5	40	40
0801	0030	761	5	5.8	4400	37	3/2.5	6.5	40	40
0801	0130	768	7	5.8	4439	39	3/2.5	6.5	40	40
0801	0230	772	4	4.0	4471	32	3/2.3	6.5	40	40
0801	0330	777	5	6.0	4511	40	3/2.3	6.5	40	40
0801	0430	782	5	6.0	4541	30	2/3.0	6.5	40	40
0801	0530	788	6	6.0	4572	31	2/3.0	6.2	40	40
0801	0630	795	7	6.0	4607	35	2/3.0	6.2	40	40
0801	0730	801	6	6.0	4634	27	2/3.0	6.5	40	40
0801	0830	807	6	6.0	4660	26	1/3.0	6.5	40	40

DATE	TIME	AGIT. COUNT RDING	AGIT SWEEP PER HR	AGIT DRIVE SETNG	GRATE GEAR COUNTER READING	GRATE GEAR RPH	GRATE DRIVE SETNG	FLUE GAS SCRUBBER		
								PH	REAGENT PUMP SPEED	REAGENT PUMP STROKES
0801	0930	811	4	4.5	4676	16	1/3.0	6.5	40	40
0801	1030	815	4	4.5	4691	15	1/3.0	6.5	40	40
0801	1130	824	9	11.5	4715	24	2/4.0	6.2	40	40
0801	1230	833	9	14.5	4766	51	5/3.0	4.0	50	50
0801	1330	848	15	14.5	4855	89	6/3.0	5.9	50	50
0801	1430	863	15	18.0	4951	96	6/3.5	6.2	50	50
0801	1530	881	18	19.5	5061	110	6/3.5	6.5	50	50
0801	1630	900	19	18.3	5165	104	6/3.1	6.5	50	50
0801	1730	918	18	18.3	5254	89	6/3.1	6.5	50	50
0801	1830	937	19	18.5	5366	12	6/3.0	6.5	50	50
0801	1930	955	18	18.5	5456	90	6/3.0	6.5	50	50
0801	2030	972	17	18.5	5551	95	6/3.5	6.5	50	50
0801	2130	991	19	20.0	5660	109	6/3.5	4.0	50	50
0801	2230	1007	16	18.8	5769	109	6/4.8	4.0	70	70
0801	2330	1025	18	18.1	5927	158	6/4.8	6.0	70	70
0802	0030	1043	18	20.5	6032	105	9/4.5	6.0	70	70
0801	0130	1062	19	20.5	6270	238	9/4.5	6.2	70	70
0802	0230	1081	19	20.5	6508	238	9/5.27	6.4	70	70
0802	0330	1100	19	20.5	6765	257	9/5.27	6.2	70	70
0802	0430	1119	19	20.5	7005	240	9/5.27	6.2	70	70
0802	0530	1139	20	20.5	7251	246	9/5.27	6.2	70	70
0802	0630	1152	13	20.5	7385	134	9/2.7	6.0	70	70
0802	0730	1173	21	19.5	7527	142	7/2.7	5.9	90	50
0802	0830	1188	15	18.0	7646	119	9/2.7	5.7	90	50
0802	0930	1206	18	17.5	7774	128	9/2.7	6.2	90	50
0802	1030	1223	17	17.5	7881	107	7/3.0	6.5	90	50
0802	1130	1241	18	19.0	7989	108	7/3.0	6.5	90	50
0802	1230	1260	19	20.0	8099	110	7/3.0	6.5	90	90
0802	1330	1280	20	21.0	8204	105	8/3.0	6.5	90	50
0802	1430	1302	22	22.0	8315	111	8/3.0	6.5	90	50
0802	1530	1320	18	21.0	8426	111	10/3.0	6.2	90	50
0802	1630	1341	21	21.0	8576	150	10/2.9	6.2	90	50
0802	1730	1361	20	21.0	8723	147	10/2.9	5.9	90	50
0802	1830	1381	20	21.0	8863	140	10/3.2	5.9	90	50
0802	1930	1401	20	22.0	9024	161	10/3.2	5.9	90	50
0802	2030	1423	22	22.0	9136	112	10/2.65	5.9	90	50
0802	2130	1444	21	22.0	9220	84	8/FULL	5.7	90	50
0802	2230	1465	21	21.0	9360	140	10/FULL	6.2	90	50
0802	2330	1485	20	20.0	9537	177	FULL	6.2	90	50
0803	0030	1504	19	21.0	9720	183	FULL	6.2	90	50
0803	0130	1527	23	21.0	9888	168	FULL	6.2	90	50
0803	0230	1547	20	21.0	10061	173	FULL	6.2	90	50
0803	0330	1568	21	21.5	10231	170	FULL	6.2	90	50
0803	0430	1585	17	22.5	10391	160	FULL	6.2	90	50
0803	0530	1605	20	22.0	10540	149	FULL	6.2	90	50
0803	0630	1627	22	21.5	10728	188	FULL	6.2	90	50
0803	0730	1646	19	21.6	10875	147	FULL	6.5	90	50
0803	0830	1667	21	21.6	11040	165	FULL	6.5	60	50
0803	0930	1688	21	21.6	11179	139	7/3.5	6.5	60	80

DATE	TIME	AGIT. COUNT RDING	AGIT SWEEP PER HR	AGIT DRIVE SETNG	GRATE GEAR COUNTER READING	GRATE GEAR RPH	GRATE DRIVE SETNG	FLUE GAS SCRUBBER		
								pH	REAGENT PUMP SPEED	REAGENT PUMP STROKE
0803	1030	1710	22	23.5	11342	163	7/3.5	6.5	60	60
0803	1130	1732	22	22.0	11506	164	7/3.5	6.5	60	60
0803	1230	1754	22	22.0	11658	152	7/2.7	6.5	60	60
0803	1330	1775	21	22.0	11785	127	7/2.7	6.2	60	60
0803	1430	1794	19	22.0	11895	110	8/2.5	6.5	60	60
0803	1530	1818	24	22.0	12017	122	8/2.5	4.0	60	60
0803	1630	1840	22	22.0	12125	108	8/3.6	4.7	60	60
0803	1730	1858	18	19.0	12274	149	8/3.6	5.5	60	60
0803	1830	1871	13	9.0	12357	83	5/2.5	5.5	60	60
0803	1930	1879	8	8.0	12427	70	5/2.5	6.5	60	60
0803	2030	1887	8	8.0	12474	47	2/2.8	7.0	60	60
0803	2130	1893	6	8.0	12497	23	2/2.8	7.0	60	60
0803	2230	1904	11	10.0	12530	33	2/2.9	7.0	25	35
0803	2330	1914	10	10.0	12564	34	2/3.0	6.2	25	35
0804	0030	1925	11	10.0	12597	33	2/3.0	6.2	25	35
0804	0130	1932	7	8.5	12621	24	2/3.0	6.2	25	35
0804	0230	1940	8	8.5	12645	24	4/3.0	6.2	25	25
0804	0330	1948	8	9.0	12711	66	4/3.0	6.2	35	40
0804	0430	1959	11	12.0	12753	42	2/3.0	6.4	35	40
0804	0530	1971	12	12.5	12796	43	2/3.0	6.5	35	40
0804	0630	1983	12	12.5	12831	35	2/3.0	6.5	40	45
0804	0730	1995	12	13.4	12857	26	2/3.0	6.5	40	45
0804	0830	2007	12	13.0	12889	32	3/3.0	6.5	40	45
0804	0930	2020	13	13.0	12961	72	3/3.0	5.9	40	45
0804	1030	2032	12	13.0	13023	62	4/3.0	5.9	40	45
0804	1130	2045	13	13.5	13085	62	4/3.0	5.9	40	45
0804	1230	2058	13	14.0	13149	64	5/3.0	5.7	40	45
0804	1330	2073	15	14.0	13230	81	5/3.0	5.7	40	45
0804	1430	2086	13	14.0	13309	79	5/3.0	5.9	40	45
0804	1530	2099	13	12.0	13390	81	3/3.2	5.9	40	45
0804	1630	2111	12	12.0	13436	46	3/3.0	5.3	50	50
0804	1730	2121	10	10.0	13483	47	3/3.0	5.3	50	50
0804	1830	2133	12	17.0	13532	49	3/3.8	5.3	50	50
0804	1930	2146	13	13.0	13592	60	3/3.8	4.0	50	50
0804	2030	2158	12	14.0	13652	60	5/2.95	5.9	50	50
0804	2130	2172	14	13.5	13729	77	5/2.95	6.2	50	50
0804	2230	2183	11	9.5	13801	72	5/2.4	6.2	50	50
0804	2330	2191	8	8.2	13857	56	5/2.4	6.2	50	50
0805	0030	2200	9	8.0	13907	50	2/2.3	7.0	50	50
0805	0130	2209	9	7.0	13916	9		7.0	40	40
0805	0230	2215	6	8.0	13916	0		6.5	40	40
0805	0330	2224	8	8.0	13916	0		6.2	40	40
0805	0430	2230	6	8.0	13929	13	2/2.3	6.2	40	40
0805	0530	2238	8	8.0	13953	24	2/2.3	6.4	40	40
0805	0630	2247	9	10.0	13977	24	2/3.5	6.2	40	40
0805	0730	2256	9	10.0	14012	35	2/3.5	6.5	40	40
0805	0830	2266	10	10.0	14049	37	2/3.5	6.5	40	40
0805	0930	2275	9	10.0	14085	36	2/3.5	6.5	40	40
0805	1030	2285	10	9.0	14121	36	2/3.75	6.5	40	40

DATE	TIME	AGIT. COUNT	AGIT SWEEP RDING	AGIT DRIVE SETNG	GRATE GEAR COUNTER READING	GRATE GEAR RPH	GRATE DRIVE SETNG	FLUE	GAS	SCRUBBER
								pH	REAGENT PUMP SPEED	REAGENT PUMP STROKE
0805	1130	2293	8	9.0	14159	38	2/3.75	6.0	40	40
0805	1230	2302	9	9.0	14193	34	2/2.5	4.0	40	40
0805	1330	2311	9	9.0	14219	26	2/2.5	6.5	40	40
0805	1430	2320	9	9.0	14247	28	2/3.0	6.2	40	40
0805	1530	2329	9	9.0	14278	31	2/3.0	6.2	40	40
0805	1630	2338	9	8.8	14310	32	2/3.15	6.2	40	40
0805	1730	2347	9	8.5	14343	33	2/3.15	6.2	40	40
0805	1830	2355	8	8.5	14376	33	2/3.6	6.2	40	40
0805	1930	2363	8	8.5	14412	36	2/3.6	5.7	45	45
0805	2030	2371	8	8.2	14451	39	3/3.65	6.5	45	45
0805	2130	2380	9	8.5	14511	60	3/3.65	6.5	40	40
0805	2230	2389	9	9.0	14563	52	3/2.5	6.5	40	40
0805	2330	2398	9	9.0	14605	42	3/2.56	5.9	40	40
0806	0030	2405	7	7.5	14639	34	3/2.52	6.0	40	40
0806	0130	2412	7	8.5	14678	39	3/2.52	5.9	40	40
0806	0230	2420	8	8.5	14719	41	3/2.52	6.0	40	40
0806	0330	2429	9	8.4	14757	38	3/2.52	6.0	40	40
0806	0430	2438	9	8.4	14798	41	3/2.52	6.0	40	40
0806	0530	2446	8	8.5	14839	41	3/2.52	6.0	40	40
0806	0630	2454	8	8.3	14879	40	3/2.52	4.6	40	40
0806	0730	2461	7	8.0	14913	34	3/2.5	4.0	50	50
0806	0830	2469	8	8.0	14951	38	3/2.5	6.2	40	40
0806	0930	2477	8	9.0	14989	38	3/2.5	5.9	40	40
0806	1030	2486	9	9.0	15028	39	3/2.5	5.9	40	40
0806	1130	2495	9	9.0	15067	39	3/2.5	5.9	40	40
0806	1230	2503	8	9.0	15111	44	3/3.25	6.2	40	40
0806	1330	2513	10	10.0	15161	50	3/3.25	6.5	40	40
0806	1430	2523	10	10.0	15212	51	3/3.25	6.5	40	40
0806	1530	2533	10	10.0	15264	52	3/3.25	6.5	40	40
0806	1630	2542	9	9.5	15314	50	3/3.25	6.5	40	40
0806	1730	2551	9	9.5	15366	52	3/3.25	6.5	40	40
0806	1830	2560	9	9.0	15415	49	3/3.25	6.2	40	40
0806	1930	2569	9	9.3	15464	49	3/3.25	6.2	40	40
0806	2030	2579	10	10.0	15519	55	3/3.75	6.2	40	40
0806	2130	2588	9	10.0	15576	57	3/3.75		40	40
0806	2230	2598	10	10.0	15635	59	3/3.25		40	40
0806	2330	2608	10	10.5	15702	67	4/3.26	6.2	40	40
0807	0030	2618	10	11.4	15767	65	4/3.26	6.2	40	40
0807	0130	2631	13	12.5	15840	73	4/3.35	5.9	40	40
0807	0230	2644	13	14.8	15911	71	4/3.26	5.9	40	40
0807	0330	2656	12	14.8	15979	68	4/3.26	5.9	40	40
0807	0430	2669	13	14.8	16040	61	4/3.26	5.9	40	40
0807	0530	2683	14	14.8	16110	70	4/3.26	5.9	40	40
0807	0630	2697	14	10.0	16180	70	4/3.26	5.9	40	40
0807	0730	2705	8	10.0	16242	62	4/3.26	6.2	40	40
0807	0830	2714	9	9.0	16304	62	4/2.5	6.2	40	40
0807	0930	2722	8	8.0	16356	52	4/2.5	5.9	40	40
0807	1030	2731	9	10.0	16411	55	4/3.25	5.9	40	40
0807	1130	2743	12	12.0	16476	65	4/3.25	5.3	40	40

DATE	TIME	AGIT. COUNT RDING	AGIT SWEEP PER HR	AGIT DRIVE SETNG	GRATE GEAR COUNTER READING	GRATE GEAR RPH	GRATE DRIVE SETNG	FLUE GAS SCRUBBER		
								pH	REAGENT PUMP SPEED	REAGENT PUMP STROKE
0807	1230	2754	11	11.0	16541	65	4/3.25	6.5	40	40
0807	1330	2764	10	11.0	16606	65	4/3.25	6.5	40	40
0807	1430	2776	12	11.0	16658	52	3/2.5	6.5	40	40
0807	1530	2784	8	8.4	16697	39	3/2.37	6.5	40	40
0807	1630	2792	8	7.9	16731	34	2/2.25	6.5	40	40
0807	1730	2800	8	7.9	16753	22	2/2.25	6.5	40	40
0807	1830	2808	8	8.4	16781	28	3/2.9	6.5	40	40
0807	1930	2816	8	8.4	16826	45	3/2.4	6.5	40	40
0807	2030	2824	8	8.4	16862	36	3/2.1	6.5	40	40
0807	2130	2832	8	8.4	16895	33	3/2.5		40	40
0807	2230	2840	8	8.4	16933	38	3/2.4		40	40
0807	2330	2849	9	8.4	16972	39	3/2.39	6.5	40	40
0808	0030	2858	9	9.5	17010	38	3/2.39	6.5	40	40
0807	0130	2866	8	10.0	17043	33	3/2.39	6.5	40	40
0808	0230	2876	10	10.0	17082	39	3/2.39	6.5	40	40
0808	0330	2886	10	10.0	17118	36	3/2.39	6.5	40	40
0808	0430	2896	10	10.8	17156	38	3/2.39	5.9	40	40
0808	0530	2905	9	9.5	17193	37	3/2.4	5.9	40	40
0808	0630	2915	10	9.5	17231	38	3/2.4	6.0	40	40
0808	0730	2924	9	10.0	17267	36	3/2.4	7.0	35	35
0808	0830						2/3.0			
0808	0930	2937	13	9.0	17310	43	2/3.0	6.5	35	35
0808	1030	2947	10	10.0	17353	43	3/3.0	6.5	40	40
0808	1130	2957	10	11.0	17410	57	3/3.0	5.9	40	40
0808	1230	2968	11	11.0	17479	69	3/2.5	6.5	40	40
0808	1330	2980	12	12.0	17522	43	3/2.5	6.5	40	40
0808	1430	2991	11	12.0	17574	52	3/2.5	6.5	40	40
0808	1530	3003	12	12.0	17627	53	3/2.5	6.5	40	40
0808	1630	3015	12	12.0	17678	51	4/2.6	6.5	40	40
0808	1730	3026	11	11.6	17732	54	4/2.3	6.5	40	40
0808	1830	3038	12	11.8	17783	51	4/2.3	6.5	40	40
0808	1930	3050	12	11.8	17829	46	4/2.6	5.9	40	40
0808	2030	3062	12	11.8	17881	52	4/2.12	5.9	40	40
0808	2130	3073	11	12.0	17921	40	4/2.12	5.7	40	40
0808	2230	3085	12	12.0	17972	51	4/3.0	5.7	40	40
0808	2330	3096	11	12.5	18031	59	4/3.0	5.7	35	35
0809	0030	3110	14	14.0	18095	64	4/3.0	5.0	40	40
0809	0130	3124	14	14.5	18156	61	4/3.0	4.7	40	40
0809	0230	3139	15	15.0	18225	69	4/3.0	6.2	40	40
0809	0330	3154	15	15.0	18296	71	4/3.0	5.9	40	40
0809	0430	3169	15	16.5	18367	71	6/3.0	5.9	40	40
0809	0530	3185	16	16.0	18467	100	6/3.0	6.2	40	40
0809	0630	3200	15	16.4	18556	89	6/3.0	5.9	40	40
0809	0730	3215	15	16.4	18643	87	6/3.0	6.5	40	40
0809	0830	3232	17	16.4	18743	100	6/3.35	6.5	40	40
0809	0930	3246	14	14.5	18843	100	6/3.35	5.9	40	40
0809	1030	3255	9	8.0	18943	100	6/3.25	6.5	40	40
0809	1130	3265	10	10.0	19046	103	6/3.25	6.5	40	40
0809	1230	3279	14	16.0	19137	91	6/2.75	6.2	40	40

DATE	TIME	AGIT. COUNT	AGIT SWEEP PER HR	AGIT DRIVE SETNG	GRATE GEAR COUNTER READING	GRATE GEAR RPH	GRATE DRIVE SETNG	FLUE GAS SCRUBBER		
								PH	REAGENT PUMP SPEED	REAGENT PUMP STROKE
0809	1330	3295	16	18.0	19220	83	6/2.75	6.5	40	40
0809	1430	3310	15	16.0	19305	85	6/2.75	6.5	40	40
0809	1530	3325	15	12.5	19393	88	6/2.75	5.7	40	40
0809	1630	3337	12	9.5	19469	78	4/2.70	5.7	40	40
0809	1730	3345	8	10.0	19516	47	4/2.70	5.7	40	40
0809	1830	3354	9	8.8	19573	57	4/2.4	6.2	40	40
0809	1930	3363	9	8.8	19623	50	4/2.4	6.2	40	40
0809	2030	3372	9	9.2	19662	39	2/2.4	6.2	40	40
0809	2130	3381	9	10.0	19685	23	2/2.2	5.7	40	40
0809	2230	3391	10	10.0	19698	13	2/0	5.7	40	40
0809	2330	3400	9	13.1	19710	12	2/2.2	5.7	40	40
0810	0030	3414	14	15.0	19735	25	2/2.2	5.7	40	40
0810	0130	3426	12	13.9	19755	20	2/2.2	6.0	40	40
0810	0230	3441	15	15.0	19789	34	2/3.0	6.0	40	40
0810	0330	3455	14	15.0	19813	24	2/3.0	5.7	40	40
0810	0430	3470	15	16.0	19857	44	4/3.0	5.7	40	40
0810	0530	3488	16	16.0	19911	54	4/3.0	6.0	40	40
0810	0630	3499	13	16.1	19974	63	4/3.0	5.7	40	40
0810	0730	3514	15	13.0	20042	68	4/3.8		60	55
0810	0830	3528	14	13.5	20114	72	4/3.8	6.5	50	50
0810	0930	3540	12	12.0	20182	68	4/3.8	6.5	50	50
0810	1030	3553	13	12.0	20265	81	7/2.5	6.5	50	50
0810	1130	3563	10	12.0	20346	81	7/3.0	6.5	50	50
0810		SHUT DOWN TO ALLOW CLEANOUT OF PLUGGED LINES								
0815	1230	0000	0	2.0	00000		3/3.6			
0815	1330	0002	2	2.0	0052	52	3/3.2			
0815	1430	0009	7	18.0	0088	36	3/2.0	4.0	40	40
0815	1530	0021	12	10.0	0129	41	3/2.70	4.0	40	40
0815	1630		POWER OUTAGE				3/2.7	7.0	40	40
0815	1730		POWER OUTAGE				3/2.7	7.0	40	40
0815	1830	0038	17	10.0	0206	77	3/2.7	7.0	40	40
0815	1930	0047	9	10.0	0249	43	3/2.7	7.0	40	40
0815	2030	0058	11	10.0	0293	44	3/2.35	7.0	40	40
0815	2130	0067	9	10.0	0325	32	3/2.35	7.0	40	40
0815	2230	0076	9	10.0	0361	36	3/2.35	4.0	40	40
0815	2330	0085	9	9.5	0397	36	3/2.35	7.0	40	40
0816	0030	0097	12	11.5	0435	38	3/2.35	7.0	40	40
0816	0130	0107	10	10.5	0470	35	3/2.35	7.0	40	40
0816	0230	0115	8	9.4	0505	35	3/2.35	7.0	40	40
0816	0330	0127	17	9.4	0548	43	3/2.35	6.8	40	40
0816	0430	0136	9	10.0	0580	32	3/2.35	6.8	40	40
0816	0530	0145	9	10.0	0617	37	3/2.47	6.8	40	40
0816	0630	0156	11	11.5	0663	46	3/3.0	6.4	40	40
0816	0730	0167	11	11.4	0708	45	3/3.0	6.5	40	40
0816	0830	0178	11	11.4	0759	51	3/3.0	6.5	40	40
0816	0930	0191	13	12.0	0814	55	3/3.0	6.5	40	40
0816	1030	0205	14	15.0	0870	56	5/3.0	4.0	50	50
0816	1130	0220	15	16.0	0946	76	5/3.0	4.5	50	50
0816	1230	0238	18	16.0	1023	77	5/3.0	6.5	50	50

DATE	TIME	AGIT.	AGIT	AGIT	GRATE	GRATE	GRATE	FLUE GAS SCRUBBER		
		COUNT	SWEEP	DRIVE	GEAR	GEAR	GEAR	pH	REAGENT	REAGENT
		RDING	PER HR	SETNG	COUNTER	RPH	SETNG		PUMP	PUMP
					READING				SPEED	STROKE
0816	1330	0251	13	16.0	1199	76	5/3.5	6.5	50	60
0816	1430	0268	17	17.5	1266	67	3/2.75	6.5	50	60
0816	1530	0285	17	18.0	1317	51	7/2.85	6.5	50	60
0816	1630	0306	21	19.5	1423	106	7/3.0	6.5	50	60
0816	1730	0323	17	19.0	1518	95	7/3.0	6.5	50	60
0816	1830	0341	18	19.0	1609	91	5/2.75	6.5	50	60
0816	1930	0361	20	19.5	1683	74	5/2.75	6.5	50	60
0816	2030	0379	18	19.4	1752	69	6/2.85	6.0	50	60
0816	2130	0399	20	19.4	1845	93	6/2.85	6.0	50	60
0816	2230	0416	17	18.6	1924	79	7/2.9	6.0	50	60
0816	2330	0435	19	19.3	2032	108	7/3.0	6.0	50	60
0817	0030	0453	18	19.4	2130	98	7/3.0	6.0	45	55
0817	0130	0472	19	19.4	2224	94	7/3.0	6.0	45	55
0817	0230	0495	23	23.3	2325	101	7/3.0	5.0	45	55
0817	0330	0517	22	22.5	2435	110	7/3.0	5.0	55	60
0817	0430	0536	19	19.5	2531	96	7/3.0	6.2	55	60
0817	0530	0557	21	19.5	2634	103	7/3.0	6.2	55	60
0817	0630	0575	18	22.2	2725	91	7/3.3	6.2	55	60
0817	0730	0596	21	22.2	2832	107	7/3.3	6.5	55	60
0817	0830	0618	22	23.0	2950	118	7/3.75	6.5	55	60
0817	0930	0641	23	23.0	3085	135	3/3.75	6.2	55	60
0817	1030	0663	22	23.0	3215	130	7/3.5	6.2	55	60
0817	1130	0685	22	23.0	3342	127	7/3.5	5.2	55	60
0817	1230	0706	21	22.0	3463	121	7/3.2	5.9	55	60
0817	1330	0727	21	22.0	3579	116	7/3.25	7.0	55	60
0817	1430	0749	22	23.0	3695	116	7/3.25	6.7	55	60
0817	1530	0772	23	23.0	3812	117	7/3.25	6.5	55	60
0817	1630	0794	22	23.0	3923	111	7/2.75	6.5	55	60
0817	1730	0817	23	22.7	4026	103	7/2.75	6.5	55	60
0817	1830	0839	22	22.0	4117	91	6/2.5	6.2	55	60
0817	1930	0859	20	21.0	4194	77	6/2.5	6.2	55	60
0817	2030	0879	20	21.0	4271	77	6/2.5	6.5	55	60
0817	2130	0901	22	21.0	4353	82	6/2.5	6.5	55	60
0817	2230	0920	19	20.0	4440	87	6/3.25	6.5	55	60
0817	2330	0941	21	22.0	4537	97	6/3.25	6.2	55	60
0818	0030	0962	21	22.0	4634	97	6/3.25	6.2	55	60
0818	0130	0983	21	21.9	4735	101	6/3.25	6.0	55	60
0818	0230	1005	22	21.9	4838	103	6/3.25	6.2	55	60
0818	0330	1025	20	22.0	4935	97	6/3.25	6.2	55	60
0818	0430	1048	23	22.0	5042	107	6/3.25	6.2	55	60
0818	0530	1069	21	21.0	5141	99	6/3.25	6.0	55	60
0818	0630	1092	23	22.5	5250	109	6/3.75	6.0	55	60
0818	0730	1111	19	22.5	5364	114	10/2.75	6.5	55	60
0818	0830	1134	23	22.5	5491	127	10/2.5	6.5	55	60
0818	0930	1156	22	22.5	5618	127	10/2.5	6.5	55	60
0818	1030	1177	21	22.5	5741	123	10/2.5	6.2	55	60
0818	1130	1199	22	22.5	5868	127	10/2.5	6.2	55	60
0818	1230	1222	23	23.5	6002	134	10/2.75	6.2	55	60
0818	1330	1244	22	23.5	6140	138	10/2.75	6.5	60	60

DATE	TIME	AGIT. COUNT	AGIT SWEEP PER HR	AGIT DRIVE SETNG	GRATE GEAR COUNTER READING	GRATE GEAR RPH	GRATE DRIVE SETNG	FLUE GAS SCRUBBER		
								pH	REAGENT PUMP SPEED	REAGENT PUMP STROKE
0818	1430	1268	24	24.0	6280	140	10/2.75	6.5	60	60
0818	1530	1290	22	24.0	6421	141	10/2.75	6.5	60	60
0818	1630	1315	25	24.0	6549	128	10/2.25	6.5	60	60
0818	1730	1337	22	22.4	6657	108	10/2.25	6.2	60	60
0818	1830	1356	19	21.4	6761	104	10/2.6	6.2	60	60
0818	1930	1378	22	22.4	6960	199	10/2.6	5.9	60	60
0818	2030	1400	22	22.5	7011	51	10/2.2	5.9	60	60
0818	2130	1422	22	22.4	7125	114	10/2.2	5.9	60	60
0818	2230	1440	18	22.4	7234	109	10/2.45	4.0	60	60
0818	2330	1461	21	23.0	7361	127	10/2.45	4.0	60	60
0819	0030	1483	22	23.0	7481	120	10/2.45	5.9	60	60
0819	0130	1504	21	23.0	7606	125	10/2.45	6.0	60	60
0819	0230	1528	24	23.0	7731	125	10/2.45	6.0	60	60
0819	0330	1554	26	25.0	7851	120	10/2.55	6.0	60	60
0819	0430	1583	29	27.7	8002	151	10/2.51	5.7	60	60
0819	0530	1609	26	27.7	8127	125	10/2.5	5.7	60	60
0819	0630	1636	27	26.9	8265	138	10/2.7	5.7	60	60
0819	0730	1662	26	27.0	8389	124	10/2.5	6.0	60	60
0819	0830	1688	26	27.0	8524	135				

END OF BOM/FGT 007 ILLINOIS #6

APPENDIX H
Gas Chromatograph Data

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/28/1983															
13:32	14.526	8.440	0.001	0.001	0.000	49.55	0.073	23.84	0.000	0.000	124.4	117.0	96.43	24.58	0.848
13:50	14.179	8.297	0.001	0.000	0.000	49.96	0.070	23.98	0.000	0.000	123.6	116.5	96.48	24.66	0.851
14: 8	14.163	8.424	0.001	0.000	0.000	50.12	0.065	23.75	0.000	0.000	122.8	115.7	96.52	24.70	0.853
14:25	12.833	7.374	0.032	0.120	0.000	50.01	0.773	24.59	0.024	0.036	132.4	124.9	95.79	24.60	0.849
14:43	15.650	8.296	0.035	0.101	0.000	50.98	0.872	21.76	0.023	0.028	132.9	124.0	97.74	24.55	0.847
15: 1	15.811	8.219	0.039	0.092	0.000	50.24	0.864	23.31	0.023	0.024	138.1	129.1	98.62	24.74	0.854
15:18	15.722	8.085	0.032	0.095	0.000	49.79	0.457	23.42	0.023	0.025	134.1	125.5	97.65	24.52	0.846
15:36	15.843	8.168	0.034	0.090	0.000	50.11	0.841	23.42	0.021	0.024	138.2	129.2	98.56	24.71	0.853
15:54	15.362	8.118	0.036	0.087	0.000	50.37	0.802	23.38	0.021	0.023	136.1	127.4	98.20	24.73	0.854
16:11	14.696	7.957	0.029	0.070	0.000	51.75	0.659	22.86	0.017	0.018	130.2	122.0	98.06	24.85	0.858
16:29	15.341	8.338	0.031	0.079	0.000	50.73	0.743	23.07	0.018	0.021	134.1	125.5	98.37	24.82	0.857
16:47	15.248	8.197	0.034	0.077	0.000	50.72	0.772	23.18	0.019	0.020	134.5	125.9	98.27	24.79	0.856
17: 5	15.227	8.256	0.035	0.079	0.000	50.94	0.759	22.92	0.020	0.021	133.5	124.9	98.26	24.81	0.856
17:22	15.245	8.318	0.034	0.080	0.000	51.12	0.762	22.98	0.019	0.021	133.8	125.2	98.57	24.90	0.859
17:40	15.157	8.226	0.035	0.084	0.000	50.95	0.775	23.12	0.020	0.022	134.2	125.6	98.38	24.85	0.858
17:58	15.177	8.196	0.038	0.084	0.000	51.43	0.836	22.33	0.021	0.022	132.4	123.8	98.13	24.76	0.855
18:16	15.321	8.650	0.044	0.087	0.000	51.20	0.848	22.23	0.026	0.021	132.9	124.2	98.42	24.88	0.859
18:33	15.284	8.957	0.054	0.116	0.000	51.26	1.030	21.57	0.030	0.031	133.6	124.6	98.33	24.89	0.859
18:51	15.356	9.259	0.071	0.115	0.000	51.69	1.113	20.70	0.035	0.029	132.2	123.0	98.37	24.93	0.860
19: 9	14.952	9.886	0.089	0.133	0.000	52.41	1.281	19.22	0.042	0.034	128.7	119.5	98.05	25.02	0.864
19:26	15.474	9.376	0.065	0.128	0.000	51.72	0.596	19.77	0.036	0.033	124.6	115.9	97.20	24.65	0.851
19:44	15.113	10.950	0.108	0.123	0.000	53.11	1.186	16.96	0.042	0.030	121.0	111.8	97.62	25.04	0.864
20: 2	14.063	9.974	0.159	0.147	0.000	53.65	0.851	17.71	0.061	0.035	118.4	110.0	96.65	24.93	0.861
20:20	13.698	11.200	0.170	0.148	0.000	55.17	0.925	14.70	0.058	0.035	108.5	100.2	96.10	25.06	0.865
20:38	14.068	10.844	0.157	0.140	0.000	54.46	1.461	16.26	0.052	0.033	119.5	110.6	97.47	25.22	0.871
20:55	14.430	10.853	0.151	0.185	0.000	54.24	1.009	15.54	0.061	0.047	115.1	106.3	96.52	24.92	0.860
21:14	15.178	10.667	0.170	0.173	0.000	53.03	1.712	16.28	0.066	0.040	127.1	117.2	97.32	24.84	0.857
21:32	15.475	9.569	0.141	0.169	0.000	52.35	1.571	18.01	0.053	0.043	131.4	121.5	97.38	24.62	0.850
21:50	15.391	9.862	0.144	0.141	0.000	52.12	1.429	17.77	0.053	0.034	128.2	118.6	96.94	24.58	0.848
22: 8	15.264	8.867	0.174	0.184	0.000	51.95	1.929	18.80	0.065	0.045	138.0	127.8	97.28	24.49	0.845
22:26	16.094	9.861	0.125	0.127	0.000	50.80	1.427	18.50	0.044	0.031	132.0	122.1	97.01	24.41	0.843
22:43	16.322	8.348	0.150	0.142	0.000	49.74	1.585	20.89	0.052	0.034	142.9	132.7	97.26	24.16	0.834
23: 1	16.472	8.756	0.156	0.166	0.000	49.41	1.702	20.19	0.062	0.041	143.3	132.8	96.96	24.10	0.832
23:19	16.188	9.440	0.170	0.152	0.000	50.43	1.694	18.90	0.057	0.037	137.9	127.5	97.06	24.31	0.839
23:37	15.684	9.558	0.194	0.150	0.000	51.20	1.747	18.32	0.059	0.035	135.3	125.1	96.94	24.42	0.843
23:55	16.163	9.112	0.209	0.193	0.000	50.50	2.076	18.73	0.072	0.047	143.1	132.2	97.10	24.23	0.836
7/29/1983															
0:13	15.694	10.233	0.181	0.153	0.000	51.42	1.839	17.33	0.057	0.037	132.9	122.6	96.94	24.51	0.846
0:30	15.303	9.441	0.172	0.147	0.000	52.23	1.576	17.46	0.053	0.035	129.0	119.2	96.41	24.37	0.841
0:48	16.139	9.659	0.205	0.166	0.000	51.12	1.733	17.79	0.062	0.039	135.6	125.2	96.92	24.31	0.839
1: 6	15.998	10.465	0.201	0.158	0.000	51.54	1.730	16.83	0.059	0.038	131.7	121.4	97.02	24.51	0.846
1:24	15.997	10.147	0.151	0.159	0.000	51.50	1.792	17.50	0.052	0.039	133.5	123.2	97.33	24.53	0.847
1:42	16.143	9.291	0.185	0.183	0.000	51.10	1.776	18.86	0.065	0.042	139.5	129.1	97.65	24.45	0.844
1:60	16.359	9.726	0.172	0.184	0.000	50.85	1.853	18.31	0.061	0.046	139.1	128.4	97.57	24.45	0.843

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/29/1983															
2:18	16.624	9.993	0.139	0.179	0.000	51.27	1.868	17.60	0.057	0.044	137.0	126.3	97.78	24.46	0.844
2:36	15.829	10.373	0.145	0.158	0.000	52.03	1.628	17.24	0.055	0.036	130.4	120.3	97.49	24.68	0.852
2:53	15.684	10.613	0.115	0.150	0.000	52.24	1.361	17.21	0.048	0.035	126.3	116.6	97.45	24.77	0.855
3:59	16.239	9.185	0.141	0.124	0.000	50.50	1.057	20.44	0.047	0.029	135.2	125.6	97.76	24.52	0.846
4:17	15.762	8.839	0.131	0.116	0.000	51.28	1.116	19.67	0.043	0.027	131.3	121.9	96.99	24.37	0.841
4:35	16.379	8.977	0.158	0.154	0.000	50.06	1.380	20.12	0.053	0.036	139.0	128.9	97.32	24.29	0.839
4:53	15.642	9.892	0.150	0.123	0.000	51.38	1.189	19.06	0.049	0.028	130.3	120.8	97.52	24.71	0.853
5:11	15.910	8.792	0.157	0.159	0.000	50.75	1.427	20.15	0.053	0.039	138.2	128.3	97.44	24.41	0.843
5:29	15.742	9.462	0.164	0.143	0.000	51.50	1.353	18.98	0.055	0.037	132.9	123.2	97.43	24.57	0.848
5:48	16.918	9.015	0.141	0.167	0.000	49.50	1.441	20.16	0.054	0.040	141.6	131.1	97.44	24.19	0.835
6: 6	16.890	8.375	0.137	0.167	0.000	49.05	1.374	21.06	0.054	0.040	143.6	133.3	97.15	24.02	0.829
6:24	17.358	8.477	0.132	0.163	0.000	48.13	1.355	21.46	0.054	0.040	146.1	135.5	97.17	23.92	0.826
6:42	15.714	7.766	0.129	0.168	0.000	49.57	1.306	22.33	0.055	0.041	143.1	133.4	97.08	24.21	0.836
6:59	16.978	8.763	0.130	0.167	0.000	48.65	1.345	20.71	0.055	0.041	142.4	132.0	96.83	23.97	0.827
7:17	16.998	8.531	0.132	0.192	0.000	48.28	1.455	21.00	0.060	0.047	145.3	134.7	96.69	23.88	0.824
7:35	17.138	9.330	0.120	0.171	0.000	48.62	1.382	19.72	0.056	0.043	140.1	129.6	96.58	23.95	0.827
7:53	17.281	8.963	0.123	0.171	0.000	48.45	1.371	20.49	0.057	0.041	143.0	132.5	96.95	23.96	0.827
8:11	16.684	8.197	0.129	0.184	0.000	48.70	1.424	20.60	0.058	0.046	142.4	132.1	96.02	23.72	0.819
8:29	17.003	8.234	0.143	0.200	0.000	48.05	1.556	21.39	0.064	0.051	148.1	137.4	96.69	23.82	0.822
8:47	17.131	7.753	0.162	0.213	0.000	47.50	1.658	21.88	0.068	0.054	151.8	140.9	96.42	23.62	0.815
9: 5	17.684	7.907	0.164	0.208	0.000	47.41	1.703	21.45	0.070	0.053	152.6	141.4	96.65	23.56	0.813
9:23	17.165	8.335	0.153	0.191	0.000	47.98	1.617	20.89	0.070	0.048	147.7	136.8	96.45	23.72	0.819
9:41	17.068	8.289	0.138	0.167	0.000	48.15	1.431	21.21	0.062	0.041	145.5	135.0	96.55	23.79	0.821
9:59	17.233	7.887	0.118	0.163	0.000	47.59	1.384	22.12	0.056	0.041	147.9	137.4	96.59	23.69	0.818
10:17	17.039	7.535	0.117	0.163	0.000	47.54	1.348	22.98	0.055	0.041	149.7	139.3	96.82	23.76	0.820
10:35	17.321	7.304	0.115	0.174	0.000	46.62	1.416	23.33	0.056	0.045	152.7	142.0	96.38	23.51	0.812
10:53	17.425	7.364	0.127	0.182	0.000	46.62	1.470	23.05	0.057	0.046	153.0	142.3	96.34	23.48	0.811
11:11	17.331	7.552	0.145	0.185	0.000	46.81	1.583	22.40	0.058	0.046	152.1	141.3	96.11	23.46	0.810
11:29	17.166	7.993	0.150	0.185	0.000	47.38	1.569	21.76	0.061	0.045	149.5	138.8	96.32	23.63	0.816
11:47	17.119	8.505	0.131	0.169	0.000	47.91	1.493	20.71	0.054	0.042	144.4	133.9	96.14	23.68	0.817
12: 5	16.525	7.870	0.126	0.178	0.000	48.76	1.512	20.84	0.053	0.043	143.2	132.9	95.91	23.67	0.817
12:23	17.336	7.557	0.117	0.176	0.000	46.91	1.482	22.52	0.053	0.044	150.7	140.0	96.19	23.49	0.811
12:41	17.195	7.373	0.112	0.173	0.000	46.71	1.444	23.01	0.053	0.043	151.3	140.8	96.12	23.48	0.811
12:59	17.168	7.023	0.100	0.158	0.000	46.38	1.361	23.80	0.048	0.039	152.2	141.8	96.08	23.43	0.809
13:17	17.299	7.032	0.104	0.156	0.000	46.52	1.339	23.75	0.049	0.038	152.3	141.9	96.29	23.46	0.810
13:50	16.930	7.281	0.102	0.173	0.000	47.16	1.312	23.80	0.049	0.045	151.5	141.2	96.85	23.76	0.820
14: 8	16.031	7.013	0.104	0.180	0.000	48.73	1.407	22.49	0.051	0.047	145.5	135.6	96.04	23.71	0.818
14:26	16.264	7.625	0.103	0.200	0.000	48.04	0.712	22.19	0.056	0.051	138.9	129.5	95.24	23.61	0.815
14:44	16.435	7.562	0.105	0.211	0.000	47.67	0.721	22.51	0.060	0.054	140.9	131.4	95.32	23.58	0.814
15: 1	16.347	7.520	0.133	0.197	0.000	47.96	1.615	22.41	0.059	0.049	149.4	139.1	96.29	23.76	0.820
15:19	16.564	7.381	0.122	0.221	0.000	46.87	0.693	22.84	0.065	0.056	142.8	133.2	94.82	23.38	0.807
15:37	16.445	7.471	0.129	0.235	0.000	47.28	1.860	22.47	0.067	0.063	153.6	142.8	96.02	23.62	0.815
17:32	16.512	7.597	0.126	0.160	0.000	48.87	1.619	22.18	0.051	0.040	148.1	137.7	97.16	23.96	0.827
17:49	17.057	7.325	0.143	0.165	0.000	48.10	1.674	22.63	0.055	0.041	152.3	141.6	97.19	23.78	0.821
18: 7	16.664	4.877	0.130	0.151	0.000	50.04	1.496	22.72	0.050	0.037	148.9	138.5	96.16	23.22	0.802
18:25	16.711	6.944	0.132	0.132	0.000	47.68	1.464	23.84	0.053	0.037	152.1	141.8	96.99	23.78	0.821

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/29/1983															
18:43	16.381	7.146	0.114	0.153	0.000	48.11	1.447	23.58	0.048	0.038	150.0	139.9	97.02	23.91	0.825
19: 0	16.373	7.060	0.101	0.136	0.000	48.17	1.311	23.92	0.041	0.034	148.9	139.0	97.15	23.95	0.827
19:18	16.020	6.900	0.099	0.146	0.000	48.14	1.345	24.02	0.043	0.038	148.7	138.9	96.76	23.90	0.825
19:36	16.363	6.730	0.095	0.144	0.000	47.58	1.356	24.33	0.041	0.038	150.8	140.8	96.67	23.76	0.820
19:54	16.271	7.205	0.098	0.161	0.000	47.77	1.454	23.33	0.042	0.043	148.8	138.7	96.37	23.76	0.820
20:11	16.140	7.443	0.115	0.191	0.000	47.80	1.646	22.81	0.049	0.052	149.8	139.5	96.25	23.78	0.821
20:29	16.126	7.329	0.112	0.185	0.000	48.08	1.628	23.14	0.048	0.050	150.4	140.1	96.69	23.89	0.825
20:47	16.089	7.495	0.103	0.177	0.000	48.42	1.570	22.93	0.048	0.047	148.6	138.5	96.88	23.99	0.828
21: 4	16.184	7.648	0.111	0.185	0.000	48.29	1.630	22.62	0.049	0.048	148.9	138.6	96.76	23.94	0.827
21:22	16.369	7.247	0.110	0.187	0.000	47.67	1.664	23.11	0.049	0.048	151.5	141.1	96.45	23.74	0.820
21:40	16.655	7.132	0.116	0.194	0.000	47.33	1.725	23.24	0.052	0.050	153.8	143.1	96.49	23.66	0.817
21:58	16.534	7.145	0.113	0.184	0.000	47.59	1.661	23.38	0.051	0.048	152.8	142.4	96.70	23.75	0.820
22:16	16.493	6.875	0.117	0.189	0.000	49.59	1.737	23.55	0.052	0.051	154.3	143.7	98.65	24.26	0.837
22:33	16.402	6.786	0.109	0.163	0.000	47.85	1.554	23.50	0.048	0.043	151.1	140.8	96.45	23.67	0.817
22:52	16.681	6.731	0.108	0.196	0.000	47.46	1.713	24.19	0.054	0.052	156.7	146.1	97.19	23.78	0.821
23:10	16.500	7.011	0.116	0.192	0.000	47.44	1.669	23.70	0.057	0.053	154.3	143.8	96.74	23.75	0.820
23:28	16.631	7.062	0.122	0.185	0.000	47.53	1.704	23.57	0.053	0.049	154.4	143.9	96.90	23.77	0.820
23:45	16.840	7.176	0.131	0.190	0.000	47.89	1.785	23.22	0.054	0.051	155.1	144.3	97.34	23.85	0.823
7/30/1983															
0: 3	17.012	6.947	0.134	0.188	0.000	47.30	1.768	23.69	0.058	0.050	157.1	146.3	97.15	23.71	0.819
0:21	16.560	7.132	0.131	0.176	0.000	47.97	1.677	23.63	0.054	0.047	154.1	143.5	97.37	23.93	0.826
0:39	16.500	7.182	0.125	0.171	0.000	48.01	1.669	23.44	0.052	0.046	152.9	142.5	97.20	23.91	0.825
0:57	16.415	7.360	0.132	0.174	0.000	48.57	1.687	23.15	0.054	0.047	152.1	141.7	97.59	24.07	0.831
1:14	16.191	7.163	0.119	0.177	0.000	48.84	1.667	23.39	0.052	0.048	151.8	141.5	97.64	24.11	0.832
1:32	16.554	7.124	0.120	0.169	0.000	48.13	1.640	23.62	0.051	0.045	153.3	142.8	97.45	23.96	0.827
1:50	16.300	7.334	0.116	0.176	0.000	48.26	1.631	23.32	0.001	0.047	150.3	140.1	97.18	23.98	0.828
2: 8	15.504	6.901	0.106	0.151	0.000	49.48	1.481	22.80	0.045	0.040	144.8	135.1	96.51	23.95	0.827
2:26	16.101	7.038	0.111	0.168	0.000	48.07	1.568	23.81	0.048	0.045	151.5	141.3	96.96	23.93	0.826
2:44	16.636	6.946	0.117	0.193	0.000	47.17	1.760	23.67	0.052	0.052	155.5	144.8	96.60	23.66	0.817
3: 1	16.759	6.802	0.125	0.194	0.000	47.46	1.791	24.01	0.056	0.052	157.5	146.7	97.25	23.78	0.821
3:19	17.060	6.786	0.131	0.202	0.000	47.04	1.864	23.90	0.056	0.055	159.2	148.2	97.09	23.65	0.816
3:37	16.669	6.798	0.124	0.195	0.000	47.47	1.772	23.92	0.055	0.053	156.7	146.0	97.05	23.75	0.820
3:55	16.687	7.168	0.112	0.172	0.000	47.54	1.645	23.51	0.048	0.047	153.3	142.8	96.94	23.79	0.821
4:13	16.229	7.202	0.112	0.169	0.000	48.80	1.639	23.04	0.044	0.045	150.0	139.8	97.28	24.01	0.829
4:31	13.847	7.018	0.105	0.154	0.000	49.00	1.489	23.67	0.042	0.041	142.3	133.4	95.37	24.08	0.831
4:48	16.536	7.190	0.106	0.155	0.000	47.95	1.504	23.31	0.043	0.040	150.0	139.8	96.83	23.81	0.822
5: 6	16.647	7.275	0.114	0.163	0.000	48.43	1.590	23.36	0.045	0.042	151.8	141.4	97.67	24.02	0.829
5:24	16.540	7.239	0.119	0.168	0.000	48.03	1.606	23.25	0.046	0.044	151.5	141.1	97.05	23.87	0.824
5:42	16.527	7.255	0.119	0.170	0.000	48.26	1.587	23.34	0.046	0.046	151.6	141.3	97.34	23.96	0.827
6:18	16.026	6.975	0.111	0.171	0.000	48.13	1.561	23.64	0.048	0.045	150.6	140.5	96.71	23.87	0.824
6:37	16.599	6.736	0.111	0.159	0.000	47.40	1.529	24.36	0.046	0.041	154.1	143.8	96.98	23.76	0.820
6:40	16.528	7.181	0.114	0.171	0.000	47.90	1.591	23.40	0.047	0.045	151.8	141.4	96.98	23.85	0.823
6:54	16.213	6.801	0.108	0.154	0.000	47.83	1.465	24.27	0.047	0.040	151.8	141.7	96.93	23.87	0.824
7:12	16.418	6.700	0.117	0.172	0.000	47.22	1.615	24.07	0.051	0.045	154.0	143.6	96.40	23.84	0.816

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/30/1983

7:30	16.462	6.739	0.117	0.173	0.000	47.17	1.611	24.14	0.051	0.045	154.3	144.0	96.51	23.66	0.817
7:48	16.568	6.636	0.121	0.167	0.000	46.93	1.578	24.01	0.051	0.044	153.9	143.5	96.10	23.51	0.811
8: 6	15.917	6.386	0.105	0.149	0.000	48.41	1.452	23.32	0.046	0.039	147.4	137.6	95.82	23.57	0.814
8:24	16.098	6.684	0.116	0.164	0.000	47.27	1.539	24.25	0.049	0.043	152.5	142.4	96.21	23.67	0.817
8:42	16.318	6.589	0.126	0.171	0.000	46.91	1.578	24.16	0.054	0.045	153.8	143.5	95.95	23.52	0.812
9: 0	16.513	6.473	0.126	0.182	0.000	46.62	1.635	24.23	0.054	0.047	155.5	145.0	95.89	23.43	0.809
9:18	16.274	6.363	0.123	0.177	0.000	46.53	1.591	24.38	0.054	0.046	154.6	144.3	95.54	23.38	0.807
9:35	16.240	6.445	0.116	0.172	0.000	46.64	1.546	24.06	0.052	0.045	152.7	142.5	95.32	23.35	0.806
9:53	16.198	6.595	0.123	0.180	0.000	46.65	1.616	24.18	0.057	0.048	154.1	143.8	95.65	23.46	0.810
10:11	16.031	6.787	0.117	0.167	0.000	47.13	1.532	23.89	0.050	0.044	151.2	141.1	95.75	23.57	0.814
10:29	15.728	6.879	0.116	0.166	0.000	47.67	1.543	23.77	0.051	0.044	149.9	140.0	95.97	23.73	0.819
10:47	15.979	6.883	0.120	0.162	0.000	47.44	1.523	23.80	0.050	0.043	150.6	140.6	96.00	23.68	0.817
11: 5	16.029	6.842	0.127	0.162	0.000	47.35	1.560	23.71	0.051	0.042	151.0	140.9	95.88	23.62	0.815
11:23	15.382	6.513	0.117	0.179	0.000	48.12	1.596	24.39	0.052	0.048	151.7	141.8	96.39	23.87	0.824
11:41	15.196	6.654	0.114	0.175	0.000	47.97	1.580	23.68	0.050	0.047	148.5	138.8	95.46	23.69	0.818
11:58	15.207	6.647	0.123	0.185	0.000	48.55	1.701	23.58	0.054	0.049	149.9	140.0	96.10	23.85	0.823
12:16	15.311	6.576	0.124	0.188	0.000	48.48	1.701	24.31	0.054	0.051	152.7	142.7	96.79	24.00	0.829
12:34	15.204	6.631	0.117	0.181	0.000	48.18	1.643	24.09	0.054	0.048	150.7	140.9	96.15	23.87	0.824
12:52	14.889	6.702	0.111	0.178	0.000	49.18	1.728	23.18	0.052	0.047	147.4	137.7	96.07	23.93	0.826
13:10	15.222	6.984	0.122	0.181	0.000	49.52	1.870	22.74	0.054	0.047	148.8	138.8	96.74	24.06	0.830
13:28	14.961	7.350	0.119	0.185	0.000	49.58	1.898	21.69	0.055	0.049	145.0	135.0	95.90	23.94	0.826
13:46	14.722	7.757	0.120	0.185	0.000	50.35	1.886	21.06	0.055	0.048	142.1	132.2	96.19	24.15	0.834
14: 4	14.293	7.178	0.109	0.172	0.000	51.00	1.781	20.68	0.049	0.046	137.8	128.3	95.31	23.94	0.826
16: 5	15.182	6.087	0.124	0.176	0.000	48.06	1.527	23.34	0.050	0.044	146.9	137.2	94.59	23.36	0.806
16:22	15.549	6.130	0.121	0.172	0.000	48.13	1.814	24.07	0.048	0.043	153.1	143.0	96.08	23.65	0.816
16:40	15.374	6.147	0.120	0.173	0.000	48.02	1.776	24.03	0.050	0.044	152.1	142.2	95.73	23.61	0.815
16:58	15.422	6.220	0.120	0.175	0.000	47.91	1.786	23.99	0.050	0.055	152.5	142.5	95.73	23.61	0.815
17:33	15.398	5.994	0.123	0.172	0.000	48.36	1.833	23.74	0.049	0.045	151.9	141.8	95.71	23.57	0.813
17:55	15.426	6.085	0.116	0.175	0.000	47.97	1.773	24.13	0.048	0.045	152.5	142.5	95.77	23.60	0.815
18:13	15.249	6.167	0.120	0.178	0.000	48.13	1.798	24.03	0.049	0.045	152.0	142.1	95.76	23.65	0.816
18:31	15.550	5.974	0.114	0.166	0.000	47.55	1.756	23.97	0.047	0.043	152.0	142.0	95.17	23.38	0.807
18:48	15.235	6.061	0.120	0.182	0.000	47.45	1.812	23.82	0.051	0.049	151.6	141.7	94.78	23.36	0.806
19: 6	15.247	6.078	0.110	0.170	0.000	47.58	1.755	23.83	0.047	0.045	150.6	140.7	94.87	23.39	0.807
19:23	15.066	6.170	0.117	0.176	0.000	46.92	1.768	23.28	0.047	0.046	148.6	138.8	93.59	23.09	0.797
19:41	15.241	6.248	0.124	0.183	0.000	47.94	1.865	23.47	0.050	0.048	151.1	141.1	95.16	23.49	0.811
19:59	15.540	6.346	0.117	0.180	0.000	47.74	1.878	23.36	0.049	0.047	151.7	141.5	95.26	23.45	0.810
20:16	15.242	6.390	0.121	0.185	0.000	48.04	1.858	23.37	0.051	0.049	150.8	140.8	95.31	23.56	0.813
22:54	16.390	6.110	0.117	0.164	0.000	49.50	1.482	25.42	0.048	0.042	156.6	146.4	99.27	24.36	0.841
23:11	15.795	6.292	0.122	0.172	0.000	48.72	1.701	24.39	0.049	0.045	153.9	143.8	97.29	23.97	0.827
23:29	16.122	6.206	0.121	0.175	0.000	48.35	1.737	24.30	0.051	0.046	155.2	144.8	97.10	23.81	0.822
23:47	16.286	6.063	0.115	0.176	0.000	48.05	1.645	24.78	0.052	0.047	156.3	145.9	97.21	23.79	0.821

7/31/1983

0: 5	15.535	5.964	0.106	0.160	0.000	49.55	1.525	24.33	0.048	0.043	150.6	140.8	97.26	24.00	0.828
0:23	15.960	6.077	0.113	0.177	0.000	48.34	1.655	24.84	0.050	0.047	155.4	145.3	97.26	23.89	0.825

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/31/1983															
0:40	15.737	6.095	0.118	0.171	0.000	48.57	1.553	24.80	0.051	0.047	153.6	143.6	97.15	23.93	0.826
0:58	16.054	6.118	0.119	0.173	0.000	48.68	1.685	24.80	0.052	0.048	156.0	145.8	97.73	24.00	0.828
1:16	15.853	5.965	0.122	0.182	0.000	48.26	1.735	24.92	0.055	0.050	156.6	146.3	97.14	23.86	0.824
1:34	16.191	6.052	0.127	0.187	0.000	48.05	1.762	24.61	0.055	0.052	157.1	146.7	97.08	23.76	0.820
1:51	16.484	6.085	0.136	0.193	0.000	48.00	1.872	24.55	0.058	0.053	159.4	148.7	97.42	23.78	0.821
2: 9	15.581	6.053	0.122	0.188	0.000	49.53	1.739	23.45	0.056	0.052	151.2	141.1	96.77	23.84	0.823
2:27	16.105	6.178	0.125	0.183	0.000	48.30	1.755	24.24	0.056	0.051	155.5	145.2	96.99	23.78	0.821
2:45	15.822	6.238	0.124	0.175	0.000	48.33	1.677	24.31	0.055	0.048	153.8	143.7	96.78	23.82	0.822
3: 3	16.109	6.021	0.124	0.168	0.000	48.03	1.659	24.60	0.053	0.045	155.2	145.0	96.80	23.71	0.819
3:20	16.052	6.039	0.126	0.175	0.000	48.13	1.699	24.51	0.053	0.047	155.4	145.1	96.82	23.73	0.819
3:38	16.055	5.975	0.124	0.172	0.000	48.11	1.665	24.67	0.054	0.047	155.5	145.2	96.87	23.74	0.819
3:56	16.036	5.848	0.119	0.160	0.000	47.90	1.584	24.84	0.051	0.043	154.7	144.6	96.58	23.65	0.816
4:14	15.523	5.256	0.112	0.154	0.000	50.29	1.551	24.10	0.048	0.043	150.0	140.2	97.08	23.83	0.823
4:49	15.674	5.812	0.115	0.170	0.000	47.97	1.588	25.11	0.050	0.045	154.6	144.6	96.53	23.72	0.819
5:26	15.624	5.814	0.116	0.175	0.000	48.00	1.610	25.21	0.051	0.047	155.1	145.2	96.65	23.77	0.821
5:44	15.884	5.919	0.118	0.175	0.000	48.06	1.616	25.09	0.051	0.047	155.7	145.6	96.97	23.81	0.822
6: 2	16.014	5.875	0.125	0.170	0.000	47.83	1.642	24.81	0.053	0.046	155.5	145.3	96.57	23.65	0.816
6:20	15.156	5.920	0.117	0.161	0.000	49.33	1.565	23.99	0.048	0.043	148.8	139.2	96.33	23.82	0.822
6:38	16.159	6.019	0.127	0.174	0.000	48.28	1.711	24.56	0.053	0.046	156.0	145.6	97.12	23.78	0.821
6:55	15.818	6.121	0.130	0.184	0.000	48.31	1.688	24.50	0.058	0.050	154.9	144.7	96.87	23.82	0.822
7:13	16.001	6.088	0.131	0.181	0.000	48.42	1.721	24.33	0.057	0.048	155.2	144.9	96.98	23.80	0.821
7:31	15.754	6.352	0.128	0.185	0.000	48.31	1.688	24.11	0.056	0.049	153.3	143.2	96.63	23.81	0.822
7:49	15.676	6.460	0.128	0.179	0.000	48.23	1.618	23.84	0.055	0.048	151.3	141.3	96.23	23.74	0.820
8: 7	15.173	6.402	0.129	0.180	0.000	49.46	1.666	22.54	0.054	0.049	146.0	136.2	95.65	23.69	0.818
8:25	15.829	6.126	0.126	0.175	0.000	48.05	1.624	24.42	0.055	0.046	153.6	143.5	96.46	23.71	0.818
8:43	15.883	6.059	0.128	0.165	0.000	47.87	1.575	24.45	0.055	0.044	153.2	143.1	96.23	23.63	0.816
9:18	15.983	5.828	0.125	0.189	0.000	47.47	1.833	24.60	0.054	0.052	157.2	146.8	96.14	23.51	0.811
9:36	15.519	6.034	0.112	0.184	0.000	48.26	1.752	24.58	0.052	0.052	154.4	144.3	96.54	23.79	0.821
9:54	15.481	5.880	0.098	0.173	0.000	47.94	1.608	24.81	0.047	0.049	153.0	143.1	96.08	23.66	0.817
10:12	14.109	6.477	0.081	0.138	0.000	50.33	1.286	23.51	0.039	0.040	139.8	131.1	96.01	24.12	0.833
10:30	16.133	5.907	0.128	0.160	0.000	47.78	1.555	24.57	0.051	0.042	153.9	143.8	96.32	23.57	0.813
10:48	15.485	6.030	0.128	0.166	0.000	48.28	1.545	24.54	0.053	0.044	151.8	142.0	96.27	23.74	0.819
11: 6	15.631	6.139	0.115	0.155	0.000	48.04	1.439	24.33	0.049	0.042	150.1	140.3	95.95	23.64	0.816
11:24	15.743	5.841	0.117	0.188	0.000	48.28	1.523	24.75	0.052	0.046	153.4	143.4	96.54	23.72	0.819
11:41	15.934	6.100	0.123	0.164	0.000	48.96	1.621	24.41	0.050	0.044	153.5	143.4	97.41	23.95	0.827
11:59	15.707	6.400	0.121	0.165	0.000	48.72	1.585	23.90	0.049	0.044	150.7	140.8	96.70	23.86	0.824
12:17	17.402	5.661	0.151	0.214	0.000	46.90	2.063	24.73	0.062	0.057	165.7	154.2	97.24	23.40	0.808
12:35	15.651	6.772	0.104	0.189	0.000	49.22	1.825	23.15	0.049	0.053	150.9	140.7	97.01	23.99	0.828
12:53	15.309	6.700	0.096	0.182	0.000	49.83	1.782	23.39	0.046	0.051	149.7	139.8	97.38	24.18	0.835
13:12	15.558	6.675	0.098	0.181	0.000	49.20	1.767	23.39	0.045	0.049	150.4	140.3	96.96	23.99	0.828
13:30	15.708	6.593	0.096	0.168	0.000	48.79	1.672	23.41	0.042	0.045	149.5	139.5	96.52	23.83	0.822
13:48	15.838	6.514	0.103	0.173	0.000	48.94	1.729	23.53	0.045	0.047	151.2	141.1	96.92	23.89	0.825
14: 6	14.643	5.829	0.090	0.157	0.000	50.71	1.545	22.24	0.041	0.043	140.7	131.4	95.29	23.65	0.816
14:24	15.802	6.050	0.098	0.165	0.000	48.34	1.635	24.58	0.044	0.046	153.3	143.2	96.76	23.79	0.821
14:42	15.775	5.837	0.101	0.159	0.000	48.12	1.596	24.92	0.044	0.044	153.7	143.8	96.59	23.72	0.819
15:18	15.819	5.805	0.112	0.163	0.000	47.47	1.590	24.74	0.047	0.044	153.6	143.6	95.79	23.8	0.810

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV	TMP %	MW	S.G. WRT AIR

7/31/1983

15:36	15.913	5.801	0.111	0.165	0.000	48.00	1.641	24.93	0.046	0.046	155.1	145.0	96.65	23.69	0.818
15:40	15.837	5.830	0.107	0.163	0.000	47.79	1.610	24.87	0.045	0.044	154.2	144.1	96.30	23.62	0.815
15:53	15.688	6.043	0.107	0.158	0.000	48.13	1.564	24.30	0.044	0.043	151.2	141.3	96.08	23.63	0.816
16:11	14.232	5.792	0.105	0.153	0.000	51.31	1.567	21.78	0.042	0.042	138.3	129.1	95.03	23.68	0.817
16:30	15.487	6.429	0.109	0.168	0.000	49.01	1.702	23.69	0.046	0.047	150.4	140.4	96.69	23.90	0.825
16:48	15.528	6.688	0.113	0.169	0.000	48.91	1.692	23.13	0.046	0.046	148.6	138.7	96.32	23.83	0.823
17: 6	15.348	6.831	0.120	0.175	0.000	49.54	1.758	22.92	0.047	0.047	148.4	138.4	96.79	24.03	0.829
17:24	14.955	7.046	0.121	0.178	0.000	49.57	1.751	22.36	0.049	0.048	145.3	135.6	96.08	23.96	0.827
17:41	15.222	6.781	0.115	0.169	0.000	49.26	1.659	23.05	0.047	0.046	147.1	137.4	96.35	23.94	0.826
17:59	15.349	6.791	0.113	0.171	0.000	49.34	1.721	22.98	0.047	0.047	148.0	138.1	96.55	23.96	0.827
18:17	14.980	6.729	0.104	0.159	0.000	49.95	1.617	22.39	0.043	0.044	143.3	133.7	96.01	23.90	0.825
18:36	14.992	7.125	0.116	0.180	0.000	49.23	1.732	22.35	0.049	0.050	145.3	135.5	95.83	23.90	0.825
18:53	15.102	7.282	0.117	0.181	0.000	49.46	1.768	22.02	0.048	0.051	144.9	135.1	96.03	23.95	0.827
19:12	15.171	7.446	0.117	0.185	0.000	49.30	1.776	21.79	0.047	0.051	144.6	134.7	95.88	23.91	0.825
19:29	15.051	7.393	0.118	0.185	0.000	49.38	1.799	22.02	0.049	0.052	145.2	135.3	96.05	23.98	0.828
19:48	15.216	7.160	0.117	0.182	0.000	49.16	1.810	22.23	0.049	0.050	146.4	136.5	95.98	23.88	0.824
20: 6	14.102	6.864	0.109	0.172	0.000	51.75	1.736	20.43	0.045	0.048	135.8	126.5	95.26	23.93	0.826
20:24	14.953	7.354	0.117	0.186	0.000	49.84	1.851	22.16	0.049	0.051	145.8	136.0	96.56	24.14	0.833
20:42	15.287	7.363	0.109	0.173	0.000	49.42	1.778	22.12	0.045	0.047	145.5	135.6	96.34	24.00	0.828
22:10	14.155	7.181	0.117	0.177	0.000	51.87	1.563	20.49	0.044	0.046	134.6	125.4	95.64	24.09	0.832
22:28	15.290	7.528	0.121	0.188	0.000	49.48	1.885	21.83	0.048	0.050	146.3	136.2	96.42	24.03	0.830
22:45	15.255	7.218	0.117	0.179	0.000	49.27	1.821	22.08	0.046	0.048	146.0	136.0	96.04	23.89	0.825
23: 3	15.088	7.352	0.113	0.178	0.000	49.37	1.784	22.23	0.046	0.049	145.5	135.6	96.20	24.01	0.829
23:21	15.195	7.215	0.102	0.158	0.000	49.58	1.720	22.33	0.041	0.044	144.8	135.0	96.39	24.02	0.829
23:39	14.977	7.201	0.103	0.169	0.000	48.86	1.742	22.24	0.044	0.047	144.3	134.6	95.38	23.79	0.821
23:56	14.520	7.149	0.100	0.165	0.000	48.81	1.654	22.29	0.042	0.045	141.9	132.5	94.77	23.74	0.819

8/ 1/1983

0:14	14.743	6.788	0.096	0.159	0.000	49.55	1.669	22.14	0.038	0.044	142.0	132.5	95.23	23.75	0.820
0:32	15.101	7.079	0.108	0.168	0.000	49.03	1.788	22.52	0.041	0.045	146.1	136.2	95.88	23.87	0.824
0:49	14.900	7.046	0.106	0.170	0.000	49.06	1.747	22.59	0.041	0.046	145.2	135.5	95.71	23.87	0.824
1: 7	15.181	7.202	0.102	0.167	0.000	48.46	1.745	22.19	0.040	0.045	144.7	134.9	95.13	23.66	0.817
1:25	15.187	7.001	0.101	0.168	0.000	48.63	1.772	22.52	0.040	0.046	146.1	136.2	95.47	23.72	0.819
1:43	15.062	6.994	0.100	0.172	0.000	49.24	1.754	22.92	0.042	0.048	146.9	137.1	96.33	24.00	0.828
1:60	14.994	6.695	0.096	0.161	0.000	48.96	1.741	23.06	0.040	0.043	146.6	136.9	95.79	23.82	0.822
2:18	13.786	6.422	0.092	0.140	0.000	51.17	1.510	21.04	0.036	0.037	133.2	124.4	94.23	23.67	0.817
2:36	14.723	6.957	0.096	0.155	0.000	49.19	1.599	23.09	0.040	0.042	144.2	134.8	95.89	23.97	0.828
2:54	14.973	6.845	0.095	0.175	0.000	49.34	1.577	23.28	0.039	0.041	145.7	136.2	96.37	24.03	0.829
3:11	14.900	6.799	0.086	0.144	0.000	49.56	1.525	23.41	0.036	0.040	144.6	135.2	96.50	24.08	0.831
3:29	14.495	7.311	0.086	0.158	0.000	50.01	1.587	22.01	0.039	0.044	139.8	130.5	95.74	24.05	0.830
3:47	14.696	7.425	0.098	0.188	0.000	49.61	1.765	22.04	0.044	0.053	143.4	133.8	95.92	24.05	0.830
4: 5	14.907	7.385	0.099	0.185	0.000	49.40	1.822	22.09	0.043	0.052	144.8	135.0	95.98	23.99	0.828
4:22	14.756	7.227	0.094	0.170	0.000	49.03	1.687	22.19	0.040	0.047	142.7	133.2	95.24	23.82	0.822
4:40	14.682	7.330	0.085	0.163	0.000	49.67	1.628	22.26	0.040	0.046	141.8	132.4	95.90	24.04	0.830
4:58	14.558	7.257	0.077	0.156	0.000	49.51	1.558	22.45	0.038	0.044	140.9	131.7	95.65	24.00	0.828

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 1/1983															
5:16	14.667	6.274	0.075	0.146	0.000	50.41	1.473	22.97	0.035	0.041	141.7	132.5	96.09	23.95	0.827
5:33	14.407	6.732	0.081	0.148	0.000	49.32	1.481	23.29	0.036	0.042	142.2	133.1	95.54	23.93	0.826
5:52	14.657	6.891	0.085	0.149	0.000	49.13	1.540	22.98	0.035	0.040	142.6	133.3	95.50	23.88	0.824
6:28	14.440	7.501	0.104	0.169	0.000	49.37	1.694	21.93	0.041	0.046	141.1	131.7	95.30	23.96	0.827
6:46	14.581	7.733	0.106	0.165	0.000	49.48	1.714	21.30	0.040	0.045	139.6	130.1	95.16	23.92	0.826
7: 4	14.436	7.956	0.103	0.168	0.000	49.89	1.719	21.17	0.040	0.045	138.8	129.3	95.53	24.09	0.832
7:21	14.439	7.787	0.104	0.167	0.000	50.17	1.699	21.11	0.040	0.045	138.4	129.0	95.56	24.07	0.831
7:39	14.556	7.639	0.103	0.163	0.000	49.63	1.701	21.26	0.040	0.043	139.1	129.7	95.13	23.90	0.825
7:57	14.573	7.521	0.104	0.167	0.000	48.95	1.703	21.78	0.041	0.045	141.0	131.5	94.88	23.81	0.822
8:15	14.725	7.022	0.124	0.186	0.000	48.80	1.946	21.75	0.045	0.050	144.7	134.9	94.65	23.59	0.814
8:33	14.585	7.453	0.105	0.167	0.000	48.92	1.776	21.92	0.040	0.045	142.2	132.7	95.01	23.82	0.822
8:50	14.380	7.394	0.099	0.158	0.000	49.49	1.714	22.12	0.039	0.043	141.3	131.9	95.43	23.99	0.828
9: 8	14.347	7.392	0.098	0.157	0.000	49.54	1.693	21.98	0.038	0.043	140.4	131.1	95.29	23.96	0.827
9:26	14.523	7.442	0.100	0.156	0.000	49.60	1.735	22.04	0.038	0.042	141.6	132.2	95.67	24.02	0.829
9:44	14.747	7.467	0.095	0.142	0.000	49.68	1.707	22.04	0.034	0.037	141.5	132.0	95.95	24.05	0.830
10: 9	13.404	6.865	0.089	0.129	0.000	52.04	1.518	20.42	0.031	0.033	129.6	121.0	94.53	23.93	0.826
10:27	14.164	7.525	0.101	0.147	0.000	50.83	1.790	22.17	0.035	0.038	141.1	131.8	96.81	24.44	0.844
10:44	13.767	8.032	0.095	0.148	0.000	50.85	1.726	21.11	0.035	0.039	135.7	126.7	95.80	24.35	0.841
11: 2	15.627	9.231	0.092	0.132	0.000	50.13	1.503	19.26	0.036	0.034	133.1	123.4	96.05	24.15	0.834
11:20	15.040	8.856	0.120	0.142	0.000	50.62	1.525	20.08	0.047	0.036	135.0	125.5	96.47	24.36	0.841
11:38	15.298	8.690	0.119	0.147	0.000	50.10	1.546	20.64	0.048	0.037	138.0	128.3	96.63	24.31	0.839
11:56	15.305	8.667	0.121	0.149	0.000	49.42	1.519	20.64	0.050	0.037	137.9	128.2	95.92	24.11	0.832
12:14	14.717	9.068	0.111	0.105	0.000	50.42	1.252	20.29	0.041	0.025	130.7	121.7	96.03	24.39	0.842
14:24	16.750	8.156	0.176	0.207	0.000	49.11	1.912	21.04	0.072	0.050	150.5	139.5	97.46	24.05	0.830
14:42	16.635	7.809	0.171	0.190	0.000	49.05	1.781	21.93	0.069	0.046	151.1	140.4	97.68	24.10	0.832
15:19	16.986	7.119	0.173	0.201	0.000	48.68	1.921	23.25	0.072	0.050	158.3	147.2	98.45	24.10	0.832
15:36	17.334	7.093	0.175	0.204	0.000	48.43	1.946	23.34	0.071	0.051	160.1	148.8	98.65	24.05	0.830
15:40	16.776	7.269	0.164	0.204	0.000	48.91	1.915	22.87	0.068	0.052	156.2	145.2	98.23	24.11	0.832
15:54	17.311	6.872	0.166	0.200	0.000	48.32	1.932	23.88	0.068	0.049	161.3	150.0	98.80	24.07	0.831
16:12	17.681	6.686	0.184	0.209	0.000	47.72	2.064	24.03	0.072	0.050	164.8	153.3	98.70	23.90	0.825
16:30	17.472	6.111	0.170	0.162	0.000	48.53	1.773	24.65	0.062	0.036	161.6	150.5	98.96	23.97	0.827
16:48	17.715	5.787	0.161	0.161	0.000	47.52	1.640	25.81	0.064	0.036	164.6	153.6	98.90	23.85	0.823
17: 6	18.186	6.225	0.149	0.166	0.000	46.97	1.598	25.58	0.062	0.038	164.9	153.7	98.98	23.82	0.822
17:23	17.758	6.353	0.137	0.170	0.000	47.31	1.569	25.42	0.060	0.040	162.6	151.6	98.81	23.91	0.825
17:41	17.867	6.341	0.135	0.186	0.000	47.09	1.681	25.35	0.062	0.045	164.3	153.1	98.76	23.86	0.823
17:59	17.831	7.018	0.136	0.199	0.000	47.47	1.793	24.19	0.067	0.048	162.0	150.7	98.75	23.96	0.827
18:17	17.450	7.837	0.203	0.192	0.000	48.58	1.939	22.30	0.074	0.042	157.1	145.8	98.61	24.13	0.833
18:35	17.146	8.124	0.230	0.201	0.000	49.36	2.092	21.31	0.083	0.042	155.3	143.9	98.59	24.23	0.837
18:53	17.439	7.492	0.210	0.185	0.000	48.96	1.981	22.46	0.077	0.039	158.0	146.6	98.84	24.14	0.833
19:11	17.684	7.506	0.215	0.185	0.000	48.82	1.954	22.20	0.077	0.039	157.8	146.3	98.69	24.04	0.830
19:32	17.783	7.316	0.169	0.187	0.000	48.21	1.755	23.32	0.072	0.041	158.9	147.7	98.86	24.05	0.830
19:50	17.738	6.545	0.160	0.173	0.000	47.97	1.657	24.59	0.068	0.038	161.3	150.2	98.93	23.97	0.827
20: 8	16.952	6.063	0.158	0.166	0.000	48.07	1.532	25.21	0.066	0.037	159.2	148.7	98.25	23.92	0.826
20:26	16.701	6.293	0.164	0.172	0.000	48.19	1.593	25.10	0.068	0.038	159.0	148.4	98.31	24.04	0.830
20:44	16.525	7.219	0.189	0.186	0.000	48.92	1.773	23.06	0.074	0.041	154.5	143.8	97.99	24.12	0.833
21: 2	16.676	8.587	0.207	0.196	0.000	49.63	1.890	20.81	0.075	0.043	149.5	138.6	98.11	24.12	0.839

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 1/1983															
21:19	17.135	9.121	0.200	0.217	0.000	49.57	2.031	19.80	0.079	0.049	149.7	138.3	98.20	24.29	0.839
21:37	17.417	8.607	0.179	0.185	0.000	49.08	1.836	20.88	0.071	0.040	150.8	139.6	98.30	24.19	0.835
21:55	16.979	7.773	0.183	0.174	0.000	48.83	1.724	22.26	0.069	0.037	152.4	141.6	98.04	24.11	0.832
22:11	16.025	7.444	0.197	0.158	0.000	49.45	1.710	22.02	0.067	0.030	148.1	137.8	97.10	24.04	0.830
22:29	16.530	7.273	0.251	0.191	0.000	48.44	2.014	22.41	0.082	0.037	156.1	145.1	97.23	23.88	0.824
22:47	17.511	7.827	0.238	0.206	0.000	47.20	1.996	21.53	0.085	0.043	156.5	145.0	96.64	23.56	0.813
23:20	17.457	7.670	0.235	0.195	0.000	47.08	1.714	22.46	0.082	0.039	156.0	144.9	96.93	23.66	0.817
23:38	17.528	6.639	0.223	0.199	0.000	47.17	1.937	22.93	0.080	0.039	159.9	148.5	96.74	23.40	0.808
23:56	17.140	6.352	0.228	0.203	0.000	47.55	2.006	24.07	0.083	0.041	163.2	151.9	97.67	23.70	0.818
8/ 2/1983															
0:13	15.724	7.266	0.208	0.166	0.000	48.19	1.537	22.73	0.070	0.032	148.1	138.1	95.92	23.78	0.821
0:31	16.194	7.877	0.210	0.199	0.000	47.90	1.712	21.93	0.077	0.042	149.9	139.4	96.15	23.80	0.822
0:49	16.274	8.630	0.220	0.196	0.000	48.28	1.715	20.77	0.079	0.041	146.6	136.0	96.21	23.92	0.826
1: 6	15.508	8.745	0.220	0.209	0.000	49.42	1.826	20.10	0.078	0.045	143.4	133.1	96.15	24.11	0.832
1:24	15.438	8.997	0.222	0.229	0.000	49.96	1.994	19.33	0.076	0.052	142.9	132.4	96.30	24.19	0.835
1:42	15.343	9.079	0.201	0.242	0.000	50.33	2.084	18.89	0.079	0.056	142.1	131.6	96.31	24.22	0.836
1:60	16.642	8.814	0.221	0.225	0.000	48.77	2.034	19.61	0.084	0.049	148.1	137.0	96.45	23.88	0.824
2:18	15.837	8.633	0.226	0.185	0.000	49.34	1.796	20.51	0.078	0.037	144.9	134.5	96.64	24.14	0.833
2:35	16.990	8.199	0.253	0.227	0.000	48.20	2.233	20.44	0.087	0.049	154.5	143.0	96.68	23.74	0.819
2:53	16.754	8.366	0.237	0.208	0.000	48.09	1.995	20.32	0.082	0.043	150.1	139.0	96.09	23.69	0.818
3:29	16.803	7.818	0.212	0.195	0.000	48.36	1.898	21.52	0.075	0.042	152.3	141.3	96.92	23.83	0.822
3:47	17.056	7.769	0.199	0.188	0.000	47.83	1.800	21.54	0.073	0.097	153.2	142.1	96.56	23.67	0.817
4: 4	17.196	1.451	0.026	0.068	0.000	53.56	1.655	21.78	0.005	0.008	144.3	133.9	95.74	22.39	0.773
4:22	17.055	7.182	0.182	0.203	0.000	47.50	1.775	22.93	0.004	0.043	154.5	143.6	96.88	23.65	0.817
4:40	16.716	7.296	0.187	0.192	0.000	47.77	1.716	22.92	0.038	0.043	153.4	142.8	96.88	23.77	0.821
4:58	16.502	7.479	0.183	0.211	0.000	48.06	1.876	22.30	0.070	0.042	153.3	142.5	96.73	23.80	0.822
5:16	14.248	8.864	0.207	0.123	0.000	51.21	1.397	20.38	0.075	0.020	133.4	124.4	96.53	24.61	0.849
5:34	13.505	9.982	0.275	0.190	0.000	53.02	1.853	17.48	0.072	0.040	129.0	119.7	96.42	24.90	0.859
5:51	11.134	11.679	0.387	0.140	0.000	57.05	1.989	13.70	0.076	0.023	111.2	102.9	96.19	25.70	0.887
6: 9	12.225	11.683	0.370	0.178	0.000	56.22	1.999	13.33	0.079	0.037	114.4	105.5	96.12	25.40	0.877
6:27	11.916	12.677	0.374	0.149	0.000	57.02	1.899	12.07	0.086	0.025	107.8	99.2	96.21	25.68	0.886
6:45	12.403	11.910	0.389	0.183	0.000	56.01	2.078	13.66	0.079	0.025	116.9	107.8	96.73	25.55	0.882
7: 4	11.596	12.629	0.343	0.158	0.000	56.22	1.962	12.57	0.075	0.029	108.5	100.0	95.58	25.57	0.883
7:21	15.143	12.203	0.165	0.172	0.000	52.43	1.560	14.24	0.071	0.033	118.7	109.0	96.02	24.75	0.854
7:39	14.748	12.272	0.161	0.166	0.000	52.57	1.470	14.45	0.061	0.033	116.8	107.4	95.93	24.85	0.858
7:57	15.221	10.820	0.132	0.175	0.000	53.76	1.547	17.69	0.054	0.029	128.9	119.3	99.43	25.46	0.879
8:15	15.706	10.127	0.147	0.207	0.000	53.12	1.780	18.63	0.056	0.041	137.0	126.8	99.81	25.30	0.873
9: 9	16.042	8.890	0.151	0.201	0.000	52.31	1.787	20.06	0.060	0.037	142.7	132.3	99.53	24.94	0.861
9:26	17.456	8.437	0.193	0.218	0.000	49.81	1.875	21.42	0.061	0.039	153.6	142.3	99.50	24.48	0.845
9:44	17.271	7.686	0.174	0.188	0.000	48.88	1.612	22.87	0.074	0.036	154.4	143.5	98.79	24.24	0.837
10: 2	17.099	7.055	0.173	0.186	0.000	48.97	1.595	23.85	0.070	0.034	156.6	145.9	99.03	24.25	0.837
10:20	17.141	7.263	0.178	0.186	0.000	48.97	1.598	24.02	0.070	0.033	157.4	146.6	99.46	24.40	0.842
10:38	17.230	7.401	0.195	0.193	0.000	49.03	1.727	23.36	0.072	0.035	157.3	146.3	99.25	24.32	0.840
10:56	17.749	8.601	0.213	0.201	0.000	49.53	1.888	21.14	0.072	0.038	154.0	142.6	99.44	24.41	0.843

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR
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8/ 2/1983

11:13	17.635	9.490	0.235	0.211	0.000	50.00	1.949	19.60	0.073	0.036	149.8	138.3	99.23	24.52	0.846
11:31	17.822	8.610	0.212	0.210	0.000	50.16	1.984	20.98	0.073	0.039	154.9	143.3	100.09	24.57	0.848
11:49	17.492	8.324	0.196	0.188	0.000	49.19	1.752	21.40	0.071	0.033	152.0	140.9	98.65	24.23	0.836
12: 7	17.610	7.434	0.179	0.189	0.000	48.91	1.725	23.41	0.062	0.031	158.0	146.9	99.55	24.31	0.839
12:28	17.485	6.751	0.177	0.188	0.000	48.01	1.036	25.05	0.065	0.028	155.9	145.5	98.79	24.10	0.832
12:46	16.925	6.416	0.166	0.183	0.000	48.39	0.648	26.16	0.064	0.027	153.4	143.7	98.97	24.29	0.839
13: 4	17.081	6.720	0.162	0.180	0.000	48.05	0.646	25.93	0.059	0.027	152.9	143.2	98.85	24.27	0.838
14:43	17.330	8.283	0.177	0.208	0.000	48.96	1.344	22.52	0.096	0.045	151.9	141.2	98.96	24.41	0.843
15: 1	17.356	8.180	0.189	0.187	0.000	49.00	1.827	22.45	0.096	0.041	156.3	145.1	99.32	24.43	0.843
15:19	16.673	7.757	0.188	0.121	0.000	49.48	1.528	23.53	0.096	0.022	152.9	142.5	99.39	24.59	0.849
15:37	17.267	7.325	0.190	0.187	0.000	48.52	1.811	23.72	0.083	0.035	159.5	148.5	99.15	24.26	0.837
15:55	17.599	7.441	0.200	0.200	0.000	48.52	1.954	23.26	0.092	0.044	161.4	149.9	99.31	24.23	0.836
16:13	17.541	7.135	0.205	0.205	0.000	48.75	2.070	23.16	0.077	0.036	161.7	150.1	99.17	24.14	0.833
16:31	17.869	6.808	0.181	0.191	0.000	47.67	1.936	24.46	0.082	0.033	165.0	153.5	99.23	24.03	0.830
16:49	17.149	6.299	0.169	0.179	0.000	47.85	1.744	25.62	0.081	0.033	164.0	153.1	99.12	24.13	0.833
17: 7	17.401	5.719	0.162	0.192	0.000	48.07	2.024	26.99	0.080	0.036	172.2	160.9	100.67	24.37	0.841
17:25	18.034	5.724	0.159	0.205	0.000	47.58	2.157	26.85	0.062	0.041	175.1	163.3	100.82	24.23	0.836
17:43	17.809	6.379	0.156	0.183	0.000	47.26	1.996	25.57	0.090	0.033	168.6	157.1	99.48	24.04	0.830
18: 1	17.692	7.100	0.164	0.187	0.000	48.08	2.067	24.78	0.090	0.027	166.4	154.9	100.19	24.38	0.841
18:19	17.581	7.940	0.173	0.188	0.000	48.61	2.007	23.29	0.093	0.029	161.0	149.5	99.91	24.47	0.845
18:37	17.436	8.202	0.177	0.200	0.000	48.61	2.020	22.84	0.082	0.024	159.1	147.7	99.60	24.46	0.844
18:55	17.342	8.579	0.175	0.187	0.000	49.25	1.964	22.18	0.021	0.021	154.4	143.2	99.72	24.58	0.848
19:12	16.626	8.583	0.193	0.206	0.000	50.44	2.203	21.77	0.103	0.020	155.6	144.4	100.14	24.86	0.858
19:30	16.495	8.636	0.215	0.205	0.000	50.69	2.250	21.48	0.091	0.025	154.9	143.7	100.08	24.88	0.859
19:48	16.474	9.162	0.239	0.189	0.000	50.60	2.210	20.57	0.117	0.022	152.2	141.0	99.59	24.84	0.858
20: 6	16.691	8.598	0.210	0.199	0.000	50.16	2.250	21.32	0.070	0.025	154.4	143.1	99.52	24.67	0.851
20:24	16.142	7.972	0.193	0.185	0.000	47.60	2.162	20.80	0.097	0.021	150.1	139.2	95.18	23.50	0.811
20:42	15.995	7.361	0.185	0.177	0.000	48.22	2.099	21.09	0.088	0.020	149.4	138.7	95.24	23.47	0.810
21:18	17.485	7.127	0.205	0.188	0.000	48.90	2.236	24.33	0.106	0.021	166.9	155.3	100.59	24.53	0.847
21:36	18.022	6.861	0.196	0.195	0.000	48.24	2.265	24.66	0.084	0.023	169.5	157.6	100.55	24.33	0.840
21:40	16.818	7.585	0.193	0.182	0.000	50.48	2.153	22.29	0.096	0.020	156.8	145.6	99.81	24.57	0.848
21:54	17.974	6.494	0.185	0.187	0.000	48.34	2.192	25.50	0.099	0.019	171.3	159.5	100.99	24.42	0.843
22:12	17.889	6.457	0.183	0.187	0.000	48.18	2.219	25.43	0.102	0.018	171.1	159.3	100.67	24.34	0.840
22:30	18.298	6.175	0.180	0.192	0.000	47.52	2.277	26.12	0.103	0.019	175.3	163.2	100.89	24.24	0.837
22:48	18.110	5.843	0.186	0.197	0.000	47.37	2.238	26.84	0.102	0.018	176.7	164.8	100.90	24.25	0.837
23: 6	17.918	5.799	0.178	0.193	0.000	47.60	2.247	26.73	0.091	0.023	175.5	163.7	100.78	24.25	0.837
23:24	18.135	6.900	0.166	0.187	0.000	48.12	2.096	25.33	0.097	0.019	169.9	158.1	101.05	24.47	0.845
23:42	17.609	7.859	0.161	0.190	0.000	48.85	2.160	23.70	0.093	0.019	163.5	151.9	100.64	24.63	0.850

8/ 3/1983

0:12	15.922	8.534	0.177	0.191	0.000	51.08	1.794	22.30	0.101	0.000	149.8	139.5	100.10	25.07	0.865
0:30	15.841	8.890	0.254	0.198	0.000	51.53	2.421	21.01	0.113	0.016	153.8	142.7	100.27	25.13	0.867
0:47	16.347	9.234	0.231	0.216	0.000	51.08	2.458	20.94	0.003	0.023	153.2	141.9	100.53	25.10	0.867
1: 5	16.681	8.655	0.246	0.218	0.000	50.51	2.598	21.28	0.072	0.072	159.8	148.1	100.33	24.87	0.858
1:23	16.852	8.654	0.230	0.199	0.000	50.02	2.359	21.57	0.128	0.072	159.7	148.0	100.09	24.79	0.856

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 3/1983															
1:40	17.352	7.996	0.209	0.196	0.000	49.33	2.354	22.48	0.120	0.072	163.6	151.7	100.10	24.56	0.848
1:58	17.714	7.703	0.191	0.019	0.000	48.87	2.257	23.13	0.113	0.052	161.8	150.2	100.05	24.41	0.843
2:15	17.326	7.242	0.184	0.182	0.000	48.83	2.098	24.04	0.103	0.045	164.2	152.7	100.05	24.46	0.844
2:33	18.096	7.269	0.191	0.201	0.000	47.79	2.250	23.92	0.101	0.048	168.3	156.3	99.88	24.19	0.835
2:50	18.031	6.969	0.187	0.188	0.000	47.46	2.184	24.48	0.104	0.047	169.0	157.1	99.65	24.11	0.832
3: 8	18.078	6.829	0.192	0.191	0.000	47.76	2.190	24.45	0.102	0.047	169.2	157.3	99.84	24.13	0.833
3:25	18.389	6.993	0.173	0.196	0.000	47.27	2.123	24.33	0.099	0.048	168.9	156.9	99.63	24.02	0.829
3:43	18.128	6.513	0.163	0.192	0.000	46.91	1.998	25.46	0.096	0.043	170.0	158.3	99.50	23.99	0.828
4: 0	17.598	6.856	0.154	0.188	0.000	47.30	1.935	25.75	0.093	0.043	168.3	156.9	99.92	24.30	0.839
4:18	15.841	7.118	0.148	0.178	0.000	49.33	1.870	24.53	0.090	0.043	157.7	147.3	99.15	24.60	0.849
4:35	15.567	8.190	0.144	0.175	0.000	50.35	1.832	22.47	0.081	0.045	149.5	139.3	98.86	24.76	0.855
6:39	15.589	8.712	0.190	0.187	0.000	50.01	1.401	21.91	0.103	0.043	144.8	134.9	98.14	24.69	0.852
6:57	17.228	8.324	0.191	0.188	0.000	49.28	2.169	21.85	0.097	0.047	157.7	146.2	99.38	24.46	0.844
7:33	17.436	7.168	0.196	0.187	0.000	48.36	2.150	23.24	0.084	0.047	162.3	150.8	98.87	24.08	0.831
7:50	16.878	7.026	0.196	0.173	0.000	48.08	1.983	24.63	0.095	0.043	163.2	152.2	99.10	24.28	0.838
8: 8	17.053	7.141	0.195	0.198	0.000	48.43	2.218	24.62	0.098	0.045	166.7	155.3	100.00	24.48	0.845
8:25	17.509	6.987	0.188	0.183	0.000	47.66	2.105	25.02	0.093	0.043	167.8	156.2	99.78	24.29	0.838
8:43	17.438	6.304	0.173	0.192	0.000	46.93	2.067	26.01	0.091	0.045	170.3	158.8	99.26	24.06	0.830
9: 0	17.385	6.030	0.172	0.194	0.000	47.19	2.114	26.54	0.097	0.048	172.5	161.0	99.76	24.17	0.834
9:18	17.066	6.056	0.150	0.167	0.000	47.33	1.814	27.03	0.085	0.040	168.7	157.8	99.74	24.28	0.838
9:37	16.979	6.470	0.139	0.171	0.000	47.48	1.760	26.56	0.083	0.041	166.2	155.4	99.69	24.36	0.841
9:54	16.850	7.960	0.134	0.200	0.000	48.54	1.906	24.03	0.081	0.048	159.8	148.8	99.74	24.63	0.850
10:12	16.008	8.937	0.171	0.192	0.000	49.61	1.899	21.53	0.081	0.048	149.4	138.8	98.47	24.65	0.851
10:29	16.255	9.263	0.179	0.197	0.000	49.67	1.953	20.85	0.101	0.047	149.2	138.4	98.52	24.65	0.851
10:47	16.512	9.291	0.178	0.206	0.000	50.02	2.084	20.56	0.083	0.048	150.2	139.1	98.97	24.69	0.852
11: 5	16.414	8.967	0.179	0.200	0.000	49.90	2.115	20.92	0.103	0.048	151.7	140.7	98.85	24.63	0.850
11:22	16.795	8.506	0.176	0.205	0.000	48.84	2.039	21.66	0.109	0.051	154.8	143.7	98.39	24.34	0.840
11:40	17.008	8.461	0.178	0.205	0.000	48.21	2.013	22.39	0.108	0.050	157.5	146.3	98.61	24.34	0.840
11:58	17.498	7.854	0.177	0.204	0.000	48.39	2.197	23.26	0.108	0.050	163.7	152.1	99.74	24.41	0.843
12:15	17.215	7.619	0.187	0.205	0.000	47.70	2.130	23.56	0.103	0.052	163.2	151.8	98.77	24.18	0.835
12:33	17.485	7.322	0.187	0.199	0.000	47.34	2.115	23.92	0.101	0.048	164.8	153.3	98.71	24.05	0.830
12:51	17.433	7.010	0.184	0.200	0.000	47.28	2.190	24.55	0.100	0.048	167.4	155.8	99.00	24.09	0.831
13: 8	17.328	7.715	0.209	0.201	0.000	47.50	2.327	24.07	0.108	0.047	167.5	155.8	99.50	24.35	0.841
13:26	17.756	7.176	0.201	0.190	0.000	47.21	2.263	24.25	0.104	0.045	168.3	156.5	99.19	24.07	0.831
13:43	17.908	6.868	0.181	0.190	0.000	46.63	2.139	24.78	0.091	0.043	168.6	156.9	98.83	23.90	0.825
14: 1	17.228	6.527	0.175	0.178	0.000	46.78	1.926	25.40	0.089	0.043	165.9	154.7	98.34	23.91	0.825
14:37	16.851	6.231	0.161	0.176	0.000	47.45	1.892	26.53	0.000	0.000	164.6	153.8	99.30	24.21	0.836
14:54	16.800	6.188	0.158	0.168	0.000	47.03	1.820	26.44	0.073	0.039	165.8	155.0	98.71	24.08	0.831
15:57	12.986	10.355	0.253	0.099	0.000	54.86	1.041	18.10	0.066	0.042	119.1	111.0	97.81	25.57	0.883
16:17	13.268	10.498	0.180	0.256	0.000	54.96	2.393	16.02	0.108	0.139	132.0	122.0	97.82	25.39	0.876
16:36	10.092	12.864	0.287	0.172	0.000	59.40	2.024	12.39	0.096	0.082	104.8	96.9	97.40	26.51	0.915
16:55	9.396	13.170	0.343	0.172	0.000	61.33	2.101	11.18	0.092	0.077	100.2	92.5	97.86	26.86	0.927
17:33	11.126	12.834	0.331	0.210	0.000	59.90	2.449	11.63	0.100	0.091	111.8	102.8	98.68	26.54	0.916
17:52	12.143	12.785	0.168	0.183	0.000	58.28	2.158	12.30	0.092	0.089	110.9	102.0	98.20	26.17	0.903
18:12	12.381	12.549	0.091	0.161	0.000	60.61	1.974	10.69	0.008	0.039	99.8	91.3	98.51	26.16	0.903
18:31	12.116	13.859	0.106	0.150	0.000	59.42	1.864	11.28	0.042	0.075	101.5	93.1	98.91	26.57	0.917

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 3/1983

18:50	11.493	13.559	0.089	0.127	0.000	59.74	1.628	11.67	0.055	0.058	97.5	89.7	98.42	26.58	0.917
19: 9	11.442	13.249	0.081	0.133	0.000	59.83	1.579	12.34	0.049	0.056	98.8	91.1	98.76	26.64	0.920
19:28	12.571	13.136	0.114	0.107	0.000	58.59	1.475	12.89	0.046	0.046	103.0	94.8	98.97	26.40	0.911
19:47	13.183	13.031	0.084	0.119	0.000	57.44	1.437	13.57	0.045	0.047	106.5	98.0	98.95	26.22	0.905
20: 6	11.498	12.409	0.096	0.117	0.000	59.44	1.481	13.60	0.052	0.052	102.0	94.3	98.74	26.50	0.915
20:26	12.685	12.406	0.120	0.142	0.000	57.47	1.635	14.24	0.057	0.058	110.5	102.0	98.81	26.19	0.904
20:45	12.970	12.502	0.122	0.138	0.000	57.14	1.608	14.22	0.064	0.058	111.2	102.6	98.83	26.14	0.902
21: 4	12.168	12.305	0.140	0.141	0.000	57.73	1.642	14.46	0.067	0.058	110.2	101.9	98.71	26.28	0.907
21:23	12.597	11.389	0.156	0.122	0.000	56.95	1.608	15.81	0.065	0.052	115.3	106.8	98.75	26.04	0.899
21:42	12.256	11.840	0.165	0.128	0.000	57.62	1.656	14.87	0.063	0.051	111.8	103.5	98.65	26.17	0.903
22: 1	13.613	11.085	0.160	0.155	0.000	55.36	1.859	16.44	0.072	0.064	124.2	114.9	98.80	25.71	0.888
22:20	13.849	11.086	0.161	0.170	0.000	55.27	2.017	16.24	0.082	0.073	126.7	117.1	98.95	25.68	0.886
22:39	14.110	10.594	0.151	0.162	0.000	54.51	1.871	17.01	0.080	0.069	128.1	118.5	98.56	25.44	0.878
22:59	14.192	10.268	0.137	0.157	0.000	54.13	1.781	17.43	0.078	0.067	128.4	118.9	98.24	25.29	0.873
23:18	14.359	10.022	0.131	0.166	0.000	53.95	1.857	17.91	0.074	0.069	131.3	121.6	98.54	25.28	0.873
23:37	14.621	10.088	0.122	0.159	0.000	53.81	1.781	17.66	0.074	0.070	130.3	120.6	98.38	25.18	0.869
23:56	14.415	10.469	0.124	0.167	0.000	54.08	1.856	16.98	0.073	0.072	128.4	118.7	98.23	25.25	0.872

8/ 4/1983

0:16	12.292	8.374	0.098	0.130	0.000	58.21	1.529	14.00	0.059	0.058	106.9	98.7	94.75	24.53	0.847
0:35	14.856	9.847	0.134	0.185	0.000	52.29	1.919	18.30	0.012	0.078	133.9	124.0	97.62	24.85	0.858
0:54	15.049	9.414	0.136	0.178	0.000	51.63	1.860	18.67	0.067	0.079	136.4	126.3	97.08	24.59	0.849
1:13	15.191	8.827	0.138	0.170	0.000	50.91	1.779	19.87	0.079	0.072	139.9	129.8	97.04	24.46	0.844
1:32	15.735	8.421	0.135	0.156	0.000	50.07	1.781	20.47	0.075	0.063	142.9	132.7	96.90	24.21	0.836
1:51	15.410	7.793	0.145	0.171	0.000	49.59	1.743	21.75	0.072	0.067	146.0	136.0	96.75	24.16	0.834
2:11	15.443	7.515	0.156	0.168	0.000	50.36	1.863	21.48	0.079	0.070	146.9	136.6	97.13	24.20	0.835
2:50	15.348	8.371	0.126	0.138	0.000	49.80	1.278	21.61	0.079	0.057	139.7	130.2	96.81	24.34	0.840
3: 9	14.945	7.484	0.108	0.118	0.000	50.83	1.359	22.43	0.067	0.050	140.8	131.5	97.39	24.45	0.844
3:28	14.956	7.303	0.101	0.124	0.000	50.29	1.382	23.31	0.062	0.051	143.7	134.4	97.57	24.47	0.845
3:47	14.606	7.298	0.101	0.131	0.000	49.84	1.347	23.06	0.060	0.053	141.6	132.5	96.49	24.26	0.837
4: 6	14.086	8.376	0.115	0.142	0.000	51.29	1.528	21.16	0.059	0.059	136.2	127.1	96.82	24.64	0.850
4:25	13.609	9.106	0.121	0.143	0.000	52.16	1.556	19.86	0.059	0.060	130.9	122.0	96.67	24.83	0.857
4:44	13.542	9.746	0.132	0.170	0.000	53.42	1.827	18.28	0.062	0.075	129.4	120.2	97.25	25.09	0.866
5: 2	13.161	10.713	0.120	0.149	0.000	53.96	1.596	16.89	0.068	0.069	120.9	112.1	96.73	25.22	0.871
5:21	13.293	10.897	0.124	0.157	0.000	54.60	1.759	16.68	0.066	0.064	122.3	113.3	97.64	25.45	0.879
5:40	13.501	10.607	0.126	0.172	0.000	53.92	1.821	17.19	0.071	0.073	125.8	116.6	97.48	25.30	0.873
5:59	14.370	9.836	0.115	0.170	0.000	52.71	1.824	18.59	0.073	0.074	133.1	123.5	97.77	25.03	0.864
6:18	14.014	9.399	0.118	0.159	0.000	51.89	1.629	19.62	0.073	0.070	133.0	123.8	96.98	24.86	0.858
6:37	14.401	8.931	0.114	0.170	0.000	51.43	1.707	20.34	0.071	0.074	137.5	128.0	97.23	24.74	0.854
6:56	14.733	8.653	0.117	0.172	0.000	51.10	1.757	20.93	0.072	0.074	141.1	131.4	97.61	24.71	0.853
7:15	15.259	7.808	0.122	0.170	0.000	49.85	1.786	22.23	0.074	0.073	147.3	137.3	97.37	24.37	0.841
7:34	15.486	7.646	0.129	0.165	0.000	50.07	1.779	21.73	0.078	0.075	146.6	136.4	97.16	24.23	0.836
7:53	15.714	7.661	0.140	0.183	0.000	49.54	1.879	22.28	0.080	0.081	150.8	140.3	97.56	24.27	0.838
8:12	15.274	7.876	0.133	0.171	0.000	49.71	1.693	22.15	0.078	0.075	146.6	136.6	97.16	24.33	0.840
8:31	15.195	8.043	0.138	0.166	0.000	50.14	1.765	21.83	0.078	0.073	145.9	135.9	97.43	24.44	0.844

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 4/1983															
8:50	15.214	7.962	0.137	0.164	0.000	50.21	1.743	21.82	0.080	0.074	145.7	135.8	97.39	24.42	0.843
9:28	14.896	8.505	0.132	0.165	0.000	50.30	1.613	20.89	0.074	0.074	140.2	130.5	96.65	24.40	0.842
9:47	15.117	8.219	0.135	0.170	0.000	50.17	1.686	21.39	0.077	0.075	143.5	133.6	97.04	24.40	0.842
10: 6	15.096	8.149	0.139	0.169	0.000	50.83	1.775	20.76	0.078	0.074	142.4	132.4	97.07	24.39	0.842
10:25	15.229	8.030	0.146	0.180	0.000	49.98	1.821	21.30	0.084	0.080	145.6	135.5	96.85	24.27	0.838
10:44	15.378	8.168	0.144	0.183	0.000	49.89	1.926	21.14	0.087	0.081	146.7	136.4	97.00	24.28	0.838
11: 4	14.979	8.102	0.138	0.195	0.000	49.81	1.884	21.07	0.088	0.087	145.1	135.0	96.35	24.20	0.835
11:23	15.280	8.220	0.152	0.105	0.000	49.40	2.100	21.09	0.087	0.088	146.9	136.6	96.52	24.16	0.834
11:42	15.488	8.308	0.157	0.192	0.000	49.36	2.004	20.85	0.096	0.086	147.6	137.1	96.54	24.14	0.833
12: 1	15.478	8.322	0.135	0.196	0.000	49.25	1.975	20.70	0.094	0.091	146.6	136.2	96.24	24.06	0.831
12:20	15.942	7.898	0.145	0.205	0.000	48.35	2.098	21.38	0.100	0.095	152.1	141.3	96.21	23.85	0.823
12:39	15.923	7.414	0.152	0.192	0.000	48.15	1.977	22.02	0.095	0.085	152.4	141.8	96.01	23.74	0.819
12:58	15.953	7.252	0.145	0.202	0.000	47.83	2.013	22.58	0.096	0.090	154.9	144.2	96.16	23.74	0.820
13:17	15.719	7.266	0.123	0.156	0.000	48.27	1.686	22.90	0.083	0.070	149.9	139.8	96.28	23.87	0.824
14:53	15.930	6.648	0.151	0.202	0.000	46.82	2.165	24.34	0.005	0.088	159.9	149.1	96.35	23.67	0.817
15:12	16.269	6.923	0.166	0.185	0.000	46.99	2.068	23.18	0.066	0.083	157.5	146.7	95.93	23.53	0.812
15:31	16.389	6.828	0.138	0.196	0.000	46.76	2.106	23.46	0.089	0.090	159.7	148.7	96.06	23.52	0.812
15:50	16.710	6.364	0.125	0.211	0.000	45.75	2.185	24.09	0.086	0.090	163.5	152.2	95.61	23.23	0.802
16: 9	15.907	6.021	0.108	0.202	0.000	47.13	2.001	23.77	0.079	0.090	157.5	146.8	95.31	23.32	0.805
16:28	16.348	5.948	0.118	0.202	0.000	46.04	1.974	25.25	0.076	0.086	163.3	152.5	96.04	23.40	0.808
16:47	16.368	5.586	0.094	0.192	0.000	46.01	1.844	25.88	0.075	0.086	163.5	152.8	96.13	23.38	0.807
17: 6	16.159	5.471	0.085	0.175	0.000	46.28	1.718	25.71	0.070	0.075	160.2	149.8	95.74	23.32	0.805
17:25	16.047	5.404	0.073	0.129	0.000	46.51	1.391	26.02	0.064	0.059	156.0	146.1	95.69	23.36	0.806
17:44	15.674	5.296	0.071	0.138	0.000	46.69	1.370	25.63	0.055	0.058	153.2	143.5	94.98	23.24	0.802
18: 3	15.021	5.270	0.070	0.147	0.000	46.70	1.385	26.43	0.054	0.064	154.1	144.7	95.14	23.45	0.809
18:22	15.120	5.290	0.076	0.174	0.000	46.40	1.613	26.46	0.057	0.076	157.7	148.0	95.27	23.43	0.809
18:42	15.250	5.733	0.092	0.192	0.000	46.90	1.790	25.59	0.065	0.087	158.2	148.1	95.70	23.57	0.814
19: 1	15.020	6.192	0.094	0.170	0.000	47.55	1.662	24.80	0.069	0.075	153.0	143.3	95.63	23.70	0.818
19:21	14.657	6.715	0.093	0.147	0.000	47.78	1.466	23.86	0.065	0.067	146.2	136.8	94.85	23.68	0.817
19:40	14.560	7.229	0.095	0.157	0.000	48.32	1.605	23.22	0.063	0.071	145.5	136.0	95.32	23.91	0.825
19:59	14.525	6.612	0.068	0.162	0.000	50.08	1.720	22.63	0.006	0.017	141.6	132.3	95.83	23.93	0.826
20:18	14.509	7.958	0.111	0.182	0.000	48.64	1.822	21.92	0.000	0.021	141.3	131.8	95.16	23.95	0.827
20:37	14.631	7.871	0.111	0.178	0.000	48.78	1.825	21.67	0.057	0.078	143.6	133.9	95.21	23.93	0.826
20:56	14.914	8.051	0.117	0.184	0.000	48.72	1.884	20.98	0.000	0.083	141.9	132.0	94.93	23.80	0.821
21:15	14.127	9.106	0.121	0.188	0.000	50.22	1.877	19.13	0.069	0.085	135.2	125.6	94.93	24.18	0.835
21:34	13.734	9.803	0.119	0.198	0.000	50.98	1.904	18.21	0.083	0.086	131.7	122.2	95.11	24.45	0.844
21:53	13.792	10.323	0.141	0.196	0.000	51.31	1.988	17.23	0.084	0.084	129.9	120.3	95.15	24.51	0.846
22:12	13.947	9.721	0.123	0.197	0.000	50.58	1.924	18.15	0.085	0.084	132.4	122.8	94.80	24.29	0.838
8/ 5/1983															
1:21	14.851	8.656	0.099	0.138	0.000	51.96	1.450	20.12	0.039	0.038	133.2	123.9	97.35	24.64	0.850
1:41	15.042	8.219	0.100	0.144	0.000	51.30	1.469	20.86	0.037	0.039	136.5	127.1	97.21	24.48	0.845
1:60	14.787	8.212	0.106	0.146	0.000	51.17	1.411	20.73	0.038	0.039	134.8	125.6	96.64	24.39	0.842
2:19	14.329	8.915	0.111	0.148	0.000	52.59	1.445	19.15	0.039	0.040	128.8	119.7	96.76	24.65	0.851
2:38	13.886	9.389	0.100	0.142	0.000	52.93	1.349	18.50	0.040	0.039	124.0	115.3	96.37	24.74	0.854

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 5/1983															
2:57	13.692	9.409	0.101	0.144	0.000	53.10	1.335	18.38	0.039	0.040	122.9	114.3	96.24	24.76	0.855
3:16	13.114	10.133	0.097	0.148	0.000	54.23	1.322	17.08	0.040	0.041	116.8	108.5	96.20	25.02	0.864
3:36	12.757	10.866	0.093	0.135	0.000	54.77	1.149	15.87	0.039	0.038	109.6	101.7	95.72	25.11	0.867
3:55	13.007	10.687	0.094	0.137	0.000	54.42	1.193	16.20	0.038	0.037	111.9	103.8	95.82	25.04	0.864
4:14	12.969	10.778	0.093	0.135	0.000	55.15	1.266	15.68	0.037	0.036	110.8	102.6	96.14	25.15	0.868
4:33	12.743	10.627	0.100	0.133	0.000	55.57	1.279	15.98	0.038	0.037	111.3	103.2	96.51	25.29	0.873
4:58	13.465	10.225	0.101	0.134	0.000	54.31	1.167	17.34	0.039	0.036	116.9	108.6	96.82	25.13	0.868
5:17	13.550	10.211	0.103	0.128	0.000	53.00	1.167	17.07	0.033	0.083	117.2	108.8	95.34	24.70	0.853
5:36	13.820	9.529	0.094	0.117	0.000	53.48	1.123	18.30	0.037	0.032	120.1	111.7	96.53	24.85	0.858
5:55	13.972	9.264	0.108	0.136	0.000	52.70	1.240	18.88	0.039	0.035	124.3	115.7	96.38	24.71	0.853
6:14	13.944	8.840	0.106	0.138	0.000	53.97	1.377	18.72	0.041	0.037	125.2	116.4	97.16	24.86	0.858
6:33	14.499	8.964	0.111	0.155	0.000	52.70	1.437	19.43	0.044	0.041	130.4	121.3	97.39	24.79	0.856
6:52	14.384	8.897	0.110	0.160	0.000	52.26	1.366	19.39	0.443	0.421	148.1	137.8	97.42	24.95	0.861
7:10	14.590	8.662	0.106	0.154	0.000	52.00	1.345	20.10	0.045	0.424	141.5	131.6	97.42	24.80	0.856
7:29	14.472	8.681	0.109	0.157	0.000	51.97	1.369	20.13	0.044	0.042	131.9	122.8	96.97	24.64	0.851
7:48	15.007	8.296	0.114	0.158	0.000	51.03	1.400	20.71	0.045	0.043	136.0	126.6	96.80	24.39	0.842
8:26	14.891	7.774	0.106	0.142	0.000	50.82	1.320	21.90	0.033	0.030	137.6	128.4	97.01	24.40	0.842
8:45	15.016	7.865	0.110	0.154	0.000	50.70	1.351	21.82	0.016	0.043	138.3	129.0	97.08	24.40	0.842
9: 4	14.671	7.915	0.118	0.149	0.000	50.74	1.340	21.39	0.026	0.042	135.9	126.8	96.39	24.31	0.839
9:23	14.854	8.149	0.122	0.115	0.000	50.38	1.300	20.94	0.047	0.041	134.6	125.4	95.96	24.18	0.835
9:42	14.779	8.295	0.111	0.142	0.000	50.94	1.253	20.43	0.048	0.039	132.5	123.4	96.04	24.26	0.837
10: 1	14.357	8.401	0.110	0.141	0.000	51.50	1.228	20.14	0.043	0.038	129.8	120.9	95.96	24.36	0.841
10:20	14.575	8.129	0.119	0.150	0.000	50.77	1.350	20.94	0.045	0.040	134.7	125.6	96.12	24.29	0.839
10:39	13.915	8.410	0.106	0.149	0.000	51.93	1.331	20.41	0.042	0.040	130.4	121.6	96.34	24.57	0.848
10:58	14.353	8.234	0.113	0.154	0.000	51.46	1.395	20.46	0.043	0.041	132.8	123.8	96.25	24.40	0.842
11:17	14.626	7.965	0.122	0.156	0.000	50.64	1.414	20.76	0.046	0.042	135.2	125.9	95.78	24.15	0.834
11:36	14.674	7.995	0.123	0.153	0.000	50.47	1.395	21.02	0.045	0.410	145.1	135.2	96.28	24.35	0.840
11:55	14.731	8.014	0.123	0.155	0.000	50.42	1.390	20.95	0.046	0.043	135.9	126.6	95.88	24.16	0.834
12:14	14.513	8.251	0.128	0.162	0.000	50.87	1.492	20.22	0.046	0.044	134.1	124.8	95.72	24.20	0.835
13:13	14.234	8.633	0.108	0.152	0.000	51.71	1.214	20.13	0.044	0.004	128.5	119.8	96.22	24.50	0.846
13:33	14.010	9.565	0.111	0.160	0.000	52.12	1.414	19.99	0.047	0.040	130.5	121.6	97.46	25.04	0.864
13:52	14.465	8.740	0.104	0.158	0.000	52.06	1.351	19.94	0.046	0.041	131.1	122.0	96.90	24.64	0.851
14:11	13.817	8.397	0.109	0.160	0.000	52.38	1.299	19.37	0.046	0.041	126.8	118.1	95.63	24.40	0.842
14:30	14.909	8.361	0.109	0.151	0.000	51.22	1.294	19.89	0.046	0.039	131.7	122.5	96.02	24.22	0.836
14:49	15.170	8.117	0.110	0.151	0.000	50.79	1.228	20.37	0.046	0.039	133.4	124.1	96.02	24.12	0.833
15: 8	14.778	8.198	0.115	0.157	0.000	50.37	1.132	20.47	0.049	0.040	131.8	122.8	95.31	24.05	0.830
15:27	15.007	8.040	0.121	0.165	0.000	50.38	1.300	20.40	0.051	0.042	134.3	125.0	95.50	24.00	0.828
15:45	14.831	8.105	0.112	0.153	0.000	50.79	1.043	20.59	0.047	0.039	131.2	122.3	95.71	24.14	0.833
16:24	14.387	7.837	0.116	0.150	0.000	50.64	1.024	21.26	0.043	0.037	131.7	123.0	95.50	24.16	0.834
16:43	14.628	7.689	0.121	0.151	0.000	50.36	1.049	21.45	0.045	0.038	133.4	124.6	95.53	24.08	0.831
17: 2	14.612	7.752	0.121	0.149	0.000	50.03	0.949	21.53	0.044	0.037	132.6	123.8	95.23	24.02	0.829
17:21	14.731	7.807	0.124	0.160	0.000	50.62	1.180	21.54	0.046	0.049	135.9	126.9	96.26	24.26	0.837
17:59	14.635	7.835	0.129	0.150	0.000	50.99	1.166	21.50	0.047	0.038	134.9	126.0	96.49	24.36	0.841
18:37	14.727	7.704	0.115	0.144	0.000	50.49	0.995	21.58	0.043	0.036	133.3	124.5	95.84	24.15	0.834
18:56	14.926	7.678	0.133	0.152	0.000	50.79	1.128	21.36	0.048	0.039	135.2	126.1	96.25	24.19	0.835
19:16	15.205	7.410	0.139	0.151	0.000	50.35	1.136	21.84	0.050	0.038	137.9	128.6	96.32	24.10	0.832

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 5/1983

19:35	14.604	7.576	0.129	0.154	0.000	50.67	1.068	21.75	0.047	0.039	134.8	125.9	96.03	24.21	0.836
19:54	15.032	7.469	0.132	0.157	0.000	50.84	1.259	22.06	0.051	0.040	139.3	130.0	97.04	24.34	0.840
20:13	14.786	7.523	0.124	0.151	0.000	50.90	1.152	21.83	0.048	0.040	136.4	127.3	96.56	24.29	0.838
20:32	14.675	7.421	0.112	0.141	0.000	50.37	0.986	22.00	0.043	0.035	134.3	125.5	95.78	24.10	0.832
20:50	14.721	7.440	0.111	0.146	0.000	50.64	1.091	22.42	0.043	0.036	136.9	128.0	96.65	24.32	0.840
21: 9	14.710	7.609	0.111	0.152	0.000	50.10	1.057	21.94	0.044	0.039	135.2	126.4	95.76	24.11	0.832
21:28	14.382	7.655	0.109	0.157	0.000	48.96	0.996	22.04	0.045	0.041	134.0	125.3	94.38	23.82	0.822
22:44	14.729	8.206	0.122	0.177	0.000	52.24	1.707	21.36	0.050	0.046	140.9	131.3	98.63	24.93	0.860
23: 3	14.815	8.091	0.112	0.166	0.000	51.07	1.439	21.53	0.047	0.043	138.5	129.2	97.31	24.55	0.847
23:22	15.240	7.868	0.120	0.173	0.000	51.43	1.645	21.75	0.039	0.046	142.8	133.0	98.31	24.66	0.851
23:41	15.344	7.837	0.130	0.173	0.000	51.04	1.619	21.66	0.049	0.043	142.9	133.1	97.89	24.51	0.846

8/ 6/1983

0: 0	15.061	7.956	0.126	0.164	0.000	51.67	1.564	20.53	0.048	0.040	137.5	127.9	97.17	24.41	0.843
0:20	14.949	8.302	0.129	0.159	0.000	51.64	1.580	21.25	0.047	0.039	139.5	130.0	98.09	24.75	0.854
0:39	15.212	8.423	0.122	0.163	0.000	52.14	1.756	21.10	0.050	0.042	141.8	131.9	99.00	24.93	0.861
0:58	14.981	8.155	0.123	0.163	0.000	51.55	1.588	21.41	0.049	0.042	140.4	130.8	98.06	24.71	0.853
1:17	14.985	7.928	0.116	0.156	0.000	51.65	1.564	21.74	0.045	0.039	140.8	131.2	98.22	24.72	0.853
1:36	14.834	7.826	0.110	0.152	0.000	51.58	1.475	21.74	0.043	0.038	139.1	129.8	97.79	24.63	0.850
1:55	15.207	7.792	0.118	0.162	0.000	51.34	1.598	22.19	0.044	0.041	143.4	133.7	98.49	24.71	0.853
2:14	15.470	7.741	0.125	0.167	0.000	51.77	1.744	22.17	0.045	0.041	145.9	135.9	99.27	24.83	0.857
2:33	15.490	7.580	0.121	0.165	0.000	51.66	1.672	22.42	0.046	0.041	146.0	136.1	99.19	24.79	0.856
2:53	15.624	7.604	0.140	0.170	0.000	51.39	1.039	22.15	0.049	0.043	139.7	130.3	98.21	24.56	0.848
3:12	15.400	7.763	0.143	0.179	0.000	51.04	1.598	21.73	0.052	0.044	143.5	133.7	97.94	24.50	0.846
3:31	15.653	7.769	0.141	0.169	0.000	51.74	1.713	21.65	0.052	0.042	145.0	134.9	98.93	24.70	0.853
3:50	15.694	7.692	0.118	0.168	0.000	51.59	0.944	21.67	0.051	0.042	137.0	127.7	97.97	24.50	0.846
4:29	15.548	7.623	0.120	0.158	0.000	51.50	1.581	21.63	0.048	0.040	142.6	132.8	98.25	24.53	0.847
4:48	14.998	7.864	0.129	0.157	0.000	51.39	1.350	21.55	0.049	0.040	138.4	129.0	97.52	24.53	0.847
5: 7	14.977	7.816	0.119	0.145	0.000	51.60	1.339	21.41	0.044	0.036	137.2	127.9	97.49	24.52	0.846
5:26	15.089	7.750	0.120	0.145	0.000	51.50	1.363	21.58	0.046	0.037	138.4	129.0	97.63	24.52	0.846
5:45	15.199	7.630	0.124	0.151	0.000	51.35	1.416	21.72	0.047	0.038	139.9	130.4	97.67	24.48	0.845
6: 5	14.970	7.761	0.130	0.153	0.000	51.51	1.356	21.47	0.048	0.379	146.6	136.5	97.77	24.65	0.851
6:24	14.949	7.753	0.111	0.162	0.000	52.40	0.846	21.78	0.050	0.041	133.7	124.9	98.09	24.75	0.854
6:43	15.160	7.689	0.133	0.163	0.000	51.04	1.478	21.79	0.051	0.040	141.2	131.6	97.55	24.46	0.844
7:23	14.890	8.052	0.122	0.154	0.000	51.37	1.105	21.83	0.046	0.038	136.2	127.1	97.60	24.64	0.851
7:42	14.868	7.746	0.121	0.168	0.000	52.31	1.587	21.31	0.048	0.042	139.7	130.1	98.20	24.71	0.853
8: 1	14.760	7.377	0.116	0.157	0.000	52.49	1.406	20.90	0.046	0.039	135.8	126.5	97.29	24.44	0.844
8:20	15.204	7.500	0.128	0.172	0.000	51.06	1.513	21.85	0.049	0.044	142.0	132.4	97.53	24.41	0.842
8:39	15.133	7.863	0.125	0.164	0.000	51.72	1.503	21.25	0.047	0.041	139.4	129.8	97.84	24.57	0.848
8:58	14.971	8.085	0.124	0.171	0.000	51.28	1.501	20.56	0.048	0.043	136.9	127.4	96.78	24.35	0.841
9:17	14.967	8.158	0.118	0.160	0.000	51.51	1.451	20.65	0.047	0.041	136.3	126.9	97.11	24.46	0.844
9:36	14.973	8.192	0.119	0.162	0.000	51.79	1.480	20.72	0.045	0.038	136.8	127.3	97.53	24.58	0.848
9:55	14.576	8.244	0.122	0.162	0.000	51.93	1.337	20.48	0.049	0.042	133.5	124.3	96.94	24.54	0.847
10:14	14.888	7.947	0.127	0.163	0.000	51.13	1.395	21.20	0.048	0.040	137.4	128.1	96.94	24.41	0.842
10:33	15.076	7.938	0.129	0.162	0.000	52.04	1.645	21.55	0.049	0.041	141.7	132.0	98.62	24.80	0.856

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 6/1983															
10:52	15.087	8.050	0.125	0.162	0.000	51.08	1.442	21.04	0.048	0.042	138.0	128.5	97.08	24.41	0.842
11:10	14.857	8.269	0.123	0.170	0.000	51.44	1.521	20.92	0.051	0.045	137.9	128.5	97.39	24.58	0.848
11:29	15.327	7.960	0.113	0.168	0.000	51.03	1.438	20.01	0.050	0.045	135.5	125.9	96.14	24.07	0.831
11:48	15.711	7.483	0.124	0.175	0.000	49.68	1.501	21.68	0.060	0.048	143.3	133.4	96.46	23.98	0.828
12: 7	15.218	7.243	0.122	0.169	0.000	50.12	1.436	22.35	0.049	0.045	142.8	133.2	96.75	24.15	0.834
12:26	15.431	7.181	0.125	0.179	0.000	49.49	1.455	22.37	0.054	0.048	144.1	134.4	96.34	23.97	0.827
12:45	15.516	7.317	0.132	0.177	0.000	50.14	1.597	22.14	0.053	0.047	145.1	135.2	97.12	24.17	0.834
13: 4	15.349	7.827	0.137	0.182	0.000	50.20	1.558	20.98	0.056	0.050	140.8	131.0	96.34	24.08	0.831
13:23	15.235	8.245	0.136	0.192	0.000	51.10	1.637	20.63	0.012	0.053	139.3	129.5	97.23	24.42	0.843
13:42	15.368	8.228	0.136	0.193	0.000	50.64	1.635	20.70	0.054	0.057	141.0	131.1	97.01	24.32	0.840
14:20	15.797	7.675	0.141	0.196	0.000	50.20	1.696	21.51	0.079	0.060	146.4	136.2	97.36	24.22	0.836
14:39	15.754	7.327	0.132	0.198	0.000	50.26	1.674	22.15	0.077	0.061	148.0	137.8	97.64	24.25	0.837
14:59	15.576	6.875	0.131	0.296	0.000	49.59	1.539	22.77	0.076	0.063	149.8	139.7	96.91	24.04	0.830
15:18	16.771	6.472	0.131	0.191	0.000	48.52	1.686	23.44	0.056	0.049	154.6	144.0	97.32	23.76	0.820
15:38	16.211	6.533	0.130	0.188	0.000	49.37	1.658	23.72	0.052	0.047	153.2	142.8	97.90	24.08	0.831
15:57	16.622	6.494	0.131	0.168	0.000	48.86	1.505	24.68	0.051	0.041	155.5	145.2	98.55	24.16	0.834
16:16	16.259	6.470	0.129	0.172	0.000	48.87	1.507	25.05	0.051	0.041	155.6	145.5	98.55	24.25	0.837
16:35	16.295	6.028	0.116	0.141	0.000	49.18	1.367	25.71	0.046	0.034	155.4	145.4	98.92	24.29	0.838
16:54	16.543	5.988	0.115	0.158	0.000	48.84	1.422	25.91	0.048	0.039	157.8	147.7	99.06	24.25	0.837
17:13	15.989	5.897	0.118	0.170	0.000	48.96	1.447	26.20	0.051	0.043	157.7	147.7	98.88	24.33	0.840
17:32	16.585	5.696	0.102	0.165	0.000	48.50	1.356	26.63	0.049	0.041	159.6	149.5	99.13	24.22	0.836
17:51	16.409	5.568	0.103	0.174	0.000	48.65	1.509	26.83	0.048	0.043	161.4	151.2	99.33	24.29	0.838
18:10	15.955	5.597	0.093	0.156	0.000	49.93	1.448	26.67	0.046	0.038	158.2	148.3	99.93	24.58	0.849
18:29	16.085	5.670	0.100	0.178	0.000	49.05	1.479	26.79	0.046	0.045	160.0	150.0	99.44	24.42	0.843
18:48	16.377	5.655	0.110	0.184	0.000	48.52	1.534	26.63	0.049	0.047	161.4	151.1	99.11	24.25	0.837
19: 7	16.301	5.891	0.112	0.199	0.000	49.06	1.816	25.63	0.053	0.050	161.2	150.7	99.11	24.27	0.838
19:26	15.699	6.341	0.107	0.207	0.000	49.70	1.781	25.34	0.055	0.052	158.1	147.9	99.28	24.55	0.848
19:45	15.982	6.716	0.106	0.200	0.000	49.43	1.732	24.38	0.056	0.050	155.3	145.0	98.65	24.37	0.841
20: 4	15.562	7.034	0.107	0.202	0.000	50.46	1.716	23.75	0.059	0.051	151.9	141.8	98.94	24.61	0.850
20:23	15.738	6.862	0.104	0.200	0.000	49.77	1.739	24.53	0.056	0.051	155.1	144.9	99.05	24.57	0.848
20:42	15.332	6.665	0.101	0.213	0.000	49.59	1.795	24.82	0.056	0.056	155.6	145.5	98.63	24.52	0.846
21: 1	15.632	6.557	0.104	0.202	0.000	49.28	1.737	24.74	0.055	0.052	155.4	145.3	98.36	24.35	0.841
21:20	15.431	6.533	0.113	0.203	0.000	49.65	1.816	24.58	0.052	0.053	155.2	145.1	98.43	24.41	0.843
21:40	14.868	7.099	0.111	0.205	0.000	50.48	1.752	23.26	0.056	0.052	148.5	138.8	97.88	24.50	0.846
21:59	15.441	7.373	0.112	0.182	0.000	50.47	1.811	22.48	0.053	0.046	147.9	137.8	97.97	24.41	0.843
22:18	15.676	6.750	0.090	0.176	0.000	49.99	1.717	24.13	0.047	0.044	152.3	142.3	98.62	24.44	0.844
22:37	15.584	6.854	0.093	0.187	0.000	50.18	1.734	23.81	0.047	0.047	151.5	141.5	98.54	24.46	0.844
22:56	16.055	7.054	0.103	0.193	0.000	49.60	1.872	23.40	0.052	0.050	153.6	143.1	98.38	24.31	0.839
23:15	15.623	6.754	0.095	0.197	0.000	49.73	1.742	24.77	0.050	0.050	155.1	145.0	99.01	24.57	0.848
23:54	16.027	6.289	0.098	0.187	0.000	48.52	1.685	25.32	0.051	0.049	157.5	147.3	98.23	24.17	0.834
8/ 7/1983															
0:33	16.088	6.276	0.111	0.216	0.000	48.67	1.931	25.56	0.053	0.056	161.9	151.3	98.96	24.33	0.840
0:52	16.310	6.141	0.115	0.217	0.000	48.02	1.960	25.65	0.054	0.055	163.3	152.6	98.53	24.13	0.833
1:11	16.465	5.791	0.110	0.201	0.000	47.94	1.876	26.33	0.051	0.050	164.5	153.9	98.81	24.12	0.833

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 7/1983															
1:30	16.509	5.449	0.105	0.204	0.000	47.86	1.952	26.82	0.052	0.051	167.1	156.3	99.01	24.10	0.832
1:49	17.109	5.252	0.106	0.197	0.000	47.30	2.029	27.13	0.051	0.049	170.6	159.5	99.22	23.97	0.827
2: 8	16.892	4.981	0.101	0.183	0.000	48.10	1.953	27.22	0.048	0.045	168.9	158.0	99.52	24.07	0.831
2:27	16.748	5.037	0.101	0.017	0.000	47.71	1.801	27.59	0.046	0.004	164.1	153.8	99.05	23.99	0.828
2:47	16.812	5.379	0.095	0.173	0.000	48.35	1.781	26.97	0.046	0.045	165.8	155.1	99.66	24.21	0.836
3: 6	16.658	5.309	0.093	0.169	0.000	47.83	1.644	27.16	0.045	0.044	164.4	153.9	98.96	24.06	0.831
3:44	16.296	5.061	0.106	0.181	0.000	47.76	1.751	27.88	0.048	0.047	167.2	156.7	99.13	24.15	0.834
4: 3	16.082	5.077	0.107	0.182	0.000	48.01	1.710	27.00	0.049	0.047	163.3	153.0	98.27	23.97	0.828
4:22	16.400	5.246	0.107	0.188	0.000	47.85	1.811	27.49	0.048	0.049	167.0	156.5	99.18	24.16	0.834
4:42	16.488	5.260	0.114	0.206	0.000	48.20	1.985	27.23	0.052	0.054	168.9	158.1	99.59	24.24	0.837
5: 1	16.954	5.266	0.110	0.214	0.000	47.97	1.015	26.63	0.054	0.051	158.7	148.6	98.26	23.86	0.824
5:20	17.042	5.723	0.132	0.221	0.000	48.31	1.051	25.94	0.056	0.056	157.8	147.6	98.53	23.98	0.828
5:39	16.873	6.279	0.128	0.220	0.000	48.72	1.152	24.74	0.056	0.058	154.4	144.1	98.22	24.02	0.829
5:58	17.028	6.553	0.125	0.230	0.000	48.65	1.105	23.68	0.059	0.061	151.3	141.1	97.49	23.82	0.822
6:18	17.032	6.600	0.136	0.245	0.000	48.77	2.666	24.39	0.062	0.064	170.0	158.1	99.97	24.34	0.840
6:37	17.699	7.271	0.243	0.255	0.000	48.72	3.101	22.41	0.080	0.063	172.5	159.7	99.84	24.19	0.835
6:56	17.104	7.467	0.118	0.190	0.000	49.85	0.966	22.48	0.052	0.000	143.8	133.8	98.23	24.16	0.834
7:15	16.617	7.529	0.149	0.153	0.000	50.21	1.035	22.80	0.050	0.040	144.7	134.9	98.58	24.39	0.842
7:35	16.864	7.096	0.136	0.131	0.000	50.13	1.768	23.64	0.045	0.034	154.8	144.1	99.84	24.52	0.846
7:54	16.969	6.887	0.131	0.125	0.000	49.48	1.642	23.88	0.053	0.032	154.6	144.0	99.20	24.30	0.839
8:47	16.146	6.887	0.130	0.140	0.000	49.02	1.089	25.09	0.042	0.034	150.2	140.6	98.58	24.40	0.842
9: 6	15.994	6.617	0.178	0.148	0.000	49.70	1.716	25.62	0.046	0.035	158.8	148.6	100.05	24.74	0.854
9:25	15.325	6.129	0.119	0.133	0.000	49.40	1.433	26.94	0.038	0.032	156.5	147.0	99.55	24.73	0.853
9:44	15.907	6.114	0.121	0.140	0.000	48.91	1.460	26.36	0.040	0.033	157.1	147.2	99.09	24.44	0.844
10: 3	15.356	6.234	0.118	0.147	0.000	50.52	1.503	25.83	0.040	0.000	153.3	143.7	99.75	24.78	0.855
10:22	16.255	6.242	0.125	0.170	0.000	48.24	1.639	26.25	0.044	0.042	160.6	150.3	99.01	24.33	0.840
10:41	16.065	6.306	0.125	0.171	0.000	48.62	1.672	25.78	0.048	0.047	159.0	148.7	98.83	24.34	0.840
10:59	16.461	6.607	0.138	0.187	0.000	48.15	1.826	25.23	0.052	0.049	160.7	150.1	98.70	24.23	0.836
11:18	17.242	6.703	0.142	0.187	0.000	50.28	1.704	24.74	0.054	0.048	160.5	149.6	101.10	24.73	0.854
11:37	16.075	7.046	0.153	0.181	0.000	52.31	1.707	23.78	0.056	0.046	153.8	143.4	101.35	25.16	0.868
11:56	16.012	7.102	0.129	0.182	0.000	52.44	1.688	22.20	0.054	0.047	147.9	137.7	99.85	24.76	0.855
12:15	16.240	7.690	0.110	0.180	0.000	52.96	1.693	22.36	0.049	0.047	148.8	138.4	101.33	25.21	0.870
12:34	15.441	7.780	0.116	0.178	0.000	53.74	1.607	21.80	0.051	0.046	143.6	133.7	100.76	25.28	0.873
12:53	15.114	7.540	0.110	0.178	0.000	53.75	1.589	22.03	0.051	0.046	143.0	133.3	100.41	25.23	0.871
13:12	14.965	7.873	0.113	0.179	0.000	54.22	1.608	21.71	0.050	0.046	141.7	132.1	100.76	25.42	0.878
13:31	14.638	7.518	0.107	0.155	0.000	54.40	1.452	21.98	0.044	0.041	139.1	129.9	100.33	25.35	0.875
13:50	14.438	7.970	0.109	0.153	0.000	55.27	1.451	21.43	0.043	0.039	136.7	127.5	100.90	25.63	0.885
14: 9	14.032	7.893	0.117	0.171	0.000	55.65	1.580	21.34	0.045	0.043	136.9	127.8	100.87	25.70	0.887
14:28	15.100	8.447	0.116	0.163	0.000	53.92	1.585	21.31	0.045	0.042	140.2	130.6	100.73	25.47	0.879
14:47	15.417	7.828	0.112	0.160	0.000	53.53	1.564	21.63	0.042	0.042	141.8	132.1	100.33	25.18	0.869
15: 6	15.272	7.963	0.106	0.142	0.000	53.66	1.498	21.95	0.038	0.035	141.0	131.5	100.66	25.34	0.875
15:25	15.338	7.745	0.107	0.142	0.000	53.87	1.472	22.06	0.038	0.037	141.4	131.8	100.81	25.33	0.874
15:44	15.265	7.851	0.107	0.133	0.000	53.86	1.394	21.88	0.036	0.035	139.5	130.1	100.55	25.30	0.873
16: 3	15.511	7.622	0.114	0.141	0.000	53.43	1.427	21.79	0.038	0.038	140.8	131.1	100.12	25.08	0.866
16:22	15.325	7.528	0.113	0.137	0.000	53.64	1.425	22.33	0.039	0.037	141.8	132.2	100.57	25.24	0.871
16:41	15.148	7.371	0.101	0.139	0.000	53.97	1.389	22.36	0.037	0.037	140.7	131.4	100.55	25.26	0.872

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 7/1983															
17: 1	15.331	7.493	0.096	0.134	0.000	53.66	1.329	22.06	0.037	0.037	139.6	130.2	100.18	25.13	0.868
17:20	15.015	7.557	0.095	0.135	0.000	54.16	1.374	21.92	0.038	0.036	138.6	129.3	100.33	25.26	0.872
17:39	15.132	8.109	0.098	0.143	0.000	54.59	1.429	20.99	0.040	0.038	136.8	127.4	100.57	25.38	0.876
17:58	14.868	8.190	0.095	0.144	0.000	54.39	1.378	21.05	0.041	0.038	135.6	126.4	100.20	25.36	0.876
18:17	15.041	7.761	0.098	0.141	0.000	53.75	1.427	22.11	0.040	0.037	140.0	130.6	100.41	25.30	0.873
18:36	15.185	7.702	0.098	0.133	0.000	52.92	1.331	22.46	0.040	0.035	140.5	131.1	99.90	25.13	0.867
18:55	15.373	7.639	0.099	0.139	0.000	53.17	1.371	21.88	0.040	0.036	139.8	130.3	99.75	25.02	0.864
19:14	15.506	7.863	0.102	0.148	0.000	52.97	1.430	21.80	0.041	0.039	140.8	131.2	99.90	25.06	0.865
19:34	15.458	7.793	0.104	0.150	0.000	52.84	1.419	21.79	0.042	0.040	140.6	131.0	99.64	24.99	0.862
19:53	15.354	8.094	0.120	0.160	0.000	52.96	1.514	21.44	0.045	0.041	140.7	131.0	99.73	25.08	0.866
20:12	14.866	7.885	0.116	0.155	0.000	54.37	1.526	21.13	0.043	0.000	137.0	127.6	100.09	25.26	0.872
20:31	15.651	7.832	0.112	0.145	0.000	52.71	1.492	21.90	0.042	0.039	142.4	132.6	99.92	25.01	0.863
20:50	15.948	7.609	0.111	0.146	0.000	52.63	1.473	22.17	0.045	0.039	144.1	134.2	100.16	24.97	0.862
21: 9	16.088	7.659	0.116	0.156	0.000	52.49	1.518	21.80	0.047	0.041	144.2	134.1	99.91	24.87	0.858
21:28	16.262	8.003	0.111	0.152	0.000	52.56	1.480	21.53	0.044	0.039	143.2	133.1	100.19	24.96	0.862
21:47	15.838	7.884	0.095	0.133	0.000	52.43	1.283	22.16	0.038	0.035	141.1	131.5	99.90	24.99	0.863
22: 7	15.326	7.560	0.116	0.148	0.000	53.94	1.434	22.04	0.042	0.039	141.3	131.7	100.64	25.26	0.872
22:26	16.061	7.651	0.111	0.144	0.000	52.01	1.423	22.43	0.040	0.038	144.6	134.7	99.91	24.88	0.859
22:45	15.876	7.657	0.105	0.141	0.000	52.49	1.403	22.15	0.040	0.037	142.7	133.0	99.89	24.93	0.860
23: 4	15.941	7.958	0.109	0.146	0.000	52.90	1.399	21.63	0.017	0.038	140.9	131.1	100.15	25.03	0.864
23:23	15.813	8.275	0.114	0.148	0.000	53.01	1.418	16.09	0.042	0.039	123.6	113.8	94.95	23.66	0.817
23:42	15.900	8.063	0.106	0.153	0.000	53.11	1.476	16.19	0.043	0.040	124.8	114.9	95.08	23.63	0.816
8/ 8/1983															
0: 2	15.990	8.351	0.109	0.155	0.000	53.17	1.520	15.09	0.044	0.040	122.1	112.1	94.47	23.48	0.810
0:21	15.801	8.423	0.115	0.152	0.000	53.24	1.546	15.21	0.043	0.040	122.2	112.3	94.58	23.57	0.813
0:40	15.962	8.169	0.114	0.156	0.000	52.68	1.490	16.10	0.000	0.041	124.1	114.2	94.71	23.52	0.812
0:59	15.842	8.397	0.121	0.171	0.000	52.84	1.558	16.40	0.048	0.045	126.9	116.9	95.42	23.79	0.821
1:19	15.891	8.114	0.120	0.164	0.000	52.41	1.489	17.35	0.046	0.044	129.2	119.3	95.63	23.80	0.821
1:38	16.146	7.971	0.116	0.162	0.000	52.21	1.579	17.66	0.044	0.043	131.8	121.6	95.93	23.78	0.821
1:57	15.994	8.084	0.114	0.155	0.000	52.44	1.484	17.71	0.043	0.041	130.2	120.3	96.06	23.89	0.824
2:16	16.019	8.100	0.120	0.155	0.000	52.35	1.491	16.50	0.045	0.041	126.6	116.7	94.81	23.53	0.812
2:36	16.036	7.907	0.117	0.155	0.000	52.29	1.450	16.76	0.044	0.041	127.1	117.1	94.80	23.50	0.811
2:55	15.822	8.004	0.118	0.154	0.000	52.69	1.464	15.71	0.045	0.042	123.2	113.3	94.05	23.36	0.806
3:14	16.094	8.350	0.113	0.153	0.000	53.38	1.461	15.95	0.041	0.039	124.6	114.6	95.58	23.77	0.820
3:33	15.612	8.472	0.115	0.156	0.000	53.37	1.427	15.94	0.047	0.042	122.9	113.2	95.18	23.81	0.822
3:52	15.982	8.324	0.115	0.157	0.000	53.22	1.508	15.75	0.043	0.042	124.2	114.3	95.14	23.67	0.817
4:11	14.814	7.521	0.104	0.151	0.000	54.89	1.384	15.30	0.038	0.000	116.3	107.1	94.20	23.58	0.814
4:31	16.263	7.714	0.115	0.154	0.000	52.15	1.442	17.11	0.043	0.041	128.8	118.7	95.03	23.47	0.810
4:50	16.392	7.812	0.116	0.157	0.000	52.32	1.526	16.59	0.045	0.042	128.5	118.3	95.01	23.44	0.809
5:28	16.300	8.010	0.110	0.155	0.000	52.51	1.473	16.78	0.042	0.039	128.0	117.9	95.42	23.61	0.815
5:47	16.340	7.899	0.112	0.154	0.000	52.20	1.503	17.34	0.044	0.041	130.3	120.2	95.63	23.64	0.816
10:42	15.926	8.160	0.115	0.151	0.000	52.92	0.601	20.41	0.046	0.038	129.7	120.7	98.37	24.00	0.851
11:22	16.112	8.157	0.130	0.161	0.000	52.84	1.526	20.12	0.049	0.041	139.3	129.2	99.14	24.00	0.853
11:41	15.490	8.182	0.125	0.160	0.000	52.57	1.332	20.54	0.048	0.040	136.5	127.0	98.49	24.00	0.854

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 8/1983

12: 0	15.179	8.252	0.064	0.154	0.000	52.44	0.590	20.80	0.047	0.386	136.5	127.2	97.91	24.81	0.856
12:19	15.354	8.239	0.124	0.154	0.000	52.32	1.333	20.68	0.046	0.038	136.3	126.8	98.29	24.72	0.853
12:37	15.187	8.105	0.125	0.161	0.000	51.88	1.340	20.96	0.049	0.040	137.0	127.6	97.84	24.61	0.850
12:56	15.490	7.793	0.125	0.050	0.000	52.57	1.496	20.54	0.041	0.040	136.1	126.5	98.14	24.55	0.847
13:15	15.434	7.582	0.119	0.156	0.000	51.42	1.419	21.90	0.048	0.039	141.4	131.8	98.12	24.53	0.847
13:34	15.515	7.371	0.114	0.149	0.000	51.20	1.343	22.31	0.046	0.037	141.9	132.3	98.09	24.48	0.845
13:53	14.887	7.593	0.115	0.144	0.000	51.75	1.152	22.15	0.046	0.036	137.3	128.3	97.88	24.64	0.851
14:12	15.810	7.652	0.150	0.185	0.000	50.80	1.613	21.53	0.056	0.045	144.7	134.6	97.84	24.35	0.840
14:31	16.001	8.030	0.131	0.176	0.000	50.95	1.412	20.96	0.051	0.044	140.9	130.9	97.75	24.36	0.841
14:50	15.738	7.602	0.122	0.168	0.000	50.91	1.266	21.70	0.049	0.042	140.6	130.9	97.60	24.33	0.840
15: 9	15.825	7.002	0.115	0.161	0.000	50.41	1.210	22.83	0.047	0.040	143.5	133.9	97.64	24.23	0.836
15:28	15.984	6.883	0.117	0.162	0.000	49.65	1.216	22.83	0.047	0.041	144.2	134.5	96.93	23.97	0.827
17:18	15.591	6.687	0.135	0.172	0.000	50.05	1.558	24.15	0.054	0.046	151.4	141.5	98.45	24.43	0.843
17:36	15.652	6.946	0.119	0.162	0.000	50.05	1.471	23.85	0.050	0.041	149.1	139.3	98.35	24.43	0.843
17:55	15.678	6.696	0.126	0.170	0.000	49.79	1.521	24.19	0.053	0.045	151.2	141.3	98.27	24.36	0.841
18:14	15.624	6.448	0.126	0.168	0.000	49.65	1.516	24.60	0.050	0.043	152.1	142.3	98.23	24.32	0.840
18:33	15.933	6.476	0.121	0.179	0.000	49.32	1.576	24.52	0.051	0.047	153.7	143.6	98.23	24.24	0.837
18:52	15.975	6.180	0.127	0.182	0.000	48.92	1.595	25.05	0.053	0.047	155.9	145.8	98.13	24.15	0.834
19:11	15.608	6.178	0.136	0.187	0.000	49.16	1.619	25.07	0.055	0.049	155.4	145.4	98.06	24.23	0.836
19:30	16.291	6.089	0.133	0.186	0.000	48.66	1.656	25.10	0.055	0.049	158.0	147.6	98.22	24.07	0.831
19:49	16.466	6.185	0.136	0.194	0.000	48.43	1.739	24.77	0.056	0.050	158.6	148.0	98.02	23.98	0.828
20: 8	16.137	5.984	0.140	0.193	0.000	49.11	1.725	24.76	0.056	0.049	157.4	147.0	98.16	24.07	0.831

8/ 9/1983

1:16	16.814	4.986	0.184	0.217	0.000	48.33	1.956	27.21	0.058	0.057	171.1	160.1	99.80	24.17	0.834
1:35	16.527	4.994	0.165	0.205	0.000	48.41	1.822	27.10	0.054	0.053	167.8	157.0	99.33	24.13	0.833
1:54	16.455	5.042	0.148	0.191	0.000	48.58	1.735	27.12	0.048	0.048	166.0	155.4	99.37	24.18	0.835
2:13	16.681	4.668	0.153	0.180	0.000	48.15	1.691	27.73	0.046	0.045	167.9	157.3	99.34	24.05	0.830
2:32	16.974	4.546	0.148	0.165	0.000	47.92	1.625	27.94	0.043	0.041	168.4	157.8	99.40	23.98	0.828
2:51	16.624	4.569	0.159	0.169	0.000	48.16	1.594	28.07	0.045	0.043	167.7	157.2	99.43	24.09	0.832
3: 9	16.153	3.518	0.165	0.184	0.000	49.59	1.669	28.30	0.049	0.048	168.3	157.9	99.67	24.11	0.832
3:28	16.130	4.676	0.165	0.199	0.000	48.22	1.752	28.05	0.049	0.052	168.6	158.1	99.29	24.18	0.835
3:47	16.596	4.487	0.169	0.201	0.000	47.82	1.844	28.05	0.049	0.053	171.1	160.4	99.26	24.01	0.829
4: 6	16.240	4.648	0.180	0.207	0.000	49.44	1.934	26.31	0.054	0.054	165.7	155.0	99.06	24.06	0.831
4:25	16.690	5.129	0.246	0.257	0.000	48.09	2.259	26.30	0.069	0.067	173.1	161.6	99.10	24.00	0.828
4:44	17.938	5.386	0.250	0.206	0.000	47.66	2.302	25.31	0.053	0.050	172.7	160.7	99.16	23.72	0.819
5: 3	18.131	5.343	0.248	0.171	0.000	47.68	2.030	25.58	0.052	0.041	170.6	158.8	99.28	23.73	0.819
5:22	17.830	5.014	0.242	0.168	0.000	47.73	1.914	26.26	0.052	0.040	170.4	159.0	99.25	23.76	0.820
5:41	17.692	4.843	0.227	0.164	0.000	47.72	1.829	26.72	0.053	0.040	170.3	159.0	99.28	23.79	0.821
6:19	16.893	4.952	0.186	0.163	0.000	48.48	1.637	26.76	0.051	0.041	165.3	154.6	99.17	24.00	0.829
6:38	16.412	4.988	0.189	0.178	0.000	48.71	1.674	26.95	0.053	0.046	165.1	154.6	99.20	24.14	0.833
6:40	17.692	4.808	0.222	0.169	0.000	47.71	1.806	26.81	0.055	0.042	170.5	159.2	99.32	23.79	0.821
6:57	16.325	4.858	0.195	0.187	0.000	48.65	1.752	27.17	0.054	0.049	166.7	156.2	99.24	24.14	0.833
7:16	16.448	4.676	0.174	0.188	0.000	48.30	1.711	27.58	0.052	0.049	167.6	157.1	99.18	24.07	0.831
7:35	16.310	4.533	0.169	0.186	0.000	48.33	1.696	27.04	0.050	0.048	165.1	154.7	98.36	23.86	0.823

GAS CHROMATOGRAPH DATA

DATE	H2	CO2	C2H4	C2H6	O2	N2	CH4	CO	C3H6	C3H8	HHV	LHV	TMP	MW	S.G.
TIME	%	%	%	%	%	%	%	%	%	%	BTU/SCF	BTU/SCF	%		WRT AIR

8/ 9/1983															
7:54	16.556	4.781	0.174	0.190	0.000	48.35	1.789	26.56	0.051	0.049	165.5	154.8	98.50	23.86	0.824
8:13	16.033	5.043	0.203	0.212	0.000	49.15	2.004	26.48	0.055	0.056	166.9	156.2	99.24	24.22	0.836
8:32	17.134	5.462	0.195	0.126	0.000	48.35	2.041	25.65	0.055	0.059	166.6	155.4	99.07	23.95	0.827
8:53	15.708	5.281	0.117	0.212	0.000	48.57	1.959	24.33	0.050	0.057	157.0	146.6	96.28	23.52	0.812
9:12	17.502	5.268	0.146	0.227	0.000	47.88	2.206	25.00	0.060	0.060	168.5	156.8	98.35	23.60	0.815
9:32	17.449	5.860	0.176	0.256	0.000	48.31	2.428	24.57	0.067	0.069	170.5	158.6	99.18	23.92	0.826
9:51	18.000	5.836	0.180	0.204	0.000	48.18	2.328	24.32	0.059	0.049	169.0	157.0	99.16	23.78	0.821
10:10	17.407	6.255	0.174	0.149	0.000	49.56	1.989	23.40	0.048	0.034	159.0	147.8	99.01	23.99	0.828
10:29	17.825	5.851	0.153	0.140	0.000	48.99	1.814	24.34	0.043	0.033	161.0	149.8	99.19	23.89	0.824
10:49	17.406	5.147	0.111	0.152	0.000	48.55	1.589	26.29	0.043	0.038	163.3	152.5	99.33	23.95	0.827
11: 8	16.734	4.614	0.092	0.134	0.000	48.55	1.345	27.70	0.040	0.033	162.3	152.2	99.24	24.04	0.830
11:27	16.232	4.166	0.071	0.126	0.000	48.28	1.181	29.13	0.037	0.032	163.0	153.4	99.25	24.12	0.833
11:46	15.487	3.987	0.077	0.129	0.000	48.60	1.161	29.76	0.037	0.033	162.6	153.4	99.27	24.30	0.839
12: 5	15.053	3.756	0.081	0.136	0.000	49.23	1.183	29.68	0.039	0.035	161.5	152.4	99.20	24.35	0.840
12:24	15.263	4.186	0.084	0.155	0.000	48.83	1.306	29.33	0.043	0.041	162.9	153.5	99.23	24.36	0.841
12:43	15.105	4.734	0.095	0.168	0.000	49.41	1.418	28.10	0.047	0.043	160.1	150.6	99.12	24.44	0.844
13: 3	14.859	5.100	0.098	0.164	0.000	50.12	1.434	27.11	0.048	0.042	156.3	146.9	98.98	24.53	0.847
13:22	14.769	6.302	0.204	0.187	0.000	51.31	1.884	23.82	0.068	0.045	152.6	142.7	98.59	24.58	0.849
13:41	14.964	6.594	0.119	0.189	0.000	51.26	1.723	23.67	0.058	0.048	149.7	139.9	98.63	24.61	0.849
14:19	14.866	6.694	0.152	0.200	0.000	51.60	1.881	23.02	0.068	0.050	149.9	139.9	98.54	24.61	0.849
14:38	15.591	6.905	0.156	0.198	0.000	51.25	1.942	22.41	0.066	0.051	150.9	140.5	98.57	24.45	0.844
14:40	14.936	6.854	0.138	0.199	0.000	51.69	1.808	22.81	0.064	0.051	148.4	138.5	98.56	24.63	0.850
14:58	15.716	6.658	0.155	0.194	0.000	51.12	1.923	22.81	0.064	0.048	152.1	141.7	98.68	24.42	0.843
15:17	16.044	6.450	0.159	0.196	0.000	50.53	1.937	23.32	0.065	0.049	155.1	144.6	98.75	24.31	0.839
15:36	16.379	6.837	0.166	0.193	0.000	50.47	1.931	22.70	0.065	0.048	154.2	143.4	98.78	24.30	0.839
15:55	15.988	7.853	0.211	0.206	0.000	51.49	2.086	20.68	0.079	0.048	149.3	138.5	98.64	24.51	0.846
16:14	15.839	7.879	0.176	0.163	0.000	51.77	1.815	20.77	0.062	0.038	144.4	134.1	98.52	24.54	0.847
17:27	15.655	7.944	0.196	0.191	0.000	49.56	2.027	21.08	0.073	0.046	148.2	137.7	96.77	24.09	0.832
17:46	15.445	8.383	0.183	0.172	0.000	50.15	1.897	19.88	0.069	0.040	141.6	131.4	96.21	24.07	0.831
18: 5	15.158	8.242	0.180	0.172	0.000	50.18	1.835	20.91	0.066	0.041	143.3	133.2	96.79	24.29	0.839
18:25	15.463	8.014	0.174	0.160	0.000	49.70	1.775	21.57	0.061	0.038	145.2	135.2	96.95	24.23	0.836
18:52	15.778	7.371	0.180	0.167	0.000	49.61	1.871	22.75	0.064	0.041	151.4	141.0	97.83	24.28	0.838
19:11	15.933	7.280	0.187	0.177	0.000	48.73	1.914	21.93	0.067	0.041	150.1	139.6	96.26	23.78	0.821
19:30	15.386	7.722	0.181	0.169	0.000	49.60	1.852	21.75	0.063	0.040	146.7	136.6	96.76	24.14	0.833
19:48	15.466	7.602	0.187	0.174	0.000	49.46	1.886	21.85	0.065	0.041	147.9	137.7	96.73	24.09	0.831
20: 7	14.908	8.235	0.180	0.174	0.000	50.44	1.876	20.80	0.063	0.043	142.5	132.6	96.71	24.33	0.840
20:26	15.158	7.959	0.179	0.175	0.000	49.93	1.883	21.36	0.061	0.042	145.2	135.1	96.75	24.23	0.836
20:45	15.616	7.877	0.171	0.164	0.000	49.57	1.861	21.37	0.061	0.038	146.0	135.8	96.73	24.09	0.832
21: 4	15.731	7.470	0.163	0.158	0.000	49.29	1.808	22.10	0.056	0.037	147.8	137.6	96.82	24.03	0.829
21:23	15.927	7.260	0.161	0.170	0.000	48.81	1.848	22.56	0.059	0.040	150.6	140.3	96.83	23.94	0.826
21:42	15.636	6.988	0.154	0.156	0.000	48.94	1.736	23.10	0.056	0.036	149.8	139.7	96.81	23.98	0.828
22: 1	15.581	7.067	0.172	0.175	0.000	48.91	1.886	22.84	0.063	0.041	151.2	140.9	96.73	23.97	0.827
22:39	15.458	7.404	0.154	0.160	0.000	48.95	1.790	22.26	0.059	0.037	147.2	137.2	96.28	23.94	0.826
22:57	15.006	7.089	0.155	0.145	0.000	49.16	1.624	22.81	0.057	0.033	145.4	135.8	96.08	23.97	0.827
23:16	14.362	7.368	0.190	0.151	0.000	50.04	1.727	22.12	0.063	0.035	143.0	133.5	96.06	24.11	0.834
23:35	14.730	8.405	0.210	0.151	0.000	50.03	1.773	20.63	0.064	0.035	140.2	130.5	96.03	24.22	0.836

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/ 9/1983															
23:54	15.410	8.559	0.226	0.175	0.000	49.31	1.975	20.22	0.072	0.041	144.2	133.8	95.98	24.04	0.830
8/10/1983															
0:13	15.920	8.475	0.212	0.181	0.000	48.65	2.027	20.31	0.070	0.044	146.6	135.9	95.88	23.86	0.823
0:32	15.878	7.618	0.204	0.191	0.000	49.89	2.066	20.31	0.072	0.046	147.0	136.3	96.27	23.84	0.823
0:51	16.603	8.010	0.183	0.181	0.000	47.73	1.951	21.27	0.067	0.043	150.6	139.7	96.04	23.66	0.817
1:10	16.011	7.820	0.178	0.186	0.000	47.89	1.884	21.85	0.067	0.045	149.9	139.4	95.94	23.76	0.820
1:29	16.248	7.270	0.158	0.173	0.000	47.17	1.733	23.05	0.062	0.042	152.2	141.8	95.91	23.62	0.815
1:48	16.437	6.960	0.162	0.172	0.000	46.87	1.771	23.40	0.061	0.042	154.4	143.8	95.87	23.51	0.811
2: 7	16.743	6.883	0.172	0.194	0.000	46.59	2.024	23.15	0.065	0.048	157.9	146.9	95.87	23.38	0.807
2:26	16.833	7.020	0.174	0.175	0.000	46.60	1.911	23.10	0.062	0.042	156.4	145.4	95.91	23.41	0.808
2:45	16.997	7.124	0.164	0.173	0.000	46.50	1.834	23.01	0.063	0.041	155.6	144.7	95.91	23.39	0.807
3: 5	17.206	6.813	0.138	0.159	0.000	46.14	1.662	23.79	0.057	0.040	156.2	145.4	96.00	23.33	0.805
3:24	16.755	6.791	0.148	0.146	0.000	46.34	1.522	24.04	0.057	0.034	153.9	143.5	95.83	23.41	0.808
3:43	16.662	6.868	0.157	0.151	0.000	46.37	1.595	23.85	0.059	0.036	154.1	143.7	95.75	23.42	0.808
4: 2	17.078	6.821	0.181	0.184	0.000	45.82	1.887	23.75	0.066	0.045	159.5	148.4	95.83	23.29	0.804
4:21	16.894	6.674	0.203	0.213	0.000	45.79	2.094	23.75	0.073	0.052	162.1	150.9	95.74	23.27	0.803
4:40	17.138	6.339	0.184	0.194	0.000	45.39	1.953	24.45	0.068	0.049	162.9	151.7	95.76	23.17	0.800
4:59	17.335	6.442	0.203	0.212	0.000	45.06	2.117	24.14	0.074	0.052	165.0	153.5	95.63	23.08	0.797
5:18	17.507	6.839	0.211	0.210	0.000	45.29	2.171	23.30	0.073	0.051	163.5	151.9	95.65	23.10	0.797
5:37	17.749	6.800	0.198	0.213	0.000	44.97	2.142	23.46	0.074	0.051	164.4	152.7	95.66	23.04	0.795
5:56	17.917	6.746	0.178	0.170	0.000	44.94	1.876	23.74	0.065	0.041	161.6	150.2	95.67	23.02	0.795
6:15	17.571	6.870	0.166	0.169	0.000	45.32	1.971	23.66	0.064	0.041	160.9	149.6	95.83	23.16	0.799
6:34	17.831	7.176	0.185	0.187	0.000	45.27	1.961	22.87	0.069	0.046	160.0	148.5	95.59	23.08	0.797
6:53	17.511	7.414	0.197	0.183	0.000	45.90	2.013	22.33	0.071	0.045	157.9	146.5	95.67	23.21	0.801
7:12	17.520	7.097	0.191	0.166	0.000	45.87	1.929	22.76	0.067	0.039	157.8	146.5	95.63	23.16	0.799
7:31	16.869	6.976	0.179	0.158	0.000	46.22	1.708	23.33	0.067	0.037	154.9	144.2	95.54	23.31	0.805
7:50	16.628	6.781	0.182	0.168	0.000	46.11	1.721	23.79	0.071	0.040	156.1	145.5	95.49	23.33	0.805
8: 9	16.642	6.937	0.192	0.174	0.000	46.19	1.812	23.46	0.071	0.042	156.4	145.6	95.53	23.35	0.806
8:28	17.072	6.904	0.180	0.180	0.000	45.90	1.899	23.26	0.070	0.043	157.9	146.9	95.51	23.22	0.801
8:48	17.390	6.785	0.206	0.198	0.000	45.33	2.089	23.39	0.075	0.047	162.2	150.8	95.50	23.09	0.797
9: 7	17.269	6.644	0.219	0.179	0.000	45.49	2.020	23.55	0.075	0.041	161.4	150.1	95.48	23.10	0.797
9:26	16.836	6.521	0.204	0.177	0.000	45.86	1.910	23.79	0.073	0.042	159.3	148.4	95.41	23.19	0.800
9:45	16.711	6.593	0.213	0.195	0.000	45.74	2.000	23.70	0.075	0.049	160.2	149.2	95.27	23.18	0.800
10: 4	17.000	6.772	0.205	0.190	0.000	45.54	2.006	22.89	0.075	0.045	158.3	147.1	94.72	22.98	0.793
10:23	16.890	7.359	0.211	0.173	0.000	46.15	1.905	22.03	0.074	0.040	153.8	142.8	94.84	23.15	0.799
10:42	16.524	8.169	0.230	0.170	0.000	47.33	1.965	20.30	0.072	0.000	146.9	136.1	94.76	23.34	0.806
11: 2	17.393	7.722	0.220	0.209	0.000	46.11	2.251	21.45	0.078	0.051	158.2	146.6	95.48	23.22	0.801
11:22	16.919	6.713	0.215	0.170	0.000	46.33	2.009	22.57	0.072	0.038	156.6	145.5	95.04	23.08	0.797
11:41	16.343	6.623	0.201	0.153	0.000	46.70	1.792	22.87	0.069	0.035	152.8	142.3	94.78	23.17	0.800
12: 0	16.210	6.700	0.214	0.166	0.000	46.71	1.864	22.81	0.072	0.038	153.6	143.0	94.79	23.21	0.801
12:19	15.620	6.832	0.195	0.152	0.000	47.28	1.674	22.97	0.068	0.035	149.5	139.4	94.82	23.41	0.808
12:38	19.524	4.445	0.266	0.295	0.000	40.14	2.979	25.64	0.099	0.071	189.2	175.5	93.46	21.49	0.742

GAS CHROMATOGRAPH DATA

DATE	H2	CO2	C2H4	C2H6	O2	N2	CH4	CO	C3H6	C3H8	HHV	LHV	TMP	MW	S.G.
TIME	%	%	%	%	%	%	%	%	%	%	BTU/SCF		%		WRT AIR

8/15/1983															
11:32	10.641	4.057	0.103	0.250	0.000	52.88	1.589	26.85	0.057	0.073	145.9	138.3	96.50	24.75	0.854
11:50	12.960	6.303	0.087	0.270	0.000	51.54	1.798	23.38	0.056	0.079	144.6	135.6	96.48	24.48	0.845
12: 8	12.229	7.843	0.065	0.236	0.000	52.79	1.569	21.27	0.046	0.068	131.7	123.4	96.12	24.84	0.857
12:25	12.140	8.142	0.059	0.218	0.000	52.28	1.509	21.59	0.040	0.062	131.2	123.0	96.04	24.89	0.859
12:43	12.153	8.165	0.053	0.196	0.000	52.79	1.401	21.39	0.035	0.057	128.7	120.8	96.25	24.96	0.862
13: 1	12.274	8.939	0.043	0.177	0.000	52.49	1.270	20.88	0.031	0.052	125.5	117.6	96.16	25.04	0.864
13:19	11.931	9.781	0.036	0.137	0.000	53.59	1.087	19.60	0.025	0.039	117.1	109.7	96.23	25.30	0.873
14:41	10.665	12.003	0.525	0.163	0.000	56.78	2.107	13.77	0.077	0.038	114.1	105.7	96.13	25.85	0.892
14:58	10.703	12.373	0.472	0.197	0.000	56.98	2.277	12.61	0.083	0.047	112.3	103.7	95.74	25.77	0.889
15:16	14.552	10.966	0.159	0.173	0.000	52.71	1.755	15.50	0.054	0.043	122.5	112.9	95.91	24.65	0.851
15:34	12.847	11.996	0.338	0.158	0.000	56.01	2.086	12.18	0.071	0.033	112.4	103.2	95.71	25.16	0.869
15:52	13.459	10.967	0.230	0.159	0.000	54.02	1.655	15.42	0.066	0.036	118.8	109.7	96.01	24.97	0.862
16: 9	14.122	10.754	0.360	0.187	0.000	53.33	2.250	14.76	0.084	0.038	127.8	117.7	95.88	24.66	0.851
19:38	15.795	9.183	0.147	0.145	0.000	50.44	1.371	20.30	0.059	0.040	137.5	127.7	97.47	24.52	0.847
19:55	15.780	8.525	0.173	0.163	0.000	49.79	1.545	21.47	0.061	0.042	143.8	133.8	97.55	24.42	0.843
20:13	15.023	8.276	0.158	0.151	0.000	51.96	1.461	20.49	0.053	0.037	136.6	127.1	97.61	24.60	0.849
20:31	15.986	8.471	0.179	0.175	0.000	49.79	1.626	21.28	0.064	0.042	145.0	134.8	97.61	24.37	0.841
20:49	15.980	7.993	0.192	0.171	0.000	49.46	1.594	22.06	0.064	0.042	147.3	137.1	97.56	24.28	0.838
21: 6	16.050	8.440	0.182	0.139	0.000	49.88	1.481	21.51	0.054	0.032	143.4	133.4	97.77	24.40	0.842
21:24	15.630	8.177	0.180	0.142	0.000	49.92	1.420	22.20	0.056	0.033	143.8	134.0	97.76	24.48	0.845
21:42	15.317	8.748	0.264	0.194	0.000	50.58	1.864	20.41	0.078	0.046	144.6	134.3	97.50	24.53	0.847
22:17	15.275	8.904	0.189	0.135	0.000	51.21	1.491	20.31	0.050	0.030	137.1	127.4	97.59	24.63	0.850
22:35	15.942	8.374	0.231	0.190	0.000	49.70	1.782	21.25	0.072	0.046	147.7	137.3	97.58	24.34	0.840
22:40	15.823	9.190	0.222	0.167	0.000	50.57	1.729	19.84	0.065	0.038	141.4	131.1	97.64	24.52	0.846
22:53	15.907	8.540	0.271	0.197	0.000	50.02	1.940	20.62	0.077	0.044	148.1	137.4	97.62	24.37	0.841
23:11	15.805	8.381	0.251	0.173	0.000	49.88	1.771	21.26	0.072	0.038	147.0	136.7	97.63	24.39	0.842
23:29	15.748	8.209	0.189	0.153	0.000	49.79	1.484	22.04	0.058	0.034	144.7	134.8	97.70	24.43	0.843
23:46	15.691	8.098	0.151	0.123	0.000	49.81	1.272	22.55	0.047	0.027	142.4	132.9	97.77	24.47	0.845

8/16/1983

0: 4	14.960	7.813	0.171	0.149	0.000	51.47	1.426	21.66	0.056	0.036	140.0	130.5	97.73	24.59	0.849
0:22	15.461	8.307	0.207	0.174	0.000	49.86	1.665	21.78	0.063	0.043	145.8	135.7	97.56	24.46	0.844
0:40	15.617	8.646	0.235	0.190	0.000	50.17	1.847	20.70	0.066	0.045	145.5	135.1	97.52	24.44	0.844
0:58	15.947	8.544	0.211	0.100	0.000	49.74	1.786	21.07	0.067	0.044	145.2	134.9	97.51	24.34	0.840
1:16	15.940	8.928	0.212	0.187	0.000	50.23	1.819	20.27	0.067	0.045	144.5	134.0	97.70	24.46	0.844
1:34	15.742	9.079	0.200	0.174	0.000	50.35	1.685	20.32	0.061	0.040	141.9	131.7	97.65	24.53	0.847
1:52	15.924	8.853	0.173	0.176	0.000	50.08	1.636	20.73	0.057	0.042	142.9	132.7	97.66	24.46	0.844
2:10	16.057	7.837	0.160	0.161	0.000	49.90	1.544	22.04	0.051	0.038	145.9	135.8	97.79	24.30	0.839
2:28	16.297	7.672	0.171	0.161	0.000	48.88	1.537	22.93	0.056	0.038	149.8	139.5	97.74	24.21	0.836
2:46	16.398	7.796	0.176	0.152	0.000	48.89	1.519	22.69	0.054	0.033	148.9	138.6	97.70	24.19	0.835
3: 4	16.486	7.763	0.198	0.183	0.000	48.70	1.707	22.60	0.069	0.043	152.3	141.7	97.74	24.15	0.834
3:22	16.409	8.069	0.209	0.168	0.000	49.14	1.749	21.90	0.065	0.037	149.9	139.3	97.75	24.22	0.836
3:40	16.310	7.852	0.203	0.160	0.000	49.19	1.635	22.17	0.062	0.035	148.9	138.6	97.62	24.19	0.835
3:58	16.278	7.642	0.180	0.160	0.000	48.86	1.548	22.93	0.060	0.036	150.0	139.7	97.69	24.19	0.835
4:16	15.964	7.740	0.143	0.135	0.000	49.24	1.315	23.10	0.050	0.030	145.8	136.0	97.72	24.3	0.839

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/16/1983															
4:34	15.676	7.878	0.134	0.131	0.000	49.57	1.246	23.02	0.047	0.029	143.6	134.0	97.73	24.43	0.843
4:52	15.327	7.833	0.159	0.130	0.000	49.70	1.281	23.17	0.050	0.028	143.7	134.3	97.68	24.49	0.845
5:10	15.681	7.392	0.173	0.141	0.000	49.45	1.404	23.66	0.053	0.031	148.2	138.4	97.98	24.40	0.842
5:27	16.257	7.154	0.176	0.147	0.000	48.78	1.461	23.93	0.057	0.033	151.8	141.7	97.99	24.21	0.836
5:45	16.424	7.020	0.186	0.170	0.000	48.50	1.587	23.98	0.064	0.040	154.7	144.3	97.97	24.13	0.833
6: 3	16.274	7.004	0.198	0.156	0.000	48.60	1.515	24.12	0.064	0.035	153.8	143.5	97.97	24.17	0.834
6:21	16.131	7.244	0.216	0.161	0.000	48.63	1.583	23.61	0.067	0.037	152.8	142.6	97.67	24.16	0.834
6:39	16.273	7.312	0.224	0.170	0.000	48.74	1.670	23.42	0.069	0.040	154.0	143.5	97.92	24.19	0.835
6:57	15.956	7.577	0.231	0.173	0.000	49.22	1.656	23.01	0.069	0.040	151.6	141.4	97.93	24.32	0.840
7:15	16.210	7.655	0.218	0.159	0.000	48.79	1.577	22.94	0.069	0.037	150.9	140.6	97.66	24.20	0.835
7:33	15.998	7.715	0.196	0.156	0.000	49.51	1.517	22.84	0.062	0.000	147.8	137.8	98.00	24.36	0.841
7:51	16.484	7.015	0.235	0.161	0.000	48.14	1.592	23.93	0.069	0.037	155.4	145.0	97.67	24.03	0.829
8: 9	15.528	7.369	0.202	0.146	0.000	49.97	1.475	22.79	0.061	0.033	146.4	136.6	97.58	24.32	0.839
8:27	16.381	7.364	0.232	0.164	0.000	48.31	1.600	23.50	0.069	0.037	153.8	143.4	97.65	24.10	0.832
8:45	16.368	7.454	0.195	0.158	0.000	48.94	1.559	22.87	0.061	0.036	150.4	140.1	97.63	24.12	0.833
9: 3	16.666	7.360	0.180	0.165	0.000	48.00	1.506	23.88	0.064	0.039	154.1	143.7	97.85	24.10	0.832
9:21	16.538	7.201	0.177	0.170	0.000	48.48	1.526	23.79	0.063	0.041	153.7	143.3	97.99	24.14	0.833
9:39	16.471	6.914	0.167	0.143	0.000	48.22	1.347	24.30	0.057	0.033	152.3	142.2	97.65	24.03	0.830
9:58	16.482	7.347	0.175	0.146	0.000	48.48	1.413	23.67	0.059	0.034	151.3	141.1	97.81	24.14	0.833
10:16	16.425	7.607	0.190	0.157	0.000	48.83	1.496	23.07	0.062	0.037	150.6	140.3	97.87	24.20	0.835
10:34	16.451	7.806	0.185	0.159	0.000	49.45	1.480	22.86	0.063	0.037	149.8	139.5	98.49	24.40	0.842
10:52	16.245	7.870	0.165	0.155	0.000	49.38	1.446	22.75	0.058	0.037	147.9	137.8	98.10	24.36	0.841
11:10	16.006	8.059	0.181	0.157	0.000	49.65	1.470	22.45	0.063	0.037	146.8	136.8	98.08	24.45	0.844
11:28	16.755	7.101	0.151	0.164	0.000	48.34	1.466	24.16	0.059	0.040	154.4	144.0	98.24	24.14	0.833
11:46	16.885	6.971	0.151	0.165	0.000	48.07	1.467	24.39	0.058	0.040	155.5	145.0	98.20	24.08	0.831
12: 4	16.597	7.252	0.144	0.158	0.000	48.94	1.455	23.31	0.052	0.038	150.6	140.3	97.94	24.13	0.833
12:22	16.689	7.305	0.159	0.165	0.000	48.59	1.496	23.70	0.057	0.039	153.0	142.6	98.19	24.18	0.835
12:40	16.793	7.442	0.149	0.165	0.000	48.46	1.473	23.50	0.058	0.041	152.4	142.0	98.09	24.14	0.833
12:58	16.850	7.290	0.149	0.166	0.000	48.27	1.484	23.73	0.055	0.040	153.3	142.9	98.03	24.09	0.831
13:16	16.857	7.591	0.163	0.168	0.000	48.41	1.512	23.36	0.058	0.041	152.8	142.3	98.16	24.17	0.834
13:34	16.813	7.269	0.163	0.163	0.000	48.56	1.487	23.18	0.055	0.039	151.7	141.2	97.73	24.01	0.829
13:52	16.705	7.738	0.176	0.173	0.000	48.76	1.576	22.76	0.059	0.042	151.4	140.9	97.99	24.18	0.834
14:10	16.483	7.762	0.171	0.172	0.000	49.15	1.563	22.51	0.060	0.042	149.7	139.3	97.92	24.22	0.836
14:28	16.134	7.354	0.170	0.168	0.000	49.25	1.515	23.26	0.058	0.040	150.3	140.1	97.95	24.26	0.837
14:46	16.063	7.726	0.176	0.154	0.000	49.44	1.427	22.99	0.059	0.036	148.1	138.1	98.08	24.38	0.842
15: 4	16.353	7.595	0.167	0.166	0.000	49.16	1.471	23.22	0.062	0.040	150.4	140.2	98.23	24.32	0.840
15:22	16.105	7.169	0.187	0.169	0.000	48.81	1.549	23.66	0.063	0.040	152.2	142.0	97.75	24.18	0.835
15:40	16.431	7.174	0.172	0.181	0.000	48.53	1.597	23.51	0.061	0.043	153.3	142.9	97.71	24.08	0.831
15:58	16.266	7.458	0.186	0.186	0.000	48.89	1.634	23.32	0.065	0.044	152.9	142.5	98.04	24.26	0.837
16:16	16.234	7.719	0.224	0.175	0.000	49.04	1.680	22.61	0.069	0.040	151.4	141.0	97.80	24.23	0.836
16:34	16.070	7.887	0.212	0.168	0.000	49.17	1.575	22.46	0.065	0.038	148.9	138.7	97.64	24.27	0.838
16:52	16.174	8.275	0.288	0.215	0.000	49.43	2.004	20.91	0.082	0.052	151.4	140.5	97.43	24.20	0.835
17:11	16.180	7.920	0.195	0.163	0.000	50.01	1.644	21.32	0.063	0.039	145.9	135.6	97.54	24.21	0.836
17:29	16.091	8.807	0.167	0.132	0.000	49.64	1.311	21.14	0.055	0.028	140.2	130.4	97.37	24.36	0.841
18: 2	16.069	8.342	0.224	0.136	0.000	50.22	1.504	22.05	0.070	0.034	146.5	136.4	98.65	24.63	0.850
18:20	15.880	8.011	0.198	0.136	0.000	49.37	1.376	22.23	0.068	0.035	144.7	134.9	97.30	24.27	0.838

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/16/1983

18:38	15.721	7.946	0.192	0.150	0.000	49.28	1.434	22.22	0.065	0.036	144.9	135.0	97.05	24.22	0.836
18:55	15.644	7.867	0.176	0.155	0.000	49.49	1.400	22.57	0.068	0.041	145.4	135.6	97.41	24.33	0.840
19:13	16.074	6.954	0.177	0.168	0.000	48.40	1.472	24.11	0.070	0.046	152.9	142.8	97.47	24.08	0.831
19:31	15.890	6.844	0.179	0.162	0.000	48.49	1.442	24.38	0.070	0.043	152.7	142.7	97.49	24.12	0.833
19:49	16.034	6.648	0.178	0.175	0.000	48.15	1.510	24.63	0.068	0.042	154.8	144.7	97.44	24.03	0.829
20: 6	16.024	6.713	0.179	0.177	0.000	48.55	1.543	24.14	0.068	0.042	153.6	143.4	97.43	24.04	0.830
20:24	16.153	6.963	0.178	0.169	0.000	48.41	1.513	24.01	0.066	0.040	153.1	142.9	97.51	24.07	0.831
20:42	16.239	6.989	0.192	0.171	0.000	48.59	1.569	23.64	0.068	0.040	153.0	142.7	97.50	24.04	0.830
21:18	16.342	7.451	0.188	0.185	0.000	48.48	1.597	23.03	0.072	0.046	152.1	141.7	97.39	24.06	0.830
21:36	16.329	7.302	0.185	0.173	0.000	48.54	1.545	23.24	0.067	0.042	151.7	141.4	97.43	24.05	0.830
21:40	16.102	7.576	0.182	0.168	0.000	48.58	1.479	23.00	0.072	0.038	149.4	139.3	97.19	24.10	0.832
21:53	16.442	6.859	0.190	0.191	0.000	48.00	1.676	23.90	0.072	0.048	156.2	145.7	97.37	23.92	0.826
22:11	16.448	6.947	0.210	0.201	0.000	48.31	1.838	23.14	0.072	0.050	156.0	145.2	97.22	23.87	0.824
22:29	16.821	6.809	0.210	0.206	0.000	47.68	1.876	23.62	0.073	0.051	159.2	148.2	97.35	23.79	0.821
22:47	17.175	7.161	0.206	0.191	0.000	47.26	1.736	23.58	0.069	0.044	158.2	147.2	97.42	23.78	0.821
23: 5	16.751	7.084	0.175	0.183	0.000	47.57	1.590	23.93	0.064	0.044	155.8	145.2	97.39	23.89	0.825
23:22	17.010	7.070	0.181	0.206	0.000	47.27	1.761	23.74	0.068	0.052	158.5	147.6	97.36	23.79	0.821
23:40	17.405	7.104	0.173	0.197	0.000	47.07	1.749	23.57	0.064	0.048	158.7	147.6	97.37	23.70	0.818
23:58	17.401	7.039	0.165	0.171	0.000	47.04	1.612	23.79	0.057	0.039	157.0	146.1	97.32	23.69	0.818

8/17/1983

0:16	17.157	7.076	0.166	0.187	0.000	47.18	1.640	23.82	0.062	0.046	157.2	146.3	97.33	23.76	0.820
0:34	17.543	6.404	0.157	0.168	0.000	46.60	1.568	24.85	0.056	0.039	160.2	149.3	97.39	23.58	0.814
0:52	16.669	6.004	0.140	0.173	0.000	47.08	1.471	25.63	0.057	0.042	158.8	148.4	97.26	23.72	0.819
1: 9	16.198	6.746	0.144	0.159	0.000	47.96	1.363	24.57	0.057	0.038	152.5	142.5	97.24	23.96	0.827
1:27	15.635	6.911	0.152	0.158	0.000	48.71	1.362	24.19	0.057	0.037	149.5	139.8	97.21	24.13	0.833
1:46	15.384	7.277	0.128	0.162	0.000	49.28	1.430	23.53	0.064	0.038	147.2	137.5	97.30	24.27	0.838
2: 4	15.425	7.778	0.186	0.174	0.000	49.51	1.526	22.52	0.068	0.041	146.3	136.5	97.23	24.31	0.839
2:22	15.520	8.142	0.172	0.177	0.000	49.55	1.544	21.97	0.065	0.042	144.9	135.0	97.18	24.33	0.840
2:40	15.185	8.383	0.193	0.176	0.000	50.19	1.600	21.32	0.066	0.042	142.6	132.8	97.15	24.44	0.844
2:58	15.731	8.270	0.205	0.192	0.000	49.14	1.736	21.39	0.071	0.047	146.7	136.4	96.79	24.16	0.834
3:16	15.846	8.207	0.231	0.217	0.000	49.44	1.935	21.05	0.075	0.054	149.1	138.4	97.05	24.17	0.834
3:33	16.746	7.984	0.230	0.231	0.000	48.21	2.000	21.52	0.078	0.056	154.5	143.4	97.06	23.90	0.825
3:51	17.151	7.908	0.185	0.184	0.000	48.06	1.719	21.88	0.066	0.042	152.0	141.1	97.20	23.85	0.823
4:27	16.584	7.215	0.180	0.180	0.000	48.07	1.629	23.26	0.068	0.044	153.6	143.1	97.23	23.91	0.825
4:45	16.742	6.953	0.182	0.182	0.000	47.67	1.642	23.72	0.069	0.044	155.8	145.2	97.21	23.82	0.822
5: 3	16.662	6.608	0.176	0.179	0.000	47.55	1.615	24.32	0.067	0.043	157.0	146.4	97.22	23.79	0.821
5:21	16.290	6.645	0.170	0.168	0.000	47.72	1.484	24.59	0.065	0.040	154.9	144.7	97.17	23.89	0.825
5:39	16.855	6.630	0.187	0.196	0.000	47.16	1.734	24.29	0.069	0.049	159.4	148.6	97.18	23.72	0.819
5:57	16.875	6.914	0.195	0.219	0.000	47.31	1.856	23.67	0.075	0.055	159.5	148.5	97.16	23.74	0.819
6:15	16.506	7.158	0.168	0.164	0.000	48.00	1.490	23.71	0.063	0.039	152.7	142.4	97.29	23.95	0.827
6:33	16.105	7.253	0.187	0.158	0.000	48.48	1.489	23.50	0.065	0.036	150.9	140.8	97.28	24.07	0.831
6:51	16.364	7.185	0.211	0.116	0.000	48.32	1.511	23.42	0.067	0.037	151.3	141.1	97.22	23.97	0.827
7: 9	16.325	6.988	0.193	0.171	0.000	48.22	1.560	23.71	0.070	0.041	153.5	143.2	97.27	23.96	0.827
7:27	16.293	6.993	0.154	0.176	0.000	48.17	1.492	23.89	0.065	0.044	152.7	142.5	97.28	23.98	0.828

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/17/1983

7:45	16.221	7.133	0.144	0.167	0.000	48.17	1.419	23.94	0.061	0.040	151.4	141.3	97.30	24.03	0.829
8: 3	16.500	6.816	0.178	0.183	0.000	47.73	1.600	24.13	0.061	0.045	155.7	145.2	97.24	23.87	0.824
8:29	17.033	7.308	0.150	0.178	0.000	49.44	1.567	24.24	0.066	0.051	157.2	146.5	100.03	24.60	0.849
8:47	16.681	7.327	0.157	0.172	0.000	49.13	1.555	23.86	0.067	0.049	154.7	144.2	99.00	24.40	0.842
9: 5	15.626	6.882	0.172	0.183	0.000	49.29	1.605	23.77	0.069	0.046	151.9	141.8	97.64	24.22	0.836
9:23	15.938	7.778	0.147	0.150	0.000	49.51	1.357	22.84	0.059	0.038	146.0	136.1	97.82	24.36	0.841
9:42	16.157	7.484	0.184	0.176	0.000	49.28	1.637	22.95	0.066	0.045	151.3	140.9	97.98	24.27	0.838
10: 0	16.439	7.699	0.174	0.201	0.000	48.98	1.730	22.46	0.073	0.054	152.2	141.6	97.81	24.18	0.835
10:18	16.259	7.742	0.161	0.177	0.000	49.10	1.585	23.03	0.056	0.044	150.7	140.4	98.15	24.34	0.840
10:36	16.191	7.428	0.175	0.185	0.000	49.00	1.628	23.19	0.067	0.045	152.1	141.8	97.91	24.23	0.837
10:54	16.480	7.601	0.176	0.189	0.000	48.79	1.679	22.72	0.067	0.046	152.2	141.6	97.75	24.14	0.833
11:12	16.371	7.502	0.180	0.186	0.000	48.89	1.652	22.85	0.069	0.046	152.0	141.5	97.75	24.15	0.834
11:30	16.630	7.389	0.186	0.188	0.000	48.45	1.671	23.04	0.071	0.046	153.8	143.2	97.67	24.04	0.830
11:48	16.766	7.320	0.206	0.203	0.000	48.32	1.801	22.90	0.076	0.051	156.0	145.1	97.65	23.97	0.828
12: 6	16.062	8.558	0.194	0.165	0.000	50.47	1.673	20.41	0.064	0.039	142.9	132.6	97.64	24.36	0.841
12:24	16.442	7.938	0.200	0.162	0.000	49.12	1.605	22.02	0.088	0.038	149.2	138.8	97.61	24.17	0.834
12:42	15.860	7.383	0.191	0.145	0.000	49.11	1.440	23.19	0.065	0.033	148.3	138.4	97.42	24.19	0.835
13:18	15.806	6.695	0.171	0.150	0.000	48.99	1.418	23.65	0.060	0.036	149.1	139.3	96.98	23.98	0.828
13:36	15.718	6.667	0.150	0.144	0.000	48.62	1.287	24.61	0.058	0.035	150.1	140.4	97.29	24.10	0.832
13:40	15.891	7.244	0.210	0.154	0.000	48.92	1.534	23.24	0.067	0.036	150.1	140.1	97.30	24.12	0.833
13:54	15.494	7.101	0.146	0.171	0.000	48.92	1.411	23.93	0.059	0.042	149.1	139.4	97.28	24.21	0.836
14:12	15.838	6.804	0.150	0.185	0.000	48.40	1.543	24.15	0.062	0.478	163.5	152.6	97.61	24.22	0.836
14:30	15.767	7.316	0.166	0.173	0.000	48.89	1.512	23.27	0.064	0.043	149.3	139.4	97.20	24.14	0.833
14:48	15.606	7.857	0.185	0.169	0.000	49.51	1.554	22.17	0.065	0.041	145.9	136.0	97.16	24.25	0.837
15: 7	15.943	7.808	0.187	0.186	0.000	49.30	1.668	21.99	0.067	0.046	148.1	137.8	97.19	24.15	0.834
15:25	16.060	7.684	0.200	0.182	0.000	48.97	1.659	22.35	0.072	0.045	149.7	139.4	97.22	24.11	0.832
15:43	15.933	7.923	0.181	0.180	0.000	49.29	1.488	22.01	0.068	0.044	146.1	136.0	97.12	24.17	0.834
16: 1	16.299	7.379	0.177	0.193	0.000	48.57	1.688	22.75	0.069	0.049	152.0	141.5	97.17	23.98	0.828
16:19	16.433	6.841	0.175	0.185	0.000	47.87	1.623	23.87	0.068	0.048	155.1	144.7	97.12	23.86	0.823
16:37	16.335	6.559	0.178	0.176	0.000	47.69	1.577	24.42	0.065	0.043	155.8	145.4	97.05	23.82	0.822
16:55	16.281	7.189	0.191	0.173	0.000	48.24	1.591	23.30	0.068	0.042	152.4	142.0	97.07	23.94	0.826
17:13	16.809	7.344	0.197	0.178	0.000	47.87	1.636	22.87	0.062	0.043	153.2	142.5	97.01	23.80	0.822
17:37	17.235	7.423	0.188	0.195	0.000	47.98	1.744	22.91	0.072	0.055	156.5	145.5	97.80	23.92	0.826
17:55	16.899	6.704	0.180	0.197	0.000	47.27	1.715	23.94	0.070	0.053	158.2	147.4	97.02	23.68	0.817
18:13	16.804	6.662	0.170	0.196	0.000	47.22	1.689	24.10	0.066	0.049	157.8	147.1	96.96	23.68	0.817
18:30	16.788	6.391	0.171	0.197	0.000	47.06	1.709	24.50	0.070	0.048	159.4	148.6	96.94	23.63	0.816
18:48	16.665	6.114	0.176	0.182	0.000	47.09	1.603	24.93	0.069	0.044	159.0	148.4	96.88	23.61	0.815
19: 6	16.513	6.564	0.156	0.177	0.000	47.31	1.464	24.63	0.064	0.043	155.5	145.2	96.92	23.75	0.820
19:24	16.623	6.870	0.165	0.206	0.000	47.18	1.680	24.07	0.070	0.053	157.3	146.7	96.92	23.75	0.820
19:41	17.260	6.631	0.160	0.200	0.000	46.65	1.730	24.18	0.066	0.051	159.9	148.9	96.93	23.54	0.813
19:59	17.285	6.730	0.180	0.199	0.000	46.70	1.784	24.02	0.070	0.048	160.4	149.3	97.02	23.57	0.814
20:17	17.434	6.716	0.178	0.192	0.000	46.65	1.736	23.99	0.070	0.047	160.1	149.0	97.01	23.53	0.812
20:35	17.288	6.379	0.157	0.195	0.000	46.51	1.657	24.68	0.067	0.048	160.7	149.8	96.98	23.52	0.812
20:52	16.898	5.818	0.168	0.189	0.000	46.42	1.647	25.63	0.067	0.046	162.4	151.7	96.88	23.50	0.811
21:10	16.274	5.565	0.170	0.165	0.000	46.91	1.491	26.16	0.063	0.039	159.8	149.6	96.83	23.63	0.816
21:28	16.175	6.225	0.171	0.173	0.000	47.43	1.552	24.98	0.063	0.043	156.6	146.4	96.81	23.74	0.820

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/17/1983

21:46	16.408	6.424	0.157	0.180	0.000	47.20	1.554	24.76	0.063	0.045	156.6	146.3	96.80	23.71	0.819
22: 4	16.101	6.733	0.157	0.177	0.000	47.98	1.537	23.94	0.064	0.045	152.8	142.6	96.74	23.83	0.823
22:21	15.900	7.233	0.172	0.149	0.000	48.62	1.416	23.94	0.061	0.035	150.3	140.4	97.53	24.19	0.835
22:39	15.700	7.383	0.176	0.161	0.000	49.19	1.487	23.33	0.059	0.038	148.8	138.9	97.52	24.26	0.837
22:57	15.981	7.586	0.177	0.172	0.000	49.13	1.560	22.77	0.061	0.042	149.0	138.8	97.49	24.20	0.835
23:15	15.671	7.867	0.170	0.175	0.000	49.62	1.539	22.33	0.060	0.044	146.3	136.3	97.47	24.32	0.840
23:33	15.822	8.564	0.186	0.177	0.000	50.05	1.626	20.92	0.065	0.042	143.5	133.4	97.46	24.38	0.842
23:51	15.836	8.320	0.171	0.179	0.000	50.02	1.597	21.43	0.062	0.041	144.6	134.5	97.66	24.40	0.842

8/18/1983

0: 8	16.124	7.882	0.180	0.182	0.000	49.74	1.644	21.58	0.067	0.045	146.9	136.6	97.44	24.19	0.835
0:26	15.915	7.775	0.173	0.173	0.000	49.40	1.557	22.50	0.062	0.041	147.8	137.7	97.60	24.28	0.838
0:44	15.971	7.386	0.166	0.184	0.000	49.06	1.578	23.21	0.062	0.045	150.7	140.5	97.66	24.22	0.836
1: 2	16.386	7.194	0.167	0.179	0.000	48.62	1.585	23.48	0.060	0.042	152.8	142.4	97.71	24.09	0.832
1:21	16.139	7.661	0.166	0.162	0.000	49.17	1.487	22.96	0.057	0.038	148.8	138.7	97.84	24.28	0.838
1:39	16.324	7.586	0.161	0.178	0.000	49.00	1.576	22.74	0.061	0.045	150.1	139.7	97.67	24.16	0.834
1:57	16.067	7.983	0.164	0.172	0.000	49.38	1.542	22.21	0.058	0.041	147.0	136.8	97.61	24.28	0.838
2:15	16.220	7.544	0.163	0.178	0.000	48.99	1.563	22.85	0.062	0.043	149.9	139.7	97.61	24.17	0.834
2:32	16.829	7.274	0.191	0.209	0.000	48.21	1.811	22.91	0.069	0.051	156.0	145.1	97.55	23.92	0.826
2:50	17.508	7.223	0.220	0.210	0.000	47.54	1.916	22.82	0.072	0.050	159.5	148.1	97.56	23.73	0.819
3: 8	17.018	6.902	0.204	0.187	0.000	47.86	1.737	23.60	0.068	0.044	157.7	146.8	97.62	23.84	0.823
3:26	16.416	7.052	0.180	0.202	0.000	48.31	1.705	23.58	0.066	0.050	155.3	144.8	97.56	24.01	0.829
3:44	16.651	6.529	0.194	0.190	0.000	47.76	1.715	24.43	0.066	0.045	158.8	148.1	97.58	23.87	0.824
4: 2	16.970	6.555	0.189	0.190	0.000	47.54	1.743	24.29	0.064	0.044	159.5	148.7	97.59	23.79	0.821
4:20	17.094	6.494	0.180	0.189	0.000	47.17	1.710	24.63	0.065	0.046	160.6	149.7	97.58	23.75	0.820
4:38	17.174	6.471	0.153	0.176	0.000	47.18	1.598	24.70	0.060	0.043	159.1	148.3	97.55	23.73	0.819
4:56	16.960	6.190	0.150	0.183	0.000	47.00	1.559	25.43	0.062	0.046	160.6	149.9	97.59	23.75	0.820
5:14	16.850	6.294	0.142	0.211	0.000	46.99	1.699	25.17	0.065	0.055	161.4	150.7	97.48	23.75	0.820
5:32	16.918	6.178	0.146	0.213	0.000	46.82	1.735	25.30	0.067	0.056	162.6	151.8	97.43	23.70	0.818
5:50	17.070	5.715	0.154	0.176	0.000	46.63	1.627	26.05	0.064	0.042	163.5	152.7	97.53	23.62	0.815
6: 8	16.547	6.174	0.137	0.139	0.000	48.04	1.349	25.16	0.052	0.033	154.7	144.6	97.63	23.89	0.825
6:26	16.516	6.182	0.129	0.153	0.000	47.57	1.337	25.68	0.054	0.038	156.4	146.3	97.66	23.91	0.825
6:44	16.481	6.696	0.133	0.175	0.000	47.92	1.461	24.60	0.059	0.045	154.8	144.6	97.57	23.96	0.827
7: 1	16.319	6.404	0.126	0.178	0.000	47.92	1.440	25.11	0.060	0.046	155.7	145.6	97.60	23.97	0.827
7:19	15.309	7.107	0.132	0.163	0.000	49.53	1.388	23.93	0.056	0.041	147.8	138.2	97.65	24.37	0.841
7:37	15.283	7.764	0.148	0.190	0.000	49.83	1.564	22.85	0.065	0.049	147.1	137.3	97.75	24.49	0.845
7:55	16.301	7.818	0.168	0.210	0.000	48.92	1.755	22.40	0.073	0.054	151.9	141.3	97.70	24.20	0.835
8:13	16.296	8.053	0.160	0.194	0.000	49.68	1.731	21.51	0.063	0.049	148.0	137.5	97.73	24.24	0.837
8:31	15.756	8.395	0.153	0.188	0.000	50.23	1.630	21.27	0.063	0.047	144.2	134.1	97.74	24.45	0.844
8:49	15.686	7.793	0.144	0.183	0.000	49.97	1.611	22.26	0.059	0.047	146.6	136.6	97.75	24.38	0.842
9: 8	15.834	7.476	0.143	0.188	0.000	49.74	1.656	22.80	0.059	0.048	149.4	139.2	97.94	24.34	0.840
9:26	16.176	7.861	0.134	0.189	0.000	49.12	1.599	22.60	0.056	0.048	149.1	138.9	97.79	24.28	0.838
9:44	15.988	8.047	0.137	0.176	0.000	49.31	1.530	22.11	0.055	0.045	145.9	135.9	97.39	24.25	0.837
10: 2	16.174	7.578	0.143	0.184	0.000	48.78	1.601	22.48	0.057	0.046	148.8	138.5	97.04	24.00	0.829
10:20	16.628	7.722	0.147	0.182	0.000	48.49	1.602	22.34	0.057	0.045	149.8	139.3	97.21	23.90	0.828

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/18/1983															
10:38	16.182	8.259	0.147	0.172	0.000	49.20	1.529	21.65	0.058	0.042	145.2	135.0	97.24	24.19	0.835
10:56	16.039	8.536	0.141	0.170	0.000	49.44	1.478	21.33	0.058	0.043	143.0	133.0	97.24	24.28	0.838
11:14	16.234	7.851	0.133	0.170	0.000	48.92	1.484	22.39	0.054	0.043	146.9	136.8	97.28	24.13	0.833
11:32	16.126	8.781	0.133	0.154	0.000	49.26	1.355	21.14	0.053	0.037	140.8	130.9	97.04	24.25	0.837
11:50	16.137	8.035	0.144	0.176	0.000	49.23	1.502	22.18	0.057	0.042	146.4	136.3	97.50	24.24	0.837
17:33	16.355	7.805	0.256	0.167	0.000	49.03	1.731	22.04	0.074	0.040	151.0	140.4	97.50	24.12	0.833
17:51	16.091	8.188	0.192	0.148	0.000	49.27	1.424	22.08	0.065	0.034	145.5	135.4	97.50	24.29	0.838
18: 9	16.096	8.161	0.218	0.165	0.000	49.30	1.610	21.84	0.070	0.038	147.5	137.2	97.50	24.26	0.837
18:26	16.222	7.801	0.217	0.164	0.000	48.81	1.590	22.59	0.069	0.038	150.0	139.7	97.50	24.17	0.834
18:44	16.305	7.027	0.215	0.168	0.000	48.35	1.588	23.74	0.070	0.039	154.1	143.7	97.50	24.03	0.829
19: 2	15.903	6.922	0.204	0.180	0.000	48.49	1.581	24.10	0.071	0.043	154.0	143.9	97.50	24.12	0.833
19:19	16.228	7.361	0.180	0.181	0.000	48.24	1.541	23.66	0.065	0.043	152.8	142.5	97.50	24.11	0.832
19:37	15.836	7.992	0.195	0.183	0.000	48.97	1.611	22.60	0.068	0.042	149.1	139.0	97.50	24.30	0.839
19:55	15.208	8.190	0.221	0.201	0.000	49.89	1.746	21.93	0.072	0.048	147.3	137.2	97.50	24.48	0.845
20:13	14.700	9.333	0.254	0.173	0.000	51.82	1.784	19.32	0.068	0.038	137.3	127.5	97.50	24.79	0.856
20:30	12.561	8.967	0.241	0.122	0.000	58.09	1.440	15.99	0.058	0.022	114.5	106.2	97.50	25.33	0.874
20:48	14.830	10.371	0.278	0.140	0.000	52.45	1.605	17.73	0.068	0.027	130.3	120.7	97.50	24.94	0.861
21: 6	16.100	9.362	0.250	0.159	0.000	50.18	1.617	19.72	0.070	0.035	141.1	130.8	97.50	24.45	0.844
21:24	16.244	8.202	0.277	0.176	0.000	49.22	1.778	21.49	0.072	0.040	149.8	139.2	97.50	24.21	0.836
21:42	16.442	7.237	0.205	0.160	0.000	48.32	1.554	23.49	0.061	0.037	152.8	142.5	97.50	24.03	0.829
21:59	16.477	6.952	0.199	0.181	0.000	47.82	1.602	24.16	0.068	0.042	156.1	145.6	97.50	23.97	0.827
22:17	16.181	7.090	0.181	0.137	0.000	48.53	1.349	23.95	0.058	0.028	150.3	140.4	97.50	24.10	0.832
22:35	16.379	7.502	0.203	0.176	0.000	48.25	1.572	23.31	0.068	0.040	152.7	142.3	97.50	24.09	0.831
22:53	16.382	8.639	0.237	0.214	0.000	48.85	1.871	21.17	0.076	0.051	150.6	139.8	97.50	24.24	0.837
23:11	15.878	8.563	0.240	0.165	0.000	49.95	1.678	20.92	0.067	0.036	144.8	134.5	97.50	24.37	0.841
23:29	16.157	8.531	0.210	0.175	0.000	49.59	1.540	21.19	0.069	0.040	145.0	134.7	97.50	24.31	0.839
23:46	16.368	7.968	0.244	0.199	0.000	48.69	1.874	22.04	0.073	0.047	153.0	142.2	97.50	24.13	0.833
8/19/1983															
0: 4	16.571	7.372	0.222	0.171	0.000	48.29	1.651	23.11	0.069	0.039	153.7	143.1	97.50	24.01	0.829
0:22	16.062	7.050	0.255	0.194	0.000	48.49	1.811	23.52	0.078	0.044	156.3	145.7	97.50	24.07	0.831
0:40	16.640	7.377	0.237	0.177	0.000	48.14	1.693	23.13	0.073	0.039	154.8	144.2	97.50	23.99	0.828
0:59	16.656	6.992	0.239	0.173	0.000	47.91	1.714	23.70	0.073	0.039	156.9	146.2	97.50	23.92	0.826
1:17	16.216	6.909	0.225	0.174	0.000	48.31	1.696	23.86	0.070	0.040	155.6	145.1	97.50	24.02	0.829
1:34	16.215	6.659	0.202	0.162	0.000	48.16	1.539	24.46	0.065	0.037	155.1	144.9	97.50	24.00	0.828
1:52	16.399	7.019	0.190	0.174	0.000	47.91	1.515	24.18	0.069	0.040	154.8	144.5	97.50	24.01	0.829
2:10	16.270	7.231	0.203	0.185	0.000	48.29	1.627	23.58	0.070	0.044	154.1	143.7	97.50	24.07	0.831
2:28	16.401	7.621	0.191	0.181	0.000	48.23	1.579	23.19	0.069	0.043	152.5	142.1	97.50	24.10	0.832
2:46	15.732	8.058	0.236	0.179	0.000	49.27	1.625	22.28	0.078	0.041	148.7	138.5	97.50	24.34	0.840
3: 4	16.836	8.121	0.231	0.224	0.000	48.27	1.937	21.75	0.080	0.055	154.8	143.7	97.50	24.03	0.829
3:22	16.886	8.653	0.287	0.225	0.000	48.78	2.100	20.43	0.085	0.054	153.4	142.0	97.50	24.08	0.831
3:39	17.233	8.035	0.212	0.178	0.000	48.01	1.714	22.01	0.070	0.041	153.0	142.0	97.50	23.93	0.826
3:57	17.446	7.831	0.220	0.188	0.000	47.62	1.720	22.35	0.076	0.043	155.3	144.2	97.50	23.85	0.823
4:15	17.378	6.544	0.193	0.181	0.000	48.19	1.654	23.24	0.075	0.042	156.7	145.7	97.50	23.67	0.817
4:33	16.943	7.375	0.182	0.153	0.000	47.59	1.452	23.71	0.061	0.034	153.5	143.1	97.50	23.93	0.826

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

8/19/1983															
4:51	16.746	6.825	0.200	0.177	0.000	47.29	1.578	24.58	0.070	0.042	158.1	147.5	97.50	23.88	0.824
5: 9	16.396	6.510	0.194	0.185	0.000	47.55	1.585	24.96	0.071	0.044	158.4	148.0	97.50	23.92	0.826
5:27	16.889	7.086	0.194	0.195	0.000	47.10	1.682	24.24	0.071	0.047	158.9	148.1	97.50	23.88	0.824
5:45	17.068	7.086	0.205	0.200	0.000	47.00	1.754	24.07	0.074	0.047	160.0	149.0	97.50	23.82	0.822
6: 3	17.226	6.883	0.246	0.226	0.000	46.81	1.992	23.98	0.083	0.055	164.2	152.8	97.50	23.72	0.819
6:21	17.375	6.470	0.245	0.193	0.000	46.71	1.871	24.51	0.076	0.044	164.1	152.8	97.50	23.63	0.816
6:38	16.897	6.849	0.220	0.152	0.000	47.49	1.556	24.24	0.064	0.034	156.8	146.2	97.50	23.85	0.823
6:56	16.368	7.250	0.263	0.165	0.000	48.20	1.645	23.50	0.072	0.036	154.8	144.3	97.50	24.04	0.830
7:14	16.918	7.294	0.221	0.168	0.000	47.43	1.600	23.76	0.068	0.037	156.2	145.6	97.50	23.91	0.825
7:32	16.726	7.077	0.228	0.199	0.000	47.29	1.735	24.12	0.077	0.046	159.3	148.5	97.50	23.91	0.825
7:50	16.894	6.733	0.249	0.214	0.000	47.06	1.908	24.31	0.083	0.050	163.0	151.9	97.50	23.79	0.821
8: 8	16.886	6.985	0.275	0.206	0.000	47.36	1.977	23.68	0.083	0.047	161.8	150.6	97.50	23.83	0.823
8:26	17.243	6.430	0.257	0.184	0.000	46.84	1.864	24.56	0.075	0.040	163.6	152.5	97.50	23.66	0.817
8:45	15.444	6.182	0.216	0.143	0.000	50.54	1.441	23.45	0.061	0.030	148.0	138.3	97.50	24.13	0.833

APPENDIX I

Continuous Output Transducer Data

These are averages of the continuous output transducer data averaged for the time periods over which material and energy balance calculations were made.

AVERAGE FROM PERIOD: 7/28/83 16: 0 TO 7/29/83 8: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	26.995	DEG C	3.609
T-702	38.110	DEG C	3.193
T-703	65.346	DEG C	2.292
T-710	23.311	DEG C	1.784
T-711	94.240	DEG C	1.917
T-712	24.465	DEG C	1.822
T-713	34.147	DEG C	5.373
T-705	457.003	DEG C	53.444
T-706	355.849	DEG C	45.128
T-707	340.158	DEG C	48.345
T-812	758.425	DEG C	81.988
T-813	--OFF--	DEG C	
T-814	699.715	DEG C	81.031
T-815	-503.911	DEG C	660.505
T-816	284.541	DEG C	518.245
T-817	-499.413	DEG C	694.106
T-818	428.240	DEG C	45.465
T-819	593.238	DEG C	66.255
T-820	292.775	DEG C	632.324
T-823	-143.699	DEG C	149.067
T-822	66.227	DEG C	1.773
T-806	316.041	DEG C	47.179
T-811	307.751	DEG C	84.535
F-701	992.802	SCFM	8.710
TT2-703	64.730	DEG C	1.077
P-703	6.816	IN WC	2.582
P-704	5.707	IN WC	2.766
P-705	1.109	IN WC	0.222
P-706	0.814	IN WC	0.201
F-707	--OFF--	SCFM	
WT-720	7.124	TONS	2.688
P-707	0.618	IN WC	0.198
P-810	0.187	IN WC	0.094
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	64.014	DEG C	1.129
CO	19.873	%	2.025
CO2	9.604	%	0.821
O2	-0.884	%	0.151
SIGMA	137.640	BTU/SCF	6.817
T-715	156.850	DEG C	2.398
T-821	462.705	DEG C	120.325
T-703A	64.047	DEG C	7.166
PH	--OFF--	PH	
AG VEL	6.993	SPH	2.080
GR VEL	0.787	RPD/T	1.158
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 24.003

AVERAGE FROM PERIOD: 7/29/83 8: 0 TO 7/29/83 16: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	30.898	DEG C	3.317
T-702	41.417	DEG C	2.967
T-703	64.214	DEG C	1.443
T-710	23.396	DEG C	1.354
T-711	87.220	DEG C	3.797
T-712	24.638	DEG C	1.529
T-713	37.518	DEG C	2.910
T-705	426.140	DEG C	49.107
T-706	353.086	DEG C	19.136
T-707	351.315	DEG C	18.428
T-812	925.978	DEG C	34.403
T-813	--OFF--	DEG C	
T-814	845.356	DEG C	38.397
T-815	-714.043	DEG C	442.172
T-816	934.945	DEG C	493.081
T-817	-230.071	DEG C	670.677
T-818	511.965	DEG C	24.690
T-819	738.892	DEG C	23.670
T-820	1047.253	DEG C	634.437
T-823	-74.314	DEG C	208.139
T-822	70.383	DEG C	0.613
T-806	338.088	DEG C	16.339
T-811	979.617	DEG C	38.019
F-701	986.945	SCFM	4.786
TT2-703	63.442	DEG C	0.522
P-703	5.943	IN WC	0.709
P-704	4.849	IN WC	0.798
P-705	1.094	IN WC	0.138
P-706	0.797	IN WC	0.166
F-707	--OFF--	SCFM	
WT-720	7.627	TONS	1.652
P-707	0.568	IN WC	0.135
P-810	-0.063	IN WC	0.175
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	62.782	DEG C	0.500
CO	23.019	%	0.980
CO2	7.858	%	0.532
O2	-0.875	%	0.136
SIGMA	158.309	BTU/SCF	2.639
T-715	152.223	DEG C	1.867
T-821	528.793	DEG C	146.453
T-703A	54.637	DEG C	4.677
PH	--OFF--	PH	
AG VEL	10.969	SPH	2.180
GR VEL	2.666	RPD/T	1.811
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 23.754

AVERAGE FROM PERIOD: 7/29/83 16: 0 TO 7/30/83 10: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	28.841	DEG C	3.927
T-702	39.546	DEG C	3.617
T-703	63.006	DEG C	1.281
T-710	24.372	DEG C	1.215
T-711	86.189	DEG C	2.807
T-712	25.257	DEG C	1.273
T-713	32.821	DEG C	2.834
T-705	411.450	DEG C	28.976
T-706	313.582	DEG C	16.626
T-707	336.954	DEG C	12.598
T-812	870.161	DEG C	29.761
T-813	--OFF--	DEG C	
T-814	776.117	DEG C	29.925
T-815	-1059.378	DEG C	417.777
T-816	1935.335	DEG C	467.799
T-817	-61.163	DEG C	1274.657
T-818	484.783	DEG C	17.832
T-819	698.702	DEG C	22.275
T-820	1976.886	DEG C	409.037
T-823	151.025	DEG C	165.230
T-822	69.616	DEG C	0.702
T-806	320.505	DEG C	12.050
T-811	919.888	DEG C	32.198
F-701	994.268	SCFM	4.841
TT2-703	61.753	DEG C	0.319
P-703	3.915	IN WC	1.208
P-704	2.923	IN WC	1.171
P-705	0.992	IN WC	0.067
P-706	0.693	IN WC	0.042
F-707	--OFF--	SCFM	
WT-720	6.519	TONS	2.459
P-707	0.486	IN WC	0.033
P-810	-0.166	IN WC	0.011
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	60.954	DEG C	0.266
CO	24.183	%	0.755
CO2	7.277	%	0.385
O2	-0.903	%	0.098
SIGMA	159.488	BTU/SCF	1.722
T-715	152.670	DEG C	1.195
T-821	560.535	DEG C	31.769
T-703A	52.980	DEG C	4.138
PH	--OFF--	PH	
AG VEL	11.493	SPH	1.364
GR VEL	3.953	RPD/T	0.164
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 24.829

AVERAGE FROM PERIOD: 7/30/83 10: 0 TO 7/31/83 9: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	27.287	DEG C	3.769
T-702	38.596	DEG C	3.602
T-703	60.898	DEG C	1.566
T-710	24.747	DEG C	1.958
T-711	80.481	DEG C	3.401
T-712	25.296	DEG C	1.797
T-713	31.531	DEG C	1.568
T-705	430.648	DEG C	24.608
T-706	302.987	DEG C	4.528
T-707	339.259	DEG C	8.054
T-812	876.191	DEG C	16.158
T-813	--OFF--	DEG C	
T-814	782.932	DEG C	15.301
T-815	-1389.428	DEG C	411.965
T-816	2124.552	DEG C	197.322
T-817	7.761	DEG C	714.396
T-818	493.755	DEG C	9.085
T-819	704.093	DEG C	10.679
T-820	2064.489	DEG C	248.583
T-823	134.759	DEG C	150.691
T-822	69.353	DEG C	0.641
T-806	321.923	DEG C	5.385
T-811	930.237	DEG C	17.974
F-701	991.446	SCFM	45.726
TT2-703	59.091	DEG C	0.653
P-703	3.379	IN WC	1.106
P-704	2.312	IN WC	1.032
P-705	1.066	IN WC	0.115
P-706	0.801	IN WC	0.105
F-707	--OFF--	SCFM	
WT-720	8.016	TONS	1.709
P-707	0.580	IN WC	0.085
P-810	-0.166	IN WC	0.021
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	58.825	DEG C	0.512
CO	25.194	%	2.806
CO2	6.550	%	0.814
O2	-0.904	%	0.123
SIGMA	159.889	BTU/SCF	1.395
T-715	153.009	DEG C	1.666
T-821	581.162	DEG C	13.815
T-703A	49.050	DEG C	4.326
PH	--OFF--	PH	
AG VEL	10.110	SPH	0.626
GR VEL	3.436	RPD/T	0.346
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 22.774

AVERAGE FROM PERIOD: 7/31/83 13: 0 TO 8/ 1/83 8: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	27.655	DEG C	4.814
T-702	40.319	DEG C	2.702
T-703	64.120	DEG C	8.488
T-710	24.531	DEG C	2.351
T-711	89.799	DEG C	16.049
T-712	25.476	DEG C	2.633
T-713	30.470	DEG C	2.818
T-705	365.735	DEG C	53.560
T-706	274.380	DEG C	34.130
T-707	239.797	DEG C	36.503
T-812	588.141	DEG C	77.856
T-813	--OFF--	DEG C	
T-814	541.015	DEG C	75.946
T-815	-1260.339	DEG C	544.585
T-816	445.143	DEG C	502.939
T-817	-1707.581	DEG C	719.841
T-818	324.465	DEG C	45.976
T-819	472.876	DEG C	55.607
T-820	300.727	DEG C	434.578
T-823	-205.877	DEG C	58.507
T-822	60.204	DEG C	2.191
T-806	259.845	DEG C	19.086
T-811	619.099	DEG C	41.560
F-701	560.788	SCFM	79.618
TT2-703	59.090	DEG C	1.287
P-703	2.316	IN WC	1.002
P-704	1.987	IN WC	1.065
P-705	0.344	IN WC	0.128
P-706	0.381	IN WC	0.139
F-707	--OFF--	SCFM	
WT-720	7.062	TONS	2.503
P-707	0.847	IN WC	4.921
P-810	0.038	IN WC	0.148
F-802	4000.000	CFM	0.000
F-803	9087.352	CFM	205.380
TT1-703	58.727	DEG C	0.214
CO	24.247	%	0.939
CO2	7.068	%	0.640
O2	-0.814	%	0.316
SIGMA	154.958	BTU/SCF	4.909
T-715	152.298	DEG C	1.960
T-821	405.781	DEG C	20.138
T-703A	52.205	DEG C	6.919
PH	--OFF--	PH	
AG VEL	5.926	SPH	0.689
GR VEL	2.312	RPD/T	0.206
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 24.094

AVERAGE FROM PERIOD: 8/ 1/83 16: 0 TO 8/ 3/83 16: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	29.569	DEG C	2.894
T-702	39.516	DEG C	2.662
T-703	64.503	DEG C	2.345
T-710	25.073	DEG C	1.713
T-711	86.881	DEG C	5.714
T-712	25.154	DEG C	1.897
T-713	38.907	DEG C	3.803
T-705	483.738	DEG C	45.470
T-706	349.783	DEG C	21.125
T-707	453.700	DEG C	27.196
T-812	1268.362	DEG C	106.893
T-813	--OFF--	DEG C	
T-814	1227.151	DEG C	175.602
T-815	-1769.500	DEG C	823.533
T-816	1131.010	DEG C	1023.315
T-817	589.487	DEG C	1695.482
T-818	744.623	DEG C	100.499
T-819	1191.752	DEG C	126.135
T-820	1709.327	DEG C	457.250
T-823	255.687	DEG C	32.601
T-822	78.788	DEG C	1.615
T-806	434.781	DEG C	25.425
T-811	1258.133	DEG C	96.938
F-701	1720.783	SCFM	76.447
TT2-703	62.451	DEG C	1.902
P-703	21.276	IN WC	97.730
P-704	11.179	IN WC	1.662
P-705	3.643	IN WC	0.584
P-706	1.594	IN WC	0.477
F-707	--OFF--	SCFM	
WT-720	6.774	TONS	2.705
P-707	6.934	IN WC	25.848
P-810	-0.631	IN WC	0.533
F-802	4422.222	CFM	224.983
F-803	10500.000	CFM	781.736
TT1-703	62.309	DEG C	1.897
CO	22.657	%	2.645
CO2	8.047	%	1.413
O2	-0.934	%	0.189
SIGMA	153.843	BTU/SCF	11.333
T-715	151.305	DEG C	2.618
T-821	900.812	DEG C	81.248
T-703A	56.306	DEG C	5.395
PH	--OFF--	PH	
AG VEL	20.015	SPH	2.674
GR VEL	2.011	RPD/T	1.634
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 24.178

AVERAGE FROM PERIOD: 8/ 3/83 20: 0 TO 8/ 4/83 15: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	29.478	DEG C	2.923
T-702	39.826	DEG C	2.498
T-703	62.064	DEG C	1.678
T-710	25.411	DEG C	1.885
T-711	81.448	DEG C	6.113
T-712	26.004	DEG C	2.043
T-713	36.256	DEG C	4.497
T-705	458.231	DEG C	35.106
T-706	296.700	DEG C	13.849
T-707	400.214	DEG C	22.820
T-812	853.414	DEG C	131.098
T-813	--OFF--	DEG C	
T-814	802.011	DEG C	115.974
T-815	-1099.572	DEG C	367.138
T-816	91.188	DEG C	171.485
T-817	448.149	DEG C	231.893
T-818	517.412	DEG C	60.005
T-819	702.906	DEG C	94.471
T-820	114.475	DEG C	203.749
T-823	-191.865	DEG C	88.423
T-822	68.898	DEG C	1.330
T-806	351.261	DEG C	30.770
T-811	904.453	DEG C	130.894
F-701	1140.054	SCFM	114.853
TT2-703	59.545	DEG C	0.355
P-703	8.173	IN WC	1.446
P-704	5.169	IN WC	1.673
P-705	3.048	IN WC	0.983
P-706	2.326	IN WC	0.934
F-707	--OFF--	SCFM	
WT-720	8.026	TONS	1.753
P-707	2.164	IN WC	0.598
P-810	0.115	IN WC	0.225
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	59.542	DEG C	0.360
CO	20.656	%	2.934
CO2	8.727	%	1.462
O2	-0.951	%	0.056
SIGMA	129.569	BTU/SCF	8.216
T-715	152.436	DEG C	1.632
T-821	521.125	DEG C	182.177
T-703A	52.100	DEG C	5.886
PH	--OFF--	PH	
AG VEL	10.982	SPH	2.170
GR VEL	2.915	RPD/T	0.271
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 23.384

AVERAGE FROM PERIOD: 8/ 4/83 16: 0 TO 8/ 5/83 10: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	25.924	DEG C	2.840
T-702	37.259	DEG C	2.519
T-703	60.920	DEG C	1.502
T-710	24.342	DEG C	1.636
T-711	84.792	DEG C	8.371
T-712	24.407	DEG C	2.007
T-713	31.044	DEG C	3.682
T-705	400.506	DEG C	30.054
T-706	245.329	DEG C	6.455
T-707	338.058	DEG C	16.422
T-812	628.118	DEG C	96.944
T-813	--OFF--	DEG C	
T-814	596.758	DEG C	88.360
T-815	-938.579	DEG C	368.997
T-816	-55.125	DEG C	168.753
T-817	133.601	DEG C	235.500
T-818	457.261	DEG C	60.631
T-819	518.076	DEG C	77.000
T-820	-331.335	DEG C	221.754
T-823	-217.137	DEG C	3.612
T-822	63.321	DEG C	2.294
T-806	311.361	DEG C	13.182
T-811	685.537	DEG C	97.246
F-701	344.953	SCFM	5.302
TT2-703	59.731	DEG C	0.275
P-703	4.549	IN WC	1.085
P-704	2.656	IN WC	1.145
P-705	1.893	IN WC	0.151
P-706	1.589	IN WC	0.152
F-707	--OFF--	SCFM	
WT-720	8.395	TONS	1.739
P-707	1.476	IN WC	0.156
P-810	0.257	IN WC	0.153
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	59.611	DEG C	0.282
CO	21.558	%	3.172
CO2	8.509	%	1.686
O2	-0.921	%	0.126
SIGMA	127.281	BTU/SCF	12.992
T-715	150.585	DEG C	2.239
T-821	73.630	DEG C	5.645
T-703A	52.715	DEG C	5.014
PH	--OFF--	PH	
AG VEL	9.648	SPH	2.298
GR VEL	2.422	RPD/T	1.232
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 22.930

AVERAGE FROM PERIOD: 8/ 5/83 10: 0 TO 8/ 8/83 8: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	30.269	DEG C	4.449
T-702	41.435	DEG C	4.199
T-703	60.303	DEG C	1.671
T-710	25.175	DEG C	1.656
T-711	84.615	DEG C	4.973
T-712	25.594	DEG C	1.869
T-713	33.535	DEG C	3.438
T-705	398.267	DEG C	28.071
T-706	225.133	DEG C	10.791
T-707	340.749	DEG C	17.632
T-812	667.792	DEG C	56.262
T-813	--OFF--	DEG C	
T-314	625.834	DEG C	50.909
T-815	-566.653	DEG C	108.190
T-316	-122.537	DEG C	84.084
T-817	-48.570	DEG C	363.476
T-818	520.864	DEG C	43.896
T-819	536.506	DEG C	42.803
T-820	-388.252	DEG C	82.974
T-823	-216.830	DEG C	2.933
T-822	63.452	DEG C	1.169
T-806	312.232	DEG C	15.168
T-811	725.285	DEG C	56.602
F-701	843.686	SCFM	5.007
TT2-703	58.595	DEG C	0.711
P-703	4.649	IN WC	1.415
P-704	2.835	IN WC	1.371
P-705	1.814	IN WC	0.438
P-706	1.397	IN WC	0.396
F-707	--OFF--	SCFM	
WT-720	8.684	TONS	1.385
P-707	1.161	IN WC	0.346
P-810	-0.172	IN WC	0.026
F-302	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	58.611	DEG C	0.525
CO	22.964	%	1.826
CO2	7.532	%	0.921
O2	-0.911	%	0.116
SIGMA	136.929	BTU/SCF	9.730
T-715	151.492	DEG C	1.708
T-821	72.857	DEG C	3.468
T-703A	52.760	DEG C	5.338
PH	--OFF--	PH	
AG VEL	9.094	SPH	1.597
GR VEL	2.834	RPD/T	0.466
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 23.489

AVERAGE FROM PERIOD: 8/ 8/83 10: 0 TO 8/ 9/83 14: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	27.094	DEG C	3.554
T-702	37.647	DEG C	3.509
T-703	60.711	DEG C	1.966
T-710	26.375	DEG C	1.931
T-711	81.351	DEG C	5.818
T-712	26.594	DEG C	1.912
T-713	37.912	DEG C	4.766
T-705	398.447	DEG C	37.360
T-706	211.594	DEG C	6.831
T-707	352.482	DEG C	24.152
T-812	908.948	DEG C	81.411
T-813	--OFF--	DEG C	
T-814	847.194	DEG C	77.766
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	-117.954	DEG C	523.272
T-818	632.561	DEG C	68.403
T-819	729.135	DEG C	71.891
T-820	-39.719	DEG C	60.184
T-823	-216.596	DEG C	1.955
T-822	68.030	DEG C	1.657
T-806	327.231	DEG C	22.442
T-811	957.489	DEG C	79.471
F-701	980.635	SCFM	7.951
TT2-703	58.666	DEG C	0.173
P-703	10.984	IN WC	2.498
P-704	4.230	IN WC	1.653
P-705	6.754	IN WC	1.450
P-706	5.936	IN WC	1.442
F-707	--OFF--	SCFM	
WT-720	8.318	TONS	1.704
P-707	5.047	IN WC	1.240
P-810	-0.673	IN WC	0.221
F-802	--OFF--	CFM	
F-803	8787.085	CFM	132.597
TT1-703	58.539	DEG C	0.172
CO	25.798	%	2.144
CO2	6.340	%	1.106
O2	-0.963	%	0.059
SIGMA	158.215	BTU/SCF	6.479
T-715	151.575	DEG C	2.009
T-821	76.657	DEG C	4.071
T-703A	49.488	DEG C	5.430
PH	--OFF--	PH	
AG VEL	12.744	SPH	2.412
GR VEL	2.770	RPD/T	0.379
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 22.547

AVERAGE FROM PERIOD: 8/15/83 20: 0 TO 8/16/83 8: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	27.738	DEG C	1.902
T-702	38.495	DEG C	1.981
T-703	63.703	DEG C	1.545
T-710	26.687	DEG C	1.873
T-711	66.624	DEG C	5.807
T-712	26.905	DEG C	1.910
T-713	44.071	DEG C	6.957
T-705	520.954	DEG C	23.672
T-706	328.242	DEG C	26.259
T-707	430.210	DEG C	25.740
T-812	911.085	DEG C	38.241
T-813	--OFF--	DEG C	
T-814	825.002	DEG C	36.664
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	145.518	DEG C	243.584
T-818	653.510	DEG C	38.388
T-819	697.970	DEG C	34.270
T-820	--OFF--	DEG C	
T-823	--OFF--	DEG C	
T-822	68.690	DEG C	0.857
T-806	413.617	DEG C	29.716
T-811	972.738	DEG C	39.002
F-701	1132.199	SCFM	18.295
TT2-703	60.714	DEG C	0.174
P-703	7.300	IN WC	0.783
P-704	5.671	IN WC	0.837
P-705	1.630	IN WC	0.204
P-706	1.312	IN WC	0.214
F-707	--OFF--	SCFM	
WT-720	8.076	TONS	1.954
P-707	1.413	IN WC	0.240
P-810	-0.357	IN WC	0.011
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	60.576	DEG C	0.176
CO	21.905	%	1.018
CO2	8.069	%	0.567
O2	-0.037	%	0.087
SIGMA	159.257	BTU/SCF	1.506
T-715	151.864	DEG C	2.225
T-821	77.090	DEG C	3.504
T-703A	43.983	DEG C	4.724
PH	--OFF--	PH	
AG VEL	9.964	SPH	0.931
GR VEL	2.456	RPD/T	0.266
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 26.509

AVERAGE FROM PERIOD: 8/16/83 16: 0 TO 8/17/83 8: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	23.695	DEG C	1.734
T-702	33.502	DEG C	1.948
T-703	62.407	DEG C	1.567
T-710	25.214	DEG C	2.093
T-711	82.429	DEG C	4.445
T-712	25.422	DEG C	1.739
T-713	40.221	DEG C	5.883
T-705	503.146	DEG C	32.768
T-706	338.393	DEG C	10.373
T-707	460.817	DEG C	22.141
T-812	1239.541	DEG C	38.336
T-813	--OFF--	DEG C	
T-814	1245.858	DEG C	60.237
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	714.343	DEG C	758.806
T-818	1054.817	DEG C	102.336
T-819	1123.174	DEG C	67.471
T-820	--OFF--	DEG C	
T-823	--OFF--	DEG C	
T-822	73.547	DEG C	1.012
T-806	468.861	DEG C	25.448
T-811	1233.501	DEG C	33.835
F-701	1722.400	SCFM	16.811
TT2-703	60.661	DEG C	0.435
P-703	15.841	IN WC	0.632
P-704	10.606	IN WC	0.806
P-705	5.234	IN WC	0.346
P-706	4.346	IN WC	0.322
F-707	--OFF--	SCFM	
WT-720	6.845	TONS	2.690
P-707	4.913	IN WC	0.354
P-810	-1.118	IN WC	0.246
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	60.488	DEG C	0.438
CO	22.904	%	1.101
CO2	7.319	%	0.582
O2	-0.062	%	0.057
SIGMA	155.708	BTU/SCF	13.794
T-715	150.690	DEG C	2.030
T-821	801.622	DEG C	45.962
T-703A	51.995	DEG C	4.960
PH	--OFF--	PH	
AG VEL	19.771	SPH	1.411
GR VEL	2.752	RPD/T	0.179
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 21.447

AVERAGE FROM PERIOD: 8/17/83 8: 0 TO 8/18/83 10: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	24.481	DEG C	2.755
T-702	34.545	DEG C	2.744
T-703	61.435	DEG C	1.546
T-710	24.260	DEG C	1.976
T-711	84.161	DEG C	5.130
T-712	24.235	DEG C	2.513
T-713	36.339	DEG C	5.286
T-705	483.264	DEG C	28.003
T-706	318.312	DEG C	8.707
T-707	437.978	DEG C	18.902
T-812	1261.209	DEG C	49.279
T-813	--OFF--	DEG C	
T-814	1241.388	DEG C	62.691
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	254.012	DEG C	198.296
T-818	1124.017	DEG C	99.628
T-819	1155.776	DEG C	55.789
T-820	--OFF--	DEG C	
T-823	--OFF--	DEG C	
T-822	73.596	DEG C	0.846
T-806	440.652	DEG C	19.657
T-811	1259.719	DEG C	47.055
F-701	1810.221	SCFM	16.145
TT2-703	60.724	DEG C	0.558
P-703	13.210	IN WC	2.167
P-704	10.943	IN WC	1.119
P-705	2.267	IN WC	1.329
P-706	1.156	IN WC	1.296
F-707	--OFF--	SCFM	
WT-720	7.434	TONS	2.022
P-707	1.561	IN WC	1.358
P-810	-1.037	IN WC	0.185
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	60.550	DEG C	0.560
CO	23.403	%	1.333
CO2	7.073	%	0.646
O2	-0.065	%	0.062
SIGMA	153.231	BTU/SCF	8.987
T-715	150.382	DEG C	1.926
T-821	276.973	DEG C	320.989
T-703A	54.271	DEG C	5.006
PH	--OFF--	PH	
AG VEL	21.881	SPH	0.832
GR VEL	3.048	RPD/T	0.419
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 21.475

APPENDIX J

Stack Sampling Report

This is the report submitted by Interpoll, Inc., Circle Pines, Minnesota to the University of Minnesota Particle Technology Laboratory. The appendices to the stack sampling report have not been included here. The appendices include raw data and calculations.

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Circle Pines, Minnesota 55014

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RESULTS OF THE AUGUST 3, 1983,
ILLINOIS NO. 6 COAL
TEST BURN EMISSION TESTS ON THE
WELLMAN-GALUSHA GASIFIER AT THE
TWIN CITIES RESEARCH CENTER
IN MINNEAPOLIS, MINNESOTA

Submitted to:

UNIVERSITY OF MINNESOTA
Room 130 Mechanical Eng. Bldg.
111 Church Street S.E.
Minneapolis, Minnesota 55455

Attention: David Y. H. Pui, Ph.D.

Approved by:

Report Number 3-1592
September 15, 1983

Perry Lonnes, Ph.D.
President

TABLE OF CONTENTS

	ABBREVIATIONS	iii
1	INTRODUCTION	1
2	SUMMARY AND DISCUSSION	3
3	RESULTS	7
	3.1 Results of Orsat and Moisture Analyses	8
	3.2 Results of Particulate Loading Determinations	12
	3.3 Results of Sulfur Dioxide Determinations	13
	3.4 Results of Opacity Observations	14
	3.5 Results of NO Measurements	15

APPENDICES:

- A - Results of Volumetric Flow Rate Measurements
- B - Location of Test Ports and Traverse Points
- C - Method 2-5 Field Data Sheets
- D - Method 9 Field Data Sheets
- E - Laboratory Data Sheets
- F - Operating Conditions of Gasifier and Fuel Composition
- G - Procedures
- H - Calculation of the Dry F-Factor
- I - Calculation Equations
- J - Sampling Train Calibration Data

On August 3, 1983, Interpoll Inc. personnel conducted a series of flow rate and emission tests on the pilot low BTU Gasifier at the Bureau of Mines Twin Cities Research Center, Minneapolis, Minnesota. On-site testing was performed by a two-man team under the direction of S. Olson. Coordination between testing activities and gasifier operation was provided by Dave Thimsen of Black, Sivalls and Bryson (BSB).

The unit tested is a six-foot, six-inch Wellman-Galusha, single stage, fixed-bed gasifier with an agitator. This gasifier has a nominal operating capacity of 30×10^6 BTU/HR (bituminous coal). A combustion test chamber is attached to the gasifier and it also has a nominal capacity of 30×10^6 BTU/HR. The combustion test chamber is a horizontal, cylindrical chamber, seven feet I.D. by 21 feet long, and exhausts through an impingement tray-type scrubber and an induced draft fan to a three-foot diameter stack. Most of the testing in this work was performed at the combustion test chamber outlet, however, flow determinations were performed at the forced draft fan outlet to allow assessment of the combustion air usage and in the stack to ascertain the total volumetric flow rate of the combustion products. During this test, Illinois No. 6 bituminous coal was gasified.

Particulate and sulfur dioxide determinations were performed in accordance with EPA Methods 1-6, CFR Title 40, Part 60, Appendix A (Revised July 1, 1982). A preliminary determination of the gas velocity profile was made before the first particulate run to allow selection of the appropriate nozzle diameter required for isokinetic sample withdrawal. An Interpoll sampling train which meets or exceeds specifications in the above-cited reference was used to collect particulate samples by means of a heated stainless steel-lined probe. A single diameter traverse was used in this work due to the high cost of installing a second test port at 90 degrees to the existing port.

ABBREVIATIONS

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

Standard conditions are defined as 68 °F (20 °C) and 29.92 IN. of mercury pressure.

The back half of the EPA Method 5 particulate sampling train was used to collect sulfur dioxide samples. This is the large impinger version specified in EPA Method 6 and provides for a complete stack traverse during sample collection. Collected sulfur dioxide samples were returned to the laboratory for sulfate analysis by the standard barium/Thorin I titration technique.

Nitric oxide concentrations in the flue gas were measured by means of a Monitor Labs chemiluminescent nitric oxide analyzer. Nitric oxide concentrations were read at each traverse point in the particulate determination. The nitric oxide concentrations were determined on a dry basis using the exhaust gas stream from the EPA Method 5 sampling train.

An integrated flue gas sample was extracted simultaneously with each particulate and sulfur dioxide sample using a specially designed gas sampling system. Integrated flue gas samples were collected in 44-liter Tedlar bags. After sampling was complete, the bags were sealed and returned to the laboratory for Orsat analysis. The integrity of the sample bags was insured by reading the oxygen concentration of the bag in the field immediately after sampling and again in the laboratory immediately prior to Orsat analysis using a Teledyne Model 320P oxygen analyzer.

Testing at the combustion chamber outlet test site was conducted from one test port on the combustion chamber outlet duct (see Appendix B). Each traverse point was sampled five minutes to give a total sampling time of 60 minutes per run. Test port and traverse port locations for the flow determinations are also given in Appendix B.

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

The important results of the particulate determinations performed at the combustor outlet are summarized in Table 1. As will be noted, the particulate concentration ranged from .008 to .009 GR/ACF and the corresponding mass rate from 5.7 to 6.6 LB/HR. The particulate emission factor, the parameter used by most pollution control agencies to regulate emissions from boilers and combustors, ranged from .13 to .16 LB/10⁶BTU (EPA methods specify that the emission factor be calculated from oxygen concentrations in the flue gas derived from Orsat analysis). The heat input to the combustion test chamber was estimated to be approximately 42 10⁶BTU/HR using the F-factor calculated from the producer gas composition together with the particulate emission factor and the particulate mass rates. These heat input rates were verified by the SO₂ emission factors and rates.

The results of the SO₂ determinations are given in Table 2. As will be noted, the SO₂ concentrations ranged from 1650 to 1800 ppm. The SO₂ emission rate was approximately 320 LB/HR and the SO₂ emission factor 7.73 LB/10⁶BTU. The measured SO₂ emission factor was about 20% higher than the value calculated from the sulfur content and heating value of the coal. This may indicate that the coal sample was not representative of the coal gasified during this test. Nitric oxide concentrations averaged 172 ppm (dry). Plume opacity was estimated to be about 0%.

Volumetric flow rate determinations were performed at three different locations. The results of the flow rate determinations performed at the combustor outlet are given in Table 1 and ranged from 16,000 to 17,600 DSCFM. The flow rate at the combustion fan inlet duct was estimated at 7226 DSCFM. The flow rate at the stack test site was 24,600 DSCFM.

Table 1. Summary of the Results of the August 3, 1963 Particulate Emission Test on the Combustor Outlet at the Bureau of Mines Coal Gasifier Plant Located in Minneapolis, Minnesota.

ITEM	RUN 1	RUN 2	RUN 3
Time of test (HRS)	0915/1028	1045/1145	1200/1300
Estimated gas burning rate (DSCFM)	5344	5538	5370
Estimated heat input (MMBTU)*	41.3	42.8	41.5
Estimated percent of rated capacity	138	143	138
Volumetric flow			
ACTUAL (ACFM)	88100	92000	84800
STANDARD (DSCFM)	16800	17600	16000
Gas temperature (DEG-F)	1940	1922	1953
Moisture content (% v/v)	10.78	11.18	11.06
Gas composition (% v/v dry)			
carbon dioxide	9.20	9.20	10.00
oxygen	10.40	10.20	9.50
nitrogen	80.40	80.60	80.50
Oxygen analyzer (% v/v, dry)	10.38	10.47	10.17
Isokinetic variation (%)	104.1	99.0	99.1
Particulate concentration			
ACTUAL (GR/ACF)	.009	.007	.008
STANDARD (GR/DSCF)	.045	.038	.043
Particulate mass rate (LB/HR)	6.6	5.7	5.9
Particulate emission factor (LB/MMBTU)			
F-factor method (O2 analyzer)	.16	.14	.15
F-factor method (Orsat)	.16	.13	.14

* To combustor from producer gas

Table 2. Summary of the Results of the August 3, 1983 Sulfur Dioxide Emission Test on the Combustor Outlet at the University of Minnesota Bureau of Mines Coal Gasifier in Minneapolis, Minnesota

ITEM	Run 1	Run 2	Run 3
Time of test (HRS)	915-1028	1045-1145	1200-1300
SO ₂ concentration (PPM/dry)	1846	1901	2032
(PPM/wet)	1647	1689	1807
SO ₂ mass rate (LB/HR)	309	333	325
SO ₂ emission factor (LB/MMBTU) E-factor method	7.66	7.75	7.77

No difficulties were encountered in the field or in the laboratory evaluation of the flyash and sulfur dioxide samples. On the basis of this fact and a complete review of the entire data and results, it is our opinion that the particulate, sulfur dioxide, and oxides of nitrogen concentration emission rates and emission factors reported herein are accurate and closely reflect the actual values which existed at the time the tests were performed.

The results of all field and laboratory evaluations are presented in this section. Gas composition (Orsat and moisture) are presented first, followed by the computer printout of particulate, visible emission data and results of NO concentrations. Preliminary measurements including traverse point description are given in Appendices A and B.

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

3.1 Results of Orsat and Moisture Analyses

Test No. 1
Combuster Fan Inlet Duct

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

Run 1

Date of run 08/03/01

Dry basis (dreset)*

carbon dioxide	.03
oxygen	20.90
carbon monoxide	.00
nitrogen	79.07

Wet basis (dreset)*

carbon dioxide	.03
oxygen	20.81
carbon monoxide	.00
nitrogen	79.01

Moisture content 2.35

Dry molecular weight 28.84

Wet molecular weight 29.59

Specific gravity
(relative to air) .9874

* Ambient air: sample not measured

Test No. 1
Combustor Outlet

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

	Run 1	Run 2	Run 3
Date of run	08/03/83	08/03/83	08/03/83
Dry basis (orsat)			
carbon dioxide	9.20	9.20	10.00
oxygen	10.40	10.20	9.50
carbon monoxide	.00	.00	.00
nitrogen	80.40	80.60	80.50
Wet basis (orsat)			
carbon dioxide	8.21	8.17	8.89
oxygen	9.28	9.06	8.45
carbon monoxide	.00	.00	.00
nitrogen	71.73	71.59	71.60
Moisture content	10.78	11.18	11.06
Dry molecular weight	29.89	29.88	29.98
Wet molecular weight	28.61	28.55	28.66
Specific gravity (relative to air)	.9881	.9863	.9898
Teledyne oxygen analyzer (velocity & time weighted avg.)			
	10.38	10.47	10.17
FO	1.14	1.16	1.14

Test No. 1
Scrubber Stack

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

Run 1

Date of run 08/03/83

Dry basis (orsat)

carbon dioxide	6.45
oxygen	11.18
carbon monoxide	.00
nitrogen	82.37

Wet basis (orsat)

carbon dioxide	4.94
oxygen	8.54
carbon monoxide	.00
nitrogen	86.06

Moisture content 23.45

Dry molecular weight 29.48

Wet molecular weight 26.79

Specific gravity
(relative to air) .9253

Test No. 1
Combustor Outlet

3.2 Results of Particulate Loading Determinations -- Method 5

	Run 1	Run 2	Run 3
Date of run	08/03/83	08/03/83	08/03/83
Time run start/end (HRS)	0915/1028	1045/1145	1200/1300
Pitot tube coefficient	.846	.846	.846
Water in sample			
condensate (ml)	77.0	80.0	71.0
silica gel (grams)	15.0	15.5	15.0
Total particulate material collected (grams) *	.1037	.0877	.0909
Meter correction coefficient	1.0047	1.0047	1.0047
Volume through gas meter			
at meter conditions... (CF)	38.81	39.40	36.20
standard conditions... (SCF)	35.86	35.73	32.57
Total sampling time (min)	60.0	60.0	60.0
Nozzle diameter (IN)	.374	.374	.374
Average stack gas temperature during determination (DEG-F)	1940	1922	1953
Volumetric flow			
actual..... (CFM)	88113	92033	84802
standard..... (DSCFM)	16801	17598	16033
Isokinetic variation (%)	104.1	99.0	99.1
Particle concentration			
actual..... (GR/ACF)	.0085	.0073	.0082
dry standard..... (GR/DSCF)	.0446	.0379	.0431
Particle mass flow (LB/HR)	6.56	5.69	5.89
Emission factor (LB/MMBTU)			
by F factor (320-F)	.159	.136	.150
by F factor (orsat)	.159	.133	.142

J-16

* Dry Catch Plus Organic Wet Catch
F factor: Run 1 =12558.0 Run 2 =12558.0 Run 3 =12558.0
mAmCQ/2

Test No. 1
Combustor Outlet

3.3 Results of Sulfur Dioxide Determinations -- Method 6

	Run 1	Run 2	Run 3
Date of run	8/ 3/83	8/ 3/83	8/ 3/83
Time run start/end (HRS)	915/1028	1045/1145	1200/1300
Average stack gas temperature during determination (DEG-F)	1940	1922	1953
Barometric Pressure (IN.HG.)	29.17	29.17	29.17
Meter Temperature (DEG-F)	101.4	112.1	116.3
Meter correction coefficient	1.0050	1.0050	1.0050
Volume through gas meter			
at meter conditions...(CF)	39.81	39.40	36.20
standard conditions...(SCF)	35.87	35.74	32.58
Total sampling time (MIN)	60	60	60
Moisture content (% v/v)	10.78	11.18	11.06
Oxygen content (% v/v dry)	10.40	10.20	9.50
Milliequivalents of SO2 in gas sample	155.7637	159.8700	155.7637
Sulfur dioxide concentration			
(GR/DSCF)	2.1460	2.2105	2.3625
(MG/DSCM)	4911	5059	5406
(PPM-dry)	1846	1901	2032
(PPM-wet)	1647	1689	1807
Dry standard volumetric flow (DSCFM)	16801	17598	16033
Sulfur dioxide mass rate (LB/HR)	309.05	333.44	324.67
Sulfur dioxide emission factor (LB/MMBTU)			
F-factor method	7.663	7.746	7.770

Test No. 1
Combustor Outlet

3.4 Results of Opacity Observations - EPA Method 9

Percent Opacity	Optical Density	Relative Frequency (%)
0	.0000	100.00
5	.0223	.00
10	.0458	.00
15	.0706	.00
20	.0969	.00
25	.1249	.00
30	.1549	.00
35	.1871	.00
40	.2219	.00
45	.2596	.00
50	.3010	.00
55	.3468	.00
60	.3979	.00
65	.4559	.00
70	.5229	.00
75	.6021	.00
80	.6990	.00
85	.8239	.00
90	1.0000	.00
95	1.3010	.00
99	2.0000	.00
.00	.00000	Time Average

Observer: D. Stock
Cert. Date: 6/23/83
Date of Observation: 8/3/83
Time of Observation: 0930-0936

Test No. 1
Combuster Outlet

3.5 Results of NO Measurement--Monitor Labs Chemiluminescent NO Analyzer

NO Concentration (PPM-DRY)			
Run 1	Run 2	Run 3	
158	171	164	
162	167	163	
160	168	168	
156	169	170	
154	170	170	
163	170	173	
178	170	172	
188	170	170	
196	171	166	
218	165	169	
201	170	172	
188	188	170	
Average:	176.8	170.8	168.9

AVERAGE FROM PERIOD: 8/18/83 8: 0 TO 8/19/83 8: 0

SIGNAL	AVERAGE	UNITS	STD.DEV.
T-701	29.907	DEG C	3.247
T-702	39.498	DEG C	2.659
T-703	62.519	DEG C	1.629
T-710	24.929	DEG C	1.762
T-711	83.181	DEG C	4.941
T-712	24.283	DEG C	4.403
T-713	40.439	DEG C	6.648
T-705	506.375	DEG C	39.095
T-706	396.679	DEG C	85.862
T-707	465.352	DEG C	31.088
T-812	1255.005	DEG C	45.464
T-813	--OFF--	DEG C	
T-814	1287.509	DEG C	78.691
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	-90.363	DEG C	693.875
T-818	1086.322	DEG C	400.705
T-819	1300.305	DEG C	117.636
T-820	--OFF--	DEG C	
T-823	--OFF--	DEG C	
T-822	77.298	DEG C	2.529
T-806	450.500	DEG C	28.641
T-811	1241.589	DEG C	37.844
F-701	2139.959	SCFM	134.684
TT2-703	61.270	DEG C	0.873
P-703	18.308	IN WC	2.292
P-704	14.707	IN WC	1.325
P-705	3.600	IN WC	1.321
P-706	2.063	IN WC	1.072
F-707	--OFF--	SCFM	
WT-720	6.597	TONS	2.639
P-707	2.342	IN WC	1.035
P-810	-0.044	IN WC	0.603
F-802	--OFF--	CFM	
F-803	--OFF--	CFM	
TT1-703	61.068	DEG C	0.885
CO	22.264	%	1.388
CO2	7.472	%	0.783
O2	-0.084	%	0.132
SIGMA	158.711	BTU/SCF	6.165
T-715	149.897	DEG C	1.862
T-821	89.135	DEG C	5.402
T-703A	57.703	DEG C	4.846
PH	--OFF--	PH	
AG VEL	23.415	SPH	2.310
GR VEL	2.406	RPD/T	0.188
P-702	--OFF--	IN WC	

AVERAGE BASE TEMPERATURE 21.491

APPENDIX K

Retort Particle Sampling Data

K-1. Dust Loading Data

K-2. Cumulative Dust Data

K-3. Cumulative Dust Size Distributions (3 included)

K-4. Dust Size Distribution Modal Analyses (3 included)

K-5. Explanation of Modal Fitting Parameters

Reference: Thimsen et al (1984)

DUST LOADING DATA

Grand Average Gas/Air Ratio 1.81 Estimated Offtake Elbow Area/ Sampler Inlet Area 8215 Retort Area Less Draft Shroud Area 28.75 square feet

Equation of Fitted Curve: Dust (#/hr)/Coal Feed (#/hr) (%) = 0.150*Face Velocity**0.962 R Squared = 0.847

RUN #	DATE TIME	TEST LENGTH (min)	MASS PARTICLES (milligram)	COAL FEED RATE (lb/hr)	T- 705 (deg. K)	P-705 ("hg abs)	F-701 (scfm)	GAS FLOW RATE (acfm)	DUST RT/ COAL RT (%)	PROBE DEPTH (inch)	AGITATOR ANGLE (deg)	AGITATOR RATE (sw/hr)	FREE-BOARD (inch)
6	9-AUG-83 11:30	5	19	2320	698	29.95	990	4252	0.163	34	225	10	37
7	9-AUG-83 12:44	7	16	2586	608	29.93	1000	3743	0.088	34	225	16	35
8	9-AUG-83 13:36	5	18	2634	648	30.03	990	3938	0.136	34	325	18	33.5
9	9-AUG-83 14:26	2	36	2414	665	29.42	990	4125	0.743	34	325	16	33
10	9-AUG-83 15:14	6	46	2414	663	30.30	1060	4275	0.316	34	270	15	33
11	9-AUG-83 16:01	5	40	2094	771	30.97	1140	5232	0.381	34	270	10.1	36
13	17-AUG-83 14:45	10	415	4020	789	29.35	1815	8915	1.03	34	0	23	35.5
14	17-AUG-83 15:31	11	436	3940	775	29.28	1820	8801	1.00	34	0	23	36
15	17-AUG-83 16:37	11	261	3820	756	29.18	1820	8615	0.619	34	270	23	36
16	17-AUG-83 18:20	10	421	3766	775	29.19	1880	9115	1.114	34	270	23	34
17	18-AUG-83 14:53	10	362	4346	776	29.23	2170	10521	0.830	34	149	24	36.5
18	18-AUG-83 15:26	9.5	114	4340	778	29.23	2175	10573	0.275	34	114	24	35
19	18-AUG-83 16:22	8.5	343	4320	826	29.23	2250	11612	0.931	34	115	23	37

BOM/FGT-007 CUMULATIVE DUST DATA

SIEVING ASTM SIEVE NUM.	SIEVE SIZE (um)	SHIFT SIZE (um)	Sample #		
			007-08 Percent Less Than (%<)	007-13 Percent Less Than (%<)	007-17 Percent Less Than (%<)
14	1400	1891.9	100.0	100.0	100.0
20	841	1136.5	96.4	77.0	73.0
30	595	804.1	92.1	61.9	58.5
40	420	567.5	79.5	48.4	46.0
60	250	337.8	59.9	29.1	29.8
100	149	201.4	38.1	16.4	17.4
200	74	100.0	13.6	4.96	6.40
270	53	71.6	10.6	3.76	5.42

MICROSCOPY

PARTICLE DIAMETER (um)	Percent Less Than Stated Size		
	(%<)	(%<)	(%<)
100.0	10.6	3.76	5.42
56.0	5.04	2.19	3.49
32.0	1.47	0.537	0.844
17.8	0.505	0.147	0.202
10.0	0.149	0.0436	0.0707
5.6	0.616	0.0139	0.025
3.2	0.0242	0.00244	0.00575

Figure K-3a

Figure K-3b

Figure K-3c

Figure K-4a

007-08 VOLUME DIST.

CHN= .04 CHS= .036 CHU= .02
 F1= 0 DG1= 1 SG1= 2
 F2= 5.92E+07 DG2= 15 SG2= 2.9
 F3= 1.25E+10 DG3= 268 SG3= 2.4

007-08 SURFACE DIST.

CHN= .04 CHS= .036 CHU= .02
 F1= 0 DG1= 1 SG1= 2
 F2= 4.18E+07 DG2= 4.8 SG2= 2.9
 F3= 4.1E+08 DG3= 125 SG3= 2.4

007-08 NUMBER DIST.

CHN= .04 CHS= .036 CHU= .02
 F1= 0 DG1= 1 SG1= 2
 F2= 5.5E+06 DG2= .5 SG2= 2.9
 F3= 39000 DG3= 26.9 SG3= 2.4

Figure K-4b

007-13 VOLUME DIST.

CHN= .06 CHS= .029 CHU= .01
 F1= 0 DG1= 1 SG1= 2
 F2= 5.34E+09 DG2= 57.7 SG2= 2.8
 F3= 6.6E+11 DG3= 903 SG3= 3.4

007-13 SURFACE DIST.

CHN= .06 CHS= .029 CHU= .01
 F1= 0 DG1= 1 SG1= 2
 F2= 9.43E+08 DG2= 20 SG2= 2.8
 F3= 9.29E+09 DG3= 202 SG3= 3.4

007-13 NUMBER DIST.

CHN= .06 CHS= .029 CHU= .01
 F1= 0 DG1= 1 SG1= 2
 F2= 6.25E+06 DG2= 2.4 SG2= 2.8
 F3= 1.45E+06 DG3= 10.1 SG3= 3.4

Figure K-4c

007-17 VOLUME DIST.

CHN= .093 CHS= .095 CHU= .022
 F1= 0 DG1= 1 SG1= 2
 F2= 9.29E+08 DG2= 28.9 SG2= 2.8
 F3= 4.12E+11 DG3= 1400 SG3= 4

007-17 SURFACE DIST.

CHN= .093 CHS= .095 CHU= .022
 F1= 0 DG1= 1 SG1= 2
 F2= 3.28E+08 DG2= 10 SG2= 2.8
 F3= 4.6E+09 DG3= 205 SG3= 4

007-17 NUMBER DIST.

CHN= .093 CHS= .095 CHU= .022
 F1= 0 DG1= 1 SG1= 2
 F2= 8.7E+06 DG2= 1.2 SG2= 2.8
 F3= 1.62E+06 DG3= 4.4 SG3= 4

Table K-5

Description of Modal Fitting Parameters
(Associated with Figure K-4(a-c))

CHN: CHI square for the number distribution
CHS: CHI square for the surface distribution
CHV: CHI square for the volume distribution

If CHI square is less than 0.04 the fit is good.
If CHI square is less than 0.15 the fit is fair.

F1: Total number, surface, or volume of Mode 1 for the
 respective weighting. (*)
F2: Total number, surface, or volume of Mode 2 for the
 respective weighting.
F3: Total number, surface, or volume in Mode 3 for the
 respective weighting.

DG1: Geometrical mean diameter of Mode 1 for the given
 weighting (*)
DG2: Geometrical mean diameter of Mode 2 for the given
 weighting
DG3: Geometrical mean diameter of Mode 3 for the given
 weighting

SG1: Geometric Standard Deviation of Mode 1 (*)
SG2: Geometric Standard Deviation of Mode 2
SG3: Geometric Standard Deviation of Mode 3

(*) Unused modes are set to $F1 = 0$, $DG1 = 1$, and $SG1 = 2$, etc.