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FIXED-BED GASIFICATION RESEARCH USING U.S. COALS, VOLUME 17 GASIFICATION AND LIQUIDS RECOVERY OF FOUR U.S. COALS

Contract H0222001
Black, Sivalls, and Bryson, Incorporated

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

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FOREWORD

This report was prepared by Black, Sivalls & Bryson, Incorporated, Houston, Texas under USBM Contract Number HO222001. The contract was administered under the technical direction of the Twin Cities Research Center with Mr. Robert Zahl acting as Technical Project Officer. Mr. Frank Pavlich was the contract administrator for the Bureau of Mines. This report is a partial summary of the work recently completed as a part of this contract during the period June 1, 1985 to September 30, 1985. This report was submitted by the authors on October 18, 1985.

Funding for this contract was through USBM/USDOE Interagency Agreement DE-A121-7ET10205. Funding for the gasification demonstration and coal pyrolysis liquids work reported herein was provided by the Electric Power Research Institute under contracts RP-2505-9 and RP-2656-1 and purchase order number RQ32130ER from the University of Illinois, Illinois State Geological Survey.

The University of Minnesota, Particle Technology Laboratory, Minneapolis, Minnesota, a subcontractor to Black, Sivalls & Bryson, Incorporated participated in preparation of this report. The coals gasified during the tests described here were provided by the organizations funding the tests. Utah Power and Light Company donated the Hiawatha bituminous coal tested under this effort.

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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 (MIFG), 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, Sivalis & Bryson, Incorporated 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 is subcontractor to BS&B to monitor process parameters, and provide analysis for material inputs and outputs.

This report describes BOM/FGT-018, a gasification and pyrolysis liquids recovery test sponsored by the Electric Power Research Institute under Contracts RP-2505-9 and RP-2656-1 with Black, Sivalis & Bryson, Incorporated. Four different coals were thermochemically beneficiated using the Wellman-Galusha gasifier. These include:

Illinois No. 6	Supplied by the Illinois State Geological Survey
SUFCO	Utah bituminous coal, mined by Coastal States
Indianhead Lignite	North Dakota lignite, mined by North American Mining Company
Hiawatha	Utah bituminous coal, mined by Utah Power and Light Company

This report describes BOM/FGT-018, the gasification of the above four coals for the purpose of recovering approximately 10 to 20 gallons of pyrolysis liquids from each fuel. This test series spanned from July 15, 1985 through July 28, 1985.

Section 1 gives a brief summary of the tests. 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

The four coals tested during BOM/FGT-018 are representative of the relatively diverse source of U.S. coals. Three of the coals were high volatile bituminous coals, one from the Illinois basin (River King underground No. 1 mine and Pit No. 3) with the other two from Emery County, Utah (Southern Utah Fuel Company and Utah Power and Light's Wilberg mine). The fourth coal tested was North Dakota lignite from the North American Mining Company's mine which is the coal source for the Great Plains coal gasification plant in Beulah, North Dakota.

The test was designed to gasify each of the four coals in a Wellman-Galusha gasifier at a moderate load (i.e. approximately 50 percent capacity) with the recovery of pyrolysis liquids under inert conditions for subsequent analysis by the University of Utah, Biomaterials Profiling Center. The majority of the hot product gas generated by the Wellman-Galusha gasifier was incinerated with the products of combustion water-quenched, cleaned of sulfur oxides and particulate, and exhausted.

A slipstream of the raw product gas (approximately 10 dscfm) was cooled and cleaned of pyrolysis liquids throughout the test, by using a surface contact condenser and electrostatic precipitator. This gas cleaning system used for the liquids recovery was the same system used in 1984 during tests BOM/FGT-014 and BOM/FGT-015. The enlarged gas cooler/tar separator operated continuously throughout the gasification test. A total of 250 Kg of relatively dry, high quality pyrolysis liquids were recovered during this test.

All four of the coals gasified well during the test as was expected since all the coals or very similar coals had been previously gasified in the TCRC Wellman-Galusha gasifier. Gas quality (HHV) was generally between 165 to 180 Btu/dscf. Operation of the agitator was required to manage the coal agglomeration for Illinois No. 6 and the Utah bituminous coals. No design point data are reported since maximum capacities were not evaluated during this test. All four of these coals are recommended feedstocks for single-stage, fixed-bed gasification using the Wellman-Galusha gasifier.

SECTION 2

TEST OBJECTIVES

2.1 Selection of Coals for Pyrolysis Liquid Recovery

The selection of the three coals for pyrolysis liquid generation and recovery using the Wellman-Galusha gasifier was made by the Liquefaction Research Group within the Advanced Fossil Power Systems of the Electric Power Research Institute. A fourth coal (Illinois No. 6) was gasified during this test series with pyrolysis liquids recovery under contract with the Illinois State Geological Survey.

During the 1984 MIFGA test season (BOM/FGT-014), Utah Power and Light supplied approximately 900 tons of their Blind Canyon high volatile bituminous B coal to be gasified in the Bureau of Mines Twin Cities Research Center Wellman-Galusha gasifier with an upscaled liquids recovery system. The pyrolysis coal tars produced by that test were compared with the pyrolysis liquids produced by the Lurgi-LR process and found to be much superior in quality (no solids and fewer polar constituents). In fact, it appears that the pyrolysis liquids generated by the atmospheric fixed-bed gasification process may represent the best possible coal tars obtainable under pyrolysis conditions. Therefore, the Electric Power Research Institute established a program to generate more "gasification generated" pyrolysis liquids from two other Utah bituminous coals (SUFCO and UP&L's Hiawatha) plus the Indianhead lignite, feedstock for the Great Plains coal gasification project.

The pyrolysis liquids generated from the three coals using the Wellman-Galusha gasifier will be characterized and further upgraded. The North Dakota lignite was included in this test for scale-up considerations, since the pyrolysis liquids generated from the Indianhead lignite in the atmospheric Wellman-Galusha gasifier can be directly compared with the pyrolysis liquids generated by the high capacity pressurized Lurgi gasifiers operated at Great Plains.

2.2 Installation and Operation of an Enlarged Gas Cooler/Tar Separator

The enlarged gas cooler/tar separator developed under EPRI support and applied to BOM/FGT-014 and 015 (UP&L's Blind Canyon bituminous and Kemmerer sub-bituminous coals) during the 1984 MIFGA test season was installed and operated for this test (BOM/FGT-018).

The installation of the enlarged gas cooler/tar separator for BOM/FGT-018 included features to purge with steam which had not been incorporated in the previous tests and insure continuous 24

hrs/day operation. In addition, an "inert box" was constructed around the drain nozzle which would enable the liquids to be extracted under a nitrogen environment (with no air/oxygen contamination). The pyrolysis liquid samples were then immediately frozen in a liquid nitrogen bath. All tar samples were stored under dry ice and shipped to the Biomaterials Profiling Center (University of Utah) under dry ice to minimize thermal degradation.

2.3 Test Objectives

- A. Recover the maximum amount of pyrolysis liquids (nominally 10 to 20 gallons) from each of the three EPRI selected coals.
- B. Operate the gasifier under "nominal" (i.e. approximately 50 percent maximum) load conditions to insure a representative pyrolysis product and enable the quantity of pyrolysis liquid to be recovered from the 80 to 100 tons of coal available.
- C. Establish the gasification performance of the SUFCO and Hiawatha Utah bituminous coals.

2.4 Test Plan

The test plan is shown in Figure 2-1. A nominal saturation air flow of 800 scfm was planned for all fuels to be gasified. All coal was screened at +1/4 inch prior to introduction into the gasifier. Each coal was scheduled for approximately three (3) days of operation in the gasifier at a nominal consumption rate of 30 tons per day.

Operation of the agitator (both rotational rate and vertical travel) was left to the facility manager's judgement based on the observed performance of the coal. The overall operational criteria was to insure the generation of a nominal product gas and pyrolysis liquids yield, representative of moderate to full capacity operation.

* Coke, Illinois No. 6, SUFCO, Indianhead Lignite, and Hiawatha.
 ** Coal input cannot be scaled, due to different coal ranks gasified.

Proposed Test Plan, BOM/FGT-018

SECTION 3

DESCRIPTION OF FUEL GASIFIED

The four coals gasified during BOM/FGT-018 are listed below in the sequence of usage:

1. Illinois No. 6 River King
2. Utah bituminous, SUFCO
3. North Dakota lignite, Indianhead
4. Utah bituminous, Hiawatha (UP&L)

The Illinois No. 6 was mined from either River King underground No. 1 mine or Pit No. 3 identified in Figure 3-1. The Illinois No. 6 initially gasified during this test was shipped from the Dairyland Power Company in Alma, Wisconsin.

The second coal gasified was shipped by rail from the Southern Utah Fuel Company (SUFCO) mine in Emery county, Utah. Figure 3-1 shows the source of this high volatile bituminous B coal.

The third coal gasified was shipped by rail from the North American Coal Company Indianhead mine in Beulah, North Dakota, identified in Figure 3-1. This is the same lignite converted to SNG by the Great Plains Gasification project as was specified by the Electric Power Research Institute.

The fourth coal gasified was supplied by Utah Power and Light Company. The Hiawatha bituminous B coal was mined from the UP&L Wilberg mine in Emery county, Utah, as shown in Figure 3-1.

Complete analyses of these four coals are presented in Table 3-1.

Figure 3-1

Locations of the Coal Mines

Table 3-1

Average Analysis of Coals Tested in BOM/FGT-018

	River King	SUFCO Bit.	Indianhead Lig.	Hiawatha Bit.
Proximate Analysis (%)				
Volatile Matter	35.47	37.35	31.52	40.06
Fixed Carbon	44.83	47.88	29.11	44.21
Ash	10.14	7.71	11.17	10.57
Moisture	9.56	7.06	28.21	5.17
Sulfur	4.25	0.52	1.40	0.60
Heating Value (Btu/lb)	11344	11837	7117	12058
Ultimate Analysis (%)				
Carbon	62.49	67.52	42.60	67.53
Hydrogen	4.65	4.81	3.02	5.17
Nitrogen	1.00	1.02	0.43	1.20
Sulfur	4.25	0.52	1.40	0.60
Oxygen	7.91	11.36	13.16	9.77
Ash	10.14	7.71	11.17	10.57
Moisture	9.56	7.06	28.21	5.17
Ash Fusion Temperatures (deg. F):				
Oxidizing				
Initial Deformation	2365	2125	2315	2390
Softening	2440	2190	2340	2425
Hemispherical	2480	2310	2355	2465
Fluid	2555	2525	2380	2515
Reducing				
Initial Deformation	1975	2070	2420	2275
Softening	2015	2140	2455	2390
Hemispherical	2070	2185	2490	2415
Fluid	2175	2320	2510	2470
Free Swelling Index:	4	0	0	1 - 1/2

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. Equipment installed specifically for this test is also described.

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 ultimately 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 water-cooled agitator, 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 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.

4.2 Gas Sampling and Conditioning System

Figure 4-2 is a schematic of the gas sampling and conditioning system used. The sampling port is thermally insulated to

Figure 4-1

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

Figure 4-2

Schematic Diagram of the Gas Sampling and Conditioning System

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 approximately every 20 minutes with a Hewlett-Packard model 5880A gas chromatograph. The principal features of this chromatograph are listed in Table 4-1.

Sulfur species concentrations in the gas are determined with a HP 5793 gas chromatograph by manual injection of grab samples. The principal features of the HP 5793 are given in Table 4-2.

4.4 Enlarged Gas Cooler/Tar Separator

The enlarged gas cooler/tar separator employed in a slipstream during this test is described in Volume 13 of this series (Thimsen, Maurer, et al, 1985) and is scaled up by a factor of approximately 30 from the gas sampling and conditioning system described in Section 4.2. The gas sampling and conditioning system is described in more detail in Volume 1 of this series (Thimsen, Maurer et al, 1984).

The enlarged gas cooler/tar separator is shown in schematic in Figure 4-3. Raw gas is withdrawn from a nozzle in the main gas downcomer, 62 pipe feet downstream of the cyclone and 5 pipe feet downstream of the sampling nozzle for the gas sampling and conditioning system.

The raw gas for the slipstream is extracted from the gas duct centerline, through a 2-inch horizontal probe designed to exclude dust particles greater than 5 μm . The relatively dust-free raw gas travels 7.5 feet through the 2-inch pipe, through control and safety valves to the shell and tube condenser.

Table 4-1

Operating Configuration and Conditions,
Hewlett-Packard Model 5880A 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

Table 4-2

Operating Configuration and Conditions,
Hewlett-Packard Model 5793 Gas Chromatograph

1. Flame photometric detector
2. Single column - 13" x 1/8" Teflon Supelpak-S (Porapak QS)
3. Ten port valve for sample injection and column backflush
4. Integrator with limited control capabilities
5. Nitrogen carrier gas: Carrier Flowrate = 32 ml/min
6. Sample loop size = 125 ul
7. Temperature program:
Initial temperature 30 C
Initial time 1.5 min
Program rate 35 C min
Final temperature 170 C
Final time 5.0 min
8. Analysis cycle time 25 min.

Figure 4-3

Enlarged Gas Cooler/Tar Scrubber System Schematic

Total heat removed in the condensor is controlled manually by coolant flow and coolant exit temperature to maintain a desired gas outlet temperature (typically 130 F, 54 C).

The nucleated tar droplets are removed in an electrostatic precipitator (ESP) with geometry identical to that of the condenser. Two stage electrodes are mounted at the centerline of each tube. A positive corona is applied to the electrodes to avoid sparkover problems (Liu et al, 1984).

The condenser and ESP are mounted on a common tar reservoir which is steam heated and contains an explosion relief diaphragm. Gas is moved through the system by a steam jet eductor located approximately 40 pipe feet downstream of the ESP outlet. The gas flow is measured by a flange tap orifice plate approximately 8 pipe feet downstream of the ESP outlet. The entire system in Figure 4-3 is constructed of 304 stainless steel.

The gas leaving the ESP is analyzed for oxygen by a fuel cell type oxygen meter. If the oxygen content of the gas at this point exceeds 1.0%, the high voltage is automatically turned off and the air operated safety valve upstream of the condenser closed. This is done to avoid potential explosions initiated by a discharge from the high voltage electrode.

SECTION 5

TEST PROCEDURES

Test procedures are described in detail in Volume 1 of this series (Thimsen, Maurer et al, 1984). The following is a summary of the procedures including specific procedures used during 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 the three test teams. This includes: gasifier start up, coal 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 water streams, and measurement of retort temperature and pressure profiles.

The gasifier operations team was also responsible for operation of the gas cooler/tar separator.

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
- 5) safety evaluation personnel

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.

5.2 Gasifier Sampling and Data Acquisition Procedures

5.2.1 Continuous Data

An Analog Devices, Incorporated MACSYM 350 data acquisition system was used for this test. Process signals are sampled once a minute. Ten-minute signal averages are recorded on floppy discs. 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.

The HP 5793 gas chromatograph is calibrated before and after the test. Calibrations with varying levels of hydrogen sulfide in nitrogen have confirmed the square root response of the flame photometric detector to gas sulfur concentrations. The hydrogen sulfide FPD calibration factor is used for determination of carbonyl sulfide concentrations.

5.2.3 Tar and Oil Data

The condensed tar, oil, and water are removed from the accumulation reservoirs 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. Moisture content of each daily tar sample is determined by distillation.

5.2.4 Coal Data

Coal samples are taken by the operations team during coal addition to the lock hopper four times each shift. These four

samples are stored in one bucket and submitted as a composite shift sample. Detailed chemical analysis of each coal gasified as well as the particle size distribution of the feed coal is performed on an appropriate composite of the shift samples.

5.2.5 Ash Data

An ash sample is taken by the operations team each time ash is discharged, and stored in a sealed container. For a single ash sample composited from those collected during the gasification of the respective coals the carbon, sulfur, and metals content of the ash are tabulated by the monitoring team. These analyses are determined from milled samples submitted by the monitoring team.

5.2.6 Dust Data

Samples of cyclone dust are grabbed daily from the dust accumulation bin. A single composite of daily samples collected during gasification of the respective coals is submitted for analysis.

5.2.7 Retort Particle Sampling

Sampling of the gasifier offtake for particles was not performed during this test, since the primary purpose of the test was the generation and recovery of the coal pyrolysis liquids.

5.2.8 Enlarged Gas Cooler/Tar Separator

The gas cooler/tar separator is normally operated at a nominal gas flow of 10 dscfm (within 10 percent). The outlet gas temperature is maintained above the water dewpoint of the gas whenever possible.

The tar reservoir of the enlarged gas cooler and tar separator enters a sealed glove box. The tar reservoir is drained under inert atmosphere into 1 and 2 liter high density polyethylene containers.

The recovery and handling of all tar samples from the enlarged gas cooler/tar separator involved the following:

- (1) Draining tar tank on a 6-hour interval in a nitrogen environment. The draining procedure involved purging the glove box for one hour prior to opening the tar valve.
- (2) Upon securing the cap on the tar sample container, it was immersed in a liquid nitrogen bath.
- (3) Long term storage and shipping of tar samples was achieved using dry ice.

The frozen samples were stored and shipped to the University of Utah, Biomaterials Profiling Center, under dry ice conditions.

SECTION 6

CONDUCT OF TEST

6.1 Gasifier Operation

The primary objective of BOM/FGT-018 was to run the gasifier in a "steady state" mode to generate the quality tars and oils collected from a slip stream condensor/ESP unit.

Test progression resulted in the following gasifier throughput on each fuel as shown in Figure 6-1:

Fuel	Start Time	Stop Time	Elapsed Time	Average Coal Throughput
Coke	0800 7-15	to 0500 7-16	20 hrs	< 0.5 tn/hr
River King Bituminous	0500 7-16	to 1700 7-17	36 hrs	0.7 tn/hr
Coke	1700 7-17	to 0200 7-17	9 hrs	0.5 tn/hr
SUFCO Bituminous	0200 7-17	to 1130 7-22	134.5 hrs	0.75 tn/hr
Indianhead Lignite	1130 7-22	to 1200 7-25	72.5 hrs	0.9 tn/hr
Hiawatha Bituminous	1200 7-25	to 2300 7-28	81 hrs	1.0 tn/hr

No significant problems developed in the gasifier operation with any of the fuels. A heavy crust developed just above the incandescent zone and some fire bed nonuniformity was evident with the Hiawatha seam bituminous coal. This condition may have been aggravated by the fact that the feedstock was very dusty and dirty. The ash from this coal appeared to be very dense and vitrified. From an operational viewpoint, the gas quality remained good throughout the various transitions and coals tested during BOM/FGT-018.

6.2 Operation of the Tar Collector/Condensor ESP

The slipstream tar separation system described in Section 4.4 operated flawlessly and continuously 317 hours. The operation could only be characterized as routine. As a safety precaution, it was taken off line for tar drains about 12 minutes out of every six hours, and had only three hours of unscheduled down time. This unscheduled downtime was due to two emergency

NOTE*: Coke, Illinois No. 6, SUFCO, North Dakota & Hiawatha

Actual Test Sequence

Figure 6-1

shutdowns of the gasifier during which the tar separation system shut down automatically and without incident. The tar separation system was available for operation essentially 100% of the gasifier operating time.

SECTION 7

TEST RESULTS

7.1 Data Summary

Summary of the gasifier operational data presented herein is consistent with the scope of previous gasification test reports prepared under the subject MIFGA coal gasification program; however, the discussion and interpretation of these data in this report is significantly abbreviated since the gasifier performance with the respective coals was not evaluated during this test. The generation and recovery of the coal pyrolysis liquids from the four coals tested was the major test objective under this EPRI sponsored test.

7.1.1 Continuous Output Transducers

The data acquisition system operated well during the entire test. No data were lost due to either problems with the gas sampling and conditioning system or the data logging system.

Figure 7-1 shows the gas offtake temperature, fire loss pressure, and dry gas higher heating value along with gasifier operating parameters throughout the test. The gas offtake temperature varied between 310 C and 450 C (600 F and 850 F) for the three bituminous coals tested under the nominal 50 percent gasifier load which was maintained throughout this test. The Indianhead lignite gas offtake temperature averaged 140 C (280 F) with a throughput of nominally 1 ton/hour. This is typical for a high moisture lignite. Due to the relatively low throughputs and correspondingly low gas offtake temperatures for the bituminous coals, a fraction of the pyrolysis liquids leaving the retort were in the liquid aerosol state.

The dry gas higher heating value was extremely steady throughout the test despite the fact that four different coals were gasified. The product gas quality was shown to be independent of the four different coals throughout this test.

Fire loss pressure was low except for the spike which occurred when the Illinois No. 6 initially entered the retort. The swelling/agglomeration characteristics of the Illinois No. 6 resulted in an initially high fire loss pressure which was reduced through use of the agitator. The gasifier operation and fuel response were extremely steady throughout this test.

7.1.2 Coal, Ash and Dust Data

A complete list of the tests performed on the bulk coal, ash and dust samples collected during BOM/FGT-018, together with the number of samples analyzed, is presented in Table 7-1. One composite sample of each coal and coal ash was generated for

Physical characteristics of the Gasifier operation

Figure 7-1

Table 7-1

Summary of Coal, Ash and Cyclone Dust Analysis

Material	Type of Analysis	Number of Samples Collected	Number of composite Samples Analyzed
Coal	Particle size distribution	39	4
	Proximate analysis	---	4
	Ultimate analysis	---	4
	Ash fusion temperature	---	4
	Free swelling index	---	4
Ash	Particle size distribution	---	4
	Bulk density	---	4
	Moisture content	---	4
	Carbon content	---	4
	Sulfur content	---	4
	Chemical analysis	---	4
Cyclone Dust	Proximate analysis	---	4
	Ultimate analysis	---	4

these analyses.

7.1.2.1 Coal Data

The average size distribution of the coal feed for each of the four coals is presented in Figure 7-2. All coal feed was screened at 1/4 inch, except for the Illinois Riverking which was screened at 1/2 inch.

The results of the physical and chemical analyses of each coal, based on one composite sample of each coal are presented in Tables 7-2 through 7-5.

7.1.2.2 Ash Data

One composite ash sample for each coal gasified was generated for elemental analyses. Table 7-6 summarizes the ash elemental analyses for each of the four coals tested. Since the objective of this test was coal pyrolysis liquids recovery, with the gasifier operated at a nominal capacity, only limited ash analyses were made.

7.1.2.3 Cyclone Dust Data

Cyclone dust samples were composited for each coal tested. Analyses of each composite sample are presented in Table 7-2 through 7-5. In all cases, the volatile matter/fixed carbon ratio is reduced from that of the original coal. In the case of the Illinois No. 6 dust, this reduction is in excess of 70 percent.

7.1.3 Gas Analysis Data

The NDIR carbon monoxide and carbon dioxide monitors operated continuously during the test. Daily calibration drift was less than 1%. No data loss occurred throughout this test. The concentrations of the gaseous species measured by the HP 5880 A are summarized in Figures 7-3 and 7-4. The major gas species, along with operating parameters and dry gas HHV, are presented in Figure 7-5.

The concentrations of the major gas species were relatively stable during the gasification of the four different coals. The minor gas species (hydrocarbons) concentrations fluctuated in a typically random fashion. These fluctuations are consistent with an unevenness in coal feed to the gasifier, resulting in an uneven flow of solids into the devolatilization zone. Figure 7-4 illustrates a distinct variation in the hydrocarbon content of the gas during the interval of lignite gasification (July 22 through July 25). Both ethane and propane exhibited a distinguishable drop in concentration. The methane concentration showed very little variation with all coals gasified.

Variation in hydrogen and carbon monoxide concentrations was

Figure 7-2

Average Particle Size Distribution of Feed Coals

Table 7-2

Physical and Chemical Analyses of Coal and Cyclone Dust
River King Bituminous Coal

Material	River King Bituminous Coal	Cyclone Dust
Screen Mesh Size, Inch	1/2	---
Type of Analysis (*)		
Proximate Analysis, wt % :		
Moisture	9.56	---
Volatile Matter	35.47	15.86
Ash	10.14	13.17
Fixed Carbon (**)	44.83	70.97
Sulfur	4.25	2.68
Ultimate Analysis, wt % :		
Hydrogen	4.65	2.50
Carbon	62.49	77.89
Nitrogen	1.00	1.31
Sulfur	4.25	2.68
Oxygen (**)	7.91	2.18
Ash	10.14	13.17
Moisture	9.56	---
Heating Value, btu/lb :		
As Received	11344	---
Moisture Free	12543	12653
Ash Fusion Temp. Deg F:		
(Oxidizing Atmosphere)		
Initial Def., IT	2365	---
Softening, ST	2440	---
Softening, HT	2480	---
Fluid, FT	2555	---
(Reducing Atmosphere)		
Initial Def., IT	1975	---
Softening, ST	2015	---
Softening, HT	2070	---
Fluid, FT	2175	---
Free Swelling Index	4	

(*) Coal values as received unless otherwise noted.

Dust values are dry basis

(**) By difference.

Table 7-3

Physical and Chemical Analyses of Coal and Cyclone Dust
SUFCO Bituminous Coal

Material	SUFCO Bituminous Coal	Cyclone Dust
Screen Mesh Size, Inch	1/4	---
Type of Analysis (*)		
Proximate Analysis, wt % :		
Moisture	7.06	---
Volatile Matter	37.35	24.42
Ash	7.71	18.10
Fixed Carbon (**)	47.88	57.48
Sulfur	0.52	0.88
Ultimate Analysis, wt % :		
Hydrogen	4.81	2.85
Carbon	67.52	71.76
Nitrogen	1.02	1.00
Sulfur	0.52	0.88
Oxygen (**)	11.36	5.05
Ash	7.71	18.10
Moisture	7.06	---
Heating Value, btu/lb :		
As Received	11837	---
Moisture Free	12735	11600
Ash Fusion Temp. Deg F:		
(Oxidizing Atmosphere)		
Initial Def., IT	2125	---
Softening, ST	2190	---
Softening, HT	2310	---
Fluid, FT	2525	---
(Reducing Atmosphere)		
Initial Def., IT	2070	
Softening, ST	2140	---
Softening, HT	2185	---
Fluid, FT	2320	---
Free Swelling Index	0	

(*) Coal values as received unless otherwise noted.

Dust values are dry basis

(**) By difference.

Table 7-4

Physical and Chemical Analyses of Coal and Cyclone Dust
Indianhead Lignite

Material	Indianhead Lignite	Cyclone Dust
Screen Mesh Size, Inch	1/4	---
Type of Analysis (*)		
Proximate Analysis, wt % :		
Moisture	28.21	---
Volatile Matter	31.52	51.74
Ash	11.17	9.32
Fixed Carbon (**)	29.11	38.94
Sulfur	1.40	0.89
Ultimate Analysis, wt % :		
Hydrogen	3.02	5.17
Carbon	42.60	74.94
Nitrogen	0.43	1.02
Sulfur	1.40	0.89
Oxygen (**)	13.16	8.48
Ash	11.17	9.32
Moisture	28.21	---
Heating Value, btu/lb :		
As Recieved	7117	---
Moisture Free	9913	12875
Ash Fusion Temp. Deg F:		
(Oxidizing Atmosphere)		
Initial Def., IT	2315	---
Softening, ST	2340	---
Softening, HT	2355	---
Fluid, FT	2380	---
(Reducing Atmosphere)		
Initial Def., IT	2420	---
Softening, ST	2455	---
Softening, HT	2490	---
Fluid, FT	2510	---
Free Swelling Index	0	

(*) Coal values as received unless otherwise noted.
Dust values are dry basis

(**) By difference.

Table 7-5

Physical and Chemical Analyses of Coal and Cyclone Dust
Hiawatha Bituminous Coal

Material	Hiawatha Bituminous Coal	Cyclone Dust
Screen Mesh Size, Inch	1/4	---
Type of Analysis (*)		
Proximate Analysis, wt % :		
Moisture	5.17	---
Volatile Matter	40.06	35.86
Ash	10.57	13.34
Fixed Carbon (**)	44.21	44.21
Sulfur	0.60	0.66
Ultimate Analysis, wt % :		
Hydrogen	5.17	4.42
Carbon	67.53	74.37
Nitrogen	1.20	1.31
Sulfur	0.60	0.66
Oxygen (**)	9.77	5.72
Ash	10.57	13.34
Moisture	5.17	---
Heating Value, btu/lb :		
As Received	12058	---
Moisture Free	12715	12943
Ash Fusion Temp. Deg F:		
(Oxidizing Atmosphere)		
Initial Def., IT	2390	---
Softening, ST	2425	---
Softening, HT	2465	---
Fluid, FT	2515	---
(Reducing Atmosphere)		
Initial Def., IT	2275	---
Softening, ST	2390	---
Softening, HT	2415	---
Fluid, FT	2470	---
Free Swelling Index	1 - 1/2	

(*) Coal values as received unless otherwise noted.

Dust values are dry basis

(**) By difference.

Table 7-6

Elemental Analyses of Moisture-Free Ash

Mass Fraction % for Composite Sample (**)

Element	River King Bituminous	SUFCO Bituminous	Indianhead Lignite	Hiawatha Bituminous
Fe	10.6	4.2	8.9	4.2
Fe(2+)	6.8	5.2	6.6	2.5
Si	19.7	26.4	15.4	23.2
Al	8.7	6.4	5.1	9.2
C	8.4	0.24	0.68	3.5
Ca	2.9	9.3	16.7	7.0
Mg	0.79	1.4	3.3	1.9
P	0.059	0.16	0.28	0.13
S	0.34	0.21	0.86	0.78

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

HYDROGEN (%)

CARBON MONOXIDE (%)

CARBON DIOXIDE (%)

NITROGEN (%)

TEST DATE (JULY 1985)

Major Gas Species Measured by the Gas Chromatograph

Figure 7-3

Figure 7-4
Minor Gas Species Measured by the Gas Chromatograph

Dry gas HHV, Major Gas Species and Gasifier
Operating Conditions

Figure 7-5

extremely slight for all four coal feeds as shown in Figure 7-5. During the lignite gasification, a very slight increase in H₂ and CO concentrations occurred. This test, in fact, demonstrates the constancy of product gas quality with different coal feed stocks using the fixed-bed single-stage Wellman-Galusha gasifier.

The gas phase sulfur species were measured using the HP 5793 gas chromatograph from hand-injected syringe samples. These data are summarized in Figures 7-6 and 7-7. The total sulfur concentration in the gas varies from a high of nominally 4,000 ppm for Illinois No. 6 to a low of nominally 500 ppm for Utah bituminous (SUFCO). The North Dakota lignite produced a total gas sulfur content in the range of 1500 to 2000 ppm. Throughout this test, the major sulfur species was measured to be hydrogen sulfide (H₂S), typically accounting for up to 70% of the total sulfur. Carbonyl sulfide (COS) accounted for nominally 25% of total sulfur. Figure 7-7 shows that mercaptans and higher order sulfur species account for nominally 5% of the total gas phase sulfur.

7.1.4 Tar and Water Yield Data

The gas sampling and conditioning system operated continuously throughout the test. Water and tar yield data throughout the test are compared with gasifier operating parameters in Figure 7-8. These results show the reduced tar yield and increased water yield corresponding to the interval of lignite gasification during July 22 through July 25.

Composite samples of liquids collected from each coal were prepared and submitted for analysis. Tables 7-8 through 7-11 present the analyses of the composite tar samples from the gas sampling and conditioning system for each of the four coals gasified. Also included in Table 7-8 through 7-11 are analyses of composite samples from the enlarged tar separator. In general, the comparison between the fuel analyses for each coal tar exhibit reasonable agreement and consistency with the samples recovered by the enlarged tar separator.

7.2 Material and Energy Balances

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

The measured data used to calculate balances around the gasifier include process temperatures, pressures, flows, condensate concentrations, and estimates of dust carryover from the retort.

While relative measurements of gas phase sulfur species are made, the total gas sulfur loading used in the analyses is calculated from the coal sulfur content, coal rate, ash sulfur content, ash rate, dust sulfur content, dust rate, and tar/oil sulfur content, and tar/oil yield. Sulfur species concentrations reported are

Figure 7-6

Total Sulfur and Normalized H₂S and
COS Species Concentrations

Figure 7-7

Total Sulfur and Normalized Mercaptans and
Higher Order Sulfur Species Concentrations

Tar/oil yield and Water Yield with Operating Conditions

Figure 7-8

Table 7-8

Condensed Material Analysis
River King Bituminous

Tar	Gas Sampling and Conditioning System		Tar Separator	
	7/16/85 & 7/17/85		7/17/85 2:15	
Heating Valve, btu/lb	14586	(16643)	15139	(15690)
Flash Point, deg. F	214		254	
Water by distillation, %	12.36		3.51	
Specific gravity, 60/60 deg. F	1.1163		1.1289	
Sediment (solids), % W/W	2.01	(2.29)	1.26	(1.31)
Pour point, deg. F	25		90	
Cold (solid) point, deg. F	20		85	
Viscosity at:				
122 deg. F Saybolt Universal, Sec.	94.8		476	
122 deg. F Kinematic, centistokes	200		1009	
210 deg. F Saybolt Universal, Sec.	69		118.8	
210 deg. F Kinematic, centistokes	12.7		24.7	
Ultimate Analysis, WT%				
Hydrogen	6.50	(7.42)	7.07	(7.33)
Carbon	75.34	(85.97)	79.22	(82.72)
Nitrogen	0.92	(1.05)	1.23	(1.27)
Oxygen (by difference)	2.44	(2.78)	6.43	(6.66)
Sulfur	2.39	(2.73)	2.42	(2.51)
Moisture (total)	12.36		3.51	
Ash	0.051	(0.058)	0.115	(0.12)
Water				
Total organics, % W/W	0.14			

Notes:

Analyses are performed on wet samples

Dry basis values are included in parentheses

Table 7-9

Condensed Material Analysis
SUFCO Bituminous

Tar	Gas Sampling and Conditioning System		Tar Separator	
	7/18/85 & 7/22/85		7/20/85 14:00	
Heating Valve, btu/lb	12856	(17107)	15990	(16240)
Flash Point, deg. F	217		269	
Water by distillation, %	24.85		1.54	
Specific gravity, 60/60 deg. F	1.0491		1.0665	
Sediment (solids), % W/W	0.42	(0.56)	0.38	(0.39)
Pour point, deg. F	90		90	
Cold (solid) point, deg. F	85		85	
Viscosity at:				
122 deg. F Saybolt Universal, Sec.	13.7		145	
122 deg. F Kinematic, centistokes	23.8		307	
210 deg. F Saybolt Universal, Sec.	45.6		110.1	
210 deg. F Kinematic, centistokes	5.90		22.69	
Ultimate Analysis, WT%				
Hydrogen	6.50	(8.65)	8.45	(8.58)
Carbon	65.01	(86.51)	81.61	(82.89)
Nitrogen	0.79	(1.05)	0.87	(0.88)
Oxygen (by difference)	2.54	(3.38)	7.13	(7.24)
Sulfur	0.28	(0.37)	0.35	(0.36)
Moisture (total)	24.85		1.54	
Ash	0.030	(0.040)	0.054	(0.055)
Water				
Total organics, % W/W	0.20			

Notes:

Analyses are performed on wet samples
Dry basis values are included in parentheses

Table 7-10

Condensed Material Analysis
Indianhead Lignite

Tar	Gas Sampling and Conditioning System		Tar Separator	
Heating Valve, btu/lb	13280	(16919)	16594	(17063)
Flash Point, deg. F	209		240	
Water by distillation, %	21.51		0.64	
Specific gravity, 60/60 deg. F	1.0766		1.0587	
Sediment (solids), % W/W	0.37	(0.47)	1.33	(1.34)
Pour point, deg. F	25		100	
Cold (solid) point, deg. F	20		95	
Viscosity at:				
122 deg. F Saybolt Universal, Sec.	2.70		24.8	
122 deg. F Kinematic, centistokes	1.34		47.4	
210 deg. F Saybolt Universal, Sec.	48.0		47.8	
210 deg. F Kinematic, centistokes	6.65		6.59	
Ultimate Analysis, WT%				
Hydrogen	6.39	(8.14)	10.92	(10.99)
Carbon	67.93	(86.55)	87.12	(87.68)
Nitrogen	0.62	(0.79)	0.44	(0.44)
Oxygen (by difference)	3.20	(4.08)	0.48	(0.48)
Sulfur	0.31	(0.39)	0.37	(0.37)
Moisture (total)	21.51		0.64	
Ash	0.060	(0.076)	0.026	(0.026)
Water				
Total organics, % W/W	0.29			

Notes:

Analyses are performed on wet samples

Dry basis values are included in parentheses

Table 7-11

Condensed Material Analysis
Hiawatha Bituminous

Tar	Gas Sampling and Conditioning System		Tar Separator	
	7/25/85 & 7/28/85		7/25/85 20:20	
Heating Valve, btu/lb	16020	(18617)	17127	(17190)
Flash Point, deg. F	206		252	
Water by distillation, %	13.95		0.37	
Specific gravity, 60/60 deg. F	0.9632		0.9962	
Sediment (solids), % W/W	0.10 (0.12)		0.95 (0.95)	
Pour point, deg. F	85		95	
Cold (solid) point, deg. F	80		90	
Viscosity at:				
122 deg. F Saybolt Universal, Sec.	16.2		26.5	
122 deg. F Kinematic, centistokes	29.0		51	
210 deg. F Saybolt Universal, Sec.	44.9		51.0	
210 deg. F Kinematic, centistokes	5.69		7.56	
Ultimate Analysis, WT%				
Hydrogen	8.65	(10.05)	10.62	(10.66)
Carbon	74.01	(86.01)	85.66	(85.98)
Nitrogen	0.57	(0.66)	0.54	(0.54)
Oxygen (by difference)	2.53	(2.94)	2.51	(2.52)
Sulfur	0.29	(0.34)	0.29	(0.29)
Moisture (total)	13.95		0.37	
Ash	0.003	(0.003)	0.011	(0.011)
Water				
Total organics, % W/W	0.16			

Notes:

Analyses are performed on wet samples
Dry basis values are included in parentheses

obtained by normalizing GC data to the total sulfur loading in the gas as calculated by difference. In addition, the total gas composition has been normalized to 99.9% accounted for in the material and energy calculations.

The balances presented in Tables 7-12 through 7-15 for this test correspond to periods of steady operation for each of the four coals tested. Each material and thermal balance corresponds to a time period during which gasifier operation was stable. Each interval is characterized by an average coal rate and blast saturation temperature (steam/air ratio). The results in Tables 7-12 through 7-15 are typical of previous performance data from similar coals gasified in the past.

7.3 Grate Performance Model

No effort was made to correlate the ash removal during this test with the geometrical grate performance model developed and described in Volume 1 of this series (Thimsen, Maurer et al, 1984), since the ash bulk density was not measured.

7.4 Tar Yield Correlations

The overall tar yield measured for each coal gasified during this test are compared with the correlations of Ode and Selvig, and Gomez et al, in Figures 7-9 and 7-10 respectively. The agreement is consistently good with the Fisher Schrader data for the SUFCO River King and Hiawatha bituminous coals whereas the Indianhead lignite tar/oil yield measured is somewhat below the Fisher Schrader data.

7.5 Combustion Emission Measurements

Emissions from the gas combustion chamber were not monitored during this test due to the objectives of recovering pyrolysis liquids.

7.6 Retort Particle Sampling

Limited retort particle sampling measurements were made during this test. However, no in-depth analyses of these data were made. The raw data are presented in Appendix D.

7.7 Enlarged Gas Cooler/Tar Separator

Tar samples collected by the enlarged gas cooler/tar separator were submitted for the same analyses performed on tar samples collected by the tar sampling and conditioning system. The results of these analyses are presented in Tables 7-8 through 7-

Table 7-12

Material Balance and Thermal Efficiency Calculation
River King Bituminous Coal

Input Data

Time period: 7/16/85 20:30 - 7/17/85 9:30 (13.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 0.75
Blast air flow (dry) , Scfm = 783.
Saturated air temperature, F = 145.
Steam/Air Ratio (lb./lb.) = 0.19
Ambient air temperature, F = 74.
Off-take temperature, F = 720.

Coal Data:

Type = Illinois # 6 Bituminous
Mass Fraction Carbon % = 62.5
Mass Fraction Fixed Carbon = 44.83
Mass Fraction Moisture % = 9.56
Mass Fraction nitrogen % = 1.00
Mass Percent sulfur = 4.25
Heating value, Btu/lb = 11344

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 6.18
Tar yield, lb/1000 SCF = 2.55
Carbon in Tar (percent) = 86.0
Sulfur in Tar (percent) = 2.73
Tar HHV, thou. Btu/lb = 16.64

Ash and Dust Data:(dry basis)

Ash discharge ,lb/hour = 261.
Ash carbon ,percent = 8.4
Ash sulfur ,percent = 0.34
Ash moisture (wet),percent = 0.0
Cyclone dust,lb/hour(est.) = 4.

Gas Composition (Dry): (normalized to 100.00)

H2 % = 17.3	CH4 % = 1.53	H2S (calc ppm) = 7172
CO % = 25.3	C2H4 % = 0.104	COS (calc ppm) = 2654
CO2 % = 6.57	C2H6 % = 0.181	
N2 % = 47.4	C3H6 % = 0.054	
O2 % = 0.00	C3H8 % = 0.050	HHV, Btu/SCF = 166
Molec. Weight = 24.38	Argon(est. %) = 0.564	LHV, Btu/SCF = 155

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: 0.91)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 1505.	28.1	Dry gas	= 4518.	85.2
Steam (total)	= 605.	11.3	Water in gas	= 434.	8.2
Air(calc,dry)	= 3241.	60.6	Oil and tar	= 179.	3.4
			Ash(calc,dry)	= 166.	3.1
			Dust	= 4.	0.1
Total	= 5350.		Total	= 5302.	

Energy Balance (Percent unaccounted for: 2.77)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 17.1	Dry coal gas	= 11.7	67.4
Air	= 0.011	Oil and tar	= 2.98	17.2
Steam(import)	= 0.663	Sensible	= 1.09	6.3
Cooling water	= 0.111	Latent	= 0.475	2.7
		Ash	= 0.201	1.2
		Dust	= 0.050	0.3
		Cooling water	= 0.868	5.0
Total	= 17.9	Total	= 17.4	

Performance Data

Cold gas efficiency, percent = 65.5
Cold gas with tar efficiency, percent = 32.2
Hot gas without tar efficiency percent = 73.5
Hot gas with tar efficiency, percent = 90.9
Air/Coal (lb./lb.) = 2.154
Steam/Coal (lb./lb.) = 0.402
Air/Fixed Carbon (lb./lb.) = 4.804
Coal/Gasifier Area (lb./hr./sqft) = 45.3
Fixed Carbon/Area (lb./hr./sqft) = 20.3
Producer Gas/Coal (SCF/lb.) = 53.0
Producer Gas/Fixed Carbon (SCF/lb.) = 118.2
Tar Yield (lb./lb. coal) = 0.119

Table 7-13

Material Balance and Thermal Efficiency Calculation
SUFCO Bituminous Coal

Input Data

Time period: 7/19/85 08:00 - 7/21/85 14:00 (54.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 0.76
Blast air flow (dry) , Scfm = 790.
Saturated air temperature, F= 145.
Steam/Air Ratio (lb./lb.) = 0.18
Ambient air temperature, F = 74.
Off-take temperature, F = 587.

Coal Data:

Type = SUFCO Bituminous
Mass Fraction Carbon % = 67.5
Mass Fraction Fixed Carbon = 47.38
Mass Fraction Moisture % = 7.06
Mass Fraction nitrogen % = 1.02
Mass Percent sulfur = 0.52
Heating value, Btu/lb = 11837

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 3.99
Tar yield, lb/1000 SCF = 2.20
Carbon in Tar (percent) = 86.5
Sulfur in Tar (percent) = 0.37
Tar HHV, thou. Btu/lb = 17.11

Asn and Dust Data: (dry basis)

Ash discharge ,lb/hour = 104.
Ash carbon ,percent = 0.2
Ash sulfur ,percent = 0.21
Ash moisture (wet), percent = 0.0
Cyclone dust, lb/hour (est.) = 1.

Gas Composition (Dry): (normalized to 100.00)

H2 % = 17.9	CH4 % = 1.66	H2S (calc ppm)= 766
CO % = 29.4	C2H4 % = 0.042	COS (calc ppm)= 329
CO2 % = 4.95	C2H6 % = 0.137	
N2 % = 45.2	C3H6 % = 0.037	
O2 % = 0.00	C3H8 % = 0.042	HHV, Btu/SCF = 175
Molec. Weight= 23.83	Argon (est. %)= 0.538	LHV, Btu/SCF = 164

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: 1.97)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 1512.	27.8	Dry gas	= 4751.	89.0
Steam (total)	= 605.	11.1	water in gas	= 302.	5.7
Air (calc, dry)	= 3326.	61.1	Oil and tar	= 166.	3.1
			Ash (calc, dry)	= 117.	2.2
			Dust	= 1.	0.0
Total	= 5444.		Total	= 5336.	

Energy Balance (Percent unaccounted for: 2.48)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 17.9	Dry coal gas	= 13.2	72.6
Air	= 0.011	Oil and tar	= 2.85	15.6
Steam (import)	= 0.665	Sensible	= 0.87	4.8
Cooling water	= 0.093	Latent	= 0.334	1.8
		Ash	= 0.007	0.0
		Dust	= 0.007	0.0
		Cooling water	= 0.927	5.1
Total	= 18.7	Total	= 18.2	

Performance Data

Cold gas efficiency, percent = 70.8
Cold gas with tar efficiency, percent = 86.1
Hot gas without tar efficiency percent = 76.7
Hot gas with tar efficiency, percent = 92.4
Air/Coal (lb./lb.) = 2.200
Steam/Coal (lb./lb.) = 0.400
Air/Fixed Carbon (lb./lb.) = 4.594
Coal/Gasifier Area (lb./hr./sqft) = 45.6
Fixed Carbon/Area (lb./hr./sqft) = 21.8
Producer Gas/Coal (SCF/lb.) = 54.4
Producer Gas/Fixed Carbon (SCF/lb.) = 113.6
Tar Yield (lb./lb. coal) = 0.110

Table 7-14

Material Balance and Thermal Efficiency Calculation
Indianhead Lignite

Input Data

Time period: 7/24/85 15:30 - 7/25/85 6:30 (15.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 1.05
Blast air flow (dry) , Scfm = 691.
Saturated air temperature, F = 145.
Steam/Air Ratio (lb./lb.) = 0.18
Ambient air temperature, F = 72.
Off-take temperature, F = 284.

Coal Data:

Type = Indianhead Lignite
Mass Fraction Carbon % = 42.6
Mass Fraction Fixed Carbon = 29.11
Mass Fraction Moisture % = 28.21
Mass Fraction nitrogen % = 0.43
Mass Percent sulfur = 1.40
Heating value, Btu/lb = 7117

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 12.02
Tar yield, lb/1000 SCF = 1.16
Carbon in Tar (percent) = 86.5
Sulfur in Tar (percent) = 0.39
Tar HHV, thou. Btu/lb = 16.92

Ash and Dust Data: (dry basis)

Ash discharge ,lb/hour = 81.
Ash carbon ,percent = 10.0
Ash sulfur ,percent = 0.50
Ash moisture (wet), percent = 0.0
Cyclone dust, lb/hour (est.) = 11.

Gas Composition (Dry): (normalized to 100.00)

H2	%	= 19.4	CH4	%	= 1.43	H2S	(calc ppm)= 3426
CO	%	= 30.6	C2H4	%	= 0.036	COS	(calc ppm)= 1507
CO2	%	= 5.18	C2H6	%	= 0.080		
N2	%	= 42.2	C3H6	%	= 0.023		
O2	%	= 0.00	C3H8	%	= 0.021	HHV,	Btu/SCF = 182
Molec. Weight= 23.56			Argon(est. %)= 0.503		LHV,	Btu/SCF = 170	

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: 1.19)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 2105.	39.3	Dry gas	= 4137.	78.2
Steam (total)	= 506.	9.5	Water in gas	= 801.	15.1
Air (calc, dry)	= 2740.	51.2	Oil and tar	= 77.	1.5
			Ash (calc, dry)	= 262.	4.9
			Dust	= 11.	0.2
Total	= 5352.		Total	= 5288.	

Energy Balance (Percent unaccounted for: 1.92)

Input,	MM BTU/hr		Output,	MM Btu/hr	% Total
Coal	= 15.0		Dry coal gas	= 12.1	79.1
Air	= 0.008		Oil and tar	= 1.30	8.5
Steam(import)	= 0.555		Sensible	= 0.35	2.3
Cooling water	= 0.056		Latent	= 0.855	5.6
			Ash	= 0.375	2.5
			Dust	= 0.144	0.9
			Cooling water	= 0.171	1.1
Total	= 15.6		Total	= 15.3	

Performance Data

Cold gas efficiency, percent = 77.6
Cold gas with tar efficiency, percent = 85.9
Hot gas without tar efficiency percent = 85.2
Hot gas with tar efficiency, percent = 93.6
Air/Coal (lb./lb.) = 1.302
Steam/Coal (lb./lb.) = 0.240
Air/Fixed Carbon (lb./lb.) = 4.471
Coal/Gasifier Area (lb./hr./sqft) = 63.4
Fixed Carbon/Area (lb./hr./sqft) = 18.5
Producer Gas/Coal (SCF/lb.) = 39.7
Producer Gas/Fixed Carbon (SCF/lb.) = 136.4
Tar Yield (lb./lb. coal) = 0.037

Table 7-15

Material Balance and Thermal Efficiency Calculation
Hiawatha Bituminous

Input Data

Time period: 7/27/85 20:30 - 7/28/85 19:30 (23.0 hours)

Gasifier Operation:

Coal feed, Ton/hour = 1.20
Blast air flow (dry) , Scfm = 1079.
Saturated air temperature, F = 145.
Steam/Air Ratio (lb./lb.) = 0.18
Ambient air temperature, F = 83.
Off-take temperature, F = 693.

Coal Data:

Type = Hiawatha Bituminous
Mass Fraction Carbon % = 67.5
Mass Fraction Fixed Carbon = 44.21
Mass Fraction Moisture % = 5.17
Mass Fraction nitrogen % = 1.20
Mass Percent sulfur = 0.60
Heating value, Btu/lb = 12058

Tar and Water Yield (dry basis):

Water yield, lb./1000 SCF = 5.03
Tar yield, lb/1000 SCF = 3.17
Carbon in Tar (percent) = 86.0
Sulfur in Tar (percent) = 0.34
Tar HHV, thou. Btu/lb = 18.62

Ash and Dust Data: (dry basis)

Ash discharge ,lb/hour = 346.
Ash carbon ,percent = 10.0
Ash sulfur ,percent = 0.50
Ash moisture (wet), percent = 0.8
Cyclone dust, lb/hour (est.) = 7.

Gas Composition (Dry): (normalized to 100.00)

H2 % = 17.9	CH4 % = 1.82	H2S (calc ppm) = 975
CO % = 28.7	C2H4 % = 0.073	COS (calc ppm) = 277
CO2 % = 5.14	C2H6 % = 0.184	
N2 % = 45.4	C3H6 % = 0.058	
O2 % = 0.00	C3H8 % = 0.064	HHV, Btu/SCF = 177
Molec. Weight = 23.85	Argon (est. %) = 0.539	LHV, Btu/SCF = 165

Calculation Results (based on nitrogen and carbon balance)

Material Balance (Percent unaccounted for: 0.09)

Input,	lb/hr	% Total	Output,	lb/hr	% Total
Coal	= 2391.	29.3	Dry gas	= 6951.	85.3
Steam (total)	= 888.	10.9	water in gas	= 557.	6.8
Air (calc, dry)	= 4876.	59.8	Oil and tar	= 351.	4.3
			Ash (calc, dry)	= 281.	3.5
			Dust	= 7.	0.1
Total	= 8154.		Total	= 8147.	

Energy Balance (Percent unaccounted for: 1.52)

Input,	MM BTU/hr	Output,	MM Btu/hr	% Total
Coal	= 28.8	Dry coal gas	= 19.5	66.5
Air	= 0.048	Oil and tar	= 6.54	22.2
Steam (import)	= 0.841	Sensible	= 1.64	5.6
Cooling water	= 0.118	Latent	= 0.620	2.1
		Ash	= 0.404	1.4
		Dust	= 0.087	0.3
		Cooling water	= 0.570	1.9
Total	= 29.9	Total	= 29.4	

Performance Data

Cold gas efficiency, percent = 65.5
Cold gas with tar efficiency, percent = 87.3
Hot gas without tar efficiency percent = 72.2
Hot gas with tar efficiency, percent = 94.8
Air/Coal (lb./lb.) = 2.039
Steam/Coal (lb./lb.) = 0.371
Air/Fixed Carbon (lb./lb.) = 4.612
Coal/Gasifier Area (lb./hr./sqft) = 72.1
Fixed Carbon/Area (lb./hr./sqft) = 31.9
Producer Gas/Coal (SCF/lb.) = 51.4
Producer Gas/Fixed Carbon (SCF/lb.) = 116.2
Tar Yield (lb./lb. coal) = 0.147

Figure 7-9

Tar Yield Comparison with Volatile Matter-Oxygen Correlation

Reference: Ode and Selvig, 1944

Figure 7-10

Tar Yield Comparison with Volatile Btu Correlation

Reference: Gomez et al, 1958

11.

The principal objective of this test was the generation and recovery of 10 to 20 gallons of pyrolysis liquids from the four coals gasified.

Table 7-16 summarizes the total weight of coal pyrolysis liquids recovered from this test series. The tar samples generated and recovered for the Illinois State Geological Survey were transported to their facilities by Dr. Carl Cruse who was on-site throughout the Illinois No. 6 River King test.

The condensate collected during gasification of the bituminous coals was relatively water-free. The condensate collected during gasification of the lignite contained a substantial aqueous component which amounted to 1/2 to 2/3 of the total. All of the condensate from the Utah and North Dakota coals was frozen in liquid nitrogen, packed in dry ice and shipped to the Biomaterials Profiling Center of the University of Utah.

TABLE 7-16

Total Quantity of Condensate Collected

River King Bituminous Coal	38.4 kg.
SUFCO Bituminous	75.1 kg.
Indianhead Lignite	53.9 kg.
Hiawatha Bituminous	82.9 kg.

SECTION 8
CONCLUSIONS

1. All four coals tested (Illinois No. 6, River King; SUFCO; Indianhead lignite; and UP&L's Hiawatha bituminous coal) are excellent fixed-bed gasifier feedstocks. No attempt was made, however, to evaluate the maximum throughput for any of the coals on this test.
2. The major objective of this test was the generation and recovery of pyrolysis liquids from each of the four coals. The total quantity and yields of pyrolysis liquids recovered from each coal are summarized below:

	Average Yield (lb/100 DAF lb coal)	Total Pyrolysis Liquids Collected	
		Kg	Gal.
Illinois No. 6	14.8	38.4	9.0
SUFCO, bituminous	12.9	75.1	18.6
Indianhead lignite	6.1	53.9	13.4
Hiawatha bituminous	17.4	82.9	22.0

3. The Illinois No. 6 was a moderate agglomerating coal which was managed through the proper use of the agitator. Volume 8 of this series provides further details of this coal's performance.
4. Utah Power & Light's Hiawatha bituminous coal also demonstrated slight agglomerating characteristics which were managed by the proper use of the agitator. This coal demonstrated the highest pyrolysis liquid yield of the four coals tested.

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APPENDIX A

Gasifier Operator's Log

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

TESTLOG

BOM/FGT 018

July 15, 1985

Start

7-16	0500	Fuel #1	Illinois #6
7-18	0130	Fuel #2	SUFCO
7-22	1130	Fuel #3	Beulah Bed
7-22		Fuel #4	Hiawatha

0700 Had 8.13 tons of coke in weigh bin.

0715 Soaked charcoal with deisel fuel (20 gallons).

0730 Dropped coke into gasifier. Seemed to flow slow.

0800 Filled cyclone with water.

0815 Installed gasifier manhole cover.

0840 Lit the charcoal in gasifier. Started saturation air blower at 200 cfm.

0845 Set saturation temperature on steam at 60 C.

0920 Started to put in 2 more tons of coke

0935 Set saturation air flow to 600 cfm.

0945 Completed coke up to bin 2.01.

0958 Combustor started - gas going down stream.

1010 Opened cyclone valve all the way.

1015 Saturation alarm went off. Temperature at 60 C - turned water in jacket up to 7 gpm.

1025 Saturation temperature still high - 65 C. Turned water in jacket up to 9 gpm.

1100 Freeboard 39" average. Firetest 12.85" average ash 5 minutes in. Most zones red about 6-12" depth.

1125 Increased water on jacket to 11 gpm.

1130 Cyclone dump water on 30 seconds. No dust.

1135 Hooked up caustic pump - 30/30.

1137 Increased saturation temperature to 62 C.
1140 Coal alarm went off. Coke wasn't flowing.
1150 Coal bin discharge; slide gate malfunctioned - showed open, but was actually closed.
1200 Freeboard 42" average. Firetest 15.57 average. Firezones 6" - 24" depth.
1210 Boiler off alarm came on again by itself.
1213 Started grate drive at 1/3.0.
1220 Ran agitator 1 revolution to level coke.
1230 Coal bin discharge gate working again.
1245 Offtake temperature has been fluctuating up and down currently. It is going up again 411 C.
1300 Ran agitator 1 revolution to level coke.
1305 Coal leg alarm went off.
1325 Reset coal leg alarm temperature to 58 C.
1335 Cyclone dump. Clean up hopper and put last of coke in weigh bin.
1340 Ran agitator 1 revolution to level coke. Turned caustic down to 20/20 on pump as pH was still 9.0.
1400 Freeboard 37" average. Firetest 17.85" average ash.
1410 Increased grate to 1/4.0.
1415 T-minus 60 minutes on tar collection system.
1417 Ran agitator one revolution.
1430 Started to coal up with Illinois #6.
1458 T minus 35 minutes to tar collector start up.

3rd SHIFT

1500 South coal leg warm. Alarm sounded. Rapped on pipes and cycled valve. Filling weigh bin with Illinois #6. Freeboard 37" average.
1515 T minus 10 minutes for ESP/P 706.5.
1520 ESP OP asked for (1.5 P 706). Closed ID fan.

1523 T minus 3 minutes.

1530 ESP waiting for house air pressure. Large comp. off. Dean F. to check on.

1540 ESP has air T minus 2 minutes.

1545 ESP on line for 1 minute and went down with high O2 level - investigating problem.

1555 ESP on line.

1600 Firetest. Ash Average 16.0". All rods down easy with good red zone after 3 minutes.

1630 Cyclone dump. Light dust floating on water.

1800 Informed ESP operator of firetest. Firetest - ash average 13.14. All rods down fairly easy and red after 3 min.

1815 Slowed grate down to 2/3.5 from 2/4.0.

1830 Coal leg alarm. Turned on all vibrators - O.K.

1840 Jacket outlet temp at 99 C.f Increased water flow to 13 gpm. T T 2-703 reading high also.

1955 Informed ESP operator of Firetest.

2000 Firetest - ash average at 11.28". All bars down fairly easy. Bars red after 3 minutes. Slowed grate to 2.6 at 2-teeth.

2025 Saturation steam temperature T T2-703 at 62.5 again increased water flow to 15 gpm.

2115 Increased saturation air flow to 800 cfm. Increased furnace pressure to 35. Informed ESP and U of M of load change. Increased secondary air flow from 15% to 25% open.

2200 Firetest - ash average 12.57". All bars down fairly easy. Red after 2 minutes down. Increased grate speed to 2/3.5.

2215 Ash dump - 500# - mostly small sandy sized pieces. Larger pieces, golfball to baseball size. Sandy gray color.

2200 Firetest - ash average 12.57". All bars down fairly easy. Red after 2 minutes down. Increased grate speed to 2/3.5.

2215 Ash dump - 500lb - mostly small sandy sized pieces.
Larger pieces, golfball to baseball size. Sandy gray
color.

2230 Cyclone dump - small amount carry-over on top of water.

2245 Caustic barrel empty - changed to new barrel.

*** (1730 hrs. ash dump at 574 lbs.)

JULY 16, 1985

1st SHIFT

2300 Good morning all!

2330 Check pH, 8.5, so reduce pump speed to 25/25 speed and
stroke. Jacket outlet temperature at 100 C, so
increased jacket water to 18 GPM from 15 GPM.

2357 ESP informed of firetest

2400 Firetest indicates an 11.0" ash average. #1, 2, and 3
side averages only 6" with 12-18" firezones. #4, 5, 6
side averages 14", with high firezones of 24-30". Have
thick crust 1/2 way down. Left rods in 2 minutes max.
Reduce grate speed to 2/3.0.

0015 Cycle coal valve often, as coke is running poorly.
T-714 at 65 C. Offtake temp 540 C to 560 C.

0045 Coal leg alarm agains. South leg not. Have 45"
Freeboard on #2. T-714 up to 90C. Cycle valves, bang
pipes and run vibrator.

0115 T-714 hits 128 C. South leg hot. Have 45" Freeboard,
so run agitator to spread out coal under south leg.
Offtake steady at 530 C range.

0130 Coal legs temp to 138 C.

0145 T-714 back to 66 C. South leg is flowing easier.
Offtake 540 C.

0155 Advise ESP Firetest in 5 minutes.

0200 Firetest shows 12.7". All holes between 12 and 17",
except a low 3" on #1 hole. Will leave grate at 2/3.0.

0215 Continue to cycle coal valves every 15 minutes.
North leg is now too hot to touch. Freeboard averaging
50" on #3 and #6.

0230 T-714 at 64 C, T-705 at 556 C.

0245 South leg has cooled off. T-714 at 62 C. Offtake still at steady 561 C.

0300 T-714 at 62 C, T-705 at 613 C, then drops to 588 C (sample #3) at 375 pounds.

0315 T-714 at 90 C, T-705 at 628C. North side emptying out. T-705 drops to 579 C after cycling. Increase jacket flow from 18 gpm to 20 gpm as T-711 at 97 C.

0345 T-714 at 68 C, T-705 at 589 C.

0355 ESP notified.

0400 Firetest indicates 13.4" ash level #1 thru #5 between 10" and 16", only #6 out of sinc at 23". Heavy crust 1/2 way down continues. Will leave grate speed at 2/3.0.

0415 Still not out of coke, although the north leg is too hot to touch. T-714 at 62 C with offtake at 568 C. Ran agitator around once to level coal.

0430 Coke still running down both legs.

0445 Just about through with the coke. Very little is trickling down feed pipes. North leg very hot. South leg sounds hollow. Freeboard about 70"? Coal legs at 85 C, but offtake below 600 C (552 C). Will drop Illinois #6 at 0500.

0500 Drop Illinois #6 into retort. A total of 7.72 tons falls from weigh bin. Ran agitator around to level out coal.

0515 Start refilling weigh bins.

T-705 600 C to 72 C
F-701 Fluctuating 400 to 525 CFM

Reduced furnace pressure to 30. Cut back on both primary and secondary blower. Reduced jacket water to 15 GPM. One inch cyclone outlet pressure being maintained. Ran down stairs to check ash pit valve position - all correct. Emptied and flushed cone anyway.

0530 Drop an additional 0.20 tons Illinois #6. P-703 and P-704 still above 30". T-705 recovers slightly to 78 C. Saturation air flow still douncing around.

0600 Firetest shows only 9.4" ash. Ran grate fast for 10

0530 - 0540) because of P-703 30-32". Left Rods in 5 full minutes. Reduce grate speed to 2 teeth/slow. Refilling weigh bin continues.

- 0618 T-705 back over 100 C to 102 C. F-701 climbing gradually too.
- 0630 Coal feed results in only 0.10 tons falling from weigh bin. Both coal legs packed and both sides of weigh bin empty normally. Both sets of valves functioning normally. Have partial recovery on air flow to 600 CFM, but fluctuating offtake temperature up to 127 C. See no change in ash pit pressure yet. Still 31" to 33".
- 0655 Finish coaling up at 9.95 tons.
-

- 0700 EVERYTHING RUNNING SMOOTH
- 0715 Started agitator at 7.0
- 0730 Cyclone dump.
- 0732 Increased water on jacket to 18 GPM.
- 0810 Tar collector off line for drain.
- 0812 Freeboard 34 1/2" average. Bed seems a little uneven. Large zones - small zones - no multizones.
- 0823 Drain is complete in tar collection. Getting ready to go back on line.
- 0830 Tar collector back on line.
- 0830 Cyclone dump. Water on 30 seconds. No ash. Some scum on top of water.
- 0835 Changed setting on caustic to 25/25 as pH was 5.0.
- 0900 Freeboard 32" average. Changed agitator speed to 5.0.
- 0920 Lubed gasifier and motors outside.
- 0940 Cyclone dump. Water on 30 secondss. Small amount of fine dust came out.
- 1000 Freeboard 31.5" average. Firetest 9.85" average stiff crust. All zones good and hot (red). No multi-zones. Changed agitator speed to 4.0.
- 1030 Cyclone dump. Water on 30 seconds. Changed caustic to 30/30 as pH was 5.

1045 Cleaning shaker screen, as it was partially blinded over.

1100 Freeboard 32 1/2 average.

1115 Offtake temperature reached 491 C.

1125 Cyclone dump. Water on 30 seconds. Very small chunk of dust.

1145 Ash dump. Warm and wet clinker up to softball size.

1155 Turned up agitator to 20.9 to adjust. Dropped agitator speed back to 4.0 for Firetest.

1200 Freeboard 32" average. Firetest 6.28" average ash. 36" firezone on #3 and multizone. 48" firezone on #2. Hard crust on holes #4, 5, and 6.

1220 Adjusted agitator lower to approximately 38" - 40".

1230 Cyclone dump. Water on 30 seconds. No ash. Offtake alarm went off, but temperature came back down on its own.

1242 Offtake alarms went off, but again the temperature went down on its own.

1250 Changed offtake temperature alarm to 600 C.

1255 Started coal up 6.93 on gauge.

1315 Illinois personnel sampled off shaker.

1330 Cyclone dump. Water on 30 seconds.

1340 Coal conveyor stopped - was wedged on hopper.

1355 Completed coal-up 10.44 on gauge.

1357 Coal tar collector shutting down for drain.

1400 Firetest 12.28" average. Hard crust #4, 5, 6. Freeboard 32" average.

1412 Collectors of tar to start back-up again.

1418 Tar collector back on line.

1420 Offtake temperature is gradually dropping since moving the agitator lower.

1425 Increased primary and secondary air flow to 40% on combustor.

1445 Cycled vent valve - worked O.K.

Took out Firetest rods and straightened them on the rail.

3rd SHIFT

1500 Reviewed operation with previous shift.

1540 Increased caustic pump to 45/45 with pH-5.0.

1600 Firetest - ash average 9.71". Heavy layer crust toward top. Bars red after 2 minutes down.

1630 Cyclone dump. Very little carry-over.

1800 Firetest - ash average 11.71". Multizone on #3, #4. All bars down fairly easy. Red after 2 minutes.

1830 Ash dump, 541 lbs..

- 1) Change screen to 1/4"
- 2) No more than 4 tons coke using 1/4" screen in weigh bin.
- 3) Keep coal fines separated.

1900 pH still low at 6.0. Increased pump speed to 60/stroke 50.

1930 pH high with 9.5 reduced speed to 50/stroked to 40.

1935 ESP operator asked for help in trouble-shooting low temperature in tar tank. Steam jacket working properly.

2000 Firetest - ash average at 17.14". All bars down with help of hammer (not real hard). Hole #3 dirty again. Rest with one firezone. Increased grate speed to 2/3.5.

2000 Informed ESP operator of firetest and he informed me of tar drain.

2010 ESP done draining tar.

2030 Started filling weigh bin with remainder of Illinois #6.

2130 With agitator setting remaining at 6.0, the number of sweep's agitator makes seems to be declining. Started at 6 to 7 sweeps per hour; now down to 2 to 3.

2200 Firetest - ash average at 18.14". Rod going down little easier this time. Red after 2 minutes.

Increased grate speed to 5.5. All Illinois #6 in weigh bin. Ready to have screen changed to 1/4".

2250 ESP operator informed us that gas was leaking from (90 C duct into comb.). Lowered P-706 to 1.8 - furnace pressure set at 45.

Cyclone dump - 2 rakes of carryover.

WEDNESDAY, JULY 17, 1985

1ST SHIFT

2300 Review operations with swing shift and initiate contact with tar collector operator down below.

2330 Drop 0.72 tons from weigh bins.

2340 Per ESP's request, increased P-706 to 2.0". Seems their instruments read better. Back pressure valve closed from 50 to 40% open and furnace pressure reduced from 40 to 35.

2358 Advise ESP of Firetest and 2.1" P-706.

2400 Firetest indicates we have 30" of ash on average. Have 4 bars above 33". #6 shows dirty & low with 13", with #5 also dirty with high and low zones. All bars down easily and all have large 2-3 ft firezones after 2 minutes insertion.

Increased grate speed from 2/5.5 to 4/5.0 to remove ash. (Current ash weight at 225 lbs.) Freeboard on #2 and 5 only 28.5", opposite agitator.

0030 Drop 0.71 tons of coal from bin. pH at 8.0, so slowing caustic rate. Dump cyclone and obtain 2 scoops of larger sized chunks, 2-3" across. Water flush on at one minute. Agitator counter not functioning. Has remained 94 for 3 hours. Will see if we can fix.

0100 Advised ESP that we have a cyclone outlet pressure of 2.1".

0115 Repaired co-monitor tubing running near north coal leg.

0130 Grate drive quit. Was down approximately 10 minutes. Got no warning alarm.

Coal feed up to 0.75 tons/hour. Agitator counter registers 3 revolutions this last hour, but still not in synchronization with variable speed setting of 6 revolutions per hour.

0140 Dump and sample ash (A-7) at 478 lbs.

0155 ESP advises tar sampling to start in 5 minutes. We advise 0200 firetest to commence at same time. P-706 at 1.9" - 2.0".

0208 ESP advises tar drain completed and back on line.

0215 Increase caustic pump speed to 45/45 as pH fell to 5.0.

0230 Drop 0.89 tons/hr from coal bins.

* Raining outside. Will put off changing of shaker screen until daybreak.

0315 Per ESP's request, reduce cyclone outlet pressure to the 1.7" - 1.9", range as wind direction had changed, causing gas leaking from flanges and elbow into combustor, to blow in their direction.

0355 Advise ESP of firetest at 0400 and that P-706 at 1.7".

0400 Firetest was 22.3" ash average. No double zones. Low 13" on #3 hole, with #1 highest at 40". Bars down easily. Increase grate speed to 4/5.0 to remove more ash.

0420 Dump and sample ash (A-8) at 425 lbs. Mostly hard, dry chunks. No smaller ash. All 2" or larger.

0459 Advise ESP that P-706 is 1.7".

0530 Noticed T-821 had climbed to 424 C from 85 C previous hour. Opened by-pass valve, as solinoid not working.

0540 T-821 now 77C.

0545 Caustic barrel changed - empty. pH only 5.0.

0555 Advise ESP of firetest at 0600 hrs and that P-706 is at 1.7".

0600 Firetest shows ash still ahead of us at 24.9" average. Had dirty bar with large clinker on #3. Other rods in easily. Will increase grate speed again from 4/5.0 to 6/7.5.

0630 Scrubber pump hose clogged.

0640 Dump and sample ash (A-9) at 565 lbs. Some chunks larger than the pail.

0647 Happens again. This time both the grate and the agitator stopped without annunciator or alarm. Restarted both after 5 minutes off.

0653 Advised 1.7" P-706.

0658 Caustic pump working again - everything loose, thus no suction. Set at 60/40.

2nd SHIFT

0710 Increased saturation temperature to 64 C. Increased primary and secondary air flow on combustor to 60%.

0730 Cyclone dump. Water on 30 seconds. Three rakes full - fines and chunks mixed.

0735 Agitator counter not working, so looked at it and repaired it.

0745 Ash dump - warm and dry. Lots of clinker up to 8"-10".

0800 Freeboard 35 1/2" average. Firetest 21.14" average ash. Hard crust on #3 and #5.

0810 Increased grate 9.0.

0820 Crew putting in 1/4" screen on shaker.

0830 Cyclone dump.

0855 Ash dump.

0900 Freeboard 36" average.

0910 Tar collector going down for dump. Changed furnace pressure to 30" to bring cyclone outlet pressure up to 2.1 as per request of operator - at collector.

0924 Back on line with tar collector.

0925 Cyclone dump. Water on 30 seconds. Small.

0930 North coal bin empty. Changed furnace pressure back to 55.

1000 Freeboard 36" average. Firetest 11.33" ash level #5 seemed hard. Had to stop agitator temporarily to avoid wedging test rod.

1010 Changed grate speed to 8.0.

1020 Ash dump. Completed installation of 1/4" screen on shaker.

1030 Last dump from weigh bin of Illinois #6.
Cyclone dump. Water on 30 seconds. Very little ash.

1055 Adjusted caustic pump to 45/45 because pH has consistent 5 or 5.5.
1100 Freeboard 32 1/2" average.
1130 Cyclone dump. Water on 30 seconds. Little ash. Cycle valve on coal and cleaned out around valve in upper storage bin.
1150 Ash dump. Very hot and dry.
1200 Freeboard 34 1/2. Firetest 11.25" average ash on 4 holes. # 3, 4 and 7 showed low ash, so slow grate down to 3.0.
1217 Shut down. Power failure.
1244 Water seal made - overflow.
1248 Start saturation air blower - 700 cfm.
1302 Combustor lit.
1315 Started grate at 3.0. Changed to 4 teeth. Cycled coal valve.
1317 Decreased saturation temperature to 62 C.
1320 Started agitator at 5.0.
1345 Started to put up coke in weigh bin.
1400 Freeboard 35" average. Firetest 10" Average ash - uneven.
1415 Completed coke-up. 2.91 tons.
1440 Increased agitator to 31.4.
1445 Cyclone dump. Water on 30 seconds. Left valve open a crack for constant flow.
1450 Reduced agitator speed to 5.0.

3rd SHIFT

1500 Reviewed operation with previous shift. (ESP down)
1600 Firetest - ash average at 9.0". Bars needed help going down. Reduced grate speed to 4/2.6. All bars red after 2 minutes.
1645 All Illinois #6 in retort and dropped 1.85 tons coke. 1.07 coke still in weigh bin.

1705 Dropped .84 coke, .23 ton in weigh bin.
1720 T-711 99 C. Increased water flow to 25 GPM.
1745 All coke out of weigh bin. Starting to fill with Sufco.
Ash dump - 526 lbs. Large size - cantelope; small size - baseball and smaller brownish gray in color.
1800 Firetest - ash average 5.71. Low hole -1" High hole - 10". Reduced grate speed to 2/2.6 to help build ash.
1820 Finished filling weigh bin with 11.31 tons of SUFCO.
1910 Coal leg alarm. Turned on vibrator and pounded north leg. Rodded out.
1930 Started cleaning outside.
2000 Firetest - ash average - 6.14". Low - 2". Multizones on holes #2, 3, 4. High - 11". Running grate at 2/2.6.
2053 ESP starting startup procedure. T-60 minutes.
2145 ESP back on line.
2200 Firetest - ash average 7.71". Multioznes on holes #2, #4. Red after 1 1/2 - 2 minutes down. Grate remaining at 2/2.6.
2245 PA at 8.5. Slowed pumps to 30/30. Still have coke in coal legs.
2250 Stuck rod down coal legs. Coke still running down.

THURSDAY, JULY 18, 1985

1st SHIFT

2330 Reviewed operations with previous shift. Cycle coal valves. Coke still is dropping down.
2355 Advise ESP that P-706 is 1.4" with our firetest coming up in 5 minutes.
2400 Firetest shows only 7.3" ash. Have heavy crust and tightness on top all around. Used sledge on all but #4. #2, 3, and 4 dirty with burning on top. Upper fire at 50" level. The #4, 5, 6 side has about 5" ash on average. Freeboard opposite agitator at 34". Coal legs

still cool. Offtake around 500 C. Leave grate slow,
2/2.5

- 0040 North leg running empty. South leg still running.
- 0100 Dump and sample ash at 382 lbs.; 2/3 of total was larger chunks 4-5" in diameter. (Sample #A-15 Illinois #6).
- 0110 North leg rodded and empty. Advised ESP and U of MN that we would drop SUFCO Bittuminous at 0130 hrs.
- 0125 South leg rodded and now empty.
- 0130 Drop 5.15 tons of SUFCO Bittuminous into retort. Cycled twice. Both legs running and full. Ran agitator at 16.0 for 2 revolutions to distribute coal.
- 0155 Advise ESP of firetest and a P-706 of 1.5".
- 0200 Firetest shows a fouled up bed. Ash level still low at 6.9" avg. #6 and #1 both cold. averaging 7 1/2". #2, 3, 4, and 5 all dirty with #3 the hot spot. The upper firezone was moved down, however. Freeboard 29" opposite agitator on #3 and 6 holes. Leave grate slow 2/2.6.
- 0230 Start filling weigh bin at 5.38 tons.
- 0255 Finish coaling up at 10.63. Very dusty tons. Advise ESP we have 1.6" P-706. ESP is purging prior to tar drain.
- 0305 Tar drain beginning.
- 0310 Tar drain completed and back on line.
- 0355 Advise ESP P-706 of 1.5 and coming Firetest.
- 0400 Firetest intersting. Had two power blips, shutting off grate agitator and ESP system at 0403. Ash average was 7.7". Have continued heavy top layer, but loosening somewhat. #2 out a cold 8" with #3 out, 7" dirty and white hot. #4 also dirty along with #7. Will crank grate fast for 10 minutes, then slow to 2/2.6.
- 0420 Call project engineer as procedure dictates for ESP shutdown.
- 0425 ESP begins startup procedure. Operator notes voltage irregularities while nitrogen still in lines. PE advise this evidently normal until nitrogen is completely out of system. ESP start up continues.

0430 Top off weigh bin at 11.00 tons and start cleanup.
0433 ESP on line.
0435 More blower blips. Grate drive off. Alarm sounds.
Restarts immediately. ESP calls saying "Still on line,
but power fluctuating and lights blinking."
0500 More power blips. Advise ESP that P-706 at 1.5" W.C.
0557 Advise ESP 1.5 P-706 and firetest time.
0600 Firetest shows that as SUFCO more fully occupies
retort, that bottom is becoming hard and top softer.
Firezones are much hotter and deeper. No dirty bars,
but 3 ft zones #2, 3, 4, and 5. Leave grate slow speed
2/2.6.
0615 Cyclone dumped - empty. No particulate.
0625 Dump and sample ash at 280 lbs. (A-20).
0630 Dropping 0.6 tons/hr at current load (800 CFM). As we
go on with SUFCO, gas quality improving. Offtake
around 265 C with CO at 26%. CO2 at 9% and 140 BTU's.
0700 Good morning day shift!

Nice heavy rain - overcast with little intermittent
lightning and thunder.

0730 Cyclone dump. Water on 30 seconds. Very little ash -
scum on top of water in dump catch tank.
0800 Freeboard 34.5" average. Firetest 9.1" average ash.
All holes looked good. Rods went down smooth.
0810 Quit raining. Sky is turning partly cloudy.
0820 Seems like all coke ash is out of bed now. Gasifier
should have all SUFCO in it - right through ash.
0830 Cyclone dump. Water on 30 seconds. Ash floating on top
of dump tank.
0850 Will attempt a tar drain on ESP. P -706 was 2.0" W.C.
0900 Freeboard 35" average.
0915 Scrubber T-821 inlet temperature was 70 degrees. This
indicates that too much water is going through it and
that the combustor will have a high water level inside
it. We will turn off scrubber inlet sprays.

0917 Skys are hazy and overcast again.
0925 Tar drain complete - went well. Also put a temperature gauge on collection box.

0930 Cyclone dump. Water on 30 seconds. Dust floating on top dump tank.

0955 Called tar collector and informed of 1000 firetest. P-706 1.7.

1000 Freeboard 35" average. Firetest 9.1" average ash. All rods down smooth. Good firezones after 2 minutes.

1015 University taking particulate test off poke hole in offtake.

1030 Cyclone dump. Water on 30 seconds. Dust on top of water.

1100 Freeboard 34 1/2" average.

1112 Tar collector called for P-706 - cyclone outlet pressure 1.7" W.C.

1120 Offtake temperature is rising gradually.

1130 Cyclone dump water on 30 seconds.

1140 Changed caustic barrel.

1150 Called tar collector to inform him of 1200 Firetest. - 706 ws 1.6" W.C.

1200 Freeboard 34.5" average. Firetest 9.0" average ash. All rods went down smooth. #2 showed a low ash level. All other ash levels seem good. Small firezones on all rods 3" - 9". Had to keep rods down 3 minutes to get good showing on rod.

1230 Cyclone dump. Water on 30 seconds.

1235 Changed caustic pump setting to 25/25 as pH is rising 8.0 at this time.

1240 Started to coalup with 5.65 tons in bin.

1245 Changed water on jacket to 20 GPM. As temperature has been decreasing steadily and is lower than it has to be.

1255 Completed putting SUFCO coal in bin at 11.74 tons. Cleaning up.

1300 Freeboard 35" average.

1330 Cyclone dump. Water on 30 seconds. 4 rakes full out.

- 1340 CO2 has decreased to between 6 and 7%. CO has increased to about 33%.
- 1400 Freeboard 34.5" average. Firetest 11.83" average ash. #7 had 0 so will retest at 1445.
- 1406 Tar collector will be down for a drain.
- 1430 Cyclone dump O.K. Water on 30 seconds.
- 1440 Ash dump.
- 1442 Tar collector going back on line.
- 1455 Tar collector called for P-706 - 1.7" W.C.
- 1455 Freeboard 35" average. Did a firetest on #7 hole, ash level 13". Increased grate speed to 3.0 on 2 teeth.
-

3rd SHIFT

- 1500 Reviewed operation with 2nd shift personnel.
- 1600 Firetest. Ash average 12.57". Firezone cooling off, - take 4 minutes to get red zone on bars. All bars down easy - no hammer. Increased grate speed to 2/3.5.
- 1630 Cyclone flush - 2 1/2 rakes black mud.
- 1700 pH at 9.0. Reduced pump to 20/20.
- 1800 Firetest - ash average at 8.85". All bars down easy. Red after 3 1/2 to 4 minutes. Leaving grate at 2/3.5.
- 1830 Cyclone flush - 2 rakes.
- 1930 Cyclone flush - 1 rake. pH at 7.0.
- 1955 ESP - Glove fell off purge box. Tar drain will be delayed until repaired and repurged. Informed of 2000 firetest.
- 2000 Firetest - ash average 9.57" All bars down easy, -12", firezone after 3 1/2 minutes remaining at 2/3.5 grate speed.
- 2015 Ash dump - 520 lbs. Larger size - softball. Smaller size - golfball and smaller. Dark gray in color and moist.
- 2100 ESP operator to start tar drain.
- 2130 Started filling weigh bin with 5.60 ton in bin.

Cyclone flush - 1 1/2 rakes.

2150 Finished filling weigh bin 12.05 tons.

2200 Firetest - ash average 9.57". Rods down easy for 3 minutes. Remain at 2/3.5 grate speed.

2210 Started straightening poke rods.

2230 Outside cleanup. Caustic barrel 1/2 full.

FRIDAY, JULY 19, 1985

1st SHIFT

2330 Reviewed with previous shift. All well.

2355 Advise P-706 of 1.8" and firetest coming up.

2400 Firetest shows a very nice bed. Ash level even all around, from 8"-10", #1 through #6 holes.

All rods down easily and left in 3-4 minutes.
Firezones 4-8" on south side and 2-3" on north side.
Leave grate speed as is, 2/3.5.

0015 Dump and sample cyclone (D-21), couple of rakes full - fine dust only. pH show basic, 8.5. Turn pump to lower speed, to cut back on caustic.

0030 Making good gas - 160 BTU's: CO-28.9%, - 5.8%, hydrogen at 17.8%.

0100 Dump and sample ash at 475 lbs. Mostly marble-sized with some 3-4" sized chunks. Ash hot and dry.

0152 ESP advises a tar drain in 5 minutes. GLO advises P-706 at 1.8" with fire test in 8 minutes.

0200 ESP advises tar drain; preparations completed. Firetest confusing. All rods except #4 between 5" and 7". Possibly a lower cooler zone underneath a hot, deep firezone on #4, at 24". Both #1 and #6 holes were cold. All bars down easily. Slow grate in order to build ash level (2/2.6). Freeboard remains 35" opposite agitator on #1 and #4 holes.

0210 Tar drain completed.

0220 Crew has mixed up some more mortar and will attempt to curtail cyclone door leak.

0330 Cyclone has 3-4 scoops of dust.

0400 Firetest shows 9.9" of ash. Depth of firezone more even: 4-8". Increase grate slightly to 2/3.0.

0520 Start filling weigh bin at 7.29 tons. The sun coming up - good morning troops!

0555 Advise ESP operator P-706 at 1.8" with firetest on the agenda. Coaling up stops at 12.31 tons. Will start cleanup after firetest.

0600 Firetest shows we've lost two inches on average, so slow grate to 2/2.6. Bars on #5, 6, 1, and 2 quite cool, with narrow firezones. Freeboard 36" opposite agitator arm.

0630 Dump and sample ash (A-24) "A little moist, mostly small".

0655 Power blip - grate, agitator and ESP down. ESP goes through emergency shutdown procedure. All gasifier blowers stay running.

0659 ESP calls advising 'will start up process.

0701 ESP back on line.

2nd SHIFT

Everything running smoothly.

0730 Cyclone dump. Water on 30 seconds. 10 rakes full.

0758 Tar collector called for P-706. Was 1.9" wc.

0800 Tar drain to start.

0801 Freeboard 36" average. Firetest 10.1" average. Narrow fire zones, but took 4 minutes for good show on rods. Rods went in nice. #2 still low 6".

0819 Tar drain complete. Going back on line.

0830 Cyclone dump. Water on 30 seconds.

0840 CO2 6% or less. CO 33%.

0855 Tar collector called for P-706 1.9" wc.

0900 Freeboard 34 " average.

0930 Cyclone dump. Water on 30 seconds.

0932 Received first load of Beulah Bed Coal.

0934 Received 2nd load of Beulah Bed Coal.

0955 Called tar collector to inform him of 1000 Firetest. P-706 1.8" wc.

1000 Freeboard 36" average. Firetest 10.1" average ash. All holes were fairly even in ash level and firezones. Good test.

1017 Cycled vent valve - worked good.

1018 Bureau of Mines started up something on south of building.

1030 Cyclone dump water on 30 seconds.

1050 3rd load of coal arrived (Beulah Bed).

1100 Freeboard 34 1/2" average.

1105 4th load of coal arrived (Beulah Bed).

1130 Cyclone dump. Water on 30 seconds. 1 full rake of fine dust.

1155 Informed tar collector of 1200 firetest P-706 1.7" wc.

1200 Freeboard 34" average. Firetest 9.5" average ash. Basically same as last test with at little more eveness in the firezones and ash.

1230 Cyclone dump O.K. Water on 30 seconds.

1300 Freeboard 35.5" average.

1315 Ash Dump #489, warm and dry.

1325 Cyclone dump. Water on 30 seconds.

1335 Started coal up 6.48 tons.

1350 Completed coal up 11.66 Tons.

1355 Informed tar collector of firetest at 1400 P-706 1.8" wc. He will shut down for a drain at 1400.

1400 Freeboard 35.5" average. Firetest 10.4" average ash. All holes looked good. Some crust on #7 and #2.

1430 Cyclone dump - water on 30 seconds. 3-4 rakes full of fine dust.

1455 Tar collector called for P-706. Informed him it was 1.8" wc.

1500 Freeboard 36" average.

The Day Ran Beautiful!!!

3rd SHIFT

1500 Reviewed operation with 2nd shift. 1/3 barrel caustic - 15/15 pump speed. Everything running real good.

1600 Cyclone flush - 1 full rake

1800 Firetest. Ash average 10.85". Rods down easy. Red after 4 minutes.

1830 Cyclone flush - 1 full rake. Ash dump - 512 lbs:

1930 Cyclone flush - 4 rakes of carry-over.

1950 ESP to drain tar. T-3 minutes.

1959 ESP finished tar drain.

2000 Firetest - ash average 11.14" (same as before).

2030 Cyclone flush - 4 rakes full of carry-over.

2100 Starting to fill weigh bin at 6.56 tons.

2130 Finished filling weigh with 12.07 tons starting outside clean-up.

2200 Firetest - ash average at 11.71". Rods down easy. Red after 4 minutes.

2230 Cyclone Flush - 2 rakes of carry-over.

SATURDAY, JULY 20, 1985

1st SHIFT

2335 Finish dumping ash. Mostly smaller chunks and dry.

2400 Firetest shows 13.4" ash average, but only 10.7", #1 through #6. #7 rod comes out hot at 30". Others relatively cool, barely red to cherry. Slight bottom crust on #4, 5, 6 side. Leave grate at 2/2.6.

0010 pH running 8.5, so reduce caustic rate from 25/25, to 15/15.

0030 Drop only 0.53 tons of coal. Both legs full and dropping from weigh bin just fine.

0110 Cyclone dump and sample - operator says looked like an ash

dump because of size and quantity of particulate globs.

0130 Coal feed this time makes up for the light numbers at 0030. Dropped 1.00 tons. Average for two hours was 0.765 tons/hour.

0159 ESP advises he will start tar drain at 0200 as we take firetest.

0200 Firetest shows nice even bed, except for a low 6" on #5 hole. Overall average about 12 inches. Leave grate speed at 2/2.6.

Freeboard at 35" opposite agitator.

0400 Firetest shows 15" ash average without #7 hole. High at 27" Averager 1-6 drops to 13". Increase grate speed to 2/3.0. Had to pound last 6" through a mass under #6 hole. Otherwise, zones nice and bars down easy.

0415 pH remains at 7.5. Freeboard constant at 35".

0430 Quote from cyclone dump. "Looks like a pile of large crackers, one on top of the other". 4-5 rakes full.

0500 Dump and sample ash (A-28) at 475 lbs. Mostly warm, dry small ash 1-3".

0600 Firetest shows 13.1" ash level. Pounded through crust last 6" on #4 hole. Others real nice. Increase grate slightly to 2/3.5.

0610 Start filling weigh bin at 5.30 tons.

0623 Stop coaling up at 12.58 tons.

Start outside clean up.

2nd SHIFT

0700 Everything running smoothly.

0725 Cycled vent valve. Worked out O.K. Ash pit pressure higher than yesterday. 11.5 vs 8.4.

0730 Cyclone dump. Water on 30 seconds. 2 rakes full. Gravel-like material.

0755 Called tar collector and informed him of 0800 firetest. He indicated that they would shut down for a drain at the same time. P-706 was 2.0" wc.

0800 Freeboard 35.5 " average. Firetest 11.3" average ash.

Good test. All rods down easy.

0815 Tar drain complete, collection going back on line.

0830 Cyclone dump. Water on 30 seconds. Three rakes full. Mixed ash and dust.

0900 Freeboard 36" average.

0901 Tar collector called for P-706. Informed him it was 1.9" wc.

0930 Cyclone dump. Water on 30 seconds. Two rakes full chunks and dust.

0955 Tar collector called for P-706 prior to 1000 firetest.

1000 Freeboard 35.5" average. Firetest, 13.3" average ash. Good zones on all rods, but #7. It had a multizone.

1010 Started repair on #7 hole - replace allen screw locknut on orifice.

1015 Ash dump 521 lbs. warm and dry.

1017 Increased grate speed +4.0 to counter the slowly rising ash level.

1030 Cyclone dump. Water ran 30 seconds.

1100 Freeboard 36" average.

1130 Cyclone dump. Water on 30 seconds. 1 rake full dust.

1155 Informed tar collector of 1200 Firetest. P-706 1.7.

1200 Freeboard 36" average. Firetest 12" average ash. #2 and 5 seemed cooler than other holes. #4 and 5 had some crust to go through.

1230 Cyclone dump. Water on 30 seconds. Took sample - 5 rakes full.

1235 Ash pit pressure has decreased steadily since beginning of shift. Currently it is at 9.6" wc.

1253 Tar collector called for P-706. Informed him it was 1.9" wc.

1300 Freeboard 35.5" average.

1355 Informed tar collector of 1400 firetest. P-706 1.8" wc. He indicatd that they would shut down for a drain at 1400.

1400 Freeboard 35" average. Firetest 9.7" average ash. All holes good firezones.

1415 Tar collection system back on line. Changed grate speed to 3.7.

1415 Ash dump. 513 lbs. warm-dry small chunks

1430 Cyclone dump. Water on 30 seconds. Started coal-up at 5.77 tons.

1450 Completed coal up at 11.78 tons.

1500 Freeboard 35" average.

3rd SHIFT

1500 Review operation with 2nd shift.

1600 Firetest - ash average 13.28. Rods down easy, red after 4 minutes.

1630 Increased grate speed to 2/4.0. Cyclone flush - 4 rakes of mud. Increased grate speed to 2/4.0.

1700 Straightened bent poke rods.

1800 Firetest - ash average at 12.0". Bed loose, rods down easy, red firezone after 4 minutes.

1905 Ash dump at 623 lbs. Size, golfball and smaller. Hot and wet.

1930 Cyclone flush. 2 rakes of mud.

2000 Firetest - ash average at 13.71". #2 hole cold after 4 minutes. Bed loose, rods down easy. Increase grate speed to 5.0 at 2 teeth for 15 minutes.

2030 Cyclone flush - 3 rakes.

2200 Firetest - 10.57" ash. Rods down easy. Red after 4 minutes.

2215 Ash dump - 446 lbs.

2230 Cyclone flush - 2 rakes.

SUNDAY, JULY 21, 1985

1st SHIFT

2400 Firetest shows 12" ash. Bars pretty even all around. Dirty bar on #6 with zones at 14" and 26". Upper zone about 18" deep. #7 also had deep fire. All bars down easily.

0155 P-706 at 2.0". ESP advises tar drain soon, approximately 0200 during firetest.

0200 Firetest results mixed. Disregarding a 33" on #7, other bars average 13". No double zones. All rods in easily. Increase grate speed slightly to 2/4.5.

0215 Dump and sample ash (A-33) at 490 lbs.

0230 Tar drain completed - system back on line.

The cyclone about normal: 3-4 rakes ash.

0400 Firetest averages 13.4". No dirty bars, but some bottom crust. Pounded #1 and #3 through the ash. Speed up grate slightly to 2/5.0. pH remains at 7.5.

0420 Start filling weigh bin at 6.8 tons.

0445 Stop coaling up with 12.2 tons.

0555 Outside clean-up completed.

0600 Firetest shows 13.0" average. #7 quite high again at 23" and has deep 30" fire. Other rods in easy, except #1 which needed the hammer. Put grate back to 2/4.5 speed.

0615 Dump and sample ash (A-34) at 565 lbs. Same as before, but much more of the smaller ash and dust.

2nd SHIFT

0700 Everything running smoothly

0710 Cycled vent valve - O.K.

0730 Cyclone dump. Water on 45 seconds. 3 rakes full.

0755 Contacted tar collector about firetest at 0800.

0758 Tar collection shutdown for drain. P-706. 2.0.

0800 Freeboard 35" average. Firetest 13.7" average ash. All holes good ash level and good hot firezones.

0810 Tar collection back on line.

0830 Cyclone dump. Water on 30 seconds. 2 rakes full.

0900 Freeboard 36" average.

0930 Cyclone dump. Water on 30 seconds. 7 rakes full.

0955 Called tar collector about 1000 Firetes P-706. 1.8" average.

1000 Freeboard 35.5" average. Firetest 11.85" average ash. Bed seems uneven with a low of 6" and high of 21". All rods went down easy.

1015 Ash dump. Warm-moist. Small chunks.

1030 Cyclone dump. Water on 30 seconds.

1100 Freeboard 36" average.

1130 Cyclone dump. Water on 30 seconds. 1 rake full. Fine.

1155 Called tar collector and informed him of Firetest. P-706. 2.3" wc.

1200 Freeboard 35.5" average. Firetest 11.75" average. All holes good ash level except #3 had 6" - rods down easy.

1230 Cyclone dump. Water on 30 seconds.

Power blip - agitator and grate off. Nothing else. No alarm.

1243 Power blip - Agitator and grate off. Nothing else. No alarm, even the light flashed.

1300 Freeboard 36" average.

1330 Cyclone dump. 3 rakes full. Started coal up at 5.24 tons.

1355 Called tar collector for firetest. P-706-1.8".

1400 Tar collection shutdown for drain. Freeboard 35.5" average. Firetest 11" average. #1 and 2 had low ash levels. All others were good.

1414 ESP going back on line.

1415 Ash dump. Warm-moist and gravel-like.

1425 Completed coal up. 11.47 tons.

1430 Cyclone dump. Water on 30 seconds. Water has a redish tinge to it.

1500 Freeboard 35.5" average.

3rd SHIFT

All SUFCO in weigh bin. Changed caustic barrel.

1600 Firetest - ash average 18.85". Bed loose, rods down easy, red after 4 minutes. Top 3 1/2 ft of poke rod wet with moisture.

1630 Cyclone flush - 2 rakes of carry-over. pH 7.0 15/15.

1800 Firetest - ash average 11.0". Grate speed remaining at 2/4.5.

1820 Ash dump at 567 lbs. Couple pieces softball size. Rest was 2" and smaller. Warm and moist.

1830 Cyclone flush - 4 rakes of mud.

1930 pH - 7.0. Cyclone flush. 2 rakes of mud.

2000 Firetest - ash average at 8.85". Reduced grate speed to 2/4.3. Rods down easy. Red after 4 minutes.

2100 Cyclone flush. 4 rakes of mud.

2115 Straightened bent rods.

2200 Firetest. Ash average 9.42". Multizone on hole #7 at 14" and 32". All rods down easy. Red after 4 minutes.

2220 Cyclone flush. About 3 1/2 rakes.

MONDAY, JULY 22, 1985

1st SHIFT

2330 Reviewed with previous shift.

2355 Advise ESP that P-706 at 2.1 with firetest coming up in 5 minutes.

2400 Firetest shows 10" ash average. Bars in easy. Double zone in #7 at 5" and 23". Other bars have 6" firezones. #1, 2, 3 is low side, averaging 7.3". # 4, 5, and 6 average 14.3". Leave grate at 1/4.0.

0010 Freeboard 35 1/2" opposite agitator.

0015 Flushed cyclone - nothing in bottom. pH at 7.5.

0200 Firetest at 9.6" average. #1 dirty at 13" and 26". All down easily, except #6. Hold same grate speed 2/4.0. Freeboard 36" opposite agitator.

0215 ESP advises will start tar drain.

0220 Dump and sample ash (A-39). Ash was warm and moist, but not damp. Sized usual. Smaller gravel to 2".

0225 Discovered agitator had shut off. Put back on at faster speed awhile (8.0). T-705 had climbed to 398 C. ESP calls saying back on line.

0400 Firetest shows a 14" ash level. Disregarding #7 hole, the average drops to 11.3". No double zones. Freeboard at 35".

0415 Dump and sample cyclone. 4 rakes of silt and clumps.

0430 North side of weigh bin empties out. Half a ton remaining on south side. Dropped only 0.43 tons. Coal packed up under south gate valve.

0530 Last 1/2 ton of SUFCO dropped from weigh bin into lower enclosed bin. Start refilling weigh bin with the Beulah Lignite at 0.00 tons.

0600 Firetest normal. No bad bars. All down easy. Reduce grate speed to 2/3.5 to maintain ash level. Freeboard 35".

0600 Truck and loader start on Illinois #6 fines to be hauled back to Alma, Wisconsin.

0615 Dump and sample ash (A-40). Chalky, gray and very fine.

0620 Finish filling weigh bin at 10.46 tons.

0630 Start cycling bottom coal valves, dropping SUFCO from the enclosed bin. Upper weigh bin full of Beulah Lignite with gate valves locked out.

2nd SHIFT

0700 Everything running smooth.

0730 Cyclone dump O.K. 5 rakes. Water on 30 seconds.

0755 Called tar collector to inform him of 0800 firetest. P-706, 2.0"wc.

0800 Tar collection system shut down for drain.

0810 Tar collector back on line. Freeboard 35.5". Firetest 12" average. All rods went down easy. Low holes #2.

0830 Cyclone dump O.K. Water on 30 seconds. 3 rakes. Last sample of SUFCO.

0900 Freeboard 34.5" average. Tar collector called for P-706 - 1.8" wc.

0930 Cyclone dump. Water on 30 seconds.

0955 Called tar collector about 1000 firetest. P-706, 2.4" wc.

1000 Freeboard 35.5" average. Firetest 12.4" average #2 was a low ash hole. All others good ash level. All rods down easy.

1015 North coal leg getting warm. Offtake temperature increasing slightly. 352 C at this time.

1030 Cyclone dump. Water on 30 seconds. 2 rakes full.

1050 Called tar collector to have him make his last SUFCO tar dump. He will shut down for drain at 1100. P-706, 1.9" wc. Tar ESP will be shut down for at least 1 hour for maintenance repair.

1055 Ash dump. Last SFUCO sample. Warm and moist.

1100 Freeboard 37.5" average.

1130 Dropped first Beulah Lignite Coal into coal legs. Cyclone dump. Water on 30 seconds. 1 rake full.

1137 Opened back pressure to 100%. Other pressures didn't change, so left it open.

1140 After 1200 firetest, we will slow down agitator as we want to maintain a 38" freeboard.

1155 Called tar collector about 1200 firetest. He indicated he was shut down and would continue to be until further notice.

1200 Freeboard 37.5". Firetest 13.85" average ash. Some rods hard to put down the last 12". Changed grate speed to 4.0 as ash level is building. Changed agitator speed to 3.1 as we want to maintain a 38" freeboard.

1220 Offtake temperature is going down rather quickly. 234 C now.

1230 Cyclone dump. Water on 30 seconds. 3 rakes full.

1253 Tar collection system is back on line.
1300 Freeboard 38" average.
1330 Cyclone dump.
1335 Started to coal up at 4.64 tons.
1340 Pin came out of stabilizing arm on loader at 6.88 tons.
1359 Tar collector P-706, 2.0.
1400 Freeboard 38" average. Firetest 10.5" average ash.
Larger firezones, had to leave rods in at least 4
minutes for good show.
1410 Resumed coal up. 6.88.
1415 Offtake temperature continues its plunge. Now 115 C.
1425 Completed coal up at 11.10 tons.
1430 Dropped saturation air flow down to 700 cfm as we want
to have a load of 3/4 ton/hour or less. Cyclone dump
O.K.
1440 Dropped water in jacket to 15 gpm, as temperature is
below what it has to be.
1450 Offtake temperature 100 C now.

3rd SHIFT

1500 Reviewed operation with 2nd shift personnel.
1530 Dropped .90 tons of Beulah. May have to drop load to
600 cfm to keep coal useage to 3/4" ton per hour.
Reduced agitator water flow to 2.5. Temp at 30 C. 2/3
barrel caustic in use.
1530 Ash dump with 532 lbs ash. Gravel size. Real moist.
1600 Firetest - ash average at 11.71". All rods down easy.
Multi zone on hole #2. Red after 4 minutes.
1745 Reduced saturation air flow to 600 cfm, as to keep coal
usage to 3/4 ton per hour. Decreased furnace pressure
to 2.5.
1755 Reduced agitator water to 2.0.
1800 Firetest. Ash average at 11.71". Multi zone on hole
#6. Rod red after 4 1/2 minutes.

1810 Cyclone flush. 2 rakes full. Lots of floating dust.
1900 Freeboard at 38 1/2".
1930 Cyclone flush - 1 full rake/floating dust.
2000 Firetest. Ash average 11.42". All rods down easy. Red after 4 1/2 to 5 minutes down. High hole #6
2020 Ash dump. 575 lbs. Moist gravel type ash.
2155 Freeboard 38".
2200 Firetest. Ash average 12.42" 31" on hole #7. All rods down easy. Red zone after 5 minutes.
2130 Started filling weigh bin at 4.17 tons.
2200 Finished at 10.87 tons.
2215 Cyclone flush. 1 full rake of carry-over. Lots of floating dust. Gas quality 174/164.

TUESDAY, JULY 23, 1985

1st SHIFT

2300 Reviewd operations with last shift.
2400 Firetest shows 10.4" ash average. Bars fall right down. Firezones a nice sunkist orange at 4-5 minutes. No double zones. Slow grate slightly to 2/3.5 to maintain ash level, as #2, 4, 5, 6 and 7 all under 10" level. Freeboard at 36" opposite agitator.
0015 Cyclone complete devoid of carry-over. Nothing but rake on metal, so could not take sample.
0100 Tar collector up to see us. Advises he will drain tar at 0200.
0130 Dump and sample ash at 470 pounds.
0155 Advise ESP that P-706 at 2.1"wc. He will tar drain as we do firetest.
0200 Firetest shows only 7.7" ash average with #2, 3, 4, and 5 at 7" or below. Bars in easily, excpet #7. Fire zones narrow, 6", and cherry red. Slow grate to 2/2.6 to build ash level. Freeboard at 37".
0215 Tar drain back on line.

0355 Advise ESP of P-706 at 2.1" wc.

0400 Firetest shows very little ash at 5.6" average. Turn off grate drive for 1 hour in order to build ash.

0500 Restart grate drive. Run fast for 10 minutes, then slow to 2/2.6.

0600 Firetest shows a slight comeback to 9" ash. #2, 3, 4 side still low averaging 6 2/3". Leave grate slow 2/2.6.

0610 Cyclone remains empty. No carryover. Start refilling weigh bin at 3.57b tons.

0625 Dump ash at 360 lbs. Nothing large. Ash color brownish.

0650 Stop coaling up at 11.90 tons.

0655 Good morning - "grumpy."

2nd SHIFT

Everything running smoothly. Running over 3/4 ton per hour. Load even at 600 cfm.

0730 Cyclone dump. Water on 60 seconds. 1 rake full.

0759 Called tar collector for 0800 firetest. P-706, 2.3.

0800 Freeboard 38". Firetest 9" average ash. All rods went down fairly easy. #6 needed hammering.

Tar collection down for drain.

0817 Tar collector back on line.

0830 Cyclone dump. Water on 60 seconds. Very little dust.

0855 Tar collector called for P-706 - 2.1" wc.

0900 Freeboard 38.5" average.

0905 Decreased water flow on jacket to 10 gpm as temperature was higher than need be.

0930 Cyclone dump. Water on 60 seconds. No dust.

0937 University started particulate test using poke hole on offtake.

1000 Will not do firetest at this time, as it will disrupt

the particle test the University is doing. Will do firetest after they have completed their test.

- 1030 Cyclone dump. Water on 60 seconds. No dust.
- 1037 Called tar collector on firetest P-706. 1.9.
- 1040 Freeboard 37.5" average. Firetest 12.85" average ash. All holes had good firezones. Some crust to go through on #7 and #3. Lowest hole #1 at 7" ash.
- 1100 Freeboard 37.5" average.
- 1130 Cyclone dump. Water on 60 seconds. No dust.
- 1155 Called tar collector about five test P-706. 1.8".
- 1200 Freeboard 37" average. Firetest 12.28" average ash. #7 was hard. All other rods went down easy. All firezones looked normal. Low ash on #3, 4, and 5.
- 1230 Cyclone dump. Water on 60 seconds. Very little dust on top of water.
- 1300 Freeboard 38" average. 1.8" - P-706.
- 1330 Cyclone dump. Water on 60 seconds. No dust to speak of.
- 1340 Ash dump. Warm and moist with small chunks.
- 1355 Called tar collector. P-706 1.7" wc. He will shut down for a drain.
- 1400 Firetest. 12.28" average ash. Freeboard 37".
- 1404 Tar collector back on line.
- 1410 Started coal up at 5.69 tons.
- 1415 Poked down #7 hole, as it had a high ash level and was multi zoned. Also, it was crusty.
- 1430 Stopped coal up at 10.10 tons for coal drop. Resumed coal up at 9.31 tons.
- 1432 Cyclone dump. Water on 60 seconds. 1/2 rake fine dust.
- 1435 Completed coal up with 10.33 tons.
- 1455 Tar collector called for P-706 - 1.7".
- 1500 Freeboard 38" average.

3rd SHIFT

- 1500 Reviewed operation with 2nd shift. 1/3 barrel caustic pump at 20/20. pH 7.5.
- 1600 Firetest. Ash average 8.85" All rods down easy. Red after 5 minutes. Freeboard = 38 1/2".
- 1630 Cyclone flush - 3/4 + rakes.
- 1800 Firetest. Ash average 7.71". Low of 0" on hole #3, also cold. High - 13" on hole #7. All rods down easy. Red after 5 minutes.
- 1830 Slowed grate to 1 tooth at 3.5. Setting was 2 teeth at lowest setting.
- 1930 Cyclone flush. 1/2 rake.
- 1955 ESP tar drain. Informed of fire test and P-706.
- 2000 Firetest. Ash average at 10.71". All rods down easy, no multi zones. Red after 5 minutes.
- 2030 Increased grate speed to 4.5 driving 1 tooth.
- 2020 ESP finished with tar drain. Back on line.
- 2040 Ash dump at 515 lbs. Some clinker, large size = flat softball. The rest was gravel size. 30% less ash by volume per weight.
- 2130 Cyclone flush. 1 rake full.
- 2200 Firetest - 1028" ash average. Hard spot last 24" on hole #5. Rods red after 5 minutes. Grate speed same - 1/4.5 multi zone hole #6.
- 2230 Cyclone flush. 1 full rake. pH 7.0. 20/20 pump speed.

WEDNESDAY, JULY 24, 1985

1st SHIFT

- 2300 Reviewed with previous shift. All is running well.
- 2355 Advise P-706 at 1.9" wc with firetest at 2400.
- 2400 Take firetest. Ash average 9.1". #5 dirty bar at 7" and 23". #4 high 14" and #6 at 11c. #7 only 2". Freeboard at 35.5" opposite agitator.

0010 Cyclone flushed 1 minute. 1 rake full.

0020 pH checked and was 8.5 with pump speed 25. Turned down to 15/15.

0155 Advise ESP of P-706 and firetest.

0200 ESP to drain tar.

0210 Firetest completed. Ash average 10.3". #4 dirty at 6" and 23". Had to be hammered down last foot. Flanked by two cold bars, #3 at 9" and #5 at 17".

Leave grate at 1/4.5.

ESP back on line, but having trouble with water buildup.

pH at 6.0. Adjust speed fo caustic pump to 20/15.

0325 Dump ash at 475 lbs. Getting brown, sandy ash and larger chunks 4-5" diameter.

0355 Advise ESP fo P-706. ESP going off line at 0400 due to water buildup in lines.

0400 Firetest. Large clinker under the #3, #7, #4 area. All these bars had to be pounded last 2 feet. Ash averages 11.3" overall. Freeboard 39" on #3 and #6. Leave grate at 1/4.5.

0410 ESP advises back on line.

0555 Advise ESP, P-706 at 2.0 with firetest coming up.

0600 Firetest shows 12.4" on average. HJard spot moved to #1 hole, which shows 2 firezones. #7 hole hottest with #3, 4, and 5 cold after 4 minutes. Freeboard at 36.5.

0610 Cyclone flushed with 3 scoops. Start coaling up weigh bin at 4.1 tons.

0640 Stop coaling up at 10.35 tons.

2nd SHIFT

Everything running smooth.

0700 Heavy downpour of rain outside. Some lightning and thunder.

0730 Cyclone dump. Water on 60 seconds. Very little dust - 1 quart.

0800 Tar collector shut down for drain. P-706, 2.5" wc.

0810 Tar collector back on line. Freeboard 39" average ash. Firetest 13.7" average ash. #7 went down hard. #7 and #5 will need to be poked down later as the firezones were high.

0830 Cyclone dump. Water on 60 seconds. 1/2 rake dust.

0850 Ash dump. Hot dry chunks. Real sticky in cone.

0855 Poked down #7 hole. Hard toward center.

0900 Freeboard 38.5" average.

0905 Poked down #4 and 5 holes. Easy all around. No hard spots.

0930 Cyclone dump. Water on 60 seconds.

0935 Raining much now - nice.

0955 Tar collector called for P-706 - 2.4" wc. Informed him of 1000 firetest.

1000 Freeboard 39" average. Firetest 9.1" average ash. #7 hard and #4 dirty. Low ash on #2 and #6 holes. Will poke down #7 and #4 at 1030.

1015 Slowed grate to 1/4.0.

1030 Cyclone dump. water on 60 seconds.

1035 Poked down #4 and #7. Shut agitator off

1040 Offtake temperature rising due to agitator being shut off. Gas quality stays the same.

1100 Freeboard 38" average.

1130 Cyclone dump. Water on 60 seconds. 2 1/2 rakes full.

1155 Called tar collector on 1200 firetest. P-706 - 2.0.

1200 Freeboard 37.5" average. Firetest 11.85" average ash. All holes were a little hard. #4 was worst. 2 low ash levels - #7 and #3. 2 Multizones - #4 and #5.

1210 Offtake temperature seems to be stabilizing now. Temperature is 243 C.

1230 University doing a particle test on offtake. Cyclone dump. Water on 60 seconds. 1/2 rake dust.

1235 1st load of Hiawatha coal arrives.

1310 Freeboard 41" average. This is due to agitator being off.

1311 University completed particle test.

1330 Cyclone dump. Water on 60 seconds. 1 rake dust.

1333 2nd load of Hiawatha coal arrives.

1335 Started to coal up at 4.37 tons. Torrential down pour hit!

1350 3rd load Hiawatha arrives.

1355 Called tar collector. P-706 - 2.0. Tar collector system will be down at 1400 for drain.

1359 Completed coal up at 11.27 tons.

1400 Freeboard 39.5" average. Firetest 10.7 ash. #7 had a real large fire zone.

1408 Tar collection back on line.

1412 Power Blip. Only grate shutdown.

1413 Dropped grate speed to 1/3.5.

1435 Cyclone dump. Water on 60 seconds. 1/2 rake dust.

1450 Tar collector called for P-706 - 1.9" wc.

1500 Freeboard 39.5" average.

1510 Increased load to 700 cfm. Furnace pressure to 45.

1530 Cyclone flush - about 1/2 rake full.

1550 Ash dump - 541 lbs. Mostly gravel size. Hot and dry.

1600 Fire test. Ash average at 15.57".

1640 Increased grate speed to 1/4.5.

1800 Fire test. Ash average at 12.14". Hammered in hole #7. Hole #1, 2, 5 cold after 5 minutes. Multi zone on #7. Grate speed at 1/4.5.

1830 Cyclone flush. 1 rake carry-over. Freeboard was 42.5" at 1800. Dropping about 1 ton per hour coal up.

2000 Firetest. Ash average at 10.28" All rods red after 5 minutes. Hole #7 and 36" firezone. No multi zones this time. All rods went down easy.

- 2100 Freeboard at 41.5"
- 2130 Cyclone flush. 1 rake of dust.
- 2200 Fire test. 12" ash average. 36" wide firezone on hole #7 also multi. Low 3" on holes #3, #5 - high - 26" on hole #6. Some clinkering starting to develop again, as most holes needed to be pounded down. Grate remaining at 1/4.5.
- 2215 Cyclone flush. 1/2 rake full. Ash dump. 587 lbs hot (red not coals). A few flat softball size clinkers. Rest gravel size.
- 2230 Cyclone flush. 1/4 rake of carry-over. Dust on top of water.
- 2245 Put on new caustic barrel - 25/25.
-

THURSDAY, JULY 25, 1985

1st SHIFT

- 2300 Reviewed with previous shift. Agitator remains off. Load bumped to 700 cfm. Will run remaining lignite from weigh bins.
- 2354 ESP calls advising he will shut down to drain water from lines.
- 2400 Firetest shows an upset bed. Ash averages 10.1". Bars hitting a very hard crust on top of ash. #4 hole as hard as I've seen. #1, 2, 3, and 7 holes all dirty, with upper zone at 40+". #2, 3, 4 and 7 all show "5 ash. #5, 6 and 1 holes had 17.3" average. Freeboard at 35" opposite agitator on #1 and #4 holes. Leave grate at 2/4.5 speed.
- 0015 pH running 8.5 with pump at 25/25. Turn down to 20/20. Cyclone dump provides nothing for sample bucket.
- ESP back on line; was only down a minute or two.
- 0030 Slow grate speed to 2/40 to conserve ash on the low holes, after reading 2215 entry about red-hot coals in ash cone.
- 0100 pH has returned to 7.5 level.
- 0130 Freeboard at 40" just behind agitator on #2 and #5 holes.
- 0155 ESP calls wanting P-706. Also advises that 0200 tar drain will be bumped back to 0230 hours.

0200 Freeboard 37.5" immediately ahead of the agitator, on #3 and #6 holes. Firetest shows a better average all around with low hole #3 at 10". #1 and #2 still dirty, but #3, 7, and 4 fell right down to the grate. Increase grate speed to 2/4.5.

0230 ESP draining tar.

0240 ESP back on line after obtaining 1 1/4 bottles of this tar.

0300 pH drops to 6.5 so slow caustic pump speed and stroke to 15/15.

0355 Advise ESP of 2.0" wc P-706.

0400 Firetest shows we're back to 10" ash. Both #1 and #2 continue dirty with an upper zone. Firezones on #4, 5, 6 side much narrower. Will try to find a midpoint on grate speed to reach the mythical 12". Slow grate to 2/4.2.

0410 Dump cyclone. Operator reports a deep reddish color to the water. Finally obtained a particulate sample.

pH at 6.0 so will speed up caustic to 20/20 again.

0430 Note that CO₂ % doubles from 5% to 10% since 0400 Firetest. Have had a 2" increase in ash pit and fire loss pressure. All other readings normal. Have no corresponding decrease in CO%, which would indicate trouble in bed. Offtake temperature the same.

0525 Dump ash at 540 lbs. (A-80). Mostly hot and damp, with fine to gravel sized. Some 6-7 chunks 5" in diameter.

0530 CO₂ has returned to 5% with CO% jumping to 30%. Both P-703 and P-704 continue to rise slowly. Offtake temperature at 119 C. Dropped 1 1/4 tons this coal feed.

0555 Advise ESP of 0600 firetest and 2.2" wc. P-706.

0600 Firetest averages 11.3" ash. We are developing a big mass under to #6, 1, 2, 7 triangle. #1, 2, and 6 dirty, with #1 and 2 cold and #6 with an 18" firezone.

0630 Starting to hear some large clinkers fall into empty ash bin.

2nd SHIFT

Everything running smooth.

- 0700 Some clinker in bed.
- 0715 Cleaned up and dumped last Beulah in weigh bin. .53 - .58.
- 0730 Increased saturation temperature 2 C to 64 C. Cyclone dump. Water on 60 seconds. 2 rakes full empties out. Weigh bin of Beulah.
- 0738 Called tar collector and informed him of firetest at 0800. P-706 2.1" wc.
- 0807 Tar collector back on line.
- 0817 Started to coalup with Hiawatha. Freeboard. 40" average. Firetest 16.57" average ash. All rods down easy except #1 was real hard. Good ash level on all holes.
- 0818 Changed grate to 2. teeth and 4.5.
- 0827 Cyclone dump. Water on 60 seconds. 2 rakes full.
- 0830 Cycled coal valve.
- 0847 Completed coal up. 12.03 tons Hiawatha.
- 0900 Freeboard 39.5" average.
- 0905 University started particle test in offtake.
- 0915 As dump. Hot and dry. Large chunks.
- 0930 Cyclone dump.
- 0955 University completed test.
- 1000 Freeboard 38.5". Firetest 14.28" average. Hard hole moved to #6. All others went down easy.
- 1030 Cyclone dump. Water on 60 seconds.
Cycle coal valve and ran vibrator. Coal legs are starting to empty.
- 1100 Freeboard 39.5" average.
- 1120 Ash dump. Very hot. Chunky.
- 1130 Cyclone dump. Water on 60 seconds. 2 rakes full.

1140 Tar collector shut down. For purge of glove box and drain.

1145 Dropped in Hiawatha coal. Started agitator at 4.0 sweep/hr.

Start Hiawatha

1155 Offtake temperature dropping. 90 C at this time.

1200 Freeboard 38.5". Firetest 10.3" average ash. #5 hard hole. All others fairly easy.

1230 Cyclone dump. Water on 60 seconds.

1249 Tar collection system back on line.

1300 Freeboard 37" average.

Offtake temperature rising steadily. Ash pit pressure rising rapidly.

1327 Cyclone dump. Water on 30 seconds. 4 rakes.

1330 Ash pit pressure has dropped off again.

1332 Started to coal up at 4.51 tons.

1345 Ash dump. Red hot. 3" - 5" chunks.

1355 Completed coal up at 1202 tons.

Called tar collector for 1400 firetest. P-706 1.6" wc.

1400 Freeboard 34" average. Firetest 11.1" average ash. #6 was hard and hot and #5 was sticky. All others not bad.

1415 Slowed agitator down to 3.1.

1430 Cyclone dump. Water on 60 seconds. 5 rakes full.

1500 Freeboard 36" average.

3rd SHIFT

pH - 7, 20-25 2/3rds barrel caustic.

1500 Reviewed operation with 2nd shift.

1545 Cyclone flush. 5 full rakes of chunky carry-over.

1600 Firetest. Ash average 8.85". Multizones on holes #2, #5. Holes #1, #2 cold after 5 minutes. Holes #3, 4, 5,

6, 7 red after 3 - 4 minutes. Reduce grate speed to 2/4.0.

- 1630 Cyclone flush. 1 3/4 rakes full.
- 1715 Ash dump. 582 lbs. Some clinker in ash, 1/2 basketball size. Rest was finer than gravel. Ash warm and very dry.
- 1730 Cyclone flush. 1 full rake.
- 1800 Firetest - 13.85" ash average. #1, 3, 4, 7 hard to put rods down crust under these holes. All rods red 3 to 4 minutes.
- 1815 Increased grate speed 2/10.4 for 10 minutes. Then will remain at 2/4.5 until next test.
- 1815 Increased jacket water to 15 gpm as jacket was at 96C.
- 1825 Running grate at 2/4.5.
- 1930 Cyclone flush - 1 1/2 rakes.
- 1945 Ash dump at 516 lbs. - size - 2 pieces basketball size, a few softball size. Rest was smaller gravel.
- 2000 Firetest. Tar drain. Ash average at 12.14". #4 hole needed extra help getting rod down. Rest weren't real bad. Red after 3 - 3 1/2 minutes. Real wide fire zone (36"+) on holes #3, 4, 5.
- 2010 Tar drain completed.
- 2020 Increased saturation air flow to 800 cfm. Increased furnace pressure to 5.5. Increased primary air flow to 50% open. Increased secondary air flow ot 50% open. Saturation temperature to remain at 64 until clinkering problem has been resolved.
- 2035 Increased grate speed to 2/5.5.
- 2130 Cyclone flush. 1 1/2 rakes of carry-over.
- 2200 Firetest. Ash avereage a 9.8". Low - 6". High 15 " Hole #5 real hard to pound down. Getting real wide firezone (24" - 36") after 3 minutes.
- 2230 Cyclone flush. 3 rakes of carry-over.

FRIDAY, JULY 26, 1985

1st SHIFT

Reviewed with previous shift. All seems well. Bed still clinkered up around #5 hole.

- 2355 Advise ESP of P-706 and firetest at 2400.
- 2400 Firetest shows 15" ash level with deep firezones and #2, #7, #3. Huge mass half way down. Took #4 separately after straightening out a cool bar. Came out dirty with zones at 16" and 33". #5 rod falls right down. Increase grate speed to 2/5.5. Freeboard 36" opposite agitator on #3 and #6 holes.
- 0045 Dump and sample ash (A-104). Combination of huge clinkers and gravel to 3" material. Operator described ash as gray, hot and moist. Had difficulty getting ash to fall from cone.
- 0100 Advise ESP P-706 at 2.2" wc. Cyclone flushed for one minute and took sample (D-80). Mostly 3/4" sized chunks and very little carryover. Operator got 3-4 rakes full.
- 0130 Steam regulated pressure gauge and differential gauge malfunctioning. Regulator pressure peaked out and differential pressure the same. Bled lines and does not help. Steam flow indicator now reads +001. Steam temperature at 310 F.
- 0150 Have differential pressure and steam flow reading working again. Will try to find replacement gauge for regulator pressure.
- 0157 Advise ESP of P-706 and firetest. ESP advises he will shut down for tar drain at 0200.
- 0200 Firetest shows 16.7" ash. Bed is hard on #4, 1, and 6. Height of firezones more pronounced on #1, 2, and 7 holes. Have a nice 8-10" on #3, 5, and 6. Freeboard 36.5 on #3 and #6. Increase grate speed to 2/7.5.
- 0240 Still no function on steam gauges. Replaced RP 715 and get same results. Possible regulator trouble?
- 0255 Advise ESP that P-706 at 2.2" wc. Finally get steam flow working, but regulator pressure peaked out at 565 PSI+.
- 0310 Dump ash (A-105) at 655 lbs. Many larger clinkers 5"-6" variety.

0355 Advise ESP of 2.1" P-706.
0400 Firetest confusing, but guess we'll have to go along with total ash average of 19.7". Increased from 2 to 4 teeth. Speed now at 4/5.0 in attempt to remove excess ash. Still have 32"+ on #1, 2, 3 side, while #4, 5 and 6 holes average only 8 1/2". Both #4 and #6 dirty, with #6 red at the bottom with 2 higher zones up the bar. Freeboard on #3 at 37" and #6 hole at 38".
0455 Advise ESP tha P-706 at 2.3" wc.
0500 Dump ash (A-106) at 560 lbs. Cyclone dumped. 3-4 rakes full. pH at 8.0, so turned down caustic pump to 15/20.
0555 Advise ESP of P-706 and firetest.
0600 Firetest shows 17.6" ash level. High 40" on #1, low 6" dirty on #3. Heavy clinker on #2. Increase grate speed to 4/6.0.
0615 Start filling weigh bin.
0630 Finish refilling. Dump ash at 680 lbs (A-10.7). Large clinkers continue to be churned out.

2nd SHIFT

Reviewed operation with previous shift.
0700 Offtake temperature is climbing very rapidly.
0720 Offtake leveling off at around 480C.
0730 Cyclone dump. Water on 60 seconds. 8 rakes full.
0750 Offtake temperature gradually coming down now at 455 C.
0815 Tar drain. Freeboard 38". Firetest 20.1". All rods went down easy. Multizone on #3 and high ash level on #1, 2 and 5. Increased teeth to 5 on grate.
0820 Ash dump 750 lbs. on readout. Hot 2" - 4" chunks.
0822 Tar collection system back on line.
0825 Offtake temperature leveling off again now at 381 C.
0830 Cyclone dump. Water on 60 seconds. 3 rakes full.
0900 Freeboard 36.5" average.
0930 Cyclone dump. Water on 60 seconds.
0935 Ash dump. Changed gauge on regulated pressure line back

to original. The orifice Delta P gauge went up to 30-33 when pressure turned back on.

- 1000 Freeboard 39" average. Firetest 17.7 " average ash. All rods down easy. #6 had a high zone, so will poke it down. Increase agitator speed to 4.0.
- 1030 Cyclone dump. Water on 60 seconds. Water overflowed, so will cut back on time. 2 rakes full.
- 1100 Freeboard 37.5" average. Poked down #6 hole.
- 1105 Ash dump. Dry and warm - 1-3" chunks.
- 1130 Cyuclone dump. Water on 30 seconds.
- 1200 Freeboard 37.5". Firetest 17.4". #5 had a high firezone, so will poke it down. All rods down easy.
- 1215 Changed grate to 6 teeth.
- 1217 Increased saturation air flow to 900 cfm. Increased primary and secondary air flow to 60%. Increased agitator speed to 5.0.
- 1230 Cyclone dump. Water on 30 seconds.
- 1235 Ash dump. Warm, dry 1-2" chunks.
- 1257 Power blip. Shutdown.
- 1325 Started saturation air blower.
- 1328 Started primary air, secondary air, ID fan.
- 1330 Gas safety valve open.
- 1335 Delivered gas to combustor.
- 1340 Tar collection system will stay down for drain.
- 1400 Freeboard 37.5" average. Firetest 13.6" Average ash. All holes had good firezones. Ash levels are evening out.
- 1415 Started to coal-up at 5.40 tons.
- 1420 Ash dump 885 lbs. Very hot, small chunks.
- 1432 Complete coal up at 11.55 tons.
- 1435 Cyclone dump. Water on 30 seconds.
- 1440 Tar collection system will start on startup procedure.

1453 Tar collection system will go back on line in about 5 minutes.

1455 Tar system back on line.

3rd SHIFT

1500 Reviewed operation with 2nd shift.

1515 1/3 barrel caustic - pump - 20/20. pH 6.5.

1540 Ash dump - 687 lbs. Warm and dry.

1600 Firetest. 14.0" ash average. Low #2 hole with 9". High #6 hole with 17". All rods went down easy, small amount of hammer used on holes #1 and #2. Red zones were around 6-9" wide. No multizones. Bed seems to be coming around in good shape.

1615 Increase grate speed from 6/6.0 to 6/7.0.

1620 Cyclone flush. 0 rakes of carryover. A few small chunks was about it.

1645 T-819 getting up there in temperature - 564 C. Increased secondary blower to 100% open. Increased primary blower to 80% open. Increased furnace setting to 70.

1700 Freeboard at 36" average. Decreased grate speed to 6/6.0. Ash dump at 731 lbs. Getting some hot ash. 4-6" clinkers. Rest was golfballs size and smaller.

1800 Firetest. Ash average at 10.42". Low - #2 and #3 at 7". High #6 and #7 at 13". All rods went down fairly easy. Red fire zone after 3 minutes (6"). No dirty rods. Grate speed to remain at 6/6.0.

1815 pH at 6.5 increased pump to 25-20.

1825 Cyclone flush - 1/2 rake (chunks)

1830 Ash dump - 759 lbs.

1900 Freeboard 38".

1950 Ash dump 643 lbs. Just a couple big clinkers. Rest was golfball size and smaller. Hot and dry.

2000 Firetest/tar drain. Low - 2" on hole #5. 7" on holes #1 and #4. All rods down easy and red after 3 minutes. Reduce grate speed to 6/3.5 to build ash average.

2015 Started filling weigh bin at 4.88 tons.
2040 Finished filling at 10.92 tons. Started outside cleanup.
2015 Started filling weigh bin at 4.88 tons.
2040 Finished filling at 10.92 tons. Started outside cleanup.
2200 Firetest. Ash average at 12.42". Low - 8" on hole #4. High - 23" on hole #7. All rods down easy, red after 3 minutes. Multizone on hole #3 - 12" and 36".
2215 Cyclone flush. Ash dump at 698 lbs. No big clinkers. 4" biggest and smaller. Hot and dry. Reddish, grayish, whitish in color. pH - 7.0. Pump at 25/20. 1/4 barrel (about).
2250 Freeboard - 39.5. Ash level at 200 lbs. Coal weight at 9.04 tons.

SATURDAY, JULY 27, 1985

1st SHIFT

2300 Everything running smoothly.
0000 Freeboard 35" average 1. Firetest 8.8" average ash. All rods down easy and good firezones. low ash on #3, 4, 5, 6.
0010 Reduced grate to 3.5 because of large number of low holes.
0015 Ash dump. 563 lbs. Hot and dry.
0030 Changed caustic pump to 15/15.
0155 Tar collector will shut down for drain at 0200. P-706, 2.0" wc.
0200 Freeboard 38" average. Firetest 16.0" average ash. All rods down easy. Good fire zones.
0210 Increased agitator speed to 5.5. Increased grate speed to 4.0.
0213 Tar collection system back on line.
0340 Ash dump 690 lbs. 1-4" chunks, warm and dry.
0400 Freeboard 37" average. Firetest 16.3" average ash. All

rods down easy. Good fire zones.

- 0410 Increased grate speed to 4.5. Light rain starting outside.
- 0430 Cyclone dump. Water on 45 seconds. 4 rakes full.
- 0500 Freeboard 37" average.
- 0550 Ash dump. Very hot, small chunks.
- 0600 Freeboard 36.5" Firetest 14.0. All rods down easy. #5 a little sticky. arge firezones on #7, 4, and 5.
- 0610 Started to coal-up at 2.12 tons.
- 0611 Increased saturation temperature to 66 C.
- 0630 Stopped coalup for coal drop 10.98 - 9.74.
- 0631 Continued coal up.
- 0635 Stopped coal up at 10.81 tons.
- 0638 Cyclone dump. Water on 30 seconds. 2 rakes dust.
- 0655 Ash dump. Red hot.
- 0700 Freeboard 36.5" average. Turned grate back to 4.0.
-

2nd SHIFT

- 0725 Dump and sample cyclone (D-83).
- 0730 Cyclone contains 3/4" sized chunks. Very little smaller particulate. 1/3 rakes full. pH remains at 6.5. Pumps at 20/20.
- 0755 Advise ESP of 2.1" wc. on P-706 with firetest coming up on 5 minutes. ESP advises he'll shut down to drain tar at 8:00.
- 0800 Dropped saturation temperature from 66 C to 62 C
Firetest shows bed very sticky. #1, 2, 4 and 5 very tight going down. Ash averages 16.6". Firezones on #1, 2, 3 side deep. The #4, 5, 6 side much cooler.
Increase grate speed to 6/5.0 to decrease ash.
- 0845 Dump and sample ash. Very few larger chunks.
- 0900 Freeboard has returned from 34" to 36" level after an hour of running agaitator at 3.5 vs. 5.0 speed.
- 1000 Firetest shows we've lost 9" ash. High hole #3 at 18".

Slow grate to 6/3.0. Bars less sticky than at 0800, but still some clinkers under #5 hole. Freeboard at 37" on #2 and #5.

1155 Advise ESP that P-706 at 1.9" wc.

1200 Firetest shows we've built back some 3-4" on ash average. Ash at 11.1". Still have a low side with #5 hole red to the tip flanked by 8" on #6 hole, and 12" on #4 hole. Otherside averages 18.3". Leave grate at 6/3.0 speed. Bars continue sticky, especially #1, 2, 5, and 6 holes. Very little clinker.

1215 Dump and sample ash at 790 lbs.

1245 Start filling weigh bin at 4.59 tons.

1355 Advise of firetest and P-706.

1400 Firetest shows very little ash at 5.6". Drop to 3 teeth at 3.0. Rods very sticky. All go in with difficulty. No dirty bars. Some deep fire zones on the #1, 2, 3 side.

1430 Dumped ash. Sample shows much smaller sized chunks. Nothing greater than 2" diameter.

3rd SHIFT

1500 Reviewed operations with 2nd shift.

1600 Firetest. Ash average at 8.85". All rods down easy, red after 2 1/2 minutes. 4-6" firezones.

1610 Replaced caustic barrel. Freeboard at -39".

1630 Increased grate speed to 3/4.0.

1700 Freeboard at -40.0".

1800 Firetest. Ash average at 10.42". All rods went down easy. Multizone on hole #6 at 8" and 14". Red firezones 4-6" after 2 1/2 minutes. Increased grate speed to 3/4.0.

1810 Freeboard at 39.0".

1815 Cyclone flush. 4 full rakes of part chunky and part muddy.

1900 Freeboard - 40".

- 1845 Styrofoam float head came off lower float unit on jacket water pump tank. Water was overflowing on floor. repaired.
- 2000 Firetest. 6.42" ash average. High - 11" on hole #3. All rods down easy. Slowed grate to 3/3.5.
- 2020 Increased saturation air flow to 1100 cfm. Increased furnace pressure to 130. Increased primary blower to 100% open. Increased agitator speed to 5.0.
- 2030 Increased grate speed to 3/4.0. Cyclone flush - 2 1/2 rakes full.
- 2040 Started filling weigh bin at 7.02 tons.
- 2100 Freeboard at 37.0". Finished filling at 13.02 tons. Increased grate speed to 3/4.5.
- 2130 Increased furnace pressure to 145. P-706 was at 2.0/2.1 - keeping P-706 below 2.0.
- 2200 Firetest. Ash average at 9.85. Low - 4" on hole #4. High - 17" on hole #1. No multizones. Rods down easy. Grate speed remaining at 3/4.5.
- 2215 Cyclone flush. 4 rakes of chunky carry-over.
- 2230 Ash dump - 746 lbs.
- 2245 Increased caustic pumps to 25/25.

SUNDAY, JULY 28, 1985

1st SHIFT

Reviewed operation with lead operator. Nice cool breeze from south.

- 0000 Freeboard 37". Firetest 14.57" average ash. All rods went down easy. #6 was hot.
- 0010 Ran agitator at 10.0 for 2 1/2 minutes.
- 0012 Increased grate speed to 5.0.
- 0015 Cyclone dump. Water on 45 seconds. 4 rakes full.
- 0100 Freeboard 36.5" average.
- 0120 Ash dump. Warm, moist. Medium chunks 2-4".

0200 Tar collector down for drain. P-706, 1.9" wc.
Freeboard 38" average. Firetest 16.14" average ash.
All rods down easy. #6 hot, yet others had normal
zones.

0210 Tar collection system back on line.

0211 Increased grate to 5.5. Ran agitator at 10.0 for 20
minutes.

0230 Cyclone dump. Water on 45 seconds. 2 rakes full dust.

0300 Freeboard 37.5" average.

0340 Ash dump.

0400 Freeboard 37" average. Firetest - 24" average ash.
Multizones on #3, 4, and 5. Rods down easy.

0420 Changed to 5 teeth on grate. Increased agitator to 6.0.

0425 Ran grate at 5/10.0 for 15 minutes to bring down ash
level. Then returned it to 5/5.5.

0430 Cyclone dump. Water on 40 seconds.

0500 Freebord 37" average.

0545 Started to coal up at 2.34 tons.

0600 Freeboard 36.5" average. Firetest 22" average ash. #2,
3, and 5 were multi-zone #4 and 7 were hot.

0610 Ran grate at 5/10.0 for 30 minutes to again help reduce
ash level.

0615 Completed coalup at 12.64 tons.

0620 Will reset grate a 6.0 after a 30 minute spin.

0625 Ash dump warm and moist.

0700 Freeboard 36" average.

2nd SHIFT

0730 All running well. Grate is really cranking. Gas
quality very good at 179.8 upper heating valve.

0755 Advise ESP that P-706 at 2.0" wc. Firetest and tar
drain at 0800.

0810 Tar collector back on line.

0812 Finish firetest and see if we've gained some on getting rid of high ash level. Ash average is 16.2". #1, 2, 7, 5, and 6 still very sticky up high. #2 dirty at 14" and 30". #3 bar fell right in. Low hole #5 at 11" ash.

0812 Will leave grate speed as is, 5/6.0. Freeboard at 34".

0815 Dump asah at 810 lbs. (A-131). Grate churns out 800 lbs in 1.75 hrs.

0830 Cyclone flushed for one minute. Got mostly 3/4" sized carryover, along with a small amount of silt-sized particulate. Ash sample mostly 1" sized and smaller, with some 3-4" chunks. Ash not as warm as 24 hours earlier.

0900 Freeboard 35.5 opposite agitator.

0955 Advise -706 at 1.8" wc. Will not do firetest at 10:00 as U of MN performing particle sampling.

1000 Dump ash at 810 lbs. (S-132). Ash warm and somewhat moist. Smaller sized chunks.

1025 Particle sampling complete.

1030 Firetest shows 15.6" ash level. #3 hole high at 31" flanked by two lower holes; #2 at 9" and #4 at 14". No dirty bars. #1 and #6 still very tight on top. Slow grate to 5/4.0. Freeboard 36" opposite agitator.

1140 Straighten rods for last time?

1155 Advise ESP that P-706 at 1.7" with firetest coming up on schedule.

1200 Firetest averages 10.3". Having considerable difficulty putting in #1, 2, 5, and 6 rods without using the sledge. Still tight half way down. rods hot after 2 minutes. No dirty bars, but #3 comes out white hot with 4 foot firezone. #2 rod barely red. Freeboard at 36" on #1 and #4.

1210 Slow grate to 5/2.7 in order to increase ash.

1230 pH remains at 6.5. Cyclone carrover light, 3-4 rakes.

1255 Putting up the last of the Hiawatha from pad, at 3.904 tons.

1300 Slow agitator to 5.0 as freeboard has climbed to 34".

1325 Stop filling weigh bin at 10.4 tons.

- 1330 Dump ash at 876 lbs. (A-133). Ash warm and moist. Mostly 1" to 3" ash. No larger clinkers.
- 1355 Advise ESP that P-706 at 1.7" wc. Firetest and tar drain at 1400.
- 1400 Last firetest day shift 1985 is 14.4". Rods difficult, continues sticky. #2, 3, 4 holes average 23.3". #3 and #4 have 4 feet deep firezones. #5, 6 one side low at 8.6" and cooler. No double zones. Freeboard at 35" opposite agitator. Increase grate speed to 5/3.5.
- 1455 Advise ESP - P706 at 1.6" wc. Freeboard 33".
-

3rd SHIFT

- 1500 Reviewed operations with 2nd shift.
- 1600 Firetest - 14.85" ash average. All rods down easy. 12" firezone after 2 minutes down. No multi zones.
- 1610 Increased grate speed to 5/4.0. Freeboard at 39". Ash dump at 827 lbs.
- 1630 Cleaned around coal pad.
- 1700 Freeboard - 40".
- 1730 Cyclone - 34 1/2 full rakes of chunky carry-over.
- 1800 Firetest. 15" ash average. #3, #4 holes hard. Good firezone (12" after 2 minutes no multizones.
- 1810 Increased grate speed to 5/6.0. Freeboard at 40.5.
- 1815 Increased agitator speed to 6.0.
- 1830 Ash dump at 904 lbs.
- 1900 Freeboard 37.5".
- 1930 Cyclone flush. Hole plugged at valve. Took caps off rod out pipes and cleaned out. 1 piece size of basketball came out.
- 2000 Firetest. 9.28` ash average. Bars going down hart at top side. Used hammer on #3, #5, #7 holes. Red after 2 minutes with 12" - 18" firezone.
- 2030 Rolled hopper and conveyor to side area. Cleaned up pad area around shaker. Ash Dump - 975 lbs. A few chunks about 6" size. Rest was gravel size. Brownish gray in

color.

- 2140 Cyclone flush. 1 1/2 rakes full. May be more build-up in cyclone, as water drain wasn't real strong.
- 2200 Firetest. Ash average at 8.71". Bed still sticky, #7 hole rod came out wet on upper half. Low zone #1 with 3", high was #7 with 12". Red after 2 minutes.
- 2245 Ash dump at 819 lbs. Warm and moist.

END .018

ENDES ALLES, DANKE, GUTEN TAG

APPENDIX B
Coal Addition Log

Coal Weights are given in short tons.

COAL FEED LOG

DATE	TIME	SAMPLE #	START WT. (TONS)	STOP WT. (TONS)	NET WT. (TONS)	SCREEN (IN)	WASH
7-15	740	COKE	8.13	0000	8.13	0.5	NO
7-15	940	COKE	2.01	1.99	.02	0.5	NO
7-15	1145	COKE	1.98	.78	1.20	0.5	NO
7-15	1230	COKE	.78	.74	.04	0.5	NO
7-15	1330	COKE	.74	.31	.43	0.5	NO
7-15	1415	COKE	.32	.00	.32	0.5	NO
7-15	1530	COKE	0.00	.00	.32	0.5	NO
7-15	1630	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-15	1730	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-15	1830	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-15	1930	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-15	2030	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-15	2130	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-15	2230	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-15	2330	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-15	2400	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0030	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0045	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0100	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0115	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0130	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0145	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0200	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0215	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0230	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0245	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0300	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0330	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0345	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0400	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0415	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0430	CYCLE VALVES		(NO SAMPLE TAKEN)			
7-16	0445	CYCLE VALVES		(NO SAMPLE TAKEN)			

END COKE

DROP ILLINOIS #6

7-16	0500	C-1	10.19	5.01	5.18	0.5	NO
7-16	0502	C-1	5.01	2.47	2.54	0.5	NO
7-16	0530	C-1	4.58	4.38	0.20	0.5	NO
7-16	0630	C-1	8.31	8.21	0.10	0.5	NO
7-16	730	C-2	9.96	9.63	.33	0.5	NO
7-16	830	C-2	9.63	8.84	.79	0.5	NO

DATE	TIME	SAMPLE #	START WT. (TONS)	STOP WT. (TONS)	NET WT. (TONS)	SCREEN (IN)	WASH
7-16	930	C-2	8.84	8.22	.62	0.5	NO
7-16	1030	C-2	8.22	7.77	.45	0.5	NO
7-16	1130	C-2	7.77	7.39	.38	0.5	NO
7-16	1230	C-2	7.39	6.93	.46	0.5	NO
7-16	1330	C-2	8.61	8.13	.48	0.5	NO
7-16	1430	C-2	10.44	9.91	.53	0.5	NO
7-16	1530	C-3	9.91	9.29	.62	0.5	NO
7-16	1630	C-3	9.29	8.84	.45	0.5	NO
7-16	1730	C-3	8.84	8.36	.48	0.5	NO
7-16	1830	C-3	8.36	7.85	.51	0.5	NO
7-16	1930	C-3	7.85	7.26	.59	0.5	NO
7-16	2030	C-3	7.26	6.70	.56	0.5	NO
7-16	2130	C-3	10.05	9.41	.64	0.5	NO
7-16	2230	C-3	9.61	8.94	.67	0.5	NO
7-16	2330	C-4	8.93	8.21	.72	0.5	NO
7-17	0030	C-4	8.21	7.50	.71	0.5	NO
7-17	0130	C-4	7.50	6.75	.75	0.5	NO
7-17	0230	C-4	6.75	5.86	.89	0.5	NO
7-17	0330	C-4	5.86	5.14	.72	0.5	NO
7-17	0430	C-4	5.14	4.28	.86	0.5	NO
7-17	0530	C-4	4.28	3.58	.70	0.5	NO
7-17	0630	C-4	3.58	2.63	.95	0.5	NO
7-17	0730	C-5	2.63	1.89	.74	0.5	NO
7-17	0830	C-5	1.89	1.36	.53	0.5	NO
7-17	0930	C-5	1.36	.46	.90	0.5	NO
7-17	1030	C-5	.46	.00	.46	0.5	NO
WEIGH BIN EMPTY							
7-17	1530	CYCLED VALVE				0.5	NO
7-17	1630	CYCLED VALVE					
7-17	1645	COKE	2.92	1.07	1.85	0.25	NO
7-17	1705	COKE	1.07	.23	.84	0.25	NO
WEIGH BIN EMPTY							
7-17	1745	COKE	.23	-0.09	.23	0.25	NO
		CYCLED VALVE					
7-17	2330	COKE				0.25	NO
7-18	0030	COKE					
DROP SUFCO							
7-18	0130	C-20	11.31	6.16	5.15	0.25	NO
7-18	0230	C-20	6.16	5.38	.78	0.25	NO
7-18	0330	C-20	10.62	10.14	.48	0.25	NO
7-18	0430	C-20	10.14	9.63	.51	0.25	NO
7-18	0530	C-20	11.00	10.37	.63	0.25	NO
7-18	0630	C-20	10.37	9.75	.62	0.25	NO
7-18	0730	C-21	9.75	9.10	.65	0.25	NO

DATE	TIME	SAMPLE #	START WT. (TONS)	STOP WT. (TONS)	NET WT. (TONS)	SCREEN (IN)	WASH
7-18	0830	C-21	9.10	8.43	.67	0.25	NO
7-18	0930	C-21	8.43	7.72	.71	0.25	NO
7-18	1030	C-21	7.72	7.70	.72	0.25	NO
7-18	1130	C-21	7.00	6.30	.70	0.25	NO
7-18	1230	C-21	6.30	5.65	.65	0.25	NO
7-18	1330	C-21	11.74	11.08	.68	0.25	NO
7-18	1430	C-21	11.08	10.40	.68	0.25	NO
7-18	1530	C-22	10.40	9.72	.68	0.25	NO
7-18	1630	C-22	9.72	9.09	.63	0.25	NO
7-18	1730	C-22	9.09	8.37	.72	0.25	NO
7-18	1830	C-22	8.37	7.70	.67	0.25	NO
7-18	1930	C-22	7.70	6.98	.72	0.25	NO
7-18	2030	C-22	6.98	6.27	.71	0.25	NO
7-18	2130	C-22	6.27	5.60	.67	0.25	NO
7-18	2200	C-22	11.93	11.65	.28	0.25	NO
7-18	2230	C-22	12.05	11.65	.40	0.25	NO
7-18	2330	C-23	11.65	10.85	.80	0.25	NO
7-19	0030	C-23	10.85	10.16	.69	0.25	NO
7-19	0130	C-23	10.16	9.42	.74	0.25	NO
7-19	0230	C-23	9.42	8.69	.73	0.25	NO
7-19	0330	C-23	8.69	7.99	.70	0.25	NO
7-19	0430	C-23	7.99	7.29	.70	0.25	NO
7-19	0530	C-23	9.70	8.98	.72	0.25	NO
7-19	0630	C-23	12.32	11.61	.71	0.25	NO
7-19	0730	C-24	11.61	10.85	.76	0.25	NO
7-19	0830	C-24	10.85	10.11	.74	0.25	NO
7-19	0930	C-24	10.11	9.38	.73	0.25	NO
7-19	1030	C-24	9.38	8.65	.73	0.25	NO
7-19	1130	C-24	8.65	7.94	.71	0.25	NO
7-19	1230	C-24	7.94	7.20	.74	0.25	NO
7-19	1330	C-24	7.20	6.47	.73	0.25	NO
7-19	1430	C-24	11.66	10.95	.71	0.25	NO
7-19	1530	C-25	10.95	10.23	.72	0.25	NO
7-19	1630	C-25	10.23	9.51	.72	0.25	NO
7-19	1730	C-25	9.51	8.79	.72	0.25	NO
7-19	1830	C-25	8.79	8.07	.72	0.25	NO
7-19	1930	C-25	8.07	7.37	.70	0.25	NO
7-19	2030	C-25	7.37	6.56	.81	0.25	NO
7-19	2130	C-25	12.07	11.40	.67	0.25	NO
7-19	2230	C-25	11.40	10.66	.74	0.25	NO
7-19	2330	C-26	10.65	9.90	.75	0.25	NO
7-20	0030	C-26	9.90	9.37	.53	0.25	NO
7-20	0130	C-26	9.37	8.37	1.00	0.25	NO
7-20	0230	C-26	8.37	7.67	.70	0.25	NO
7-20	0330	C-26	7.67	6.87	.80	0.25	NO
7-20	0430	C-26	6.87	5.89	.98	0.25	NO
7-20	0530	C-26	5.89	5.30	.79	0.25	NO
7-20	0630	C-26	12.59	11.80	.79	0.25	NO
7-20	0730	C-27	11.80	11.06	.74	0.25	NO

.0765
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0.785
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DATE	TIME	SAMPLE #	START WT. (TONS)	STOP WT. (TONS)	NET WT. (TONS)	SCREEN (IN)	WASH
7-20	0830	C-27	11.06	10.26	.80	0.25	NO
7-20	0930	C-27	10.26	9.46	.80	0.25	NO
7-20	1030	C-27	9.46	8.71	.75	0.25	NO
7-20	1130	C-27	8.71	8.00	.71	0.25	NO
7-20	1230	C-27	8.00	7.24	.76	0.25	NO
7-20	1330	C-27	7.24	6.48	.76	0.25	NO
7-20	1430	C-27	6.48	5.77	.71	0.25	NO
7-20	1530	C-28	11.78	10.96	.82	0.25	NO
7-20	1630	C-28	10.96	10.34	.62	0.25	NO
7-20	1730	C-28	10.34	9.59	.75	0.25	NO
7-20	1830	C-28	9.59	8.81	.78	0.25	NO
7-20	1930	C-28	8.81	8.13	.68	0.25	NO
7-20	2030	C-28	8.13	7.31	.82	0.25	NO
7-20	2130	C-28	7.31	6.64	.67	0.25	NO
7-20	2230	C-28	11.47	10.70	.77	0.25	NO
7-20	2330	C-29	10.69	9.95	.74	0.25	NO
7-21	0030	C-29	9.95	8.93	1.02	0.25	NO
7-21	0130	C-29	8.93	8.54	.48	0.25	NO
7-21	0230	C-29	8.45	7.54	.91	0.25	NO
7-21	0330	C-29	7.54	6.81	.73	0.25	NO
7-21	0430	C-29	8.64	7.89	.75	0.25	NO
7-21	0530	C-29	12.20	11.41	.79	0.25	NO
7-21	0630	C-29	11.41	10.58	.83	0.25	NO
7-21	0730	C-30	10.58	9.81	.77	0.25	NO
7-21	0830	C-30	9.81	8.99	.82	0.25	NO
7-21	0930	C-30	8.99	8.24	.75	0.25	NO
7-21	1030	C-30	8.24	7.49	.75	0.25	NO
7-21	1130	C-30	7.49	6.72	.77	0.25	NO
7-21	1230	C-30	6.72	6.02	.70	0.25	NO
7-21	1330	C-30	6.02	5.24	.78	0.25	NO
7-21	1430	C-30	11.47	10.66	.81	0.25	NO
7-21	1530	C-31	10.68	9.96	.72	0.25	NO
7-21	1630	C-31	9.96	9.26	.70	0.25	NO
7-21	1730	C-31	9.26	8.43	.83	0.25	NO
7-21	1830	C-31	8.43	7.72	.71	0.25	NO
7-21	1930	C-31	7.72	6.92	.80	0.25	NO
7-21	2030	C-31	6.92	6.26	.66	0.25	NO
7-21	2130	C-31	6.26	5.48	.78	0.25	NO
7-21	2230	C-31	5.48	4.76	.72	0.25	NO
7-21	2330	C-32	4.75	3.92	.83	0.25	NO
7-22	0030	C-32	3.92	3.17	.75	0.25	NO
7-22	0130	C-32	3.17	2.37	.80	0.25	NO
7-22	0230	C-32	2.37	1.56	.81	0.25	NO
7-22	0330	C-32	1.56	0.92	.64	0.25	NO2
North 1/2 of weight bin empty:							
7-22	0430	C-32	.92	.49	.43	0.25	NO

DATE	TIME	SAMPLE #	START WT. (TONS)	STOP WT. (TONS)	NET WT. (TONS)	SCREEN (IN)	WASH
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South bin empty:

7-22	0530	C-32	.49	.00	.49	0.25	NO
7-22	0630	C-32	CYCLE COAL VALVES FOR ENCLOSE BIN				
7-22	0730						

DROP BEULAH

7-22	1130	C-33	10.47	6.17	4.30	0.25	NO
7-22	1230	C-33	6.16	5.36	.81	0.25	NO
7-22	1330	C-33	5.36	4.64	.72	0.25	NO
7-22	1430	C-33	11.10	10.22	.88	0.25	NO
7-22	1530	C-51	10.22	9.32	.90	0.25	NO
7-22	1630	C-51	9.32	8.49	.83	0.25	NO
7-22	1730	C-51	8.49	7.55	.94	0.25	NO
7-22	1830	C-51	7.55	6.71	.84	0.25	NO
7-22	1930	C-51	6.71	5.80	.91	0.25	NO
7-22	2030	C-51	5.80	5.05	.75	0.25	NO
7-22	2130	C-51	5.05	4.17	.88	0.25	NO
7-22	2230	C-51	10.87	10.04	.82	0.25	NO
7-22	2330	C-52	10.04	9.08	.96	0.25	NO
7-23	0030	C-52	9.08	8.12	.96	0.25	NO
7-23	0130	C-52	8.12	7.24	.88	0.25	NO
7-23	0230	C-52	7.24	6.28	.96	0.25	NO
7-23	0330	C-52	6.28	5.35	.93	0.25	NO
7-23	0430	C-52	5.35	4.52	.83	0.25	NO
7-23	0530	C-52	4.52	3.57	.95	0.25	NO
7-23	0630	C-52	8.22	7.23	.99	0.25	NO
7-23	0730	C-53	11.91	10.96	.95	0.25	NO
7-23	0830	C-53	10.96	10.01	.95	0.25	NO
7-23	0930	C-53	10.01	9.07	.94	0.25	NO
7-23	1030	C-53	9.07	8.21	.86	0.25	NO
7-23	1130	C-53	8.21	7.35	.86	0.25	NO
7-23	1230	C-53	7.35	6.50	.85	0.25	NO
7-23	1330	C-53	6.50	5.69	.81	0.25	NO
7-23	1430	C-53	10.10	9.31	.79	0.25	NO
7-23	1530	C-54	10.33	9.54	.79	0.25	NO
7-23	1630	C-54	9.54	8.73	.81	0.25	NO
7-23	1730	C-54	8.73	7.87	.86	0.25	NO
7-23	1830	C-54	7.87	7.09	.78	0.25	NO
7-23	1930	C-54	7.09	6.22	.87	0.25	NO
7-23	2030	C-54	6.22	5.40	.82	0.25	NO
7-23	2130	C054	5.40	4.53	.87	0.25	NO
7-23	2230	C-54	11.25	10.41	.84	0.25	NO
7-23	2330	C-55	10.41	9.50	.91	0.25	NO
7-24	0030	C-55	9.50	8.65	.85	0.25	NO
7-24	0130	C-55	8.65	7.77	.88	0.25	NO
7-24	0230	C-55	7.77	7.03	.74	0.25	NO
7-24	0330	C-55	7.03	5.90	1.13	0.25	NO
7-24	0430	C-55	5.90	5.04	.86	0.25	NO

0.935
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DATE	TIME	SAMPLE #	START WT. (TONS)	STOP WT. (TONS)	NET WT. (TONS)	SCREEN (IN)	WASH
7-24	0530	C-55	5.04	4.09	.95	0.25	NO
7-24	0630	C-55	10.12	9.06	1.06	0.25	NO
7-24	0730	C-56	10.36	9.59	.77	0.25	NO
7-24	0830	C-56	9.59	8.60	.99	0.25	NO
7-24	0930	C-56	8.60	7.61	.99	0.25	NO
7-24	1030	C-56	7.61	6.63	.98	0.25	NO
7-24	1130	C-56	6.63	5.86	.77	0.25	NO
7-24	1230	C-56	5.86	5.14	.72	0.25	NO
7-24	1330	C-56	5.14	4.37	.77	0.25	NO
7-24	1430	C-56	11.27	10.49	.78	0.25	NO
7-24	1530	C-57	10.49	9.56	.93	0.25	NO
7-24	1630	C-57	9.56	8.71	.85	0.25	NO
7-24	1730	C-57	8.71	7.59	1.12	0.25	NO
7-24	1830	C-57	7.59	6.61	.98	0.25	NO
7-24	1930	C-57	6.61	5.55	1.06	0.25	NO
7-24	2030	C-57	5.55	4.47	1.08	0.25	NO
7-24	2130	C-57	4.47	3.37	1.10	0.25	NO
7-24	2230	C-57	10.14	9.13	1.01	0.25	NO

All Beulah in weigh bin.

7-24	2330	C-58	9.13	8.09	1.04	0.25	NO
7-25	0030	C-58	8.09	6.97	1.12	0.25	NO
7-25	0230	C-58	6.97	6.05	.92	0.25	NO
7-25	0330	C-58	4.99	3.98	1.01	0.25	NO
7-25	0430	C-58	3.98	2.90	1.08	0.25	NO
7-25	0530	C-58	2.90	1.68	1.22	0.5	NO
7-25	0630	C-58	1.68	.54	1.14	0.25	NO
7-25	0730	C-58	.58	.00	.58	0.25	NO

DROP HIAWATHA

7-25	1145	C-80	12.03	6.36	5.67	0.25	NO
7-25	1230	C-80	6.36	5.67	1.05	0.25	NO
7-25	1330	C-80	5.31	4.51	.80	0.25	NO
7-25	1430	C-80	12.02	11.41	.61	0.25	NO
7-25	1530	C-81	11.41	10.83	.58	0.25	NO
7-25	1630	C-81	10.83	10.29	.54	0.25	NO
7-25	1730	C-81	10.29	9.76	.53	0.25	NO
7-25	1830	C-81	9.76	9.24	.52	0.25	NO
7-25	1930	C-81	9.24	8.69	.55	0.25	NO
7-25	2030	C-81	8.69	8.13	.56	0.25	NO
7-25	2130	C-81	8.13	7.45	.68	0.25	NO
7-25	2230	C-81	10.89	10.22.	.67	0.25	NO
7-25	2330	C-82	10.22	9.47	.75	0.25	NO
7-26	0030	C-82	9.47	8.71	.76	0.25	NO
7-26	0130	C-82	8.71	7.97	.74	0.25	NO
7-26	0230	C-82	7.97	7.10	.87	0.25	NO
7-26	0330	C-82	7.10	6.26	.84	0.25	NO

DATE	TIME	SAMPLE #	START WT. (TONS)	STOP WT. (TONS)	NET WT. (TONS)	SCREEN (IN)	WASH
7-26	0430	C-82	6.26	5.28	.98	0.25	NO
7-26	0530	C-82	5.28	4.41	.87	0.25	NO
7-26	0630	C-82	12.23	10.86	1.37	0.25	NO
7-26	0730	C-83	11.20	10.76	.44	0.25	NO
7-26	0830	C-83	10.76	9.79	.97	0.25	NO
7-26	0930	C-83	9.79	8.88	.91	0.25	NO
7-26	1030	C-83	8.88	7.86	1.02	0.25	NO
7-26	1130	C-83	7.86	6.99	.87	0.25	NO
7-26	1230	C-83	6.99	5.97	1.02	0.25	NO
7-26	1330	C-83	5.97	5.40	.57	0.25	NO
7-26	1430	C-83	11.55	10.30	1.25	0.25	NO
7-26	1530	C-84	10.30	9.27	1.03	0.25	NO
7-26	1630	C-84	9.27	8.13	1.14	0.25	NO
7-26	1730	C-84	8.13	7.08	1.05	0.25	NO
7-26	1830	C-84	7.08	6.09	.99	0.25	NO
7-26	1930	C-84	6.09	4.88	1.21	0.25	NO
7-26	2030	C-84	10.92	10.06	.86	0.25	NO
7-26	2130	C-84	10.79	9.88	.91	0.25	NO
7-26	2230	C-84	9.88	9.04	.84	0.25	NO
7-26	2330	C-85	9.04	8.11	.93	0.25	NO
7-27	0030	C-85	8.11	7.18	.93	0.25	NO
7-27	0130	C-85	7.18	6.24	.94	0.25	NO
7-27	0230	C-85	6.24	5.33	.91	0.25	NO
7-27	0330	C-85	5.33	4.26	1.07	0.25	NO
7-27	0430	C-85	4.26	3.26	1.00	0.25	NO
7-27	0530	C-85	3.26	2.13	1.13	0.25	NO
7-27	0630	C-85	10.98	9.74	1.24	0.25	NO
7-27	0730	C-86	10.81	9.77	1.04	0.25	NO
7-27	0830	C-86	9.77	8.81	.96	0.25	NO
7-27	0930	C-86	8.81	7.66	1.15	0.25	NO
7-27	1030	C-86	7.66	6.59	1.07	0.25	no
7-27	1130	C-86	6.59	5.64	.95	0.25	NO
7-27	1230	C-86	5.64	4.59	1.05	0.25	NO
7-27	1330	C-86	12.49	11.67	.82	0.25	NO
7-27	1430	C-86	12.61	11.80	.81	0.25	NO
7-27	1530	C-87	11.80	11.17	.63	0.25	NO
7-27	1630	C-87	11.17	10.38	.79	0.25	NO
7-27	1730	C-87	10.38	9.44	.94	0.25	NO
7-27	1830	C-87	9.44	8.71	.73	0.25	NO
7-27	1930	C-87	8.71	7.90	.81	0.25	NO
7-27	2030	C-87	7.90	7.02	.88	0.25	NO
7-27	2130	C-87	13.02	11.96	1.06	0.25	NO
7-27	2230	C-87	11.96	10.83	1.13	0.25	NO
7-27	2330	C-88	10.83	9.66	1.17	0.25	NO
7-28	0030	C-88	9.66	8.59	1.07	0.25	NO
7-28	0130	C-88	8.59	7.49	1.10	0.25	NO
7-28	0230	C-88	7.49	6.10	1.39	0.25	NO
7-28	0330	C-88	6.10	5.11	.99	0.25	NO

DATE	TIME	SAMPLE #	START WT. (TONS)	STOP WT. (TONS)	NET WT. (TONS)	SCREEN (IN)	WASH
7-28	0430	C-88	5.11	3.80	1.31	0.25	NO
7-28	0530	C-88	3.80	2.34	1.46	0.25	NO
7-28	0630	C-88	12.64	11.22	1.42	0.25	NO
7-28	0730	C-89	11.22	9.87	1.35	0.25	NO
7-28	0830	C-89	9.87	8.63	1.24	0.25	NO
7-28	0930	C-89	8.63	7.37	1.26	0.25	NO
7-28	1030	C-89	7.37	6.25	1.12	0.25	NO
7-28	1130	C-89	6.24	5.01	1.23	0.25	NO
7-28	1230	C-89	5.01	3.94	1.07	0.25	NO
7-28	1330	C-89	10.40	9.33	1.07	0.25	NO
7-28	1430	C-89	9.96	8.47	1.49	0.25	NO
7-28	1530	C-90	8.47	7.92	.55	0.25	NO
7-28	1630	C-90	7.92	6.89	1.03	0.25	NO
7-28	1730	C-90	6.89	5.63	1.26	0.25	NO
7-28	1830	C-90	5.63	4.24	1.39	0.25	NO
7-28	1930	C-90	4.24	2.91	1.33	0.25	NO
7-28	2030	C-90	2.91	1.67	1.24	0.25	NO
North bin empty							
7-28	2130	C-90	1.24	.79	.45	0.25	NO
7-28	2230	C-90	.79	.15	.64	0.25	NO

APPENDIX C

Ash Removal Log

Ash weights are given in pounds.

30 gallons of water is normally added to each "wet ash" discharge.

GASIFIER ASH DUMP

DATE	TIME	SAMPLE #	INITIAL DRY WT.	FINAL DRY WT.	NET DRY WT	INITIAL WET WT.	FINAL WET WT.	NET WET WT	NET DRY + NET WET	COAL TYPE
715	1730	A-1	574	+011	563	335	003	332	895	COKE
715	2200	A-2	508	023	485	315	015	300	885	
716	0300	A-3	383	013	370	310	009	301	671	ILL #6
716	1130	A-4	500	29	471	342	38	304	775	
716	1830	A-5	545	008	533	368	029	339	623	
716	2230	A-6	310	020	290	346	029	317	357	
717	0140	A-7	445	022	423	308	002	306	729	
717	0430	A-8	427	022	405	341	021	320	725	
717	0640	A-9	567	019	548	350	050	300	848	
717	0745	A-10	555	528	27					
717	0745	A-10	560	45	515	369	44	325	867	
717	0900	A-11	613	54	559	384 649	345 35	39 614	1212	
717	1020	A-12	538	119	419	415	035	380	799	
717	1150	A-13	581	51	530	350	75	275	805	
717	1745	A-14	526	072	454	342	070	272	476	
718	0109	A-15	385	050	335	320	050	270	605	
718	0620	A-20	279	059	220	338	060	278		
718	1435	A-21	475	74	401	338	047	291	692	SUFCO
718	2025	A-22	522	070	452	310	15	295	747	
719	0100	A-23	467	075	392	390	078	312	704	
719	0630	A-24	400	67	333	384	78	306	639	
719	1315	A-25	490	83	407	415	81	334	741	
719	1830	A-26	512	37	475	449	83	366	591	
719	2330	A-27	426	037	399	341	71	270	669	
720	0515	A-28	474	87	387	448	41	357	805	
720	1010	A-29	521	88	433	402	44	358	791	
720	1410	A-30	511	80	431	449	78	371	802	
720	1900	A-31	629	95	514	482	86	390	660	
720	2230	A-32	449	99	350	467	89	378	478	
721	0230	A-33	496	86	418	455	90	365	783	
721	0615	A-34	559	84	475	405	35	370	845	
721	1410	A-36	519	76	443	430	35	295	738	
721	1830	A-37	567	107	460	489	89	400	610	
721	2250	A-38	484	047	433	465	030	435	868	
722	0230	A-39	485	90	395	419	050	369	764	
722	0615	A-40	480	110	370	453	96	357	727	
722	1100	A-41	510	81	429	442	89	353	782	
722	1530	A-70	529	92	440	485	81	404	844	BELLAH
722	2000	A-71	575	37	538	467	75	392	930	
723	0130	A-72	524	90	434	460	102	358	792	
723	0630	A-73	349	100	249	389	70	319	568	
723	1340	A-74	480	124	356	460	88	372	728	
723	2040	A-75	515	139	376	492	128	364	490	

DATE	TIME	SAMPLE #	INITIAL DRY WT.	FINAL DRY WT.	NET DRY WT	INITIAL WET WT.	FINAL WET WT.	NET WET WT	NET DRY + NET WET	COAL TYPE
724	0330	A-76	450	120	330	430	127	303	633	HIAWATHA
724	1000	A-77	494	91	403	434	120	314	717	
724	1550	A-78	541	062	479	410	059	351	761	
724	2220	A-79	587	113	474	412	100	312	546	
725	0530	A-80	542	103	439	402	93	299	738	
725	0915	A-81	530	98	432	403	90	313	716	
725	1120	A-82	516	99	417	345	72	273	690	
725	1345	A-100	493	92	401	350	69	281	682	
725	1715	A-101	582	116	466	386	103	283	499	
725	1945	A-102	516	103	413	381	85	296	459	
725	2230	A-103	553	103	450	373	93	280	480	
726	0045	A-104	543	83	460	389	88	280	480	
726	0300	A-105	656	76	550	358	54	304	884	
726	0630	A-107	693	92	596	415	60	355	951	
726	0820	A-108	750	82	668	420	90	330	998	
726	0935	A-109	645	90	555	410	58	352	907	
726	1105	A-110	799	90	709	390	56	334	1043	
726	1235	A-111	797	97	700	430	100	230	1030	
726	1420	A-112	885	96	789	392	91	301	1090	
726	1540	A-113	687	116	571	389	102	287	608	
726	1655	A-114	731	112	619	387	104	283	652	
726	1830	A-115	759	117	642	354	96	258	650	
726	1945	A-116	643	110	533	342	100	242	775	
726	2220	A-117	698	106	592	348	102	246	838	
727	0015	A-118	563	97	466	346	61	285	751	
727	0340	A-119	695	100	595	349	56	293	888	
727	0550	A-120	669	80	589	398	61	337	926	
727	0700	A-121	543	103	440	378	100	278	718	
727	0845	A-122	749	71	678	379	46	333	1011	
727	1215	A-123	856	55	801	401	50	351	1152	
727	1435	A-123	542	56	486	372	51	321	807	
727	1835	A-125	616	106	510	378	97	281	791	
727	2230	A-126	746	122	624	442	114	328	952	
728	0130	A-127	654	106	548	399	56	343	891	
728	0400	A-128	663	115	548	446	101	345	893	
728	0530	A-129	779	125	654	444	61	388	1042	
728	0630	A-130	625	124	501	464	64	400	901	
728	0815	A-131	828	56	772	493	57	436	1208	
728	1000	A-132	864	113	751	503	56	447	1198	
728	1330	A-133	891	52	839	492	106	386	1225	
728	1610	A-134	827	130	697	479	126	353	1050	
728	1830	A-135	904	132	972	484	124	360	1132	
728	2030	A-136	975	132	843	492	122	370	1213	
728	2235	A-137	819	135	684	483	127	356	1040	

APPENDIX D

Retort Particle Sampling Data

Reference: Volume 1, Thimsen, Maurer et al, 1984

D-1. Dust Loading Data

D-2. Cumulative Dust Data

D-3. Cumulative Dust Size Distributions

D-4. Cumulative Dust Size Distributions

D-5. Cumulative Dust Size Distributions

DUST LOADING DATA

Grand Average Gas/Air Ratio	Estimated Offtake Elbow Area/ Sampler Inlet Area	Retort Area Less Draft Shroud Area
SUFCO 1.83	9735	square feet
INDIAN 2.26		
HIAWATHA 1.96		

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)
1	18-JUL-85 10:12	2.0	57.70	1420	557	31.32	791	2524	2.62	34	210	5.0	36
2	18-JUL-85 10:47	2.0	78.10	1420	575	31.32	787	2582	3.54	34	270	5.0	36
3	18-JUL-85 11:05	2.0		1380	580	31.31	787	2587		34	325	5.0	35
4	23-JUL-85 09:23	3.125	35.60	1840	394	31.62	592	1615	0.80	34	270	3.2	38.5
5	23-JUL-85 09:51	3.13	53.30	1800	393	31.55	591	1606	1.22	34	325	3.2	37.5
6	23-JUL-85 10:16	3.13	79.30	1800	397	31.66	589	1602	1.81	34	210	3.2	37.5
7	24-JUL-85 12:25	3.0	69.10	1500	512	31.44	598	2132	1.98	34	0	0	38
8	24-JUL-85 12:40	3.0	17.00	1480	513	31.58	597	2123	0.49	34	0	0	39
9	24-JUL-85 12:53	3.0	6.80	1480	426	31.45	598	1811	0.20	34	0	0	41
10	25-JUL-85 09:11	3.0	16.20	2100	419	31.78	690	2013	0.33	34	0	0	39
11	25-JUL-85 09:28	3.0		2100	415	31.80	690	1994		34	0	0	39
12	25-JUL-85 09:41	3.0	37.90	2100	408	31.99	691	1947	0.77	34	0	0	39
13	28-JUL-85 09:38	1.67	14.20	2380	632	32.49	1084	4042	0.46	34	270	6.0	35.5
14	28-JUL-85 09:55	1.67	28.40	2380	640	32.34	1087	4144	0.92	34	325	6.0	35.5
15	28-JUL-85 10:10	1.67	20.60	2400	649	32.54	1082	4133	0.66	34	210	6.0	35.5

TABLE D-2

Cumulative Dust Data

Particle Size (micron)		Cumulative Percent Less Than		
		Run Number		
		018-02	018-11	018-15
		SUFCO	Indianhead	Hiawatha
Sieved	Shifted Sieved	---	---	---
1400	1892	99.57	99.67	92.83
840	1135	97.72	97.07	88.73
595	804	90.90	92.93	80.36
420	568	66.77	84.15	62.31
250	338	40.72	73.01	43.00
149	201	15.49	48.87	20.71
74	100			
Microscopy				
(micron)				
100		15.49	48.87	20.71
56		9.30	33.27	13.78
32		6.12	20.91	9.61
17.8		3.59	9.87	4.96
10		1.67	4.71	1.86
5.6		0.29	1.15	0.40
3.2		---	---	---

FIGURE D-3

FIGURE D-4

FIGURE D-5

APPENDIX E

Gasifier Operator Logged Data

Included are three tables of data:

E-1. Freeboard Data

E-2. Firetest Data

C - Relatively cold incandescent zone

H - Relatively hot incandescent zone

D - multiple incandescent zones

E-3. Operator Logged Data I

Water flows in gpm.

Water totals in gallons.

Steam flows in lb/min.

E-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 E-1
FREEBOARD DATA

DATE	TIME	#1	#2	#3	#4	#5	#6	#7	AVERAGE	AGITATOR DEPTH
7-15	1100	40			38				39	
7-15	1200		41			43			42	
7-15	1300			44			46		45	
7-15	1400	37			37				37	
7-15	1500		38			36			37	
7-15	1600			30			32		31	
7-15	1700	40			42				41	
7-15	1800		46			46			46	
7-15	1900			42			44		43	
7-15	2000	46			54				50	
7-15	2100		42			46			44	
7-15	2200	49			47				48	
7-16	0000	37			37				37	
7-16	0100		45			42			43.5	37-38
7-16	0200			53			47		50.0	37-38
7-16	0300	57			56				56.5	37.5
7-16	0400		55			53			54.0	36.0
7-16	0500			65			65		65.0	36.0
7-16	0600	36			36				36.0	36.0
7-16	0700		35			36			35.5	36.0
7-16	0730	36		33	36		35		35.0	36.0
7-16	0800		33			36			34.5	36.0
7-16	0900			31			33		32.0	36.0
7-16	1000	35			28				31.5	36.0
7-16	1100		32			33			32.5	36.0
7-16	1200			32		32	32		32.0	36.0
7-16	1300	33			32				32.5	38-41
7-16	1400		32			32			32.0	38-41
7-16	1500			32			31		31.5	38-41
7-16	1600	29			32				30.5	38-41
7-16	1700		34			33			33.5	38-41
7-16	1800			37			30		33.5	38-41
7-16	1900	39			35				37.0	38-41
7-16	2000		30			30			30.0	38-41
7-16	2100			31			35		33.0	38-41
7-16	2200	35			35				35.0	38-41
7-17	2400		30			27			28.5	40.0
7-17	0100			26			28		27.0	39.5
7-17	0200	34			34				34.0	39.0
7-17	0300		32			28			30.0	40.0
7-17	0400			32			32		32.0	404.5
7-17	0500	29			28				28.5	39.5
7-17	0600		34			33			33.5	39.0
7-17	0700			30			31		30.5	39.5
7-17	0800		35			36			35.5	39.5

DATE	TIME	#1	#2	#3	#4	#5	#6	#7	AVERAGE	AGITATOR DEPTH
7-17	0900	36			36				36.0.0	39.5
7-17	1000			36			36		36.0	39.5
7-17	1100		33			34			36.0	39.5
7-17	1200	35			34				34.5	39.5
7-17	1300			35			35		35.0	39.5
7-17	1400		34			36			35.0	39.5
7-17	1445	31			33				32.0	
7-17	1600		31			35			33.0	
7-17	1700			24			28		26.0	
7-17	1800	37			37				37.0	
7-17	1900		31			31			31.0	
7-17	2000			36			36		36.0	
7-17	2100	32			33				32.5	
7-17	2200		39			38			38.5	
7-17	2300			39			39		39.0	
7-18	2400		34			34			34.0	39.0
7-18	0100		35		36				35.5	38-39
7-18	0200			28			39		29.0	40.0
7-18	0300			29			31		30.0	38.5
7-18	0400	31			34				32.5	38.0
7-18	0500		33			32			32.5	40.0
7-18	0600			36			35		35.5	40.5
7-18	0700		34			34			34.0	39.0
7-18	0800	34			35				34.5	39.0
7-18	0900		35			35			35.0	38.5
7-18	1000			36			35		35.0	39.5
7-18	1100	35			34				34.5	40.0
7-18	1200		34				35		34.5	40.5
7-18	1300			34		36			35.0	40.0
7-18	1400	36			33				34.5	39.5
7-18	1500		35			35			35.0	39.5
7-18	1600			35			36		35.5	
7-18	1700	25			26				35.5	
7-18	1800		36			38			37.0	
7-18	1900			38			37		37.5	
7-18	2000	36			32				34.0	
7-18	2100		37			36			36.5	
7-18	2200			39			38		38.5	
7-18	2300	37			37				37.0	
7-19	0000			35			36		35.5	39.6
7-19	0100			35			35		35.0	39.0
7-19	0200	35			35				35.0	39.6
7-19	0300			36			35		35.5	39.0
7-19	0400			36			35		35.5	38.5
7-19	0500	35			35				35.0	39.3
7-19	0600	36			36				36.0	40.2
7-19	0700			36			35		35.5	40.0
7-19	0800		36			36			36.0	39.0
7-19	0900	34			34				34.0	39.5

DATE	TIME	#1	#2	#3	#4	#5	#6	#7	AVERAGE	AGITATOR DEPTH
7-19	1000			36			36		36.0	39.0
7-19	1100		34			35			34.5	40.0
7-19	1200	34			34				34.0	40.5
7-19	1300			36			35		35.5	40.0
7-19	1400		36			35			35.5	39.5
7-19	1500			36			36		36.0	38.5
7-19	1600	39			39				39.0	
7-19	1700		36			38			37.0	
7-19	1800			37			35		36.0	
7-19	1900	37			37				37.0	
7-19	2000		36			36			36.0	
7-19	2100			36			35		35.5	
7-19	2200	34			32				33.0	
7-19	2300		40			38			39.0	
7-19	2400	35			35				35.0	39.7
7-20	0100			34			35		34.5	39.0
7-20	0200			35			35		35.0	40.0
7-20	0300			34			35		35.0	38.7
7-20	0500		34			33			33.5	40.5
7-20	0600	35			34				34.5	39.0
7-20	0700			35			35		35.0	38.8
7-20	0800		36			36			36.0	40.0
7-20	0900	36			36				36.0	40.0
7-20	1000			36			35		35.5	39.5
7-20	1100		36			36			36.0	39.5
7-20	1200	36			36				36.0	38.5
7-20	1300			36			35		35.5	39.0
7-20	1400		35			35			35.0	39.5
7-20	1500	36			34				35.0	40.5
7-20	1600		36			36			36.0	40.5
7-20	1700			35			39		37.0	40.5
7-20	1800	37			38				37.5	40.5
7-20	1900		39			39			39.0	40.5
7-20	2000			40			39		39.5	40.5
7-20	2400		34			34			34.0	39.7
7-21	100		33			34			33.5	38.5
7-21	200		32			33			32.5	40.0
7-21	300		33			34			33.5	40.4
7-21	400			35			35		35.0	39.3
7-21	500			35			36		35.5	40.5
7-21	600			35			35		35.0	40.0
7-21	700			35			35		35.0	39.6
7-21	800	35			36				35.5	40.0
7-21	900		36			36			36.0	40.5
7-21	1000			36			35		35.5	39.5
7-21	1100	36			36				36.0	39.0
7-21	1200		36			35			35.5	38.5
7-21	1300			36			36		36.0	39.5
7-21	1400	35			36				35.5	40.5

DATE	TIME	#1	#2	#3	#4	#5	#6	#7	AVERAGE	AGITATOR DEPTH
7-21	1500		35			36			35.5	39.5
7-21	1600			34			36		35.0	
7-21	1700	38			36				37.0	
7-21	1800		32			38			35.0	
7-21	1900			39			39		39.0	
7-21	2000	37			38				37.5	
7-21	2100		38			38			38.0	
7-21	2200			37			38		37.5	
7-21	2300	37			36				36.5	
7-21	2400			37			36		36.5	38.6
7-21	100		35			35			35.0	39.2
7-22	200	36			36				36.0	40.2
7-22	300		33			34			33.5	39.0
7-22	400			35			35		35.0	40.2
7-22	500			35			35		35.0	40.2
7-22	600		35			35			35.0	40.1
7-22	700		35			35			35.0	39.0
7-22	800	36			35				35.5	39.5
7-22	900			35			34		34.5	40.0
7-22	1000			36			35		35.5	40.5
7-22	1100		37			38			37.5	40.5
7-22	1200	36			38				37.0	39.0
7-22	1300			37			39		38.0	39.0
7-22	1400		38			38			38.0	39.5
7-22	1500	37			37				37.0	39.0
7-22	1600		42			42			42.0	40.0
7-22	1700			43			42		42.0	39.0
7-22	1800	27			35				36.0	40.5
7-22	1900		35			35			35.0	38.5
7-22	2000			40			37		38.5	40.0
7-22	2100	38			38				38.0	
7-22	2200		38			37			38.0	
7-22	2300			41			39		40.0	
7-22	2400	36			36				36.0	38.8
7-23	100		38			38			38.0	40.0
7-23	200		37			37			37.0	38.6
7-23	300			37			37		37.0	38.5
7-23	500	34			36				35.0	40.6
7-23	600	35			35				35.5	38.6
7-23	700	35			35				35.0	40.5
7-23	800		38			38			38.0	38.5
7-23	900			38			39		38.5	40.0
7-23	1000	38			37				37.5	40.5
7-23	1100		38			37			37.5	39.5
7-23	1200			37			37		37.0	40.5
7-23	1300	38			38				38.0	38.5
7-23	1400		37			37			37.0	40.0
7-23	1500			38			38		38.0	39.0
7-23	1600	38			39				38.5	39.0

DATE	TIME	#1	#2	#3	#4	#5	#6	#7	AVERAGE	AGITATOR DEPTH
7-23	1700		40			38			39.0	39.5
7-23	1800			41			40		40.5	40.0
7-23	1900	38			40				39.0	39.0
7-23	2000		39			40			39.5	40.0
7-23	2100			37			41		39.0	40.0
7-23	2200	39			40				39.5	40.0
7-23	2300		42			40			41.0	40.0
7-23	2400	36			35				25.5	39.8
7-24	100	35			35				35.0	39.4
7-24	200	36			36				36.0	39.8
7-24	300		35			37			36.0	39.5
7-24	400			39			39		39.0	39.0
7-24	500	26			35				35.5	40.2
7-24	600	36			37				36.5	38.8
7-24	700		38			38			38.0	40.6
7-24	800			39			39		39.0	39.0
7-24	900	39			38				38.5	40.0
7-24	1000		39				39		39.0	39.5
7-24	1100			39			37		38.0	40.5
7-24	1200	38			37				37.5	40.5
7-24	1300		41			41			41.0	40.5
7-24	1400			40			39		39.5	40.5
7-24	1500	40			39				39.5	
7-24	1600		44			45			44.5	
7-24	1700			46			46		46.0	
7-24	1800	42			43				42.5	
7-24	1900		42			44			43.0	
7-24	2000			46			45		45.5	
7-24	2100	41			42				41.5	
7-24	2200		43			44			43.5	
7-24	2300			44			44		44.0	
7-24	2400			35			35		35.0	40.6
7-25	100		40			40			40.0	40.6
7-25	200	37			38				37.5	40.6
7-25	300			36			36		36.0	40.6
7-25	400		41			39			40.0	40.6
7-25	500	38			36				37.0	40.6
7-25	600	38			36				37.0	40.6
7-25	700	36			36				36.0	40.6
7-25	800			40			40		40.0	40.6
7-25	900		39			40			39.5	40.6
7-25	1000	38			39				38.5	40.6
7-25	1100			40			39		39.5	40.6

START HIAWATHA

7-25	1200		38			39			38.5	40.0
7-25	1300	37			37				37.0	40.2
7-25	1400			34			34		34.0	39.5

DATE	TIME	#1	#2	#3	#4	#5	#6	#7	AVERAGE	AGITATOR DEPTH
7-25	1500		36			36			36.0	40.0
7-25	1600	34			36				35.0	39.5
7-25	1700		37			38			37.5	39.0
7-25	1800			37			35		36.0	40.0
7-25	1900	36			38				37.0	39.0
7-25	2000		38			39			38.5	40.0
7-25	2100			37			36		37.0	38.5
7-25	2200	35			37				36.0	40.5
7-25	2300		34			35			34.5	39.0
7-25	2400			36			36		36.0	39.5
7-26	100	35			35				35.0	40.4
7-26	200			37			36		36.5	39.5
7-26	300			36			36		36.0	40.0
7-26	400			37			38		37.5	40.5
7-26	500		37			35			36.0	39.8
7-26	600	35			35				35.0	40.2
7-26	700			35			34		34.5	39.8
7-26	800		38			38			38.0	38.5
7-26	900	37			36				36.5	40.5
7-26	1000			40			38		39.0	38.5
7-26	1100		38			37			37.5	39.5
7-26	1200	37			38				37.5	40.5
7-26	1300	SHUTDOWN								
7-26	1400		38			37			37.5	39.5
7-26	1500			36			35		36.0	40.0
7-26	1600	37			38				37.5	37.5
7-26	1700		37			35			36.0	39.0
7-26	1800			38			37		37.5	39.0
7-26	1900	38			39				38.5	39.0
7-26	2000		39			39			39.0	39.0
7-26	2100			35			33		34.0	39.0
7-26	2200	36			36				39.0	
7-26	2300		36			34			35.0	39.5
7-27	0000	35			35				35.0	40.0
7-27	100			37			37		37.0	39.0
7-27	200		38			38			38.0	38.5
7-27	300	37			36				36.5	39.5
7-27	400			37			37		37.0	39.5
7-27	500		37			37			37.0	40.5
7-27	600	36			37				36.5	40.5
7-27	700			37			36		36.5	39.5
7-27	800		34			35			34.5	40.2
7-27	900			36			37		36.5	38.7
7-27	1000		37			37			37.0	40.0
7-27	1100	36			36				36.0	39.8
7-27	1200		36			36			36.0	39.5
7-27	1300		36			36			36.0	40.5
7-27	1400			37			35		36.0	38.7
7-27	1500	36			36				36.0	40.2

DATE	TIME	#1	#2	#3	#4	#5	#6	#7	AVERAGE	AGITATOR DEPTH
7-27	1600		39			39			39.0	38.5
7-27	1700			40			40		40.0	40.5
7-27	1800	39			39				39.0	39.0
7-27	1900		38			38			38.0	40.0
7-27	2000			41			39		40.0	39.5
7-27	2200		38			39			38.5	40.0
7-27	2300			39			38		38.5	40.0
7-28	0000		37			37			37.0	40.0
7-28	100	36			37				36.5	39.5
7-28	200			38			38		38.0	39.0
7-28	300		37			38			37.5	39.0
7-28	400	37			37				37.0	38.5
7-28	500			37			37		37.0	39.0
7-28	600		36			37			36.5	38.5
7-28	700	36			36				36.0	39.0
7-28	800			34			34		34.0	38.2
7-28	900		36			35			35.5	39.2
7-28	1030			36			36		36.0	40.6
7-28	1100			35			36		35.5	39.0
7-28	1200	36			35				36.0	38.8
7-28	1300	34			34				34.0	38.8
7-28	1400	35			35				35.0	39.5
7-28	1500			33			33		33.0	39.2
7-28	1600		36			35			35.5	39.0
7-28	1700	36			34				35.9	40.0
7-28	1800			38			39		38.5	40.5
7-28	1900		38			37			37.5	40.0
7-28	2000	37			39				38.0	40.0
7-28	2100		35			34			34.5	40.0
7-28	2200			36			35		35.5	40.0
7-28	2300	38			34				36.5	39.0

TABLE E-2
FIRETEST DATA

DATE	TIME	INSERT TIME	POKE HOLE NUMBER							AVERAGE (IN)
			RD #1	RD #2	RD #3	RD #4	RD #5	RD #6	RD #7	
7-15	1100	5	9	13	16	9	C 13	18	C 12	12.86
7-15	1200	5	C 12	16	17	17	12	16	19	15.57
7-15	1400	5	23	14	H 14	18	C 17	23	16	17.86
7-15	1600	3	22	12	12	21	21	15	9	16.0
7-15	1800	3	12	13	14	17	10	17	9	13.14
7-15	2000	3	13	17	12	11	8	8	10	11.29
7-15	2200	3	15	17	8	9	15	15	9	12.57
7-16	000	2	4	6	8	11	19	12	17	11.00
7-16	200	2	3	12	17	17	15	12	13	12.70
7-16	400	2	13	11	14	16	10	23	7	13.40
7-16	600	3	7	6	6	8	10	20	9	9.40
7-16	800	3	22			17	17		6	11.80
7-16	900	2	11		17			7		11.70
7-16	1000	2	11	13	12	12	7	7	7	9.86
7-16	1200	2	3	15	D 3	7	4	4	8	6.29
7-16	1400	2	16	12	12	12	C 11	13	10	12.29
7-16	1600	2	9	15	17	11	6	10	0	9.71
7-16	1800	2	13	17	19	15	6	8	4	11.71
7-16	2000	2	19	32	D 29	14	8	12	6	17.14
7-16	2200	2	25	31	14	18	12	13	14	18.14
7-17	0000	2	33	41	17	41	D 26	D 13	35	29.40
7-17	200	2	39	19	25	13	14	13	10	19.00
7-17	400	2	40	38	13	15	14	22	13	22.14
7-17	600	2	40	24	D 11	27	20	20	32	24.90
7-17	800	2	14	C 23	23	26	18	11	33	21.14
7-17	1000	2	11	D 14	D 13	12	12	D 0	6	11.33
7-17	1200	2	12	D 10	0	0	9	14	0	11.25
7-17	1400	2	10	9	D 26	11	3	4	9	10.29
7-17	1600	2	8	13	12	9	4	10	7	9.00
7-17	1800	2	8	5	5	D 7	4	1	10	5.71
7-17	2000	2	4	D 4	D 11	D 8	2	8	6	6.14
7-17	2200	2	5	D 11	13	D 8	2	7	7	7.71
7-18	0000	2	C 9	D 10	D 10	D 4	4	6	6	7.30

START SUFCO

7-18	200	2	C 9	D 10	D 8	D 5	D 5	C 6	5	6.90
7-18	400	2	6	D 8	H 7	D 11	6	8	D 8	7.70
7-18	600	2-3	5	3	3	12	9	6	8	
7-18	800	2	7	12	14	7	6	7	11	9.10
7-18	1000	2	9	14	12	6	9	8	6	9.10
7-18	1200	3	C 10	2	10	C 10	15	8	8	9.00
7-18	1400	3	4	13	23	14	D 10	7	0	11.83

DATE	TIME	INSERT TIME	POKE HOLE NUMBER									AVERAGE (IN)					
			RD #1	RD #2	RD #3	RD #4	RD #5	RD #6	RD #7								
7-18	1600	3-4		14	C	11		5		19	C	14	C	12		13	12.57
7-18	1800	3-4		9		8		13		12		6		9		5	8.86
7-18	2000	3-4		10		8		11		9		10		10		9	9.57
7-18	2200	3-4		9		6		9		4		12		12		15	9.57
7-19	0000	3-4		9		9		10		12		8		9		13	10.00
7-19	200	3-4	C	5		7		7		24		7	C	6		7	9.00
7-19	400	3-4		3		8		9		12		12		12		13	9.90
7-19	600	3-4	C	2		5		10		10		9		11		8	7.90
7-19	800	3-4		12		6		13		12		9		9		10	10.10
7-19	1000	4		8		19		19		19		12		19		11	10.10
7-19	1200	4		10		8		5		9		12		9		14	9.60
7-19	1400	4		12		12		11		12		8		9		9	10.40
7-19	1600	4		10		10		12		9		9		8		16	10.60
7-19	1800	4		12		11		13		10		6		12		12	10.90
7-19	2000	4		12		13		8		9		8		12		16	11.14
7-19	2200	4		11		9		11		10		11		14		16	11.71
7-20	0000	3		13		8		13		12		6		12		30	13.40
7-20	200	4		13		11		13		16		6		13		16	12.60
7-20	400	4		11		13		19		9		9		17		27	15.00
7-20	600	4		13		13		17		12		11		13		13	13.10
7-20	800	4	C	11	C	8	C	8		15	C	13	C	10		14	11.30
7-20	1000	4		16		15		8		17		11		17	D	9	13.30
7-20	1200	4		13	C	12		8		12	C	9		14		16	12.00
7-20	1400	4		13		6		10		10		12		11		6	9.70
7-20	1600	4		13		15		14		13		11		15		12	13.29
7-20	1800	4		13		10		11		12		8		10		20	12.00
7-20	2000	4		11	C	17		14		11		12		17		14	13.71
7-20	2200	4		9		9		16		7		14		6		13	10.57
7-20	2400	3-4		11		15		12		9		11	D	14		12	12.00
7-21	200	3-4		12		14		12		12		10		18		33	15.90
7-21	400	3-4		16		14		12		16		19		10		7	13.40
7-21	600	3-4		10		11		13		8		13		12		23	13.00
7-21	800	4		14		9		9		15		23		13		13	13.70
7-21	1000	4		11		8		6		18		7		12		21	11.86
7-21	1200	4		12		12		6		12		11		14		14	11.57
7-21	1400	4		7		6		13		15		11		12		13	11.00
7-21	1600	4		11		13		7		7		10		9		19	10.85
7-21	1800	4		8		12		11		12		11		10		13	11.00
7-21	2000	4		9		9		7		10		7		7		13	8.86
7-21	2200	4		6		11		6		9		13		7	D	14	9.43
7-21	2400	3		7		6		9		14		16		13	D	5	10.00
7-22	200	3		13		6		10		9		6		12		11	9.60
7-22	400	3		13		11		14		11		9		10		30	14.00
7-22	600	3		16		10		8		7		13		10		9	10.40
7-22	800	3		11		6		9		14		15		20	D	9	12.00
7-22	1000	3		11		7	D	14		11		15		13		16	12.40

DATE	TIME	INSERT TIME	POKE HOLE NUMBER							AVERAGE (IN)
			RD #1	RD #2	RD #3	RD #4	RD #5	RD #6	RD #7	

START INDIANHEAD

7-22	1200	3		19	C	7		23	11	13	C	11		13	13.86		
7-22	1400	4		7	C	15		13	11	7	D	10	D	11	10.57		
7-22	1600	4		14		11		12	9	6	D	7		23	11.71		
7-22	1800	4		11		10		10	13	13	D	14		11	11.71		
7-22	2000	4-5		9		8		10	5	8		28		12	11.43		
7-22	2200	5	C	9		9		7	10	12		9		31	12.43		
7-22	2400	4-5		11	C	6		16	8	8		7		17	10.40		
7-23	200	4-5		12		7		4	5	4		11		11	7.70		
7-23	400	4		8	C	5		7	4	3		9		3	5.60		
7-23	600	5		11		7		5	8	14		10		8	9.00		
7-23	800	5	C	10		8		6	11	D	9	13		6	9.00		
7-23	1040	5		7		21		13	11	12		10		16	12.86		
7-23	1200	5		13		14	D	6	6	5		18		24	12.29		
7-23	1400	5		13		11		5	14	8		11	D	24	12.19		
7-23	1600	5		13		7		4	12	13		7		6	8.86		
7-23	1800	5	C	3		7	C	0	12	11		8		13	7.71		
7-23	2000	5		7		14		11	12	15		4		12	10.71		
7-23	2200	5		11		9		7	10	17	D	7		11	10.29		
7-24	0000	4		10		9		11	14	D	7	C	11	2	9.10		
7-24	200	4	C	10		8	C	9	D	6	C	17		11	10.29		
7-24	400	4		11	C	11		11	16	9		7		14	11.29		
7-24	600	4	D	16		11	C	11	C	8	C	12		9	20	12.43	
7-24	800	5	C	9		8		12	C	20	D	9	C	10	28	13.71	
7-24	1000	5	C	8		3		17	D	13		8	C	5	10	9.14	
7-24	1200	5	C	16	C	14		4	D	11	D	10	C	23	5	11.86	
7-24	1400	5		10	C	9		6		9	C	8		15	18	10.71	
7-24	1600	5	C	10	C	10		8		6		20		29	D	12	13.57
7-24	1800	5	C	7	C	8		13	D	12	C	13		19	D	13	12.14
7-24	2000	5		10		9		9		13		10		8	13	10.29	
7-24	2200	5		11	D	16		3		14		3		26	D	11	12.00
7-25	0000	4	D	16	D	5	D	5	C	5		16		20	D	5	10.28
7-25	200	4	D	18	D	12	C	10	C	12		22		13	C	12	14.14
7-25	400	4	D	17	D	10	C	9		6	C	10		9	C	9	10.00
7-25	600	4	D	9	D	7	C	11		9		18	D	10	C	15	11.29
7-25	800	5		18		27	C	13	C	15		11		17		15	16.57
7-25	1000	5	C	18		7		16		13		18	D	16		12	14.29

START HIAWATHA

7-25	1200	5	C	5		7		13	C	10		15		13	C	9	10.29
7-25	1400	5	C	11		10		7		12		14	H	11	C	13	11.14
7-25	1600	5		10	D	13		8		7	D	12		5	C	7	8.86
7-25	1800	4		20		23		12		9	D	5		13		15	13.85
7-25	2000	4		22		14		2		10		4		17	D	16	12.14
7-25	2200	3		8		6	D	9		15		9		9		13	9.86
7-25	2400	3		6		26	D	36		16		8		11		4	15.29
7-26	200	3		8		8		38		20		18		23		2	16.71

DATE	TIME	INSERT TIME	POKE HOLE NUMBER									AVERAGE (IN)				
			RD #1	RD #2	RD #3	RD #4	RD #5	RD #6	RD #7							
7-26	400	3	32	43		23	D	13	13	D	0	14	19.71			
7-26	600	3	40	17	D	6		15	15		25	C	5	17.57		
7-26	800	3	36	32	D	8		11	27		16		11	20.14		
7-26	1000	3	15	C	7		15	12	25		36		14	17.71		
7-26	1200	3	9		13		16	18	30		13		23	17.43		
7-26	1400	3	15		18		14	12	13		7		16	13.57		
7-26	1600	3	13		9		16	15	12		17		16	14.00		
7-26	1800	3	12		7		7	10	11		13		13	10.43		
7-26	2000	3	7		6		6	7	2		4		4	5.14		
7-26	2200	3	11		10	D	12	8	10		13		23	12.43		
7-27	0000	3	14		11		6	5	1		7		18	8.86		
7-27	200	3	12		5		12	19	24		12		28	16.00		
7-27	400	3	23		11		12	22	9		10		27	16.29		
7-27	600	3	8		11		9	30	22		9		9	14.00		
7-27	800	3	13		19		22	D	22		15	D	19	17.00		
7-27	1000	3	D	7	D	0	18	8	D	5	8		7	7.57		
7-27	1200	3		20		24	11	12		0	8		3	11.14		
7-27	1400	3		3		4	7	2		2	14		7	5.57		
7-27	1600	2.5		12		13	8	6		4	6		13	8.86		
7-27	1800	2.5		9		8	13	12	15	D	8		8	10.43		
7-27	2000	2.5		8		10	11	C	0		6		4	6.43		
7-27	2200	2.5		17		6	12		4		6		15	9.86		
7-28	0000	2		15		13	19	8	18	H	16		13	14.57		
7-28	200	2		22		17	17	11	12	H	20		14	16.14		
7-28	400	2		24		22	D	23	D	19	D	14	30	36	24.00	
7-28	600	2		20	D	18	D	25	H	28	D	8	20	H	36	22.14
7-28	800	2		13	D	14		14	29		11	13	20		16.29	
7-28	1030	2		13		9		31	14	21	9		12		15.57	
7-28	1200	2		9		3	H	7	10	15	24		4		10.29	
7-28	1400	2		8		22		27	21	11	7		5		14.43	
7-28	1800	2		15		24		10	16	16	13		10		14.86	
7-28	2000	2		8		10		2	13	10	8		14		9.29	
7-28	2200	2		3		8		10	D	10	11		7		12	8.71

TABLE E-3

OPERATOR LOGGED DATA I

DATE	TIME	AGITATOR WATER FLOW	JACKET WATER IN			JACKET WATER OUT		STEAM				
			FLOW	METER TOTAL	HOURLY USAGE	METER TOTAL	HOURLY USAGE	REG. INLET PRESSURE	REGULATED PRESSURE	TEMP	ORIFICE DELTA P	VALVE POSIT
7-15	930	3.0	3.0	34467	000	16189	000	88	39.0	280	6.0	13
7-15	1030	3.0	3.0	34470	300	16218	290	82	39.5	285	0	0
7-15	1130	3.0	11.0	34474	400	16258	400	82	40.0	285	2.0	6
7-15	1230	3.0	11.0	34481	700	16311	530	88	40.0	285	2.5	15
7-15	1330	3.0	11.0	34487	600	16362	510	86	39.5	285	1.0	4
7-15	1430	3.0	11.0	34493	600	16420	580	86	40.0	285	2.5	15
7-15	1530	3.0	11.0	34498	500	16469	490	85	39.5	285	2.5	8
7-15	1630	3.0	11.0	34505	700	16523	540	85	39.5	285	2.5	8
7-15	1730	3.0	11.0	23411	600	16583	600	85	39.5	385	4.0	12
7-15	1830	3.5	13.0	34517	600	16634	510	85	39.5	285	2.0	10
7-15	1930	3.5	13.0	34524	700	16697	630	80	39.5	285	0	6
7-15	2030	3.5	15.0	34531	700	16763	660	85	39.5	285	4.5	16
7-15	2130	3.5	15.0	34540	900	16846	830	85	39.5	285	5.0	14
7-15	2230	3.5	15.0	34549	900	16924	780	85	40.0	285	5.0	12
7-15	2330	3.5	18.0	34550	1000	17007	830	90	39.5	285	5.0	18
7-16	0030	3.5	18.0	34569	1000	17097	900	90	39.0	285	5.0	18
7-16	0130	3.5	18.0	34579	1000	17197	1000	90	39.5	282	4.0	15
7-16	0230	3.5	18.0	34590	1100	17289	920	90	39.5	282	4.0	17
7-16	0330	3.5	20.0	34600	1000	17383	940	88	39.4	85	3.5	16
7-16	0430	3.5	20.0	34612	1200	17485	1020	88	39.5	282	5.0	20
7-16	0530	3.5	15.0	34623	1100	17581	960	88	39.5	285	2.0	12
7-16	0630	2.5	15.0	34631	800	17667	860	88	39.5	285	3.0	12
7-16	0730	3.0	18.0	34641	1000	17758	910	88	40.0	285	1.0	5
7-16	0830	3.0	20.0	34652	1100	17855	970	86	40.0	285	5.0	13
7-16	0930	3.0	20.0	34662	1000	17952	970	85	40.0	285	5.0	17
7-16	1030	3.0	20.0	34674	1200	18060	1080	84	40.0	285	4.0	20
7-16	1130	3.0	20.0	34685	1100	18171	1110	84	40.0	285	3.0	22
7-16	1230	3.0	20.0	34697	1202	18278	1070	85	39.5	285	3.0	22
7-16	1330	3.0	20.0	34709	1200	18391	1130	82	40.0	285	4.0	22
7-16	1430	3.0	20.0	34720	1100	18499	1080	84	40.0	285	4.0	24
7-16	1530	3.0	20.0	34732	1200	18612	1130	83	40.0	285	4.0	28
7-16	1630	3.0	20.0	34744	1200	18726	1140	83	39.5	285	2.2	22
7-16	1730	3.0	20.0	34756	1200	18841	1150	83	39.5	285	4.5	26
7-16	1830	3.0	20.0	34767	1100	18952	1110	82	39.5	285	3.0	22
7-16	1930	3.0	20.0	34778	1100	19056	1040	82	39.5	285	1.0	28
7-16	2030	3.0	20.0	34790	1200	19176	1200	81	39.5	285	1.0	26
7-16	2130	3.0	20.0	34802	1200	19289	1130	82	39.5	285	1.5	29
7-16	2230	3.0	20.0	34814	1200	19406	1170	82	39.5	285	5.0	28
7-16	2330	3.0	20.0	34826	1202	19527	1210	84	39.5	290	2.5	30
7-17	0030	3.0	20.0	34838	1200	19638	1110	84	39.0	285	1.0	28
7-17	0130	3.0	20.0	34850	1200	19745	1070	84	39.0	290	1.0	28
7-17	0230	3.0	20.0	34861	1100	19867	1220	82	39.0	287	1.0	28
7-17	0330	3.0	20.0	34873	1200	19976	1090	84	39.5	290	3.0	29
7-17	0430	3.0	20.0	34885	1200	20100	1240	84	39.0	287	3.0	27

DATE	TIME	AGITATOR WATER FLOW	JACKET WATER IN			JACKET WATER OUT		STEAM				
			FLOW	METER TOTAL	HOURLY USAGE	METER TOTAL	HOURLY USAGE	REG. INLET PRESSURE	REGULATED PRESSURE	TEMP	ORIFICE DELTA P	POSIT
7-17	0530	3.0	20.0	34897	1200	20216	1160	84	39.5	290	3.0	28
7-17	0630	3.0	20.0	34909	1200	20332	1160	84	39.0	290	2.0	26
7-17	0730	3.0	21.0	34921	1200	20455	1230	84	39.5	290	2.5	30
7-17	0830	3.0	20.0	34934	1300	20573	1180	84	39.5	290	3.0	28
7-17	0930	3.0	20.0	34945	1100	20675	1020	83	39.5	290	3.0	26
7-17	1030	3.0	21.0	34957	1200	20796	1210	83	40.0	290	3.5	26
7-17	1130	3.0	21.0	34968	1100	20899	1030	84	40.0	290	3.0	20
7-17	1230	SYSTEM SHUTDOWN										
7-17	1330	3.0	21.0	34992	2400	21124	2250	90	39.5	285	5.0	17
7-17	1430	3.0	21.0	35003	1100	21231	1070	86	39.5	285	5.0	15
7-17	1530	3.0	21.0	35015	1200	21344	1130	85	39.5	285	5.0	8
7-17	1630	3.0	23.0	35027	1200	21445	1010	80	39.5	285	2.5	10
7-17	1730	3.0	25.0	35040	1300	21565	1200	90	39.5	285	4.0	12
7-17	1830	3.0	25.0	35055	1500	21705	1400	82	39.5	285	3.0	20
7-17	1930	3.0	25.0	35071	1600	21854	1490	85	39.5	285	2.0	24
7-17	2030	3.0	25.0	35085	1400	21986	1320	80	39.5	285	2.0	18
7-17	2130	3.0	25.0	35101	1600	22135	1490	83	39.5	285	4.0	16
7-17	2230	3.0	25.0	335115	1400	22272	1370	83	39.5	285	5.0	14
7-17	2330	3.0	25.0	35130	1500	22413	1410	84	39.5	285	2.0	20
7-18	0030	3.0	25.0	35145	1500	22554	1410	85	39.0	285	2.0	18

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7-18	0130	3.0	25.0	35161	1600	22704	1500	85	39.0	285	1.0	22
7-18	0230	3.0	25.0	35175	1400	22835	1310	85	39.0	285	2.0	21
7-18	0330	3.0	25.0	35189	1400	22963	1280	84	39.5	290	2.5	20
7-18	0440	3.0	25.0	35206	1700	23131	1680	83	39.4	285	0.0	23
7-18	0530	3.0	25.0	35219	1300	23257	1260	84	39.5	285	2.0	22
7-18	0630	3.0	25.0	35234	1500	23395	1380	83	39.5	285	3.0	22
7-18	0730	3.0	25.0	35250	1600	23549	1540	84	39.5	285	3.0	23
7-18	0830	3.0	25.0	35266	1400	23685	1360	84	39.5	285	3.0	22
7-18	0930	3.0	25.0	35279	1500	23826	1410	85	39.5	285	2.5	24
7-18	1030	3.0	25.0	35294	1500	23970	1440	85	39.5	285	2.5	22
7-18	1130	2.0	25.0	35309	1500	24115	1450	84	39.5	290	2.5	26
7-18	1230	3.0	25.0	35324	1500	24258	1430	84	39.5	290	2.0	22
7-18	1330	3.0	20.0	35336	1200	24378	1200	85	39.5	285	2.0	22
7-18	1430	3.0	20.0	35347	1100	24491	1130	77	39.0	290	1.0	24
7-18	1530	3.0	20.0	35359	1200	24599	1080	82	39.5	285	2.5	21
7-18	1630	3.0	20.0	35370	1100	24710	1110	82	39.5	285	3.0	2
7-18	1730	3.0	20.0	35382	1200	24824	1140	84	39.5	285	2.0	24
7-18	1830	3.0	20.0	35393	1100	24934	1100	82	39.5	285	1.0	22
7-18	1930	3.0	20.0	35405	1200	25051	1170	82	39.5	285	5.0	24
7-18	2030	3.0	20.0	35417	1200	25165	1140	82	39.5	285	3.5	26
7-18	2130	3.0	20.0	35428	1100	25271	1060	85	39.5	285	5.0	24
7-18	2230	3.0	20.0	35439	1100	25385	1140	82	39.5	285	5.0	24
7-18	2330	2.5	20.0	35451	1200	25505	1200	85	39.5	285	3.0	25
7-19	0030	2.5	20.0	35463	1200	25624	1190	84	39.5	285	4.0	26
7-19	0130	2.5	20.0	35474	1100	25720	960	84	39.5	285	1.0

TIME	AGITATOR WATER FLOW	JACKET WATER IN			JACKET WATER OUT		SIFAM				
			FLOW	METER TOTAL	HOURLY USAGE	METER TOTAL	HOURLY USAGE	REG. INLET PRESSURE	REGULATED PRESSURE	TEMP	ORIFICE DELTA P	VALVE POSIT
7-19	0230	2.5	20.0	35487	1300	25840	1200	83	39.5	285	2.0	25
7-19	0330	2.5	20.0	35498	1100	25957	1170	84	39.5	285	1.0	24
7-19	0430	2.5	20.0	35509	1100	26058	1010	84	39.5	285	2.5	26
7-19	0530	2.5	20.0	35520	1100	26172	1140	83	39.5	285	2.0	24
7-19	0630	2.5	20.0	35532	1200	26283	1110	83	39.5	285	3.0	27
7-19	0730	3.0	20.0	35544	1200	26403	1200	84	39.0	290	2.0	24
7-19	0830	3.0	20.0	35555	1100	26509	1060	84	40.0	290	4.0	25
7-19	0930	3.0	20.0	35566	1100	26619	1100	84	40.0	290	4.0	24
7-19	1030	3.0	20.0	35578	1200	27629	1100	84	40.0	290	4.0	22
7-19	1130	3.0	20.0	35589	1100	26846	1170	83	39.5	290	3.5	24
7-19	1230	3.0	20.0	35601	1200	26964	1180	83	39.5	295	2.5	25
7-19	1330	3.0	20.0	35613	1200	27074	1100	84	39.4	295	2.5	23
7-19	1430	3.0	20.0	35625	1200	27193	1190	83	39.5	295	2.0	23
7-19	1530	3.0	20.0	35636	1100	27299	1060	82	39.5	285	3.0	26
7-19	1630	3.0	20.0	35647	1100	27407	1080	82	39.5	285	2.5	24
7-19	1730	3.0	20.0	35658	1100	27523	1160	83	39.5	285	3.5	26
7-19	1830	3.0	20.0	35669	1100	27621	980	82	39.5	285	2.5	24
7-19	1930	3.0	20.0	35681	1200	27740	1190	82	39.5	285	2.5	28
7-19	2030	3.0	20.0	35694	1300	27865	1250	82	39.5	285	4.0	26
7-19	2130	3.0	20.0	35705	1100	27976	1110	81	39.5	290	3.5	24
7-19	2230	3.0	20.0	35716	1100	28086	1100	82	38.5	285	4.0	24
7-19	2330	3.0	20.0	35727	1100	28196	1100	82	39.5	285	4.0	26
7-20	0030	3.0	20.0	35739	1200	28315	1190	84	39.0	285	5.0	26
7-20	0130	3.0	20.0	35751	1200	28427	1120	83	39.5	285	2.0	27
7-20	0230	3.0	20.0	35751	1200	28537	1100	84	39.5	283	5.0	27
7-20	0330	3.0	20.0	35774	1200	28654	1170	84	39.5	285	4.5	28
7-20	0430	3.0	20.0	35786	1200	28774	1200	84	39.5	285	4.0	27
7-20	0530	3.0	20.0	35797	1100	28880	1060	84	39.5	300	2.0	30
7-20	0630	3.0	20.0	35809	1200	28998	1180	83	39.5	285	3.0	25
7-20	0730	3.0	20.0	35820	1100	29113	1150	83	39.5	295	2.5	26
7-20	0830	3.0	20.0	35831	1100	29219	1060	82	39.5	295	3.0	22
7-20	0930	3.0	20.0	35843	1200	29331	1120	83	39.0	295	2.0	24
7-20	1030	3.0	20.0	35854	1100	29447	1160	83	39.5	295	3.0	24
7-20	1130	3.0	20.0	35866	1200	29556	1090	83	39.5	290	2.5	26
7-20	1230	3.0	20.0	35878	1200	29676	1200	84	39.0	295	2.0	24
7-20	1330	3.0	20.0	35889	1100	29783	1070	83	39.5	290	2.5	24
7-20	1430	3.0	20.0	35901	1200	29901	1180	83	39.5	295	3.0	23
7-20	1530	3.0	20.0	35912	1100	30007	1060	82	39.5	285	3.5	24
7-20	1630	3.0	20.0	35924	1200	30114	1070	83	39.5	285	5.0	26
7-20	1730	3.0	20.0	35935	1100	30229	1150	82	39.5	285	4.5	25
7-20	1830	3.0	20.0	35946	1100	30345	1160	83	39.5	285	4.5	24
7-20	1930	3.0	20.0	35957	1100	30460	1150	82	39.5	285	3.0	26
7-20	2030	3.0	20.0	35969	1200	30575	1150	82	39.5	285	2.5	28
7-20	2130	3.0	20.0	35980	1100	30685	1100	83	39.5	285	2.5	28
7-20	2230	3.0	20.0	35992	1200	30796	1110	82	39.5	285	2.5	28
7-20	2330	3.0	20.0	36003	1100	30914	1180	84	39.5	290	3.0	27
7-21	0030	3.0	20.0	36015	1200	31030	1160	84	39.0	290	1.5	29
7-21	0130	3.0	20.0	36026	1100	31139	1090	83	39.5	290	2.0	25

DATE	TIME	AGITATOR WATER FLOW	JACKET WATER IN			JACKET WATER OUT		STEAM					E POSIT
			FLOW	METER TOTAL	HOURLY USAGE	METER TOTAL	HOURLY USAGE	REG. INLET PRESSURE	REGULATED PRESSURE	TEMP	ORIFICE DELTA P		
7-21	0230	3.0	20.0	36038	1200	31254	1150	84	39.0	295	3.0	27	
7-21	0330	3.0	20.0	36050	1200	31385	1310	84	39.5	290	1.0	28	
7-21	0430	3.0	20.0	36060	1000	31472	870	84	39.5	285	3.5	26	
7-21	0530	3.0	20.0	36007	1100	31577	1050	83	39.5	285	2.0	27	
7-21	0630	3.0	20.0	36083	1200	31696	1190	84	39.5	285	2.0	26	
7-21	0730	3.0	20.0	36095	1200	31817	1210	83	39.5	295	2.0	28	
7-21	0830	3.0	20.0	36107	1200	31931	1140	82	39.5	295	2.0	25	
7-21	0930	3.0	20.0	36118	1100	32043	1120	84	39.5	295	3.0	27	
7-21	1030	3.0	20.0	35130	1200	32154	1110	84	39.0	285	2.0	24	
7-21	1130	3.0	20.0	36142	1200	32272	1180	84	39.0	295	2.0	26	
7-21	1230	3.0	20.0	36152	1000	32388	1160	83	39.0	285	3.0	26	
7-21	1330	3.0	20.0	36165	1300	32504	1160	83	39.5	290	3.5	28	
7-21	1430	2.0	20.0	36176	1100	32607	1030	84	39.5	290	3.0	25	
7-21	1530	3.0	20.0	36187	1100	32718	1110	83	39.5	285	3.5	25	
7-21	1630	3.0	20.0	36198	1100	32830	1120	83	39.5	285	5.0	24	
7-21	1730	3.0	20.0	36209	1100	32941	1110	84	39.5	285	4.0	22	
7-21	1830	3.0	20.0	36221	1200	33053	1120	84	39.5	290	2.5	24	
7-21	1930	3.0	20.0	36232	1100	33167	1140	83	39.5	285	3.5	24	
7-21	2030	3.0	20.0	36244	1200	33282	1150	82	39.5	285	5.0	26	
7-21	2130	3.0	20.0	36266	1100	33500	1090	83	39.5	285	5.0	26	
7-21	2230	3.0	20.0	36266	1100	33500	1090	83	39.5	285	5.0	26	
7-21	2330	3.0	20.0	36279	1300	33622	1220	84	39.5	285	3.0	25	
7-22	0030	3.0	20.0	36291	1200	33741	1190	84	39.5	285	3.0	26	
7-22	0130	3.0	20.0	36302	1100	33850	1090	84	39.5	290	2.5	28	
7-22	0230	3.0	20.0	36313	1100	33962	1120	83	39.0	285	2.0	27	
7-22	0330	3.0	20.0	36325	1200	34071	1090	84	39.5	285	3.0	28	
7-22	0430	3.0	20.0	36336	1100	34187	1160	83	39.5	285	3.0	27	
7-22	0530	3.0	20.0	36348	1200	34309	1220	83	39.5	285	3.0	26	
7-22	0630	3.0	20.0	36358	1000	34403	940	84	39.5	290	3.5	26	
7-22	0730	3.0	20.0	36371	1100	34526	1230	84	39.5	295	3.0	28	
7-22	0830	3.0	20.0	36382	1100	34638	1120	83	39.5	295	3.0	27	
7-22	0930	3.0	20.0	36393	1100	34740	1020	83	39.0	295	2.0	25	
7-22	1030	3.0	20.0	36404	1100	34856	1160	84	40.0	290	5.0	24	
7-22	1130	3.0	20.0	36416	1200	34973	1170	85	39.5	295	4.0	26	

START INDIANHEAD

7-22	1230	3.0	20.0	36427	1100	35077	1040	84	39.5	295	3.0	22	
7-22	1330	3.0	20.0	36438	1100	35189	1120	84	40.0	290	4.0	24	
7-22	1430	3.0	20.0	36450	1200	35304	1150	84	40.0	290	3.5	22	
7-22	1530	2.5	15.0	36459	900	35391	870	82	39.5	290	3.0	24	
7-22	1630	2.5	15.0	36467	800	35474	830	82	39.5	290	3.0	24	
7-22	1730	2.5	15.0	36475	800	35558	840	82	39.5	285	4.5	26	
7-22	1830	2.0	15.0	36484	900	35644	860	82	39.5	285	4.5	26	
7-22	1930	2.0	15.0	36493	900	35730	860	82	39.5	285	5.0	26	
7-22	2030	2.0	15.0	36501	800	35810	800	82	39.5	285	4.5	28	
7-22	2130	2.0	15.0	36510	900	35891	810	82	39.5	285	5.0	28	
7-22	2230	2.0	15.0	36518	800	35982	910	82	39.5	285	3.0	28

TIME	AGITATOR WATER FLOW	JACKET WATER IN			JACKET WATER OUT		STEAM				
			FLOW	METER TOTAL	HOURLY USAGE	METER TOTAL	HOURLY USAGE	REG. INLET PRESSURE	REGULATED PRESSURE	TEMP	ORIFICE DELTA P	VALVE POSIT
7-22	2330	2.0	15.0	36526	800	36078	960	84	39.5	285	2.0	26
7-23	0030	2.0	15.0	36535	900	36151	730	84	39.5	825	3.0	26
7-23	0130	2.0	15.0	36544	900	36230	790	84	39.5	285	3.5	26
7-23	0230	2.0	15.0	36552	800	36317	870	84	39.5	285	3.0	27
7-23	0330	2.0	15.0	36561	900	36407	900	83	39.5	285	3.0	26
7-23	0430	2.0	15.0	36570	900	36486	790	84	39.5	285	2.0	26
7-23	0530	2.0	15.0	36578	800	36577	910	84	39.5	290	2.0	27
7-23	0630	2.0	15.0	36587	900	36661	840	84	39.5	285	3.0	27
7-23	0730	2.0	15.0	36597	1000	36754	930	83	40.0	290	3.0	26
7-23	0830	2.0	15.0	36605	800	36837	830	83	39.5	290	3.0	23
7-23	0930	2.0	10.0	36612	700	36903	660	84	39.5	290	3.0	22
7-23	1030	2.0	10.0	36617	500	36962	590	83	29.5	290	3.0	35
7-23	1130	2.0	10.0	36622	500	37014	520	83	39.5	290	2.0	22
7-23	1230	2.0	10.0	36628	600	37065	510	82	39.5	290	2.0	20
7-23	1330	2.0	10.0	36633	500	37116	510	84	39.5	290	2.0	20
7-23	1430	2.0	10.0	36644	600	37169	530	84	39.5	285	2.0	21
7-23	1530	2.0	10.0	36644	500	37222	530	84	39.5	285	3.0	22
7-23	1630	2.0	10.0	36649	500	37276	540	84	39.5	284	3.0	24
7-23	1730	2.0	10.0	36654	500	37329	530	84	39.5	285	2.0	26
7-23	1830	2.0	10.0	36660	600	37382	530	84	39.5	285	2.5	25
7-23	1930	2.0	10.0	36665	500	37434	520	84	39.5	285	2.5	25
7-23	2030	2.0	10.0	36671	600	37486	520	84	39.5	285	5.0	25
7-23	2130	2.0	10.0	36676	500	37542	560	84	39.5	285	5.0	25
7-23	2230	2.0	10.0	36682	600	37598	560	84	39.5	285	4.5	25
7-23	2330	2.0	10.0	36687	500	37650	530	83	39.5	282	4.0	26
7-24	0030	2.0	10.0	36693	650	37715	650	84	39.5	285	2.0	26
7-24	0130	2.0	10.0	36669	500	37762	470	83	39.5	285	2.0	26
7-24	0230	2.0	10.0	37604	600	37814	520	84	39.5	285	3.0	26
7-24	0330	2.0	10.0	36709	500	37865	510	84	39.5	285	4.5	26
7-24	0430	2.0	10.0	37615	600	37917	520	83	39.5	285	3.0	26
7-24	0530	2.0	10.0	36720	500	37970	530	84	39.5	285	3.0	26
7-24	0630	2.0	10.0	36726	600	38031	610	83	39.5	290	2.0	26
7-24	0730	2.0	10.0	36732	600	38084	530	84	39.5	295	4.0	27
7-24	0830	2.0	10.0	36737	500	38138	540	83	39.5	295	4.0	27
7-24	0930	2.0	10.0	36742	500	38194	560	83	39.5	290	3.5	27
7-24	1030	2.0	10.0	36748	500	38249	550	83	39.5	290	5.0	22
7-24	1130	2.0	10.0	37654	600	38306	570	84	39.5	285	5.0	22
7-24	1230	2.0	10.0	36759	500	38354	480	84	39.5	290	4.0	22
7-24	1330	2.0	10.0	36764	500	38411	570	84	39.5	285	3.0	24
7-24	1430	2.0	10.0	36770	600	38467	560	84	39.5	290	3.0	25
7-24	1530	2.0	10.0	36775	500	38520	530	82	39.5	285	2.5	25
7-24	1630	2.0	10.0	36780	500	38573	530	82	39.5	285	2.5	26
7-24	1730	2.0	10.0	36786	600	38630	570	82	39.5	285	2.5	26
7-24	1830	2.0	10.0	36792	600	38744	570	83	39.5	285	3.0	26
7-24	1930	2.0	10.0	36798	600	38744	570	83	39.5	285	3.5	26
7-24	2030	2.0	10.0	36804	600	38802	580	82	39.5	285	6.5	28
7-24	2130	2.0	10.0	36809	500	38854	520	82	39.5	285	4.0	27
7-24	2230	2.0	10.0	36814	500	38906	520	82	39.5	285	3.0	28

DATE	TIME	AGITATOR WATER FLOW	JACKET WATER IN			JACKET WATER OUT		STEAM				
			FLOW	METER TOTAL	HOURLY USAGE	METER TOTAL	HOURLY USAGE	REG. INLET PRESSURE	REGULATED PRESSURE	TEMP	ORIFICE DELTA P	WATER POSIT
7-24	2330	2.0	10.0	36819	500	38960	540	83	39.5	285	2.0	26
7-25	0030	2.9	10.0	36825	500	39021	610	84	39.3	285	2.5	30
7-25	0130	2.0	10.0	36830	500	39066	450	84	39.5	282	2.0	27
7-25	0230	2.0	10.0	36930	600	39126	600	85	39.3	290	2.5	28
7-25	0330	2.0	10.0	36841	500	39171	450	83	39.5	284	5.0	29
7-25	0430	2.0	10.0	36847	600	39231	600	84	39.5	290	6.0	28
7-25	0530	2.0	10.0	35852	500	39284	530	84	39.5	285	4.5	28
7-25	0630	2.0	10.0	36857	500	39337	520	84	39.2	290	2.5	28
7-25	0730	2.0	10.0	36864	700	39397	600	84	29.5	295	3.0	27
7-25	0830	2.0	10.0	36869	500	39450	530	84	39.5	295	3.0	28
7-25	0930	2.0	10.0	36874	500	39501	510	82	39.5	295	2.5	26
7-25	1030	2.0	10.0	36880	600	39554	530	83	39.5	290	3.0	28
7-25	1130	2.0	10.0	36885	500	39614	600	84	39.5	295	3.0	28

START HIAWATHA

7-25	1230	2.0	10.0	36891	600	39666	520	84	39.5	290	3.0	26
7-25	1330	2.0	10.0	36896	500	39717	510	83	39.5	285	4.0	22
7-25	1430	2.0	10.0	36902	600	39767	500	83	29.5	285	3.0	22
7-25	1530	2.0	10.0	36907	500	39820	530	83	39.5	285	3.0	22
7-25	1630	2.0	10.0	36912	500	39873	530	83	39.5	285	5.0	23
7-25	1730	2.0	10.0	36918	600	39925	520	82	39.5	285	3.0	23
7-25	1830	2.0	15.0	36925	700	39980	550	83	39.5	285	2.5	24
7-25	1930	2.0	15.0	36933	800	40062	820	83	39.5	285	2.5	25
7-25	2030	2.0	15.0	36942	900	40144	820	83	39.5	285	3.5	26
7-25	2130	2.0	15.0	36950	800	40224	800	84	39.5	285	3.5	22
7-25	2230	2.0	15.0	36958	800	40304	800	83	39.5	285	3.0	18
7-25	2330	2.0	15.0	36967	900	40287	830	83	39.5	285	31	26
7-26	0030	2.0	15.0	36975	800	40466	790	83	39.2	285	31	28
7-26	0130	2.0	15.0	36984	900	40546	800	84	60+	310	31	22
7-26	0230	2.0	15.0	36992	800	40625	790	84	60+	310	31	22
7-26	0330	2.0	15.0	37001	900	40706	810	84	60+	310	3.3	24
7-26	0430	2.0	15.0	37010	900	40790	840	83	60+	310	3.3	25
7-26	0530	2.0	15.0	37025	700	40862	720	83	60+	310	3.3	27
7-26	0630	2.0	15.0	37025	800	40940	780	83	60+	305	3.3	24
7-26	0730	2.0	15.0	37035	1000	41040	1000	84	39.5	295	4.0	28
7-26	0830	2.0	15.0	37943	800	41113	730	84	39.0	295	3.0	30
7-26	0930	2.0	15.0	37051	800	41194	810	82	39.0	295	32	27
7-26	1030	2.0	15.0	37060	900	41276	820	83	38.0	295	33	28
7-26	1130	2.0	15.0	37068	800	41357	810	82	39.0	295	32	26
7-26	1230	2.0	15.0	37076	800	41440	830	83	39.0	295	31	28
7-26	1330	2.0	15.0	37086	1000	41538	980	83	38.5	295	31	30
7-26	1430	2.0	15.0	37093	700	41604	660	83	38.5	295	31.5	30
7-26	1530	2.0	15.0	37101	800	41686	820	83	39.0	295	32.0	30
7-26	1630	2.0	15.0	37110	900	41768	820	83	39.0	295	32.0	26
7-26	1730	2.0	15.0	37118	800	41842	740	82	39.5	295	32.5	28
7-26	1830	2.0	15.0	37127	900	41927	850	82	39.5	290	31.5	28
7-26	1930	2.0	15.0	37136	900	42012	850	83	39.5	290	31.5	28

DATE	TIME	AGITATOR WATER FLOW	JACKET WATER IN			JACKET WATER OUT		STEAM				
			FLOW	METER TOTAL	HOURLY USAGE	METER TOTAL	HOURLY USAGE	REG. INLET PRESSURE	REGULATED PRESSURE	TEMP	ORIFICE DELTA P	VALVE POSIT
7-26	2030	2.0	15.0	37144	800	42092	800	82	39.5	290	31.5	28
7-26	2130	2.0	15.0	37152	800	42251	810	82	39.5	290	32	30
7-26	2230	2.0	15.0	37160	800	42251	780	82	39.5	290	32	30
7-26	2330	2.0	15.0	37169	900	42334	830	83	39.0	295	31	31
7-27	0030	2.0	15.0	37177	800	42417	830	83	39	290	31.5	30
7-27	0130	2.0	15.0	37185	800	42500	830	84	39	295	31	29
7-27	0230	2.0	15.0	37194	900	42576	760	83	39	295	31	30
7-27	0330	2.0	15.0	37202	800	42654	780	83	38.5	290	31.5	30
7-27	0430	2.0	15.0	37210	800	42736	820	84	38.5	295	31.5	30
7-27	0530	2.0	15.0	37227	800	42919	830	84	38.5	295	31	27
7-27	0630	2.0	15.0	37227	800	42902	830	83	39	295	32	30
7-27	0730	2.0	15.0	37235	800	42983	810	83	39.2	295	31	32
7-27	0830	2.0	15.0	37244	900	43070	870	84	39.3	282	31	24
7-27	0930	2.0	15.0	37252	800	43150	800	84	39.5	285	31	24
7-27	1030	2.0	15.0	37261	900	43224	740	84	39.5	285	31	24
7-27	1130	2.0	15.0	37269	800	43307	830	84	39.2	282	31	24
7-27	1230	2.0	15.0	37278	900	43389	820	83	39.0	282	31	25
7-27	1330	2.0	15.0	37287	900	43472	830	83	39.0	288	31	26
7-27	1430	2.0	15.0	37295	800	43544	720	82	39.5	290	31	26
7-27	1530	2.0	15.0	37303	800	43627	830	82	39.5	290	31	24
7-27	1630	2.0	15.0	37311	800	43711	840	82	39.5	290	31	24
7-27	1730	2.0	15.0	37319	800	43789	780	82	39.5	290	31	24
7-27	1830	2.0	15.0	37329	1000	43791	200*	82	39.5	290	31	23
7-27	1930	2.0	15.0	37338	900	43962	1710*	82	39.5	290	31	23
7-27	2030	2.0	15.0	37346	800	44035	730	82	39.5	290	31	26
7-27	2130	2.0	15.0	37354	800	44117	820	82	39.5	290	31	30
7-27	2230	2.0	15.0	37362	800	44195	780	82	39.5	290	31	28
7-27	2330	2.0	15.0	37371	900	44284	890	84	39	290	31	30

* Float came off lower float unit on jacket pump tank.

7-28	0030	2.0	15.0	37379	800	44358	740	84	39	295	31	28
7-28	0130	2.0	15.0	37387	800	44442	840	84	39	295	31.5	27
7-28	0230	2.0	15.0	37396	900	44523	810	84	39.5	295	32	28
7-28	0330	2.0	15.0	37404	800	44598	750	83	39.5	295	31.5	28
7-28	0430	2.0	15.0	37413	900	4461	830	83	39	290	31.5	27
7-28	0530	2.0	15.0	37421	800	44754	840	84	39	295	31.5	25
7-28	0630	2.0	15.0	37430	900	44845	800	84	39.5	290	31	27
7-28	0730	2.0	15.0	37438	800	44924	790	84	39.0	295	31	29
7-28	0830	2.0	15.0	37446	800	45006	820	84	39.5	285	31	25
7-28	0930	2.0	15.0	37455	900	45081	750	83	39.0	285	31	24
7-28	1030	2.0	15.0	37463	800	45165	840	83	39.0	282	31	26
7-28	1130	2.0	15.0	37472	900	45244	790	84	39.0	285	31	23
7-28	1230	2.0	15.0	37480	800	45324	800	84	39.0	285	31	25
7-28	1330	2.0	15.0	37489	900	45414	900	84	39.0	284	31	26
7-28	1430	2.0	15.0	37497	800	45476	620	84	39.0	285	31	24
7-28	1530	2.0	15.0	37505	800	45560	840	83	39.5	285	31	26
7-28	1630	2.0	15.0	37514	900	45644	840	82	39.5	285	31	28

DATE	TIME	AGITATOR WATER FLOW	JACKET WATER IN			JACKET WATER OUT		STEAM				
			FLOW	METER TOTAL	HOURLY USAGE	METER TOTAL	HOURLY USAGE	REG. INLET PRESSURE	REGULATED PRESSURE	TEMP	ORIFICE DELTA P	WAVE POSIT
7-28	1730	2.0	15.0	37522	800	45722	780	82	39.5	285	31	28
7-28	1830	2.0	15.0	37531	900	45803	810	82	39.5	285	31	28
7-28	1930	2.0	15.0	37539	800	45884	810	82	39.5	285	31	28
7-28	2030	2.0	15.0	37548	900	45968	840	82	39.5	285	31	26
7-28	2130	2.0	15.0	37555	700	46044	767	82	39.5	285	31	26
7-28	2230	2.0	15.0	37546	900	46123	790	84	39.5	285	31	24

TABLE E-4

OPERATOR LOGGED DATA II

DATE	TIME	AGITATOR			GRATE			SCRUBBER WATER PH	REAGENT PUMP SPEED/STROKE
		COUNTER TOTAL	SWEEPS PER HR	DRIVE SETTING	GEAR COUNTER	GEAR REVOLUTIONS RPH	DRIVE SETTING TEETH/RPD		
7-15	0930	0	0	0	0	0	0	10	0
7-15	1030	0	0	0	0	0	0	10	
7-15	1130	0	0	0	0	0	0	9	30/30
7-15	1230	2	2	-	3		1-3.0	9	30/30
7-15	1330	4	2	-	10	7	1-3.0	9	20/20
7-15	1430	11	7	0	18	8	1-4.0	9	30/30
7-15	1530	12	1	0	27	9	1-4.0	9.5	40/40
7-15	1630	13	1	0	39	12	2-4.0	9.5	40/40
7-15	1730	13	0	0	59	20	2-4.5	9.0	20/20
7-15	1830	14	1	0	77	18	2-3.5	7.5	20/20
7-15	1930	14	0	0	94	17	2-3.5	6.0	20/20
7-15	2030	15	1	0	110	16	2-2.6	5.0	20/20
7-15	2130	15	0	0	124	14	2-3.0	5.0	35/35
7-15	2230	16	1	0	140	16	2/3.5	5.0	35/35
7-15	2330	16	0	0	158	18	2-3.5	8.5	35/35
7-16	0030	16	0	0	174	16	2-3.0	8.0	25/25
7-16	0130	18	2	0	189	15	2-3.0	7.5	25/25
7-16	0230	18	0	0	203	14	2-3.0	7.5	25/25
7-16	0330	18	0	0	217	14	2-3.0	7.5	20/20
7-16	0430	20	2	0	231	14	2-3.0	7.5	20/20
7-16	0530	21	1	0	244	13	2-3.0	5.5	20/20
7-16	0630	21	0	0	268	24	2-2.6	6.5	20/20
7-16	0730	24	3	6	282	14	2-2.6	5.0	20/20
7-16	0830	30	6	6	294	12	2-2.6	5.0	20/20
7-16	0930	35	5	5	306	12	2-2.6	5.0	25/25
7-16	1030	40	5	4	319	13	2-2.6	5.0	25/35
7-16	1130	44	4	4	332	13	2-2.6	5.0	30/30
7-16	1230	49	5	4	344	12	2-2.6	5.0	30/30
7-16	1330	53	4	4	357	13	2-2.6	5.5	35/35
7-16	1430	59	6	4	369	12	2-2.6	5.5	35/35
7-16	1530	65	6	6.1	382	13	2-2.6	5.0	35/35
7-16	1630	72	7	6.0	394	12	2-2.6	5.5	45/45
7-16	1730	78	6	6.0	406	12	2-2.6	5.5	60/50
7-16	1830	83	5	6.0	418	12	2-2.6	6.0	60/50
7-16	1930	87	4	6.0	431	13	2-2.6	9.5	60/50
7-16	2030	91	4	6.0	444	13	2-3.5	6.5	50/40
7-16	2130	93	2	6.0	461	17	2-3.5	5.5	50/50
7-16	2230	94	1	6.0	480	19	2-5.5	9.0	60/50
7-16	2330	94	0	6.0	505	25	2-5.5	8.0	60/45
7-17	0030	94	0	6.0	535	30	4-5.0	8.0	40/40
7-17	0130	97	3	6.0	575	40	4-5.0	5.0	40/40

DATE	TIME	AGITATOR			GRATE			SCRUBBER WATER PH	REAGENT PUMP SPEED/STROKE
		COUNTER TOTAL	SWEEPS PER HR	DRIVE SETTING	GEAR COUNTER	GEAR REVOLUTIONS RPH	DRIVE SETTING TEETH/RPD		
7-17	0230	99	2	6.0	620	45	4-3.5	5.5	45/45
7-17	0330	99	0	6.0	654	34	4-3.5	5.5	45/45
7-17	0430	99	0	6.0	697	43	4-5.0	5.5	45/45
7-17	0530	99	0	6.0	745	48	4-5.0	5.0	60/45
7-17	0630	99	0	6.0	812	67	6-7.5	5.5	45/45
7-17	0730	101	2	6.0	927	115	6-7.6	7.0	35/35
7-17	0830	106	5	6.0	1051	124	6-9.0	5.5	35/35
7-17	0930	112	6	6.0	1178	127	6-9.0	5.5	35/35
7-17	1030	118	6	6.0	1311	133	6-8.0	5.5	35/35
7-17	1130	124	6	6.0	1419	108	6-8.0	7.0	45/45
7-17	1230	SYSTEM SHUT DOWN							
7-17	1330	129	5	5.1	1504	85	4-3.0	7.0	45/45
7-17	1430	134	5	5.1	1531	27	4-3.0	7.0	45/45
7-17	1530	115	11	5.0	1560	29	4-3.0	7.0	45/45
7-17	1630	149	5	5.0	1586	34	4-2.6	7.5	45/45
7-17	1730	154	5	5.0	1609	23	4-2.6	8.5	45/45
7-17	1830	159	5	5.0	1632	23	2-2.6	9.0	35/35
7-17	1930	165	6	5.0	1646	14	2-2.6	7.0	35/35
7-17	2030	169	4	5.0	1658	12	2-2.6	7.0	40/40
7-17	2130	175	6	5.0	1672	14	2-2.6	7.5	40/40
7-17	2230	180	5	5.0	1684	13	2-2.6	8.5	40/40
7-17	2330	185	5	5.0	1697	13	2-2.6	6.5	30/30
7-18	0030	189	4	5.0	1711	14	2-2.6	6.5	30/30
7-18	0130	196	7	5.0	1724	13	2-2.6	6.5	30/30
7-18	0230	202	6	5.0	1733	12	2-2.6	6.5	30/30
7-18	0330	207	5	5.0	1748	12	2-2.6	6.5	30/30
7-18	0430	212	5	5.0	1761	13	2-2.6	7.5	30/30
7-18	0530	216	4	5.0	1773	12	2-2.6	7.0	30/30
7-18	0630	221	5	5.0	1786	13	2-2.6	7.0	30/30
7-18	0730	226	5	5.0	1800	14	2-2.6	7.0	30/30
7-18	0830	231	5	5.0	1812	12	2-2.6	7.0	30/30
7-18	0930	236	5	5.0	1824	12	2-2.6	7.0	30/30
7-18	1030	241	5	5.0	1837	13	2-2.6	7.0	30/30
7-18	1130	246	5	5.0	1850	13	2-2.6	7.5	30/30
7-18	1230	251	5	5.0	1863	13	2-2.6	8.0	30/30
7-18	1330	256	5	5.0	1876	13	2-2.6	8.0	25/25
7-18	1430	261	5	5.0	1888	12	2-2.6	7.0	25/25
7-18	1530	266	5	5.0	1902	14	2-3.0	9.0	25/25
7-18	1630	271	5	5.0	1917	15	2-3.5	9.0	20/20
7-18	1730	276	5	5.0	1935	18	2-3.5	8.5	20/20
7-18	1830	286	5	5.0	1952	17	2-3.5	7.5	20/20
7-18	1930	286	5	5.0	1970	18	2-3.5	7.0	20/20
7-18	2030	291	5	5.0	1987	17	2-3.5	8.5	20/20
7-18	2130	296	5	5.0	2004	17	2-3.5	7.5	20/20
7-18	2230	301	5	5.0	2021	17	2-3.5	7.5	20/20

DATE	TIME	AGITATOR			GRATE			SCRUBBER WATER PH	REAGENT PUMP SPEED/STROKE
		COUNTER TOTAL	SWEEPS PER HR	DRIVE SETTING	GEAR COUNTER	GEAR REVOLUTIONS RPH	DRIVE SETTING TEETH/RPD		
7-18	2330	306	5	5.0	2039	18	2-3.5	8.5	20/20
7-19	0030	311	5	5.0	2058	19	2-3.5	7.5	15/15
7-19	0130	316	5	5.0	2073	15	2-3.5	7.5	15/15
7-19	0230	321	5	5.0	2090	17	2-3.5	7.0	15/15
7-19	0330	326	5	5.0	2203	13	2-2.6	7.0	15/15
7-19	0430	330	4	5.0	2115	12	2-3.0	7.0	15/15
7-19	0530	335	5	5.0	2130	15	2-3.0	7.0	15/15
7-19	0630	339	4	5.0	2143	13	2-2.6	7.5	15/15
7-19	0730	345	6	5.0	2157	14	2-2.6	7.0	15/15
7-19	0830	350	5	5.0	2170	13	2-2.6	7.0	15/15
7-19	0930	355	5	5.0	2183	13	2-2.6	7.0	15/15
7-19	1030	360	5	5.0	2196	13	2-2.6	7.0	15/15
7-19	1130	365	5	5.0	2209	13	2-2.6	7.0	15/15
7-19	1230	370	5	5.0	2222	13	2-2.6	7.0	15/15
7-19	1330	375	5	5.0	2235	13	2-2.6	7.0	15/15
7-19	1430	380	5	5.0	2248	13	2-2.6	7.0	15/15
7-19	1530	385	5	5.0	2260	12	2-2.6	7.0	15/15
7-19	1630	390	5	5.0	2273	13	2-2.6	7.0	15/15
7-19	1730	395	5	5.0	2286	13	2-2.6	7.0	15/15
7-19	1830	400	5	5.0	2298	12	2-2.6	7.0	15/15
7-19	1930	405	5	5.0	2311	13	2-2.6	7.0	15/15
7-19	2030	410	5	5.0	2326	15	2-2.6	7.5	15/15
7-19	2130	415	5	5.0	2338	12	2-2.6	7.5	15/15
7-19	2230	420	5	5.0	2351	13	2-2.6	7.5	15/15
7-19	2330	425	5	5.0	2363	12	2-2.6	8.5	25/25
7-20	0030	429	4	5.0	2377	14	2-2.6	8.0	15/15
7-20	0130	435	6	5.0	2389	12	2-2.6	7.5	15/15
7-20	0230	439	4	5.0	2402	13	2-2.6	7.5	15/15
7-20	0330	444	5	5.0	2415	13	2-2.6	7.5	15/15
7-20	0430	452	8	5.0	2429	14	2-3.0	7.5	15/15
7-20	0530	456	4	5.0	2443	14	2-3.0	7.5	15/15
7-20	0630	462	6	5.0	2459	16	2-3.5	7.5	15/15
7-20	0730	466	4	5.0	2477	18	2-3.5	7.0	15/15
7-20	0830	471	5	5.0	2494	17	2-3.5	7.0	15/15
7-20	0930	476	5	5.0	2512	18	2-3.5	7.0	15/15
7-20	1030	481	5	5.0	2529	17	2-4.0	7.0	15/15
7-20	1130	486	5	5.0	2549	20	2-4.0	7.0	15/15
7-20	1230	449	5	5.0	2569	20	2-4.0	6.5	15/15
7-20	1330	496	5	5.0	2589	20	2-4.0	7.0	15/15
7-20	1430	501	5	5.0	2609	20	2-3.7	7.0	15/15
7-20	1530	506	5	5.0	2624	15	2-3.7	7.0	15/15
7-20	1630	511	5	5.0	2643	19	2-4.0	7.0	15/15
7-20	1730	516	5	5.0	2663	20	2-4.0	7.0	15/15
7-20	1830	521	5	5.0	2683	20	2-4.0	7.0	15/15
7-20	1930	526	5	5.0	2703	20	2-4.0	7.0	15/15
7-20	2030	531	5	5.0	2732	29	2-4.0	7.0	15/15

DATE	TIME	AGITATOR			GRATE			SCRUBBER WATER PH	REAGENT PUMP SPEED/STROKE
		COUNTER TOTAL	SWEEPS PER HR	DRIVE SETTING	GEAR COUNTER	GEAR REVOLUTIONS RPH	DRIVE SETTING TEETH/RPD		
7-20	2130	536	5	5.0	2747	15	2-4.0	7.0	15/15
7-20	2230	541	5	5.0	2761	14	2-4.0		15/15
7-20	2330	546	5	5.0	2781	20	2-4.1	7.5	15/15
7-21	0030	554	8	5.0	2803	22	2-4.0	7.5	15/15
7-21	0130	559	5	5.0	2822	19	2-3.0	7.5	15/15
7-21	0230	566	7	5.0	2843	21	2-4.5	7.5	15/15
7-21	0330	571	5	5.0	2865	22	2-4.5	7.5	15/15
7-21	0430	576	5	5.0	2887	22	2-5.0	7.5	15/15
7-21	0530	581	5	5.0	2910	23	2-5.0	7.5	15/15
7-21	0630	586	5	5.0	2933	23	2-4.5	7.7	15/15
7-21	0730	591	5	5.0	2957	24	2-4.5	7.0	15/15
7-21	0830	596	5	5.0	2979	22	2-4.5	7.0	15/15
7-21	0930	601	5	5.0	2999	20	2-4.5	7.0	15/15
7-21	1030	606	5	5.0	3021	22	2-4.5	7.0	15/15
7-21	1130	611	5	5.0	3044	23	2-4.5	7.0	15/15
7-21	1230	615	4	5.0	3062	28	2-4.5	7.0	15/15
7-21	1330	621	6	5.0	3085	23	2-4.5	7.0	15/15
7-21	1430	625	4	5.0	3105	20	2-4.5	7.0	15/15
7-21	1530	630	5	5.0	3126	21	2-4.5	7.0	15/15
7-21	1630	635	5	5.0	3148	22	2-4.5	7.0	15/15
7-21	1730	640	5	5.0	3170	22	2-4.5	7.0	15/15
7-21	1830	645	5	5.0	3192	22	2-4.5	7.0	15/15
7-21	1930	650	5	5.0	3214	22	2-4.2	7.0	15/15
7-21	2030	655	5	5.0	3236	22	2-4.2	7.0	15/15
7-21	2130	660	5	5.0	3255	19	2-4.2	7.0	15/15
7-21	2230	665	5	5.0	3275	20	2-4.2	7.0	15/15
7-21	2330	671	6	5.0	3297	22	2-4.2	7.5	15/15
7-22	0030	675	4	5.0	3318	21	2-4.0	7.5	15/15
7-22	0130	680	5	5.0	3337	19	2-4.0	7.5	15/15
7-22	0230	686	6	5.0	3356	19	2-4.0	7.5	15/15
7-22	0330	691	5	5.0	3376	20	2-4.0	7.0	15/15
7-22	0430	696	5	5.0	3396	20	2-4.0	6.5	15/15
7-22	0530	702	6	5.0	3415	19	2-4.0	6.5	15/15
7-22	0630	706	4	5.0	3431	16	2-3.5	7.0	15/15
7-22	0730	711	5	5.0	3449	18	2-3.5	7.0	15/15
7-22	0830	716	5	5.0	3465	16	2-3.5	7.0	15/15
7-22	0930	721	5	5.0	3481	16	2-3.5	7.0	15/15
7-22	1030	726	5	5.0	3498	17	2-3.5	7.0	15/15
7-22	1130	731	5	5.0	3515	17	2-3.5	7.0	15/15
7-22	1230	736	5	5.0	3532	17	2-4.0	6.5	15/15
7-22	1330	739	3	3.1	3551	19	2-4.0	6.5	15/15
7-22	1430	742	3	3.1	3571	20	2-4.0	6.0	15/15
7-22	1530	745	3	3.1	3590	19	2-4.0	6.0	15/15
7-22	1630	748	3	3.2	3609	19	2/4.0	6.0	15/15
7-22	1730	751	3	3.1	3628	19	2-4.0	6.0	20/20
7-22	1830	754	3	3.1	3647	19	2-4.0	7.0	20/20

DATE	TIME	AGITATOR			GRATE			SCRUBBER WATER PH	REAGENT PUMP SPEED/STROKE
		COUNTER TOTAL	SWEEPS PER HR	DRIVE SETTING	GEAR COUNTER	GEAR REVOLUTIONS RPH	DRIVE SETTING TEETH/RPD		
7-22	2030	761	3	3.1	3685	18	2-4.0	7.0	20/20
7-22	2130	764	3	3.1	3704	19	2-4.0	7.0	20/20
7-22	2230	767	3	3.1	3724	20	2-4.0	7.5	20/20
7-22	2330	770	3	3.2	3741	17	2-4.0	7.0	20/20
7-23	0030	774	4	3.2	3761	20	2-3.5	7.0	20/20
7-23	0130	776	2	3.2	3778	17	2-3.5	7.0	20/20
7-23	0230	780	4	3.2	3794	16	2-2.6	7.5	20/20
7-23	0330	784	4	3.2	3807	13	2126	7.5	20/20
7-23	0430	786	2	3.2	3814	7	0	7.5	20/20
7-23	0530	790	4	3.2	3824	10	2-2.6	7.5	20/20
7-23	0630	793	3	3.2	3836	12	2-2.6	7.5	20/20
7-23	0730	796	3	3.2	3850	14	2-2.6	7.0	20/20
7-23	0830	799	3	3.2	3862	12	2-2.6	7.0	20/20
7-23	0930	802	2	3.2	3874	12	2-2.7	7.0	20/20
7-23	1030	806	4	3.2	3887	13	2-2.7	7.0	20/20
7-23	1130	809	3	3.2	3900	13	2-2.7	7.0	20/20
7-23	1230	812	3	3.2	3913	13	2-2.7	7.0	20/20
7-23	1330	815	3	3.2	3926	13	2-2.7	7.0	20/20
7-23	1430	819	4	3.2	3939	13	2-2.7	7.0	20/20
7-23	1530	822	3	3.2	3952	13	2-2.8	7.5	20/20
7-23	1630	825	3	3.2	3965	13	2-2.7	7.5	20/20
7-23	1730	829	3	3.2	3977	12	2-2.7	7.5	20/20
7-23	1830	832	3	3.2	3990	13	2-2.7	7.5	20/20
7-23	1930	835	3	3.2	3998	8	1-3.5	7.0	20/20
7-23	2030	838	3	3.2	4007	9	1-3.5	7.0	20/20
7-23	2130	841	3	3.2	4017	10	1-4.5	7.0	20/20
7-23	2230	844	3	3.2	4028	11	1-4.5	7.0	20/20
7-23	2330	848	4	3.2	4040	12	1-4.6	8.5	20/20
7-24	0030	851	3	3.2	4053	13	1-4.6	8.0	15/15
7-24	0130	854	3	3.2	4062	9	1-4.6	7.5	15/15
7-24	0230	856	2	3.2	4073	11	1-4.6	6.5	15/15
7-24	0330	860	4	3.2	4083	10	1-4.6	6.5	20/15
7-24	0430	863	3	3.2	4094	11	1-4.6	6.0	20/15
7-24	0530	866	3	3.2	4104	10	1-4.6	6.0	20/15
7-24	0630	870	4	3.2	4116	12	1-4.6	6.5	25/15
7-24	0730	873	3	3.2	4127	11	1-4.5	6.5	25/15
7-24	0830	876	3	3.2	4138	11	1-4.5	7.0	25/15
7-24	0930	880	4	3.2	4148	10	1-4.5	7.0	25/15
7-24	1030	883	3	3.2	4159	11	1-4.0	7.0	25/25
7-24	1130	883	0	-	4169	10	1-4.0	7.0	25/25
7-24	1230	883	0	-	4178	9	1-4.0	6.5	25/25
7-24	1330	883	0	-	4188	10	1-4.0	7.0	25/25
7-24	1430	883	0	-	4197	9	1-3.5	7.0	25/25
7-24	1530	883	0	-	4205	8	1-3.5	7.0	25/25
7-24	1630	883	0	-	4214	9	1-3.5	7.0	25/25
7-24	1730	883	0	-	4225	11	1-4.5	7.0	25/25

DATE	TIME	AGITATOR			GRATE			SCRUBBER WATER PH	REAGENT PUMP SPEED/STROKE
		COUNTER TOTAL	SWEEPS PER HR	DRIVE SETTING	GEAR COUNTER	GEAR REVOLUTIONS RPH	DRIVE SETTING TEETH/RPD		
7-24	1830	883	0	-	4236	11	1-4.5	7.0	25/25
7-24	1930	883	0	-	4247	11	1-4.5	7.0	25/25
7-24	2030	883	0	-	4258	11	1-4.5	7.0	25/25
7-24	2130	883	0	-	4269	11	1-4.5	7.0	25/25
7-24	2230	883	0	-	4280	11	1-4.5	7.0	25/25
7-24	2330	883	0	-	4291	11	2-4.5	8.5	25/25
7-25	0030	883	0	OFF	4303	12	2-4.0	8.5	20/20
7-25	0130	883	0	OFF	4311	8	2-4.0	7.5	20/20
7-25	0230	883	0	OFF	4322	11	2-4.5	7.5	20/20
7-25	0330	883	0	OFF	4332	10	2-4.5	6.5	20/20
7-25	0430	883	0	OFF	4343	11	2-4.2	6.5	15/15
7-25	0530	883	0	OFF	4353	10	2-4.2	7.0	20/20
7-25	0630	883	0	OFF	4363	10	2-4.4	7.0	20/20
7-25	0730	883	0	OFF	4376	13	2-9.5	7.0	20/25
7-25	0830	883	0	OFF	4396	20	2-4.5	7.0	20/25
7-25	0930	883	0	OFF	4418	22	2-4.5	7.0	20/25
7-25	1030	883	0	OFF	4440	22	2-4.5	7.0	20/25
7-25	1130	883	0	OFF	4463	23	2-4.5	7.0	20/25
7-25	1230	887	4	4.0	4485	22	2-4.5	7.0	20/25
7-25	1330	891	4	4.0	4506	21	2-4.5	7.0	20/25
7-25	1430	894	3	3.1	4528	22	2-4.5	7.0	20/25
7-25	1530	897	3	3.1	4549	21	2-4.5	7.0	20/25
7-25	1630	900	3	3.1	4570	21	2-4.5	7.0	20/15
7-25	1730	903	3	3.1	4591	21	2-4.5	7.0	20/25
7-25	1830	906	3	3.1	4615	24	2-4.5	7.0	20/25
7-25	1930	909	3	3.1	4637	22	2-4.5	7.5	20/25
7-25	2030	912	3	3.1	4659	22	2-4.5	7.5	20/25
7-25	2130	915	3	3.1	4684	25	2-5.5	7.5	20/25
7-25	2230	918	3	3.1	4710	26	2-5.5	7.5	20/25
7-25	2330	922	4	3.1	4734	24	2-5.1	7.5	20/25
7-26	0030	926	4	3.1	4759	25	2-5.5	7.5	20/25
7-26	0130	929	3	3.1	4785	26	2-5.5	7.5	20/25
7-26	0230	933	4	3.1	4815	30	2-7.5	7.5	20/25
7-26	0330	936	3	3.0	4852	37	2-7.5	7.5	20/25
7-26	0430	938	2	3.0	4894	42	4-5.0	7.5	20/25
7-26	0530	941	3	3.0	4937	43	4-5.0	8.0	20/25
7-26	0630	948	7	3.0	4984	47	4-6.0	7.5	15/20
7-26	0730	952	4	3.1	5054	70	4-6.0	6.0	15.20
7-26	0830	958	6	3.1	5109	55	5-6.0	7.0	20/20
7-26	0930	961	3	3.1	5180	71	5-6.0	7.0	20/20
7-26	1030	964	3	4.0	5254	74	5-6.0	7.0	20/20
7-26	1130	968	4	4.0	5325	71	5-6.0	7.0	20/20
7-26	1230	972	4	5.0	5398	73	6-6.0	7.0	20/20
7-26	1330	975	3	5.0	5447	49	6-6.0	7.0	20/20
7-26	1430	980	5	5.0	5520	73	6-6.0	6.5	20/20
7-26	1530	985	5	5.0	5608	88	6-6.0	6.5	20/20

DATE	TIME	AGITATOR			GRAPE			SCRUBBER WATER PH	REAGENT PUMP SPEED/STROKE
		COUNTER TOTAL	SWEEPS PER HR	DRIVE SETTING	GEAR COUNTER	GEAR REVOLUTIONS RPH	DRIVE SETTING TEETH/RPD		
7-26	1630	990	5	5.0	5697	89	6-7.0	6.5	20/20
7-26	1730	995	5	5.0	5787	90	6-6.0	6.5	20/20
7-26	1830	1000	5	5.0	5878	91	6-6.0	7.0	25/20
7-26	1930	1005	5	5.0	5969	91	6-6.0	7.0	25/20
7-26	2030	1010	5	5.0	6027	58	6-3.5	7.0	25/20
7-26	2130	1015	5	5.0	6085	58	6-3.5	7.0	25/20
7-26	2210	1020	5	5.0	6139	54	6-4.5	7.0	25/20
7-26	2330	1025	5	5.0	6205	66	6-4.5	8.0	25/20
7-27	0030	1030	5	5.0	6265	60	6-3.5	8.0	15/15
7-27	0130	1034	4	5.0	6217	52	6-3.5	6.5	15/15
7-27	0230	1039	5	5.5	6269	52	6-4.0	6.0	15/15
7-27	0330	1044	5	5.5	6488	58	6-4.0	6.0	15/15
7-27	0430	1049	5	5.5	6488	61	6-4.5	6.0	15/15
7-27	0530	1054	5	5.5	6553	65	6-4.5	6.5	20/20
7-27	0630	1059	5	5.5	6620	67	6-4.5	6.5	20/20
7-27	0730	1065	6	5.5	6681	61	6-4.0	6.5	20/20
7-27	0930	1070	5	3.1	6748	67	6-5.0	6.5	20/20
7-27	1030	1073	3	3.5	6824	76	6-5.0	6.5	20/20
7-27	1130	1077	4	3.0	6877	53	6-3.0	6.5	20/20
7-27	1230	1080	3	3.0	6916	39	6-3.0	6.5	20/20
7-27	1330	1083	3	3.0	6961	45	6-3.0	6.5	20/20
7-27	1340	1087	4	3.0	7000	39	6-3.0	6.5	20/20
7-27	1430	1090	3	3.0	7035	35	3-3.0	6.5	20/20
7-27	1530	1093	3	3.0	7055	20	3-3.0	7.0	20/20
7-27	1630	1096	3	3.0	7075	20	3-3.0	7.0	20/20
7-27	1730	1099	3	3.0	7103	28	3-4.0	7.5	20/20
7-27	1830	1103	4	3.0	7131	28	3-4.0	7.5	20/20
7-27	1930	1106	3	3.0	7155	24	3-3.5	7.5	20/20
7-27	2030	1109	3	3.0	7179	24	3-3.5	7.5	20/20
7-27	2130	1113	4	5.0	7206	27	3-4.0	7.0	20/20
7-27	2220	1118	5	5.0	7234	28	3-4.5	6.5	20/20
7-27	2300	1124	6	6.0	7265	31	3-4.5	8.5	25/25
7-28	0030	1128	4	5.0	7329	31	3-5.0	8.5	20/20
7-28	0130	1133	5	5.0	7329	33	3-5.0	7.5	20/20
7-28	0230	1140	7	5.0	7364	35	3-5.0	7.5	20/20
7-28	0330	1144	4	5.0	7397	33	3-5.5	7.0	20/20
7-28	0430	1150	6	6.0	7443	46	5-5.5	7.0	20/20
7-28	0530	1156	6	6.0	7512	69	5-5.5		
7-28	0630	1161	5	6.0	7599	87	5-6.0		
7-28	0730	1167	6	6.0	7673	74	5-6.0	6.5	20/20
7-28	0830	1172	5	6.0	7743	70	5-6.0	6.5	20/20
7-28	0930	1178	6	6.0	7811	68	5-6.0	6.5	20/20
7-28	1030	1184	6	6.0	7865	54	5-3.5	6.5	20/20
7-28	1130	1191	7	6.0	7912	47	5-4.0	6.5	20/20
7-28	1230	1196	5	6.0	7953	41	5-2.7	6.5	20/20
7-28	1330	1201	5	5.0	7989	36	5-2.7	6.5	20/20

DATE	TIME	AGITATOR			GRATE			SCRUBBER WATER PH	REAGENT PUMP SPEED/STROKE
		COUNTER TOTAL	SWEEPS PER HR	DRIVE SETTING	GEAR COUNIER	GEAR REVOLUTIONS RPH	DRIVE SETTING TEETH/RPD		
7-28	1430	1215	14	5.0	8019	30	5-3.5	6.5	20/20
7-28	1530	1223	4	5.0	8059	40	5-3.5	6.5	20/20
7-28	1630	1223	4	5.0	8109	47	5-4.0	6.5	20/20
7-28	1730	1227	4	6.0	8153	47	5-4.0	7.0	20/20
7-28	1830	1234	7	6.0	8210	57	5-6.0	7.0	20/20
7-28	1930	1239	5	6.0	8282	72	5-6.0	7.5	20/20
7-28	2030	1245	6	6.0	8350	68	5-5.0	7.0	20/20
7-28	2130	1248	3	6.0	8408	58	5-5.0	7.0	20/20
7-28	2230	1252	4	6.0	8466	58	5-5.0	7.0	20/20

APPENDIX F

Gas Chromatograph Data

The results of each successful gas chromatograph analysis of permanent gases and hydrocarbons are included here.

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR
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7/15/1985

11:16	11.541	10.880	0.012	0.003	0.000	54.36	0.117	22.54	0.004	0.001	0.000	111.3	105.4	99.46	26.59	0.918
11:52	11.645	10.450	0.005	0.002	0.000	56.19	0.090	20.28	0.001	0.000	0.000	103.9	98.0	98.66	26.27	0.907
12:27	11.741	10.520	0.003	0.001	0.000	55.49	0.077	20.08	0.001	0.000	0.000	103.4	97.4	97.92	26.05	0.899
13: 2	11.559	10.615	0.002	0.001	0.000	55.84	0.067	19.89	0.000	0.001	0.000	102.0	96.2	97.97	26.13	0.902
13:38	11.583	10.439	0.002	0.001	0.000	56.27	0.063	20.20	0.001	0.001	0.000	103.1	97.2	98.56	26.26	0.907
14:13	11.930	10.466	0.002	0.001	0.000	54.93	0.057	20.85	0.001	0.000	0.001	106.2	100.2	98.24	26.09	0.901
15: 8	12.116	10.113	0.005	0.003	0.000	55.52	0.069	21.59	0.002	0.001	0.001	109.5	103.3	99.43	26.31	0.908
15:43	12.055	9.802	0.002	0.002	0.000	55.02	0.053	21.64	0.001	0.001	0.001	109.1	103.1	98.57	26.04	0.899
16:19	11.742	10.009	0.002	0.002	0.000	55.49	0.048	21.24	0.001	0.001	0.002	106.8	100.9	98.53	26.15	0.903
16:55	12.262	9.603	0.001	0.002	0.000	54.38	0.047	21.98	0.001	0.001	0.001	110.8	104.7	98.28	25.87	0.893
17:30	12.167	9.660	0.001	0.001	0.000	54.56	0.043	21.95	0.001	0.001	0.001	110.4	104.3	98.39	25.94	0.895
18: 5	11.812	10.330	0.002	0.001	0.000	54.66	0.045	21.22	0.001	0.001	0.001	106.9	101.0	98.08	26.05	0.899
18:42	11.342	10.815	0.000	0.000	0.000	56.55	0.040	19.80	0.000	0.000	0.000	100.7	95.0	98.55	26.38	0.911
19:17	11.213	10.606	0.000	0.000	0.000	56.53	0.037	20.13	0.000	0.000	0.000	101.3	95.7	98.51	26.38	0.910
19:34	11.281	10.597	0.000	0.001	0.000	55.94	0.038	20.26	0.000	0.000	0.000	102.0	96.3	98.12	26.25	0.906
19:52	11.292	10.458	0.000	0.001	0.000	55.91	0.037	20.52	0.000	0.000	0.000	102.9	97.2	98.23	26.25	0.906
20: 9	11.280	10.189	0.000	0.001	0.000	55.84	0.035	20.84	0.000	0.000	0.000	103.8	98.2	98.19	26.20	0.904
20:27	11.549	10.047	0.000	0.000	0.000	55.68	0.035	21.16	0.000	0.000	0.000	105.7	99.9	98.46	26.18	0.904
20:44	11.543	9.795	0.000	0.000	0.000	55.53	0.034	21.47	0.000	0.000	0.000	106.7	100.9	98.37	26.12	0.902
21: 2	11.740	9.566	0.000	0.000	0.000	55.14	0.033	21.92	0.000	0.000	0.000	108.7	102.8	98.40	26.04	0.899
21:19	11.105	10.534	0.000	0.000	0.000	55.88	0.031	20.09	0.000	0.000	0.000	100.8	95.2	97.64	26.15	0.903
21:37	11.982	9.438	0.000	0.001	0.000	54.76	0.030	22.20	0.000	0.001	0.000	110.4	104.4	98.41	25.96	0.896
21:55	12.109	9.202	0.001	0.001	0.000	54.52	0.032	22.67	0.001	0.001	0.001	112.4	106.3	98.54	25.92	0.895
22:12	12.008	9.346	0.000	0.000	0.000	54.64	0.031	22.66	0.000	0.000	0.000	111.9	105.9	98.68	26.01	0.898
22:30	12.113	9.074	0.000	0.000	0.000	54.57	0.032	22.91	0.000	0.000	0.000	113.1	107.0	98.70	25.95	0.896
22:47	11.991	9.143	0.000	0.001	0.000	54.60	0.031	22.71	0.000	0.001	0.001	112.1	106.1	98.47	25.93	0.895
23: 5	12.049	9.197	0.001	0.002	0.000	54.59	0.034	22.72	0.001	0.001	0.001	112.4	106.3	98.60	25.96	0.896
23:23	11.891	9.294	0.001	0.002	0.000	54.87	0.035	22.53	0.001	0.002	0.001	111.3	105.3	98.63	26.02	0.898
23:41	11.889	9.345	0.001	0.002	0.000	54.94	0.036	22.45	0.001	0.002	0.001	111.0	105.1	98.67	26.04	0.899
23:58	11.962	9.316	0.001	0.003	0.000	55.18	0.037	22.69	0.001	0.002	0.001	112.1	106.1	99.19	26.16	0.903

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0:16	11.945	9.394	0.001	0.002	0.000	55.58	0.016	22.48	0.001	0.002	0.001	111.1	105.1	99.42	26.25	0.906
0:34	11.833	9.540	0.000	0.001	0.000	55.71	0.016	22.35	0.000	0.000	0.000	110.3	104.3	99.45	26.31	0.908
0:52	11.817	9.482	0.001	0.002	0.000	55.61	0.036	22.44	0.001	0.001	0.001	110.8	104.8	99.39	26.28	0.907
1:10	11.948	9.388	0.001	0.002	0.000	55.56	0.016	22.66	0.001	0.001	0.001	111.7	105.7	99.58	26.29	0.908
1:28	11.848	9.488	0.001	0.002	0.000	55.78	0.015	22.43	0.001	0.001	0.001	110.6	104.7	99.57	26.33	0.909
1:45	11.857	9.386	0.001	0.001	0.000	55.73	0.034	22.65	0.001	0.001	0.000	111.5	105.6	99.66	26.33	0.909
2: 4	11.725	9.435	0.001	0.002	0.000	56.02	0.034	22.41	0.001	0.001	0.000	110.3	104.5	99.63	26.37	0.910
2:22	11.750	9.466	0.003	0.002	0.000	55.83	0.016	22.44	0.001	0.001	0.001	110.4	104.5	99.51	26.34	0.909
2:40	11.863	9.340	0.001	0.002	0.000	55.65	0.036	22.62	0.001	0.001	0.000	111.5	105.5	99.52	26.28	0.907
2:58	11.801	9.322	0.001	0.003	0.000	55.63	0.015	22.69	0.001	0.002	0.000	111.4	105.4	99.47	26.29	0.907
3:52	11.663	9.377	0.002	0.004	0.000	55.67	0.039	22.52	0.002	0.002	0.000	110.7	104.8	99.28	26.28	0.907
4:10	11.374	9.545	0.002	0.005	0.000	56.16	0.041	22.00	0.002	0.003	0.000	108.1	102.4	99.13	26.34	0.909
4:28	11.606	9.489	0.001	0.005	0.000	55.67	0.039	22.31	0.002	0.002	0.000	109.8	104.0	99.12	26.27	0.907

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/16/1985																
4:45	11.606	9.466	0.001	0.005	0.000	55.54	0.039	22.29	0.002	0.002	0.000	109.7	103.9	98.95	26.21	0.905
5: 3	11.583	9.461	0.001	0.004	0.000	55.70	0.038	22.22	0.001	0.002	0.000	109.4	103.6	99.01	26.24	0.906
5:21	12.947	8.498	0.071	0.269	0.000	52.18	1.516	22.91	0.060	0.081	0.000	140.1	131.4	98.53	25.44	0.878
5:39	13.636	7.712	0.047	0.235	0.000	51.99	1.706	23.46	0.046	0.069	0.000	144.4	135.3	98.90	25.21	0.870
5:57	12.158	9.436	0.030	0.165	0.000	54.98	1.365	20.64	0.029	0.047	0.000	124.7	116.8	98.85	25.89	0.894
6:15	11.373	11.087	0.029	0.145	0.000	56.94	1.130	18.92	0.027	0.042	0.000	113.7	106.5	99.70	26.62	0.919
6:32	11.616	9.969	0.030	0.138	0.000	55.68	1.043	20.37	0.026	0.041	0.000	118.1	110.9	98.91	26.17	0.903
6:50	11.633	9.813	0.026	0.133	0.000	55.47	0.991	20.69	0.025	0.039	0.000	118.5	111.3	98.83	26.12	0.902
7: 8	11.575	9.873	0.025	0.127	0.000	55.64	0.954	20.64	0.024	0.038	0.000	117.5	110.5	98.90	26.17	0.903
7:26	10.963	10.480	0.031	0.145	0.000	56.70	0.982	19.42	0.029	0.043	0.000	112.6	105.8	98.80	26.40	0.911
7:44	12.904	9.396	0.045	0.149	0.000	53.98	1.061	21.26	0.036	0.044	0.000	126.1	118.2	98.88	25.74	0.888
8: 2	13.876	9.201	0.045	0.131	0.000	53.11	1.109	21.44	0.032	0.037	0.000	129.7	121.3	98.99	25.48	0.879
8:20	14.099	9.014	0.056	0.147	0.000	52.36	1.191	21.54	0.038	0.042	0.001	132.3	123.6	98.49	25.24	0.871
8:38	14.151	8.854	0.068	0.161	0.000	51.99	1.250	21.81	0.043	0.046	0.002	134.6	125.8	98.37	25.16	0.869
8:55	14.204	8.798	0.083	0.181	0.000	51.74	1.352	21.90	0.050	0.051	0.002	136.9	128.0	98.36	25.13	0.867
9:13	14.481	8.674	0.060	0.137	0.000	51.69	1.186	22.14	0.036	0.038	0.000	135.1	126.3	98.44	25.07	0.866
9:31	14.498	8.630	0.078	0.146	0.000	51.37	1.222	22.43	0.041	0.040	0.002	137.1	128.2	98.45	25.06	0.865
10:22	14.945	8.428	0.091	0.185	0.000	51.64	1.475	23.14	0.051	0.050	0.002	144.8	135.3	100.00	25.32	0.874
10:39	14.822	8.393	0.082	0.160	0.000	51.09	1.394	22.44	0.042	0.042	0.001	140.3	131.1	98.47	24.92	0.860
10:57	14.955	8.453	0.086	0.171	0.000	50.90	1.428	22.28	0.047	0.045	0.001	141.0	131.6	98.36	24.87	0.858
11:14	15.013	8.826	0.096	0.166	0.000	51.55	1.417	21.63	0.048	0.045	0.002	139.1	129.7	98.79	25.03	0.864
11:32	15.360	8.919	0.087	0.154	0.000	51.45	1.413	21.22	0.044	0.041	0.001	138.3	128.8	98.69	24.93	0.860
11:50	15.294	8.341	0.097	0.161	0.000	51.20	1.452	21.76	0.050	0.043	0.003	140.7	131.1	98.40	24.77	0.855
12: 7	16.072	9.045	0.101	0.173	0.000	51.13	1.534	20.70	0.048	0.049	0.002	141.0	130.9	98.85	24.79	0.856
12:25	15.509	8.585	0.101	0.173	0.000	50.73	1.527	21.11	0.049	0.048	0.002	140.4	130.6	97.83	24.58	0.849
12:43	15.578	8.130	0.090	0.160	0.000	50.34	1.402	21.90	0.045	0.045	0.002	141.4	131.7	97.69	24.47	0.845
13: 0	15.444	8.152	0.095	0.168	0.000	50.29	1.430	21.99	0.048	0.048	0.003	141.9	132.2	97.67	24.50	0.846
13:18	15.507	8.486	0.099	0.165	0.000	50.49	1.426	21.49	0.049	0.043	0.003	140.3	130.7	97.75	24.56	0.848
13:54	16.371	8.073	0.102	0.197	0.000	49.37	1.694	21.66	0.055	0.052	0.002	147.3	136.9	97.57	24.19	0.835
14:11	16.738	8.444	0.100	0.199	0.000	49.21	1.699	21.60	0.055	0.054	0.003	148.5	137.9	98.11	24.30	0.839
14:29	16.961	7.798	0.102	0.196	0.000	48.60	1.701	22.13	0.055	0.053	0.003	150.9	140.1	97.60	24.00	0.828
14:47	17.321	7.484	0.101	0.187	0.000	47.96	1.760	22.78	0.052	0.050	0.002	154.4	143.5	97.70	23.87	0.824
15: 4	18.553	8.765	0.114	0.210	0.000	44.48	1.826	25.29	0.062	0.058	0.003	168.2	156.5	99.36	24.22	0.836
15:40	17.252	7.333	0.108	0.181	0.000	47.93	1.777	23.12	0.054	0.049	0.003	155.5	144.5	97.80	23.89	0.825
15:58	17.042	7.445	0.101	0.171	0.000	48.21	1.590	22.97	0.052	0.047	0.003	152.0	141.4	97.63	23.94	0.826
16:16	16.890	7.629	0.092	0.170	0.000	48.49	1.564	22.65	0.048	0.048	0.002	150.0	139.5	97.58	24.00	0.828
16:34	16.756	7.525	0.085	0.169	0.000	48.42	1.504	23.05	0.046	0.048	0.003	150.1	139.7	97.60	24.03	0.829
16:51	16.536	7.528	0.091	0.178	0.000	48.52	1.518	23.09	0.051	0.051	0.003	150.1	139.8	97.57	24.07	0.831
17: 9	16.544	7.547	0.087	0.164	0.000	48.61	1.401	23.21	0.049	0.044	0.002	148.8	138.6	97.66	24.12	0.832
18: 4	17.012	7.460	0.091	0.156	0.000	48.17	1.453	23.30	0.046	0.040	0.003	150.9	140.5	97.73	23.99	0.828
18:22	16.996	7.378	0.092	0.144	0.000	48.15	1.431	23.54	0.044	0.038	0.003	151.1	140.7	97.81	24.01	0.829
18:40	17.178	7.237	0.098	0.156	0.000	47.79	1.537	23.66	0.048	0.041	0.003	153.6	143.0	97.75	23.91	0.825
18:57	16.995	6.985	0.100	0.159	0.000	47.73	1.568	24.01	0.048	0.041	0.002	154.5	144.0	97.65	23.88	0.824
19:15	17.136	7.077	0.101	0.162	0.000	47.53	1.584	23.96	0.049	0.042	0.002	155.1	144.4	97.64	23.86	0.823
19:33	17.197	7.062	0.098	0.162	0.000	47.55	1.453	23.95	0.046	0.044	0.002	153.9	143.3	97.56	23.83	0.823

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/16/1985																
19:51	17.136	7.012	0.099	0.164	0.000	47.60	1.561	24.07	0.048	0.045	0.003	155.3	144.7	97.74	23.88	0.824
20: 8	17.117	7.155	0.099	0.160	0.000	47.74	1.605	23.99	0.045	0.044	0.002	155.2	144.6	97.96	23.96	0.827
20:26	17.355	6.860	0.087	0.158	0.000	47.30	1.498	24.29	0.043	0.045	0.002	155.6	145.0	97.64	23.77	0.821
20:44	17.195	6.879	0.077	0.162	0.000	47.59	1.379	24.55	0.045	0.047	0.002	154.7	144.3	97.92	23.91	0.825
21: 2	16.900	6.646	0.063	0.138	0.000	47.70	1.194	25.14	0.039	0.041	0.002	152.9	142.8	97.86	23.95	0.827
21:20	16.674	6.489	0.077	0.143	0.000	47.82	1.166	25.80	0.043	0.039	0.002	154.3	144.4	98.25	24.10	0.832
21:37	16.639	6.505	0.074	0.146	0.000	48.19	1.159	26.02	0.040	0.040	0.002	154.8	144.9	98.82	24.27	0.838
21:55	16.686	6.241	0.075	0.187	0.000	47.52	1.348	26.27	0.050	0.051	0.002	158.9	148.7	98.43	24.09	0.832
22:13	17.065	5.988	0.074	0.170	0.000	47.15	1.330	26.57	0.046	0.045	0.002	160.4	150.1	98.44	23.95	0.827
22:31	17.271	5.594	0.073	0.174	0.000	46.58	1.367	27.26	0.049	0.047	0.002	163.8	153.3	98.41	23.83	0.823
22:49	17.311	5.348	0.073	0.174	0.000	46.43	1.379	27.57	0.048	0.047	0.002	165.0	154.5	98.38	23.77	0.820
23: 6	17.562	5.483	0.065	0.163	0.000	46.46	1.378	27.34	0.045	0.044	0.002	164.6	154.0	98.54	23.77	0.820
23:24	17.528	5.531	0.069	0.165	0.000	46.56	1.328	27.29	0.046	0.046	0.002	164.0	153.5	98.56	23.80	0.821
23:42	17.606	5.586	0.090	0.172	0.000	46.46	1.373	27.14	0.049	0.048	0.002	164.9	154.2	98.53	23.77	0.821

7/17/1985

0: 0	17.532	5.923	0.102	0.192	0.000	46.64	1.570	26.44	0.056	0.053	0.002	165.2	154.3	98.51	23.82	0.822
0:18	17.379	6.297	0.128	0.192	0.000	46.98	1.666	25.57	0.059	0.053	0.003	163.3	152.4	98.32	23.85	0.823
0:36	17.874	6.151	0.089	0.166	0.000	46.68	1.485	26.00	0.048	0.044	0.003	162.9	152.0	98.54	23.78	0.821
0:53	17.784	6.086	0.108	0.174	0.000	46.76	1.541	26.17	0.055	0.045	0.003	164.4	153.4	98.73	23.84	0.823
1:11	17.332	6.377	0.113	0.167	0.000	47.38	1.498	25.64	0.054	0.042	0.003	160.7	150.0	98.61	23.98	0.828
1:29	16.950	6.349	0.100	0.172	0.000	47.44	1.434	25.78	0.050	0.046	0.003	159.1	148.7	98.33	24.00	0.828
1:48	15.317	5.358	0.078	0.187	0.000	48.89	1.382	27.03	0.052	0.053	0.002	157.5	147.9	98.35	24.28	0.838
2: 6	17.748	5.702	0.092	0.185	0.000	46.17	1.469	27.13	0.051	0.052	0.003	166.6	155.8	98.61	23.76	0.820
2:24	17.717	5.765	0.086	0.170	0.000	46.44	1.431	26.68	0.051	0.046	0.002	164.2	153.4	98.38	23.72	0.819
2:42	17.257	5.953	0.097	0.196	0.000	46.83	1.497	26.54	0.056	0.055	0.003	163.9	153.2	98.49	23.90	0.825
3: 0	17.220	6.078	0.110	0.208	0.000	46.75	1.613	26.19	0.062	0.057	0.004	164.5	153.6	98.30	23.86	0.824
3:18	17.495	6.189	0.129	0.211	0.000	46.49	1.778	25.48	0.064	0.058	0.004	165.1	154.0	97.89	23.67	0.817
3:36	17.465	6.131	0.141	0.222	0.000	46.32	1.821	25.63	0.069	0.060	0.004	166.5	155.3	97.86	23.66	0.817
3:53	18.006	6.275	0.106	0.170	0.000	46.65	1.665	25.42	0.051	0.045	0.003	163.7	152.6	98.38	23.70	0.818
4:11	17.638	6.644	0.097	0.163	0.000	47.28	1.501	25.11	0.051	0.046	0.003	159.7	148.9	98.54	23.92	0.826
4:29	16.173	6.126	0.108	0.188	0.000	48.66	1.537	25.80	0.054	0.054	0.003	158.4	148.2	98.71	24.26	0.838
4:47	16.853	6.875	0.127	0.214	0.000	48.17	1.780	24.58	0.065	0.060	0.004	160.3	149.5	98.73	24.19	0.835
5: 5	18.021	6.295	0.075	0.170	0.000	47.03	1.457	25.63	0.047	0.049	0.002	161.9	151.0	98.78	23.84	0.823
5:23	17.611	6.310	0.107	0.195	0.000	47.02	1.590	25.64	0.059	0.056	0.004	163.4	152.4	98.59	23.88	0.824
5:41	17.379	6.531	0.118	0.185	0.000	47.33	1.621	25.23	0.057	0.051	0.004	161.4	150.6	98.51	23.95	0.827
5:59	17.639	6.549	0.112	0.175	0.000	47.18	1.538	25.22	0.056	0.048	0.004	161.0	150.2	98.52	23.90	0.825
6:17	17.776	6.600	0.091	0.152	0.000	47.38	1.413	25.28	0.047	0.043	0.004	159.3	148.6	98.78	23.95	0.827
6:35	16.978	7.484	0.096	0.145	0.000	48.62	1.273	23.98	0.046	0.042	0.005	151.1	140.9	98.67	24.29	0.838
6:53	16.423	6.889	0.088	0.148	0.000	48.69	1.229	24.86	0.047	0.044	0.003	151.6	141.8	98.42	24.27	0.838
7:11	16.707	7.103	0.102	0.168	0.000	48.34	1.363	24.75	0.052	0.049	0.005	154.4	144.1	98.63	24.28	0.838
7:29	17.111	8.033	0.110	0.187	0.000	47.90	1.524	23.16	0.054	0.053	0.004	152.8	142.2	98.14	24.16	0.834
7:47	16.021	8.846	0.198	0.286	0.000	48.98	2.172	21.01	0.088	0.080	0.007	153.5	142.5	97.69	24.39	0.842
8: 5	16.016	8.766	0.248	0.279	0.000	48.12	2.346	21.34	0.103	0.074	0.008	157.3	146.0	97.30	24.25	0.837
8:23	17.810	7.788	0.107	0.189	0.000	47.03	1.811	23.00	0.050	0.053	0.003	157.4	146.1	97.84	23.83	0.822

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/17/1985																
8:41	17.846	8.285	0.123	0.199	0.000	47.15	1.851	22.02	0.057	0.053	0.003	155.4	144.0	97.58	23.82	0.822
8:59	18.319	8.037	0.141	0.191	0.000	46.71	1.966	22.37	0.060	0.049	0.004	159.3	147.5	97.84	23.72	0.819
9:17	18.120	7.948	0.146	0.153	0.000	47.31	1.690	22.33	0.051	0.039	0.005	154.7	143.4	97.79	23.77	0.820
9:40	17.769	8.772	0.139	0.148	0.000	48.70	1.627	21.30	0.050	0.043	0.006	149.4	138.4	98.55	24.21	0.836
9:57	17.534	9.231	0.137	0.155	0.000	49.26	1.666	19.64	0.051	0.047	0.005	144.0	133.0	97.73	24.11	0.832
10:15	17.347	9.662	0.143	0.170	0.000	49.28	1.761	19.06	0.054	0.050	0.005	143.0	132.0	97.54	24.17	0.834
10:32	16.817	9.359	0.119	0.155	0.000	49.60	1.514	20.13	0.049	0.047	0.004	141.3	130.9	97.79	24.36	0.841
10:50	16.696	9.446	0.118	0.145	0.000	49.98	1.456	20.11	0.044	0.044	0.004	139.9	129.7	98.05	24.48	0.845
11: 8	16.676	9.207	0.103	0.152	0.000	49.53	1.414	20.71	0.044	0.047	0.004	141.3	131.1	97.89	24.41	0.843
11:25	16.170	9.553	0.090	0.144	0.000	50.39	1.321	20.29	0.042	0.042	0.003	136.9	127.1	98.05	24.65	0.851
11:43	15.651	10.186	0.080	0.142	0.000	51.15	1.256	19.40	0.039	0.042	0.003	131.4	121.9	97.95	24.87	0.858
12: 1	15.859	9.968	0.087	0.144	0.000	50.89	1.319	19.59	0.039	0.043	0.004	133.5	123.8	97.95	24.77	0.855
13:29	15.715	9.399	0.078	0.097	0.000	51.37	1.076	20.14	0.027	0.026	0.002	130.7	121.4	97.92	24.73	0.854
13:47	15.941	8.949	0.104	0.129	0.000	50.53	1.279	20.73	0.040	0.035	0.003	136.8	127.2	97.73	24.53	0.847
14: 4	15.324	9.193	0.089	0.135	0.000	51.13	1.261	20.28	0.040	0.036	0.002	133.1	123.8	97.50	24.66	0.851
14:22	14.916	9.449	0.091	0.129	0.000	51.76	1.246	19.99	0.037	0.036	0.002	130.6	121.5	97.65	24.85	0.858
14:40	14.548	9.734	0.103	0.147	0.000	52.23	1.366	19.40	0.044	0.043	0.003	129.5	120.5	97.61	24.97	0.862
14:57	14.096	10.058	0.098	0.192	0.000	52.71	1.495	18.56	0.046	0.057	0.001	127.8	118.7	97.32	25.05	0.865
15:15	13.586	10.538	0.098	0.210	0.000	53.74	1.636	17.49	0.050	0.062	0.002	124.7	115.7	97.41	25.27	0.872
15:33	12.634	11.678	0.084	0.168	0.000	56.04	1.498	15.38	0.043	0.049	0.002	112.0	103.7	97.57	25.76	0.889
15:50	12.744	12.300	0.085	0.174	0.000	56.54	1.464	14.16	0.044	0.051	0.002	108.3	100.0	97.56	25.83	0.892
16: 8	13.126	12.704	0.081	0.156	0.000	56.43	1.392	14.25	0.039	0.047	0.002	108.5	100.1	98.23	25.99	0.897
16:26	13.626	11.606	0.084	0.156	0.000	55.34	1.454	15.17	0.039	0.046	0.002	113.7	105.0	97.52	25.47	0.879
16:43	12.952	11.878	0.086	0.156	0.000	56.15	1.453	14.74	0.039	0.045	0.002	110.1	101.8	97.51	25.69	0.887
17: 1	12.320	12.608	0.084	0.147	0.000	57.39	1.403	13.42	0.037	0.042	0.002	103.0	95.0	97.45	25.96	0.896
17:19	11.947	13.348	0.079	0.134	0.000	58.50	1.305	12.17	0.036	0.038	0.003	96.4	88.7	97.56	26.22	0.905
17:37	11.659	13.412	0.066	0.105	0.000	58.41	1.075	12.37	0.028	0.030	0.003	92.7	85.5	97.16	26.22	0.905
17:54	11.448	12.971	0.050	0.080	0.000	58.37	0.871	13.29	0.019	0.023	0.002	91.8	85.0	97.12	26.21	0.905
18:12	12.576	12.664	0.049	0.071	0.000	57.78	0.813	14.10	0.017	0.020	0.002	97.2	89.9	98.09	26.15	0.903
19:39	12.463	11.188	0.045	0.054	0.000	56.02	0.701	17.13	0.016	0.016	0.002	104.9	97.8	97.63	25.82	0.891
19:56	11.965	11.443	0.044	0.053	0.000	56.66	0.682	16.69	0.018	0.017	0.002	101.7	94.9	97.57	25.98	0.897
20:14	11.913	11.438	0.051	0.055	0.000	56.91	0.733	16.37	0.015	0.016	0.002	101.1	94.2	97.50	25.97	0.896
20:32	11.957	11.706	0.047	0.049	0.000	57.19	0.686	16.22	0.011	0.011	0.001	99.9	93.1	97.88	26.11	0.901
20:49	12.066	11.708	0.043	0.048	0.000	57.05	0.681	16.17	0.010	0.013	0.000	100.0	93.1	97.80	26.06	0.899
21: 8	12.204	11.808	0.041	0.046	0.000	57.49	0.711	16.02	0.011	0.012	0.001	100.2	93.2	98.35	26.19	0.904
21:26	12.370	11.795	0.039	0.041	0.000	57.45	0.697	15.88	0.009	0.010	0.001	99.9	92.9	98.30	26.13	0.902
21:43	12.348	11.739	0.033	0.036	0.000	56.85	0.602	16.24	0.008	0.010	0.001	99.8	92.9	97.86	26.01	0.898
22: 1	12.171	11.731	0.030	0.031	0.000	57.58	0.520	16.27	0.009	0.011	0.001	98.4	91.7	98.35	26.21	0.905
22:19	11.918	11.889	0.038	0.032	0.000	57.30	0.528	16.15	0.008	0.009	0.001	97.4	90.8	97.87	26.16	0.903
22:37	11.630	12.015	0.036	0.026	0.000	57.78	0.506	15.63	0.007	0.009	0.001	94.4	88.0	97.64	26.20	0.904
22:54	11.678	11.896	0.033	0.025	0.000	57.40	0.498	16.13	0.007	0.008	0.001	96.0	89.6	97.67	26.17	0.903
23:12	11.788	11.623	0.036	0.026	0.000	57.51	0.492	16.73	0.007	0.008	0.001	98.2	91.8	98.22	26.25	0.906
23:30	11.782	11.637	0.041	0.032	0.000	57.63	0.534	16.59	0.010	0.010	0.001	98.5	92.0	98.27	26.27	0.907
23:48	11.829	11.699	0.042	0.034	0.000	57.23	0.552	16.53	0.009	0.009	0.000	98.7	92.1	97.93	26.17	0.903

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR
7/18/1985																
0: 5	12.040	11.156	0.039	0.032	0.000	56.25	0.530	17.28	0.010	0.009	0.001	101.5	94.8	97.36	25.87	0.893
0:23	12.094	11.188	0.039	0.024	0.000	56.81	0.475	17.58	0.010	0.006	0.001	101.9	95.3	98.23	26.11	0.901
0:41	11.759	11.226	0.036	0.020	0.000	56.74	0.370	17.36	0.007	0.006	0.001	98.8	92.4	97.52	26.02	0.898
0:59	11.993	10.921	0.034	0.022	0.000	56.49	0.375	18.26	0.008	0.007	0.001	102.5	96.1	98.10	26.07	0.900
1:17	11.948	10.700	0.039	0.030	0.000	56.12	0.415	18.72	0.009	0.008	0.001	104.5	98.1	97.98	26.01	0.898
1:34	11.975	10.891	0.035	0.031	0.000	56.14	0.420	18.43	0.008	0.009	0.001	103.7	97.2	97.95	26.02	0.898
1:52	12.922	10.844	0.048	0.100	0.000	54.31	1.050	18.26	0.031	0.030	0.001	115.1	107.3	97.60	25.60	0.884
2:10	13.501	10.689	0.061	0.107	0.000	53.57	1.267	18.26	0.033	0.031	0.001	119.6	111.3	97.53	25.38	0.876
2:28	13.791	10.447	0.047	0.099	0.000	53.21	1.253	19.01	0.028	0.029	0.000	122.3	113.8	97.92	25.38	0.876
2:46	14.251	10.195	0.046	0.105	0.000	52.79	1.321	19.56	0.029	0.032	0.000	126.4	117.6	98.32	25.32	0.874
3: 3	14.403	9.810	0.050	0.113	0.000	51.94	1.411	20.10	0.031	0.035	0.000	129.8	120.9	97.90	25.09	0.866
3:21	14.585	9.607	0.050	0.117	0.000	51.46	1.447	20.43	0.032	0.036	0.000	131.9	122.9	97.76	24.97	0.862
3:39	14.548	9.599	0.051	0.117	0.000	51.28	1.425	20.66	0.032	0.034	0.000	132.3	123.3	97.75	24.98	0.862
3:56	14.738	9.613	0.040	0.115	0.000	51.22	1.442	20.63	0.031	0.034	0.000	132.8	123.6	97.87	24.96	0.862
4:14	14.625	9.577	0.039	0.098	0.000	51.56	1.275	20.87	0.024	0.029	0.000	130.9	122.1	98.10	25.07	0.865
4:32	14.857	9.322	0.034	0.103	0.000	51.22	1.325	21.30	0.027	0.031	0.000	133.7	124.6	98.21	25.00	0.863
4:51	14.874	9.037	0.040	0.109	0.000	51.09	1.332	21.84	0.029	0.034	0.000	135.9	126.8	98.39	24.99	0.863
5: 8	15.005	8.995	0.037	0.118	0.000	50.67	1.457	22.04	0.032	0.037	0.000	138.4	129.1	98.40	24.94	0.861
5:26	15.045	9.069	0.037	0.127	0.000	50.53	1.523	21.86	0.033	0.039	0.000	138.9	129.5	98.27	24.90	0.860
5:44	15.015	8.915	0.041	0.131	0.000	50.46	1.531	22.23	0.035	0.041	0.000	140.3	130.9	98.41	24.92	0.860
6: 2	14.712	8.799	0.042	0.138	0.000	50.36	1.526	22.55	0.036	0.044	0.000	140.5	131.3	98.22	24.93	0.861
6:19	15.000	8.661	0.034	0.129	0.000	50.03	1.558	22.74	0.034	0.040	0.000	142.0	132.6	98.23	24.83	0.857
6:37	14.649	8.167	0.037	0.139	0.000	50.08	1.601	23.41	0.036	0.043	0.000	143.7	134.4	98.16	24.82	0.857
6:55	15.280	8.391	0.044	0.143	0.000	49.48	1.647	23.13	0.038	0.045	0.000	145.6	135.9	98.19	24.70	0.852
7:13	15.901	3.748	0.043	0.162	0.000	52.36	1.812	24.35	0.020	0.049	0.001	153.3	143.1	98.45	23.84	0.823
7:31	14.976	8.613	0.037	0.141	0.000	49.90	1.674	22.93	0.036	0.042	0.000	144.0	134.5	98.35	24.85	0.858
7:49	15.294	8.493	0.040	0.132	0.000	49.64	1.618	22.97	0.035	0.040	0.000	144.4	134.8	98.26	24.73	0.854
8: 6	15.523	8.468	0.042	0.137	0.000	49.05	1.656	23.21	0.036	0.041	0.000	146.5	136.7	98.16	24.64	0.850
8:24	15.069	8.511	0.045	0.150	0.000	49.57	1.696	22.91	0.040	0.045	0.000	144.9	135.3	98.04	24.72	0.853
8:42	15.240	8.442	0.043	0.144	0.000	49.32	1.726	23.03	0.037	0.043	0.000	145.9	136.2	98.03	24.66	0.851
9: 0	15.577	8.275	0.036	0.134	0.000	49.00	1.674	23.07	0.035	0.041	0.000	146.2	136.4	97.85	24.50	0.846
9:18	15.572	8.235	0.038	0.142	0.000	48.85	1.708	23.06	0.037	0.043	0.000	146.8	136.9	97.69	24.45	0.844
9:36	15.337	8.239	0.044	0.146	0.000	48.92	1.744	23.14	0.038	0.045	0.000	146.9	137.1	97.65	24.49	0.846
9:53	15.457	8.154	0.042	0.139	0.000	48.99	1.701	23.28	0.037	0.043	0.000	147.1	137.2	97.84	24.51	0.846
10:11	15.928	8.038	0.040	0.132	0.000	48.41	1.707	23.40	0.036	0.039	0.000	148.7	138.7	97.73	24.33	0.840
10:29	15.800	8.008	0.045	0.148	0.000	48.37	1.759	23.53	0.040	0.044	0.000	149.9	139.8	97.75	24.36	0.841
10:47	15.667	7.875	0.040	0.149	0.000	48.29	1.789	23.79	0.040	0.045	0.000	150.5	140.5	97.68	24.35	0.841
11: 5	15.782	7.684	0.041	0.135	0.000	48.16	1.698	23.98	0.036	0.040	0.000	150.1	140.2	97.56	24.27	0.838
11:23	16.167	7.475	0.040	0.129	0.000	47.69	1.656	24.41	0.034	0.039	0.000	152.1	142.1	97.64	24.16	0.834
11:41	16.102	7.629	0.042	0.138	0.000	47.61	1.692	23.99	0.037	0.042	0.000	151.3	141.2	97.28	24.10	0.832
11:59	16.006	7.347	0.037	0.140	0.000	47.33	1.711	24.59	0.037	0.043	0.000	153.1	143.0	97.24	24.07	0.831
12:16	16.162	7.237	0.035	0.130	0.000	47.14	1.656	24.68	0.034	0.041	0.000	153.0	142.9	97.12	23.98	0.828
12:49	17.033	6.676	0.041	0.135	0.000	46.80	1.691	26.05	0.037	0.044	0.000	160.9	150.3	98.50	24.05	0.830
13: 6	16.706	6.487	0.036	0.136	0.000	45.99	1.676	26.13	0.037	0.044	0.000	159.9	149.5	97.24	23.75	0.820
13:24	16.692	6.220	0.035	0.134	0.000	45.81	1.654	26.56	0.036	0.043	0.001	160.9	150.5	97.18	23.70	0.818
13:41	17.164	6.040	0.039	0.128	0.000	45.43	1.653	26.80	0.034	0.041	0.002	163.0	152.5	97.33	23.59	0.814

7/18/1985

GAS CHROMATOGRAPH DATA

DATE	H2	CO2	C2H4	C2H6	O2	N2	CH4	CO	C3H6	C3H8	C3H4	HHV	LHV	TMP	MW	S.G.
TIME	%	%	%	%	%	%	%	%	%	%	%	BTU/SCF	BTU/SCF	%		WRT AIR

7/18/1985

13:59	17.316	5.866	0.041	0.133	0.000	44.93	1.655	27.09	0.036	0.043	0.001	164.7	154.0	97.11	23.46	0.810
14:17	16.975	6.085	0.040	0.133	0.000	45.48	1.652	26.72	0.035	0.042	0.000	162.3	151.8	97.17	23.60	0.815
14:35	16.918	5.998	0.040	0.135	0.000	45.44	1.670	26.92	0.035	0.042	0.000	163.0	152.5	97.20	23.60	0.815
14:52	17.239	5.570	0.035	0.131	0.000	45.18	1.678	27.44	0.034	0.040	0.000	165.5	154.9	97.35	23.49	0.811
15:10	17.348	5.528	0.041	0.134	0.000	44.89	1.664	27.57	0.036	0.041	0.000	166.4	155.7	97.25	23.43	0.809
15:27	17.254	5.534	0.036	0.136	0.000	45.00	1.661	27.90	0.036	0.040	0.000	167.1	156.4	97.60	23.56	0.813
15:45	17.231	5.588	0.039	0.130	0.000	45.08	1.623	27.79	0.034	0.039	0.000	166.1	155.5	97.55	23.56	0.813
16: 2	17.448	5.618	0.035	0.130	0.000	44.93	1.645	27.69	0.034	0.038	0.000	166.6	155.9	97.57	23.51	0.812
16:20	17.439	5.593	0.035	0.131	0.000	44.94	1.624	27.59	0.035	0.040	0.000	166.1	155.4	97.42	23.47	0.810
16:38	17.202	5.597	0.041	0.137	0.000	45.09	1.644	27.78	0.036	0.043	0.000	166.5	155.9	97.57	23.58	0.814
16:55	17.169	5.699	0.040	0.132	0.000	45.22	1.621	27.63	0.033	0.042	0.000	165.5	154.9	97.58	23.61	0.815
17:13	17.529	5.696	0.040	0.131	0.000	44.95	1.659	27.46	0.034	0.041	0.000	166.5	155.7	97.54	23.49	0.811
17:31	17.439	5.689	0.042	0.137	0.000	45.01	1.674	27.50	0.036	0.042	0.000	166.7	155.9	97.57	23.52	0.812
17:48	17.100	5.767	0.037	0.139	0.000	45.32	1.663	27.47	0.036	0.042	0.000	165.3	154.7	97.57	23.63	0.816
18: 6	17.211	5.773	0.040	0.135	0.000	45.08	1.660	27.61	0.035	0.041	0.000	166.0	155.4	97.58	23.60	0.815
18:24	17.529	5.762	0.040	0.131	0.000	45.10	1.663	27.47	0.035	0.039	0.000	166.5	155.7	97.77	23.57	0.814
18:41	17.464	5.636	0.042	0.139	0.000	45.01	1.705	27.59	0.037	0.041	0.000	167.4	156.6	97.66	23.53	0.812
18:59	17.075	5.810	0.042	0.141	0.000	45.40	1.695	27.44	0.037	0.042	0.000	165.6	155.0	97.69	23.67	0.817
19:16	17.071	5.909	0.036	0.134	0.000	45.57	1.637	27.33	0.035	0.041	0.000	164.3	153.8	97.76	23.71	0.819
19:34	17.496	5.818	0.039	0.130	0.000	45.24	1.654	27.31	0.034	0.040	0.000	165.8	155.0	97.76	23.59	0.814
19:52	17.528	5.658	0.042	0.137	0.000	45.01	1.690	27.61	0.036	0.043	0.000	167.5	156.7	97.76	23.55	0.813
20: 9	17.371	5.567	0.043	0.141	0.000	44.90	1.686	27.92	0.038	0.044	0.000	168.1	157.3	97.72	23.56	0.813
20:28	16.945	5.730	0.040	0.134	0.000	45.74	1.631	27.63	0.034	0.042	0.001	164.9	154.5	97.93	23.76	0.820
20:46	17.439	5.652	0.041	0.135	0.000	45.27	1.687	27.36	0.036	0.042	0.000	166.3	155.5	97.66	23.54	0.813
21: 3	17.461	5.833	0.043	0.140	0.000	45.29	1.718	27.42	0.037	0.042	0.000	167.0	156.2	97.98	23.65	0.816
21:39	17.392	5.676	0.041	0.136	0.000	45.54	1.675	27.94	0.036	0.040	0.000	167.8	157.1	98.47	23.79	0.821
21:56	17.788	5.437	0.039	0.129	0.000	44.92	1.662	28.06	0.035	0.038	0.000	169.1	158.3	98.11	23.54	0.813
22:14	17.748	5.506	0.037	0.136	0.000	45.00	1.678	28.07	0.037	0.040	0.000	169.4	158.5	98.25	23.60	0.815
22:32	17.390	5.635	0.039	0.145	0.000	45.35	1.720	27.83	0.038	0.045	0.000	168.3	157.5	98.19	23.70	0.818
22:50	17.399	5.682	0.041	0.139	0.000	45.49	1.707	27.84	0.037	0.043	0.000	168.0	157.2	98.37	23.75	0.820
23: 7	17.765	5.441	0.034	0.127	0.000	45.10	1.653	28.11	0.034	0.039	0.000	169.1	158.2	98.30	23.61	0.815
23:25	17.877	5.310	0.041	0.134	0.000	44.90	1.676	28.44	0.034	0.041	0.000	171.0	160.0	98.45	23.60	0.815
23:44	17.740	5.245	0.042	0.140	0.000	45.08	1.698	28.67	0.037	0.047	0.000	171.8	160.9	98.70	23.69	0.818

7/19/1985

0: 2	17.801	5.328	0.041	0.134	0.000	45.43	1.662	28.69	0.036	0.042	0.001	171.4	160.5	99.16	23.82	0.822
0:20	17.859	5.535	0.034	0.127	0.000	45.66	1.635	28.27	0.033	0.039	0.000	169.6	158.7	99.19	23.85	0.823
0:37	18.057	5.405	0.037	0.135	0.000	45.35	1.689	28.40	0.036	0.041	0.000	171.5	160.5	99.15	23.76	0.820
0:55	17.710	5.423	0.044	0.144	0.000	45.49	1.692	28.47	0.038	0.044	0.000	171.1	160.2	99.05	23.83	0.822
1:13	15.835	4.964	0.042	0.141	0.000	47.58	1.643	28.93	0.037	0.042	0.000	165.8	155.9	99.21	24.29	0.838
1:30	17.968	5.194	0.036	0.134	0.000	45.37	1.683	28.83	0.035	0.040	0.000	172.5	161.5	99.29	23.79	0.821
1:48	18.097	5.126	0.041	0.133	0.000	45.12	1.661	28.93	0.035	0.039	0.000	173.1	162.0	99.18	23.71	0.819
2: 6	18.112	5.207	0.040	0.133	0.000	45.02	1.658	29.18	0.035	0.040	0.000	173.9	162.8	99.42	23.79	0.821
2:24	17.737	5.275	0.034	0.126	0.000	45.65	1.592	28.78	0.033	0.038	0.000	170.4	159.6	99.27	23.87	0.824
2:42	17.749	5.373	0.038	0.126	0.000	45.97	1.574	28.77	0.034	0.039	0.000	170.4	159.6	99.67	23.99	0.828

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/19/1985																
2:59	18.003	5.290	0.041	0.134	0.000	45.52	1.649	28.75	0.036	0.041	0.000	172.2	161.1	99.47	23.85	0.823
3:17	17.874	5.362	0.043	0.142	0.000	45.56	1.704	28.64	0.037	0.044	0.000	172.2	161.2	99.41	23.87	0.824
3:35	17.796	5.472	0.040	0.132	0.000	45.91	1.661	28.57	0.035	0.042	0.000	171.0	160.0	99.66	23.98	0.828
3:52	17.631	5.439	0.035	0.127	0.000	45.97	1.569	28.68	0.033	0.040	0.000	169.6	158.9	99.53	23.99	0.828
4:11	17.832	5.315	0.035	0.120	0.000	46.03	1.505	28.75	0.031	0.038	0.000	169.6	158.9	99.65	23.96	0.827
4:29	17.813	5.310	0.033	0.122	0.000	45.91	1.526	28.86	0.032	0.039	0.001	170.2	159.4	99.65	23.96	0.827
4:47	17.663	5.273	0.040	0.131	0.000	45.85	1.607	29.00	0.034	0.041	0.000	171.3	160.5	99.65	23.99	0.828
5: 5	17.752	5.253	0.039	0.130	0.000	45.75	1.603	28.94	0.034	0.040	0.000	171.3	160.5	99.54	23.93	0.826
5:23	17.992	5.288	0.039	0.126	0.000	45.72	1.601	29.02	0.035	0.038	0.000	172.2	161.3	99.85	23.96	0.827
5:40	17.962	5.281	0.041	0.133	0.000	45.74	1.628	28.94	0.036	0.041	0.000	172.4	161.4	99.80	23.95	0.827
5:58	17.758	5.244	0.040	0.134	0.000	45.71	1.619	29.06	0.036	0.041	0.000	172.0	161.2	99.64	23.96	0.827
6:16	17.572	5.223	0.037	0.123	0.000	45.90	1.491	29.11	0.031	0.036	0.000	169.8	159.2	99.52	23.98	0.828
6:34	17.014	4.962	0.038	0.126	0.000	46.88	1.536	28.71	0.033	0.038	0.000	167.4	157.0	99.34	24.03	0.829
6:51	17.834	4.948	0.041	0.134	0.000	45.31	1.633	29.18	0.036	0.040	0.000	172.8	161.9	99.15	23.75	0.820
7: 9	17.546	5.094	0.044	0.145	0.000	45.41	1.686	28.97	0.039	0.044	0.000	172.1	161.3	98.98	23.80	0.821
7:27	17.607	5.137	0.037	0.139	0.000	45.35	1.673	28.91	0.037	0.044	0.000	171.8	160.9	98.93	23.77	0.821
7:45	17.827	5.096	0.041	0.133	0.000	45.18	1.646	28.93	0.036	0.042	0.000	172.1	161.2	98.94	23.71	0.819
8: 3	17.809	5.021	0.043	0.140	0.000	45.01	1.677	28.97	0.037	0.043	0.000	172.7	161.8	98.75	23.65	0.816
8:21	17.581	5.186	0.040	0.146	0.000	45.28	1.697	28.95	0.039	0.046	0.001	172.3	161.4	98.96	23.80	0.821
8:38	17.578	5.228	0.037	0.137	0.000	45.40	1.658	28.87	0.037	0.042	0.001	171.3	160.5	98.99	23.81	0.822
8:56	17.740	5.199	0.041	0.134	0.000	45.42	1.654	28.80	0.036	0.041	0.000	171.5	160.6	99.06	23.79	0.821
9:14	17.746	5.251	0.043	0.139	0.000	45.31	1.698	28.75	0.039	0.041	0.000	172.0	161.0	99.02	23.78	0.821
9:32	17.515	5.250	0.043	0.144	0.000	45.36	1.723	28.76	0.039	0.042	0.000	171.7	160.8	98.88	23.79	0.821
9:50	17.480	5.198	0.041	0.135	0.000	45.47	1.648	28.83	0.036	0.040	0.000	170.7	159.9	98.87	23.80	0.822
10: 8	17.758	5.287	0.040	0.129	0.000	45.17	1.613	28.94	0.034	0.039	0.000	171.4	160.6	99.01	23.79	0.821
10:26	17.681	5.152	0.036	0.135	0.000	45.20	1.642	28.82	0.036	0.040	0.000	171.2	160.4	98.75	23.71	0.818
10:43	17.452	5.166	0.037	0.140	0.000	45.35	1.688	28.85	0.038	0.042	0.000	171.2	160.4	98.77	23.77	0.821
11: 1	17.534	5.184	0.040	0.133	0.000	45.40	1.613	28.90	0.036	0.041	0.000	170.7	160.0	98.89	23.79	0.821
11:19	17.848	5.148	0.041	0.133	0.000	45.18	1.642	28.98	0.036	0.040	0.000	172.3	161.4	99.05	23.75	0.820
11:37	17.855	5.089	0.042	0.138	0.000	45.16	1.671	29.01	0.037	0.041	0.000	172.8	161.9	99.04	23.73	0.819
12: 0	17.621	5.151	0.041	0.137	0.000	45.59	1.654	29.11	0.038	0.043	0.000	172.3	161.4	99.38	23.90	0.825
12:17	17.621	5.218	0.035	0.131	0.000	45.24	1.624	28.66	0.038	0.045	0.000	170.4	159.6	98.61	23.70	0.818
12:35	17.666	5.157	0.042	0.138	0.000	44.85	1.686	28.47	0.037	0.043	0.000	170.7	159.8	98.09	23.52	0.812
12:52	17.467	5.137	0.045	0.146	0.000	44.77	1.708	28.52	0.039	0.046	0.000	170.7	159.9	97.88	23.51	0.812
13:10	17.333	5.027	0.042	0.140	0.000	44.95	1.674	28.56	0.037	0.044	0.000	169.8	159.1	97.81	23.51	0.812
13:27	17.135	4.726	0.035	0.132	0.000	45.17	1.618	29.11	0.035	0.040	0.000	170.0	159.5	98.00	23.58	0.814
13:45	17.664	4.836	0.042	0.135	0.000	44.54	1.656	28.80	0.036	0.041	0.000	171.3	160.4	97.75	23.38	0.807
14: 3	17.438	4.960	0.043	0.140	0.000	44.63	1.668	28.73	0.037	0.043	0.000	170.7	159.9	97.69	23.44	0.809
14:20	17.315	5.176	0.042	0.139	0.000	44.86	1.659	28.50	0.037	0.041	0.000	169.3	158.7	97.77	23.53	0.812
14:38	17.495	5.121	0.040	0.135	0.000	44.77	1.662	28.57	0.035	0.040	0.000	170.0	159.3	97.86	23.50	0.811
14:55	17.674	5.038	0.041	0.134	0.000	44.59	1.658	28.60	0.036	0.040	0.000	170.7	159.8	97.81	23.43	0.809
15:13	17.473	5.044	0.043	0.143	0.000	44.72	1.678	28.65	0.038	0.043	0.000	170.7	159.9	97.83	23.48	0.811
15:31	17.414	5.115	0.037	0.138	0.000	44.80	1.684	28.61	0.036	0.043	0.000	170.2	159.4	97.87	23.52	0.812
15:48	17.451	4.975	0.038	0.127	0.000	44.90	1.591	28.55	0.034	0.040	0.000	168.9	158.2	97.70	23.45	0.810
16: 6	17.767	5.099	0.041	0.131	0.000	44.52	1.638	28.66	0.036	0.041	0.000	170.9	160.0	97.93	23.45	0.809
16:24	17.548	5.124	0.042	0.137	0.000	44.78	1.646	28.58	0.036	0.043	0.000	170.2	159.4	97.94	23.51	0.812

GAS CHROMATOGRAPH DATA

DATE	H2	CO2	C2H4	C2H6	O2	N2	CH4	CO	C3H6	C3H8	C3H4	HHV	LHV	TMP	MW	S.G.
TIME	%	%	%	%	%	%	%	%	%	%	%	BTU/SCF	BTU/SCF	%		WRT AIR

7/19/1985

16:41	17.415	4.983	0.043	0.143	0.000	44.78	1.710	28.59	0.037	0.044	0.000	170.6	159.8	97.74	23.46	0.810
16:59	17.534	4.951	0.040	0.134	0.000	44.73	1.647	28.56	0.035	0.041	0.000	170.0	159.2	97.67	23.41	0.808
17:17	17.712	5.081	0.042	0.135	0.000	44.72	1.666	28.53	0.036	0.041	0.000	170.7	159.8	97.95	23.46	0.810
17:34	17.573	4.980	0.043	0.142	0.000	44.74	1.684	28.49	0.038	0.043	0.000	170.5	159.7	97.73	23.42	0.808
17:52	17.409	4.938	0.043	0.144	0.000	44.78	1.722	28.65	0.037	0.043	0.000	170.9	160.1	97.77	23.46	0.810
18: 9	17.736	5.039	0.041	0.135	0.000	44.59	1.638	28.90	0.035	0.039	0.000	171.6	160.8	98.16	23.51	0.812
18:27	17.669	5.096	0.042	0.138	0.000	44.67	1.673	28.51	0.037	0.041	0.000	170.7	159.8	97.88	23.46	0.810
18:45	16.935	4.898	0.041	0.137	0.000	45.44	1.595	28.83	0.036	0.040	0.000	168.5	158.0	97.96	23.65	0.816
19: 2	17.383	5.025	0.038	0.143	0.000	44.86	1.712	28.80	0.038	0.042	0.000	171.1	160.3	98.05	23.56	0.813
19:20	17.536	5.006	0.041	0.134	0.000	44.83	1.644	28.63	0.036	0.040	0.000	170.2	159.4	97.90	23.49	0.811
19:39	17.754	4.929	0.040	0.130	0.000	44.78	1.631	28.70	0.035	0.039	0.000	170.8	160.0	98.03	23.45	0.810
19:57	17.603	4.885	0.043	0.139	0.000	44.81	1.658	28.83	0.037	0.042	0.000	171.4	160.5	98.05	23.49	0.811
20:14	17.256	5.107	0.041	0.135	0.000	45.17	1.614	28.66	0.036	0.041	0.000	169.1	158.5	98.05	23.62	0.815
20:32	17.533	5.119	0.041	0.135	0.000	44.96	1.642	28.66	0.036	0.041	0.000	170.3	159.5	98.17	23.58	0.814
20:49	17.665	5.114	0.041	0.134	0.000	44.90	1.664	28.58	0.036	0.041	0.000	170.6	159.8	98.17	23.54	0.813
21: 7	17.588	5.102	0.039	0.143	0.000	44.84	1.694	28.64	0.038	0.045	0.000	171.2	160.3	98.13	23.55	0.813
21:25	17.369	5.117	0.043	0.142	0.000	44.95	1.669	28.67	0.037	0.044	0.000	170.3	159.6	98.03	23.58	0.814
21:42	17.539	5.034	0.040	0.132	0.000	44.93	1.633	28.77	0.035	0.040	0.000	170.5	159.7	98.15	23.56	0.813
22: 0	17.615	5.054	0.040	0.130	0.000	44.85	1.623	28.64	0.035	0.040	0.000	170.1	159.3	98.02	23.51	0.811
22:18	17.554	5.125	0.042	0.137	0.000	44.99	1.637	28.64	0.037	0.042	0.000	170.3	159.5	98.20	23.59	0.814
22:36	17.326	4.942	0.042	0.139	0.000	45.04	1.651	28.70	0.037	0.043	0.000	170.0	159.3	97.92	23.53	0.812
22:53	17.504	5.057	0.041	0.136	0.000	44.95	1.649	28.73	0.036	0.042	0.000	170.5	159.7	98.14	23.57	0.814
23:11	17.657	4.875	0.040	0.132	0.000	44.89	1.635	28.70	0.034	0.040	0.000	170.6	159.8	98.01	23.46	0.810
23:29	17.585	4.840	0.043	0.139	0.000	44.83	1.648	28.83	0.037	0.043	0.000	171.3	160.4	98.00	23.47	0.810
23:46	17.218	4.766	0.041	0.137	0.000	45.09	1.626	29.11	0.036	0.042	0.000	170.6	160.0	98.06	23.58	0.814

7/20/1985

0: 4	17.320	4.870	0.035	0.131	0.000	45.01	1.597	28.93	0.035	0.040	0.000	169.8	159.2	97.97	23.54	0.813
0:22	17.362	4.855	0.031	0.108	0.000	45.36	1.376	29.07	0.028	0.034	0.000	167.4	157.0	98.23	23.63	0.816
0:40	16.947	4.949	0.049	0.140	0.000	45.31	1.570	29.05	0.041	0.043	0.000	169.3	158.9	98.09	23.69	0.818
0:57	17.301	4.873	0.055	0.177	0.000	44.62	1.879	28.81	0.048	0.055	0.000	174.0	163.0	97.82	23.48	0.810
1:15	17.826	5.056	0.048	0.161	0.000	44.38	1.931	28.68	0.043	0.048	0.000	175.1	163.8	98.17	23.46	0.810
1:33	17.963	4.901	0.040	0.130	0.000	44.54	1.690	28.84	0.034	0.038	0.000	172.5	161.5	98.18	23.43	0.809
1:51	17.665	4.886	0.042	0.135	0.000	44.88	1.631	29.09	0.036	0.040	0.000	172.0	161.2	98.41	23.58	0.814
2: 8	17.816	4.850	0.037	0.124	0.000	45.10	1.558	29.29	0.032	0.037	0.000	171.9	161.1	98.84	23.66	0.817
2:26	17.525	4.930	0.035	0.115	0.000	45.56	1.478	29.19	0.031	0.035	0.000	169.6	159.0	98.90	23.77	0.821
2:44	17.625	4.770	0.038	0.124	0.000	45.40	1.517	29.26	0.033	0.038	0.000	170.9	160.2	98.81	23.69	0.818
3: 2	17.889	4.838	0.042	0.136	0.000	44.93	1.648	29.19	0.037	0.042	0.000	173.3	162.3	98.75	23.61	0.815
3:20	17.716	4.736	0.042	0.137	0.000	45.15	1.656	29.28	0.037	0.043	0.000	173.1	162.3	98.80	23.65	0.816
3:38	17.733	4.815	0.039	0.128	0.000	45.34	1.575	29.35	0.034	0.041	0.000	172.3	161.5	99.05	23.73	0.819
3:56	17.801	4.747	0.041	0.132	0.000	45.02	1.605	29.34	0.035	0.040	0.000	172.9	162.0	98.76	23.62	0.815
4:14	17.738	4.827	0.041	0.132	0.000	45.12	1.593	29.16	0.035	0.041	0.000	172.0	161.2	98.68	23.63	0.816
4:31	17.784	4.865	0.052	0.162	0.000	44.75	1.829	29.21	0.044	0.049	0.000	175.8	164.6	98.75	23.62	0.815
4:49	18.182	4.775	0.049	0.162	0.000	44.45	1.911	29.20	0.043	0.048	0.000	177.8	166.4	98.82	23.51	0.811
5: 7	18.030	4.697	0.039	0.129	0.000	44.77	1.660	29.28	0.033	0.037	0.000	173.8	162.8	98.67	23.52	0.812

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
7/20/1985																
5:25	17.453	4.454	0.034	0.116	0.000	45.58	1.448	29.84	0.029	0.033	0.000	171.1	160.6	98.99	23.74	0.820
5:43	17.815	4.624	0.036	0.115	0.000	45.28	1.471	29.60	0.031	0.034	0.000	171.8	161.1	99.00	23.68	0.817
6: 0	17.945	4.588	0.038	0.121	0.000	45.10	1.505	29.59	0.033	0.036	0.000	172.7	161.9	98.96	23.62	0.815
6:18	17.654	4.675	0.038	0.123	0.000	45.54	1.501	29.60	0.034	0.037	0.000	171.9	161.2	99.20	23.78	0.821
6:36	17.592	4.808	0.035	0.129	0.000	45.29	1.547	29.42	0.034	0.039	0.000	171.7	161.0	98.89	23.73	0.819
6:54	17.867	4.571	0.040	0.130	0.000	44.89	1.602	29.38	0.035	0.039	0.000	173.1	162.2	98.56	23.52	0.812
7:11	17.831	4.525	0.041	0.131	0.000	44.85	1.603	29.37	0.035	0.039	0.000	173.0	162.1	98.43	23.48	0.811
7:29	17.659	4.647	0.041	0.135	0.000	44.96	1.616	29.35	0.035	0.040	0.000	172.6	161.8	98.48	23.56	0.813
7:47	17.424	4.715	0.041	0.134	0.000	45.08	1.600	29.37	0.035	0.040	0.000	171.7	161.1	98.44	23.62	0.815
8: 5	17.768	4.775	0.042	0.135	0.000	44.62	1.629	29.48	0.036	0.042	0.000	173.6	162.7	98.53	23.57	0.813
8:23	17.722	4.836	0.043	0.138	0.000	44.85	1.661	29.10	0.036	0.042	0.000	172.6	161.7	98.42	23.55	0.813
8:40	17.701	4.914	0.040	0.146	0.000	44.78	1.699	29.00	0.040	0.044	0.000	172.8	161.9	98.36	23.55	0.813
8:58	17.471	4.798	0.045	0.149	0.000	44.97	1.731	29.05	0.039	0.044	0.000	172.7	161.8	98.30	23.57	0.814
9:16	17.669	4.896	0.044	0.144	0.000	44.92	1.728	28.97	0.039	0.043	0.000	172.9	161.9	98.44	23.58	0.814
9:34	17.911	4.947	0.042	0.139	0.000	44.81	1.715	28.93	0.037	0.041	0.000	173.2	162.2	98.58	23.56	0.813
9:52	17.938	4.908	0.044	0.144	0.000	45.00	1.706	29.16	0.039	0.045	0.000	174.2	163.2	98.99	23.66	0.817
10:10	17.690	5.013	0.044	0.145	0.000	44.96	1.722	29.18	0.038	0.045	0.000	173.6	162.7	98.84	23.70	0.818
10:28	17.425	4.650	0.042	0.138	0.000	45.20	1.671	29.28	0.036	0.043	0.000	172.3	161.6	98.49	23.62	0.815
10:45	17.757	4.836	0.043	0.139	0.000	44.79	1.669	29.11	0.037	0.043	0.000	172.9	162.0	98.43	23.55	0.813
11: 7	17.764	4.886	0.043	0.141	0.000	45.06	1.670	29.30	0.040	0.047	0.000	173.7	162.8	98.95	23.70	0.818
11:25	17.787	4.871	0.041	0.136	0.000	44.80	1.673	29.17	0.038	0.042	0.001	173.1	162.2	98.56	23.58	0.814
11:42	17.813	4.768	0.038	0.125	0.000	44.92	1.552	29.28	0.033	0.038	0.000	171.9	161.1	98.57	23.57	0.814
12: 0	17.974	4.795	0.041	0.131	0.000	44.67	1.616	29.17	0.035	0.039	0.000	172.9	162.0	98.47	23.50	0.811
12:17	17.861	4.848	0.042	0.136	0.000	44.81	1.630	29.01	0.036	0.041	0.000	172.4	161.5	98.42	23.52	0.812
12:35	17.694	4.792	0.043	0.141	0.000	44.77	1.682	29.00	0.038	0.042	0.000	172.5	161.6	98.20	23.49	0.811
12:52	17.877	4.879	0.041	0.134	0.000	44.60	1.632	28.99	0.036	0.041	0.000	172.3	161.4	98.22	23.47	0.810
13:10	18.037	4.873	0.042	0.134	0.000	44.50	1.642	28.95	0.036	0.041	0.000	172.8	161.8	98.25	23.43	0.809
13:27	17.897	4.899	0.045	0.144	0.000	44.48	1.664	28.99	0.039	0.042	0.000	173.1	162.1	98.20	23.46	0.810
13:45	17.731	4.771	0.043	0.141	0.000	44.43	1.665	28.92	0.038	0.041	0.000	172.1	161.2	97.77	23.36	0.806
14: 3	17.810	4.868	0.040	0.130	0.000	44.42	1.582	28.97	0.034	0.039	0.000	171.4	160.5	97.89	23.40	0.808
15:45	17.846	4.724	0.039	0.129	0.000	43.86	1.547	29.09	0.036	0.041	0.000	171.6	160.7	97.31	23.21	0.801
16: 2	17.731	4.698	0.037	0.120	0.000	43.86	1.451	29.04	0.032	0.037	0.000	169.7	159.1	97.00	23.15	0.799
16:20	17.590	4.916	0.030	0.098	0.000	44.17	1.210	28.93	0.026	0.030	0.000	165.6	155.4	97.00	23.25	0.803
16:37	17.943	4.874	0.023	0.079	0.000	44.08	0.974	28.99	0.020	0.023	0.000	163.8	153.7	97.00	23.18	0.800
16:55	17.900	4.818	0.008	0.061	0.000	44.29	0.733	29.15	0.015	0.017	0.000	161.0	151.1	97.00	23.21	0.801
18:13	18.113	4.878	0.044	0.143	0.000	44.95	1.681	29.79	0.042	0.047	0.000	176.6	165.5	99.68	23.81	0.822
18:31	17.962	4.922	0.044	0.147	0.000	44.95	1.731	29.60	0.041	0.049	0.000	176.2	165.1	99.44	23.79	0.821
18:48	18.154	4.870	0.043	0.139	0.000	44.69	1.714	29.50	0.038	0.045	0.000	175.9	164.8	99.19	23.66	0.817
19: 6	18.388	4.682	0.043	0.140	0.000	44.69	1.726	29.53	0.039	0.044	0.000	176.9	165.6	99.28	23.59	0.814
19:25	18.038	4.600	0.046	0.152	0.000	44.68	1.751	29.79	0.043	0.048	0.000	177.4	166.2	99.15	23.63	0.816
19:42	18.007	4.882	0.044	0.145	0.000	44.81	1.739	29.66	0.040	0.046	0.000	176.5	165.3	99.37	23.75	0.820
20: 0	18.175	4.696	0.042	0.136	0.000	44.69	1.685	29.66	0.037	0.041	0.000	176.1	165.0	99.17	23.62	0.815
20:18	18.322	4.756	0.041	0.134	0.000	44.75	1.694	29.45	0.036	0.041	0.000	175.9	164.7	99.23	23.61	0.815
20:35	18.032	4.898	0.045	0.148	0.000	44.70	1.744	29.52	0.040	0.047	0.000	176.2	165.1	99.18	23.69	0.818
20:53	17.986	4.878	0.042	0.140	0.000	44.81	1.708	29.51	0.038	0.046	0.000	175.4	164.3	99.16	23.69	0.818

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/20/1985																
21:10	18.082	4.816	0.041	0.135	0.000	44.77	1.672	29.61	0.037	0.044	0.000	175.5	164.4	99.21	23.68	0.817
21:28	18.382	4.734	0.041	0.132	0.000	44.55	1.682	29.58	0.035	0.042	0.000	176.3	165.1	99.18	23.58	0.814
21:46	18.170	4.785	0.044	0.142	0.000	44.59	1.697	29.65	0.038	0.045	0.000	176.4	165.3	99.16	23.63	0.816
22: 4	18.115	4.723	0.042	0.139	0.000	44.76	1.690	29.70	0.037	0.044	0.000	176.2	165.1	99.25	23.66	0.817
22:21	18.137	4.906	0.041	0.132	0.000	44.76	1.654	29.46	0.036	0.042	0.000	174.9	163.8	99.17	23.67	0.817
22:39	18.165	4.628	0.043	0.137	0.000	44.70	1.691	29.70	0.038	0.044	0.000	176.3	165.2	99.15	23.61	0.815
22:57	17.967	4.850	0.045	0.145	0.000	44.69	1.723	29.48	0.040	0.046	0.000	175.6	164.5	98.98	23.64	0.816
23:14	17.817	4.740	0.042	0.138	0.000	44.63	1.698	29.36	0.037	0.044	0.000	174.2	163.2	98.50	23.53	0.812
23:32	17.892	4.713	0.040	0.132	0.000	44.53	1.653	29.21	0.036	0.042	0.000	173.3	162.3	98.25	23.44	0.809
23:50	18.085	4.836	0.042	0.135	0.000	44.63	1.683	29.41	0.037	0.043	0.000	175.0	163.9	98.90	23.59	0.814
7/21/1985																
0: 8	17.973	4.989	0.043	0.141	0.000	44.67	1.679	29.54	0.038	0.045	0.000	175.2	164.1	99.12	23.71	0.818
0:26	17.752	4.994	0.058	0.175	0.000	44.66	1.828	29.43	0.051	0.056	0.000	177.1	165.9	99.00	23.72	0.819
0:43	17.959	4.934	0.056	0.184	0.000	44.46	1.947	29.43	0.051	0.060	0.000	179.2	167.7	99.09	23.67	0.817
1: 1	18.481	4.912	0.044	0.152	0.000	44.20	2.006	29.26	0.038	0.047	0.000	179.5	167.8	99.14	23.53	0.812
1:19	18.064	4.854	0.031	0.102	0.000	45.30	1.464	29.48	0.027	0.031	0.000	171.6	160.8	99.35	23.75	0.820
1:36	17.570	4.988	0.041	0.122	0.000	45.49	1.495	29.57	0.035	0.038	0.000	171.5	160.9	99.34	23.89	0.825
1:54	17.458	4.889	0.055	0.171	0.000	45.01	1.798	29.51	0.049	0.055	0.000	175.9	164.9	99.00	23.78	0.821
2:12	18.269	5.026	0.047	0.162	0.000	44.68	1.994	29.18	0.043	0.050	0.000	178.9	167.3	99.45	23.69	0.818
2:30	18.478	4.747	0.036	0.118	0.000	45.03	1.690	29.66	0.031	0.036	0.000	176.4	165.2	99.83	23.73	0.819
2:47	18.163	4.804	0.036	0.115	0.000	45.34	1.518	29.78	0.032	0.036	0.000	174.0	163.1	99.83	23.84	0.823
3: 6	18.466	5.184	0.039	0.125	0.000	43.73	1.591	30.79	0.034	0.040	0.000	179.4	168.2	100.00	23.87	0.824
3:24	18.171	4.817	0.038	0.123	0.000	45.19	1.568	29.75	0.034	0.041	0.000	174.8	163.8	99.74	23.81	0.822
3:42	18.312	4.727	0.039	0.125	0.000	45.10	1.598	29.64	0.034	0.041	0.000	175.2	164.1	99.61	23.72	0.819
4: 0	18.215	4.878	0.042	0.135	0.000	45.05	1.657	29.64	0.037	0.044	0.000	175.9	164.8	99.69	23.79	0.821
4:18	18.152	4.987	0.039	0.128	0.000	45.19	1.608	29.46	0.035	0.042	0.000	174.4	163.3	99.64	23.81	0.822
4:35	17.989	4.880	0.038	0.122	0.000	45.52	1.563	29.45	0.033	0.040	0.000	173.1	162.2	99.64	23.84	0.823
4:53	18.337	4.832	0.041	0.131	0.000	44.99	1.659	29.52	0.036	0.042	0.000	175.8	164.6	99.58	23.72	0.819
5:11	18.282	4.645	0.043	0.138	0.000	44.89	1.682	29.74	0.038	0.044	0.000	176.8	165.6	99.50	23.68	0.817
5:29	18.203	4.797	0.043	0.140	0.000	45.00	1.706	29.84	0.038	0.045	0.000	177.2	166.0	99.81	23.81	0.822
5:47	18.250	4.821	0.040	0.131	0.000	45.24	1.640	29.76	0.035	0.042	0.000	176.0	164.9	99.96	23.85	0.823
6: 5	18.511	4.912	0.039	0.127	0.000	44.85	1.606	29.82	0.035	0.039	0.000	176.6	165.4	99.94	23.79	0.821
6:22	18.235	4.596	0.043	0.139	0.000	45.14	1.667	30.10	0.039	0.043	0.000	177.7	166.5	100.00	23.82	0.822
6:40	18.049	4.684	0.045	0.145	0.000	44.95	1.730	29.79	0.040	0.045	0.000	176.9	165.8	99.48	23.73	0.819
6:58	17.975	4.762	0.041	0.134	0.000	44.78	1.650	29.60	0.037	0.042	0.000	174.8	163.8	99.02	23.64	0.816
7:16	18.136	4.742	0.043	0.138	0.000	44.52	1.693	29.48	0.038	0.043	0.000	175.6	164.4	98.84	23.54	0.813
7:34	17.868	4.825	0.043	0.142	0.000	44.71	1.702	29.36	0.039	0.044	0.000	174.5	163.5	98.72	23.60	0.814
7:51	17.787	4.795	0.042	0.138	0.000	44.69	1.695	29.48	0.038	0.044	0.000	174.5	163.5	98.71	23.61	0.815
8: 9	17.775	4.765	0.039	0.128	0.000	44.75	1.605	29.36	0.035	0.041	0.000	172.8	161.9	98.49	23.55	0.813
8:27	18.056	4.891	0.043	0.136	0.000	44.59	1.669	29.34	0.038	0.044	0.000	174.6	163.5	98.81	23.58	0.814
8:45	18.038	4.889	0.044	0.144	0.000	44.83	1.707	29.55	0.040	0.047	0.000	175.9	164.8	99.29	23.72	0.819
9: 3	17.914	4.876	0.044	0.147	0.000	45.10	1.757	29.55	0.040	0.048	0.000	176.1	164.9	99.48	23.80	0.821
9:21	18.079	4.934	0.041	0.136	0.000	45.05	1.681	29.47	0.036	0.044	0.000	175.2	164.1	99.47	23.77	0.820
9:39	18.216	4.916	0.042	0.136	0.000	44.98	1.674	29.48	0.037	0.044	0.000	175.6	164.4	99.52	23.74	0.820

GAS CHROMATOGRAPH DATA

DATE	H2	CO2	C2H4	C2H6	O2	N2	CH4	CO	C3H6	C3H8	C3H4	HHV	LHV	TMP	MW	S.G.
TIME	%	%	%	%	%	%	%	%	%	%	%	BTU/SCF		%		WRT AIR

7/21/1985																
10:16	17.883	5.353	0.041	0.135	0.000	45.49	1.659	29.06	0.037	0.043	0.000	172.9	162.0	99.70	23.95	0.827
10:33	17.928	4.886	0.040	0.130	0.000	45.46	1.626	29.62	0.035	0.040	0.000	174.3	163.4	99.76	23.89	0.825
10:51	18.089	4.835	0.043	0.139	0.000	44.76	1.700	29.29	0.038	0.043	0.000	174.9	163.8	98.93	23.60	0.815
11: 8	17.925	4.931	0.044	0.142	0.000	44.87	1.698	29.35	0.039	0.044	0.000	174.7	163.6	99.04	23.69	0.818
11:26	17.854	4.925	0.043	0.141	0.000	44.98	1.730	29.31	0.038	0.044	0.000	174.6	163.5	99.07	23.71	0.818
11:43	17.878	4.988	0.040	0.132	0.000	44.89	1.644	29.22	0.036	0.042	0.000	173.2	162.2	98.87	23.67	0.817
12: 1	18.053	4.990	0.043	0.138	0.000	44.71	1.688	29.19	0.037	0.043	0.000	174.3	163.2	98.90	23.62	0.815
12:19	17.871	5.070	0.043	0.140	0.000	44.89	1.695	29.03	0.038	0.045	0.000	173.4	162.4	98.82	23.66	0.817
12:36	17.867	5.053	0.036	0.123	0.000	45.02	1.568	29.09	0.032	0.040	0.000	171.6	160.8	98.83	23.68	0.817
12:54	17.557	4.907	0.037	0.121	0.000	45.16	1.526	29.18	0.033	0.039	0.000	170.4	159.8	98.56	23.66	0.817
13:11	17.688	5.023	0.039	0.126	0.000	44.95	1.561	29.04	0.035	0.041	0.000	171.0	160.2	98.50	23.63	0.816
13:29	18.003	5.061	0.043	0.138	0.000	44.83	1.678	29.08	0.038	0.044	0.000	173.7	162.7	98.92	23.65	0.817
13:46	17.822	4.943	0.044	0.146	0.000	44.76	1.722	29.11	0.040	0.047	0.000	174.0	162.9	98.63	23.60	0.815
14: 4	17.843	5.098	0.042	0.139	0.000	44.63	1.710	29.16	0.037	0.044	0.000	173.8	162.8	98.70	23.64	0.816
14:21	16.137	4.717	0.041	0.135	0.000	47.11	1.611	28.85	0.037	0.043	0.000	166.1	156.1	98.67	24.02	0.829
14:39	18.032	4.847	0.043	0.141	0.000	44.63	1.735	29.11	0.038	0.045	0.000	174.6	163.4	98.62	23.52	0.812
14:57	17.804	5.018	0.046	0.152	0.000	44.64	1.768	29.12	0.041	0.048	0.000	174.6	163.5	98.63	23.61	0.815
15:14	17.786	5.099	0.042	0.141	0.000	44.80	1.729	29.05	0.038	0.044	0.000	173.5	162.5	98.73	23.66	0.817
15:32	18.034	5.060	0.041	0.131	0.000	44.72	1.673	29.00	0.036	0.041	0.000	173.2	162.2	98.73	23.59	0.814
15:49	18.142	5.088	0.042	0.135	0.000	44.59	1.697	28.89	0.037	0.043	0.000	173.6	162.5	98.66	23.55	0.813
16: 7	18.021	5.108	0.045	0.146	0.000	44.36	1.744	29.26	0.040	0.046	0.000	175.3	164.2	98.77	23.61	0.815
16:25	17.780	4.986	0.043	0.142	0.000	44.79	1.723	28.99	0.038	0.045	0.000	173.3	162.3	98.53	23.59	0.814
16:42	18.030	4.881	0.042	0.135	0.000	44.61	1.693	29.07	0.037	0.043	0.000	173.8	162.7	98.54	23.51	0.812
17: 0	18.265	4.943	0.044	0.142	0.000	44.35	1.744	29.12	0.038	0.044	0.000	175.5	164.2	98.69	23.50	0.811
17:18	17.928	4.983	0.046	0.152	0.000	44.48	1.776	29.14	0.041	0.048	0.000	175.2	164.0	98.60	23.56	0.813
17:36	17.850	4.895	0.043	0.144	0.000	44.63	1.756	29.10	0.039	0.046	0.000	174.3	163.2	98.51	23.54	0.813
17:54	18.000	4.905	0.043	0.137	0.000	44.57	1.716	29.02	0.037	0.044	0.000	173.9	162.8	98.47	23.50	0.811
18:12	18.184	5.150	0.043	0.137	0.000	44.31	1.728	28.95	0.037	0.043	0.000	174.3	163.1	98.58	23.52	0.812
18:29	17.830	4.923	0.045	0.149	0.000	44.52	1.775	28.99	0.040	0.047	0.000	174.2	163.1	98.32	23.50	0.811
18:47	17.768	4.926	0.042	0.140	0.000	44.72	1.742	29.21	0.038	0.045	0.000	174.0	163.0	98.63	23.61	0.815
19: 5	17.961	4.818	0.041	0.134	0.000	44.43	1.680	29.04	0.036	0.043	0.000	173.3	162.3	98.18	23.42	0.808
19:22	18.109	4.817	0.042	0.136	0.000	44.19	1.721	28.91	0.036	0.043	0.000	173.8	162.7	98.00	23.33	0.805
19:40	17.739	5.011	0.044	0.146	0.000	44.37	1.759	28.87	0.040	0.045	0.000	173.2	162.2	98.02	23.45	0.810
19:58	17.695	5.048	0.042	0.139	0.000	44.42	1.804	28.80	0.037	0.043	0.000	173.0	162.0	98.02	23.47	0.810
20:15	17.720	5.181	0.039	0.126	0.000	44.87	1.612	28.66	0.034	0.039	0.000	170.3	159.5	98.28	23.58	0.814
20:33	17.847	5.087	0.041	0.132	0.000	44.75	1.655	28.66	0.036	0.041	0.000	171.4	160.5	98.24	23.51	0.812
21:27	17.956	5.084	0.039	0.127	0.000	44.94	1.618	29.08	0.035	0.041	0.000	172.6	161.6	98.92	23.68	0.817
21:45	18.112	5.006	0.041	0.132	0.000	44.82	1.650	29.14	0.038	0.042	0.000	173.8	162.7	98.98	23.64	0.816
22: 2	17.863	4.875	0.041	0.134	0.000	44.91	1.643	29.23	0.036	0.042	0.000	173.2	162.3	98.78	23.63	0.816
22:20	17.681	5.100	0.041	0.135	0.000	45.10	1.646	29.01	0.037	0.043	0.000	172.0	161.1	98.79	23.71	0.819
22:38	17.874	4.727	0.039	0.129	0.000	45.01	1.633	29.36	0.036	0.040	0.000	173.4	162.5	98.85	23.62	0.815
22:55	18.145	4.926	0.043	0.139	0.000	44.73	1.699	29.15	0.038	0.044	0.000	174.7	163.5	98.92	23.59	0.814
23:13	17.841	5.034	0.043	0.142	0.000	45.01	1.689	29.17	0.039	0.045	0.000	173.7	162.7	99.01	23.72	0.819
23:31	17.767	5.150	0.043	0.142	0.000	45.09	1.738	29.02	0.038	0.045	0.000	173.5	162.5	99.04	23.76	0.820
23:49	17.914	5.113	0.040	0.131	0.000	45.16	1.639	28.96	0.036	0.042	0.000	172.4	161.4	99.04	23.72	0.819

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW WRT AIR	U.G. WRT AIR

7/22/1985																
0: 6	18.082	5.052	0.040	0.130	0.000	44.94	1.625	29.02	0.036	0.041	0.000	172.9	161.9	98.97	23.65	0.816
0:24	17.855	5.083	0.039	0.127	0.000	45.53	1.585	29.02	0.034	0.039	0.000	171.6	160.8	99.31	23.81	0.822
0:42	17.797	5.187	0.039	0.128	0.000	45.76	1.581	29.17	0.035	0.039	0.000	171.9	161.1	99.74	23.97	0.827
1: 0	17.883	5.235	0.040	0.132	0.000	45.66	1.615	29.17	0.036	0.041	0.000	172.7	161.8	99.81	23.97	0.827
1:18	18.215	5.202	0.041	0.132	0.000	45.52	1.657	29.16	0.036	0.042	0.000	174.2	163.1	100.00	23.93	0.826
1:36	18.086	5.240	0.043	0.140	0.000	45.39	1.706	29.01	0.038	0.044	0.000	174.1	163.0	99.70	23.88	0.824
1:54	17.911	5.281	0.042	0.138	0.000	45.62	1.690	28.94	0.037	0.042	0.000	173.0	162.0	99.70	23.93	0.826
2:12	17.990	5.326	0.034	0.117	0.000	46.08	1.539	28.67	0.031	0.037	0.000	170.1	159.3	99.83	23.97	0.827
2:29	17.494	5.000	0.027	0.088	0.000	46.58	1.222	29.49	0.023	0.028	0.000	166.9	156.7	99.96	24.12	0.833
2:47	17.595	5.161	0.053	0.167	0.000	45.67	1.711	29.31	0.048	0.054	0.000	174.7	163.7	99.77	24.02	0.829
3: 5	18.226	5.165	0.050	0.168	0.000	45.20	1.972	29.12	0.045	0.052	0.000	178.6	167.0	100.00	23.88	0.824
3:23	18.390	4.957	0.041	0.132	0.000	45.03	1.760	29.20	0.036	0.040	0.000	175.9	164.6	99.59	23.71	0.819
3:41	18.093	4.798	0.038	0.121	0.000	45.36	1.577	29.46	0.033	0.037	0.000	173.5	162.6	99.52	23.77	0.820
3:58	17.784	4.919	0.039	0.121	0.000	45.58	1.524	29.48	0.034	0.037	0.000	172.1	161.4	99.52	23.87	0.824
4:16	17.596	4.967	0.037	0.117	0.000	46.04	1.447	29.31	0.032	0.036	0.000	170.0	159.5	99.59	23.96	0.827
4:34	17.953	5.005	0.040	0.127	0.000	45.76	1.555	29.48	0.036	0.039	0.000	173.2	162.3	100.00	23.98	0.828
4:52	18.174	4.927	0.045	0.143	0.000	45.28	1.695	29.62	0.040	0.044	0.000	176.3	165.2	99.96	23.88	0.824
5:10	18.172	4.926	0.044	0.141	0.000	45.33	1.748	29.56	0.038	0.042	0.000	176.5	165.3	100.00	23.88	0.824
5:28	18.151	4.902	0.038	0.120	0.000	45.53	1.561	29.63	0.032	0.036	0.000	174.1	163.1	100.00	23.91	0.825
5:45	18.123	4.766	0.042	0.118	0.000	45.58	1.507	29.79	0.034	0.036	0.000	174.0	163.1	100.00	23.90	0.825
6: 3	17.988	4.816	0.041	0.127	0.000	45.62	1.567	29.77	0.035	0.040	0.000	174.4	163.4	100.00	23.93	0.826
6:21	17.406	4.533	0.039	0.122	0.000	46.17	1.498	29.97	0.034	0.039	0.000	172.2	161.7	99.81	23.99	0.828
6:39	17.743	4.865	0.045	0.142	0.000	45.63	1.626	29.78	0.039	0.045	0.000	174.7	163.9	99.91	23.98	0.828
6:57	18.213	4.806	0.047	0.155	0.000	44.97	1.816	29.64	0.042	0.049	0.000	178.2	166.8	99.74	23.77	0.821
7:14	18.511	4.844	0.043	0.156	0.000	44.75	1.846	29.50	0.042	0.049	0.000	179.0	167.4	99.74	23.70	0.818
7:32	18.100	4.892	0.044	0.142	0.000	45.32	1.731	29.66	0.039	0.043	0.000	176.5	165.4	99.97	23.89	0.825
7:51	17.882	4.986	0.043	0.130	0.000	45.67	1.619	29.58	0.038	0.039	0.000	174.1	163.2	99.99	23.98	0.828
8: 9	17.636	4.937	0.041	0.126	0.000	45.77	1.544	29.35	0.036	0.039	0.000	171.6	160.9	99.47	23.90	0.825
8:27	17.814	4.806	0.045	0.141	0.000	45.32	1.672	29.43	0.040	0.044	0.000	174.3	163.3	99.31	23.77	0.821
8:45	17.850	5.002	0.047	0.153	0.000	45.10	1.782	29.39	0.041	0.048	0.000	175.8	164.7	99.42	23.81	0.822
9: 7	17.973	4.939	0.044	0.141	0.000	45.40	1.728	29.67	0.040	0.046	0.000	176.2	165.1	99.98	23.94	0.826
9:24	18.093	4.812	0.045	0.142	0.000	45.10	1.694	29.52	0.040	0.046	0.000	175.8	164.7	99.48	23.75	0.820
9:42	18.134	4.841	0.043	0.138	0.000	45.04	1.702	29.51	0.037	0.043	0.000	175.8	164.6	99.49	23.74	0.820
9:59	17.922	4.883	0.040	0.129	0.000	45.60	1.598	29.70	0.035	0.039	0.000	174.3	163.4	99.95	23.94	0.826
10:17	17.838	5.108	0.036	0.114	0.000	45.94	1.479	29.23	0.032	0.035	0.000	170.8	160.1	99.81	23.98	0.828
10:35	18.013	4.971	0.038	0.117	0.000	45.75	1.473	29.57	0.033	0.036	0.000	172.5	161.7	100.00	23.96	0.827
10:52	18.051	4.918	0.039	0.122	0.000	45.69	1.528	29.53	0.034	0.038	0.000	173.2	162.3	99.96	23.93	0.826
12: 3	17.683	5.284	0.021	0.055	0.000	45.90	1.020	29.62	0.016	0.015	0.000	164.7	154.7	99.62	24.04	0.830
12:21	17.234	5.691	0.019	0.049	0.000	46.36	0.952	29.30	0.014	0.014	0.000	161.3	151.6	99.63	24.23	0.836
12:39	17.351	5.428	0.020	0.053	0.000	45.99	1.004	29.52	0.015	0.015	0.000	163.1	153.3	99.40	24.09	0.832
12:56	17.286	5.457	0.022	0.057	0.000	45.77	1.047	29.63	0.016	0.016	0.000	163.8	154.0	99.30	24.08	0.831
13:14	17.427	5.443	0.022	0.058	0.000	45.69	1.068	29.77	0.016	0.016	0.000	165.0	155.0	99.51	24.10	0.832
13:31	17.462	5.512	0.024	0.062	0.000	45.48	1.129	29.62	0.017	0.017	0.000	165.3	155.3	99.32	24.04	0.830
13:49	17.663	5.513	0.026	0.065	0.000	45.26	1.196	29.58	0.018	0.018	0.000	166.7	156.5	99.34	23.98	0.828
14: 7	17.716	5.642	0.026	0.066	0.000	45.05	1.207	29.57	0.018	0.018	0.000	167.0	156.7	99.32	23.98	0.828
14:24	17.622	5.530	0.027	0.066	0.000	45.04	1.200	29.59	0.019	0.018	0.000	166.7	156.5	99.11	23.93	0.826

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR
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7/22/1985

14:42	17.757	5.486	0.029	0.070	0.000	44.84	1.261	29.69	0.020	0.019	0.000	168.2	157.9	99.18	23.90	0.825
15: 0	17.752	5.491	0.030	0.072	0.000	44.67	1.299	29.46	0.020	0.019	0.000	167.9	157.5	98.81	23.80	0.821
15:17	17.778	5.596	0.030	0.072	0.000	44.72	1.290	29.66	0.020	0.019	0.000	168.5	158.1	99.19	23.91	0.825
15:35	17.845	5.421	0.030	0.074	0.000	44.61	1.320	29.74	0.021	0.019	0.000	169.3	158.9	99.07	23.83	0.823
15:52	17.883	5.300	0.030	0.071	0.000	44.57	1.301	30.08	0.020	0.019	0.000	170.3	159.9	99.27	23.86	0.824
16:10	18.077	5.585	0.031	0.074	0.000	44.06	1.333	30.32	0.021	0.020	0.000	172.1	161.6	99.52	23.92	0.826
16:28	17.888	5.448	0.030	0.072	0.000	44.60	1.320	29.90	0.020	0.020	0.000	170.0	159.5	99.30	23.89	0.825
16:46	18.089	5.461	0.033	0.079	0.000	44.15	1.433	29.89	0.023	0.022	0.000	172.0	161.3	99.18	23.79	0.821
17: 4	18.199	5.484	0.034	0.082	0.000	43.86	1.473	29.94	0.024	0.023	0.000	173.1	162.3	99.12	23.75	0.820
17:22	18.189	5.504	0.034	0.082	0.000	43.92	1.469	29.92	0.023	0.022	0.000	172.9	162.1	99.16	23.76	0.820
17:39	18.148	5.291	0.033	0.078	0.000	44.03	1.427	29.86	0.022	0.021	0.000	172.0	161.3	98.91	23.67	0.817
17:57	18.325	5.395	0.034	0.082	0.000	43.82	1.521	29.92	0.022	0.021	0.000	173.8	162.9	99.14	23.70	0.818
18:15	17.964	5.555	0.033	0.077	0.000	44.27	1.442	29.57	0.021	0.020	0.000	170.6	159.9	98.96	23.78	0.821
18:32	17.927	5.673	0.033	0.078	0.000	44.31	1.459	29.40	0.022	0.020	0.000	170.1	159.5	98.92	23.79	0.821
18:50	18.014	5.752	0.034	0.081	0.000	44.26	1.482	29.34	0.023	0.021	0.000	170.5	159.8	99.00	23.80	0.822
19: 7	18.150	5.577	0.034	0.081	0.000	44.10	1.493	29.53	0.023	0.022	0.000	171.8	161.0	99.02	23.74	0.820
19:25	18.125	5.553	0.029	0.076	0.000	44.30	1.419	29.81	0.022	0.021	0.000	171.6	160.9	99.35	23.85	0.823
19:43	18.015	5.641	0.033	0.078	0.000	44.36	1.414	29.73	0.022	0.021	0.000	171.0	160.4	99.32	23.88	0.824
20: 0	18.050	5.657	0.034	0.080	0.000	44.27	1.436	29.64	0.023	0.021	0.000	171.1	160.5	99.21	23.84	0.823
20:18	18.051	5.775	0.034	0.083	0.000	44.36	1.487	29.29	0.023	0.022	0.000	170.6	159.9	99.12	23.83	0.823
20:36	17.839	5.636	0.034	0.080	0.000	44.51	1.479	29.63	0.023	0.022	0.000	170.9	160.3	99.25	23.90	0.825
20:53	18.205	5.576	0.035	0.084	0.000	43.94	1.531	29.74	0.024	0.022	0.000	173.1	162.2	99.16	23.76	0.820
21:11	18.314	5.464	0.034	0.080	0.000	44.07	1.490	29.82	0.023	0.020	0.000	173.1	162.2	99.31	23.76	0.820
21:28	18.113	5.611	0.035	0.082	0.000	44.29	1.476	29.81	0.023	0.021	0.000	172.3	161.6	99.46	23.88	0.824
21:46	18.140	5.701	0.035	0.083	0.000	44.29	1.495	29.73	0.024	0.021	0.000	172.4	161.6	99.52	23.90	0.825
22: 4	18.322	5.699	0.036	0.086	0.000	43.99	1.553	29.48	0.024	0.022	0.000	172.9	161.9	99.21	23.76	0.820
22:22	18.099	6.265	0.035	0.085	0.000	44.53	1.588	28.81	0.024	0.023	0.000	170.4	159.5	99.46	23.98	0.828
22:39	18.445	5.849	0.037	0.088	0.000	44.01	1.639	29.26	0.025	0.024	0.000	173.6	162.5	99.37	23.79	0.821
22:57	18.648	5.957	0.033	0.090	0.000	43.85	1.668	29.29	0.025	0.024	0.000	174.6	163.4	99.60	23.81	0.822
23:15	18.342	5.901	0.036	0.085	0.000	44.11	1.591	29.32	0.024	0.023	0.000	172.8	161.8	99.43	23.85	0.823
23:32	18.280	5.949	0.036	0.085	0.000	44.23	1.596	29.25	0.024	0.023	0.000	172.4	161.5	99.47	23.88	0.824
23:50	18.444	5.991	0.037	0.089	0.000	44.07	1.648	29.20	0.024	0.023	0.000	173.4	162.3	99.53	23.86	0.823

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0: 8	18.904	6.040	0.037	0.086	0.000	43.44	1.653	29.63	0.024	0.022	0.000	176.3	164.9	99.83	23.83	0.823
0:26	18.649	5.998	0.038	0.088	0.000	44.08	1.709	28.88	0.025	0.024	0.001	173.7	162.5	99.49	23.79	0.821
0:44	18.635	5.858	0.038	0.089	0.000	44.00	1.672	29.18	0.025	0.023	0.000	174.3	163.0	99.52	23.78	0.821
1: 2	18.575	5.925	0.038	0.088	0.000	43.95	1.624	29.31	0.025	0.023	0.000	173.9	162.8	99.55	23.82	0.822
1:20	18.267	5.816	0.037	0.086	0.000	43.79	1.582	29.28	0.025	0.021	0.000	172.4	161.4	98.90	23.71	0.818
1:37	16.639	5.628	0.037	0.086	0.000	46.84	1.536	28.56	0.025	0.022	0.000	164.3	154.2	99.37	24.24	0.837
1:55	18.828	5.840	0.038	0.089	0.000	43.80	1.650	29.47	0.025	0.022	0.000	175.6	164.3	99.76	23.80	0.821
2:13	19.073	5.984	0.036	0.085	0.000	43.13	1.604	30.05	0.024	0.021	0.000	177.6	166.2	100.00	23.83	0.823
2:31	18.825	5.939	0.036	0.085	0.000	44.02	1.599	29.41	0.024	0.021	0.000	174.7	163.5	99.95	23.87	0.824
2:48	18.747	5.811	0.036	0.085	0.000	44.14	1.557	29.58	0.024	0.022	0.000	174.6	163.5	100.00	23.89	0.825
3: 6	18.867	5.723	0.036	0.085	0.000	43.93	1.567	29.65	0.024	0.022	0.000	175.3	164.1	99.90	23.82	0.822

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW WRT AIR	U.G. WRT AIR

7/23/1985																
3:24	18.847	5.507	0.037	0.085	0.000	43.95	1.555	29.97	0.023	0.022	0.000	176.2	165.0	100.00	23.82	0.822
3:42	19.026	5.564	0.037	0.085	0.000	43.72	1.586	29.93	0.024	0.022	0.000	176.9	165.6	100.00	23.78	0.821
4: 0	18.858	5.573	0.036	0.085	0.000	43.79	1.560	30.05	0.023	0.022	0.000	176.5	165.3	100.00	23.82	0.822
4:17	18.835	5.499	0.034	0.079	0.000	43.65	1.559	29.98	0.022	0.021	0.000	176.0	164.8	99.68	23.73	0.819
4:35	18.754	5.394	0.034	0.080	0.000	43.60	1.520	30.13	0.022	0.022	0.000	175.9	164.8	99.56	23.71	0.818
4:53	18.766	5.172	0.034	0.082	0.000	43.54	1.545	30.39	0.022	0.022	0.000	177.0	165.9	99.57	23.67	0.817
5:11	18.853	4.981	0.036	0.082	0.000	43.37	1.548	30.60	0.023	0.022	0.000	178.0	166.8	99.52	23.60	0.815
5:28	19.268	5.031	0.039	0.091	0.000	42.78	1.665	30.52	0.025	0.024	0.000	180.6	169.1	99.44	23.46	0.810
5:46	19.098	5.112	0.033	0.086	0.000	43.09	1.575	30.78	0.025	0.021	0.000	179.7	168.4	99.82	23.64	0.816
6: 4	19.503	5.305	0.039	0.085	0.000	42.38	1.607	31.04	0.025	0.021	0.000	182.3	170.7	100.00	23.61	0.815
6:22	18.938	5.494	0.036	0.084	0.000	43.57	1.579	30.03	0.023	0.021	0.000	176.8	165.6	99.78	23.73	0.819
6:40	18.680	4.839	0.035	0.080	0.000	43.55	1.487	30.92	0.023	0.020	0.000	177.8	166.7	99.63	23.66	0.817
6:58	18.902	4.809	0.037	0.083	0.000	43.28	1.533	31.05	0.024	0.021	0.000	179.5	168.3	99.74	23.62	0.815
7:16	18.840	4.888	0.037	0.085	0.000	43.26	1.546	30.96	0.024	0.022	0.000	179.2	168.0	99.66	23.63	0.816
7:33	18.945	5.146	0.036	0.084	0.000	43.13	1.572	30.58	0.024	0.021	0.000	178.5	167.3	99.54	23.60	0.815
7:51	19.109	5.223	0.038	0.088	0.000	42.89	1.651	30.44	0.025	0.022	0.000	179.6	168.1	99.49	23.55	0.813
8:17	18.816	5.704	0.037	0.089	0.000	43.88	1.636	29.78	0.029	0.027	0.000	176.6	165.3	100.00	23.85	0.823
8:35	18.869	5.559	0.039	0.088	0.000	43.14	1.620	30.16	0.027	0.025	0.001	177.7	166.4	99.53	23.68	0.817
8:52	19.485	4.689	0.040	0.092	0.000	41.99	1.690	31.19	0.027	0.025	0.000	183.8	172.2	99.24	23.29	0.804
9:10	19.492	4.610	0.039	0.090	0.000	42.12	1.647	31.31	0.025	0.025	0.000	183.7	172.1	99.35	23.31	0.805
9:27	19.311	4.641	0.038	0.087	0.000	42.28	1.638	31.36	0.025	0.022	0.000	183.1	171.5	99.41	23.38	0.807
9:45	19.399	4.614	0.038	0.087	0.000	42.43	1.664	31.17	0.025	0.023	0.000	183.0	171.4	99.45	23.36	0.807
10: 2	19.113	4.759	0.037	0.085	0.000	42.65	1.601	31.18	0.024	0.021	0.000	181.4	170.0	99.47	23.48	0.810
10:20	18.775	4.953	0.037	0.086	0.000	42.94	1.569	30.86	0.025	0.022	0.000	179.0	167.8	99.27	23.54	0.813
10:37	18.688	5.080	0.031	0.081	0.000	43.01	1.535	30.69	0.023	0.021	0.000	177.6	166.5	99.16	23.56	0.813
11:12	18.874	5.489	0.035	0.085	0.000	43.07	1.615	30.07	0.023	0.021	0.000	177.1	165.9	99.29	23.60	0.815
11:30	19.163	5.080	0.036	0.086	0.000	42.58	1.654	30.58	0.024	0.022	0.000	180.2	168.7	99.22	23.44	0.809
11:48	19.192	4.837	0.037	0.085	0.000	42.26	1.638	30.98	0.024	0.022	0.000	181.4	169.9	99.08	23.35	0.806
12: 5	19.478	4.832	0.038	0.086	0.000	41.60	1.643	31.48	0.024	0.023	0.000	184.0	172.4	99.21	23.31	0.805
12:23	18.575	5.640	0.031	0.081	0.000	43.21	1.566	29.97	0.023	0.020	0.000	175.2	164.1	99.12	23.66	0.817
12:40	18.925	5.002	0.036	0.086	0.000	42.31	1.606	31.05	0.024	0.022	0.000	180.4	169.1	99.07	23.45	0.809
12:58	19.361	4.625	0.037	0.086	0.000	41.94	1.638	31.36	0.025	0.022	0.000	183.2	171.6	99.10	23.28	0.804
13:15	19.274	4.590	0.037	0.088	0.000	42.13	1.651	31.41	0.025	0.022	0.000	183.2	171.7	99.22	23.33	0.805
13:33	19.020	4.507	0.035	0.080	0.000	42.57	1.564	31.31	0.023	0.021	0.000	181.0	169.7	99.13	23.37	0.807
13:51	16.732	4.394	0.035	0.082	0.000	45.16	1.475	31.14	0.023	0.023	0.000	172.2	162.1	99.06	23.94	0.826
14: 8	19.075	4.732	0.035	0.083	0.000	41.80	1.565	32.08	0.023	0.023	0.000	183.7	172.4	99.41	23.47	0.810
14:26	18.660	4.939	0.034	0.080	0.000	42.83	1.548	30.94	0.021	0.022	0.000	178.4	167.3	99.08	23.52	0.812
14:43	18.855	4.628	0.033	0.080	0.000	42.57	1.555	31.10	0.022	0.022	0.000	179.6	168.4	98.86	23.36	0.806
15: 1	19.204	4.628	0.035	0.083	0.000	42.18	1.621	31.33	0.023	0.023	0.000	182.3	170.8	99.12	23.33	0.805
15:19	19.119	4.514	0.035	0.083	0.000	41.93	1.634	31.07	0.023	0.022	0.000	181.3	169.9	98.42	23.14	0.799
15:36	19.048	4.497	0.035	0.081	0.000	42.03	1.607	31.42	0.022	0.022	0.000	181.9	170.5	98.77	23.25	0.803
15:55	19.233	4.380	0.036	0.084	0.000	41.83	1.639	31.56	0.023	0.023	0.000	183.3	171.9	98.81	23.19	0.801
16:13	19.629	4.582	0.037	0.089	0.000	41.14	1.703	31.90	0.024	0.022	0.000	186.5	174.7	99.12	23.20	0.801
16:30	19.148	4.782	0.035	0.085	0.000	41.97	1.669	31.02	0.023	0.021	0.000	181.6	170.1	98.75	23.26	0.803
16:48	18.946	4.709	0.034	0.079	0.000	42.22	1.578	31.05	0.022	0.020	0.000	179.9	168.7	98.66	23.28	0.804
17: 6	19.036	4.367	0.036	0.083	0.000	41.84	1.593	31.54	0.024	0.021	0.000	182.1	170.8	98.54	23.17	0.800

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR
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17:23	18.975	4.399	0.035	0.082	0.000	41.87	1.577	31.55	0.023	0.021	0.000	181.8	170.5	98.53	23.19	0.801
17:41	18.947	4.487	0.035	0.083	0.000	42.01	1.591	31.24	0.023	0.021	0.000	180.8	169.5	98.43	23.18	0.800
17:59	19.027	4.520	0.036	0.084	0.000	41.79	1.629	31.40	0.024	0.023	0.000	182.1	170.7	98.53	23.19	0.801
18:16	18.639	5.130	0.035	0.084	0.000	42.42	1.587	30.48	0.023	0.023	0.000	177.4	166.3	98.42	23.37	0.807
18:34	18.831	4.630	0.034	0.081	0.000	42.07	1.558	31.07	0.023	0.022	0.000	179.5	168.3	98.32	23.21	0.801
18:51	19.364	4.396	0.037	0.087	0.000	41.25	1.648	31.61	0.024	0.024	0.000	184.1	172.6	98.45	23.06	0.796
19: 9	19.264	4.219	0.037	0.086	0.000	41.38	1.615	31.89	0.024	0.024	0.000	184.3	172.9	98.54	23.09	0.797
19:27	19.093	4.095	0.036	0.085	0.000	41.46	1.577	31.79	0.024	0.023	0.000	183.0	171.7	98.18	23.02	0.795
19:44	19.153	4.094	0.037	0.084	0.000	41.44	1.580	31.79	0.024	0.023	0.000	183.3	171.9	98.23	23.01	0.794
20: 2	19.180	4.358	0.037	0.087	0.000	41.25	1.607	31.73	0.025	0.024	0.000	183.5	172.1	98.30	23.06	0.796
20:20	18.817	4.927	0.035	0.082	0.000	42.13	1.556	30.71	0.023	0.020	0.000	178.3	167.1	98.30	23.25	0.803
20:38	18.990	4.705	0.036	0.085	0.000	41.95	1.595	30.83	0.024	0.022	0.000	179.8	168.4	98.23	23.15	0.799
20:55	19.142	4.653	0.036	0.085	0.000	41.83	1.630	31.09	0.024	0.022	0.000	181.5	170.0	98.51	23.18	0.800
21:13	19.320	4.578	0.036	0.086	0.000	41.56	1.653	31.11	0.024	0.022	0.000	182.3	170.8	98.39	23.08	0.797
21:31	19.272	4.250	0.036	0.083	0.000	41.49	1.575	31.73	0.024	0.021	0.000	183.3	171.9	98.48	23.08	0.797
21:48	19.245	4.314	0.036	0.084	0.000	41.60	1.555	31.56	0.025	0.022	0.000	182.5	171.1	98.44	23.09	0.797
22: 6	19.671	4.438	0.037	0.085	0.000	40.80	1.607	32.15	0.025	0.022	0.000	186.4	174.7	98.84	23.10	0.797
22:24	19.124	4.567	0.036	0.083	0.000	41.95	1.598	31.22	0.023	0.022	0.000	181.4	170.1	98.63	23.20	0.801
22:41	19.254	4.524	0.036	0.084	0.000	41.64	1.626	31.21	0.023	0.022	0.000	182.1	170.7	98.42	23.10	0.797
22:59	19.213	4.469	0.037	0.084	0.000	41.38	1.635	31.13	0.024	0.022	0.000	181.9	170.4	97.99	22.98	0.793
23:17	18.996	4.430	0.035	0.080	0.000	41.48	1.559	31.16	0.023	0.022	0.000	180.4	169.1	97.79	22.99	0.793

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0:12	18.607	4.929	0.034	0.082	0.000	42.40	1.535	30.29	0.023	0.023	0.000	176.1	165.0	97.92	23.21	0.801
0:30	18.837	5.041	0.035	0.084	0.000	41.83	1.611	30.23	0.024	0.023	0.000	177.5	166.3	97.72	23.10	0.797
0:47	18.795	4.730	0.035	0.083	0.000	41.63	1.573	30.89	0.024	0.024	0.000	179.1	167.9	97.78	23.08	0.797
1: 5	19.070	4.263	0.035	0.081	0.000	41.34	1.583	31.32	0.024	0.023	0.000	181.4	170.1	97.74	22.92	0.791
1:22	18.950	4.420	0.035	0.081	0.000	41.75	1.533	31.41	0.024	0.023	0.000	180.8	169.6	98.22	23.12	0.798
1:40	18.984	4.492	0.035	0.083	0.000	42.00	1.537	31.45	0.023	0.022	0.000	181.1	169.8	98.62	23.24	0.802
1:57	19.433	4.286	0.035	0.082	0.000	41.63	1.576	31.77	0.023	0.022	0.000	184.0	172.5	98.86	23.15	0.799
2:15	19.133	4.287	0.034	0.082	0.000	41.63	1.558	31.70	0.023	0.021	0.000	182.5	171.2	98.47	23.12	0.798
2:32	19.287	3.934	0.032	0.075	0.000	41.31	1.504	32.04	0.021	0.019	0.000	183.3	172.0	98.21	22.96	0.792
2:50	19.575	3.875	0.035	0.079	0.000	41.05	1.549	32.00	0.023	0.020	0.000	184.8	173.2	98.21	22.86	0.789
3: 8	19.339	3.987	0.035	0.081	0.000	41.35	1.548	32.05	0.024	0.021	0.000	184.2	172.8	98.43	23.01	0.794
3:25	19.329	4.077	0.036	0.083	0.000	41.35	1.548	31.97	0.024	0.022	0.000	184.0	172.6	98.44	23.03	0.795
3:43	19.387	4.013	0.038	0.088	0.000	41.21	1.634	31.81	0.025	0.023	0.000	184.7	173.2	98.23	22.93	0.792
4: 0	19.257	4.210	0.038	0.088	0.000	41.27	1.646	31.43	0.025	0.023	0.000	183.2	171.7	97.98	22.93	0.791
4:18	19.120	4.407	0.035	0.084	0.000	41.64	1.589	31.58	0.023	0.023	0.000	182.5	171.1	98.50	23.15	0.799
4:35	19.374	4.230	0.037	0.088	0.000	41.01	1.637	31.77	0.024	0.023	0.000	184.6	173.0	98.20	22.96	0.793
4:53	19.262	4.189	0.037	0.085	0.000	41.16	1.574	31.88	0.024	0.023	0.000	183.9	172.4	98.23	23.00	0.794
5:10	19.166	4.054	0.036	0.083	0.000	41.41	1.525	31.99	0.023	0.023	0.000	183.3	172.0	98.31	23.03	0.795
5:28	19.153	4.264	0.036	0.084	0.000	41.45	1.523	31.76	0.023	0.023	0.000	182.6	171.2	98.32	23.07	0.796
5:45	18.942	4.414	0.036	0.087	0.000	41.45	1.553	31.20	0.024	0.024	0.000	180.5	169.2	97.74	22.98	0.793
6: 3	19.501	4.309	0.036	0.086	0.000	40.47	1.583	31.97	0.024	0.023	0.000	185.0	173.5	98.00	22.89	0.790
6:21	19.202	4.283	0.038	0.091	0.000	41.04	1.633	31.60	0.025	0.023	0.000	183.5	172.0	97.93	22.94	0.792

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW C.G. WRT AIR

7/24/1985															
6:38	19.014	4.087	0.035	0.078	0.000	41.57	1.468	31.69	0.023	0.020	0.000	181.1	169.9	97.99	0.794
6:56	18.844	4.578	0.037	0.087	0.000	41.60	1.566	31.19	0.025	0.022	0.000	180.2	169.0	97.95	0.797
7:13	19.411	4.555	0.037	0.086	0.000	41.29	1.603	30.87	0.024	0.022	0.000	181.4	169.9	97.90	0.791
7:32	18.994	5.000	0.036	0.083	0.000	41.94	1.542	30.70	0.024	0.021	0.000	178.8	167.5	98.33	0.802
7:50	19.352	4.678	0.037	0.087	0.000	41.18	1.587	31.08	0.024	0.023	0.000	181.8	170.3	98.05	0.794
8: 7	19.813	4.680	0.037	0.087	0.000	40.58	1.629	31.64	0.024	0.022	0.000	185.5	173.7	98.51	0.794
8:25	18.964	5.356	0.035	0.083	0.000	42.24	1.571	29.82	0.023	0.022	0.000	176.1	164.8	98.11	0.802
8:43	18.971	4.948	0.035	0.084	0.000	41.74	1.572	30.69	0.023	0.022	0.000	179.0	167.7	98.09	0.799
9: 0	17.741	4.269	0.036	0.085	0.000	43.71	1.560	30.38	0.024	0.023	0.000	173.9	163.3	97.82	0.804
9:18	19.185	4.743	0.036	0.087	0.000	41.41	1.632	30.86	0.024	0.023	0.000	180.9	169.5	98.00	0.795
9:35	20.024	4.233	0.037	0.088	0.000	39.83	1.709	32.20	0.024	0.023	0.000	188.8	176.8	98.16	0.786
10:11	19.565	4.849	0.038	0.088	0.000	40.46	1.661	31.38	0.026	0.023	0.000	184.2	172.5	98.09	0.793
10:28	18.957	4.868	0.036	0.083	0.000	41.54	1.562	30.74	0.024	0.021	0.000	179.0	167.7	97.83	0.797
10:46	18.832	5.065	0.036	0.087	0.000	41.51	1.603	30.33	0.024	0.022	0.000	177.8	166.5	97.51	0.796
11: 4	19.199	4.859	0.033	0.080	0.000	41.29	1.577	30.56	0.022	0.020	0.000	179.2	167.8	97.64	0.792
11:39	18.863	4.433	0.031	0.065	0.000	41.96	1.306	31.16	0.019	0.016	0.000	176.8	165.9	97.86	0.796
11:57	18.950	4.301	0.030	0.066	0.000	41.98	1.295	31.32	0.019	0.016	0.000	177.5	166.6	97.98	0.796
12:15	18.633	4.854	0.032	0.067	0.000	42.28	1.296	30.39	0.020	0.017	0.000	173.6	162.8	97.59	0.798
12:32	18.823	4.591	0.032	0.070	0.000	41.94	1.337	30.72	0.020	0.018	0.000	175.7	164.8	97.55	0.794
12:50	18.976	4.308	0.031	0.069	0.000	41.72	1.321	31.12	0.020	0.017	0.000	177.3	166.3	97.58	0.792
13: 8	19.291	4.177	0.030	0.070	0.000	41.37	1.343	31.34	0.019	0.018	0.000	179.3	168.1	97.66	0.789
13:25	19.036	4.162	0.031	0.072	0.000	41.54	1.330	31.33	0.020	0.019	0.000	178.3	167.3	97.53	0.790
13:43	18.916	4.480	0.032	0.072	0.000	41.81	1.332	31.03	0.020	0.019	0.000	177.1	166.1	97.71	0.795
14: 1	19.043	4.173	0.031	0.072	0.000	41.51	1.343	31.35	0.020	0.020	0.000	178.6	167.6	97.56	0.790
14:18	19.008	4.555	0.032	0.075	0.000	41.66	1.393	30.97	0.021	0.019	0.000	177.8	166.8	97.73	0.794
14:36	19.337	4.073	0.033	0.076	0.000	41.11	1.417	31.63	0.022	0.019	0.000	181.3	170.0	97.72	0.788
14:54	19.342	4.083	0.033	0.076	0.000	41.07	1.406	31.66	0.022	0.019	0.000	181.3	170.1	97.71	0.788
15:13	19.412	3.988	0.034	0.077	0.000	41.03	1.405	31.76	0.022	0.020	0.000	181.9	170.6	97.75	0.788
15:30	19.122	4.307	0.033	0.074	0.000	41.61	1.326	31.32	0.022	0.019	0.000	178.7	167.6	97.83	0.793
15:48	19.005	4.782	0.032	0.076	0.000	41.99	1.348	30.71	0.022	0.020	0.000	176.6	165.6	97.98	0.798
16: 6	19.156	4.523	0.032	0.075	0.000	41.71	1.360	31.04	0.021	0.020	0.000	178.3	167.1	97.94	0.795
16:24	18.890	4.883	0.032	0.074	0.000	42.16	1.347	30.25	0.021	0.020	0.000	174.7	163.7	97.68	0.797
16:41	19.345	4.450	0.035	0.079	0.000	41.21	1.402	31.23	0.022	0.021	0.000	180.1	168.8	97.80	0.791
16:59	19.162	5.208	0.033	0.078	0.000	41.68	1.391	30.14	0.021	0.021	0.000	175.8	164.6	97.74	0.796
17:17	19.321	4.880	0.034	0.078	0.000	41.45	1.410	30.58	0.023	0.020	0.000	177.9	166.7	97.79	0.794
17:35	19.033	5.006	0.034	0.078	0.000	41.77	1.375	30.42	0.022	0.020	0.000	176.1	165.0	97.77	0.797
17:52	18.982	4.926	0.033	0.076	0.000	42.04	1.352	30.23	0.022	0.019	0.000	175.0	164.0	97.68	0.796
18:10	19.209	5.983	0.032	0.075	0.000	42.21	1.368	29.20	0.021	0.019	0.000	172.6	161.4	98.12	0.804
18:28	19.121	4.880	0.034	0.076	0.000	41.83	1.357	30.35	0.022	0.019	0.000	176.0	164.8	97.69	0.795
18:46	19.102	5.001	0.036	0.078	0.000	41.85	1.396	30.33	0.023	0.020	0.000	176.3	165.2	97.83	0.797
19: 3	19.194	4.901	0.037	0.080	0.000	41.67	1.422	30.36	0.023	0.021	0.000	177.1	165.8	97.71	0.794
19:21	18.947	5.194	0.036	0.079	0.000	42.07	1.391	29.90	0.023	0.021	0.000	174.5	163.4	97.66	0.798
19:39	19.008	5.293	0.035	0.078	0.000	42.10	1.394	29.79	0.022	0.021	0.000	174.3	163.2	97.74	0.798
19:57	19.152	5.168	0.036	0.078	0.000	41.98	1.402	30.07	0.023	0.022	0.000	175.7	164.6	97.93	0.798
20:15	19.025	5.132	0.036	0.079	0.000	42.07	1.404	30.04	0.022	0.022	0.000	175.3	164.1	97.82	0.798

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/24/1985																
20:32	19.275	4.928	0.035	0.079	0.000	41.71	1.420	30.49	0.023	0.022	0.000	177.7	166.4	97.98	23.06	0.796
20:50	19.338	4.845	0.036	0.080	0.000	41.55	1.449	30.51	0.023	0.022	0.000	178.3	166.9	97.85	22.99	0.794
21: 8	19.208	4.956	0.035	0.081	0.000	41.75	1.438	30.40	0.023	0.021	0.000	177.4	166.1	97.90	23.06	0.796
23: 0	19.123	4.858	0.036	0.080	0.000	41.15	1.443	30.41	0.024	0.022	0.000	177.2	166.0	97.14	22.85	0.789
23:18	19.447	4.821	0.037	0.083	0.000	41.55	1.474	30.73	0.024	0.022	0.000	179.7	168.3	98.19	23.05	0.796
23:35	19.356	4.870	0.036	0.083	0.000	41.57	1.489	30.48	0.023	0.022	0.000	178.7	167.3	97.93	23.01	0.794
23:53	19.190	5.034	0.038	0.084	0.000	41.55	1.465	30.49	0.024	0.022	0.000	178.0	166.7	97.89	23.07	0.796
7/25/1985																
0:10	19.327	5.583	0.038	0.087	0.000	41.26	1.530	30.18	0.025	0.023	0.000	178.2	166.8	98.05	23.16	0.800
0:28	18.987	5.458	0.033	0.080	0.000	42.16	1.440	29.70	0.021	0.021	0.000	174.4	163.2	97.90	23.20	0.801
0:45	19.420	4.749	0.036	0.082	0.000	41.36	1.471	30.74	0.023	0.021	0.000	179.5	168.1	97.91	22.97	0.793
1: 3	19.566	4.506	0.039	0.085	0.000	40.97	1.515	31.10	0.024	0.022	0.000	181.8	170.2	97.83	22.87	0.789
1:21	19.588	4.441	0.037	0.082	0.000	40.96	1.464	31.32	0.023	0.021	0.000	181.9	170.4	97.94	22.89	0.790
1:38	19.184	4.728	0.036	0.079	0.000	41.68	1.398	30.99	0.022	0.020	0.000	178.7	167.5	98.14	23.10	0.797
1:56	19.451	4.854	0.039	0.082	0.000	41.52	1.451	30.94	0.024	0.021	0.000	180.1	168.7	98.38	23.11	0.798
2:13	19.125	5.298	0.037	0.081	0.000	42.19	1.427	30.15	0.023	0.021	0.000	176.2	165.0	98.35	23.27	0.803
2:31	19.384	5.017	0.037	0.078	0.000	41.87	1.384	30.61	0.023	0.020	0.000	178.0	166.7	98.43	23.18	0.800
2:48	19.264	5.132	0.040	0.080	0.000	41.97	1.396	30.52	0.023	0.020	0.000	177.6	166.3	98.45	23.23	0.802
3: 6	19.091	5.216	0.036	0.079	0.000	42.21	1.391	30.22	0.023	0.020	0.000	175.9	164.7	98.28	23.24	0.802
3:23	19.340	4.855	0.038	0.077	0.000	41.89	1.364	30.78	0.023	0.019	0.000	178.2	167.0	98.38	23.15	0.799
3:41	18.956	5.597	0.038	0.078	0.000	42.49	1.361	29.87	0.023	0.020	0.000	174.1	163.0	98.43	23.39	0.807
3:58	18.990	5.692	0.038	0.080	0.000	42.56	1.384	29.56	0.023	0.020	0.000	173.5	162.4	98.35	23.37	0.807
4:16	18.238	7.513	0.038	0.076	0.000	44.14	1.333	27.09	0.022	0.018	0.000	162.4	151.8	98.47	23.89	0.825
4:34	19.139	8.726	0.038	0.075	0.000	42.98	1.346	26.13	0.021	0.018	0.000	162.4	151.2	98.47	23.85	0.823
4:51	18.596	7.113	0.035	0.074	0.000	43.11	1.366	28.17	0.020	0.018	0.000	167.2	156.4	98.50	23.74	0.819
5: 9	19.492	4.957	0.033	0.078	0.000	41.49	1.436	30.95	0.021	0.019	0.000	179.9	168.5	98.47	23.15	0.799
5:26	19.741	4.550	0.034	0.079	0.000	41.13	1.447	31.56	0.022	0.020	0.000	182.8	171.3	98.59	23.05	0.796
5:44	19.563	4.239	0.039	0.082	0.000	41.19	1.496	31.76	0.023	0.020	0.000	183.6	172.1	98.42	22.99	0.794
6: 2	20.071	4.412	0.040	0.086	0.000	40.69	1.570	31.67	0.024	0.021	0.000	185.8	174.0	98.58	22.92	0.791
6:19	19.750	4.517	0.037	0.084	0.000	41.24	1.510	31.49	0.023	0.021	0.000	183.4	171.8	98.67	23.06	0.796
6:38	19.674	4.957	0.036	0.086	0.000	41.56	1.530	31.06	0.023	0.022	0.001	182.1	170.5	98.95	23.22	0.802
6:55	19.575	4.993	0.036	0.086	0.000	41.57	1.545	30.87	0.023	0.022	0.000	181.3	169.7	98.72	23.19	0.800
7:13	19.720	3.861	0.035	0.084	0.000	42.07	1.527	31.39	0.023	0.021	0.000	183.2	171.6	98.74	22.98	0.793
7:31	19.508	4.765	0.035	0.082	0.000	41.51	1.510	31.32	0.023	0.021	0.000	182.0	170.6	98.78	23.19	0.800
7:48	20.179	5.357	0.035	0.083	0.000	41.08	1.504	30.54	0.023	0.021	0.000	181.7	169.9	98.82	23.12	0.798
8: 6	20.341	5.901	0.037	0.087	0.000	40.50	1.569	30.09	0.024	0.021	0.000	181.5	169.6	98.56	23.09	0.797
8:24	19.853	5.692	0.034	0.082	0.000	41.08	1.494	30.05	0.022	0.020	0.000	178.9	167.2	98.33	23.12	0.798
8:41	20.031	5.423	0.035	0.081	0.000	40.88	1.507	30.36	0.023	0.020	0.000	180.6	168.9	98.36	23.04	0.795
8:59	19.966	6.065	0.038	0.088	0.000	41.32	1.565	29.14	0.025	0.022	0.000	177.3	165.5	98.23	23.12	0.798
9:17	19.720	6.534	0.034	0.085	0.000	41.87	1.536	28.57	0.023	0.022	0.000	174.2	162.6	98.39	23.31	0.805
9:34	18.940	7.494	0.033	0.085	0.000	43.13	1.485	27.01	0.022	0.022	0.000	166.1	155.0	98.22	23.62	0.815
9:52	19.642	6.307	0.033	0.085	0.000	41.55	1.558	28.94	0.022	0.021	0.000	175.3	163.7	98.15	23.22	0.802
10: 9	20.012	6.384	0.034	0.085	0.000	41.38	1.570	29.05	0.022	0.021	0.000	177.0	165.2	98.56	23.25	0.803
10:27	19.847	6.592	0.034	0.087	0.000	41.48	1.614	28.53	0.023	0.022	0.000	175.3	163.6	98.23	23.23	0.802

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW WRT AIR	U.G. WRT AIR
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10:45	19.333	8.038	0.031	0.090	0.000	42.14	1.640	26.86	0.024	0.023	0.000	168.6	157.1	98.17	23.57	0.814
11: 2	19.858	7.058	0.035	0.091	0.000	41.60	1.690	27.83	0.024	0.023	0.000	174.0	162.2	98.21	23.29	0.804
11:20	20.089	6.919	0.036	0.093	0.000	40.94	1.739	28.49	0.025	0.023	0.000	177.5	165.5	98.36	23.24	0.802
11:38	20.193	5.966	0.035	0.089	0.000	41.04	1.716	29.14	0.024	0.022	0.000	179.5	167.5	98.23	23.02	0.795
12:36	20.525	5.800	0.061	0.224	0.000	41.72	2.478	29.05	0.060	0.077	0.000	193.0	179.7	100.00	23.33	0.805
12:54	20.158	5.279	0.064	0.238	0.000	41.17	2.557	28.90	0.000	0.083	0.000	191.2	178.0	98.45	22.90	0.790
13:12	19.873	4.951	0.061	0.233	0.000	41.36	2.429	29.41	0.000	0.081	0.000	190.4	177.5	98.40	22.92	0.791
13:30	19.874	5.053	0.054	0.213	0.000	41.98	2.287	28.96	0.054	0.074	0.000	188.2	175.4	98.55	23.00	0.794
13:48	19.593	5.976	0.055	0.214	0.000	42.85	2.278	27.45	0.000	0.075	0.000	181.2	168.6	98.49	23.20	0.801
14: 5	19.807	6.243	0.056	0.217	0.000	42.65	2.356	27.56	0.000	0.076	0.000	183.1	170.3	98.96	23.31	0.805
14:23	19.757	6.078	0.054	0.211	0.000	42.81	2.311	27.29	0.053	0.073	0.000	182.6	169.8	98.63	23.21	0.801
14:42	19.948	6.108	0.057	0.210	0.000	42.98	2.285	27.08	0.054	0.072	0.000	182.3	169.5	98.79	23.22	0.801
15: 0	19.654	6.732	0.054	0.203	0.000	43.96	2.198	26.11	0.052	0.070	0.000	177.1	164.5	99.03	23.47	0.810
15:18	18.963	7.205	0.053	0.199	0.000	44.70	2.140	25.39	0.051	0.069	0.000	171.8	159.7	98.77	23.66	0.817
15:36	19.355	6.424	0.051	0.188	0.000	43.78	2.021	26.85	0.049	0.065	0.000	176.2	164.0	98.79	23.45	0.809
15:54	18.869	7.555	0.054	0.192	0.000	45.24	2.070	24.79	0.050	0.066	0.000	168.7	156.7	98.88	23.78	0.821
16:12	18.649	7.727	0.047	0.175	0.000	45.65	1.949	24.75	0.045	0.058	0.000	165.9	154.1	99.04	23.92	0.826
17:50	19.076	6.942	0.048	0.163	0.000	45.89	1.816	25.96	0.049	0.058	0.000	169.7	157.9	100.00	23.97	0.827
18: 8	18.574	7.133	0.050	0.164	0.000	45.45	1.789	25.56	0.047	0.059	0.000	166.6	155.0	98.83	23.80	0.822
18:26	18.483	7.203	0.048	0.163	0.000	45.05	1.768	25.20	0.045	0.057	0.000	164.8	153.3	98.02	23.61	0.815
18:43	18.533	6.908	0.048	0.159	0.000	44.85	1.754	25.63	0.044	0.055	0.000	166.0	154.5	97.98	23.54	0.813
19: 1	18.486	6.712	0.047	0.153	0.000	44.78	1.718	25.86	0.042	0.053	0.000	166.0	154.6	97.86	23.49	0.811
19:19	18.835	6.645	0.047	0.148	0.000	44.25	1.667	26.60	0.000	0.049	0.000	167.8	156.4	98.24	23.50	0.811
19:37	18.691	6.771	0.046	0.147	0.000	44.46	1.660	26.38	0.041	0.049	0.000	167.5	156.1	98.24	23.56	0.813
19:55	18.434	6.681	0.046	0.150	0.000	44.51	1.653	26.62	0.042	0.050	0.000	167.5	156.2	98.19	23.60	0.815
20:13	18.029	7.253	0.042	0.137	0.000	45.29	1.559	25.79	0.000	0.045	0.000	161.2	150.3	98.15	23.79	0.821
20:31	18.095	7.129	0.046	0.141	0.000	45.21	1.503	25.98	0.041	0.047	0.000	162.5	151.6	98.19	23.78	0.821
20:48	18.324	6.879	0.046	0.138	0.000	44.86	1.479	26.47	0.041	0.046	0.000	164.5	153.5	98.28	23.71	0.818
21: 6	18.208	6.800	0.048	0.137	0.000	44.94	1.428	26.57	0.042	0.047	0.000	164.0	153.1	98.21	23.71	0.819
21:24	18.410	6.751	0.050	0.143	0.000	44.75	1.457	26.67	0.044	0.050	0.000	165.6	154.5	98.33	23.68	0.817
21:42	18.070	6.805	0.052	0.153	0.000	44.98	1.532	26.51	0.045	0.054	0.000	165.1	154.1	98.20	23.74	0.819
22: 0	17.790	7.113	0.053	0.157	0.000	45.69	1.559	25.79	0.046	0.056	0.000	162.2	151.3	98.25	23.87	0.824
22:18	17.686	7.152	0.051	0.152	0.000	45.56	1.525	25.84	0.044	0.054	0.000	161.5	150.7	98.07	23.85	0.823
22:36	15.582	6.774	0.000	0.000	0.000	47.99	1.509	25.51	0.000	0.041	0.059	148.6	139.3	97.47	24.15	0.834
22:54	17.783	6.941	0.000	0.000	0.000	45.03	1.511	26.15	0.000	0.039	0.056	157.8	147.3	97.51	23.61	0.815

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1:35	17.946	6.813	0.057	0.168	0.000	45.58	1.700	25.88	0.052	0.061	0.000	165.0	153.8	98.25	23.77	0.820
1:53	18.026	6.721	0.059	0.174	0.000	45.51	1.767	26.27	0.052	0.061	0.000	167.3	156.1	98.64	23.83	0.823
2:10	18.336	6.940	0.060	0.175	0.000	45.40	1.777	26.14	0.054	0.059	0.000	168.1	156.6	98.94	23.87	0.824
2:28	18.479	6.406	0.060	0.170	0.000	45.01	1.740	26.56	0.053	0.059	0.000	169.4	157.9	98.54	23.64	0.816
2:46	18.449	6.120	0.059	0.171	0.000	44.88	1.737	26.96	0.053	0.059	0.000	170.5	159.1	98.49	23.59	0.814
3: 3	18.543	6.141	0.060	0.172	0.000	44.92	1.729	27.03	0.052	0.058	0.000	171.0	159.5	98.71	23.63	0.816
3:21	18.398	5.955	0.058	0.169	0.000	45.17	1.706	27.36	0.051	0.057	0.000	171.2	159.8	98.92	23.70	0.818
3:38	18.211	6.393	0.060	0.168	0.000	45.44	1.664	26.68	0.052	0.058	0.000	168.0	156.8	98.73	23.77	0.820

GAS CHROMATOGRAPH DATA

DATE	H2	CO2	C2H4	C2H6	O2	N2	CH4	CO	C3H6	C3H8	C3H4	HHV	LHV	TMP	MW	S.G.
TIME	%	%	%	%	%	%	%	%	%	%	%	BTU/SCF	BTU/SCF	%		WRT AIR

7/26/1985																
3:56	18.067	6.741	0.065	0.175	0.000	45.87	1.686	26.27	0.056	0.061	0.000	166.8	155.6	98.99	23.93	0.826
4:14	17.671	6.720	0.048	0.128	0.000	46.72	1.379	26.37	0.041	0.044	0.000	160.9	150.3	99.12	24.10	0.832
4:31	18.182	6.327	0.066	0.177	0.000	45.51	1.741	26.86	0.056	0.061	0.000	169.7	158.4	98.99	23.83	0.823
4:49	18.626	6.137	0.070	0.188	0.000	45.02	1.856	27.08	0.060	0.067	0.000	173.5	161.8	99.11	23.70	0.818
5: 6	18.466	5.512	0.074	0.199	0.000	44.80	1.910	27.92	0.064	0.070	0.000	176.7	165.0	99.02	23.62	0.815
5:24	18.900	6.155	0.074	0.210	0.000	44.62	2.027	26.99	0.066	0.073	0.000	176.6	164.5	99.11	23.62	0.815
5:42	18.891	6.139	0.075	0.206	0.000	44.62	2.048	26.82	0.065	0.071	0.000	176.1	164.0	98.93	23.57	0.813
6: 0	19.370	5.870	0.072	0.186	0.000	44.26	1.962	27.31	0.059	0.063	0.000	177.6	165.4	99.14	23.46	0.810
6:17	19.537	5.853	0.086	0.241	0.000	43.73	2.246	27.20	0.075	0.084	0.000	182.8	170.1	99.05	23.37	0.807
6:35	18.943	5.969	0.088	0.259	0.000	44.22	2.307	27.16	0.079	0.091	0.000	182.0	169.4	99.11	23.55	0.813
6:52	18.731	6.390	0.103	0.282	0.000	44.23	2.611	26.33	0.087	0.095	0.000	182.6	169.8	98.86	23.57	0.814
7:10	19.606	5.995	0.070	0.206	0.000	43.81	2.246	27.01	0.059	0.066	0.000	180.7	168.1	99.07	23.37	0.807
7:28	19.557	5.650	0.064	0.150	0.000	43.85	1.981	27.43	0.046	0.045	0.000	177.3	165.1	98.77	23.27	0.803
7:46	19.283	5.506	0.075	0.147	0.000	44.08	1.728	28.09	0.053	0.048	0.000	176.3	164.5	99.00	23.41	0.808
8: 4	19.197	5.293	0.081	0.164	0.000	44.15	1.751	28.24	0.060	0.055	0.000	177.5	165.6	98.99	23.40	0.808
8:22	19.080	5.344	0.081	0.184	0.000	43.64	1.850	28.11	0.063	0.063	0.000	178.3	166.4	98.41	23.27	0.803
8:39	18.926	5.784	0.083	0.196	0.000	43.37	1.909	28.01	0.068	0.069	0.000	178.6	166.6	98.41	23.37	0.807
8:57	18.519	6.056	0.079	0.202	0.000	44.35	1.958	26.80	0.065	0.071	0.000	173.9	162.1	98.10	23.43	0.809
9:15	18.907	4.741	0.075	0.214	0.000	44.43	2.052	27.69	0.062	0.074	0.000	179.1	167.0	98.24	23.14	0.799
9:33	18.908	5.740	0.068	0.196	0.000	43.62	1.969	27.67	0.060	0.067	0.000	177.6	165.6	98.30	23.33	0.805
9:50	19.116	5.324	0.067	0.195	0.000	43.32	2.000	28.25	0.059	0.066	0.000	180.4	168.3	98.40	23.23	0.802
10: 8	19.231	5.730	0.066	0.187	0.000	43.59	1.998	27.49	0.057	0.062	0.000	177.9	165.8	98.41	23.27	0.803
10:26	19.116	5.838	0.072	0.213	0.000	43.57	2.107	27.11	0.064	0.073	0.000	178.5	166.2	98.16	23.24	0.802
10:43	18.983	5.783	0.076	0.228	0.000	43.39	2.185	27.25	0.068	0.078	0.000	179.8	167.5	98.04	23.22	0.802
11: 1	18.943	5.986	0.068	0.206	0.000	43.63	2.057	27.15	0.061	0.069	0.000	177.2	165.1	98.17	23.31	0.805
11:19	18.697	5.946	0.064	0.189	0.000	44.16	1.972	27.22	0.056	0.063	0.000	175.1	163.3	98.37	23.43	0.809
11:36	19.013	6.159	0.063	0.190	0.000	44.02	1.985	26.94	0.055	0.064	0.000	175.4	163.4	98.49	23.42	0.808
11:54	18.943	6.121	0.065	0.193	0.000	44.08	1.982	27.00	0.057	0.067	0.000	175.5	163.5	98.51	23.44	0.809
12:12	18.884	6.048	0.065	0.190	0.000	44.17	1.964	26.92	0.057	0.067	0.000	174.8	162.9	98.36	23.40	0.808
12:29	18.818	6.360	0.071	0.206	0.000	44.36	2.011	26.78	0.062	0.073	0.000	175.3	163.3	98.74	23.57	0.814
13:41	17.385	6.947	0.050	0.137	0.000	45.99	1.466	26.36	0.038	0.045	0.000	161.0	150.4	98.41	24.00	0.828
13:59	18.630	6.221	0.062	0.187	0.000	44.13	1.851	26.89	0.059	0.066	0.000	172.7	161.0	98.09	23.43	0.809
14:34	19.138	6.276	0.072	0.217	0.000	43.59	2.174	26.52	0.064	0.074	0.000	177.4	165.1	98.13	23.28	0.804
14:52	18.997	6.340	0.076	0.228	0.000	43.54	2.207	26.59	0.069	0.080	0.000	178.1	165.7	98.13	23.33	0.805
15: 9	18.856	6.086	0.074	0.217	0.000	43.43	2.130	27.00	0.065	0.076	0.000	177.7	165.5	97.94	23.28	0.804
15:28	19.164	6.060	0.074	0.224	0.000	43.19	2.196	27.04	0.066	0.080	0.000	179.8	167.3	98.10	23.23	0.802
15:46	18.884	5.855	0.073	0.231	0.000	43.27	2.301	27.15	0.067	0.081	0.000	180.4	168.0	97.92	23.21	0.801
16: 4	19.549	6.107	0.066	0.208	0.000	42.85	2.190	26.76	0.060	0.074	0.000	179.3	166.8	97.87	23.07	0.796
16:21	19.303	6.833	0.067	0.208	0.000	43.72	2.175	25.34	0.061	0.075	0.000	173.9	161.5	97.78	23.23	0.802
16:39	19.230	6.380	0.070	0.228	0.000	43.30	2.243	26.20	0.066	0.082	0.000	177.8	165.3	97.80	23.18	0.800
16:57	19.438	6.345	0.068	0.228	0.000	42.92	2.292	26.42	0.065	0.081	0.000	179.6	167.0	97.86	23.13	0.798
17:15	19.446	6.244	0.070	0.238	0.000	42.79	2.323	26.63	0.067	0.084	0.000	181.0	168.2	97.89	23.12	0.798
17:32	19.308	6.514	0.070	0.237	0.000	43.10	2.362	26.04	0.066	0.082	0.000	178.9	166.2	97.78	23.16	0.799
17:50	19.575	6.229	0.065	0.214	0.000	42.94	2.322	26.45	0.060	0.072	0.000	179.8	167.1	97.92	23.09	0.797
18: 8	19.778	6.305	0.062	0.200	0.000	42.65	2.252	26.32	0.055	0.067	0.000	178.8	166.1	97.69	22.99	0.793

GAS CHROMATOGRAPH DATA

DATE	H2	CO2	C2H4	C2H6	O2	N2	CH4	CO	C3H6	C3H8	C3H4	HHV	LHV	TMP	MW	S.G.
TIME	%	%	%	%	%	%	%	%	%	%	%	BTU/SCF	BTU/SCF	%		WRT AIR

7/26/1985

18:26	19.731	6.081	0.065	0.204	0.000	42.62	2.242	26.65	0.058	0.069	0.000	179.9	167.2	97.72	22.97	0.793
18:44	19.696	6.331	0.065	0.204	0.000	42.97	2.174	26.35	0.059	0.070	0.000	178.1	165.5	97.92	23.09	0.797
19: 1	19.731	5.960	0.062	0.188	0.000	42.90	2.078	26.84	0.055	0.064	0.000	178.3	165.8	97.88	23.02	0.794
19:19	19.502	6.292	0.068	0.200	0.000	43.10	2.072	26.53	0.060	0.068	0.000	177.0	164.6	97.90	23.14	0.799
19:37	19.231	6.214	0.065	0.199	0.000	43.27	2.062	26.75	0.059	0.068	0.000	176.6	164.4	97.91	23.20	0.801
19:55	19.077	6.294	0.065	0.206	0.000	43.36	2.054	26.69	0.061	0.071	0.000	176.1	163.9	97.88	23.24	0.802
20:12	19.036	6.398	0.062	0.197	0.000	43.60	2.044	26.24	0.057	0.068	0.000	174.0	161.9	97.71	23.22	0.802
20:30	18.981	6.460	0.066	0.212	0.000	43.54	2.106	26.37	0.062	0.073	0.000	175.5	163.3	97.87	23.29	0.804
20:48	18.973	6.217	0.063	0.194	0.000	43.54	2.031	26.89	0.056	0.065	0.000	175.7	163.6	98.03	23.30	0.804
21: 6	19.163	5.794	0.057	0.163	0.000	43.21	1.856	27.57	0.048	0.055	0.000	175.6	163.7	97.92	23.17	0.800
21:24	19.263	5.701	0.060	0.168	0.000	43.21	1.855	27.54	0.051	0.058	0.000	176.1	164.2	97.91	23.13	0.798
21:42	19.290	5.812	0.062	0.174	0.000	43.16	1.873	27.49	0.053	0.061	0.000	176.5	164.5	97.98	23.16	0.799
21:59	18.985	5.781	0.065	0.181	0.000	43.56	1.863	27.59	0.055	0.063	0.000	176.0	164.1	98.14	23.28	0.804
22:17	19.349	5.829	0.057	0.148	0.000	43.70	1.728	27.70	0.046	0.051	0.000	174.9	163.1	98.60	23.34	0.806
22:35	19.048	5.881	0.062	0.164	0.000	44.17	1.717	27.81	0.052	0.058	0.000	174.9	163.2	98.96	23.53	0.812
22:53	19.090	5.985	0.063	0.172	0.000	44.27	1.790	27.57	0.053	0.060	0.000	175.2	163.4	99.06	23.55	0.813
23:18	19.345	6.127	0.065	0.180	0.000	44.61	1.852	27.69	0.061	0.067	0.000	177.6	165.5	100.00	23.77	0.820
23:36	19.252	6.092	0.063	0.182	0.000	43.96	1.874	27.45	0.060	0.064	0.000	176.7	164.6	99.00	23.50	0.811
23:54	19.145	6.022	0.060	0.169	0.000	43.43	1.816	27.14	0.052	0.057	0.000	174.1	162.2	97.89	23.21	0.801

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0:11	18.542	5.842	0.051	0.142	0.000	43.72	1.553	27.26	0.044	0.048	0.000	168.8	157.6	97.20	23.17	0.800
0:29	18.586	5.599	0.059	0.171	0.000	43.19	1.745	27.54	0.052	0.059	0.000	172.9	161.3	97.00	23.05	0.796
0:46	18.851	5.750	0.057	0.165	0.000	42.90	1.794	27.37	0.051	0.057	0.000	173.5	161.8	97.00	23.00	0.794
1: 4	18.687	5.556	0.060	0.177	0.000	42.99	1.815	27.60	0.056	0.059	0.000	174.3	162.7	97.00	23.01	0.794
1:21	18.713	5.612	0.060	0.179	0.000	42.85	1.828	27.64	0.054	0.062	0.000	174.8	163.1	97.00	23.01	0.794
1:39	18.835	5.684	0.063	0.184	0.000	43.31	1.825	27.69	0.056	0.063	0.000	175.5	163.7	97.70	23.19	0.800
1:56	19.072	5.651	0.057	0.159	0.000	43.60	1.737	27.75	0.048	0.053	0.000	174.6	162.8	98.12	23.24	0.802
2:14	18.574	5.795	0.043	0.109	0.000	44.63	1.297	28.08	0.035	0.037	0.000	167.7	156.8	98.60	23.58	0.814
2:31	18.981	5.757	0.053	0.161	0.000	44.09	1.632	28.00	0.048	0.057	0.000	174.1	162.5	98.78	23.48	0.811
2:49	19.143	5.926	0.058	0.172	0.000	44.08	1.756	27.64	0.052	0.061	0.000	175.2	163.3	98.89	23.48	0.811
3: 6	19.773	3.104	0.062	0.175	0.000	45.42	1.768	28.73	0.044	0.060	0.000	180.8	168.6	99.14	22.94	0.792
3:24	19.214	5.782	0.055	0.159	0.000	43.99	1.689	27.93	0.049	0.054	0.000	175.1	163.4	98.92	23.46	0.810
3:42	19.045	5.748	0.057	0.161	0.000	44.19	1.656	28.23	0.050	0.056	0.000	175.4	163.7	99.18	23.57	0.814
3:59	18.896	5.883	0.058	0.163	0.000	44.38	1.661	27.82	0.051	0.056	0.000	173.7	162.1	98.96	23.57	0.814
4:17	18.723	5.986	0.050	0.144	0.000	44.81	1.516	27.85	0.044	0.049	0.000	171.0	159.7	99.17	23.71	0.818
4:34	18.778	5.963	0.059	0.179	0.000	44.21	1.750	27.55	0.054	0.062	0.000	173.9	162.2	98.61	23.51	0.811
4:52	18.772	5.904	0.060	0.179	0.000	44.11	1.785	27.47	0.055	0.062	0.000	174.0	162.3	98.39	23.44	0.809
5:10	18.792	6.000	0.063	0.176	0.000	44.26	1.770	27.42	0.055	0.060	0.000	173.7	162.0	98.59	23.50	0.811
5:27	18.985	5.953	0.063	0.175	0.000	44.25	1.800	27.43	0.053	0.060	0.000	174.6	162.8	98.77	23.49	0.811
5:45	19.114	6.143	0.061	0.180	0.000	44.11	1.853	27.15	0.054	0.063	0.000	174.8	162.8	98.73	23.47	0.810
6: 2	19.440	6.617	0.065	0.185	0.000	44.06	1.902	26.52	0.055	0.064	0.000	174.5	162.4	98.90	23.51	0.811
6:20	19.952	7.270	0.073	0.195	0.000	43.60	1.988	25.69	0.060	0.067	0.000	174.9	162.3	98.90	23.47	0.810
6:38	19.153	7.841	0.158	0.253	0.000	44.59	2.422	24.07	0.090	0.086	0.000	175.0	162.2	98.66	23.66	0.817
6:56	19.525	7.378	0.080	0.235	0.000	43.55	2.195	25.29	0.071	0.083	0.000	175.8	163.1	98.41	23.44	0.809

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/27/1985																
7:14	20.001	7.085	0.071	0.228	0.000	43.03	2.304	25.51	0.064	0.077	0.000	178.6	165.6	98.37	23.24	0.802
7:32	20.331	7.158	0.077	0.219	0.000	42.85	2.281	25.35	0.066	0.075	0.000	178.8	165.7	98.41	23.18	0.800
7:49	19.938	7.484	0.095	0.200	0.000	43.68	2.154	24.88	0.066	0.065	0.000	174.4	161.7	98.56	23.39	0.807
8: 7	18.745	6.826	0.079	0.180	0.000	45.91	2.120	25.13	0.058	0.059	0.000	170.1	158.0	99.10	23.75	0.820
8:25	18.665	5.851	0.063	0.165	0.000	45.42	1.911	26.74	0.050	0.055	0.000	172.0	160.3	98.92	23.58	0.814
8:42	18.635	5.900	0.057	0.166	0.000	45.47	1.834	26.99	0.049	0.057	0.000	171.9	160.3	99.16	23.68	0.817
9: 0	18.172	5.820	0.062	0.186	0.000	45.88	1.945	26.73	0.054	0.066	0.000	171.5	160.0	98.92	23.71	0.818
9:18	18.709	5.709	0.063	0.199	0.000	45.01	2.082	27.20	0.057	0.071	0.000	176.6	164.6	99.10	23.59	0.814
9:35	18.508	5.463	0.062	0.193	0.000	44.93	2.001	27.41	0.056	0.068	0.000	175.6	163.8	98.69	23.49	0.811
9:53	17.969	5.850	0.060	0.191	0.000	45.60	1.939	27.03	0.055	0.068	0.000	171.9	160.4	98.77	23.72	0.819
10:11	17.947	5.645	0.062	0.208	0.000	45.60	2.045	27.21	0.060	0.072	0.000	174.0	162.4	98.85	23.71	0.818
10:28	18.010	5.852	0.057	0.196	0.000	45.48	2.030	26.95	0.056	0.069	0.000	172.8	161.2	98.71	23.69	0.818
10:46	18.081	5.406	0.055	0.185	0.000	45.38	1.939	27.58	0.053	0.065	0.000	173.7	162.2	98.74	23.61	0.815
11: 4	18.030	5.486	0.057	0.183	0.000	45.42	1.910	27.59	0.053	0.064	0.000	173.3	161.8	98.80	23.66	0.817
11:21	18.063	5.523	0.061	0.181	0.000	45.44	1.880	27.58	0.054	0.063	0.000	173.1	161.6	98.84	23.67	0.817
11:57	17.883	5.726	0.064	0.188	0.000	45.69	1.953	27.28	0.056	0.065	0.000	172.5	161.1	98.90	23.76	0.820
12:15	17.699	5.632	0.058	0.183	0.000	45.74	1.911	27.24	0.053	0.063	0.000	171.0	159.8	98.58	23.71	0.818
12:32	18.130	5.599	0.064	0.205	0.000	45.23	2.145	27.32	0.058	0.071	0.000	175.9	164.1	98.82	23.63	0.816
12:50	18.124	5.504	0.062	0.184	0.000	45.33	2.019	27.44	0.054	0.063	0.000	174.3	162.7	98.79	23.62	0.815
13: 8	18.125	5.537	0.073	0.215	0.000	45.22	2.151	27.25	0.064	0.075	0.000	176.3	164.4	98.70	23.59	0.814
13:25	18.413	5.410	0.064	0.191	0.000	44.93	2.072	27.56	0.055	0.066	0.000	176.4	164.6	98.76	23.52	0.812
14: 1	18.627	5.128	0.060	0.176	0.000	44.73	1.950	27.94	0.052	0.062	0.000	176.6	164.8	98.73	23.42	0.809
16: 1	18.314	4.832	0.056	0.166	0.000	43.62	1.888	28.01	0.050	0.060	0.000	174.8	163.3	97.00	22.98	0.793
16:19	18.083	4.921	0.057	0.172	0.000	43.70	1.840	28.11	0.051	0.061	0.000	174.1	162.7	97.00	23.06	0.796
16:37	18.063	4.958	0.059	0.178	0.000	43.73	1.830	28.07	0.052	0.062	0.000	174.0	162.6	97.00	23.07	0.796
17:51	17.817	5.181	0.058	0.165	0.000	45.24	1.668	28.53	0.052	0.060	0.000	172.7	161.6	98.77	23.69	0.818
18: 9	17.696	5.237	0.057	0.157	0.000	45.60	1.608	28.43	0.048	0.055	0.000	171.0	160.1	98.88	23.76	0.820
18:27	17.543	5.197	0.057	0.161	0.000	45.30	1.628	28.48	0.049	0.057	0.000	171.0	160.2	98.47	23.68	0.817
18:44	17.248	4.689	0.053	0.153	0.000	45.26	1.582	28.92	0.046	0.054	0.000	170.7	160.0	98.01	23.55	0.813
19: 2	17.410	5.023	0.055	0.152	0.000	45.24	1.571	28.75	0.047	0.054	0.000	170.6	159.8	98.30	23.64	0.816
19:20	17.576	5.076	0.057	0.152	0.000	45.05	1.599	28.70	0.048	0.051	0.000	171.2	160.4	98.31	23.61	0.815
19:38	17.539	4.998	0.057	0.156	0.000	44.77	1.618	28.70	0.048	0.053	0.000	171.4	160.6	97.93	23.50	0.811
19:56	17.439	4.951	0.057	0.159	0.000	44.69	1.630	28.78	0.049	0.054	0.000	171.6	160.7	97.81	23.48	0.811
20:14	17.323	5.134	0.059	0.166	0.000	45.30	1.657	28.68	0.051	0.057	0.000	171.4	160.6	98.43	23.71	0.819
20:31	17.351	5.304	0.059	0.168	0.000	45.86	1.626	28.54	0.051	0.058	0.000	170.8	160.0	99.02	23.90	0.825
20:49	17.614	4.936	0.061	0.164	0.000	45.41	1.633	28.97	0.051	0.056	0.000	173.0	162.1	98.89	23.74	0.819
21: 7	18.044	4.858	0.068	0.183	0.000	44.82	1.797	28.99	0.057	0.063	0.000	176.9	165.6	98.88	23.59	0.814
21:25	18.235	4.846	0.068	0.180	0.000	44.66	1.801	29.17	0.056	0.063	0.000	178.1	166.6	99.08	23.60	0.815
21:43	18.080	4.877	0.059	0.181	0.000	44.67	1.793	29.13	0.056	0.064	0.000	177.2	165.9	98.91	23.60	0.814
22: 1	17.973	4.929	0.072	0.180	0.000	44.81	1.746	29.07	0.058	0.064	0.000	176.5	165.2	98.90	23.64	0.816
22:19	18.044	4.899	0.066	0.180	0.000	44.74	1.769	29.03	0.058	0.064	0.000	176.7	165.4	98.85	23.59	0.814
22:54	18.189	4.749	0.079	0.182	0.000	45.24	1.808	29.62	0.067	0.067	0.000	180.0	168.5	100.00	23.85	0.823
23:11	17.888	4.706	0.068	0.162	0.000	44.90	1.627	29.51	0.058	0.057	0.000	175.8	164.8	98.97	23.65	0.817
23:29	17.891	4.504	0.074	0.167	0.000	44.61	1.627	29.61	0.058	0.059	0.000	176.4	165.3	98.60	23.52	0.812
23:46	18.096	4.497	0.073	0.171	0.000	44.35	1.679	29.41	0.054	0.060	0.000	176.9	165.7	98.38	23.40	0.808

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR

7/28/1985																
0: 4	17.963	4.520	0.072	0.175	0.000	44.57	1.704	29.30	0.057	0.062	0.000	176.6	165.4	98.43	23.44	0.809
0:21	17.938	4.775	0.074	0.181	0.000	44.64	1.737	29.18	0.059	0.063	0.000	176.7	165.4	98.65	23.55	0.813
0:39	18.143	4.775	0.072	0.180	0.000	44.49	1.775	29.03	0.058	0.063	0.000	177.1	165.8	98.59	23.47	0.810
0:56	17.917	4.895	0.072	0.173	0.000	44.78	1.699	29.00	0.057	0.060	0.000	175.3	164.2	98.66	23.58	0.814
1:14	17.780	4.905	0.073	0.188	0.000	44.70	1.773	28.86	0.060	0.066	0.000	175.7	164.5	98.41	23.54	0.813
1:31	15.959	4.248	0.071	0.174	0.000	46.75	1.660	29.31	0.057	0.060	0.000	169.6	159.4	98.28	23.89	0.825
1:49	17.807	4.620	0.071	0.162	0.000	44.77	1.600	29.21	0.054	0.056	0.000	174.3	163.3	98.35	23.49	0.811
2: 7	17.713	4.840	0.068	0.173	0.000	44.81	1.663	28.94	0.055	0.061	0.000	174.0	163.0	98.32	23.54	0.812
2:24	17.835	4.753	0.076	0.206	0.000	44.49	1.858	29.23	0.064	0.072	0.000	178.5	167.2	98.59	23.55	0.813
2:42	17.983	4.660	0.067	0.186	0.000	44.49	1.828	29.42	0.060	0.064	0.000	178.5	167.1	98.75	23.54	0.813
2:59	18.162	4.759	0.072	0.170	0.000	44.73	1.702	29.35	0.056	0.060	0.000	177.2	165.9	99.06	23.61	0.815
3:17	18.061	4.676	0.078	0.191	0.000	44.53	1.888	29.22	0.061	0.065	0.000	179.0	167.6	98.77	23.52	0.812
3:35	18.299	4.730	0.076	0.151	0.000	44.72	1.626	29.29	0.054	0.052	0.000	176.2	164.9	99.00	23.56	0.813
3:52	17.907	4.781	0.077	0.154	0.000	45.13	1.529	29.40	0.055	0.053	0.000	174.4	163.4	99.09	23.70	0.818
4:10	17.440	4.747	0.063	0.133	0.000	45.77	1.344	29.33	0.047	0.047	0.000	169.8	159.4	98.92	23.79	0.821
4:27	17.897	4.839	0.073	0.173	0.000	45.31	1.652	29.26	0.058	0.058	0.000	175.7	164.5	99.32	23.77	0.820
4:45	17.957	4.952	0.077	0.175	0.000	45.19	1.657	29.17	0.059	0.059	0.000	175.8	164.6	99.30	23.76	0.820
5: 3	17.897	4.762	0.078	0.172	0.000	45.26	1.659	29.37	0.059	0.058	0.000	176.1	165.0	99.31	23.75	0.820
5:20	17.903	4.840	0.080	0.179	0.000	45.17	1.716	29.24	0.060	0.060	0.000	176.5	165.3	99.24	23.74	0.819
5:38	17.977	4.877	0.077	0.182	0.000	45.26	1.762	29.06	0.060	0.061	0.000	176.7	165.4	99.32	23.74	0.820
5:56	17.938	4.808	0.075	0.182	0.000	45.22	1.765	29.05	0.059	0.062	0.000	176.6	165.3	99.16	23.70	0.818
6:13	17.669	5.106	0.066	0.145	0.000	46.11	1.510	28.72	0.049	0.049	0.000	170.7	159.9	99.42	23.91	0.825
6:32	18.086	5.238	0.088	0.213	0.000	45.27	1.974	28.47	0.070	0.074	0.000	178.5	166.9	99.47	23.79	0.821
6:50	18.194	5.267	0.093	0.222	0.000	45.13	2.086	28.28	0.073	0.078	0.000	179.8	168.0	99.42	23.74	0.820
7: 7	18.328	5.410	0.087	0.217	0.000	45.12	2.080	28.01	0.069	0.076	0.000	179.0	167.1	99.40	23.72	0.819
7:25	18.288	5.451	0.085	0.218	0.000	45.07	2.113	27.91	0.068	0.076	0.000	178.9	167.0	99.28	23.70	0.818
7:42	18.334	5.456	0.089	0.217	0.000	45.13	2.126	27.91	0.069	0.076	0.000	179.2	167.3	99.41	23.73	0.819
8: 0	18.095	5.431	0.082	0.205	0.000	45.19	2.016	27.73	0.066	0.073	0.000	176.3	164.6	98.89	23.65	0.816
8:18	16.162	5.153	0.074	0.192	0.000	47.68	1.902	27.77	0.059	0.067	0.000	168.4	157.8	99.06	24.17	0.834
8:35	17.936	5.614	0.084	0.202	0.000	45.39	1.998	27.71	0.064	0.070	0.000	175.4	163.8	99.06	23.77	0.821
8:53	18.158	5.657	0.082	0.199	0.000	45.20	2.007	27.62	0.063	0.070	0.000	175.8	164.1	99.05	23.72	0.819
9:11	18.044	5.474	0.076	0.197	0.000	44.89	1.974	27.59	0.061	0.070	0.000	174.8	163.2	98.38	23.53	0.812
9:28	17.929	5.611	0.073	0.210	0.000	44.76	2.071	27.48	0.064	0.075	0.000	175.5	163.8	98.27	23.54	0.813
9:46	17.926	5.683	0.086	0.209	0.000	44.80	2.096	27.31	0.065	0.073	0.000	175.3	163.6	98.24	23.55	0.813
10: 4	17.847	5.665	0.070	0.184	0.000	45.05	1.887	27.50	0.057	0.065	0.000	172.5	161.1	98.32	23.61	0.815
10:21	17.676	5.404	0.065	0.179	0.000	45.04	1.828	27.98	0.054	0.063	0.000	172.6	161.4	98.29	23.61	0.815
10:39	17.342	5.473	0.058	0.163	0.000	45.65	1.676	27.95	0.049	0.058	0.000	169.2	158.4	98.41	23.76	0.820
10:57	17.399	5.422	0.070	0.200	0.000	45.13	1.886	28.01	0.061	0.071	0.000	173.2	162.0	98.25	23.67	0.817
11:14	17.640	5.216	0.067	0.179	0.000	44.98	1.846	28.26	0.055	0.062	0.000	173.6	162.4	98.31	23.59	0.814
11:32	17.532	5.365	0.067	0.178	0.000	45.16	1.814	28.05	0.055	0.062	0.000	172.2	161.1	98.28	23.64	0.816
11:50	17.560	5.547	0.072	0.182	0.000	45.19	1.842	27.65	0.057	0.064	0.000	171.6	160.4	98.16	23.62	0.815
12: 7	17.324	5.654	0.068	0.158	0.000	45.72	1.680	27.51	0.050	0.055	0.000	167.8	157.0	98.22	23.73	0.819
12:25	17.700	5.670	0.072	0.182	0.000	45.61	1.847	27.62	0.055	0.064	0.000	171.9	160.7	98.83	23.79	0.821
12:43	18.014	5.633	0.074	0.196	0.000	45.32	1.952	27.82	0.060	0.069	0.000	175.1	163.6	99.14	23.78	0.821
13: 1	18.109	5.509	0.073	0.190	0.000	45.20	1.930	27.99	0.057	0.066	0.000	175.5	164.0	99.13	23.73	0.819
13:18	18.085	5.471	0.063	0.166	0.000	45.41	1.767	28.11	0.050	0.057	0.000	173.2	161.9	99.17	23.76	0.820

GAS CHROMATOGRAPH DATA

DATE TIME	H2 %	CO2 %	C2H4 %	C2H6 %	O2 %	N2 %	CH4 %	CO %	C3H6 %	C3H8 %	C3H4 %	HHV BTU/SCF	LHV BTU/SCF	TMP %	MW	S.G. WRT AIR
7/28/1985																
13:36	16.415	4.843	0.058	0.161	0.000	47.38	1.638	28.65	0.048	0.057	0.000	168.0	157.7	99.25	24.13	0.833
13:54	17.988	5.486	0.063	0.167	0.000	45.67	1.710	28.25	0.052	0.059	0.000	172.9	161.7	99.45	23.88	0.824
14:13	17.385	5.771	0.073	0.203	0.000	45.65	1.869	27.68	0.062	0.073	0.000	172.1	160.9	98.77	23.87	0.824
14:30	17.398	5.917	0.083	0.245	0.000	45.41	2.045	27.39	0.075	0.092	0.000	174.6	163.2	98.65	23.85	0.823
14:48	17.508	5.737	0.098	0.266	0.000	45.22	2.327	27.65	0.081	0.097	0.000	179.6	167.7	98.99	23.85	0.823
15: 6	18.831	5.425	0.082	0.219	0.000	44.13	2.508	27.48	0.061	0.071	0.000	182.9	170.4	98.81	23.38	0.807
15:23	18.459	5.247	0.071	0.153	0.000	45.01	1.757	28.01	0.049	0.053	0.000	173.8	162.3	98.82	23.53	0.812
15:41	18.091	5.305	0.082	0.171	0.000	45.00	1.771	28.27	0.057	0.059	0.000	174.4	163.0	98.81	23.63	0.816
15:59	18.201	5.308	0.083	0.167	0.000	44.77	1.816	28.07	0.057	0.057	0.000	174.4	163.0	98.52	23.52	0.812
16:17	16.021	4.859	0.071	0.159	0.000	47.57	1.670	27.96	0.052	0.056	0.000	165.1	154.9	98.42	24.00	0.829
16:35	17.878	5.066	0.064	0.152	0.000	44.92	1.597	28.61	0.050	0.053	0.000	172.1	161.1	98.39	23.55	0.813
16:52	17.972	4.834	0.062	0.160	0.000	44.48	1.654	29.02	0.050	0.057	0.000	174.5	163.4	98.29	23.46	0.810
17:10	17.916	4.490	0.065	0.167	0.000	44.28	1.674	29.53	0.053	0.059	0.000	176.5	165.3	98.24	23.40	0.808
17:28	17.911	4.329	0.066	0.174	0.000	43.94	1.696	29.90	0.055	0.062	0.000	178.1	166.9	98.12	23.34	0.806
17:46	17.841	4.368	0.067	0.177	0.000	43.89	1.716	29.85	0.056	0.063	0.000	178.0	166.9	98.03	23.34	0.806
18: 3	17.670	4.438	0.058	0.179	0.000	43.94	1.727	29.60	0.056	0.064	0.000	176.7	165.6	97.73	23.31	0.805
18:21	17.424	4.720	0.064	0.182	0.000	44.31	1.739	28.97	0.056	0.065	0.000	174.2	163.2	97.54	23.36	0.806
18:39	17.327	4.879	0.069	0.207	0.000	44.42	1.958	28.60	0.062	0.074	0.000	175.8	164.5	97.60	23.41	0.808
18:57	17.232	5.580	0.070	0.208	0.000	44.85	2.017	27.42	0.062	0.075	0.000	172.3	161.1	97.51	23.51	0.812
19:51	17.505	5.735	0.079	0.197	0.000	44.94	2.035	27.01	0.062	0.069	0.000	171.9	160.5	97.64	23.50	0.811
20: 9	17.804	5.938	0.063	0.176	0.000	45.56	1.928	26.96	0.054	0.060	0.000	170.6	159.2	98.54	23.72	0.819
20:27	17.920	5.811	0.069	0.190	0.000	45.30	1.966	27.10	0.058	0.065	0.000	172.3	160.8	98.48	23.65	0.816
20:44	18.035	5.541	0.078	0.182	0.000	45.14	1.900	27.69	0.061	0.061	0.000	173.9	162.5	98.69	23.64	0.816
21: 2	17.744	5.624	0.077	0.182	0.000	45.35	1.862	27.64	0.061	0.062	0.000	172.4	161.2	98.60	23.71	0.818
21:20	17.401	5.499	0.077	0.185	0.000	44.71	1.891	27.12	0.061	0.062	0.000	170.0	158.9	97.00	23.33	0.805
21:38	17.902	5.636	0.076	0.184	0.000	45.16	1.884	27.59	0.059	0.063	0.000	173.0	161.6	98.55	23.65	0.816
22:14	17.949	5.713	0.081	0.194	0.000	45.97	1.950	27.93	0.065	0.069	0.000	175.5	164.0	99.92	24.03	0.829
22:31	17.817	5.523	0.078	0.184	0.000	45.18	1.886	27.84	0.061	0.066	0.000	173.7	162.4	98.63	23.68	0.817
22:49	17.608	5.128	0.079	0.176	0.000	45.17	1.811	28.26	0.057	0.062	0.000	173.3	162.1	98.34	23.60	0.815
23: 6	19.357	6.264	0.075	0.201	0.000	43.31	2.022	27.16	0.064	0.071	0.000	178.3	166.0	98.52	23.35	0.806
23:24	19.982	6.292	0.074	0.218	0.000	42.42	2.338	27.05	0.064	0.077	0.000	183.7	170.7	98.52	23.16	0.799

APPENDIX G

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: 7/16/85 20:30 TO 7/17/85 9:30

SIGNAL	AVERAGE	UNITS	STD.DEV
CO	28.547	%	2.050
CO2	7.336	%	1.066
O2	-0.240	%	0.075
SIGMA	157.757	BTU/SCF	3.310
AG VEL	601.667	SPH	34.193
GR VEL	0.054	RPD/T	0.018
T - 3	--OFF--	DEG C	
T - 8	--OFF--	DEG C	
T - 9	--OFF--	DEG C	
T-701	23.429	DEG C	2.032
T-702	34.026	DEG C	2.032
T-703	62.130	DEG C	0.542
T-703A	42.123	DEG C	1.814
TT1-703	62.791	DEG C	0.709
TT2-703	63.050	DEG C	0.717
T-705	382.015	DEG C	45.629
T-706	158.154	DEG C	2.401
T-707	280.892	DEG C	16.409
T-710	20.944	DEG C	0.460
T-711	63.311	DEG C	4.049
T-712	21.027	DEG C	0.486
T-713	57.618	DEG C	11.523
T-715	154.825	DEG C	1.085
T-806	242.721	DEG C	13.448
T-811	--OFF--	DEG C	
T-812	--OFF--	DEG C	
T-813	--OFF--	DEG C	
T-814	--OFF--	DEG C	
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	--OFF--	DEG C	
T-818	--OFF--	DEG C	
T-819	532.673	DEG C	39.054
T-820	408.867	DEG C	98.600
T-821	109.905	DEG C	76.632
T-822	71.015	DEG C	2.858
T-823	70.992	DEG C	2.746
F-701	783.254	SCFM	2.436
F-715	743.297	LBS/HR	41.247
F-802	1462.499	SCFM	181.788
F-803	4793.247	SCFM	935.296
P-703	4.626	IN WC	0.702
P-705	2.366	IN WC	0.209
P-704	2.259	IN WC	0.745
P-706	1.865	IN WC	0.201
P-707	--OFF--	IN WC	
P-810	0.155	IN WC	0.206

AVERAGE BASE TEMPERATURE 21.911

AVERAGE FROM PERIOD: 7/19/85 8:00 TO 7/21/85 14:00

SIGNAL	AVERAGE	UNITS	STD.DEV.
CO	31.112	%	2.318
CO2	5.550	%	0.341
O2	-0.220	%	0.309
SIGMA	164.908	BTU/SCF	4.547
AG VEL	506.188	SPH	206.113
GR VEL	0.034	RPD/T	0.007
T - 3	--OFF--	DEG C	
T - 8	--OFF--	DEG C	
T - 9	--OFF--	DEG C	
T-701	23.426	DEG C	3.335
T-702	34.030	DEG C	3.243
T-703	60.863	DEG C	1.148
T-703A	42.097	DEG C	2.162
TT1-703	62.368	DEG C	0.029
TT2-703	62.617	DEG C	0.028
T-705	308.559	DEG C	19.663
T-706	--OFF--	DEG C	
T-707	227.900	DEG C	7.428
T-710	20.307	DEG C	0.998
T-711	66.114	DEG C	1.698
T-712	20.661	DEG C	1.372
T-713	47.016	DEG C	2.501
T-715	153.262	DEG C	1.411
T-806	199.079	DEG C	6.289
T-811	--OFF--	DEG C	
T-812	--OFF--	DEG C	
T-813	--OFF--	DEG C	
T-814	--OFF--	DEG C	
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	--OFF--	DEG C	
T-818	--OFF--	DEG C	
T-819	464.566	DEG C	10.568
T-820	412.634	DEG C	12.118
T-821	73.567	DEG C	1.455
T-822	67.187	DEG C	1.058
T-823	67.865	DEG C	1.554
F-701	789.612	SCFM	4.036
F-715	704.014	LBS/HR	29.680
F-802	1779.970	SCFM	46.135
F-803	6218.864	SCFM	378.485
P-703	9.520	IN WC	0.994
P-705	2.551	IN WC	0.217
P-704	6.969	IN WC	0.846
P-706	1.859	IN WC	0.160
P-707	--OFF--	IN WC	
P-810	-0.076	IN WC	0.010

AVERAGE BASE TEMPERATURE 22.134

AVERAGE FROM PERIOD: 7/24/85 15:30 TO 7/25/85 6:30

SIGNAL	AVERAGE	UNITS	STD.DEV
CO	29.536	%	1.130
CO2	5.381	%	0.678
O2	-0.379	%	0.258
SIGMA	159.924	BTU/SCF	11.690
AG VEL	-1.875	SPH	1.411
GR VEL	0.042	RPD/T	0.003
T - 3	--OFF--	DEG C	
T - 8	--OFF--	DEG C	
T - 9	--OFF--	DEG C	
T-701	22.267	DEG C	1.921
T-702	32.674	DEG C	1.759
T-703	61.349	DEG C	1.815
T-703A	37.649	DEG C	1.806
TT1-703	62.380	DEG C	0.029
TT2-703	62.627	DEG C	0.027
T-705	139.939	DEG C	21.600
T-706	82.208	DEG C	1.315
T-707	125.719	DEG C	13.756
T-710	21.048	DEG C	1.971
T-711	52.656	DEG C	2.869
T-712	21.262	DEG C	2.082
T-713	28.243	DEG C	1.772
T-715	150.318	DEG C	2.710
T-806	110.642	DEG C	9.947
T-811	--OFF--	DEG C	
T-812	--OFF--	DEG C	
T-813	--OFF--	DEG C	
T-814	--OFF--	DEG C	
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	--OFF--	DEG C	
T-818	--OFF--	DEG C	
T-819	407.027	DEG C	10.664
T-820	329.675	DEG C	11.283
T-821	96.426	DEG C	3.317
T-822	66.685	DEG C	1.411
T-823	67.117	DEG C	1.976
F-701	690.563	SCFM	1.877
F-715	744.907	LBS/HR	36.047
F-802	1445.979	SCFM	23.051
F-803	5040.294	SCFM	137.861
P-703	7.328	IN WC	0.635
P-705	2.777	IN WC	0.199
P-704	4.552	IN WC	0.577
P-706	1.900	IN WC	0.154
P-707	--OFF--	IN WC	
P-810	0.127	IN WC	0.011

AVERAGE BASE TEMPERATURE 23.499

AVERAGE FROM PERIOD: 7/27/85 20:30 TO 7/28/85 20:30

SIGNAL	AVERAGE	UNITS	STD.DEV.
CO	27.740	%	1.196
CO2	5.464	%	0.438
O2	-0.144	%	0.170
SIGMA	153.846	BTU/SCF	22.954
AG VEL	547.246	SPH	322.845
GR VEL	0.044	RPD/T	0.013
T - 3	--OFF--	DEG C	
T - 8	--OFF--	DEG C	
T - 9	--OFF--	DEG C	
T-701	28.446	DEG C	2.125
T-702	37.617	DEG C	1.924
T-703	63.553	DEG C	1.532
T-703A	49.768	DEG C	2.212
TT1-703	62.311	DEG C	0.034
TT2-703	62.549	DEG C	0.033
T-705	367.337	DEG C	32.944
T-706	162.511	DEG C	2.869
T-707	279.381	DEG C	12.283
T-710	23.392	DEG C	1.671
T-711	82.074	DEG C	4.197
T-712	23.992	DEG C	1.647
T-713	52.908	DEG C	10.719
T-715	156.767	DEG C	2.061
T-806	263.001	DEG C	12.724
T-811	--OFF--	DEG C	
T-812	--OFF--	DEG C	
T-813	--OFF--	DEG C	
T-814	--OFF--	DEG C	
T-815	--OFF--	DEG C	
T-816	--OFF--	DEG C	
T-817	--OFF--	DEG C	
T-818	--OFF--	DEG C	
T-819	249.829	DEG C	13.607
T-820	262.195	DEG C	16.491
T-821	51.512	DEG C	2.172
T-822	71.364	DEG C	1.392
T-823	72.303	DEG C	1.371
F-701	1078.848	SCFM	4.969
F-715	720.429	LBS/HR	95.495
F-802	2025.256	SCFM	37.927
F-803	6927.262	SCFM	192.633
P-703	10.220	IN WC	0.591
P-705	3.281	IN WC	0.232
P-704	6.938	IN WC	0.577
P-706	1.751	IN WC	0.157
P-707	--OFF--	IN WC	
P-810	-1.866	IN WC	0.064

AVERAGE BASE TEMPERATURE 20.975

APPENDIX H

Gas Cooler/Tar Separator Operator's Log

These are the comments recorded by the operators of the enlarged gas cooler/tar separator during its operation.

MONDAY, July 15, 1985

- 1318 Gasifier now on coke, plan to change to Illinois #6 sometime tomorrow morning.
- 1406 Begin startup procedure.
- 1452 t-35 minutes. Notified lead operator, countdown late.
- 1516 Countdown @ t-10 minutes
P-704 = .5
- 1519 P-704 set @ 1.3 in wc.
Countdown @ t-10 minutes
- 1521 Countdown accelerated to t-3 minutes
O2 = 3700 ppm.
- 1524 HV turned on. Low HV (5 kv).
ma. @ 1.4
- Adjust for 1.0 ma. per DWL & T.K. and proceed
- 1532 Countdown delayed due to low plant air pressure.
- 1540 Plant air- up. T-2 minutes.
- 1545 On line approx 1 min. Down on high O2
- 1548 O2 level falling. Return to T-5 minutes.
- 1555 Increased kv to 10.
- 1609 O2 level high, switched to cal. range
- 1600 FIRETEST
- 1614 Decreased H.V. to 10 from 10.5.
- 1622 Turned O2 range back to X1000
- 1634 Increased kv to 10.
- 2025 Increased kv from 9 to 10. Would not stay at ten.
ma at .7, T1=267 (overload light flickers when voltage is increased).
- 2106 kv back to 10 at .7 ma
Adjusted V11 to 27, DP4 at 4.5.
- 2129 kv dropped to 7. T2 jumped up to 200. Decreased V11
to 25%. DP4 at 3.5. Temperature went back down to 102 and
kv came back to 9 at .8 ma.

Illinois #6

July 16, 1985

0005 O2 went up to 5. It is slowly coming down.

0502 Dump coal. Still burning coke.

0810 Begin drain shutdown procedure

0813 Begin drain.

0825 Drain ended. Back on line.

0827 Coolant flow adjusted to approx .75 gpm.

TARGET PARAMETERS:

T2 and T3 = 130 F

Gas flow @ 10 cfm DP approx 13
per DWL 7-16-85. 8:30

0838 Tar sample nos.
018-101, 102, 103, 104.

Container 104 approx 50% full
Drain time 0815

0845 H.V. adjusted to 11 kv
ma up to approx 6, T2 up to 115 F

0853 Coolant flow adjusted to .5 gpm.

0905 Drained pressure instrumentation knock-out reservoirs. O2
train had a trace of moisture; all others dry.

1107 Coolant flow set down off scale.

1300 Purged bottles and glove box.

1400 Begin to drain

1416 System back on line
Tar drain produced 2 2/3 bottles
Sample No's. 018-105, 106, 107

107, 2/3 full

1416 Recalibrated O2 analyzer.

1716 DP4 moved up to 16. Adjusted V11 so DP4 is at 13.5

1735 T2 temperature dropped to 126, reduced water flow.

1743 T2 still at 126
1922 T2 at 123 raised tankheater high limit to 155
1938 Shut water off all the way (no change). Notified lead operator about the temperature drop. Wayne changed high range on thermostat to 180 F.
2000 Tar sample taken.
Number 018 - 108, 109, 110
Container 110 50% full
2015 System back on line
2026 T2 at 122
2043 T2 at 125
2055 T2 at 128
2104 T2 at 130
Opened up water to 1 gal per minute
2120 T2 at 133, thermostat lowered to 160
Water coolant increased to 1.1 gpm
2135 DP4 dropped to 12.5. V11 open more so DP is 14.5
2139 T2 is 133 F. Thermostat lowered to 150
2143 T2 is 134 F. Thermostat lowered to 140.
2203 T2 is 136 F. Water is increased to 1.2 gpm.
2216 T2 is 138.
2228 T2 is 137.

JULY 17, 1985.

2345 Increase cyclone outlet pressure to increase P3.
0200 Started tar drain. Produced 2 1/3 bottles.
0208 Sample no's. 018-111, 112, 113
113, 1/3 full
0230 Sump tank gas temperature low. working to increase.
0700 Started glove box purge.
0909 Shut down; begin to drain tar

0922 Tar drain complete; back on line
Tar drain produced 3 2/3 bottles
#117, 2/3 full

Sample no's 114, 115, 116, 117

1217 Power failure, emergency shutdown
ESP isolated
V-1, V-2, V-13, V-30 closed.

1243 Begin to purge glove box.

1300 Approx gasifier startup.

1422 Drain O2 train water knockout reservoir.
Traces of water.

1615 Drierite and iron oxide changed
O2 back on line

1703 O2 does not seem to be working right

2050 O2 working

2055 Began start-up procedure.

2110 Cyclone outlet pressure is 1.3
Informed lead operator of system status

2145 System on line.

2350 Adjusted V11 to make DP4 = 14

0100 T4 = 256 F opening V11 closing V17

0130 Dropped SUFCO coal
Opening V11 and closing V16

0250 Purge glove box

0300 V15 closed to keep T2 about 130
T2 is 124

0305 Started tar drain.

0310 Stopped tar, drain system on line
Produced 2/3 container.
Sample 018 - 119 coke and Illinois #6.

0405 Emergency shut down.
Lost power, gas safety V2 valve and V-13 steam to
inductor closed automatically.
Closed V-1
Informed lead operator purging system open V-4.

0420 Called project engineer

0425 Start up procedure begun
Open V1, V2, V-13
Set V-11 to 14, turn off nitrogen. Closed V-4.

0430 System on line.

0800 Start glove box purge.

0847 Cyclone outlet 2.1. Drain begun.
Produced 2 1/3 bottles

Samples 018-120, 121, 122
122 is 1/3 full.

0927 Back on line. Installed temperature gauge on tar tank.

1237 Started glove box purge.

1330 Turned kv to 10.

1411 P-706 2.0.
Begin tar drain shutdown.

1437 Tar drain complete
Sufco coal tar sample

No's. 018-201, 202
202 is 3/4 full

1445 Back on line

1555 High voltage dropped to 7.5 at 7 ma

1605 High voltage back to 11 at 6 ma

1623 T2 at 140 F, turned on water.

1743 Temperature gauges are not reading right
HV overload light flashing

1752 HV and temperature readings have evened out.

1801 DP4 at 12, V11 opened more so DP4 is at 15.

1900 Tar drain procedure started

1958 Glove box glove came off. Fixed it

2010 Started purge over again

2105 Started drain

2115 Drain complete. Waiting for O2 to come down.
2146 System on line
Drained two large bottles and one small bottle
Sample no's 018-203, 204, 205.
2213 DP 4 had risen to 16, closed V11 to 20%.
DP4 at 13

JULY 19, 1985

0110 Started glove box purge
0200 Started tar drain
0210 Stopped tar drain. Produced 1 1/2 jars full|
Back on line.
0215 SUFCO tar sample 018-206,207.
207, 1/2 full
0230 Open V8 to drain water about 1/2 - 1 cup
Closed V8 and drained O2 knockout
0656 Emergency shutdown
Lost power to V-2 and V13
0700 Back on line
Started glove box purge
0800 Tar drain started
0816 Tar drain complete
Sample 018-208, 209, 210.
Sample 210, 60% of small bottle
0820 System back on line.
0900 Turned kv to 10.
0930 No flow to oxygen analyzer.
Changed line filter
Cleaned sight glass and lines
1006 High O2, alarm sounded and shut V2 and V13.
Changed range and open valves V2 and V13.
1033 O2 meter calibrated and working.
1255 Temperatures low, turned coolant flow down.
1300 Begin glove box purge.

1400 Begin tar drain.

1415 Tar drain complete, system back on line
Samples 018-211 and 212.

NOTE: Samples 206, 207, 208, 209, 210, 211 and 212
taken on the 19th may have 7/18/85 date on them

1952 Start box purge.

2052 Start drain.

2059 Drain complete, produced 2 large andd one small contained,
no's 018-213, 214, and 215.

2200 System back on line

2210 One nitrogen tank empty

2215 Opened up water coolant.
Samples 018-216, 217, 218.
#218 is a small bottle (full).

2300 Turned water flow down

July 20, 1985

0105 Purged glove box

0200 Started Tar drain

0215 Stopped Tar drain, system on line.
Samples 018-216, 217, 218
#218 is a full small bottle

0700 Started glove box purge

0800 Started tar drain.

0812 Tar drain complete, system back on line.

Sample No's 018-291, 220, 221
Sample 221 is a small bottle - 50% full.

0930 T2 is high, turned on coolant

1300 Begin glove box purge

1400 Started tar drain.

1405 Checked 1/4" tube on ESP outlet and found traces of tar on
bottom side of tube.

1412 Tar drain complete, system on line.

1415 Sample No's 018-222, 223, 224.
Sample 224 is a small bottle, 50% full.

1854 Started purge of glove box.

2001 Started drain.

2012 Finished drain, system back on line
Produced samples 018-225, 226, 227.
Sample 227 is a small bottle, 1/3 full.

JULY 21, 1985

0110 Started glove box purge

0200 Started tar drain

0210 Stopped tar drain, produced 2 2/3 bottles.
Sample 018 - 228, 229, 230.
#230 is 2/3 full

0213 System back on line

0700 Started glove box purge.

0756 Start drain.

0805 Drain complete
Samples 018-231, 232

0810 Back on line.

1300 Started glove box purge

1400 Started drain.

1405 Drained V-8 and O2 reservoir.
Traces of tar and O2 water

1410 Sample No's. 018-233, 234, 235
Sample 235 is a small bottle

1427 Changed liquid nitrogen

1744 Adjusted V11 so DP4 us 13.

1853 Started box purge.

2000 Started drain.

2011 Drain complete system on line.
Sample no's 018-236, 237, 238.

Sample 238 is a small bottle 60% full

2200 Replaced iron oxide during firetest. Flow on O2 analyzer is still very low (the Drierite still looks good)
The float ball is below scale.

2246 Flow on O2 analyzer improved to .9 liter per minute.

JULY 22, 1985

0100 Started glove box purge.

0145 Change drierite.

0200 O2 is high because change drierite.

0215 Start tar drain

0230 Stopped tar drain; system on line
Produced 2 containers full
Sample #018-239,240

0250 O2 level is .5, normal.

0700 started glove box purge

0800 Begin drain.

0808 Drain complete and back on line

Sample no's 018-241, 242, both full

0942 Changed liquid N2 tank.

1000 Started glove box purge

1100 Started drain.

1138 Repaired low O2 flow meter.

1200 Blew steam on outside of drain valve to get tar out.

1252 Drain complete and back on line.

Sample no's 018-243, 244.
Sample 244, 1/3 full

INDIANHEAD LIGNITE TAR

1545 Circuit Breaker to V-2, V-13, and HV tripped.

1853 Started box purge.

1950 Circuit Breaker tripped again.

20000 Samples 018-401, 402 taken.
Tar drippings on the paper towel are black in color.

2010 The O2 analyzer pump seems to have overheated and it's thermostat has shut it down (the pump seems hot).

2018 The pump turns itself back on
O2 on line

2029 Changed V11 to 17%. DP4 at 14

2033 Noticed water in the dark line coming out of the oxygen train pump.

2045 Took hose off to let water out. Performed parts A, B, C of emergency shutdown. Cleared water out of the analyzer

2055 System back on line.

JULY 23, 1985

0100 Started glove box purge.

0200 Started tar drain.

0210 Stopped tar drain, system on line. Produced 1 2/3.
Indianhead lignite 018-403, 404
#404 is 2/3 full.

0230 Change nitrogen bottle.

0710 Started glove box purge.

0810 Tar drain begin.

0818 Tar drain complete and system back on line.

Sample No's 018-405, 406.
#406 is 1/2 full.

1100 Changed nitrogen bottle.

1300 Started glove box purge.

1355 Begin drain.

1404 Drain complete and back on line
Sample no's 018-407, 408, 409.

1840 Emergency shutdown. Vacuum pump tripped.

1845 System back on line. Drained water from pump and O2

knockout drain.

1850 Adjusted V11 to make DP4 = 14.

1900 Start glove box purge.

2015 Drain V-8.

2020 Started system.
Produced 3, 018- 407, 408, 409

2310 Breaker #5 tripped, reset.

2338 O2 analyzer pump overheated and tripped.

2340 Replaced Drierite (Drierite had turned dark on top and bottom of tube).

2345 O2 analyzer back on.

JULY 24, 1985

0055 Started box purge

0200 Started drain.

0210 Drain complete. System on line. Drain produced two samples, 018-410, 411.

0229 Water collecting in the O2 outlet line from the pump.

0245 Braker #5 tripped, reset.

0250 Changed nitrogen bottle

0400 Did steps A, B, V-2 of emergency shutdown and drained the water from the O2 pump outlet line.

0403 Back on line

0626 Breaker #5 tripped, reset.

0637 Repeated same steps as per 0400.

0700 Started glove box purge.

0800 Started tar drain.

0809 Drain complete and system on line
Sample no's 018-412, 413
Sample 413 is 1/2 full.

1305 Begin glove box purge

1400 Begin tar drain.
1408 Drain complete and back on line
Sample no's 414, 415, both full.
1900 Started glove box purge
2000 Started tar drain
2005 Drain V-8. No water in O2 drain.
2010 Completed tar drain, system on line. Produced 2/3
Sample 018-416 2/3 full
Found out gasifier operator changed air flow 700 to 600 at
1500.
2359 Let water out of O2 pump.

JULY 25, 1985

0130 Started purge (forgot to start at 0100)
0230 Started drain.
Samples 018-417, 418.
#418 large bottle, 1/4 full
Used steam on the valve to see if more would drain.
No more drained.
0243 Drain complete, system on line.
0245 Changed nitrogen bottle.
0400 Let water out of O2 pump.
0700 Started glove box purge.
0756 Started drain.
0806 Drain complete and system on line
Sample No's 018-419, 420.
Sample 420 is a small bottle 1/2 full.
1124 Started glove box purge at 15 psi
1139 ESP off line, purge pressure of 4 psi
1226 Begin drain.
1247 Tar drain complete, system back on line
Sample no's 018-421, 422. 422 is 25% full

HIAWATHA

1300 kv down to 9.

1304 Turned steam to intector down; DP4 at 11.

1400 Turned kv to 10.

1500 Turned kv to 9 and DP4 to 11.

1900 Started glove box purge

2000 Started tar drain.

2010 Complete tar drain.

2012 Drain V8 and O2 knockout tank.

2013 System on line. Produced 4.
Sample 018-301, 302, 303, 304.
#304 is a small bottle, full.

2040 Gasifier operator increased air flow from 700 to 800.

0057 Started purge

0200 Started drain.

0215 Drain complete, system on line.
Produced 3 samples no's 018-305, 306, 307.
#307 is a large bottle 1/3 full.

0715 Begin purge on glove box.

0815 Tar drain.

0822 Drain complete and system on line
Sample no's 018-308, 309, 310.

1000 Changed liquid nitrogen.

1027 Turned coolant flow on.

1048 Turned coolant off.

1255 System down. Emergency procedure.
System purging - gasifier down due to power blip.

1330 Gasifier operating.

1333 Glove box purge started.

1430 Drain completed. 2 full 2-litre bottles.
Sample no's 018-311 and 312.

1440 ESP start up.
1555 Started Regular readings.
1600 Adjusted Vll to maintain 14 on DP4.
1900 Started glove box purge
2000 Started tar drain.
2010 Completed tar drain. System on line. Produced 4.
Samples 018-313, 314, 315, 316.
Sample 316 is a full small bottle.

JULY 27, 1985

0100 Strted box purge.
0200 Started drain.
0213 Drain complete. System on line.
Drain produced samples 018-317, 318, 319, 320.
#320 is a full, small bottle.
0302 Adjusted Vll to 18%, DP4 at 12. HV at 9.5
0403 Adjusted Vll to 10%.
0700 Started glove box purge.
0800 Begin drain-valve; clogged, applied steam.
0812 Drain complete, back on line.
Sample no's 018-321, 322, 323, 324.
#324 is a small bottle.
0822 Changed liquid nitrogen.
1300 Begin purge in glove box.
1400 Begin drain.
1410 Drain complete and back on line.
Sample no's 018-325, 326, 327, 328.
Sample 328 is a small bottle.
1900 Started gove box purge.
2000 Started tar drain.

2010 Completed tar drain, system on line. Produced 2 2/3.

Samples 018-329, 330, 331.

#331 is 2/3 full.

2030 Gasifier operator Increased air flow to 1400.

JULY 28, 1985

0057 Started box purge

0100 P1, P2, P3 are running close to -2 in wg
This seems to be related to the increase of the cfm.

0200 Start drain.

0210 Drain complete, system on line.
Drain produced samples 018-332, 333, 334.
#334 is a small bottle.

0214 After system was on line for 4 minutes.
DP4 had not stabilized, pegged all the way to the right,
changed V11.

0700 Begin purge.

0756 Begin drain.

0806 Drain complete system on line

Sample no's 018-335, 336
#336 is a 1 gallon bucket.

0900 Changed nitrogen.

1006 Start efficiency test of system (Tom Kotz).

1200 Turned heat exchanger coolant on.

1300 Begin glove box purge.

1357 Begin drain.

1410 Drain complete; ESP on line

Sample No's 018-337, 338, 339
337 is a large bottle
338 is a 1 gallon bucket
339 is a small bottle.

1430 Thermometer readout failed.

1510 Thermometer readout working.
Unplugged and plugged back in power cord.

1525 Changed Drierite and drained water from 02 knockout.

1900 Started glove box purge.

1905 Stopped purge to put another sample bottle in.

1916 Restarted purge.

2010 Started drain.

2020 Completed drain. System on line.

Produced 2 large bottles and 2 small bottles
Samples 018-340, 341, 342, 343.
#342 and 343 are small bottles.

2025 ma will not go to normal.

2305 Informed by gasifier operator that gasifier shutdown will
begin in 15 minutes.
Purge box.

2320 Started drain and planned shutdown.
Samples 018-344, 345, 346.
346 is a small bottle.

2340 Drain complete; started system shutdown.
Purge.

0042 Purge complete. Shut V-4 and V-12.

ENDES ALLES

APPENDIX I

Gas Cooler/Tar Scrubber Operator Logged Data

Signals are identified in Figure 4-3.

TAR COLLECTION
SHIFT LOG

TIME	O2	K.V.	MA.	P1	P2	P3	P1-P2	P2-P3	DP4	T1	T2	T3	T4	T5	T6	P5	P6	V11 %	P706
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JULY 15, 1985

1755	.1	10	.5	.5	.5	.5	.05	.9	6	260	94	104	76	73	72	100	90	30%	1.2
1855	.2	10	.5	.5	.5	.5	0	.6	5	263	97	105	77	73	71	90	78	30	1.5
1955	.2	10	.6	.5	.5	.5	0	.7	6.5	274	95	104	77	73	71	100	80	30	1.3
2055	.1	9	.7	.5	.5	.5	0	.2	3.5	266	96	103	76	72	71	90	82	30	1.3
2155	0	9	.9	.5	.5	.5	0	.2	2.5	271	94	99	77	71	71	100	82	20	1.6
2255	0	10	.8	.5	.5	.5	.1	.1	3.5	277	100	106	81	76	75	100	82	20	1.8
2355	0	9.5	7.0	.5	.5	.5	.01	.01	3.5	288	104	105	77	71	70	100	84	20	1.8

JULY 16, 1985

0055	1.5	10	5.0	.5	.5	.5	.01	.01	4.0	298	107	114	76	71	70	100	82	20	1.8
0155	1.5	10	4.5	.5	.5	.5	.01	.01	3.5	302	105	113	77	71	70	98	78	20	1.8
0255	.2	10	5.0	.5	.5	.5	.01	.01	4.0	306	105	112	77	71	70	100	84	20	1.8
0355	.3	10	5.0	.5	.5	.5	.01	.01	4.0	317	105	111	77	71	70	100	84	20	1.8
0455	.1	10	5.0	.5	.5	.5	0	.03	4.0	321	104	110	77	71	70	100	78	20	1.7
0444	.3	10	3.0	.5	.5	.5	.01	.02	3.0	266	107	114	79	77	70	100	88	20	.8
0655	.4	10	3.0	.5	.5	.5	.01	.02	4.0	233	106	112	77	71	69	100	96	20	1.2
0800	.1	10	.4	.5	.6	.5	.4	.6	4.0	231	107	113	79	71	69	100	90	20	2.0
0900	.1	11	.5	.5	.5	.4	.6	.18	14.0	261	121	129	88	73	72	100	93	20	2.0
0955	.1	11	.4	.5	.5	.3	.6	.20	14.0	286	122	126	85	73	71	100	94	20	1.9
1055	0	11	.4	.5	.5	.4	.6	.20	13.5	305	122	128	86	75	73	100	90	20	1.9
1155	.5	11	.4	.5	.5	.4	.6	.18	13.5	330	120	130	93	76	74	100	90	20	2.1
1255	.5	11	.4	.5	.5	.4	.6	.18	13.5	344	121	131	86	76	74	100	90	20	1.9
1355	.5	11	.4	.5	.5	.4	.6	.18	13.0	342	123	134	88	77	74	100	90	20	2.0
1455	.2	11	.5	.5	.5	.4	.5	.20	15.0	313	126	131	88	79	75	100	93	20	2.0
1555	.1	11	.5	.5	.5	.3	.4	.18	15.0	327	130	136	92	80	75	100	95	20	1.1
1655	.1	12	.6	.5	.5	.3	.4	.18	16.0	333	131	136	93	79	75	99	78	20	1.9
1755	.1	11	.6	.5	.5	.3	.4	.18	13.5	345	125	132	83	75	73	98	99	19	2.0
1855	0	11	.4	.5	.5	.3	.4	.18	13.5	345	126	132	88	77	73	100	94	19	2.0
1955	0	11	.4	.5	.5	.4	.4	.18	13.0	348	121	130	88	77	73	100	98	19	2.0
2055	0	11	.4	.5	.5	.4	.4	.17	12.5	357	129	133	91	76	64	98	78	19	2.0
2155	0	11	.4	.5	.5	.3	.4	.18	13.0	330	135	135	79	74	72	99	95	20	2.1
2255	2.0	11	.4	.3	.3	-.2	.4	.18	13.5	326	136	135	79	72	71	99	86	20	1.8
2355	.1	11	.3	.5	.5	.2	.02	.16	14.0	334	133	134	82	72	71	98	75	20	2.1

JULY 17, 1985

0055	.1	11	.3	.4	.4	.3	.02	.2	14.0	341	127	131	84	72	71	98	98	20	2.1
0155	.1	11	.3	.3	.2	.0	.02	.16	13.5	341	123	128	82	72	71	98	90	20	1.9
0255	.1	11	.3	.4	.4	.1	.02	.18	15.0	318	119	128	121	95	81	98	78	20	2.1
0355	.7	11	.3	.6	-.2	-.5	-.02	.14	14.0	348	121	133	210	192	135	98	96	20	1.8
0455	.8	11	.3	.0	-.2	-.5	.0	.18	14.0	351	118	132	235	212	156	98	78	20	1.7
0600	1.3	11	.4	0	-.2	-.3	.2	.16	14.0	353	111	126	84	72	71	98	98	20	1.6
0655	1.0	11	.4	0	0	-.2	.2	.14	13.0	346	117	135	210	176	126	98	88	20	1.7
0755	.9	11	.3	.1	.1	-.1	.02	.18	13.0	334	123	136	238	81	71	100	74	20	1.6

TIME	O2	K.V.	MA.	P1	P2	P3	P1-P2	P2-P3	DP4	T1	T2	T3	T4	T5	T6	P5	P6	V11 %	P706
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JULY 17, 1985

0855	1.0	11	.4	-.1	-.1	-.1	-.1	.18	13.0	334	116	126	243	79	72	100	69	20	2.1
0955	1.0	11	.4	-.1	-.2	-.5	.02	.18	15.5	329	117	128	235	81	72	100	85	20	1.7
1055	1.2	11	.5	0	0	-.5	.02	.20	15.5	341	119	130	244	82	73	100	98	20	1.4
1155	1.2	11	.5	0	0	-.5	.02	.20	15.0	343	117	130	245	82	75	100	98	20	1.8
1255										268	112	92	168	74	73	100	96	20	
1355				-2.0	-2.0	0	.05	-		223	111	90	147	75	72	100	94	20	1.4
1455				1.0	1.0	0	.05	1.0+		182	112	92	137	103	92	100	96	20	
1655	-	-	0	-2.5	-2.5	-	-	-	-	159	111	91	137	116	102	100	85	20	1.1
1800	4.7	-	0	-2.5	-2.5	-	-	-	-	145	111	88	129	115	103	100	100	20	1.4
1855	4.7	-	0	2.5	2.5	.3	.5	-	-	139	121	90	131	120	108	100	100	20	1.5
1955	5.2	-	0	1.0	1.0	-	-	.8	-	141	128	90	133	125	118	97	97	20	1.3
2355	.3	10.5	-.5	-.5	-.5	-1.	.01	.18	14	362	134	136	172	72	71	98	90	20	1.4

JULY 18, 1985

0055	.3	10.5	.5	-.5	-.5	-1.	.01	.18	14	382	131	137	256	72	71	98	90	20	1.4	
0155	.3	10.5	.7	-.5	-.5	-1.	.01	.16	13	352	126	136	233	126	89	99	98	20	1.5	
0255	.2	10.5	.7	-.5	-.5	-1.	.01	.16	13.5	343	124	136	273	204	122	98	88	20	1.5	
0355	.2	10.5	.6	-.5	-.1	-.8	.01	.16	14.0	222	129	136	273	202	125	98	88	20	1.1	
0455	.2	10.0	.6	-.2	-.1	-.4	.0	.16	14.0	294	124	130	220	133	92	98	86	20	1.6	
0555	.2	9.5	.5	-.2	.0	-.4	.0	.16	13.0	300	134	133	235	83	74	98	88	20	1.6	
0655	.2	11.0	.5	-.2	-.2	-.8	.0	.16	14.5	279	121	130	226	137	98	98	90	20	1.5	
0755	.1	11.0	.4	0	0	-.5	0	.16	14.5	279	122	128	222	146	99	100	80	20	2.1	
0855	.3	11.0	.4	0	0	-.5	0	.20	15.5	270	117	128	220	148	103	100	92	20	2.1	TAR
0955	.2	11.0	.4	0	0	-.5	0	.20	15.0	276	119	126	218	155	109	100	94	20	1.7	GAUGE
1155	.1	11.0	.4	0	0	-.5	0	.18	14.0	282	113	124	232	174	113	100	94	20	1.6	135
1255	.1	11.0	.4	0	0	-.5	0	.18	13.0	290	120	129	240	190	117	100	94	20	1.6	136
1355	.7	10.5	.3	0	0	-.5	.01	.16	12.0	296	125	129	246	197	118	100	91	20	2.0	140
1455	1.7	11.0	.4	0	0	-.5	.02	.18	14.5	271	125	126	221	157	108	100	90	20	1.7	136
1555	1.0	7.5	7.0	0	0	-.5	0	.18	13.0	303	147	147	245	187	125	100	95	20	1.7	143
1655	1.0	10.0	5.0	0	0	-.5	0	.18	12.5	289	136	137	196	72	73	98	90	20	1.7	143
1755	1.0	10.0	3.0	0	0	-.5	.02	.18	12.0	290	133	134	197	72	71	99	78	20	1.7	140
1855	1.0	11.0	3.0	0	0	-.6	.02	.19	14.0	288	132	135	190	73	72	99	95	21	1.6	142
1955	1.0	11.0	3.0	0	0	-.5	.02	.19	14.0	290	133	137	194	73	71	98	74	21	1.7	142
2055	1.0	11.0	4.0	0	0	-.5	.02	.19	13.5	292	134	135	194	72	71	99	80	21	1.7	142
2155	1.0	9.0	2.0	0	0	-.5	.02	.23	16.5	254	126	126	160	73	71	99	90	21	1.8	138
2255	1.0	11.0	5.0	0	0	-.5	.02	.17	12.5	280	129	131	195	76	71	99	85	20	1.7	138
2355	.1	10.5	.4	-.1	-.1	-.1	0	.18	13.0	294	135	133	187	73	71	98	76	20	1.8	140

JULY 19, 1985

0055	.2	10.5	.4	-.1	-.1	-.5	0	.16	13.0	296	131	130	201	72	71	98	90	20	1.0	140
0155	.1	10.5	.4	-.1	-.1	-.5	0	.16	13.0	299	131	131	204	74	71	98	78	20	1.9	138
0255	.2	10.5	.6	0	0	-.2	0	.16	13.0	302	129	131	203	74	71	98	94	20	1.9	136
0355	.1	10.5	.6	0	0	-.3	0	.16	14.0	311	133	133	206	74	72	98	86	20	2.1	138
0455	.2	10.5	.6	0	0	-.3	0	.14	13.0	308	130	130	212	75	70	98	88	15	1.9	138
0555	.1	10.0	.6	-.1	-.1	-.5	0	.18	14.5	313	129	132	214	75	71	98	98	15	1.8	138

TIME	O2	K.V.	MA.	P1	P2	P3	P1-P2	P2-P3	DP4	T1	T2	T3	T4	T5	T6	P5	P6	V11 %	P706
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JULY 19, 1985

0655	.4	10.5	.2	-.2	-.2	-.8	.01	.18	15.0	304	125	124	201	73	71	98	96	15	1.8	132
0755	.1	10.5	.3	0	0	-.5	.03	.20	14.5	310	125	130	214	76	71	100	84	11	1.0	134
0855	.8	10.5	.3	0	0	-.5	.02	.20	14.5	297	123	127	202	77	73	100	82	11	1.9	132
0955		10.0	.3	0	0	-.5	.02	.20	14.0	306	128	132	210	77	72	100	94	11	1.8	132
1055	1.9	10.5	.4	0	0	-.5	.02	.20	16.0	307	126	127	219	78	73	100	94	11	1.6	126
1155	.4	10.0	.4	0	0	-.5	.02	.20	15.0	307	126	132	213	77	72	100	93	11	1.7	134
1255	.3	10.0	.3	0	0	-.5	.02	.18	15.0	307	120	127	219	78	73	100	94	11	1.6	126
1355	.1	10.0	.4	0	0	-.5	0	.18	14.5	309	123	129	225	79	73	100	90	11	1.8	136
1455	.1	10.0	.4	0	0	-.5	.02	.20	15.0	302	120	127	216	80	73	100		11	1.8	131
1555	.1	10.0	6.0	0	0	-.7	.02	.20	15.0	314	122	129	230	82	73	99	80	11	1.8	129
1655	.1	10.5	3.0	0	0	-.7	.03	.20	15.0	317	123	131	244	140	94	99	80	11	1.8	129
1755	0	10.0	3.5	0	0	-.3	.05	.22	14.5	318	120	131	257	169	103	98	90	11	1.7	129
1855	.1	10.0	4.0	0	0	-.5	.02	.18	14.0	316	122	131	259	178	105	99	95	11	1.7	131
1955	.1	10.0	4.0	0	0	-.5	.04	.18	13.5	321	125	133	262	182	106	99	78	11	1.7	134
2055	1.1	10.75	3.0	0	0	-.5	.04	.19	15.4	316	130	138	228	74	72	98	89	11	1.8	137
2155	1.0	11.0	3.0	0	0	-.6	.02	.20	15.0	291	132	136	98	71	70	99	83	11	1.9	142
2255	1.0	11.0	3.0	0	0	-.6	.04	.19	14.0	304	131	133	204	72	71	99	88	11	1.9	134
2355	0	10.0	.5	-.2	-.1	-.7	.02	.18	14.0	313	126	129	222	76	71	98	90	11	1.9	128

JULY 20, 1985

0035	0	10.0	.4	0	0	-.5	.02	.16	14.0	317	127	133	248	137	93	98	96	11	1.9	136
0155	.1	10.0	.3	0	0	-.4	0	.18	13.5	320	129	131	229	77	72	98	80	11	2.1	140
0300	0	10.5	.4	-.2	-.2	-.5	.02	.18	15.5	322	129	132	222	76	71	98	76	11	2.1	138
0355	0	10.5	.3	-.2	-.2	-.5	.02	.18	14.5	324	130	132	228	75	71	98	82	11	2.1	136
0500	0	10.0	.3	0	0	-.3	0	.16	14.0	220	128	132	237	78	71	98	86	11	2.2	136
0555	0	10.0	.3	0	0	-.3	0	.18	14.0	335	124	130	248	92	71	98	88	11	2.2	124
0655	0	10.0	.3	-.2	-.1	-.4	0	.18	14 0	335	128	132	267	160	88	98	90	11	2.1	134
0755	0	10.0	.3	0	0	-.5	0	.20	13.5	332	132	132	271	170	94	100	90	11	2.1	138
0855	0	10.0	.3	0	0	-.5	0	.20	15.5	314	131	134	254	153	95	100	96	11	1.9	138
0955	0	10.0	.3	0	0	-.5	.02	.20	15.0	312	135	138	226	76	71	100	74	11	1.6	140
1055	0	10.0	.3	0	0	-.5	.02	.20	15.0	311	136	135	231	82	73	100	74	11	1.7	136
1155	0	10.0	.3	0	0	-.5	.02	.20	15.0	315	134	136	231	82	73	100	80	11	1.7	138
1255	0	10.0	.3	0	0	-.5	.02	.20	14.0	313	127	133	228	82	74	100	100	11	1.8	126
1355	0	10.0	.3	0	0	-.5	0	.20	13.5	309	129	132	226	82	74	100	94	11	1.8	140
1455	0	10.0	.4	0	0	-.5	.02	.20	15.75	299	130	135	215	82	74	100	92	11	1.8	138
1555	0	10.0	4.5	0	0	-.6	.02	.20	15.0	309	131	134	214	77	73	98	96	11	1.8	139
1655	0	10.0	4.0	-.02	-.02	-.5	.02	.20	14.5	306	132	136	216	76	72	98	75	11	1.8	137
1755	0	10.0	2.0	-.02	-.02	-.6	.03	.20	15.0	302	129	132	192	72	71	98	80	11	1.8	140
1855	1	10.0	3.0	0	0	-.6	.02	.20	14.5	305	131	135	212	74	73	98	85	11	1.7	141
1955	0	10.0	3.0	0	0	-.6	.02	.19	14.5	305	131	135	212	72	72	98	85	11	1.7	142
2055	0	10.5	3.0	-.02	-.02	-.6	.02	.20	16.0	299	124	130	228	140	96	97	87	11	1.7	139
2155	0	10.5	2.0	0	0	-.5	0	.21	15.5	310	129	134	244	79	73	98	90	11	1.7	140
2255	0	10.75	2.0	0	0	-.5	.02	.20	15.0	307	127	131	230	117	84	98	92	11	1.8	140
2355	0	10.0	.25	-.2	-.2	-.5	0	.18	15.0	313	125	130	252	166	100	98	98	10	1.9	138

TIME	O2	K.V.	MA.	P1	P2	P3	P1-P2	P2-P3	DP4	T1	T2	T3	T4	T5	T6	P5	P6	V11 %	P706
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JULY 21, 1985

0055	0	10.0	.3	0	0	-.3	0	.18	15.0	298	127	130	225	81	71	98	96	10	2.0	140
0155	0	10.0	.2	0	0	-.5	0	.18	15.0	307	120	129	241	142	94	98	92	10	2.0	136
0255	0	10.0	.3	-.2	-.2	-.6	.02	.2	16.0	315	129	134	251	181	105	98	88	10	2.0	140
0355	0	10.0	.3	-.2	-.2	-.5	0	.2	16.0	325	129	134	268	204	109	98	80	10	2.0	140
0500	0	10.0	.3	0	-.0	-.5	0	.2	13.5	325	130	135	270	209	113	98	86	10	2.0	143
0555	0	10.0	.3	-.3	-.3	-.8	.02	.18	14.0	320	127	130	236	80	71	98	94	10	1.9	142
0655	0	10.0	.3	0	0	-.5	0	.18	14.0	315	120	126	254	167	100	98	91	10	2.1	136
0755	0	10.0	.3	0	0	-.5	.02	.14	13.0	314	121	128	260	191	105	100	96	10	2.0	138
0855	0	10.0	.3	0	0	-.5	.02	.20	17.0	306	129	143	257	196	111	100	86	10	1.8	139
0955	0	10.0	.3	0	0	-.5	.02	.20	16.0	309	127	133	261	204	117	100	80	10	1.8	136
1055	0	10.0	.3	0	0	-.5	.02	.20	15.5	309	123	132	262	209	123	100	94	10	1.8	132
1155	0	10.0	.3	0	0	-.5	.02	.20	15.0	307	120	130	261	209	128	100	90	10	2.3	132
1255	0	10.0	.3	0	0	-.5	.02	.20	15.0	315	120	131	265	210	132	100	94	10	1.8	132
1355	0	10.0	.4	0	0	-.5	.02	.20	15.0	311	122	133	264	210	134	100	84	10	1.8	140
1455	0	10.0	.4	0	0	-.5	.02	.20	18.0	301	125	135	257	210	135	100	78	10		138
1555	0	10.0	.4	0	0	-.5	.04	.20	17.0	309	124	134	258	210	141	98	80	11	1.8	133
1655	0	10.0	.4	0	0	-.5	.04	.21	16.0	310	124	135	258	210	133	98	86	11	1.8	135
1755	0	10.0	.5	0	0	-.5	.04	.20	14.0	310	123	133	261	211	142	99	91	11	1.9	139
1855	0	10.0	.5	0	0	-.5	.04	.18	13.0	309	121	131	263	212	145	99	96	9	1.7	133
1955	0	9.0	.6	0	0	-.5	.04	.18	12.5	314	125	133	266	213	150	98	90	9	1.8	135
2055	0	10.0	.5	0	0	-.5	.04	.20	14.0	313	121	130	259	211	148	98	80	9	1.8	128
2155	0	10.0	.5	0	0	-.5	.02	.18	13.0	315	122	128	265	211	153	98	85	9	1.9	125
2255	4.1	10.0	.4	-.05	-.03	-1.0	.02	.19	15.0	313	124	135	265	212	156	99	88	9	2.1	128
2355	.2	9.5	.3	0	.3	0	0	.15	13.0	314	121	131	264	210	123	98	96	9	2.1	128

JULY 22, 1985

0055	.0	9.5	.35	0	0	-.3	0	.16	13.0	317	119	128	266	207	111	98	90	10	2.0	120
0155		9.5	.3	0	0	-.3	0	.18	13.0	316	127	131	265	206	110	98	78	10	2.0	144
0255	.5	10.0	.4	0	0	-.5	0	.18	14.5	300	127	132	252	192	112	98	80	10	2.2	142
0355	.2	10.0	.4	0	0	-.5	0	.18	15.0	309	125	130	255	197	107	98	80	9	2.4	140
0455	.1	10.0	.4	.5	.5	.2	.02	.18	15.5	313	129	132	255	193	105	98	80	9	2.4	142
0555	.1	10.0	.35	0	0	-.3	0	.18	15.0	320	125	130	260	199	105	98	80	9	2.4	142
0655	.1	10.0	.3	0	0	-.5	-	.18	14.5	316	129	130	254	125	71	98	88	9	2.1	144
0755	.1	10.0	.4	0	0	-.5	.02	.20	15.0	308	128	130	235	110	72	100	90	9	2.0	137
0855	.1	10.0	.4	0	0	-.5	.02	.20	17.0	299	126	133	229	112	82	100	92	9	2.1	128
0955	.1	10.0	.5	0	0	-.5	.02	.20	17.0	305	130	139	234	122	89	100	96	9	2.1	132
1055	.1	9.5	.3	0	0	-.5	.02	.20	15.5	314	127	134	240	121	88	100	76	9	1.9	130
1155	0	0	0	0	0	0	0	0	0	243	112	85	188	119	88	100	96	9	1.8	122
1255	3.1	10.5	.3	0	0	-.5	.02	.20	18.5	229	111	128	179	133	102	100	82	9	1.8	118
1355	1.0	11.0	.4	0	0	-.5	.02	.20	18.0	228	119	144	189	159	144	100	97	9	2.0	127
1455	.1	11.0	.4	0	0	-.5	.02	.20	18.5	216	122	145	237	232	198	100	80	9	1.6	124
1558	0	13.0	.3	0	0	-.05	.02	.20	16.0	202	122	143	211	210	152	98	91	19	1.9	123
1659	.1	11.0	.2	0	0	-.05	.02	.20	16.0	197	125	144	210	210	150	98	99	19	1.4	124
1755	0	11.0	.2	.5	.5	.3	.02	.20	16.0	195	128	145	211	210	150	98	80	19	1.7	132
1900	0	11.5	.2	.5	.5	.2	.02	.19	16.0	190	126	146	211	210	145	98	84	19	1.8	129
2018	2.0	12.75	.4	.5	.5	.3	.03	.19	16.0	189	127	146	211	210	145	98	80	19	1.8	129

TIME	O2	K.V.	MA.	P1	P2	P3	P1-P2	P2-P3	DP4	T1	T2	T3	T4	T5	T6	P5	P6	V11 8	P706
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JULY 22, 1985

2100	1.5	13.0	.5	.5	.75	.5	.02	.19	15.0	188	126	146	212	210	143	98	78	17.0	1.8	126
2159	.1	13.0	.4	.7	1.0	.5	.02	.18	13.5	189	129	146	210	210	144	98	84	17	1.9	130
2255	0	13.0	.3	.7	.8	.5	.02	.18	14.5	189	130	146	210	209	144	98	96	17	1.8	131
2355	.1	11.5	.3	.8	.8	.5	.02	.18	14.0	193	129	145	211	210	143	98	93	15	2.2	132

JULY 23, 1985

0055	.1	12.0	.3	.8	.8	.5	.02	.18	14.0	193	129	145	211	210	144	98	83	15	2.0	132
0155	.1	11.5	.3	.8	.8	.5	.02	.18	14.0	197	128	144	211	210	143	98	95	15	2.1	132
0255	.1	11.0	.3	.8	.8	.5	.02	.18	13.5	197	128	143	211	210	143	98	76	15	2.2	130
0355	.1	11.5	.3	.5	.7	.6	.02	.16	13.0	204	127	144	211	210	143	98	80	17	2.2	132
0455	.1	10.5	.2	.5	.7	.5	.02	.18	14.0	209	126	142	211	210	140	98	76	17	2.2	130
0555	.1	10.5	.2	.8	.8	.5	.02	.18	13.5	205	125	146	211	210	143	98	90	17	2.2	130
0655	0	11.5	.2	.5	.8	.5	.02	.18	14.5	262	127	144	210	209	143	98	95	17	2.2	130
0755	0	11.5	.2	.75	.75	.5	.02	.18	14.0	200	126	147	211	210	143	100	90	17	2.3	128
0855	0	11.5	.2	.75	.75	.5	.08	.20	16.0	197	127	143	210	210	141	100	94	17	2.1	130
0955	0	11.5	.3	.50	.75	.5	.06	.20	15.5	196	124	141	210	210	139	100	94	17	1.9	129
1055	2.3	11.5	.3	.5	.75	.5	.04	.20	16.0	195	122	140	210	210	140	100	94	17	1.9	130
1155	0	11.5	.3	.5	.5	.5	.06	.20	16.5	192	119	137	210	209	137	100	92	17	1.8	130
1255	0	11.0	.5	.5	.5	.5	.04	.20	16.0	190	122	139	210	207	136	100	97	17	1.6	130
1355	0	11.0	.5	.5	.5	.5	.04	.20	15.5	190	122	140	210	208	137	100	96	17	1.7	131
1455	.3	11.0	.5	.5	.5	.5	.06	.20	16.0	190	122	140	210	208	136	100	90	17	1.7	132
1555	0	11.5	.6	.6	.7	.4	0	.20	16.5	189	122	139	210	208	136	98	90	15	1.8	131
1655	0	11.5	.6	.6	.8	.4	.02	.20	17.0	189	123	140	210	208	138	98	88	15	1.8	131
1755	0	11.5	.6	.6	.7	.3	0	.22	17.0	191	123	140	210	209	138	98	79	15.0	1.8	131
1855	.1	11.0	.6	.6	.9	.4	0	.18	14.5	186	122	139	210	206	137	98	85	17	1.9	130
1955	0	11.0	.6	.7	.8	.4	0	.20	14.5	188	122	139	210	208	137	98	91	17	1.9	128
2055	0	11.0	.3	.7	.8	.4	.02	.18	14.5	189	126	141	215	208	138	98	80	17	1.9	130
2155	.1	11.0	.3	.7	.8	.4	.02	.18	14.5	189	126	141	211	209	140	98	78	17	1.8	130
2255	.5	11.5	.3	.7	.8	.4	0	.18	14.5	189	128	143	210	209	143	98	98	17	1.8	131
2355	0	12.5	.6	.7	.7	.3	.02	.18	15.0	191	126	145	210	209	141	99	81	17	1.8	130

JULY 24, 1985

0055	0	12.5	.4	.7	.7	.4	.02	.18	14.5	195	127	143	210	209	140	98	90	17	1.9	130
0155	0	13.0	.4	.7	.7	.4	.02	.19	14.0	196	127	144	211	209	141	99	99	17	2.0	130
0255	0	13.0	.4	.7	.8	.5	.20	.19	14.5	196	129	146	210	209	144	99	75	17	2.0	130
0355	0	13.0	.4	.7	.7	.5	.02	.18	14.0	193	128	145	210	209	143	99	78	17	1.9	130
0455	0	13.0	.4	.7	.7	.5	0	.19	14.5	197	126	143	210	209	142	99	86	17	2.0	130
0555	0	13.0	.4	.7	.7	.4	.02	.18	14.0	198	126	143	210	209	142	99	89	17	1.9	130
0655	0	13.0	.4	.7	.7	.2	.02	.18	15.5	194	125	139	210	209	140	99	95	17	2.0	130
0755	0	11.5	.4	.5	.5	.5	.04	.20	15.5	199	126	143	210	210	142	100	80	17	2.5	130
0855	0	11.5	.4	.5	.5	.5	.06	.20	15.0	194	124	143	209	209	142	100	92	17	2.7	130
0955	0	11.5	.4	.5	.5	.5	.04	.18	14.0	194	124	141	210	208	141	100	80	17	2.4	130
1055	.2	11.5	.4	.5	.5	.5	.04	.20	14.5	198	115	134	209	208	136	100	94	17	1.4	124
1155	0	11.5	.5	.5	.5	.5	.04	.20	14.5	232	116	135	210	209	135	100	94	17	2.0	122
1255	0	11.5	.5	.5	.5	.5	.04	.18	14.5	239	123	140	209	209	145	100	88	17	2.0	124

TIME	02	K.V.	MA.	P1	P2	P3	P1-P2	P2-P3	DP4	T1	T2	T3	T4	T5	T6	P5	P6	V11 %	P706
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JULY 24, 1985

1355	0	11.5	.4	.5	.5	.5	.04	.20	17.0	240	122	139	209	209	143	100	94	17	2.0	125
1455	0	11.5	.4	.75	1.0	.5	.06	.20	14.0	234	125	142	210	210	143	100	94	17	1.9	124
1555	0	11.5	.4	.2	.2	0	0	.20	15.5	239	132	143	209	209	148	98	98	17	1.8	136
1655	0	11.5	.4	.1	.2	-.2	0	.20	15.5	239	128	144	210	209	149	98	82	17	1.8	136
1755	0	11.5	.4	.4	.4	.1	0	.20	15.5	230	130	145	210	210	140	98	78	17	1.8	136
1855	0	11.5	.6	.4	.3	0	0	.20	15.0	225	132	147	210	210	150	98	85	17	1.8	140
1955	0	11.5	.6	.5	.5	0	0	.20	15.5	220	130	146	210	210	149	98	92	17	1.8	138
2055	0	11.5	.6	.2	.2	-.1	0	.18	15.0	215	132	148	210	210	149	98	95	17	1.9	138
2155	0	11.5	.6	.2	.2	-.2	.2	.18	15.0	211	126	145	210	209	147	98	80	17.0	1.8	132
2255	0	11.5	.4	.1	.1	-.3	0	.20	15.5	207	126	145	210	209	146	98	85	17	1.8	132
2355	0	12.5	.6	.4	.4	0	.02	.20	15.5	205	123	145	210	210	144	99	84	17	1.95	130

JULY 25, 1985

0055	0	13.0	.4	.5	.6	.3	.02	.19	15.5	205	125	145	210	210	145	99	88	17	2.1	130	
0155	0	13.0	.4	.4	.4	0	0	.21	15.0	211	123	149	211	210	146	98	89	17	2.1	127	
0255	0	13.0	.6	.4	.4	-.2	.02	.20	16.0	213	122	142	210	210	143	99	95	17	2.0	125	
0355	0	13.0	.6	.4	.4	0	.02	.19	15.0	218	126	145	210	210	145	99	80	17	2.0	129	
0455	0	13.0	.4	.4	.4	0	.02	.18	15.0	213	124	145	210	210	145	99	89	17	2.0	129	
0555	0	13.0	.6	.4	.4	.0	.02	.20	16.0	204	122	145	211	210	143	98	78	17	2.2	127	
0655	0	13.0	.4	.2	.3	-.2	.04	.19	15.5	202	122	143	211	210	143	98	84	17	1.9	127	
0755	0	11.5	.3	.25	.25	0	.06	.18	15.5	207	120	142	210	209	142	100	90	17	2.1	125	
0855	0	11.5	.4	.25	.25	0	.04	.18	15.0	211	124	144	209	209	141	100	82	17	1.8	127	
0955	0	11.5	.6	.25	.25	0	.04	.18	15.0	210	121	145	210	210	142	100	94	17	1.9	123	
1055	0	11.5	.5	.25	.25	0	.06	.18	14.5	203	120	143	211	210	142	100	92	17	1.9	123	
1155	OFF LINE										202	121	115	209	210	138	100	93	17	1.9	124
1255	.4	9.5	.4	.5	.5	0	.06	.20	15.0	189	107	121	207	206	120	100	94	17	1.6	133	
1355	0	9.0	.1	.25	.25	0	.04	.14	11.0	228	116	122	211	210	128	100	96	17	1.7	133	
1455	.4	9.0	.2	0	0	0	.02	.18	13.5	271	124	130	225	188	143	100	90	17	1.7	133	
1555	0	9.0	.1	.1	.2	0	.02	.10	10.0	304	116	136	255	200	145	98	98	20	1.7	130	
1655	0	9.5	.4	.4	.4	0	.02	.14	10.0	323	121	128	272	216	156	98	93	20	1.7	136	
1755	0	9.5	.4	.4	.4	0	.02	.12	10.0	337	125	129	282	219	159	98	98	20	1.8	140	
1855	0	9.0	.3	0	.1	-.2	.02	.14	10.0	349	127	130	292	223	163	98	78	20	1.9	144	
1955	0	9.0	.3	.5	.6	.5	.02	.14	9.5	354	127	131	296	227	166	98	80	20	1.7	140	
2055	0	9.0	.3	0	.1	-.2	0	.16	10.0	360	130	133	297	226	166	98	86	20	1.8	142	
2155	0	9.0	.1	.4	.4	.1	.0	.12	10.5	369	135	138	309	233	173	98	90	20	1.9	144	
2255	0	9.0	.1	0	0	-.2	.02	.12	10.5	367	127	132	261	.83	.73	98	92	20	1.9	142	
2355	0	8.0	.2	.2	.2	0	.02	.11	9.5	372	126	130	299	211	120	99	99	20	2.1	140	

JULY 26, 1985

0055	0	8.0	.2	.2	.2	0	.02	.11	9.5	372	128	130	285	156	90	99	95	20	2.15	140
0155	0	8.0	.2	.3	.4	0	.02	.11	10.0	375	127	132	308	213	135	99	90	20	2.2	140
0255	0	8.5	.2	.4	.4	0	.02	.12	10.5	359	122	128	280	187	107	98	81	20	2.0	140
0355	0	8.5	.2	.4	.4	0	.02	.11	10.5	369	125	130	301	211	137	98	84	20	2.0	140
0455	0	8.5	.2	.4	.4	0	.02	.11	10.0	368	127	130	301	212	152	98	89	20	2.3	139
0555	0	9.0	.2	.4	.4	0	.02	.12	10.0	362	125	129	297	211	158	98	90	20	2.2	139

TIME	O2	K.V.	MA.	F1	F2	F3	P1-P2	P2-P3	DP4	T1	T2	T3	T4	T5	T6	P5	P6	V11 %	P706
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JULY 26, 1985

0655	0	9.0	.2	.3	.3	-.2	.03	.11	10.0	337	125	128	283	211	160	98	95	20	2.2	140
0755	0	9.5	.2	0	0	0	.04	.10	10.0	373	126	133	201	216	157	100	98	20	2.1	139
0855	0	9.5	.2	0	0	0	.04	.14	12.0	359	131	133	299	219	162	100	90	20	2.0	137
0955	0	9.5	.2	0	0	0	.02	.14	12.0	360	135	138	299	220	162	100	94	20	2.0	140
1055	.1	9.2	.3	0	0	0	.02	.18	13.0	352	128	135	271	122	85	100	77	20	1.9	140
1155	0	9.1	.2	0	0	0	.02	.18	14.0	347	130	138	278	210	138	100	81	20	1.9	140
1255	0	9.0	.2	0	0	0	.02	.20	14.5		134	OFF LINE				100		20		
1355	OFF LINE																			
1455	OFF LINE																			
1555	.2	9.0	.2	.1	.2	-.2	.02	.18	14.0	286	129	133	235	202	141	98	96	20	2.1	142
1655	.2	9.0	.2	0	0	-.6	.02	.16	13.5	289	133	136	224	126	82	98	75	20	1.9	146
1755	.2	9.0	.2	-.1	-.1	-.6	0	.18	13.0	305	131	134	217	79	73	98	81	20	1.9	146
1855	.1	9.0	.3	0	0	-.3	.02	.16	13.0	320	140	136	228	77	73	98	84	20	2.0	148
1955	.1	9.0	.3	-.5	-.5	-.8	0	.16	12.5	321	134	136	230	77	73	98	85	20	1.9	148
2055	0	9.0	.3	-.0	0	-.5	0	.16	13.0	289	109	105	340	184	106	98	84	20	2.0	132
2155	0	9.5	.3	0	0	-.5	0	.18	13.5	350	133	141	279	211	154	98	90	20	2.1	144
2255	.1	9.0	.3	-.3	-.3	-.1	0	.16	13.0	359	134	140	252	78	73	98	93	20	2.0	146
2355	0	9.25	3.0	0	0	-.5	.02	.19	12.5	359	134	137	258	77	72	98	96	20	2.1	143

JULY 27, 1985

0055	0	9.25	3.0	.2	.2	-.2	.02	.18	13.0	356	130	135	257	78	72	98	95	20	2.4	143
0155	0	9.25	3.0	.5	.4	-.1	.02	.18	12.5	362	127	133	258	78	72	98	78	20	2.0	142
0255	0	9.5	3.0	-.5	-.2	-.75	.02	.19	13.5	353	130	134	249	78	73	100	80	20	1.9	133
0355	0	9.5	3.0	-.2	0	-.5	.02	.18	11.5	354	127	132	256	78	72	99	80	19	2.0	135
0455	0	9.75	3.0	.1	.1	-.2	.02	.18	12.5	350	126	132	253	77	71	99	85	19	2.2	136
0555	0	9.9	3.0	-.1	-.1	-.75	.02	.19	13.0	345	125	131	249	77	71	99	86	19	1.9	138
0655	0	9.6	2.5	-.3	-.3	-.9	.02	.17	12.0	330	122	130	247	77	71	99	86	19	1.9	130
0755	0	10.0	.3	0	0	-.1	0	.14	12.0	340	117	128	242	77	72	100	90	19	2.1	132
0855	0	10.0	.3	0	0	-.1	.02	.14	12.0	330	119	126	233	76	71	100	92	19	2.0	133
0955	0	10.0	.3	0	0	-.1	.02	.14	12.0	326	122	130	233	77	73	100	92	19	1.8	128
1055	0	9.5	.4	0	0	-1.0	.02	.14	12.5	329	123	125	235	77	72	100	98	19	1.9	130
1155	0	10.0	.4	0	0	-1.0	.02	.14	12.0	332	109	120	242	78	72	100	94	19	1.9	130
1255	0	10.0	.3	0	0	-.5	.04	.14	11.0	334	117	127	275	210	121	100	90	19	1.9	135
1355	0	10.0	.4	0	0	-1.0	.04	.14	11.5	342	122	129	276	212	140	100	93	19	1.8	140
1455	0	9.5	.4	0	0	-1.0	.04	.18	12.0	338	119	127	274	211	143	100	84	19	1.7	135
1555	0	9.0	.3	-.2	-.3	-.8	.02	.16	13.0	353	117	124	286	210	143	98	90	19	1.6	132
1655	0	9.5	.3	-.2	-.2	-.5	.02	.16	12.0	352	113	124	288	211	145	98	98	19	2.0	130
1755	0	9.5	.3	-.2	-.2	-.7	.02	.16	12.5	354	115	123	292	217	145	98	82	19	2.0	130
1855	.1	9.5	.3	-.5	-.4	-1.0	.01	.15	14.0	358	118	126	296	219	148	98	79	19	2.0	132
1955	0	9.5	.3	-.4	-.3	-.8	.02	.16	13.5	362	116	127	297	220	150	98	88	19	2.0	134
2055	0	9.0	.3	-1.5	-1.4	-1.8	.02	.14	10.0	362	116	123	298	225	145	98	75	19	1.6	128
2155	0	9.0	.3	-2.0	-1.8	-2.3	.02	.16	11.5	366	120	125	293	225	150	98	91	19	1.6	132
2255	.1	9.0	.3	-1.8	-1.8	-2.0	.02	.18	11.5	369	120	125	303	228	153	98	93	19	1.6	134
2355	0	9.0	3.0	-2.0	-2.0	-2.2	.02	.17	11.5	378	116	125	307	236	153	98	94	19	1.9	131

TIME	O2	K.V.	MA.	P1	P2	P3	P1-P2	P2-P3	DP4	T1	T2	T3	T4	T5	T6	P5	P6	V11 %	P706
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JULY 28, 1985

0055	0	9.25	2.0	-2.0	-1.7	-2.2	.02	.16	10.5	376	120	126	302	238	155	98	89	19	1.8	138
0155	0	9.25	3.0	-1.7	-1.7	-2.2	.02	.17	10.2	378	123	126	310	243	156	98	80	19	1.9	138
0255	0	9.75	4.0	-1.9	-1.9	-2.2	.04	.17	12.0	367	125	130	307	242	157	98	75	9	1.8	137
0355	0	9.75	4.0	-1.9	-1.9	-2.0	0	.17	11.0	388	126	128	307	250	160	98	78	9	1.9	135
0455	0	9.5	3.0	-1.9	-1.9	-2.0	0	.17	11.0	378	132	132	327	252	165	98	80	9	1.7	139
0555	0	9.5	3.5	-1.9	-1.9	-2.0	.02	.17	11.0	374	132	131	322	254	170	98	80	9	1.9	140
0655	0	9.6	3.0	-1.7	-1.6	-2.2	.02	.17	11.5	358	121	129	278	86	73	98	84	9	1.8	138
0755	0	9.5	.3	-2.0	-1.5	-2.0	.02	.14	11.0	357	117	128	273	85	71	100	84	9	2.0	134
0855	0	9.5	.2	-2.0	-1.5	-2.0	.02	.12	9.5	354	113	121	270	85	71	100	88	9	1.7	130
0955	0	9.5	.3	-2.0	-2.0	-2.0	.06	.14	9.0	355	122	126	295	211	127	100	90	9	1.8	134
1055	0	9.5	.3	-2.0	-2.0	-2.0	.04	.14	9.0	362	129	130	301	211	151	100	95	9	1.7	137
1155	0	9.5	.3	-2.0	-2.0	-2.5	.04	.25	21.0	358	138	145	290	218	165	100	94	15	1.7	156
1255	0	9.5	.3	-2.0	-2.0	-2.0	.04	.26	20.5	366	140	145	263	83	73	100	90	15	1.7	160
1355	0	9.5	.2	-2.0	-2.0	-2.0	.04	.20	14.0	379	137	142	170	153	83	100	80	15	1.6	158
1455	0	9.5	.4	-2.0	-2.0	-2.0	.02	.20	13.5	358	131	137	291	212	140	100	85	15	1.6	146
1555	.1	9.0	.3	-1.8	-1.5	-2.2	.02	.14	10.0	319	135	136	305	212	153	98	82	15	1.9	144
1655	0	9.0	.35	-1.8	-1.6	-2.1	.02	.16	13.5	388	134	140	280	79	73	98	78	15	1.7	148
1755	.1	9.0	.3	-1.8	-1.8	-2.2	.02	.16	13.0	379	133	140	289	109	78	98	90	15	1.7	148
1855	0	9.0	.3	-1.9	-1.7	-2.2	.02	.16	13.0	360	128	136	283	120	84	98	90	15	1.6	144
1955	0	9.5	5.0	-1.9	-1.7	-2.3	.02	.16	13.0	360	131	138	294	211	135	98	96	15	1.6	148
2055	0	9.5	000	-1.7	-1.5	-2.2	.02	.18	14.0	358	130	138	290	211	153	98	94	15	1.7	142
2155	0	9.5	000	-1.7	-1.7	-2.2	.02	.18	13.5	366	127	138	300	219	168	98	96	15	1.8	134
2255	0	9.5	00	-1.7	-1.5	-2.0	.02	.18	13.5	370	126	136	308	225	172	98	98	15	1.8	136
2305																				

SHUT DOWN BEGAN

APPENDIX J

Tar Separator Sample Weights

These are the weights of the individual tar samples removed from the Gas Cooler/Tar Separator during the test.

COAL DISTILLATE COLLECTION SYSTEM SAMPLES

BOM/FGT-018

River King Illinois #6 Bituminous Coal

DATE	TIME	SAMPLE NUMBER	GROSS WT (gm)	TARE WT (gm)	NET WT (gm)	
7-16	0815	018-101	2198	245	1953	IGS
7-16	0815	018-102	2171	245	1926	IGS
7-16	0815	018-103	2137	245	1892	IGS
7-16	0815	018-104	1141	245	896	IGS
7-16	1400	018-105	2253	245	2008	IGS
7-16	1400	018-106	2304	245	2059	IGS
7-16	1400	018-107	1831	245	1586	IGS
7-16	2010	018-108	2253	245	2008	IGS
7-16	2011	018-109	2345	245	2100	IGS
7-16	2012	018-110	1105	245	860	IGS
7-17	0215	018-111	2552	245	2307	IGS
7-17	0215	018-112	2455	245	2210	IGS
7-17	0215	018-113	993	245	748	BS&B/UMPTL
7-17	0915	018-114	2262	245	2017	IGS
7-17	0915	018-115	2293	245	2048	IGS
7-17	0915	018-116	2257	245	2012	IGS
7-17	0915	018-117	1726	245	1481	IGS
		018-118	2236	245	1991	UUBMPC
		018-119	2291	245	2046	UUBMPC
		018-120	2342	245	2097	UUBMPC
		018-121	2350	245	2105	UUBMPC

IGS - Total Shipped to Illinois Geological Survey 29.363 kg

UUBMPC - Total Shipped to Biomaterials Profiling Center 8.239 kg

BS&B/UMPTL - Total retained by BS&B/UMPTL .748 kg

COAL DISTILLATE COLLECTION SYSTEM SAMPLES

BOM/FGT-018

SUFCO Bituminous Coal

DATE	TIME	SAMPLE NUMBER	GROSS WT (gm)	TARE WT (gm)	NET WT (gm)	
7-18	1430	018-201	# 2200	245	# 1955	UUBMPC
7-18	1430	018-202	# 2200	245	# 1955	UUBMPC
7-18	2105	018-203	2219	245	1974	UUBMPC
7-18	2106	018-204	2138	245	1893	UUBMPC
7-18	2107	018-205	1302	128	1174	UUBMPC
7-19	0215	018-206	2280	245	2035	UUBMPC
7-19	0215	018-207	1341	245	1096	UUBMPC
7-19	0816	018-208	2171	245	1926	UUBMPC
7-19	0816	018-209	2310	245	2065	UUBMPC
7-19	0816	018-210	862	128	734	UUBMPC
7-19	1400	018-211	2261	245	2016	UUBMPC
7-19	1400	018-212	2342	245	2097	UUBMPC
7-19	1854**	018-213	2206	245	1961	UUBMPC
7-19	1855**	018-214	2218	245	1973	UUBMPC
7-19	1856**	018-215	1183	128	1055	UUBMPC
7-20	0215	018-216	2264	245	2019	UUBMPC
7-20	0215	018-217	2232	245	1987	UUBMPC
7-20	0215	018-218	1192	128	1064	UUBMPC
7-20	0800	018-219	2121	245	1876	UUBMPC
7-20	0800	018-220	2244	245	1999	UUBMPC
7-20	0800	018-221	797	128	669	UUBMPC
7-20	1400	018-222	2156	245	1911	UUBMPC
7-20	1400	018-223	2331	245	2086	UUBMPC
7-20	1400	018-224	738	128	610	BS&B/UMPTL
7-20	2002	018-225	2277	245	2032	UUBMPC
7-20	2003	018-226	2377	245	2132	UUBMPC
7-20	2005	018-227	622	128	494	UUBMPC
7-21	0210	018-228	2115	245	1870	UUBMPC
7-21	0210	018-229	2142	245	1897	UUBMPC
7-20*	0210	018-230	1831	245	1586	UUBMPC
7-21	0800	018-231	2202	245	1957	UUBMPC
7-21	0800	018-232	2332	245	2087	UUBMPC
7-21	1400	018-233	2232	245	1987	UUBMPC
7-21	1400	018-234	2361	245	2116	UUBMPC
7-21	1400	018-235 ***	1124	128	996	UUBMPC
7-21	2001	018-236	2338	245	2093	UUBMPC
7-21	2007	018-237	2248	245	2003	UUBMPC
7-21	2008	018-238	818	128	690	UUBMPC
7-22	0230	018-239	2300	245	2055	UUBMPC
7-22	0230	018-240	2267	245	2022	UUBMPC
7-22	0800	018-241	2226	245	1981	UUBMPC
7-22	0800	018-242	2464	245	2219	UUBMPC

7-22	1200	018-243	2213	245	1968	UUBMPC
7-22	1200	018-244	1039	245	794	BS&B/UMPTL

* Misdated, should be 7-21

** These samples were taken at 2054, 2055, 2056 respectively

*** Sample Bottle cracked during shipment

- Estimated weights

UUBMPC - Total shipped to Biomaterials Profiling Center 73.723 kg

BS&B/UMPTL - Total retained by BS&B/UMPTL 1.404 kg

COAL DISTILLATE COLLECTION SYSTEM SAMPLES

BOM/FGT-018

Indianhead Lignite

DATE	TIME	SAMPLE NUMBER	GROSS WT (gm)	TARE WT (gm)	NET WT (gm)	
7-22	2000	018-401	2237	245	1992	UUBMPC
7-22	2001	018-402	1984	245	1739	UUBMPC
7-23	0210	018-403	2346	245	2101	UUBMPC
7-23	0210	018-404	1628	245	1383	UUBMPC
7-23	0800	018-405	2282	245	2037	UUBMPC
7-23	0800	018-406	1579	245	1730	UUBMPC
7-23	1400	018-403 **	2236	245	1991	UUBMPC
7-23	1400	018-406 **	2237	245	1992	UUBMPC
7-23	1400	018-409 **	2461	245	2216	UUBMPC
7-23	2020	018-407	2302	245	2057	UUBMPC
7-23	2020	018-408 ***	2251	245	2006	UUBMPC
7-23	2020	018-409	2251	245	2006	UUBMPC
7-24	0200	018-410	2243	245	1996	UUBMPC
7-24	0200	018-411	2340	245	2095	UUBMPC
7-24	0800	018-412	2309	245	2064	UUBMPC
7-24	0800	018-413	1581	245	1336	UUBMPC
7-24	1400	018-414	2224	245	1979	UUBMPC
7-24	1400	018-415	2225	245	1980	UUBMPC
7-24	2010	018-416	1767	245	1522	UUBMPC
7-25	0230	018-417	2247	245	2002	UUBMPC
7-25	0231	018-418	780	245	535	UUBMPC
7-25	0800	018-419	2343	245	2098	UUBMPC
7-25	0800	018-420	729	128	601	BS&B/UMPTL
7-25	1230	018-421	2395	245	2150	UUBMPC
7-25	1230	018-422	473	128	345	UUBMPC

** These samples were misnumbered. All samples are listed in chronological order.

*** Sample bottle broken during shipment

UUBMPC - Total shipped to Biomaterials Profiling Center 43.352 kg

BS&B/UMPTL - Total retained by BS&B/UMPTL .601 kg

COAL DISTILLATE COLLECTION SYSTEM SAMPLES

BOM/FGT-018

Hiawatha Bituminous Coal

DATE	TIME	SAMPLE NUMBER	GROSS WT (gm)	TARE WT (gm)	NET WT (gm)	
7-25	2010	018-301	2169	245	1924	UUBMPC
7-25	2010	018-302	2243	245	1998	UUBMPC
7-25	2010	018-303 ***	2281	245	2036	UUBMPC
7-25	2010	018-304	1135	128	1007	UUBMPC
7-26	0200	018-305	2149	245	1904	UUBMPC
7-26	0201	018-306	2187	245	1942	UUBMPC
7-26	0213	018-307	1078	245	833	UUBMPC
7-26	0815	018-308	2094	245	1849	UUBMPC
7-26	0815	018-309 *	2146	245	1901	UUBMPC
7-26	0815	018-310	2175	245	1930	UUBMPC
7-26	1430	018-311	2223	245	1978	UUBMPC
7-26	1430	018-312	2272	245	2027	UUBMPC
7-26	2010	018-313	2298	245	2053	UUBMPC
7-26	2010	018-314	2199	245	1954	UUBMPC
7-26	2010	018-315	2291	245	2046	UUBMPC
7-26	2010	018-316	1288	128	1160	UUBMPC
7-27	0200	018-317	2132	245	1887	UUBMPC
7-27	0201	018-318	2232	245	1987	UUBMPC
7-27	0202	018-319	2193	245	1948	UUBMPC
7-27	0208	018-320	1251	128	1123	UUBMPC
7-27	0800	018-321	2074	245	1829	UUBMPC
7-27	0800	018-322	2216	245	1971	UUBMPC
7-27	0800	018-323	2220	245	1975	UUBMPC
7-27	0800	018-324	1223	128	1095	UUBMPC
7-27	1400	018-325	2205	245	1960	UUBMPC
7-27	1400	018-326	2216	245	1971	UUBMPC
7-27	1400	018-327	2310	245	2065	UUBMPC
7-27	1400	018-328	1223	128	1095	UUBMPC
7-27	2010	018-329	2275	245	2030	UUBMPC
7-27	2010	018-330	2230	245	1985	UUBMPC
7-27	2010	018-331	1750	245	1505	UUBMPC
7-28	0200	018-332	2195	245	1950	UUBMPC
7-28	0200	018-333	2277	245	2032	UUBMPC
7-28	0200	018-334	1191	128	1063	UUBMPC
7-28	0800	018-335	2178	245	1933	UUBMPC
7-28	0800	018-336	3823	220	3603	BS&B/UMPTL
7-28	1400	018-337	2174	245	1929	UUBMPC
7-28	1400	018-338	3666	220	3446	BS&B/UMPTL
7-28	1400	018-339	1264	128	1136	UUBMPC
7-28	2020	018-340	2338	245	2093	UUBMPC
7-28	2020	018-341	2485	245	2240	UUBMPC
7-28	2020	018-342	1335	128	1207	UUBMPC
7-28	2020	018-343	1300	128	1172	BS&B/UMPTL
7-28	2330	018-344	2163	245	1918	UUBMPC

7-28	2333	018-345	2304	245	2059	UUBMPC
7-28	2335	018-346	328	128	200	BS&B/UMPTL

* During packing for shipment the cap to this sample bottle was broken after the sample was frozen in liquid nitrogen. The cap was replaced, but pieces of the broken cap remained inside the sample bottle.

*** Sample bottle broken during shipment

UUBMPC - Total Shipped to Biomaterials Profiling Center 74.528 kg

BS&B/UMPTL - Total retained by BS&B/UMPTL 8.421 kg