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FIELD EVALUATION OF LOW-EMISSION COAL BURNER TECHNOLOGY ON UTILITY BOILERS

VOLUME III
Field Evaluations

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16. ABSTRACT The report gives results of field tests conducted to determine the emission characteristics of a Babcock and Wilcox Circular burner and Dual Register burner (DRB). The field tests were performed at two utility boilers, generally comparable in design and size except for the burner equipment. The Circular burner was evaluated at Unit 2 of the Colorado Public Services Comanche Generating Station, and the DRB was evaluated at Unit 1 of the Wyodak Generating Station of the Pacific Power and Light Company and the Black Hills Power and Light Company. Of particular interest was the development of NOx emission correlations for the performance of Circular burners and DRBs under boiler conditions which could be used in interpreting individual burner tests in a subscale burner test facility. The field tests were conducted with both boilers operating at nominal full-load conditions. During each test, boiler performance and operating conditions were monitored using plant equipment, while gaseous emissions of NOx, O2, CO, SO2, and CO2 were continuously monitored using a mobile test trailer. The nominal NOx emissions with the Circular burner at Comanche were 550 ppm at 0% O2. Full-load NOx emissions at Wyodak with all mills in service were 395 ppm at 0% O2. Operation over a narrow excess O2 range precluded establishing NOx emission as a function of excess O2.

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Coal	Stationary Sources	21D
Combustion	Circular Burners	21B
Field Tests	Dual Register Burners	14B
Evaluation		14G
Burners		13A
Nitrogen Oxides		
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ABSTRACT

This report describes the results of field tests conducted to determine the emission characteristics of B&W circular and dual register burners. The field tests were performed at two different utility boilers, generally comparable in design and size except for the burner equipment. The B&W circular burner was evaluated at Unit 2 of the Colorado Public Services Comanche Generating Station and the B&W dual register burner was evaluated at Unit 1 of the Wyodak Generating Station of the Pacific Power and Light Company and the Black Hills Power and Light Company. Of particular interest was the development of NO_x emission correlations for the performance of circular and dual register burners under boiler conditions which could be used in interpretation of individual burner tests in a subscale burner test facility. The field tests were conducted with both boilers operating at nominal full-load conditions. During each test, boiler performance and operating conditions were monitored using plant equipment, while gaseous emissions of NO_x, O_2, CO, SO_2, and CO_2 were continuously monitored using a mobile test trailer. The nominal NO_x emissions with the circular burner at Comanche were 550 ppm at 0 percent O_2. Full-load NO_x emissions at Wyodak with all mills in service were 395 ppm at 0 percent O_2.

Since both boilers were operated over a narrow excess O_2 range, the data were not sufficient to establish NO_x emission as a function of excess O_2. However, the data from both boilers do show a strong dependence of NO_x on both boiler load and firing configuration.

This work was carried out by Energy and Environmental Research Corporation under EPA Contract 68-02-3130, through Babcock and Wilcox Subcontract 940962 NR.

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1.0 INTRODUCTION

Field evaluations to determine the emission characteristics of Babcock & Wilcox (B&W) circular and dual register burners were conducted by Energy and Environmental Research (EER) Corporation. These evaluations were part of a burner development program conducted by B&W and EER for the U.S. EPA. This burner development program involved the integration of the EPA distributed mixing burner concept with commercial B&W hardware. The performance and emissions of the distributed mixing burner were evaluated in the Large Watertube Simulator, a full-scale burner test facility. B&W circular and dual register burners were also evaluated in the LWS. The objective of the field evaluation was to develop a correlation between the test results of the circular and dual register burners in the LWS and in the utility boilers. This correlation could then be used to extrapolate the performance and emissions of the distributed mixing burner to a large scale utility application.

Field testing was conducted at two boilers, one equipped with the circular burner and one with the dual register burner. The boilers were selected by B&W to be comparable in terms of age, capacity, coal characteristics, and firing configuration. The circular burner was evaluated at the Colorado Public Service Comanche Generating Station, Unit 2 located in Pueblo, Colorado. The dual register burner was tested at the Wyodak Generating Station, Gillette, Wyoming, owned by Pacific Power and Light Company and the Black Hills Power and Light Company. Testing was conducted for one week at Comanche in December 1984 and for two weeks at Wyodak in February 1985.

Section 2.0 presents a summary of the field test results. The boilers and test plan are described in Section 3.0. Detailed results are included in Section 4.0. The appendices include test procedures, data, and quality assurance.

2.0 SUMMARY

Table 2-1 shows the characteristics of the two boilers tested. Both boilers fire subbituminous coal and use a front and rear wall firing configuration. The front and rear wall burners at the Comanche boiler are directly opposed with four rows of four burners each. The front and rear wall burners at Wyodak are offset to avoid flame interactions and are arranged in five rows of three burners each. The boilers have comparable furnace cross-sectional dimensions, but the Wyodak boiler has a taller furnace to accommodate the five burner rows. Thus, the Wyodak furnace has a lower ratio of firing rate to cooled surface area (HA/SC).

During testing, the boilers were generally operated in a normal fashion by the operators without interference from EER. Thus, the burner settings, load, and excess air were controlled by plant personnel. The overfire air NO_x ports were closed during the day at the Comanche boiler at the request of EER, and returned to their normal open position of 18 percent at night. Table 2-2 shows the typical burner settings and flame characteristics during the tests. Both the circular and dual register burners operated satisfactorily during the tests. Exact flame lengths could not be determined with the available observation ports. Both burners showed a high combustion efficiency and large imbalances of fuel or air distribution were not observed.

Both boilers operated over a narrow excess O_2 range, 2.5 to 3.5 percent at Comanche and 3.8 to 4.0 percent at Wyodak. Thus, the data were not sufficient to establish NO_x emissions as a function of excess O_2. Figure 2-1 shows NO_x emissions at the two boilers as a function of load. Both correlations show a similar slope, with lower emissions for the dual register burner at Wyodak. Nominal NO_x emissions with the circular burner at Comanche were 550 ppm at 0 percent O_2 (0.64 lbs/10^6 Btu). Full load emissions at Wyodak with all mills in service were 395 ppm at 0 percent O_2 (0.46 lbs/10^6 Btu). More detailed test data are presented in Section 4.0.

TABLE 2-1. BOILER DESCRIPTIONS

UNIT	COMANCHE UNIT 2	WYODAK UNIT 1
UTILITY	COLORADO PUBLIC SERVICE	PACIFIC POWER & LIGHT BLACK HILLS POWER & LIGHT
BOILER MANUFACTURER	B&W	B&W
YEAR OF INITIAL OPERATION	1976	1978
GROSS GENERATING CAPACITY	350 MW_E	350 MW_E
TYPE OF BURNER	B&W CIRCULAR	B&W DUAL REGISTER
NO. OF BURNERS	32	30
NO. OF MILLS	4	5
BURNER ARRANGEMENT	4W x 4H ON FRONT & REAR WALLS	3W x 5H ON FRONT & REAR WALLS
FURNACE DIMENSIONS	43'W x 45'D x 161'H	46'W x 45'D x 180'H
COAL TYPE	SUB BITUMINOUS	SUB BITUMINOUS
ADDITIONAL FEATURES	8 NO_X PORTS	SEALED NO_X PORTS OPPOSING BURNERS OFFSET
	COMPARTMENTED WINDBOXES	

TABLE 2-2. BURNER OPERATING CHARACTERISTICS

UNIT	COMANCHE	WYODAK
BURNER TYPE	CIRCULAR	DUAL REGISTER
TYPICAL BURNER SETTINGS	BOTTOM BURNERS-REGISTERS 50% OPEN TOP BURNERS -REGISTERS 100% OPEN	OUTER REGISTERS 50% OPEN INNER REGISTERS 25-50% OPEN SWIRL VANES 45% OPEN
FLAME CHARACTERISTICS	LONG AND NARROW 0-2 FT STANDOFF	LONG AND NARROW 35 - 44 FT LONG 0.5-3 FT STANDOFF

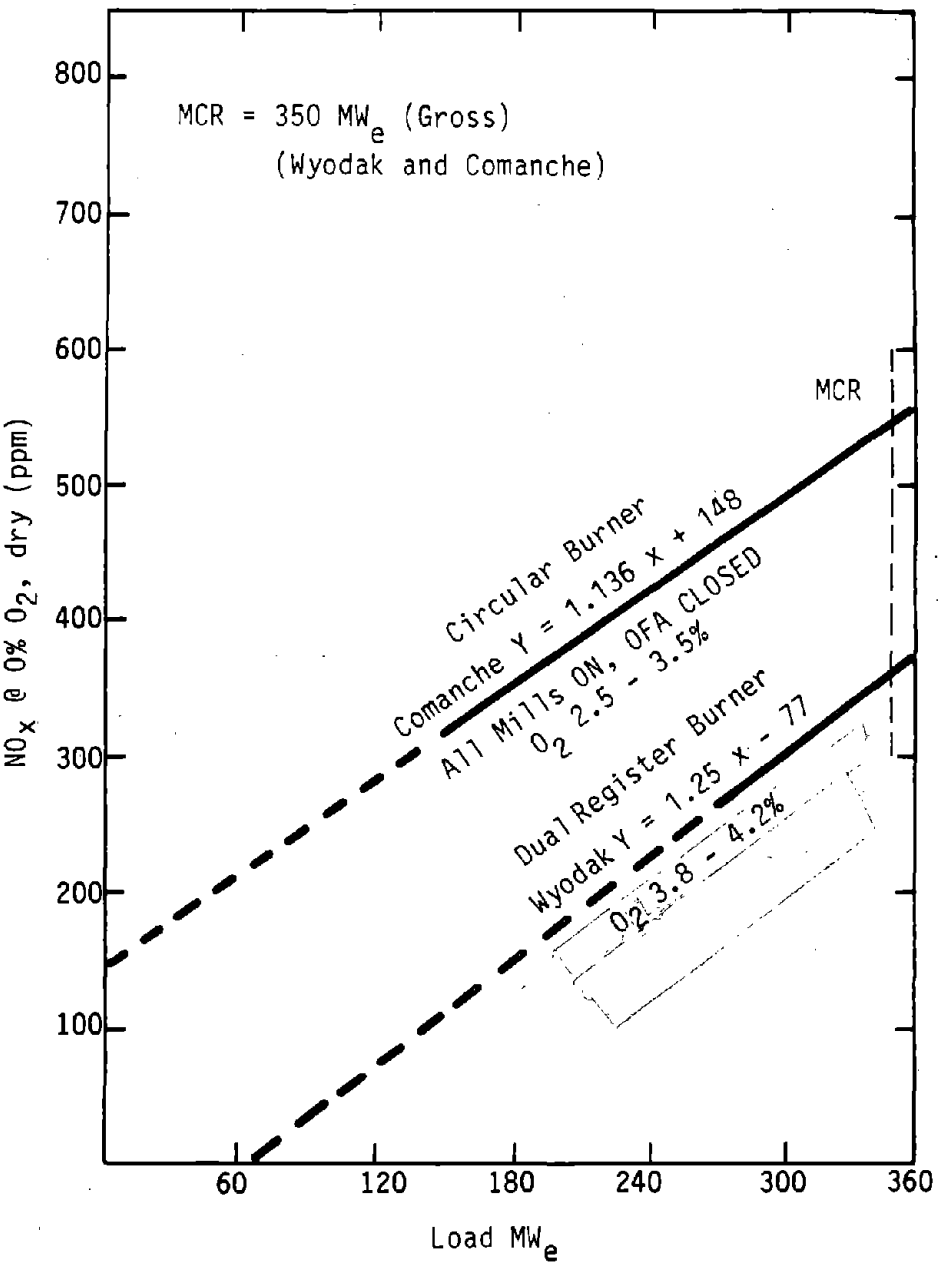


Figure 2-1. NO_x emissions vs. boiler load.

3.0 BOILER DESCRIPTIONS AND TEST PLAN

Characteristics of the Comanche boiler are included in Section 3.1. The Wyodak boiler is described in Section 3.2. The Test Plan for the evaluation of both boilers is described in Section 3.3.

3.1 Description of Comanche Unit 2

Comanche Unit 2 is a horizontally opposed wall fired balanced draft utility boiler manufactured by Babcock & Wilcox. The boiler is located via Pueblo, Colorado and is operated by Public Service Company of Colorado. It has a maximum continuous operating capacity of 350 MW_e with a steam flowrate of 2.54×10^6 lbs/hr at 1005^oF and 2500 psig from the superheater. The reheater outlet temperature and pressure are 1005^oF and 555 psig. The boiler fires a subbituminous coal with a higher heating value of 8400 Btu/lb and a moisture content of 31 percent by weight as received. The coal sulfur content is approximately 0.4 percent by weight as received. The characteristics of the boiler are summarized in Table 3-1.

The coal for the boiler is ground in four pulverizers designated A, B, C and D. Each mill feeds eight burners. The burners are arranged in four rows of four burners each on two boiler walls. The unit is equipped with eight overfire air ports for NO_x control. A single port is located over each of the top row burners. Secondary air is fed through three compartmentalized windboxes. One windbox feeds all the burners located in the lower two rows. Another feeds all burners in the upper two rows and a third windbox feeds all of the overfire air ports.

The burners used on the unit are B&W high turbulence circular burners. These are the standard burners used on B&W pre-NSPS (New Source Performance Standards) units. Figure 3-1 shows the circular burner. Coal is supplied through a central coal nozzle. The coal is dispersed into the furnace by an impeller on the end of the coal nozzle. Secondary air flowrate and swirl to each burner are controlled by a single register. Figure 3-2 shows the burner settings during testing. These settings are normally not changed. Burners

TABLE 3-1. COMANCHE PLANT UNIT 2 BOILER SPECIFICATIONS

Manufacturer	Babcock & Wilcox
Year in Commercial Operation	1971
Gross Electrical Capacity	350 MW_e
Fuel	Pulverized Coal Subbituminous
Burners	
Type	B&W Circular
Number	32
Configuration	Horizontal, Opposed-Fired
Array	4 Rows of 4 Burners on Front and Rear Walls
Number of Pulverizers	4
Furnace Dimensions	
Width	43 ft
Depth	45 ft
Height	174 ft
Design Efficiency	84.57% at Maximum Continuous Rating
Steam Flowrate	2,540,000 lb/hr at Maximum Continuous Rating
Steam Pressure	2500 psig
Superheat Temperature	$1005^{o}F$
Reheat Temperature	$1005^{o}F$
HA/SC	
Design	384×10^3 Btu/hr-ft^2
Field	400×10^3 Btu/hr-ft^2

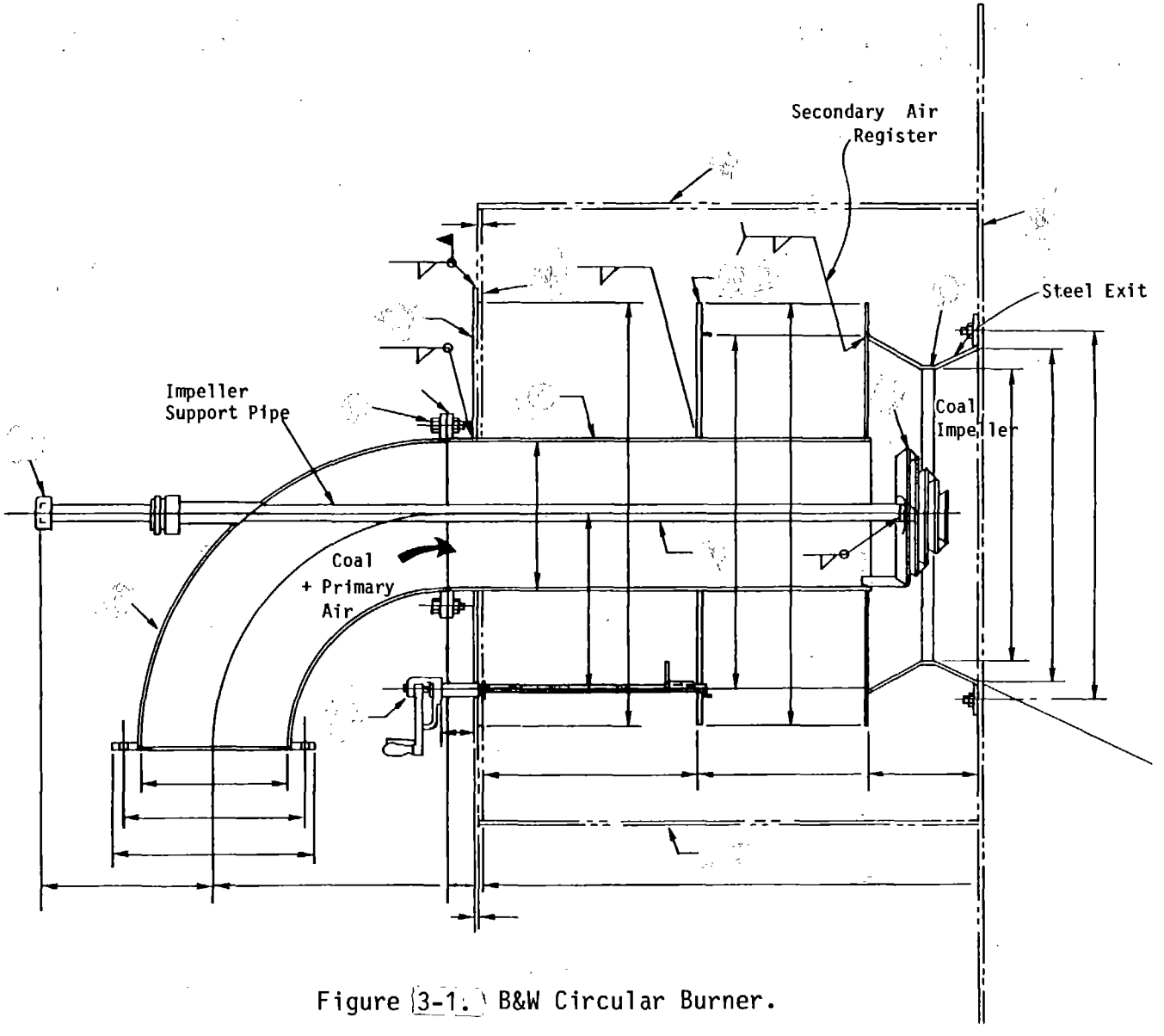


Figure 3-1. B&W Circular Burner.

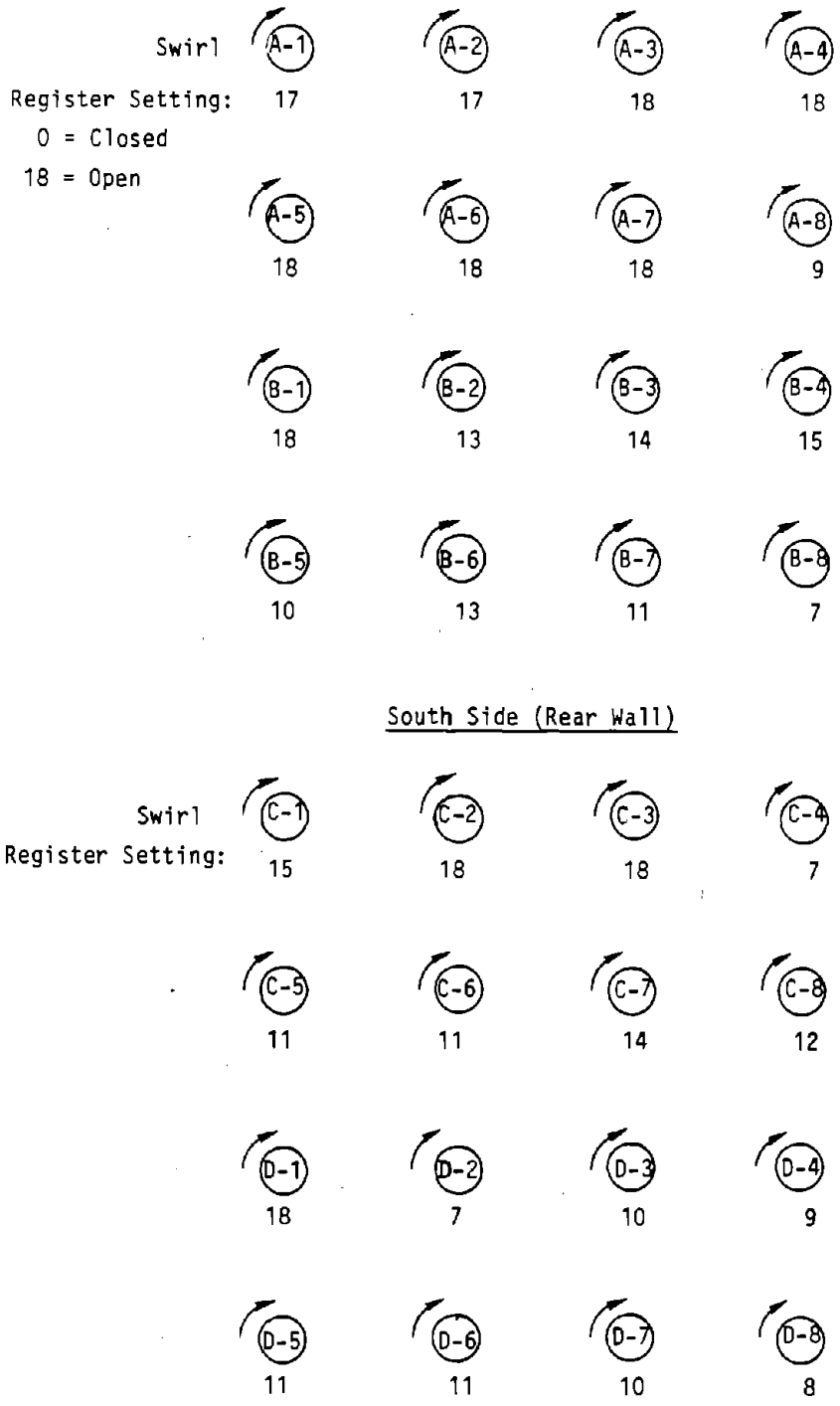


Figure 3-2. Comanche Unit 2 burner settings.

on both the front and rear wall are operated with clockwise swirl, as viewed looking at the burners, resulting in opposite rotation. The boiler is normally operated with the NO_x ports open 18 percent to provide tempering air in order to prevent superheater fouling. During this test, the ports were closed during the day, but opened during the night.

3.2 Description of Wyodak Unit 1

Wyodak Unit 1 is a radiant reheat boiler manufactured by the Babcock and Wilcox Company (B&W). The plant is located near Gillette, Wyoming, and is owned by Pacific Power & Light Company and Black Hill Power & Light Company. Commercial operation of the plant began in 1978. The plant has a rated capacity of 330 MW_e with a steam flowrate of 2,600,000 lb/hr at 1800 psig and 1000°F. The boiler is equipped with two superheater banks, a pendant reheater, economizer, and regenerative air heater. A diagram of the boiler is shown in Figure 3-3 with key boiler specifications listed in Table 3-2.

The boiler fuel is pulverized subbituminous coal supplied from a mine near the plant. The coal has an average higher heating value of 8000 Btu/lb with 30 percent moisture and 8 percent ash. The sulfur content of the coal is consistently low at about 0.7 percent by weight.

The boiler is equipped with B&W's dual register burner compartmentalized windbox firing system. This firing system was developed by B&W to control fuel and air mixing in the burner zone, thus reducing NO_x emissions and enhancing complete combustion. The dual register burner (DRB), shown in Figure 3-4, consists of a central coal nozzle surrounded by two concentric secondary air passages. The coal nozzle incorporates a venturi to promote a uniform coal distribution. The venturi plug shown in Figure 3-4, had been removed about one year prior to this test program at the Wyodak plant. The absence of this plug has apparently not compromised burner performance. Air flow distribution between the two secondary air passages and swirl generation is controlled by three devices: outer secondary air register, inner secondary air register, and inner secondary air axial spin vanes. The multiple air passages and the associated controls allow variation in the rate

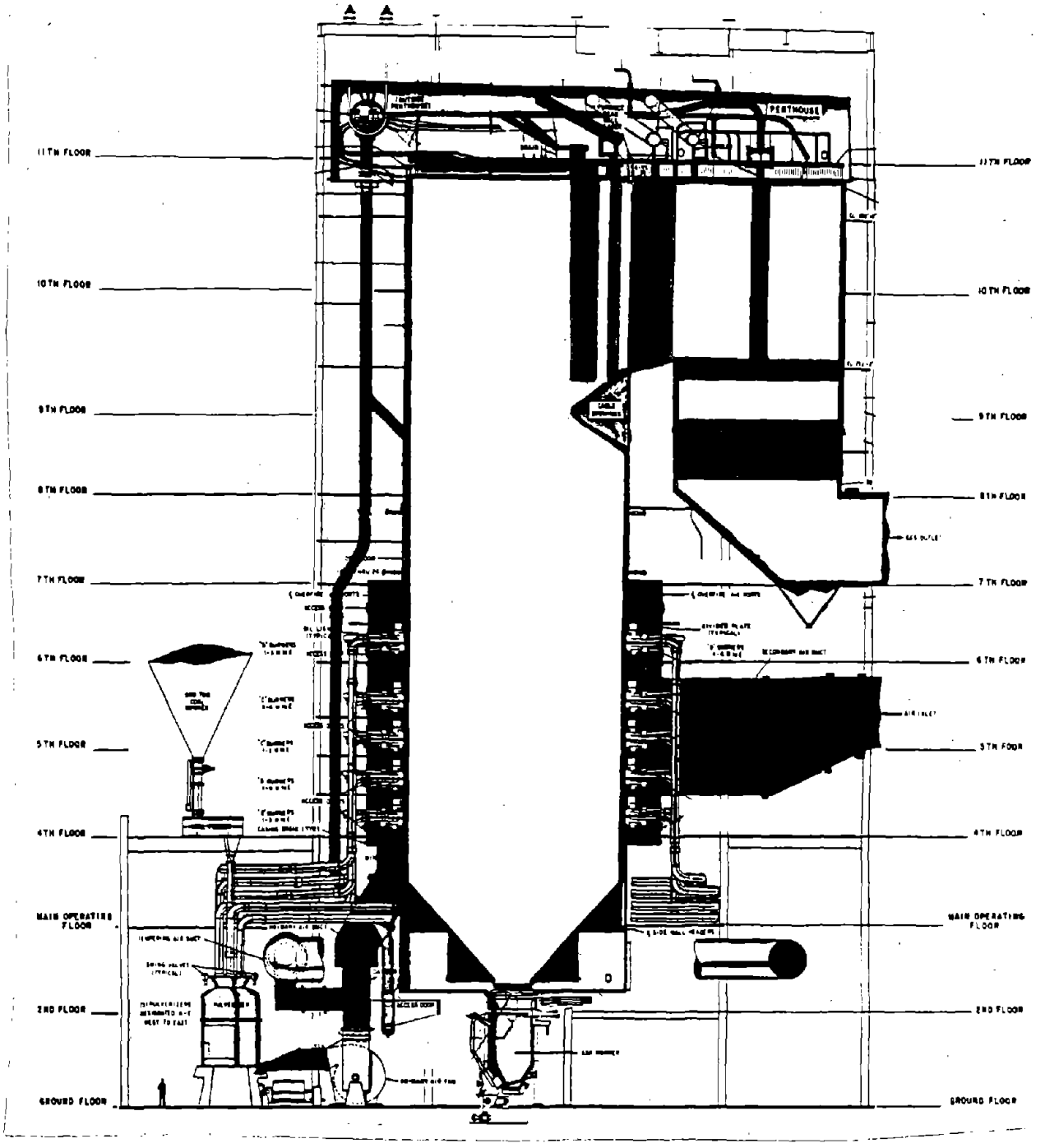


Figure 3-3. General arrangement of Wyodak Unit 1.

TABLE 3-2. WYODAK PLANT UNIT 1 BOILER SPECIFICATIONS

Manufacturer	Babcock & Wilcox
Year in Commercial Operation	1978
Gross Electrical Capacity	350 MW_e
Fuel	Pulverized Coal, Wyoming Sub-bituminous
Burners	
Type	B&W Dual Register
Number	30
Configuration	Horizontal, Opposed-Fired
Array	5 Rows of 3 Burners on Front and Rear Walls
Number of Pulverizers	5
Furnace Dimensions	
Width	46 ft
Depth	45 ft
Height	180 ft
Design Efficiency	83.92% at Maximum Continuous Rating
Steam Flowrate	2,600,000 lb/hr at Maximum Continuous Rating
Steam Pressure	1800 psig
Superheat Temperature	1000°F
Reheat Temperature	1000°F
HA/SC	
Design (5 mills)	387×10^3 Btu/hr-ft^2
Field	330×10^3 Btu/hr-ft^2

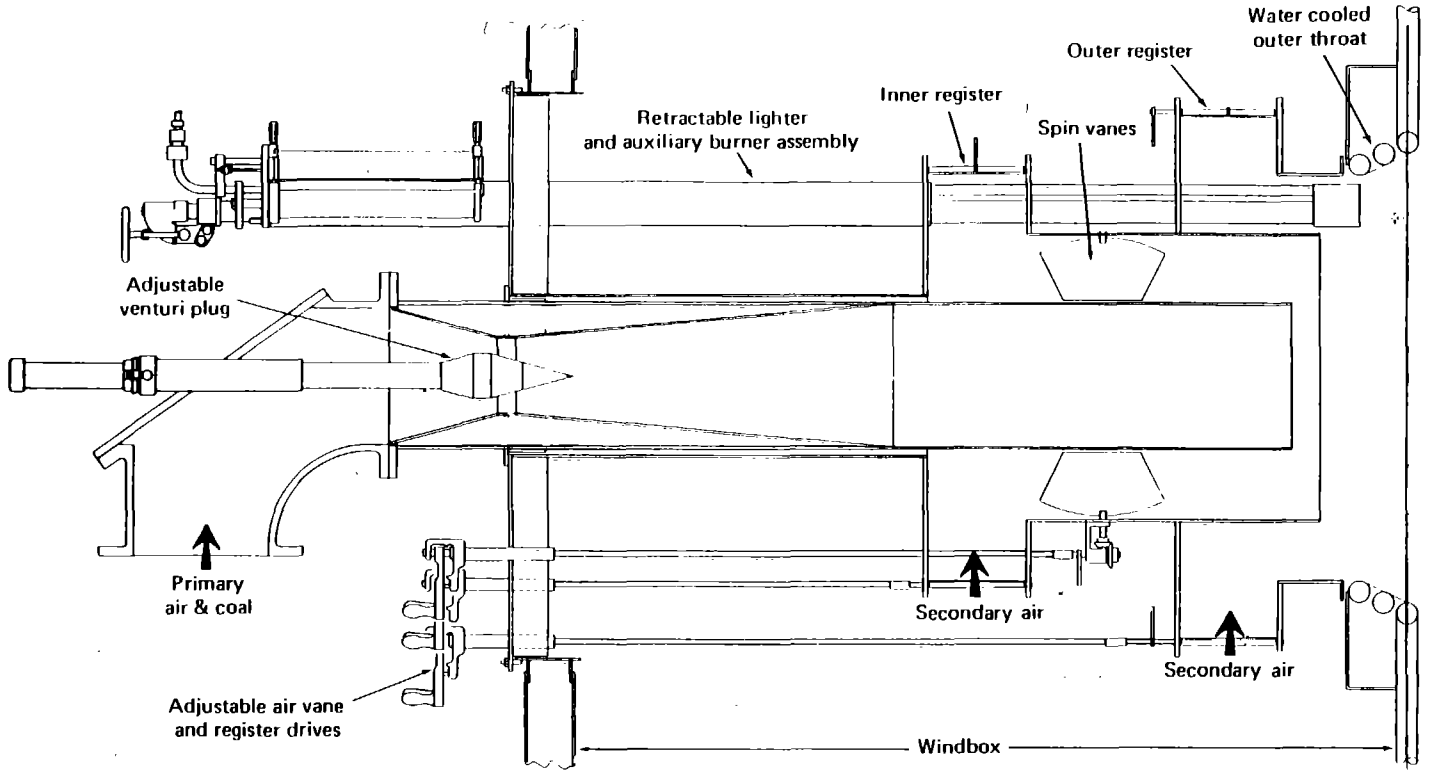


Figure 3-4. Babcock & Wilcox dual register burner.

of fuel and air mixing, thereby controlling NO_x emissions. The compartmented windbox separately controls the combustion air flow for the group of burners associated with each pulverizer. The compartmented windbox thus permits balancing the secondary air to each burner group in operation.

Wyodak Unit 1 has 30 dual register burners arranged in a horizontally opposed firing configuration, as shown in Figure 3-5. The 30 burners are arranged in five rows of three burners on both the front and rear walls. Opposing burners are offset avoiding direct flame tail interaction and promoting uniform heat release across the lower furnace. In addition, the top row of burners on both walls, supplied by D mill, is spaced 12 feet above the lower four rows of burners.

During this two-week test period, no adjustments were made to the burner controls. The settings for each burner maintained during this test period are listed in Table 3-3. Each register control had 18 divisions, with notch 1 representing closed and notch 19 representing open. Thus, each division for the registers represents approximately five degrees of motion. The spin controls also have 18 notches, but there is a 2:1 gear ratio that permits 180° of travel; i.e., 0 to 90°CW and 0 to 90°CCW. It is general practice on this unit to have the spin vanes always in the same direction as the outer register.

The predominant firing configuration for full load operation at Wyodak during this test was with D mill and the associated top row of burners out of service and all the other mills and burners in service. When a mill is taken out of service, the air flow to the idle burners is reduced to provide only flow to cool the burner components. With D mill out of service, the windbox compartment for burners D1-D6 is closed so that only about 10 percent of the total secondary air is supplied for cooling. The other additional configuration had C mill, which supplies burners C1-C6, out of service. These three cases allowed evaluation of the effect of firing pattern on boiler performance and emissions.

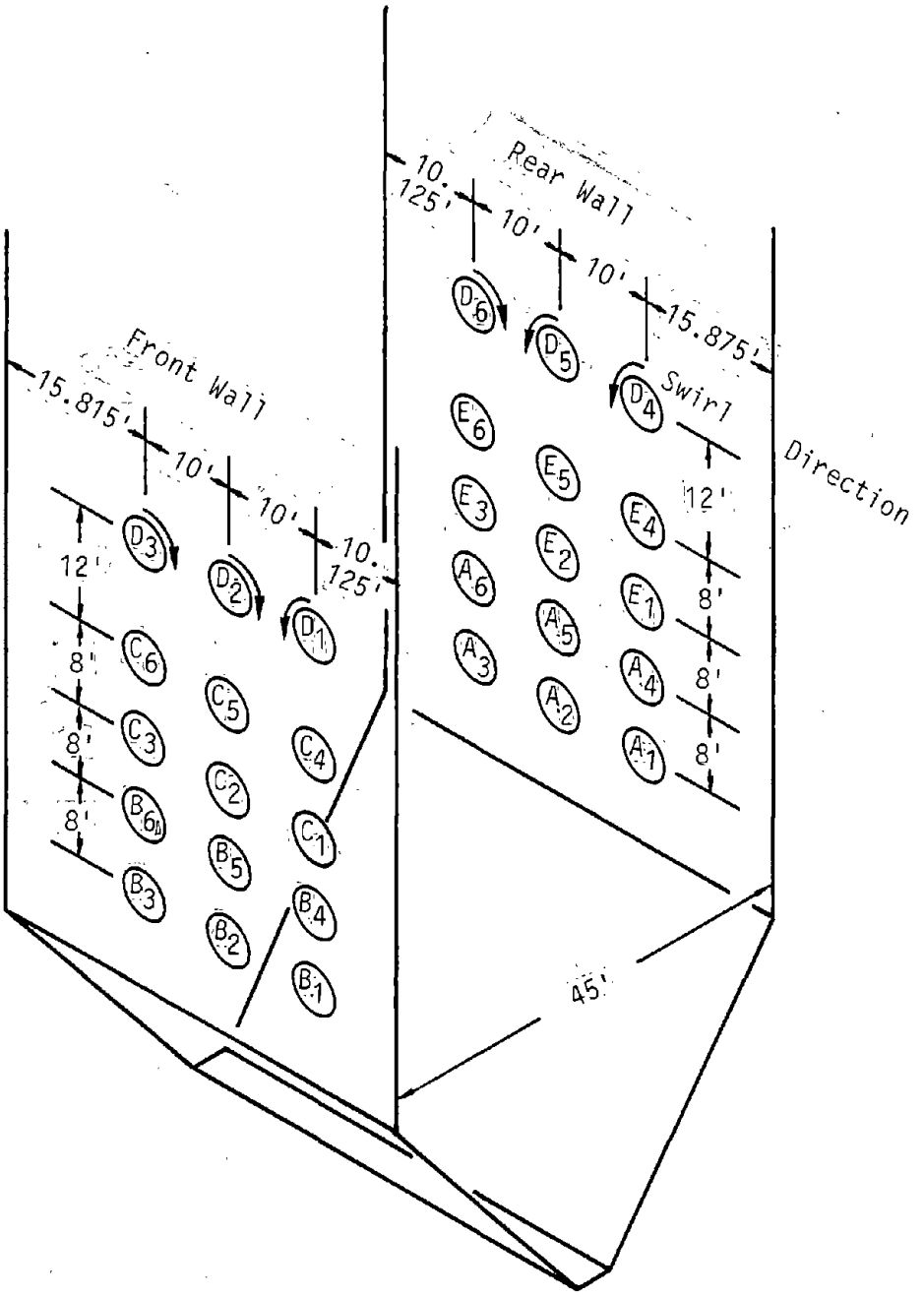


Figure 3-5. Wyodak Unit 1 burner arrangement.

TABLE 3-3. WYODAK UNIT 1 BURNER SETTINGS

Front Wall				Rear Wall			
Burner	Outer Register*	Inner Register*	Spin Vanes*	Burner	Outer Register*	Inner Register*	Spin Vanes*
B1	7	6	5	A1	8	10	3
B2	9	10	2	A2	8	10	7
B3	7	10	2	A3	9	10	5
B4	7	9	2	A4	9	10	4
B5	8	10	2	A5	10	11	5
B6	7	11	2	A6	9	10	4
C1	9	10	2	E1	9	10	4
C2	8	10	4	E2	9	10	5
C3	9	10	3	E3	9	9	4
C4	5	8	4	E4	9	10	4
C5	5	7	2	E5	9	10	4
C6	9	8	3	E6	8	9	4
D1	10	10	3	D4	9	10	5
D2	9	10	3	D5	9	10	3
D3	9	11	3	D6	9	9	5

*Notches Open

3.3 Test Plan

The field evaluations consisted of monitoring boiler performance for one week at the Comanche boiler and for two weeks at the Wyodak boiler. Testing at Comanche was reduced because additional data was available from previous testing by Exxon (Reference 1) for the EPA in 1977. During tests at both boilers, boiler operating conditions were established by the boiler operators.

Figure 3-6 shows the field test plan for both boilers. Boiler operating conditions and performance were monitored using plant instrumentation. Gaseous emissions of NO_x, O_2, CO, SO_2, and CO_2 were continuously monitored using a mobile test trailer. Sampling was performed at both boilers using an array of probes located at the air heater inlet. Coal and ash samples were collected from selected points throughout the boiler for analysis.

Burner performance was assessed using observations of flame characteristics and evaluation of combustion efficiency as determined from ash analyses and CO emissions. The relative fuel/air balance to the burners was assessed by gas stratification measurements obtained at the air heater inlet. In addition, furnace gas temperatures were measured at Wyodak using a water-cooled suction pyrometer. Detailed descriptions of the test procedures are included in Appendix A.

1.0 BOILER DATA FROM PLANT INSTRUMENTATION

- FUEL FLOWRATE
- STEAM QUALITY AND FLOWRATE
- WATER/STEAM TEMPERATURES AND PRESSURES
- AIR/FLUE GAS TEMPERATURES AND PRESSURES
- BOILER LOAD CYCLE
- RANGE OF BURNER OPERATING CONDITIONS

2.0 EXHAUST GAS MEASUREMENTS BY EER

- CONTINUOUS MONITORING OF NO_x, CO, CO_2, O_2, SO_2 AT AIR HEATER INLET
- PERIODIC ANALYSIS OF COAL AND ASH COMPOSITION:
  - COAL FEED
  - FLY ASH AT AIR HEATER INLET
  - BOTTOM ASH
  - PARTICULATE COLLECTOR HOPPER

3.0 BURNER/BOILER PERFORMANCE

- FLAME OBSERVATIONS
- COMBUSTION EFFICIENCY FROM COAL AND FLUE GAS MEASUREMENTS
- FURNACE GAS TEMPERATURE WITH WATER-COOLED PROBE AT WYODAK

Figure 3-6. Field test plan.

4.0 TEST RESULTS

4.1 Results at Comanche Unit 2

Emissions testing of the B&W circular burner was conducted by EER at Comanche Unit 2 from December 7 through December 12, 1984. Gaseous emissions of NO_x, O_2, CO, SO_2, and CO_2 were continuously monitored during this period. The plant was operated in response to system demand. The NO_x overfire air ports are normally partially open. At the request of EER, the ports were closed during the day, but opened at night. Otherwise the boiler operating conditions were established by the plant operators. Emissions were measured at this unit by Exxon in 1977 as part of another EPA program. Exxon's results are compared to the results of the current test program.

During the week of testing, boiler load varied from 150 to 360 MW. The trends for the daily averages of gaseous emissions and boiler load are shown in Figure 4-1. The overall averages are summarized in Table 4-1. During a portion of the testing the boiler was operated with mill A out of service. The A mill supplies coal to the upper two burner rows on the front wall. Excess O_2 varied from only 2.5 to 3.5 percent O_2. A brief series of tests was performed at 300 MW to assess the impact of the NO_x overfire air ports on NO_x emissions.

NO_x and CO emissions as a function of boiler load are presented in Figure 4-2. NO_x emissions with all mills on and the overfire air ports closed showed the following correlation:

$$NO_x \text{ (ppm @ 0\% } O_2) = (1.136)(\text{Load, MW}) + 148$$

Nominal NO_x emissions at full load of 360 MW were 550 ppm @ 0 percent O_2, corresponding to 0.64 lbs/10^6 Btu. These emissions are substantially lower than the NO_x measured by Exxon of 847 ppm @ 0 percent O_2 (0.99 lbs/10^6 Btu). The Exxon data were obtained at a higher excess O_2 level, 5.2 percent compared to 2.7 percent, however. Operation with the A mill out of service resulted in a slight decrease in NO_x emissions. This result could be due to

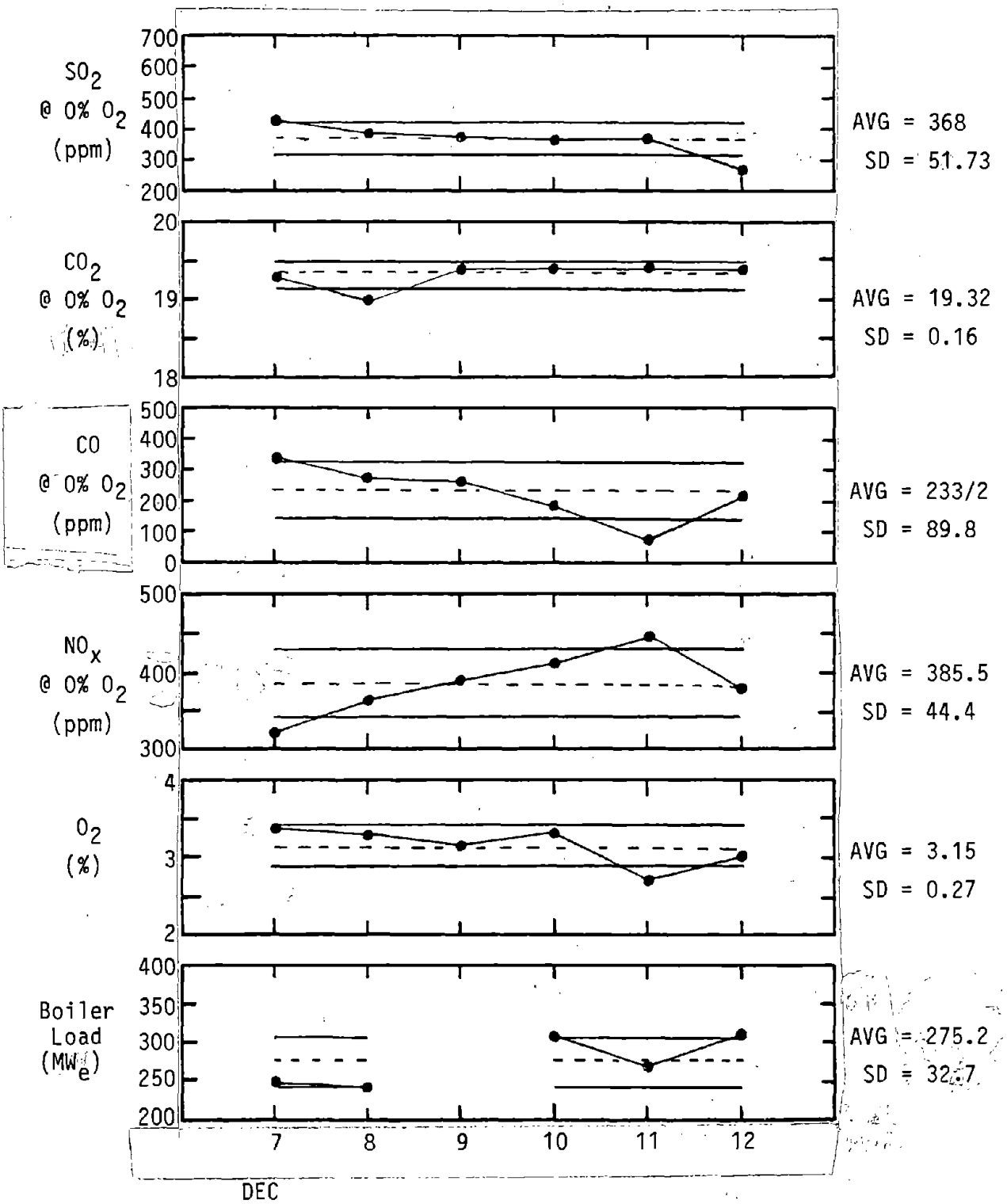
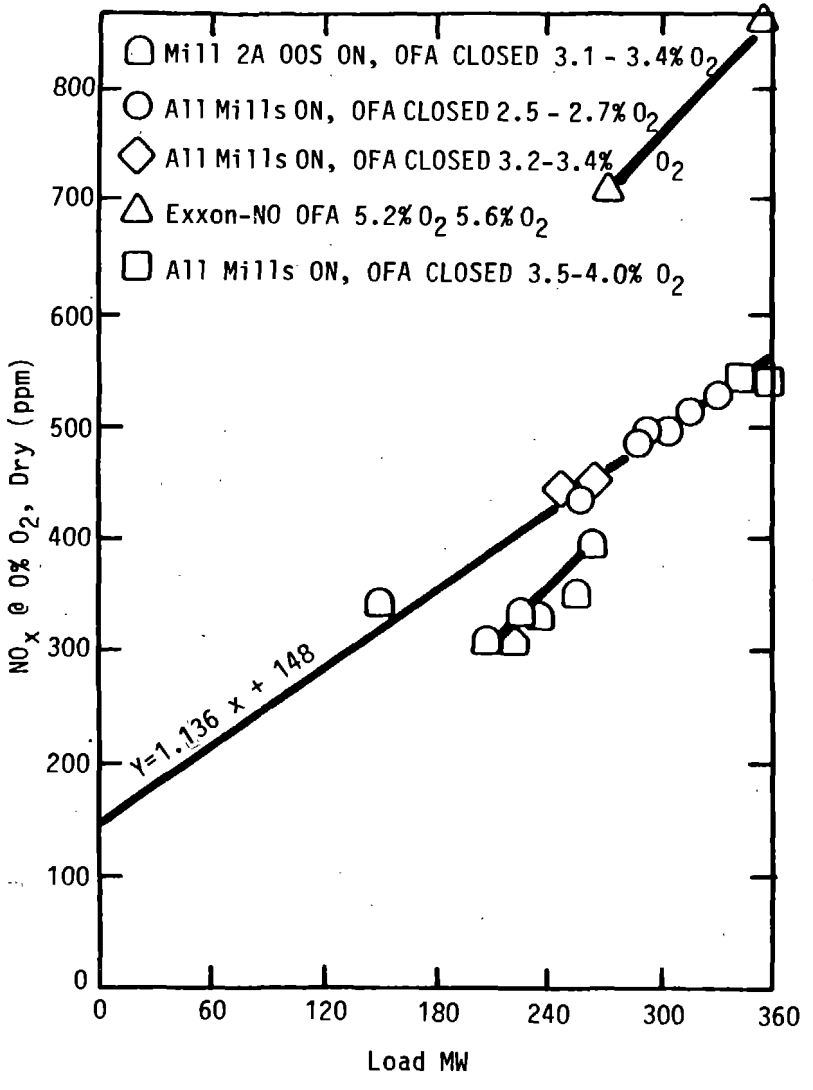


Figure 4-1. Daily averages of gaseous emissions--Comanche Unit 2.

TABLE 4-1. AVERAGE EMISSIONS AT COMANCHE UNIT 2
DECEMBER 7-12, 1984

Species	Average Concentration		
	Measured	@ 0% O_2	lb/10^6 Btu
O_2	3.15%	--	--
NO_x	328 ppm	386 ppm	0.45
SO_2	313 ppm	368 ppm	--
CO	198 ppm	233 ppm	--
CO_2	16.4%	19.3%	--



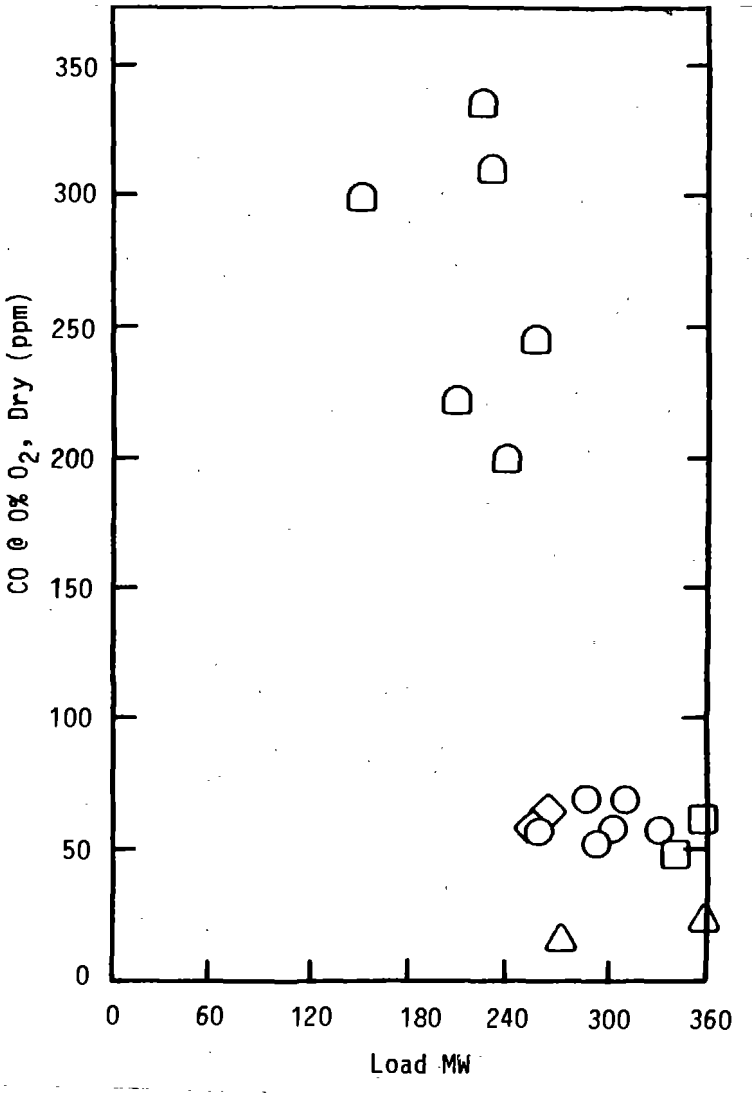


Figure 4-2. NO_x and CO vs. load - Comanche Unit 2.

a decrease in the ratio of firing rate to cooled surface area or to a degree of combustion staging. Here, combustion staging refers to operation with the burner zone at a lower stoichiometry and with the addition of combustion air above the burner zone. The latter conclusion is supported by the measured CO emissions and by the operating excess air level. With all coal mills (and burners) in service, combustion efficiency was typically high, as indicated by low CO emissions in the range of 50 to 60 ppm. However, operation with the A mill out of service resulted in increased CO emissions of up to 500 ppm. Increased CO emissions would be consistent with a decrease in combustion efficiency due to relatively poor fuel/air mixing that could be associated with a degree of combustion staging occurring with the A mill off. In addition, the boiler operating excess air level was generally not increased when the A mill was taken out of service. Since the idle burners would need to be supplied with cooling air, operation at a constant excess air level would result in a lower burner zone stoichiometry with the A mill out of service, resulting in a degree of combustion staging.

Figure 4-3 shows NO_x and CO emissions vs. excess O_2 at a constant load of 253 to 273 MW. In general, the data taken during the current test do not have enough variation in O_2 level to indicate a trend. However, comparing the current data with the previous Exxon data would suggest a strong dependence of NO_x on excess O_2. This is typically the case with subbituminous coals as indicated in LWS tests.

Exhaust gas composition was measured using an array of 12 probes in the two exhaust ducts upstream of the air heater. The gas compositions at each sampling location were measured on December 10 and 11, 1984 to determine gas stratification. In wall-fired boilers, gas stratification measurements upstream of the air heater can typically be used to evaluate the side to side balance of fuel and air to the burners. Figure 4-4 shows the results of the stratification measurements at Comanche. Although some variation in O_2 and CO levels is evident, no consistent imbalance between the two ducts or within each duct can be seen from these data. Thus, adjustment of the burners to improve the air/fuel balance would be expected to result in only a minor improvement in combustion performance.

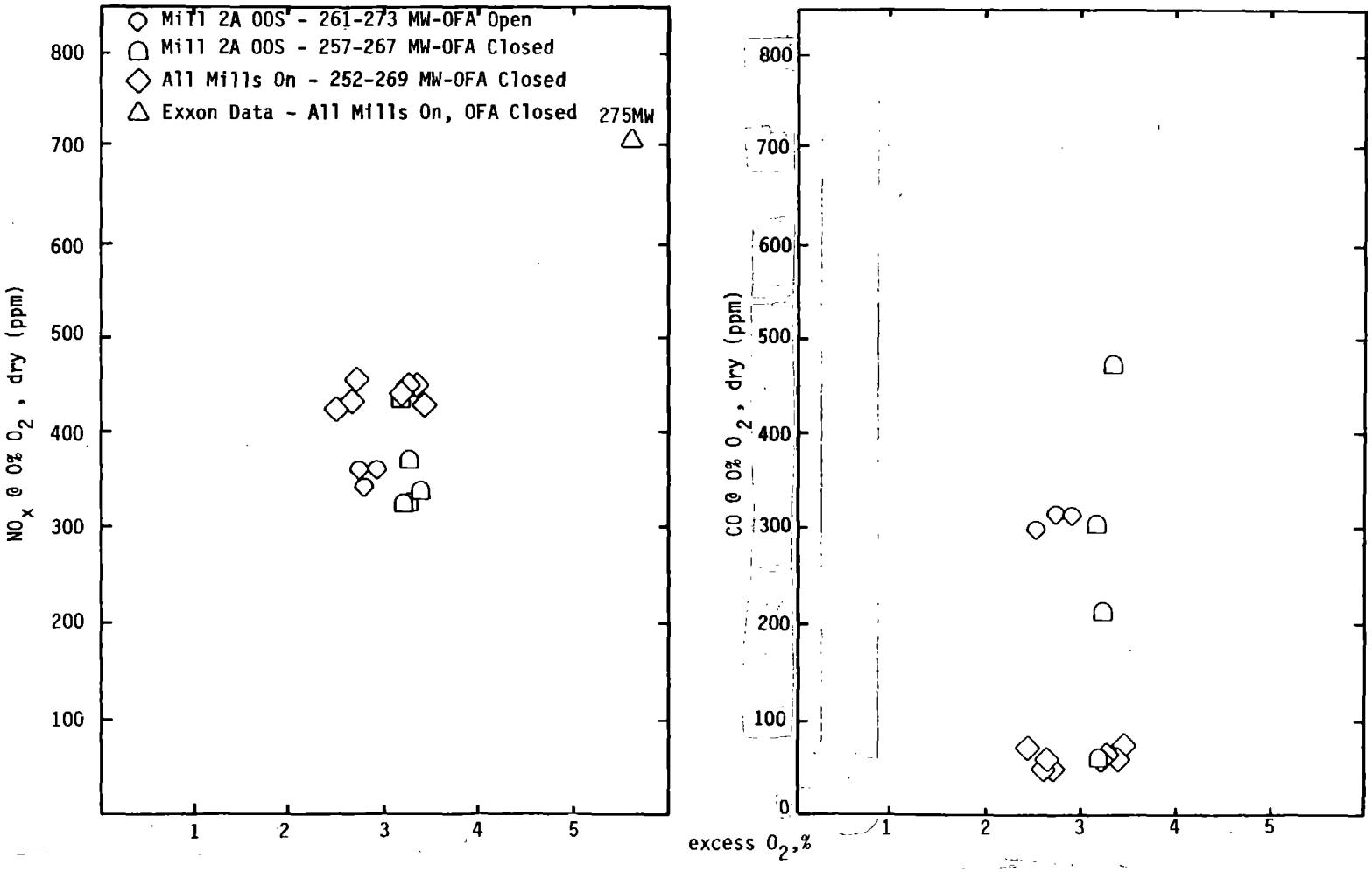


Figure 4-3. Comanche Unit 2 - NO_x and CO vs. excess O_2 at a load of 253-273 MW_e.

12-10-84

	A			B		
O_2, %	3.29	4.59	2.89	5.24	4.74	2.49
NO_x, ppm	504	480	350	379	400	306
CO, ppm	36	77	186	94	129	-
	2.99	3.26	3.74	2.99	2.49	3.74
	478	420	335	355	340	401
	35	59	416	187	228	122
	Avg O_2 3.46%			Avg O_2 3.61%		

12-11-84

	A			B		
	3.73	2.67	4.72	2.00	1.92	2.52
	517	476	451	475	473	426
	84	91	102	43	43	56
	4.12	2.57	3.55	4.02	2.17	2.87
	454	479	457	483	446	417
	49	45	42	48	145	57
	Avg O_2 3.56%			Avg O_2 2.58%		

Figure 4-4. Comanche gas stratification test.

Figure 4-5 shows the effect of opening the overfire air ports on NO_x and CO emissions. Opening the ports resulted in a substantial decrease in NO_x emissions. This trend is similar to that seen during the Exxon testing, except that no decrease in NO_x was observed until the ports were opened more than 30 percent. Evidently the back lash in the mechanical linkage resulted in the ports not actually opening until the indicator was past 30 percent. Thus, although the plant normally operates with the ports 18 percent open, they may actually be closed.

Unlike the results seen during the Exxon tests, however, opening the overfire air ports resulted in a large increase in CO emissions, to over 800 ppm at the maximum opening, indicating a substantial decrease in combustion efficiency.

4.2 Results at Wyodak

Emissions and boiler performance were monitored at the Wyodak plant from January 31 to February 14, 1985. During this test period, the unit was operated based on normal practice following system demand. The boiler was essentially base loaded through the test program with only brief load variations. A short boiler outage occurred between February 7 and 10, for necessary boiler repairs.

The primary objective of the test program was to characterize the performance of B&W Dual Register Burners in a typical utility boiler. The burner performance was determined based on CO emissions, flame characteristics, and efficiency. Emissions measured included continuous monitoring of NO_x, CO, O_2, CO_2 and SO_2. Visual observations were made through available inspection ports to determine flame characteristics to the extent possible. Combustion efficiency was determined by analysis of unburned carbon content in fly ash samples and measurement of CO emissions. In addition, the overall boiler efficiency was determined based on calculation of the heat rate during the test period.

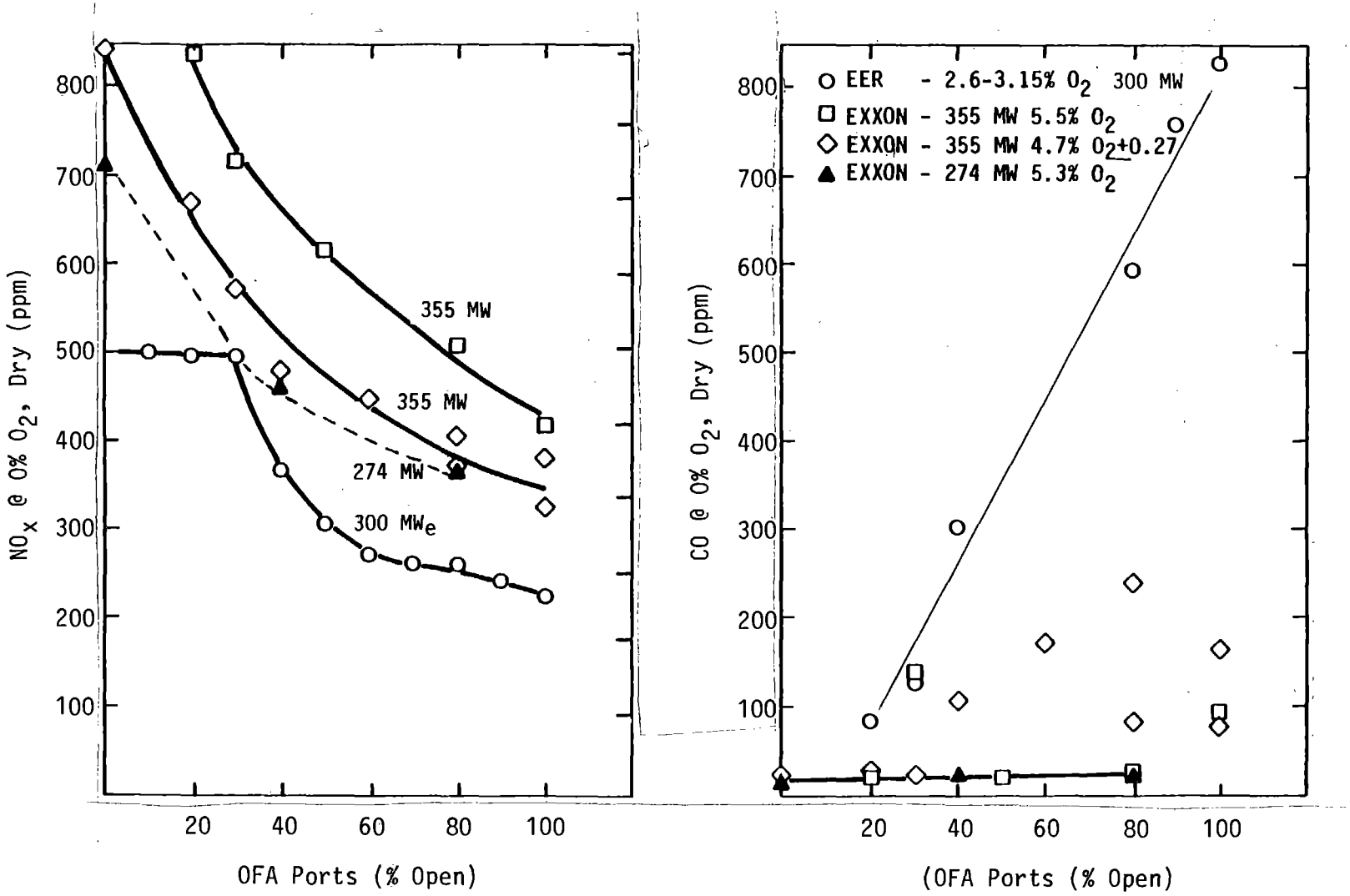


Figure 4-5. Effect of overfire air port damper position on emissions - Comanche.

4.2.1 Emissions

Emissions were monitored at the economizer outlet of Wyodak Unit 1. The gaseous species monitored included O_2, CO, CO_2, NO_x and SO_2.

A continuous emissions monitoring system was used to measure the gaseous species with an array of eight probes. Four probes were placed in each of the two ducts leading from the economizer to the air heater to ensure a representative sample. The gas sample flow rate was balanced to provide an equal sampling rate through each of the eight probes. In addition, each of the probes was monitored individually at a typical operating condition during the test period to determine the presence and extent of stratification of the gas stream. The gas stratification test was conducted on February 6 between 9:30 to 11:00 AM with the unit running at 360 MW_e gross output and with D mill out of service. The results of this test are shown in Figure 4-6 and summarized in Table 4-6. The concentration profiles of O_2, NO_x, and CO shown in Figure 4-5, indicate that the gas concentrations are slightly higher in the west duct. Previous tests at other boilers have shown that burner-to-burner imbalances in fuel or air flow result in non-uniform gas concentrations across the width of the boiler. Thus, slight burner-to-burner flow imbalances may account for the differences measured during the stratification test.

Averaged concentrations for the two ducts are compared with gas concentrations from balanced sampling with all probes before and after the individual probe stratification test in Table 4-2. Again, the O_2 concentration in the west duct was slightly higher than measured in the east duct. Associated with the higher oxygen concentration in the west duct are higher NO_x emissions. This is an indication that careful control of excess air and proper balances of fuel and air, from burner to burner is beneficial in reducing overall NO_x emissions. Differences between averaged concentrations from the two ducts and balanced probe sampling are about 5 percent, which is within the fluctuations typical of normal boiler operation.

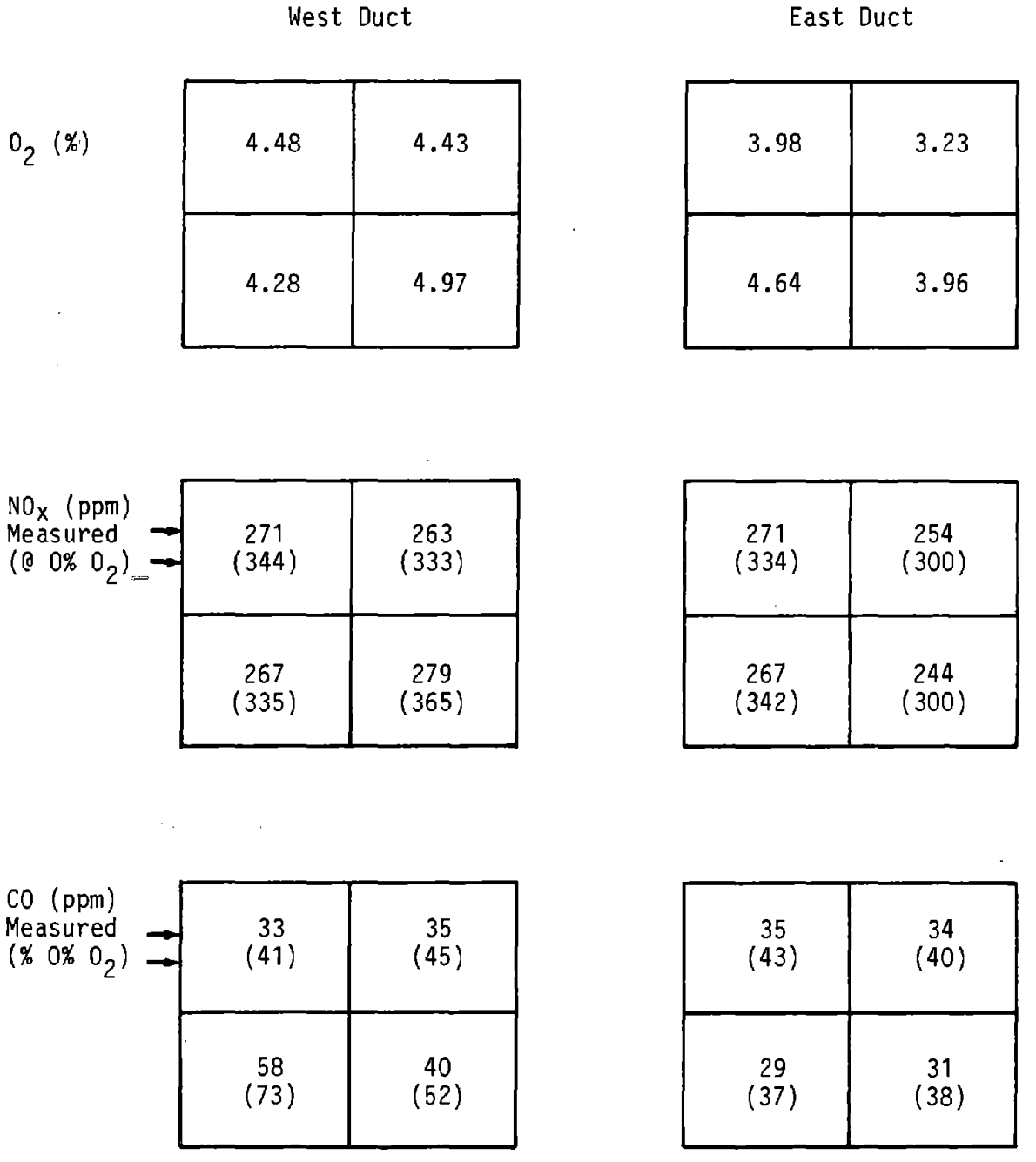


Figure 4-6. Stratification test results at economizer outlet.

TABLE 4-2. SUMMARY OF STRATIFICATION AT ECONOMIZER OUTLET

Sample	O_2 (%)	NO_x (ppm @ 0% O_2)	CO (ppm @ 0% O_2)
Average West Duct	4.54	344	53
Average East Duct	3.95	319	40
Average Both Ducts	4.24	331	46
All Probes Balanced	4.03	318	51

Hourly averages of the gaseous emissions were calculated from the continuous monitoring data. These hourly averages are tabulated in Appendix C-3. The hourly averages were used to calculate daily and overall averages for the test period. The overall averages of measured gas concentration for the test period are summarized in Table 4-3. These values represent essentially base-loaded operation, with only about four hours of reduced load operation during the test period. The NO_x emission rate of 0.40 $lb/10^6$ Btu is below the Federal New Source Performance Standard of 0.5 $lb/10^6$ Btu for subbituminous coal-fired boilers.

The trends for the daily averages of gaseous emissions and boiler load are shown in Figure 4-7. A short boiler outage occurred between February 7 and 10 during which time no emissions data was collected. The plant load averaged 358 MW_e during the test period when in operation, with only 1 percent relative deviation. Close control was maintained on the operating excess air level, indicated by 2.5 percent deviation from the average of 4.03 percent O_2 measured in the flue gas. CO emissions were low throughout the test period and averaged about 51 ppm. The variations in CO measured at this low level are generally considered to be insignificant. The CO_2 and SO_2 emissions, which are directly related to the coal composition, also showed variations that were generally small.

Gaseous emissions, including NO_x emissions, were monitored primarily with continuous analyzers. In addition, NO_x emissions were measured following EPA Method 7 procedures on one day during the test period to verify the accuracy of the continuous monitors. The results of the EPA Method 7 sampling are summarized in Table 4-4 with details included in Appendix B: Quality Assurance. The discrete Method 7 samples are compared with the continuous monitor responses in the table. Each Method 7 value represents a set of three discrete samples while the continuous monitor value is time averaged during the Method 7 sampling period. The agreement between the two measurement techniques is good. The continuous monitors were within about 13.7 percent, including 95 percent confidence interval, of the EPA standard method.

TABLE 4-3. AVERAGE EMISSIONS AT WYODAK UNIT 1
JANUARY 31 - FEBRUARY 14, 1985

Species	Average Concentration		
	Measured	@ 0% O_2	lb/10^6 Btu
O_2	4.03%	--	--
NO_x	278 ppm	344 ppm	0.40
SO_2	584 ppm	723 ppm	1.17
CO	42 ppm	52 ppm	0.03
CO_2	15.7%	19.4%	216.7

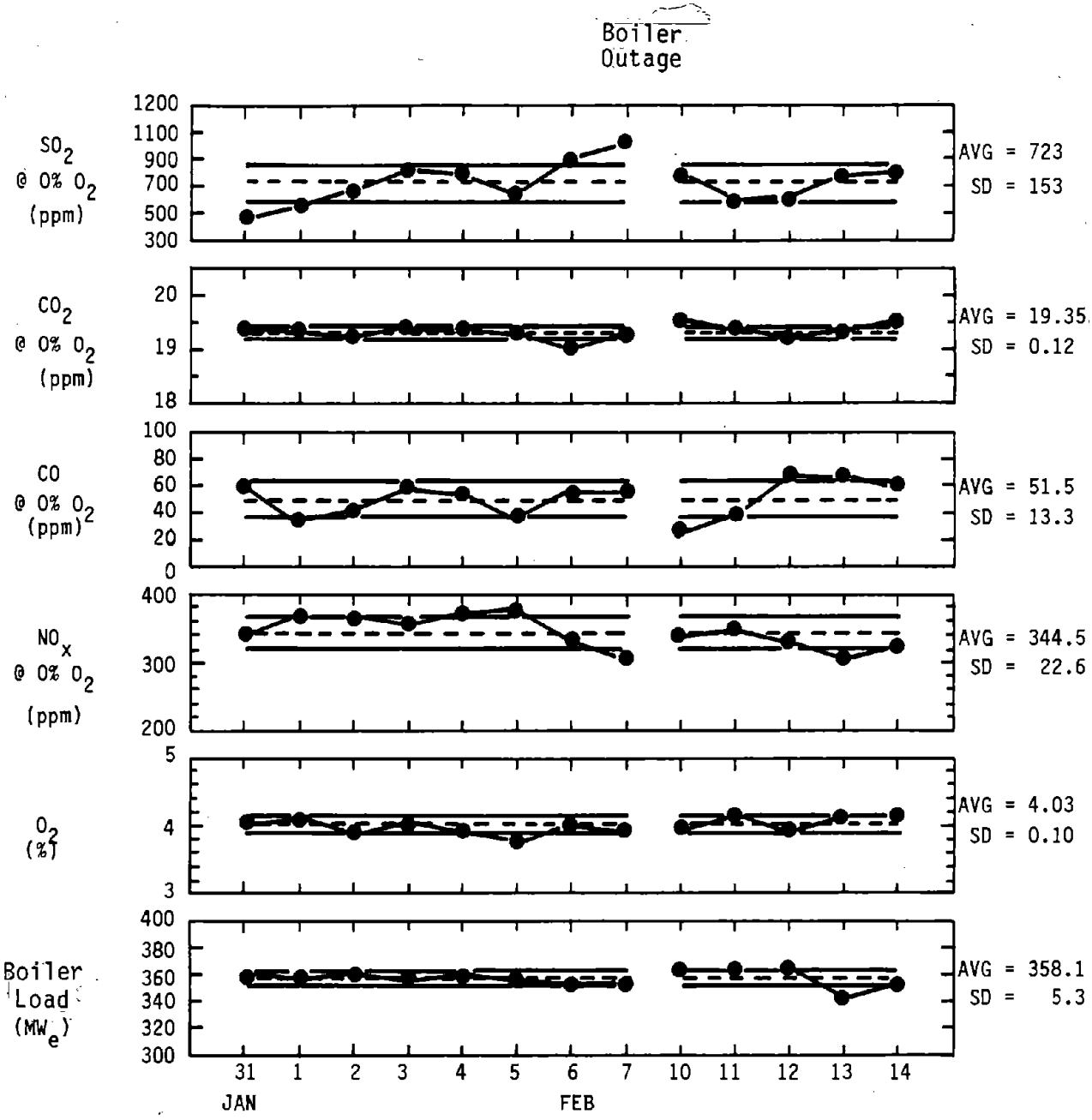


Figure 4-7. Daily averages of gaseous emissions.

TABLE 4-4. COMPARISON OF NO_x MEASURED BY CONTINUOUS MONITORING SYSTEM AND EPA METHOD 7 SAMPLES AT ECONOMIZER OUTLET

Date	Time	NO_x @ 0% O_2, dry	
		Method 7	CMS
2-4-85	1603	358	395
2-4-85	1612	368	397
2-4-85	1616	368	400
2-4-85	1623	357	405

NO_x emissions at Wyodak were sensitive to burner firing arrangement and boiler load. These effects are shown in Figure 4-8. The data are averages of hourly emissions for three firing configurations. The primary configuration at Wyodak has the D mill out of service. The D mill supplies the top row of burners on both the front and rear walls. The two other firing configurations were: (1) all mills and burners in service and (2) "C" mill out of service. The burners supplied by C mill are the second and third rows from the top on the front wall.

Operation with the D mill out of service resulted in the lowest average NO_x emissions (344 ppm at nominal full-load operation), while operation with all mills and burners in service resulted in the highest NO_x emissions (395 ppm at nominal full-load operation). An intermediate level of NO_x emissions was produced with the C mill out of service. These results are somewhat surprising since operation with the D mill out of service produces the highest HA/SC ratio. In general, the effects of the boiler firing configuration on NO_x emissions could be due to slight variations in the burner operating stoichiometry (combustion staging) or to changes in the burner flame length and, consequently, changes in the degree of flame confinement and flame-to-flame interactions. Since the excess air level was similar for operation with all mills in service and for operation with the C mill out of service, the burners in the latter case could have been operating at a slightly lower stoichiometry, resulting in a decrease in burner NO_x emissions. However, when the D mill was taken out of service, the boiler was operated at a higher excess air level. This result is consistent with the standard B&W practice of increasing the operating excess air level as a result of supplying additional air to cool the idle burners. Therefore, it is likely that the burners were operating at the design stoichiometry. Since operation with the D mill out of service would have required the burner throughput to increase, it is possible that the flame length could have changed. As indicated by the results of the LWS burner studies, NO_x production from the dual register burners correlates directly with flame length. In addition, variations in the boiler firing configuration and burner flame length would be expected to influence the boiler flow patterns and flame-to-flame interactions and could possibly account for the variations

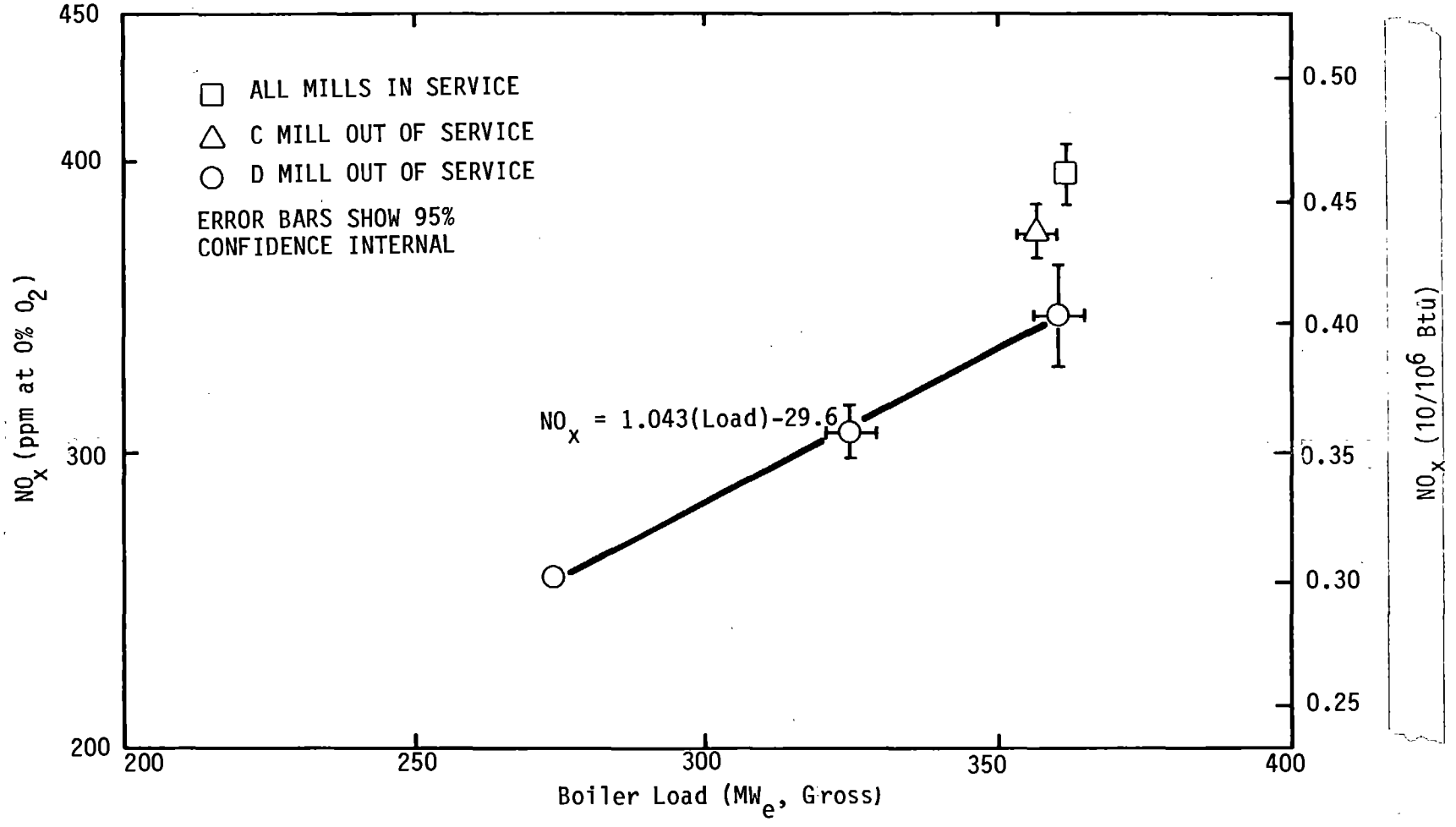


Figure 4-8. Correlation of NO_x emissions with load.

in NO_x emissions. Although this analysis is simplistic, these results do indicate the importance of burner arrangement and firing configuration on burner performance.

Limited data were obtained at reduced loads with D mill out of service. For typical coal-fired boilers, NO_x increases with load due to increasing combustion intensity and fuel/air mixing rates. As shown in Figure 4-8, NO_x emissions correlate essentially linearly with boiler load. Least square linear regression yields the following correlation for operation with the D mill out of service:

$$NO_x \text{ (ppm @ 0\% } O_2) = 1.043 \times \text{Load } (MW_e) - 29.6,$$

while the correlation obtained for all data taken during the field test was:

$$NO_x \text{ (ppm @ 0\% } O_2) = 1.25 \times \text{Load } (MW_e) - 77.$$

These relationships only apply over the small range of excess air levels at which the boiler operated during this field test.

4.2.2 Boiler Performance

Boiler performance during the field evaluation was monitored using the plant instrumentation and measurements performed by EER. Boiler performance parameters of interest included:

1. Coal characteristics
2. Mill performance
3. Burner performance
   - Air/fuel mixing
   - Flame characteristics
   - Combustion efficiency
   - Burner pressure drop
4. Boiler heat rate
5. Furnace gas temperatures

The Wyodak plant is typically base loaded and operates almost continuously at full load of about 360 MW gross. During the two week test period, the plant

experienced no significant operating problems and operated at full load with the following brief exceptions:

1. Two day outage on February 8 and 9, 1985.

2. Three hour outage on February 12, 1985 caused by an electrical disturbance in the power distribution system unrelated to station operation.

3. Five hours of low load operation at 275 MW on February 13, 1985 at the request of EER.

4. Two hours of operation at 325 MW on February 14, 1985 at the request of EER.

Wyodak uses Powder River Basin coal, which is mined locally. The coal has a low sulfur content with approximately 30 percent moisture and a higher heating value of 8000 Btu/lb. Coal moisture, ash, sulfur and heating value are monitored daily by the station. These results and coal analyses by EER are presented in Appendix C. With the exception of sulfur content, coal properties did not vary substantially during the test period. Coal sulfur varied from about 0.3 to 0.7 percent, as received.

The boiler is equipped with five mills, but can operate at full load with only four mills in operation. During the majority of the test period, the plant operated with the D mill out of service. The D mill supplies coal to the top row of burners on both the front and rear walls. The boiler operated with the C mill out of service during February 4 and 5, 1985 to allow repairs on the C mill. The boiler also operated will all mills in service during the brief periods while the C mill was taken offline and brought back online. Mill performance was satisfactory during the test period. Coal fineness test results provided by the station showed fineness to vary from 68 to 85 percent less than 200 mesh. Detailed fineness results are included in Appendix C.

Burner performance with the dual register burners was satisfactory throughout the test program. Air/fuel distribution between burners was relatively uniform, as shown by flame observations and by variations in excess O_2 concentrations in the exhaust duct prior to the air heater. Flame observations showed the flame shapes to be uniform and stable for all burners. Exact flame length was difficult to evaluate due to the lack of observation ports in the middle of the furnace side walls. Flame lengths appeared to be relatively long, however, extending from 1/2 to 3/4 of the distance across the furnace. The burners on the front and rear walls are offset to minimize flame interactions.

Combustion efficiency was very high, as measured by carbon in the fly ash and CO emissions. Carbon in the ash averaged 0.16 percent, corresponding to a carbon utilization of 99.98 percent. Ash analyses are included in Appendix C. Carbon monoxide emissions were stable, averaging less than 60 ppm.

Overall boiler performance and electrical generation efficiency were measured in terms of the gross plant heat rate, the ratio of fuel heat input to gross electrical production (Btu/kw hr). The average heat rate during the test period was 10,236 Btu/kw hr compared to the design heat rate of 10,177 Btu/kw hr. Thus, overall boiler performance was satisfactory, with efficiency very near to design conditions.

Upper furnace gas temperatures were measured during full load operation using a water-cooled suction pyrometer. Figure 4-9 shows the range of temperatures measured. The furnace exit temperature at the inlet to the superheater pendants varied from 1120 to 1359°C. The temperatures at the bottom portion of the superheater are above the ash fusion temperature of about 1200°C, and thus some buildup of ash/slag deposits could be expected in this region. However, fouling of the superheater tubes was not observed to be a significant operational problem during testing. The impact of sootblowing on furnace gas temperatures was evaluated during testing. The results shown in Table 4-9 show sootblowing to have very little effect on gas temperatures.

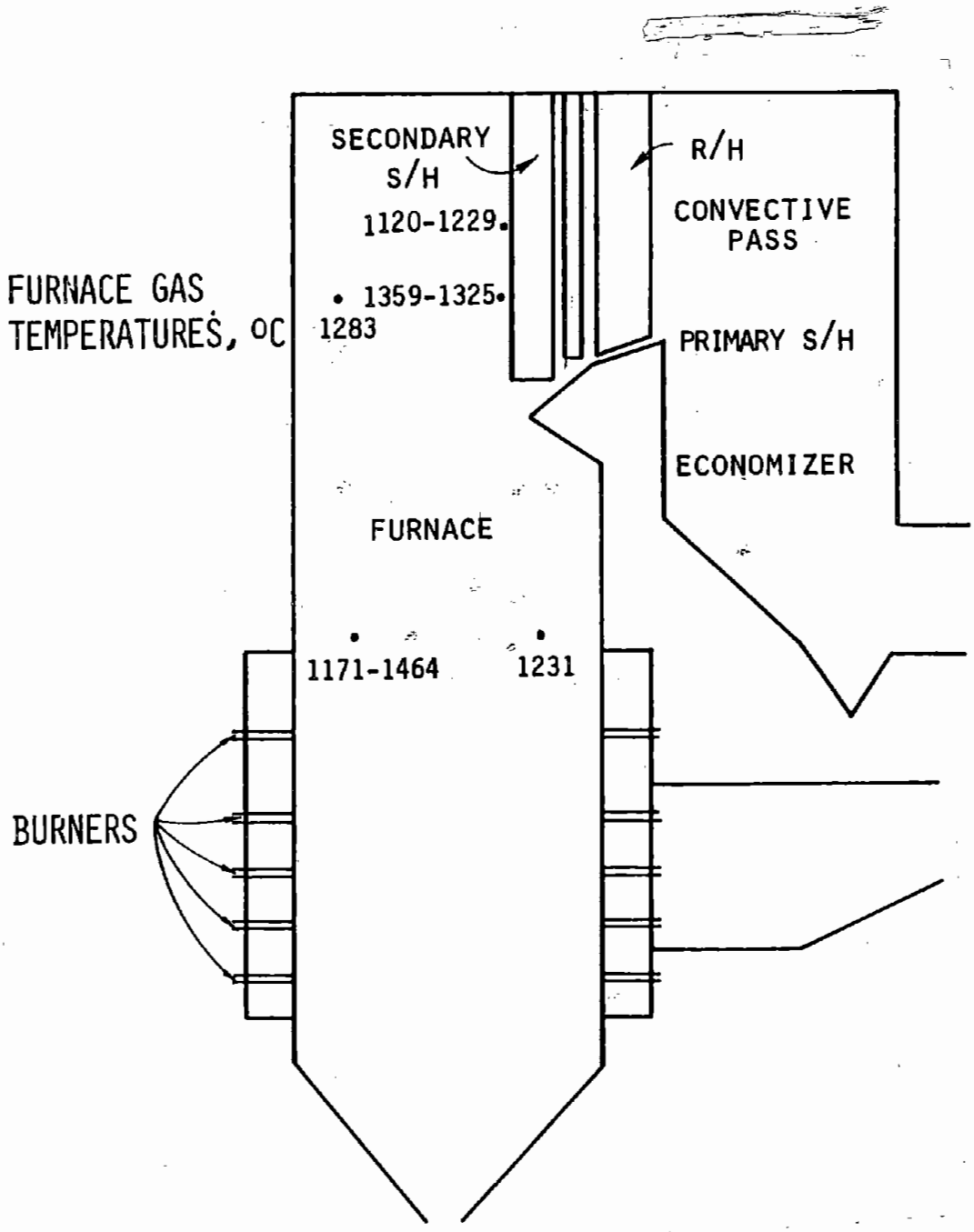


Figure 4-9. Wyodak furnace gas temperatures.

TABLE 4-9. EFFECT OF SOOTBLOWING

Port	Distance Into Furnace	Temp. °C Before Blowing	Temp. °C After Blowing	Sootblowing Location
10W	8'	1120	1120	Furnace
9-1/2W	8'	1416	--	
9-1/2W	12'	1384	1370	Front of Superheater
9-1/2W	16'	1377	1351-62	Front of Superheater
9-1/2W	20'	1324	1315-32	Front of Superheater
9-1/2W	12'	1383	1370	Air Heater
	16'	1354	1351-62	
	20'	1345	1315-32	
	8'	1402	--	

5.0 REFERENCE

1. Manny, E. H. and A. R. Crawford. Control of Utility Boiler and Gas Turbine Pollutant Emissions by Combustion Modification - Phase II. EPA-600/7-81-039 (NTIS PB 81-222267), March 1981.

APPENDIX A

TEST PROCEDURES

Measurements performed by EER included the following:

- Flue gas composition of NO_x, O_2, CO, SO_2, and CO_2 by continuous monitors
- Coal and ash composition
- Furnace gas temperatures by suction pyrometer

Flue Gas Composition

The flue gas composition (NO_x, CO, CO_2, O_2, and SO_2) was monitored with continuous analyzers at the inlet of the air heater. Figure A-1 shows a schematic diagram of the monitoring system at the air heater inlet. The gas sample was obtained with eight sample probes. The gas sample flow rate from each probe is controlled with a glass rotameter to ensure equal flows through each probe. In addition, sampling can be conducted through one probe at a time to determine stratification of the gas concentrations. All components of the sample system upstream of the moisture condenser are heated. A separate sample stream for the SO_2 analyzer is dried with a Perma Pure drier. Moisture is removed from the condenser frequently using solenoid valves and a timer to minimize contact of moisture and the sample. All components of the system are stainless steel, Teflon, or glass to minimize possible reactions with the sample. The continuous monitoring instrumentation is listed in Table A-1.

Furnace Gas Temperature

Furnace gas temperatures were measured using a water-cooled suction pyrometer. A suction pyrometer was used due to the inaccuracies in high-temperature measurements caused by radiation loss from standard thermocouples. The suction pyrometer consists of a high-temperature thermocouple in a ceramic shield. A high flow rate of furnace gas is withdrawn through the shield and over the thermocouple so that convective heat transfer dominates, reducing the errors caused by radiation losses to an insignificant level. An air ejector is used to aspirate furnace gas. The

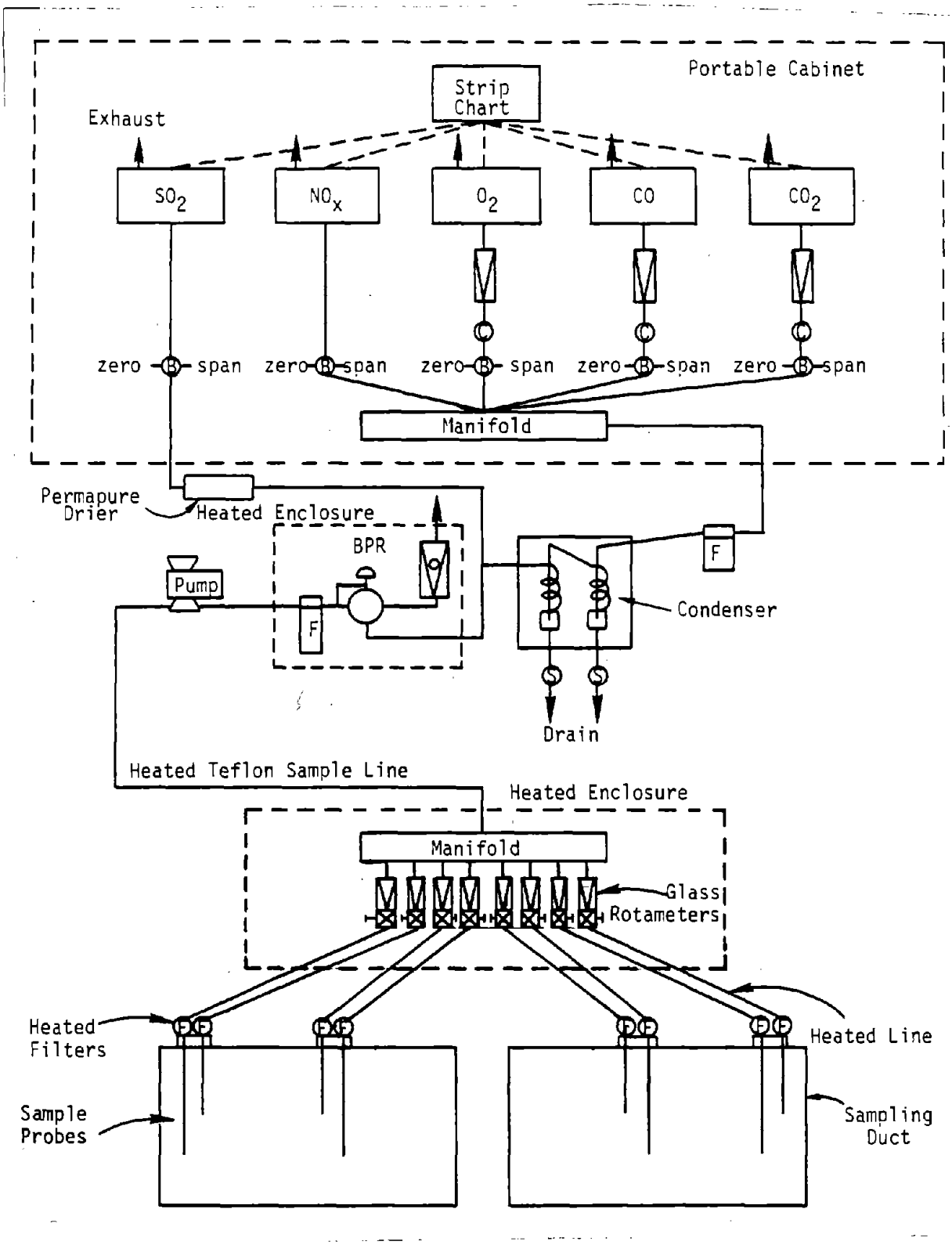


Figure A-1. Air heater inlet continuous monitoring system.

TABLE A-1. CONTINUOUS GAS ANALYZERS -- AIR HEATER INLET

Gas Measured	Detection Principle	Manufacturer	Model No.	Range	Nominal Calibration Gas Level
O_2	Paramagnetic	Taylor	OA570	10%	8%
SO_2	Pulsed Fluorescence	TECO	40	1000 ppm	800 ppm
NO_x	Chemiluminescent	TECO	10AR	1000 ppm	800 ppm
CO	Nondispersive Infrared	ANARAD	AR500R	500 ppm	400 ppm
CO_2	Nondispersive Infrared	ANARAD	AR500R	25%	22.5%

gas flow rate is monitored with a calibrated orifice to ensure an adequate gas velocity over the thermocouple. Temperatures are measured with K or S type thermocouples. Figure A-2 shows the design of the suction pyrometer probe. Figure A-3 shows the construction of the pyrometer tip.

Coal and Ash Characteristics

Samples of coal and ash were collected throughout the test program to determine chemical composition and physical characteristics. Coal samples were collected on a daily basis. Ash samples were obtained from the bottom hopper of the boiler, the precipitator hopper, and the high volume particulate sampler during the field tests. Solids analytical procedures are listed in Table A-2.

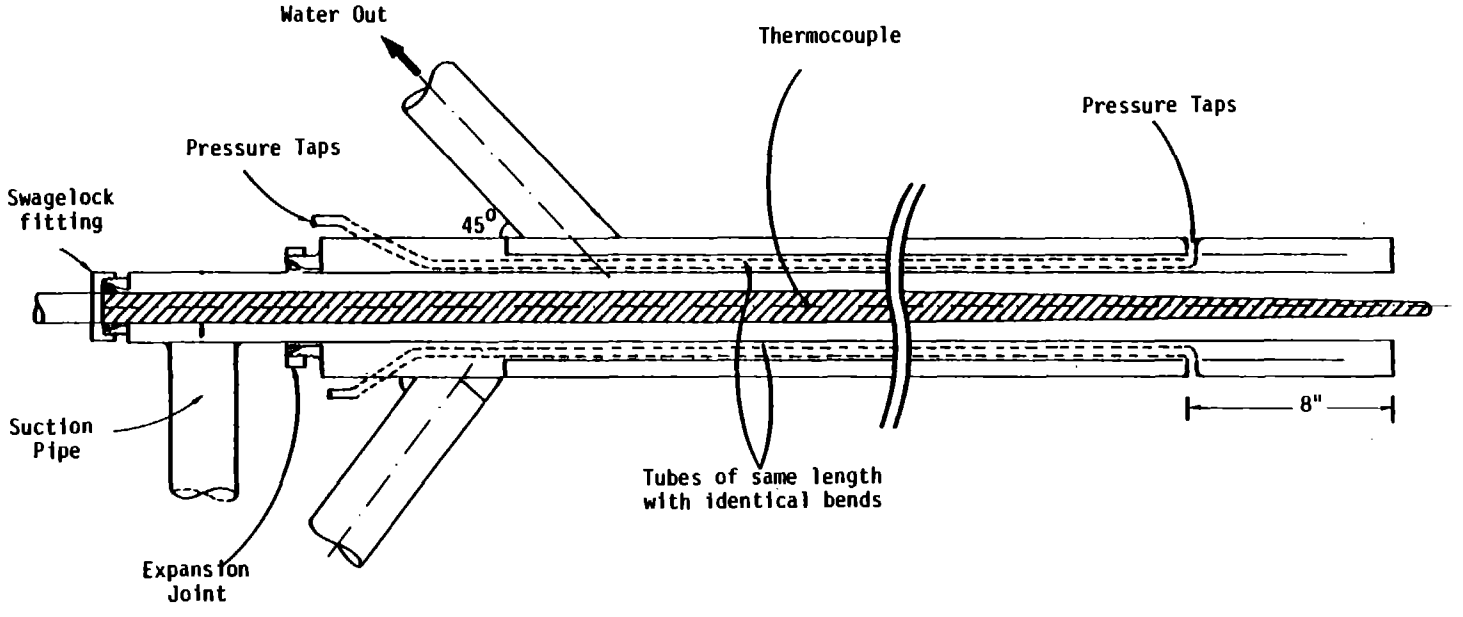


Figure A-2. Internal construction of water-cooled suction pyrometer probes.

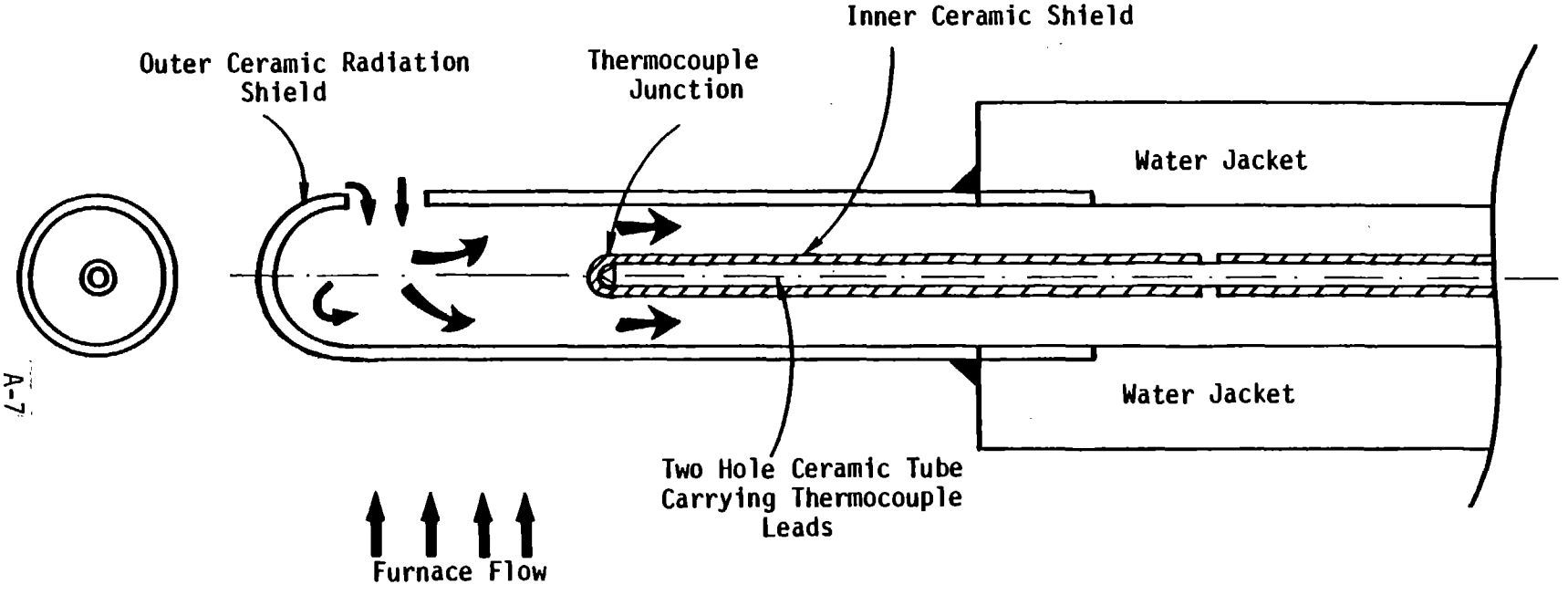


Figure A-3. Suction pyrometer tip construction.

TABLE A-2. COAL AND ASH ANALYSES

Parameter	Analytical Procedure	Samples to be Analyzed	
		Coal	Ash
Proximate Analysis Volatiles, Fixed C, H_2O, Ash	ASTM D3172	X	
Heating Value	ASTM D2015	X	
Ultimate Analysis C, H, N, Ash, S	ASTM D3176	X	
Ultimate Analysis C, H, N, Ash	Perkin Elmer 240b Analyzer	X	X
Sulfur	Leco SC 32 Sulfur Analyzer	X	X
Ash	ASTM D3174	X	X

APPENDIX B

QUALITY ASSURANCE

Exhaust gas composition was measured using continuous monitors at the air heater gas inlet. This location was selected to allow flue gas stratification to be measured prior to dilution and mixing by the air heater. Routine quality control procedures included daily leak checks of the sampling system and calibration of the analyzers using standard compressed gas certified by the manufacturer to have an accuracy within 2 percent of the stated value.

Replicate calibrations were monitored as a measure of instrument precision. Precision was generally less than 2 percent. Data were corrected for instrument drift for the few occasions that precision exceeded 2 percent. The relative accuracy of NO_x, O_2 and CO_2 was evaluated using wet chemical analyses using EPA Reference Methods. NO_x concentrations were determined using grab samples collected in glass sample flasks in accordance with Method 7. Sampling was performed by EER and the analysis was performed by Truesdail Laboratories. Truesdail also analyzed the grab samples for CO_2 and O_2 using Method 3. Results of the relative accuracy measurement are shown in Tables B-1 and B-2. Relative accuracy of the NO_x emission rate in terms of $lbs/10^6$ Btu were well within the EPA performance specifications for continuous monitors of 20 percent. Some of the data for NO_x, O_2, and CO_2 on an as measured basis showed substantial differences compared to the continuous monitors. Those differences are due to gas stratification in the exhaust ducts. The Method 7 flasks obtain a grab sample at a single location over a period of a few seconds. Each of the twelve flasks collected at each boiler were obtained at different points in an attempt to obtain a representative sample. As can be seen in Table B-1, flasks collected in the west duct showed an O_2 concentration very close to the monitors, while the east duct samples showed a large difference, apparently due to variations in O_2 concentration between the two ducts. This variation was the cause of the apparent poor relative accuracy for O_2. Similar results were seen in Table B-2. Although the overall NO_x emission rate showed good instrument accuracy, the NO_x and O_2 concentrations showed poor accuracy apparently due to gas stratification at the sample points.

TABLE B-1. CONTINUOUS MONITORS RELATIVE ACCURACY CALCULATION
12-11-84 COMANCHE

	NO_x (ppm)				O_2 (%)			CO_2 (%)			NO_x (lbs/10^6 Btu)			
Time	RM	AVG RM	M	DIFF	RM	M	DIFF	RM	M	DIFF	RM	M	DIFF	
0902	--		422		2.2	2.65	0.45	16.7	17.02	0.32				Grab Samples From West Duct
0904	366	420		2	3.6		0.95	16.3		0.72	0.567	0.564	0.003	
0907	473				2.7		0.05	16.4		0.62				
0912	431				2.3		0.35	16.6		0.42				
0915	456	410		12	2.1		0.55	17.0		0.02	0.540	0.564	0.024	
0923	342				2.8		0.15	16.2		0.82				
1003	411		394		5.7	2.62	3.08	14.6	16.53	1.93				Grab Samples From East Duct
1006	410	407		13	3.9		1.28	15.3		1.23	0.614	0.525	0.089	
1008	399				4.7		2.08	14.8		1.73				
1012	337				4.2		1.58	14.9		1.63				
1021	411	377		17	4.3		1.68	14.9		1.63	0.562	0.525	0.037	
1023	384				5.2		2.58	14.9		1.63				
Avg		404		11	3.6		1.23	15.7		1.06	0.571		0.038	
Confidence Coefficient				10			0.63			0.41			0.058	
Relative Accuracy				5.2			51.7			9.4			16.8	

TABLE B-2. CONTINUOUS MONITORS RELATIVE ACCURACY CALCULATION
WYODAK 2-4-85

NO_x (ppm)					O_2 (%)			CO_2 (%)			NO_x (lbs/10^6 Btu)		
Time	RM	Avg RM	M	DIFF	RM	M	DIFF	RM	M	DIFF	RM	M	DIFF
1603	287	283	324	41	5.3	3.78	1.52	14.8	15.58	0.78	0.415	0.461	0.046
1609	279				3.3		0.48	15.8		0.22			
1614	290	292		32	5.5		1.72	15.6		0.02	0.431		0.030
1616	283				3.6		0.18	14.0		1.58			
1617	304				4.1		0.32	14.9		0.68			
1620	279	292		32	4.6		0.82	15.3		0.28	0.430		0.031
1620	304				4.1		0.32	14.9		0.68			
1623	261	275		49	5.5		1.72	14.7		0.88	0.417		0.044
1625	279				5.3		1.52	14.9		0.68			
1626	284				3.7		0.08	15.3		0.28			
Avg		285.5		38.5	4.5		0.87	15.0		0.61	0.423		0.038
Confidence Coefficient				13.0			0.49			0.32			0.013
Relative Accuracy				18.0			30.2			6.2			12.1

Quality assurance of the solids analysis by EER and Hagen includes analyses of audit samples provided by the EPA EMSL for coal. Figures B-1, B-2, and B-3 show the results of these analyses in terms of quality control charts.

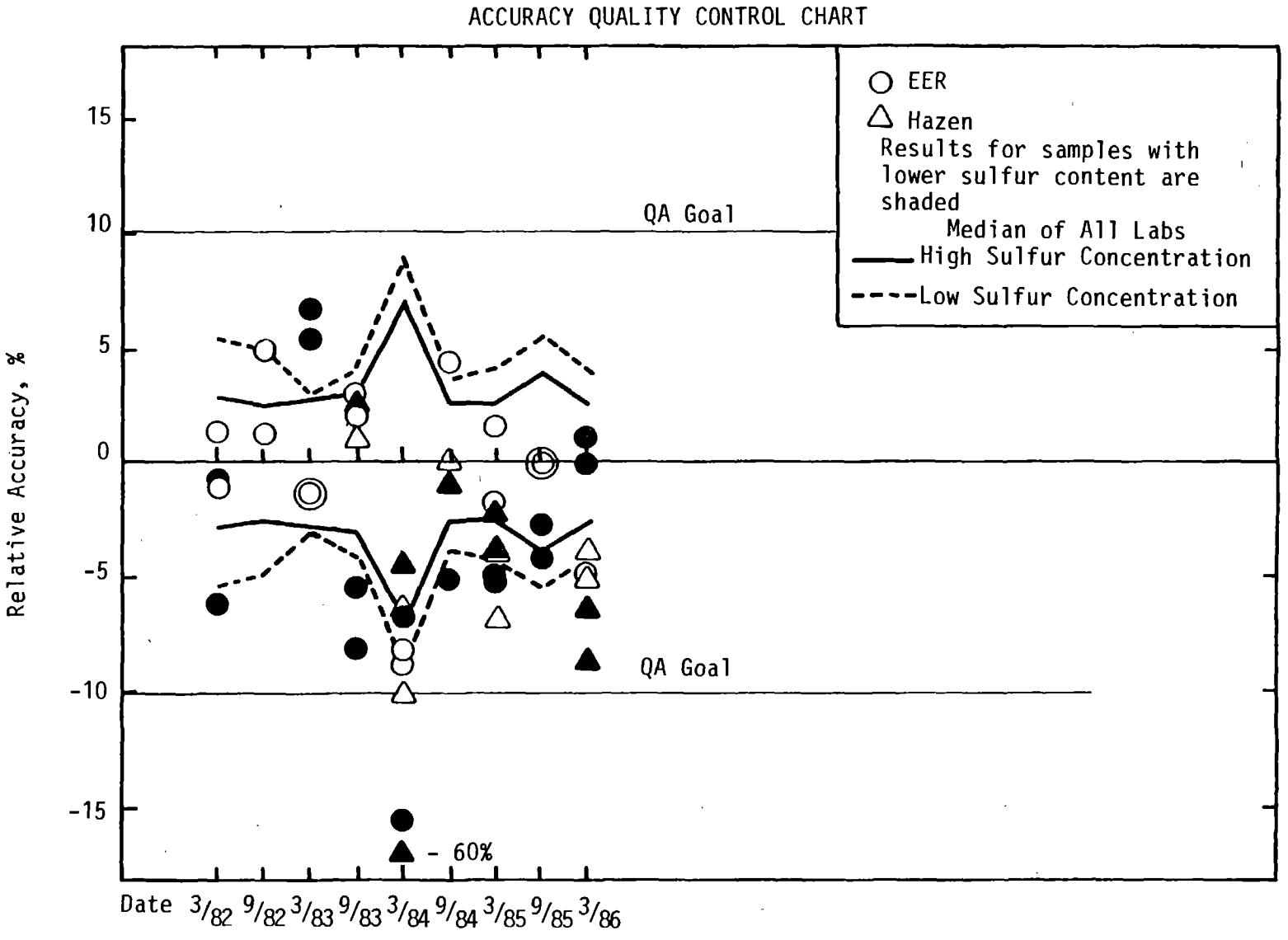


Figure B-1. EPA EMSL coal audit sulfur analysis.

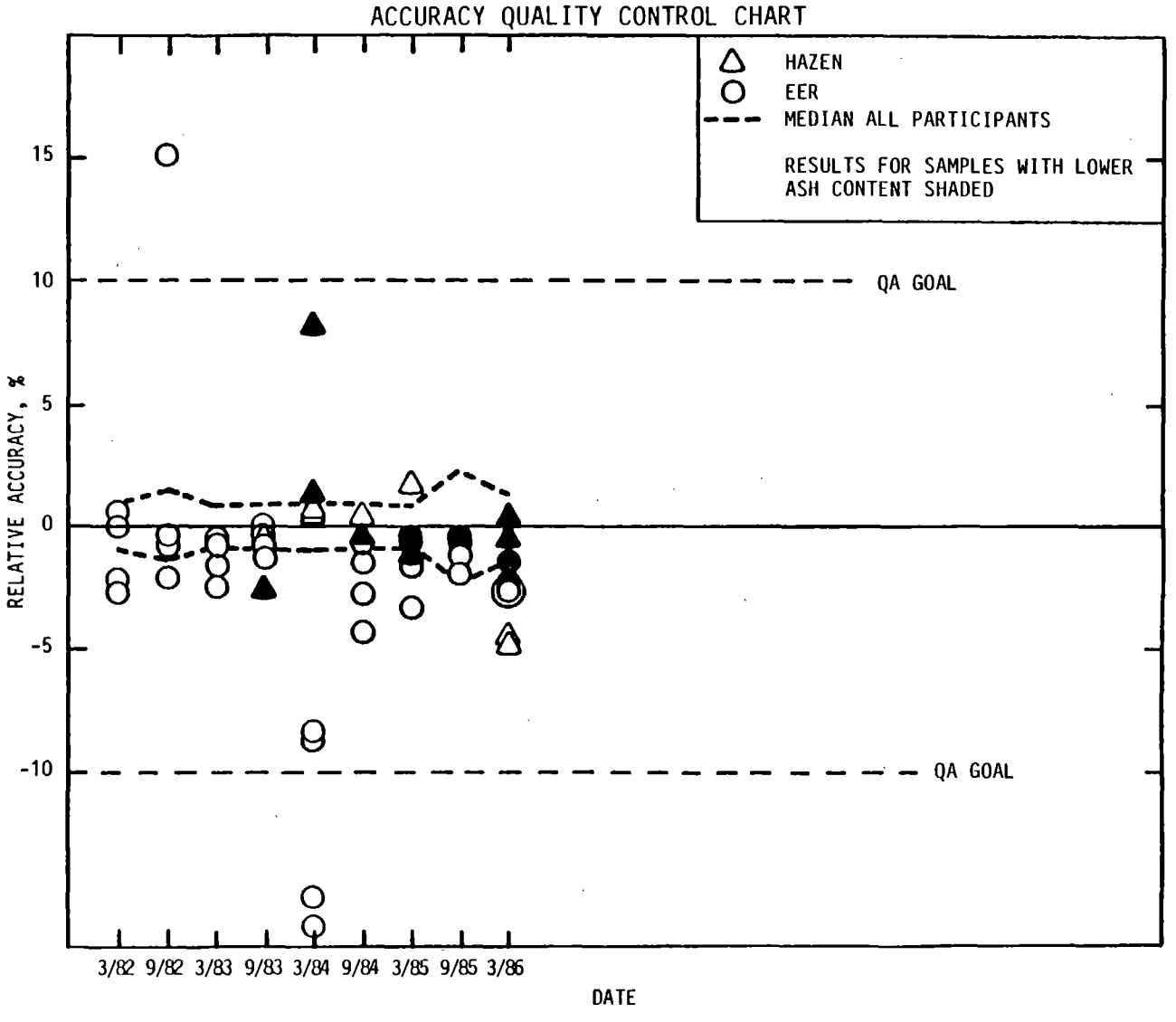


Figure B-2. EPA coal audit ash analysis.

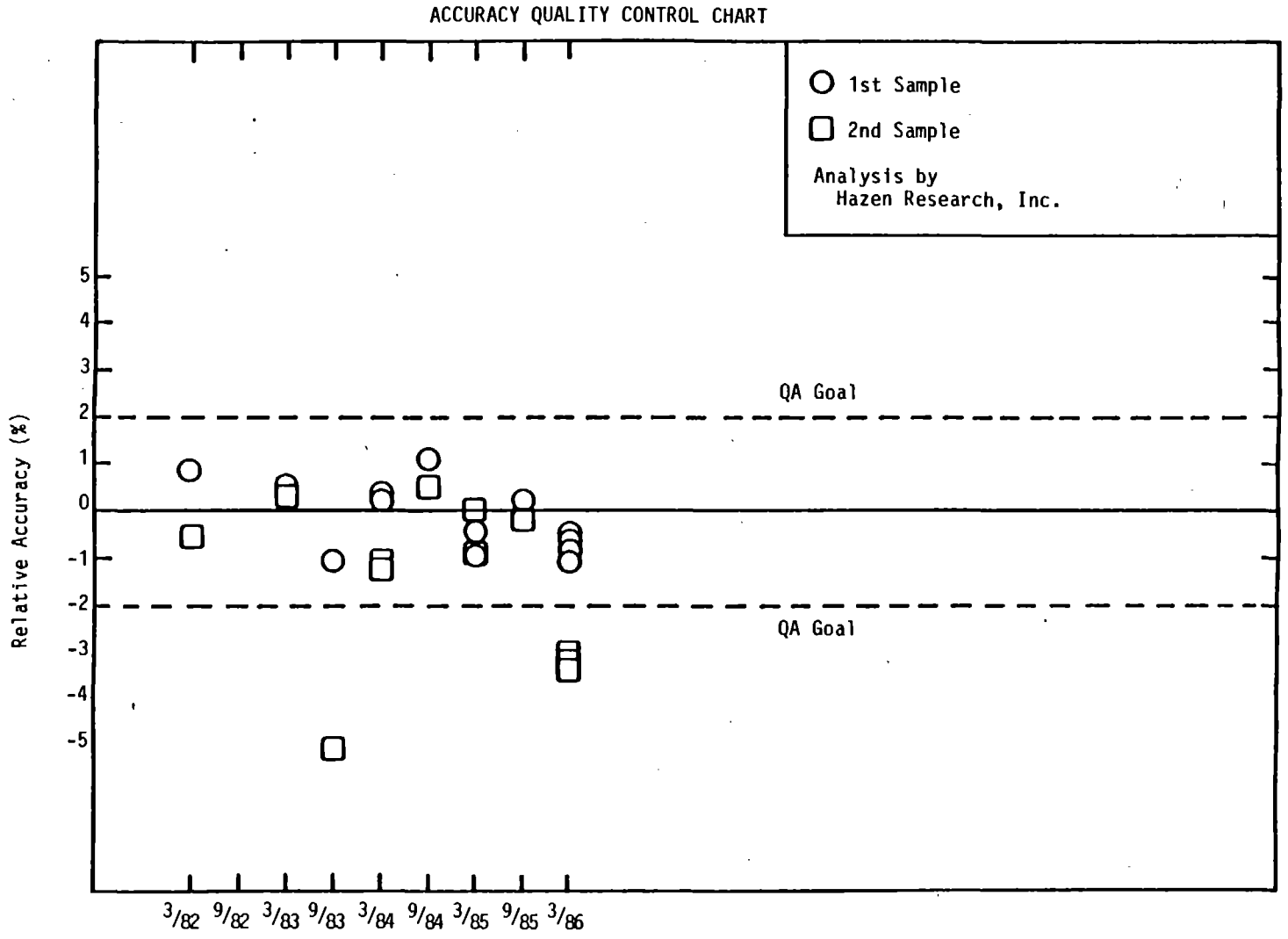


Figure B-3. EPA EMSL coal audit heating value analysis.

REPORT

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CLIENT: Energy and Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705
Attention: Jim Reese

DATE: December 21, 1984
RECEIVED: November 16, 1984

SAMPLE: Preparation and shipment of NO_x Flasks to Pueblo, Co.

P.O. No. 28219

LABORATORY NO. 00358

INVESTIGATION: Nitrogen Oxides

RESULTS

The submitted samples were analyzed for carbon dioxide (CO_2) and Oxygen (O_2) by Orsat and for nitrogen oxides (NO_x) by phenol disulfonic acid (PDSA) method. The results were as follows:

Sample I.D.	CO_2, %	O_2, %	NO_x, ppm dry
3606	14.9	4.3	411
1439	14.9	4.2	337
1090	14.9	5.2	384
1357	16.3	3.6	366
1377	14.6	5.7	411
1328	14.8	4.7	399
1437	15.3	3.9	410
612	17.0	2.1	456
611	16.6	2.3	431
1193	16.2	2.8	342
3330	16.7	2.2	*
1183	16.4	2.7	473

* Sample lost during analysis

Respectfully submitted,

TRUESDAIL LABORATORIES, INC.

S. Hugh Brown

S. Hugh Brown, Supervisor
Air Pollution Testing

NO_x SAMPLING DATA AND RESULTS

Sample No.	Date	MST Time	V_{oc}-252 (N.U.) Flask Vol Vf (ml)	Initial Barom. Press P_{bar_I} (in Hg)	Initial Man Vacuum $M/_I$ (Cm Hg)	Initial Flask Press P_I (mm Hg)	Initial Flask Temp T_I (°C)	Final Barom. Press P_{bar_F} (in Hg)	Final Man Vacuum M_F (Cm Hg)	Final Flask Press P_F (mm Hg)	Final Flask Temp T_F (°C)	Corr. Sample Vol Vsc (ml)	NO_2 in Sample (µg)	NO_x conc as NO_2, C (lbs/scf)	NO_x conc, C (ppm)
NO_x 1-W 3330	12/11/84	0902	2043	24.75											LOST
NO_x 2-W 1357		0904	2033												364
NO_x 3-W 1183		0907	2076												473
NO_x 4-W 611		0912	2040												431
NO_x 6-W 612		0915	2055												456
NO_x 4-W 1193		0923	2016												342
NO_x 1-E 1377		1003	2035												411
NO_x 2-E 1437		1006	2090												410
NO_x 3-E 1328		1008	2070												397
NO_x 4-E 1439		1012	2051												337
NO_x 5-E 3606		1021	2012												411
NO_x 6-E 1090		1023	1941												384

$$Vsc = 0.3858\ (V_F - 25)\left(\frac{P_F}{T_F} - \frac{P_I}{T_I}\right)$$

$$C\ (lbs/scf) = (6.243 \times 10^{-5})\ m\ /\ Vsc$$

$$C\ (ppm) = C\ (lbs/scf)\ \frac{384.8}{46} \times 10^6$$

REPORT

TRUESDAIL LABORATORIES, INC.

CHEMISTS - MICROBIOLOGISTS - ENGINEERS
RESEARCH - DEVELOPMENT - TESTING

14201 FRANKLIN AVENUE
TUSTIN, CALIFORNIA 92680
AREA CODE 714 • 730-6239
AREA CODE 213 • 225-1564
CABLE: TRUELABS

CLIENT ENERGY AND ENVIRONMENTAL RESEARCH
8001 Irvine Blvd.
Santa Ana, CA 92705
ATTENTION: Jim Reese

DATE February 22, 1985

RECEIVED February 6, 1985

LABORATORY NO. 05516

SAMPLE Preparation of 12 PDSA Flasks-Shipment to Pacific Power and Light Plant in Wyoming
P.O. Number: 28976

INVESTIGATION Nitrogen Oxides

RESULTS

The submitted samples were analyzed for nitrogen oxides (NO_x) by the phenoldisulfonic acid (PDSA) method, and for carbon dioxide (CO_2) and oxygen (O_2) by Orsat. The results were as follows:

Sample I.D.	CO_2, %	O_2, %	NO_x, ppm dry
1460	15.3	4.6	279
3473	14.9	4.1	304
1360	15.6	3.8	302
968	14.7	5.5	261
1413	15.8	3.3	279
1474	14.8	5.3	287
3253	14.2	12.1	250
610	14.0	3.6	283
619	15.3	3.7	284
626	14.9	5.3	279
*613			
1442	15.6	5.5	290

* No sample.

Respectfully submitted,

TRUESDAIL LABORATORIES, INC.

S. Hugh Brown

S. Hugh Brown, Supervisor
Air Pollution Testing

PROJ. NO.: 8516-30
PLANT: WYODAK
CITY: GILLETTE WYOMING

NO_x SAMPLING DATA AND RESULTS

Sample No.	Date	Time	Total −25ml Flask Vol Vf (ml)	Initial Barom. Press P_{bar_I} (in Hg)	Initial Man Vacuum $M/_I$ (Cm Hg)	Initial Flask Press P_I (mm Hg)	Initial Flask Temp T_I (°C)	Final Barom. Press P_{bar_F} (in Hg)	Final Man Vacuum M_F (Cm Hg)	Final Flask Press P_F (mm Hg)	Final Flask Temp T_F (°C)	Corr. Sample Vol Vsc (ml)	NO_2 in Sample (µg)	NO_x conc as NO_2, C (lbs/scf)	NO_x conc, C (ppm)
1A 1474	2/4/85	16:03	2083												
2A 3253	2/4/85	16:07	2005	NO HiSS											
3A 1413	2/4/85	16:09	2059												
1B 613	2/4/85	16:13	2034	NO HiSS											
2B 1442	2/4/85	16:14	2077												
3B 610	2/4/85	16:16	2013												
1C 1460	2/4/85	16:17	2089												
2C 3473	2/4/85	16:20	2009												
3C 1460	2/4/85	16:20	2089												
10/968 886	2/4/85	16:23	2061												
2D 626	2/4/85	16:25	2037												
3D 619	2/4/85	16:26	2029												

$$Vsc = 0.3858\ (V_F - 25)\left(\frac{P_F}{T_F} - \frac{P_I}{T_I}\right)$$

$$C\ (lbs/scf) = (6.243 \times 10^{-5})\ m\ /\ Vsc$$

$$C\ (ppm) = C\ (lbs/scf)\ \frac{384.8}{46} \times 10^6$$

GAS CONCENTRATION CALCULATION

Date 1-31-85 Operator _____ Avg Gas Response, D_{avg}

Test No. 1-31-14 → 1-31- Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
1643	1-31-14 IK 33↕34	33.3	291	356	11.5	35	43	68.3	15.73	19.26	43.5	3.85		50.5	456	558
1647	1-31-15 IK 35↕36	32.7	284	349	14.5	50	62	68.3	15.73	19.32	44.0	3.90		49.0	441	541
1651	16 IK 37↕38	32	277	339	~~14.5~~ 18	~~50~~ 68	~~61~~ 83	68.0	15.66	19.17	43.5	3.85		50.0	451	552
1655	17 IK 39↕40	32	277	343	~~12.5~~ 18	~~40~~ 68	~~50~~ 84	67.7	15.54	19.31	45.5	4.05		49.0	441	546
1700 1713	18 AM soot blow IA↕B	32	277	~~340~~	~~12.5~~ 18	~~40~~ 68	~~49~~ 84	68	15.66	19.23	44	3.90		48.0	431	529
1800	1-31-19 Econo out	32.5	277	341	14.5	44	54	67.5	15.65	19.28	44.5	3.95		47	425	523
1900	1-31-20	33	282	338	17	56	68	68	15.77	18.93	40	3.50		41	364	437
2000	21	32.3	275	340	18	62	76	68	15.77	19.55	45.5	4.05		39.0	344	426
2100	22	35.0	302	376	15	46	58	68	15.77	19.66	46.5	4.15		38.5	339	422
2200	23	32.0	271	340	15	46	58	67.5	15.65	19.62	47.5	4.25		39	344	431
2300	1-31-24	34.0	292	366	13.5	39	49	67.5	15.65	19.62	47.5	4.25		40.5	359	450
2400	1-31-25	32.5	277	349	12	31	40	67	15.52	19.58	48.5	4.35		41	364	459
1:00	1-31-26	33.5	287	360	12	31	39	67	15.52	19.52	48	4.30		44	394	496
2:00	1-31-27	33	282	355	12	31	40	67	15.52	19.58	48.5	4.35		43.5	389	491

B-13

Cal → A/M 30 furnace soot blow test *

coal change

* moderate effect (coal related?) step change in NO_x

GAS CONCENTRATION CALCULATION

Date 2-1-85 Operator D.C.

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	ECON. OUT. LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
0810	2-1-1	33.5	280	354	11.0	35	44	65.8	15.15	19.14	49.0	4.38		46.0	417	527
cal 0835	2-1-2	33.5	280	354	11.0	35	44	66.0	15.20	19.20	49.0	4.38		48.0	438	553
1120	2-1-3	36.2	309	385	10.5	28	35	67.8	15.61	19.45	46.5	4.15		40.2	357	444
12:00 1150 1210	2-1-4	37.5	322	399	10.4	27	34	67.8	15.61	19.34	45.5	4.05		43.5	390	483
13:00 1250	2-1-5	34.2	289	360	10.2	26	33	67.5	15.54	19.36	46.5	4.15		44.0	395	492
1400 1350	2-1-6	36.5	312	386	9.8	24	30	67.5	15.54	19.25	45.5	4.05		46.0	415	515
SO_2 #3 1500	2-1-7	34.2	289	359	9.5	23	28	—	1-	—	46.0	4.1		49.0	446	554
1600	EAST ONLY 2-1-8	—	—	—	10.0	25	31	—	—	—	45.5	4.05		53.2	488	605
SO_2 #4 1615 1635	2-1-9	* strip chart 34.5	292	362	9.2	21	26	—	—	—	45.5	4.05		51.0	466	577
cal																
940 955	SO_2 #1	—			11.0			—			56.0	5.10		455	410	542

GAS CONCENTRATION CALCULATION

Date 2-1 2-2-85 Operator _____

Test No. 2-MD 2-2-7

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	Exhaust LOCATION	NO_x blv			CO or			CO_2 bv			O_2 blv			SO_2 v.o		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	Davg	GA	Ga@0%	Davg	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
1800	2-1-10	34	289	357	11.2	30	36	66.5	15.33	18.94	45.3	4.0		55.5	505	623
19 00	2-1-11	35	299	368	11.0	29	35	68.3	15.78	19.40	44.5	3.92		54.0	490	602
20 00	2-1-12	36	309	383	11.0	29	35	68.0	15.70	19.44	45.7	4.04		53.0	480	594
21 00	2-1-13	34.8	297	365	11.0	29	35	68.0	15.70	19.31	44.5	3.92		54.0	490	602
22 00	2-1-14	36.5	314	388	11.2	30	37	68.0	15.70	19.42	45.5	4.02		55.0	500	618
23 00	2-1-15	34.5	294	364	11.0	29	35	67.8	15.65	19.36	45.5	4.02		59.0	520	643
24 00	2-1-16	34.8	297	367	11.0	29	35	68.0	15.70	19.42	45.5	4.02		58.5	535	661
100	2-2-1	36.7	316	390	11.0	29	35	68.0	15.70	19.42	45.5	4.02		~~64.5~~ 59.5	595	736
2 00	2-2-2	36.5	314	387	11.2	30	36	67.7	15.63	19.27	45.0	3.97		~~64.0~~ 59.0	690	727
3 00	2-2-3	34.5	297	370	11.0	29	36	67.5	15.58	19.41	46.8	4.15		61.0	560	698
4 00	2-2-4	34.9	297	368	11.0	29	35	68	15.70	19.46	45.8	4.05		60.5	555	687
5 00	2-2-5	35.8	307	380	11.0	29	35	68	15.70	19.42	45.5	4.02		60	550	680
6 00	2-2-6	34.5	294	363	11.5	31	38	68.2	15.75	19.43	45.0	3.97		58	530	653
7:00 cal	2-2-7	34.0	289	354	14.0	44	54	68.7	15.88	19.46	44.1	3.87		57.5	525	643

GAS CONCENTRATION CALCULATION

Date 2-2-85 Operator D.C.

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

	TIME	ECON. OUT. LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
	1040	2-2-8	33.5	284	349	12.5	40	50	67.5 ~~68.0~~	15.57	19.12	44.0	3.90		63.0	583	716
*	1112	SO_2 #5 2-2-9	32.5	274	336	13.2	44	54	67.8	15.64	19.21	~~44.0~~	3.90		62.8	581	713
	1130	2-2-10	33.0	279	342	13.5	45	56	68.0	15.69	19.22	43.5	3.85		62.0	~~57~~	701
*	1206	SO_2 #6 2-2-11	33.5	284	347	12.5	40	49	68.0	15.69	19.18	43.2	3.82		61.5	568	694
	1224	2-2-12	35.0	299	368	11.5	35	44	67.5	15.57	19.19	44.6	3.96		65.0	603	743
*	1300 1403	SO_2 #7 2-2-13	35.5 34.2	303 291	373 355	11.5 14.5	35 50	44 62	67.5 67.8	15.57 15.64	19.19 19.10	44.6 43.0	3.96 3.80		65 67.5	603 628	743 767
	1423 ~~1500~~	2-2-14	35.0	299	367	14.8	52	64	68.0	15.69	19.27	44.0	3.90		67.5	628	772
*	1451	SO_2 #8 2-2-15	35.6	305	374	13.5	45	56	67.5	15.57	19.12	44.0	3.90		67.5	628	772

* SO_2 RUN

GAS CONCENTRATION CALCULATION

Date 2-2-85 Operator D.C.

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	ECON. OUT LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
1550	2-2-16	33.8	292	359	14.0	41	51	67.2	15.16	18.49	44.2	3.92		70.5	663	816
1652	2-2-17	34.0	294	362	11.5	29	35	68.5	15.48	19.08	44.6	3.96		68.0	638	786
1752	2-2-18	33.8	292	359	11.8	30	37	69.0	15.60	19.18	44.2	3.92		67.0	628	772
1852	2-2-19	33.5	289	356	11.2	27	33	69.0	15.60	19.22	44.5	3.95		64.5	603	742
1952	2-2-20	35.2	306	376	13.5	39	47	69.4	15.70	19.28	44.0	3.90		61.5	572	703
2052	2-2-21	34.8	302	373	13.0	36	45	69.0	15.60	19.27	45.0	4.00		59.5	552	682
2152	2-2-22	34.5	299	366	14.0	41	50	69.3	15.68	19.19	43.5	3.85		59.0	547	670
2252	2-2-23	35.6	310	383	NO INK	—	—	69.2	15.65	19.31	44.8	3.98		56.5	522	644
2352	2-2-24	33.5	289	356	"	-	-	69.0	15.60	19.22	44.5	3.95		60.5	562	693
0052	2-3-1	33.8	292	359	"	-	-	69.5	15.73	19.37	44.5	3.95		61.0	567	699
0152	2-3-2	33.6	290	357	"	-	-	69.3	15.68	19.31	44.5	3.95		61.5	572	705
0252	2-3-3	35.2	306	379	"	-	-	69.2	15.65	19.39	45.5	4.05		59.7	554	687
0352	2-3-4	32.0	274	345	"	—	-	68.0	15.35	19.37	48.5	4.35		58.5	542	684

GAS CONCENTRATION CALCULATION

Date 2-3-85 Operator D.C

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
0452	2-3-5	33.3	287	357	NO INK	–	–	69.0	15.60	19.41	46.2	4.12		58.5	542	674
0552	2-3-6	33.9	293	360	11	–	–	69.5	15.73	19.31	44.0	3.96		59.5	552	678
0652	2-3-7	31.8	272	336	11	–	–	69.4	15.70	19.39	45.0	4.00		58.5	542	670
0752	2-3-8	32.4	278	342	11	–	–	70.0	15.85	19.52	44.5	3.95		61.0	567	699

GAS CONCENTRATION CALCULATION

Date 2-3-85 Operator D.C

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21) / (21 - \%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
11:00	1058	2-3-9	33.2	282	345	17.5	64	78	67.5	15.62	19.07	42.8	3.80		69.0	648	792
12:00	1152	2-3-10	34.4	294	367	15.5	54	67	67.0	15.50	19.33	46.5	4.17		68.5	643	803
13:00	1252	2-3-11	32.0	270	337	14.0	47	58	66.8	15.45	19.28	46.6	4.18		72.0	679	848
14:00	1352	2-3-12	34.0	290	358	16.0	57	70	67.6	15.64	19.32	44.8	4.00		73.6	695	859
15:00	1452	2-3-13	33.6	286	355	13.0	42	51	67.5	15.62	19.37	45.5	4.07		76.5	725	899
16:00	1552	2-3-14	34.0	290	358	13.0	42	51	67.9	15.72	19.38	44.5	3.97		77.0	730	900
17:00	1652	2-3-15	32.5	275	341	13.0	42	51	67.8	15.69	19.43	45.2	4.04		77.0	730	903
18:00	1752	2-3-16	33.2	282	348	14.0	47	57	68.0	15.74	19.44	44.7	3.99		77.5	735	907
19:00	1852	2-3-17	32.2	272	337	14.0	47	58	67.9	15.72	19.44	45.0	4.02		80.0	760	940
20:00	1952	2-3-18	34.1	291	359	14.5	49	61	68.0	15.74	19.41	44.5	3.97		81.0	770	950
21:00	2052	2-3-19	32.3	273	338	14.0	47	58	68.0	15.74	19.47	45.0	4.02		82.5	785	971
22:00	2152	2-3-20	33.7	287	356	15.0	52	64	67.8	15.69	19.46	45.5	4.07		84.0	801	993
23:00	2252	2-3-21	33.5	285	354	14.5	49	61	67.8	15.69	19.46	45.5	4.07		87.0	831	1031

GAS CONCENTRATION CALCULATION

Date 2-3-85 Operator D.C.

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
2400	2352	2-3-12	32.8	278	347	14.5	49	61	67.5	15.62	19.49	46.5	4.115 / ~~15.62~~		87.0	831	1036
1	0052	2-4-1	33.0	280	349	19.5	74	92	67.5	15.62	19.43	46.0	4.12		87.0	831	1034
2	0152	2-4-2	34.2	292	365	15.0	52	64	67.5	15.62	19.52	46.8	4.20		85.0	811	1014
3	0252	2-4-3	33.0	280	348	14.0	47	58	67.0	15.50	19.28	NO(41) INK	4.12*		84.5	806	1002
4	0352	2-4-4	33.0	280	348	14.5	49	61	67.2	15.55	19.34	"			82.5	785	977
5	0452	2-4-5	31.3	263	327	16.0	57	71	67.5	15.62	19.43	"			82.5	785	977
6	0552	2-4-6	32.6	276	343	16.5	59	73	67.5	15.62	19.43	"			83.0	791	984
7:00	0652	2-4-7	34.5	295	367	13.5	44	55	67.2	15.55	19.34	"			82.0	780	971

* BASED ON CO_2

GAS CONCENTRATION CALCULATION

Date 2-4-85 Operator D.C.

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
-	0938	2-4-8	32.8	272	337	18.0	67	83	67.2	15.45	~~16.49~~ 19.00	45.8	4.07		81.5	774	961
*	1005	SO_2 #9 2-4-9	33.5	279	346	23.0	92	114	67.6	15.55	19.32	46.0	4.09		81.0	769	955
	1020	2-4-10	33.6	280	347	16.5	59	73	67.5	15.53	19.23	45.5	4.04		80.8	759	940
*	1054	SO_2 #10 2-4-11	33.4	278	345	15.5	54	67	67.5	15.53	19.29	46.0	4.09		80.0	759	943
	1109	2-4-12	33.5	279	345	15.0	52	64	67.5	15.53	19.23	45.5	4.04		78.0	739	915
*	1143	SO_2 #11 2-4-13	34.5	289	355	15.0	52	64	67.8	15.60	19.21	44.5	3.94		76.5	724	891
	1224	2-4-14	35.5	299	368	15.0	52	64	68.5	15.78	19.42	44.5	3.94		74.0	698	860
-	1316	2-4-15	33.5	279	343	13.0	42	51	68.5	15.78	19.42	44.5	3.94		70.5	663	816
*	1402	SO_2 #12 2-4-16	34.8	292	359	13.0	42	51	69.0	15.90	19.60	44.7	3.96		65.0	607	748
	1422	2-4-17	35.5	299	370	11.5	34	42	NO INK	—	—	45.5	4.04		62.5	582	720
	1500 1546	2-4-18	36 31.8	303 262	376 326	11.6 11.0	31 31	38 39	67.0	15.40	19.19	46 46.5	4.09 4.14		60 60.5	556 562	690 699

* SO_2

DUP

GAS CONCENTRATION CALCULATION

Date 2-4-85 Operator D.C.

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s/(S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

			NO_x			CO			CO_2			O_2			SO_2		
	TIME	LOCATION	D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
2-4-19 *	1603	NOx SET "A"	37.5	324	395	10.8	29	36	67.5	~~15.58~~	19.00	43.0	3.78		63.5	592	722
2-4-20 *	1612	SET "B"	38.0	329	397	10.5	28	34	69.0	15.95	19.25	41.2	3.60		64.8	605	731
2-4-21 *	1617	SET "C"	37.9	328	400	11.2	31	38	68.8	15.90	19.42	43.2	3.80		62.0	577	705
2-4-22 *	1623	SET "D"	38.2	331	405	11.0	30	37	67.7	15.63	19.15	43.8	3.86		61.5	572	701

* NO_x SETS

GAS CONCENTRATION CALCULATION

Date 2-4-85 Operator D. C.

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s/(S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
* 1603	NOx SET "A" 2-4-19	37.5	324	395	10.8	29	36	67.5	15.58	19.00	43.8	3.78		63.5	592	722
* 1612	NOx SET "B" 2-4-20	38.0	329	397	10.5	28	34	69.0	15.95	19.25	41.2	3.60		64.8	605	731
* 1617	NOx SET "C" 2-4-21	37.9	328	400	11.2	31	38	68.8	15.90	19.42	43.2	3.80		62.0	577	705
* 1623	NOx SET "D" 2-4-22	38.2	331	405	11.0	30	37	67.7	15.63	19.15	43.8	3.86		61.5	572	701
1626	2-4-23	37.2	315	387	12.0	37	45	68.3	15.73	19.31	44.0	3.89		60.5	562	690
1700		36.8	316	388	12.0	36	44	67.6	15.61	19.16	44	3.89		59	558	685
1720	2-4-24	36.8	316	387	12.0	36	43	67.6	15.61	19.10	43.7	3.84		58.5	553	676
1850	2-4-25	37.5	323	395	14.5	48	59	69.0	15.96	19.51	43.5	3.82		55.0	516	631
1950	2-4-26	36.5	313	384	11.5	33	40	69.0	15.96	19.57	44.0	3.87		53.5	501	614
2050	2-4-27	36.5	313	380	12.5	38	46	69.5	16.09	19.49	42.0	3.67		54.0	506	613
2150	2-4-28	35.0	298	364	11.0	30	37	69.0	15.96	19.48	43.2	3.79		50.0	465	567
2250	2-4-29	36.6	314	383	11.0	30	37	69.0	15.96	19.45	43.0	3.77		48.5	449	548
2350	2-4-30	36.0	308	379	10.6	28	35	68.5	15.84	19.47	44.5	3.92		46.0	423	521
0050	2-5-1	36.0	308	377	11.2	31	38	69.0	15.96	19.51	43.5	3.82		47.0	434	530

B=23 NO STARTS

* NO_x SETS

GAS CONCENTRATION CALCULATION

Date 2-5-85 Operator D.C.

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
0150	2-5-2	35.5	303	373	10.8	29	36	68.5	15.84	19.47	44.5	3.92		46.5	429	527
0250	2-5-3	36.5	313	381	11.0	30	37	69.0	15.96	19.43	42.8	3.75		48.0	444	541
0350	2-5-4	37.8	326	396	NO INK	—	—	69.0	15.96	19.38	42.4	3.71		50.0	465	564
0450	2-5-5	36.0	308	374	11	—	—	69.0	15.96	19.34	42.0	3.67		48.5	449	544
0550	2-5-6	36.4	312	378	NO INK	—	—	69.2	16.01	19.40	NO INK	(3.67)*		47.0	434	526
0650	2-5-7	36.5	313	380	11	—	—	69.2	16.01	19.40	11	(3.67)*		48.5	449	544

* PASSED INTO CO_2

GAS CONCENTRATION CALCULATION

Date 2-5-85 Operator D.C

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21) / (21 - \%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
0850	2-5-8	35.0	299	363	11.2	34	42	67.8	15.60	18.94	42.0	3.70		52.0	473	574
0950	2-5-9	34.8	297	360	11.5	36	44	68.0	15.65	18.95	41.6	3.66		51.0	463	561
1050	2-5-10	35.8	307	374	10.5	31	38	68.6	15.80	19.24	42.6	3.76		50.5	458	558
1150	2-5-11	36.3	312	379	10.6	31	38	69.0	15.90	19.30	42.0	3.70		49.0	443	537
1250	2-5-12	35.6	305	371	10.0	28	35	69.2	15.95	19.41	42.5	3.75		52.5	478	582
1350	2-5-13	36.0	309	375	9.9	28	34	70.5	16.27	19.75	42.0	3.70		55.0	503	611
* 1450	ANDERSEN-1 2-5-14	36.5	314	385	9.0	23	29	69.0	15.90	19.50	43.8	3.88		62.5	579	710
1550	2-5-15	34.4	293	360	9.9	28	34	69.0	15.90	19.52	44.0	3.90		68.5	639	785
1700		38	330	402	11.5	30	37	68	15.38	18.76	43	3.78		65	601	733
1750	2-5-16	37.0	320	391	12.2	34	41	69.4	15.72	19.17	43.0	3.78		64.5	596	726
1850	2-5-17	37.9	329	402	11.5	30	37	70.0	15.86	19.37	43.2	3.80		63.5	586	715
1950	2-5-18	37.5	325	397	11.7	31	38	70.2	15.91	19.41	43.0	3.78		68.0	631	769
2050	2-5-19	39.3	343	420	11.2	29	35	70.0	15.86	19.40	43.5	3.83		72.0	671	820
2150	2-5-20	33.2	282	347	12.5	35	44	69.5	15.74	19.37	44.5	3.93		75.0	701	862

* ANDERSEN

GAS CONCENTRATION CALCULATION

Date 2-5-85 Operator D.C.

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

			NO_x			CO			CO_2			O_2			SO_2		
	TIME	LOCATION	D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
2/5	2250	2-5-21	34.6	296	364	15.0	48	59	70.0	15.86	19.48	44.2	3.90		77.0	721	885
	2350	2-5-22	34.2	292	362	12.3	34	43	69.8	15.82	19.57	45.5	4.03		77.5	726	898
	0050	2-6-1	32.7	277	341	14.5	45	56	69.9	15.84	19.49	44.5	3.93		77.0	721	887
	0150	2-6-2	32.4	274	338	12.5	35	44	70.0	15.86	19.57	45.0	3.98		76.0	711	877
	0250	2-6-3	32.7	277	341	14.5	45	56	70.3	15.94	19.62	44.6	3.94		73.5	686	844
2/6	0350	2-6-4	33.4	284	349	13.0	38	46	70.5	15.99	19.61	44.0	3.88		74.0	691	847
	0450	2-6-5	34.2	292	362	13.5	40	50	70.2	15.91	19.69	45.5	4.03		73.0	681	843
	0550	2-6-6	32.2	272	336	13.0	38	47	70.2	15.91	19.63	45.0	3.98		73.0	681	840
	0650	2-6-7	31.8	268	331	13.0	38	47	70.0	15.86	19.57	45.0	3.98		70.0	651	803
100	0934	2-6-8	31.1	268	321	12.5	40	50	67.0	14.95	18.46	45.2	4.00		71.0	668	825
	1100	2-6-9	30.5	254	315	12.8	42	52	68.8	15.38	19.07	45.8	4.06		75.0	708	878
	1150	2-6-10	31.0	259	318	13.0	43	53	68.5	15.31	18.83	44.5	3.93		76.5	724	890
	1115	2-6-11	31.8	267	330	13.5	45	56	68.2	15.24	18.85	45.5	4.03		80.0	759	939

D off

GAS CONCENTRATION CALCULATION

Date 2-6-85 Operator D.C.

Test No.

STRATIFICATION TEST

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
0934	ALL PROBES 2-6-85	31.1	260	321	12.5	40	50	67.6	14.95	18.46	45.2	4.00		71.0	668	825
1003	Long PROBE #1	29.5	244	300	10.6	31	38	67.5	15.07	18.57	44.8	3.96		78.0	739	911
1010	PROBE #2	30.5	254	300	11.2	34	40	70.0	15.67	18.52	37.5	3.23		—		
1014	Long PROBE #3	31.8	267	342	10.3	29	37	65.2	14.51	18.62	51.6	4.64		74.0	698	896
1021	PROBE #4	~~32.2~~ 33.0	271	334	~~11.5~~ 12.4	35	43	68.7	15.36	18.95	45.0	3.98		79.5	754	930
1025	Long PROBE #5	~~33.0~~ 32.2	279	365	12.4	40	52	64.0	14.22	18.63	55.0	4.97		—		
1031	PROBE #6	31.4	263	333	11.5	35	45	66.4	14.80	18.75	49.5	4.43		—		
1035	Long PROBE #7	31.8	267	335	16.0	58	73	67.5	15.07	18.92	48.0	4.28		—		
1041	PROBE #8	32.2	271	344	11.0	33	41	67.5	15.07	19.15	50.0	4.48		—		
1100	ALL PROBES EX. 3&4 2-6-85	30.5	254	315	12.8	42	52	68.8	15.38	19.07	45.8	4.06		75.0	708	878

GAS CONCENTRATION CALCULATION

Date 2-6-85 Operator D.C.

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
1300	2-6-12	32.0	269	330	12.5	40	49	69.5	15.55	19.07	44.0	3.88		89.5	855	1049
1400	2-6-13	32.5	274	337	12.5	40	50	68.2	15.24	18.77	44.8	3.96		87.0	830	1023
1500	2-6-14	32.0	269	331	12.5	40	50	68.5	15.31	18.86	44.8	3.96		93.5	896	1104
1600	2-6-15	31.8	267	328	11.5	35	43	69.2	15.48	19.04	44.5	3.93		93.0	891	1096
1800	2-6-16	34.0	289	357	15.5	55	69	67.2	14.99	18.55	45.5	4.03		83.0	794	982
1900	2-6-17	31.5	264	327	13.5	45	56	67.2	14.99	18.61	46.0	4.08		80.0	763	947
2000	2-6-18	33.6	285	354	13.6	46	57	67.2	14.99	18.66	46.5	4.13		82.5	788	981
2100	2-6-19	32.0	269	335	14.5	50	63	67.0	14.95	18.63	46.8	4.16		85.0	814	1015
2200	2-6-20	32.8	277	345	16.0	58	72	67.2	14.99	18.66	46.5	4.13		82.5	788	981
2300	2-6-21	31.8	267	332	15.5	55	69	67.5	15.07	18.75	46.5	4.13		82.0	783	975
2400	2-6-22	33.0	279	348	15.3	54	68	67.5	15.07	18.79	46.8	4.16		81.5	778	971
0100	2-7-1	32.8	276	343	15.5	44	54	67.5	15.56	19.33	45.8	4.10		80.0	763	948
0200	2-7-2	31.8	266	330	15.5	44	54	67.8	15.64	19.39	45.5	4.07		82.0	783	972

GAS CONCENTRATION CALCULATION

Date 2-7-85 Operator D.C.

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
0300	2-7-3	32.0	268	332	16.5	49	60	67.8	15.64	19.39	45.5	4.07		81.5	778	965
0400	2-7-4	30.3	251	311	18.0	56	69	68.0	15.69	19.46	45.5	4.07		83.0	794	984
0500	2-7-5	30.6	254	316	18.0	56	70	67.8	15.64	19.43	45.8	4.10		85.5	819	1018
0600	2-7-6	31.2	260	321	18.5	58	72	68.0	15.69	19.40	45.0	4.02		87.0	834	1032
0700	2-7-7	30.8	256	316	17.5	54	66	68.3	15.76	19.49	45.0	4.02		90.0	865	1069

GAS CONCENTRATION CALCULATION

Date 2-7-85 Operator D. C.

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	Davg	GA	Ga@0%	Davg	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
1100		30.5	254	313	16	58	72	62.5	15.81	19.51	45	3.98		83	799	986
1200	2-7-8	29.8	247	302	18.0	68	84	68.5	16.06	19.64	43.5	3.83		75.0	717	877
1300		31	259	323	10.5	30	37	—	—	—	46	4.18		72	687	857
1400	2-7-9	31.0	259	320	10.0	28	34	67.0	15.68	19.35	45.0	3.98		75.0	717	885
1600	2-7-10	31.8	265	326	14.0	40	50	67.0	15.12	18.62	44.2	3.95		90.0	866	1067
1700	2-7-11	32.0	267	327	13.5	38	46	68.4	15.47	18.97	43.5	3.88		99.0	958	1175
1800	2-7-12	32.0	267	327	13.5	38	46	69.5	15.73	19.30	43.5	3.88		99.0	958	1175
1900	2-7-13	32.8	275	336	14.5	43	52	70.0	15.86	19.37	42.8	3.81		98.5	953	1164
2000	2-7-14	32.8	275	337	14.5	43	52	69.5	15.73	19.30	43.5	3.88		95.0	917	1125
2100	2-7-15	32.2	269	330	14.5	43	52	69.5	15.73	19.30	43.5	3.88		95.0	917	1125
2200	2-7-16	30.4	251	313	14.0	40	50	68.2	15.42	19.25	46.5	4.18		NO INK	—	—
* 2300	2-7-17	23.0	177	285	11.8	29	47	58.0	12.92	20.78	84.0	7.94		NO INK	—	—

* PLANT GOING DOWN

GAS CONCENTRATION CALCULATION

Date 2-10-85 Operator _____

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	Econoy outlet LOCATION	NO blue			CO orange			CO_2 brown			O_2 black			SO_2 violet		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
11:00	2-10-11	31.5	263	326	11.0	35	43	67.8	15.65	19.24	44.5	3.91		71.5	675	830
12 00	2-10-12	32	270	333	10.3	31	39	67.0	15.45	19.05	45.0	3.96		68.5	645	795
13 00	2-10-13	32.5	275	339	10.3	31	39	67.8	15.65	19.27	44.8	3.94		67.8	638	785
14 00	2-10-14	34.0	290	358	9.8	29	36	67.8	15.65	19.29	45.0	3.96		67.0	630	776
15 00	2-10-15	32.5	275	343	9.0	25	31	67.2	15.50	19.31	46.8	4.14		67.0	630	784
16 00	2-10-16	33.0	280	346	8.5	22	28	68.5	15.83	19.57	45.5	4.01		67.2	632	781
17 00	2-10-17	32.5	275	339	7.2	16	20	69.0	15.95	19.64	44.8	3.94		67.8	638	785
18 00	2-10-18	31.5	265	327	8.0	20	25	69.0	15.95	19.69	45.2	3.98		66.8	628	774
19 00	2-10-19	33.8	288	352	9.0	25	30	69.5	16.08	19.65	43.5	3.81		65.0	609	744
20 00	2-10-20	33.5	285	354	6.8	14	17	69.0	15.95	19.78	46.0	4.06		64.5	604	749
21 00	2-10-21	32.8	278	343	7.0	15	18	68.8	15.90	19.60	45.0	3.96		64.5	604	745
22 00	2-10-22	34.5	295	368	7.0	15	19	68.3	15.78	19.68	47.0	4.16		62.5	584	728
23 00	2-10-23	33.5	285	357	6.8	14	17	68.0	15.70	19.64	47.5	4.21		62.0	579	724
24 00	2-10-24	32.5	275	342	6.9	14	18	68.5	15.83	19.65	46.2	4.08		60.5	564	699

GAS CONCENTRATION CALCULATION

Date 2-11-85 Operator _____

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	Exhaust Out LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
1:00	2-11-1	33	280	348	7.5	17	22	68.0	15.70	19.53	46.5	4.11		58.5	543	675
2:00	2-11-2	32.8	278	346	7.5	17	22	67.5	15.58	19.37	46.5	4.11		55.8	516	641
3:00	2-11-3	34.1	291	362	7.8	19	24	67.8	15.65	19.46	46.5	4.11		53.0	487	606
4:00	2-11-4	32.9	279	348	8.0	20	25	67.8	15.65	19.52	47.0	4.16		51.3	470	586
5:00	2-11-5	34.5	295	366	8.2	21	26	68.0	15.70	19.49	46.2	4.08		48.5	442	548
6:00	2-11-6	33.0	280	349	8.6	23	29	68.0	15.70	19.56	46.8	4.14		47.8	435	541
7:00	2-11-7	33.5	285	357	9.2	26	32	67.8	15.65	19.61	47.8	4.24		48.5	442	553

STRATIFICATION GAS CONCENTRATION CALCULATION

Date 2-11-85 Operator D.C.

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
2-11-14	1500	ECON. OUT ALL PROBES	31.5	265	329	14.0	41	51	68.0	15.76	19.53	45.5	4.05		51.2	471	583
	1512	PROBE 1	—			17.0	56	69	67.5	15.64	19.32	45.0	4.00		54.0	499	617
	1518	PROBE 2	32.6	276	327	15.0	46	54	71.0	16.51	19.53	37.5	3.25		—		
	1522	PROBE 3	31.5	265	363	11.5	29	39	61.0	14.01	19.17	61.5	5.65		48.5	443	606
	1525	PROBE 4	32.8	278	338	13.0	36	44	69.0	16.01	19.44	42.0	3.70		54.8	507	616
	1530	PROBE 5	32.5	275	356	15.0	46	59	65.0	15.01	19.40	52.5	4.75		—		
O2 ONLY	1534	PROBE 6	—	—	—	—	—	—	~~63.5~~	—	—	51.5	4.68		—		
	1536	PROBE 7	34.2	292	355	19.5	68	83	67.5	15.64	18.98	42.0	3.70		—		
	NO	PROBE 8	—			—			—			—			—		
2-11-15	1614	ALL PROBES	33.5	285	356	13.5	39	48	66.0	15.26	19.05	46.8	4.18		52.8	487	608

GAS CONCENTRATION CALCULATION

Date 2-11-85 Operator D.C.

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
0900	ECON. OUT 2-11-8	34.0	290	361	11.4	28	35	67.5	15.64	19.46	46.3	4.13		57.8	535	666
~~0900~~ 1000	2-11-9	32.8	278	345	12.2	32	40	67.8	15.71	19.50	45.8	4.08		59.0	550	683
~~1000~~ 1100	2-11-10	33.3	283	350	12.4	33	41	68.0	15.76	19.47	45.0	4.00		58.5	545	673
~~1100~~ 1200	2-11-11	34.2	292	366	12.5	34	42	67.0	15.51	19.46	47.6	4.26		53.0	489	613
~~1200~~ 1300	2-11-12	31.8	268	334	12.6	34	42	67.5	15.64	19.49	46.5	4.15		52.5	484	603
~~1300~~ 1400	2-11-13	31.8	268	334	13.5	39	48	67.5	15.64	19.49	46.5	4.15		52.5	484	603
~~1400~~ 1500	2-11-14	31.5	265	329	14.0	41	51	68.0	15.76	19.53	45.5	4.05		51.2	471	583
~~1500~~ 1614	2-11-15	33.5	285	356	13.5	39	48	66.0	15.26	19.05	46.8	4.18		52.8	487	608
1700 1800	2-11-16	32 33.0	269 279	332 348	15.0 15.0	50 50	62 62	67.5 67.5	15.58 15.58	19.23 19.43	45.0 46.8	3.99 4.16		50.0 46.0	454 414	561 516
1900	2-11-17	32.0	269	336	13.5	43	53	67.5	15.58	19.43	46.8	4.16		46.0	414	516
2000	2-11-18	31.6	265	330	12.5	38	47	67.8	15.65	19.49	46.5	4.13		46.5	419	521
2100	2-11-19	33.5	284	354	11.5	33	41	68.0	15.70	19.55	46.5	4.13		45.0	404	503
2200	2-11-20	33.5	284	357	11.0	30	38	67.5	15.58	19.54	47.8	4.26		43.5	389	487

GAS CONCENTRATION CALCULATION

Date 2-11-91 Operator D. C

Test No.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
2300	ECON. OUT 2-11-21	32.5	274	342	11.5	33	41	67.8	15.65	19.49	46.5	4.13		42.8	381	475
2400	2-11-22	33.5	284	355	11.0	30	37	67.8	15.65	19.52	46.8	4.16		41.8	371	463
0100	2-12-1	32.3	272	340	11.5	33	41	67.5	15.58	19.43	46.8	4.16		41.5	368	459
0200	2-12-2	31.5	264	330	12.0	35	44	67.5	15.58	19.43	46.8	4.16		41.0	363	453
0300	2-12-3	32.2	271	339	14.0	45	56	67.5	15.58	19.45	47.0	4.18		40.8	361	451
0400	2-12-4	32.0	269	336	12.0	35	44	67.8	15.65	19.52	46.8	4.16		40.8	361	451
0500	2-12-5	34.0	289	361	11.3	32	39	67.5	15.58	19.43	46.8	4.16		40.5	358	447
0600	2-12-6	31.5	264	329	12.3	37	46	67.8	15.65	19.49	46.5	4.13		41.5	368	459
0700	2-12-7	32.5	274	342	11.8	34	42	68.0	15.70	19.55	46.5	4.13		41.5	368	459

GAS CONCENTRATION CALCULATION

Date 2-12-85 Operator _____ Avg Gas Response, D_{avg}

Test No. 2-13-85 Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
21:00	2-12-21	unit off line						—								
22:00	2-12-22	unit off line						—								
23:00	2-12-23	increasing load						—								
24:00	2-12-24	27.8	228	278	26	101	123	—			43.5	3.82		60.5	561	686
1:00	2-13-1	28.0	230	281	28	111	136	—	knocked off line when unit went down		44.0	3.87		59.2	548	671
2:00	2-13-2	29.0	240	295	25	96	118	—			44.5	3.92		58.2	538	661
3:00	2-13-3	28.5	235	289	24	91	112	—			45.0	3.97		58.5	541	667
4:00	2-13-4	30.6	255	317	19.5	68	85	—			45.8	4.05		61.0	566	701
5:00	2-13-5	29.9	249	307	18.0	61	75	—			45.5	4.02		61.8	574	710
6:00	2-13-6	31.2	261	323	19.0	66	82	—			45.5	4.02		62.5	581	719
7:00	2-13-7	30.0	250	308	16.0	51	63	—			45.3	4.00		65.8	614	759

GAS CONCENTRATION CALCULATION

Date 2-12-85 Operator _____ Avg Gas Response, D_{avg}

Test No. Wyodak Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	Econo Out LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
8:20	2-12-8	33.8	288	357	14	46	57	66.5	15.22	18.89	46.0	4.08		42.5	376	467
9:00	2-12-9	32.0	270	333	12	36 ~~39~~	44 720	66.8	15.30	18.87	45.0	3.98		43.0	381	470
10 00	2-12-10	33.3	283	348	16	56	69	67.5	15.47	19.03	44.5	3.93		43.1	382	470
11 00	2-12-11	34.0	290	356	17	61	75	68.2	15.64	19.19	44.0	3.88		44.8	439	539
12 00	2-12-12	32.2	272	331	16	56	68	68.0	15.60	18.99	42.8	3.76		55.0	502	611
13 00	2-12-13	31.8	268	325	25	101	124	68.5	15.72	19.06	42.0	3.68		65.0	602	730
14 00	2-12-14	32.0	270	327	27	111	134	68.5	15.72	19.06	42.0	3.68		69.5	640	785
15 00	2-12-15	32.0	270	329	18	66	80	69.0	15.84	19.32	43.0	3.78		70.5	658	802
16 26	2-12-16	31.8	267	326	19	66	81	68.5	15.83	19.38	43.8	3.85		75.5	712	872
17 00	2-12-17	31.5	264	323	19	66	81	68.5	15.83	19.35	43.5	3.82		73.5	692	846
18 00	2-12-18	unit off line														
19 00	2-12-19	unit off line														
20 00	2-12-20	unit off line														

GAS CONCENTRATION CALCULATION

Date 2-13-85 Operator _____ Avg Gas Response, D_{avg}

Test No. _____ Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

MWe	TIME	Econo Out LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
319.5 294.3	9:00	2-13-9	28	230	295	13.5	42	54	65	15.09	19.33	51.5	4.61		65.0	607	778
273 275	10:00	2-13-10	25.2	202	258	11.3	31	40	63.3	14.66	18.76	51.3	4.59		65.5	612	784
275 272	11:00	2-13-11	25.2	202	260	10.8	29	37	64.5	14.97	19.23	52.0	4.66		64.7	604	774
270 273	12:44	2-13-12	24.8	198	256	10.5	27	35	64.0	14.84	19.19	53.0	4.76		64.0	597	772
274.8 275.5	1300	2-13-13	25.0	200	256	11.3	30	38	66.2	14.94	19.06	50.4	4.54		64.5	599	765
310 327	14:00	2-13-14	26.5	216	269	13.5	41	51	68.0	15.38	19.22	47.0	4.20		63.5	589	737
366 367	15 00	2-13-15	30.8	259	319	19.0	68	85	69.4	15.72	19.42	45.0	4.00		64.5	599	740
	16 00	2-13-16	30.5	256	316	16	54	66	69.5	15.74	19.45	45.0	4.00		65.5	609	753
	17 00	2-13-17	31.4	256	327	14.0	44	54	69.5	15.74	19.45	45.0	4.00		64.7	601	743
	18 00	2-13-18	31.4	265	327	14.3	45	56	69.5	15.74	19.45	45.0	4.00		66.5	620	765
	19 00	2-13-19	31.5	266	326	17.0	58	72	69.9	15.84	19.46	44.0	3.90		65.0	604	742
	20 00	2-13-20	31.3	264	325	16.5	56	69	69.7	15.79	19.45	44.5	3.95		67.5	630	775
	21 00	2-13-21	31.3	264	325	18.0	63	78	69.9	15.84	19.51	44.5	3.95		66.8	623	767

GAS CONCENTRATION CALCULATION

Date 2-13-85 Operator _____ Avg Gas Response, D_{avg}

Test No. 2-14-85 Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
22 00	2-13-22	32.8	279	343	15.2	50	61	69.8	15.82	19.84	44.5	3.95		66.5	620	763
23 00	2-13-23	33.8	289	358	13	39	48	69.5	15.74	19.51	45.5	4.05		68.0	635	786
24 00	2-13-24	32.8	279	345	13.5	41	51	69.2	15.67	19.42	45.5	4.05		69.0	645	799
1 00	2-14-1	31.2	263	326	13.5	41	51	69.0	15.62	19.41	46.0	4.10		68.0	635	789
2 00	2-14-2	32.3	274	340	15.2	50	61	69.8	15.82	19.63	45.8	4.08		65.2	606	753
3 00	2-14-3	31.2	263	325	14	44	54	69.2	15.67	19.38	45.2	4.02		66.5	620	766
4 00	2-14-4	32.5	276	344	15	49	61	69.0	15.62	19.50	46.8	4.18		67.5	630	786
5 00	2-14-5	31.8	269	335	19	68	85	69.3	15.69	19.60	46.8	4.18		69.0	645	805
320NW 6 00	2-14-6	30.0	251	316	13.5	41	52	68.2	15.42	19.46	48.5	4.35		68.0	635	800
320NW 7 00	2-14-7	29.0	241	303	14	44	55	68.5	15.52	19.55	48.5	4.35		68.2	637	803

INSTRUMENT CALIBRATION

DATE 1-31-95 Plant WYODAK

TEST NO. _____ Operator D.C.

TIME OF INITAL CALIBRATION 1440

TIME OF FINAL CALIBRATION 1713

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.0	5.3	4.5	5.0
Initial Span Response, S_i (Div)	86.25	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	82.0	84.4	99.4	85.5	86.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.5	5.15	4.75	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	84.13	84.7	99.2	85.25	86.9
Zero Drift, (%) $= (Z_f - Z_i)$	0	-1	0.3	-0.5	0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-4.25	0.4	0.1	1.0	-0.2

INSTRUMENT CALIBRATION

DATE 1-31-85 Plant WYODAK

TEST NO. _____ Operator D.C.

TIME OF INITAL CALIBRATION 1723

TIME OF FINAL CALIBRATION 0741

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.2	6.5	5.3	4.9	5.2
Initial Span Response, S_i (Div)	86.3	85.1	99.0	85.0	87.0
Final Span Response, S_f (Div)	84.9	86.5	98.0	85.0	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.1	5.75	5.15	4.95	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.6	85.8	98.5	85	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0.2	1.5	0.3	-0.1	+.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-1.6	-0.1	-1.3	0.10	-2.2

INSTRUMENT CALIBRATION

DATE 2-1-85 Plant WYO OAK

TEST NO. _____ Operator D.C.

TIME OF INITAL CALIBRATION 0750

TIME OF FINAL CALIBRATION 1056

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	870
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.1	4.9
Initial Span Response, S_i (Div)	86.3	84.2	98.9	85.0	87.0
Final Span Response, S_f (Div)	87.8	84.0	99.6	85.0	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5	5	5	5.05	4.95
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	87.05	84.1	99.25	85.0	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	0	0	0.1	-0.1
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	1.5	-.2	0.7	-0.1	-1.9

INSTRUMENT CALIBRATION

DATE 2-1-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1054
TIME OF FINAL CALIBRATION 1642

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.1	4.9
Final Zero Response, Z_f (Div)	4.9	3.5	5.0	5.3	5.3
Initial Span Response, S_i (Div)	87.8	84.0	99.6	85.0	85.0
Final Span Response, S_f (Div)	87.7	81.6	98.5	85.3	86.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	4.95	4.25	5.0	5.2	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	87.75	82.80	99.05	85.15	85.5
Zero Drift, (%) $= (Z_f - Z_i)$	-0.1	-1.5	0	0.20	+.4
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0	-.9	-1.1	0.1	+.6

INSTRUMENT CALIBRATION

DATE 2-1-85 Plant WYODAK

TEST NO. _____ Operator D.C.

TIME OF INITAL CALIBRATION 1652

TIME OF FINAL CALIBRATION 1016 2/2/85

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.2	5.0	5.0	5.2
Final Zero Response, Z_f (Div)	5.0	5.5	5.0	5.4	5.0
Initial Span Response, S_i (Div)	86.4	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.6	85.0	99.0	85.8	87.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.35	5.0	5.2	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.5	85.0	99.0	85.4	87.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	0.3	0	0.4	-0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	.2	-.3	0	0.4	+0.2

INSTRUMENT CALIBRATION

DATE 2-2-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1016
TIME OF FINAL CALIBRATION 1522

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.2	4.0	5.0	4.8	5.5
Initial Span Response, S_i (Div)	86.1	85.3	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.6	83.0	99.1	85.3	86.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.10	4.50	5.0	4.9	5.25
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.35	84.15	99.05	85.15	86.5
Zero Drift, (%) $= (Z_f - Z_i)$	0.2	-1.0	0	-0.2	+0.5
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.3	-1.3	0.1	0.50	-1.5

INSTRUMENT CALIBRATION

DATE 2-2-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1530
TIME OF FINAL CALIBRATION 0820

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	6.6	5.2	4.8	4.7
Initial Span Response, S_i (Div)	86.3	84.6	99.1	85.0	87.0
Final Span Response, S_f (Div)	84.0	87.0	103.0	85.3	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.8	5.1	4.9	4.85
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.15	85.40	101.05	85.15	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	1.6	.2	-.2	-0.3
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-23	.8	3.7	0.5	-1.7

INSTRUMENT CALIBRATION

DATE 2-3-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1006
TIME OF FINAL CALIBRATION 0740

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.3	4.5	5.0	4.0	5.2
Initial Span Response, S_i (Div)	86.2	84.7	99.0	85.0	87.2
Final Span Response, S_f (Div)	85.6	84.5	98.5	85.3	84.6
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.15	4.75	5.0	4.5	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.9	84.6	98.75	85.15	85.9
Zero Drift, (%) $= (Z_f - Z_i)$	0.3	-0.5	0.0	-1.0	0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.9	0.3	-0.5	1.3	-2.8

INSTRUMENT CALIBRATION

DATE 2-4-85
TEST NO. _____
TIME OF INITAL CALIBRATION 0808
TIME OF FINAL CALIBRATION 1455

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	~~4~~ 5.4	4.5	5.4	5.0	5.2
Initial Span Response, S_i (Div)	86.3	85.0	99.1	85.0	87.2
Final Span Response, S_f (Div)	89.0	84.0	99.3	85.3	84.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.2	~~5.0~~ 4.75	5.2	5.0	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	87.65 ~~5.4~~	84.50 ~~4.5~~	99.20 5.4	85.15 ~~5.0~~	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0.4	-0.5	0.4	0	0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	2.3	-0.5	-0.2	0.3	-2.6

INSTRUMENT CALIBRATION

DATE 2-4-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1534
TIME OF FINAL CALIBRATION 1650

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.9	5.0	5.4	5.0
Initial Span Response, S_i (Div)	86.3	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.7	85.0	99.0	85.4	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.95	5.0	5.2	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.5	85.0	99.0	85.2	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	-0.1	0.0	0.4	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.4	0.1	0.0	0.0	-2.0

INSTRUMENT CALIBRATION

DATE 2-4-85 Plant WYODAK

TEST NO. _____ Operator D.C.

TIME OF INITAL CALIBRATION 1650

TIME OF FINAL CALIBRATION 0747

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	4.9	5.0	5.4	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.4	5.0
Initial Span Response, S_i (Div)	86.7	85.0	99.0	85.4	85.0
Final Span Response, S_f (Div)	86.7	84.5	98.9	85.0	83.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.95	5.00	5.40	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.7	84.75	98.95	85.2	84.4
Zero Drift, (%) $= (Z_f - Z_i)$	0	.1	0	0	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0	-.6	-.1	-0.4	-1.2

INSTRUMENT CALIBRATION

DATE 2-5-85
TEST NO. _____
TIME OF INITAL CALIBRATION 0821
TIME OF FINAL CALIBRATION 1643

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	3.8	5.0	4.9	5.0
Initial Span Response, S_i (Div)	86.2	84.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.8	83.5	99.6	85.3	86.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.4	5.0	4.95	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.5	83.75	99.3	85.15	86.5
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	-1.2	0.0	-0.1	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.6	0.7	0.6	0.4	-1.0

INSTRUMENT CALIBRATION

DATE 2-5-85 Plant WYODAK

TEST NO. _____ Operator D.C.

TIME OF INITAL CALIBRATION 1651

TIME OF FINAL CALIBRATION 0742

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.8	5.0	4.8	5.0
Initial Span Response, S_i (Div)	86.3	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.0	87.0	103.0	86.0	86.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.4	5.0	4.9	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.15	86.0	101.0	85.0	86.9
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.8	0.0	-0.2	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.3	1.2	4.0	1.2	-0.2

INSTRUMENT CALIBRATION

DATE 2-6-85
TEST NO. _____
TIME OF INITAL CALIBRATION 0900
TIME OF FINAL CALIBRATION 1645

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.3	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.3	3.8	5.7	5.2	5.3
Initial Span Response, S_i (Div)	86.1	85.4	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.5	82.5	105.0	85.7	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.15	4.55	5.35	5.10	5.15
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.3	83.95	102.0	85.35	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0.3	-1.5	0.7	0.2	0.3
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.1	-1.4	5.3	0.5	-2.3

INSTRUMENT CALIBRATION

DATE 2-6-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1658
TIME OF FINAL CALIBRATION 0750

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.3	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	8.5	5.1	5.0	5.0
Initial Span Response, S_i (Div)	86.2	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	87.6	90.0	99.0	84.3	84.2
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	6.75	5.2	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.9	87.5	99.0	84.65	85.6
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	3.5	-0.2	0.0	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	1.4	1.5	0.2	-0.7	-2.8

INSTRUMENT CALIBRATION

DATE 2-7-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1000
TIME OF FINAL CALIBRATION 1458

Plant WYODAK
Operator D. C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.2	4.0	5.0	5.4	5.2
Initial Span Response, S_i (Div)	86.4	84.9	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.3	83.0	96.3	85.3	83.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.1	4.5	5.0	5.2	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.35	83.95	97.65	85.15	85.0
Zero Drift, (%) $= (Z_f - Z_i)$	0.2	-1.0	0.0	0.4	0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.3	-0.9	-2.7	-0.1	-4.2

INSTRUMENT CALIBRATION

DATE 2-7-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1503
TIME OF FINAL CALIBRATION 0740

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.2	5.0	5.0	5.0	5.2
Final Zero Response, Z_f (Div)	5.3	7.0	5.2	4.7	5.2
Initial Span Response, S_i (Div)	86.3	85.2	99.0	85.0	87.0
Final Span Response, S_f (Div)	87.1	86.5	103.0	84.2	84.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.25	6.0	5.1	4.85	5.2
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.7	85.85	101.0	84.6	855
Zero Drift, (%) $= (Z_f - Z_i)$	0.1	2.0	0.2	-0.3	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.7	-0.7	3.8	-0.5	-3.0

INSTRUMENT CALIBRATION

DATE 2-10-85
TEST NO. _____
TIME OF INITAL CALIBRATION 0915
TIME OF FINAL CALIBRATION 0740

Plant WYODAK
Operator D.C

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	3.0	5.0	5.0	5.0
Initial Span Response, S_i (Div)	86.4	85.6	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.0	84.0	99.0	86.5	84.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.0	5.0	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.2	84.8	99.0	85.75	85.75
Zero Drift, (%) $= (Z_f - Z_i)$	0	-2	0	0	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.4	0.4	0	1.5	-2.5

INSTRUMENT CALIBRATION

DATE 2-11-85
TEST NO. _____
TIME OF INITAL CALIBRATION 0755
TIME OF FINAL CALIBRATION 1637

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	4.8	6.5	4.8	5.0	5.0
Initial Span Response, S_i (Div)	86.5	85.2	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.3	88.0	98.4	85.0	84.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	4.9	5.75	4.9	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.4	86.6	98.7	85.0	85.5
Zero Drift, (%) $= (Z_f - Z_i)$	-0.2	1.5	-0.2	0.0	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.0	1.3	-0.4	0.0	-3.0

INSTRUMENT CALIBRATION

DATE 2-11-85
TEST NO. _____
TIME OF INITAL CALIBRATION 1650
TIME OF FINAL CALIBRATION 0744

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.4	5.0
Initial Span Response, S_i (Div)	86.3	85.5	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.5	85.0	99.0	85.4	85.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.0	5.2	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.4	85.25	99.0	85.2	86.25
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.0	0.4	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.2	-0.5	0.0	0.0	-1.5

INSTRUMENT CALIBRATION

DATE 2-12-85

TEST NO. _____

TIME OF INITAL CALIBRATION 0757

TIME OF FINAL CALIBRATION 1552

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.5	5.0	5.3	5.2
Initial Span Response, S_i (Div)	86.3	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.2	86.0	100.3	85.6	86.3
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.75	5.00	5.15	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.25	85.5	99.65	85.3	86.65
Zero Drift, (%) $= (Z_f - Z_i)$	0	-0.5	0	0.3	0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.1	1.5	1.3	0.3	-0.9

INSTRUMENT CALIBRATION

DATE 2-12-85 Plant WYODAK

TEST NO. _____ Operator D. C

TIME OF INITAL CALIBRATION 1600

TIME OF FINAL CALIBRATION 0740 2/13

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	6.5	PEN STUCK 5.0	5.0	5.0
Initial Span Response, S_i (Div)	86.3	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.5	88.0	PEN STUCK	86.2	85.3
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.75	5.0	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.4	86.5	99.0	85.6	86.15
Zero Drift, (%) $= (Z_f - Z_i)$	0	1.5	0	0	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.2	1.50	0.0	1.2	-1.7

INSTRUMENT CALIBRATION

DATE 2-13-85
TEST NO. _____
TIME OF INITAL CALIBRATION 0805
TIME OF FINAL CALIBRATION 1157

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.7	5.0
Initial Span Response, S_i (Div)	86.3	86.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.2	85.8	97.3	86.0	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.0	5.35	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.25	85.9	98.15	85.5	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	0	0	0.7	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.1	-0.2	-1.7	0.3	-2.0

INSTRUMENT CALIBRATION

DATE 2-13-85 Plant WYODAK

TEST NO. _____ Operator D.C.

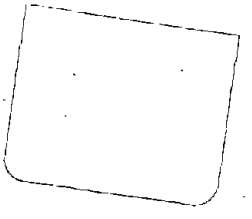
TIME OF INITAL CALIBRATION 1207

TIME OF FINAL CALIBRATION 0726

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.5	5.0	4.9	5.0
Initial Span Response, S_i (Div)	86.3	85.5	99.0	85.0	87.0
Final Span Response, S_f (Div)	85.8	86.5	103.0	85.0	85.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.25	5.0	4.95	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.05	86.0	101.0	85.0	86.4
Zero Drift, (%) $= (Z_f - Z_i)$	0	0.5	0	-0.1	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.5	0.5	4.0	0.1	-1.2

APPENDIX C

TEST DATA



COMANCHE
GASEOUS EMISSIONS DATA

Comanche

Instantaneous readings

NO_x vs OFA% open @ constant O_2 -12/12

Test Dates

12/7/84 1345-1615; 209-265 MWe; 3.2-3.4% O_2; OFA-Closed; "2A" MOOS

12/8/84 930-1130; "2A" MOOS; 152-286 MWe; 3.2-3.4% O_2; OFA-Closed
1300-1600; 252-269 MWe; 3.2-3.4% O_2; OFA-Closed; all mills

12/10/84 830- 930; 334-360 MWe; 3.95-4.05% O_2 OFA-Open; all mills on
1000-1330; 296-345 MWe; 2.7-3.95% O_2; OFA-Closed; all mills on
1500-1600; 261-273 MWe; 2.75-2.9% O_2; "2A" MOOS, OFA-Closed
1630 ; 281 MWe; 3.0% O_2; OFA-Open; all mills on

12/11/84 1100-1430; 257-263 MWe; 2.5-2.7% O_2; OFA-Closed; all mills on except 1300

12/12/84 800-1430; 290-321 MW; 2.5-2.75% O_2; OFA-Closed, all mills on

OFA - normally open 18%

Comanche

Overfire Air

12/8/84 9:10 NO_x ports closed ←

12/10/84 9:40 OFA ports closed
16:15 OFA ports opened

12/11/84 16:15 OFA ports opened

12/12/84 OFA Test

750 OFA Closed

%Open	Time	Load
10	1445	270 MW
20	1455	295
30	1505	291
40	1515	285
50	1525	294
60	1535	302
70	1545	315
80	1555	305
90	1610	295
100	1620	293
Normal	1628	305 MW

avg. load = 298 MW ± 8.7

± 2.9%
rel std
dev

w/out 315 MW
avg load = 296 ± 6.7 = 2.2%

HOURLY AVERAGES

COMANCHE POWER PLANT

GAS CONCENTRATION CALCULATION

Date 12-28-84 Operator _____

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

HI 200 PPM/DIV

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-7	1215-1315		20.0	152	183	HI 47.0	844	1016	68.5	15.87	19.11	40.5	3.56		39.0	340	409
12-7	1348-1448		30.0	253	300	HI 28.0	462	528	68.8	15.95	18.91	37.8	3.29		40.5	355	421
12-7	1442-1542	—	31.5	269	317	18.0	261	308	69.8	16.2	19.12	37.0	3.21		43.2	382	455
12-7	1730-1830		34.5	299	356	14.0	182	217	69.5	16.33	19.46	38.5	3.37		43.5	385	459
12-7	1830-1930		34.5	299	356	17.0	242	288	69.5	16.33	19.46	38.5	3.37		41.5	365	435
12-7	1930-2030		30.0	257	304	20.0	302	362	69.5	16.33	19.57	39.5	3.47		42.0	370	443
12-7	2030-2130		30.5	258	310	20.0	302	362	69.0	16.21	19.42	39.5	3.47		42.0	370	443
12-7	2130-2230		30.5	258	311	19.0	282	339	68.5	16.08	19.32	40.0	3.52		40.0	350	420
12-7	2230-2330		31.0	264	316	19.0	282	338	68.5	16.08	19.26	39.5	3.47		38.5	335	401
12-7	2330-0030		28.0	233	278	17.5	252	301	68.5	16.08	19.21	39.0	3.42		38.5	335	400
12-8	0030-0130		29.5	248	296	20.0	302	360	68.5	16.08	19.15	38.5	3.37		36.5	315	375
12-8	0130-0230		28.5	238	284	20.0	302	360	68.2	16.00	19.06	38.5	3.37		37.5	325	387
12-8	0230-0330		30.5	258	308	21.5	332	395	67.8	15.90	18.94	38.5	3.37		38.0	330	393

GAS CONCENTRATION CALCULATION

Date 12-8 & 9-84 Operator _____ Avg Gas Response, D_{avg}

Test No. _____ Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

41 10 PPM/DIV

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-8	0730-0430		30.2	255	305	18.5	272	325	67.5	15.82	18.90	39.0	3.42		39.5	345	412
12-8	0430-0530		32.5	279	335	26.0	422	507	67.5	15.82	19.01	40.0	3.52		39.0	340	408
12-8	0530-0630		33.0	284	341	25.0	402	483	67.0	15.70	18.84	40.0	3.52		39.0	340	408
12-8	0630-0730	—	29.0	243	291	18.0	262	313	67.5	15.82	18.90	39.0	3.42		37.5	325	388
12-8	0930-1030		33.5	287	342	17.5	251	299	68.5	15.82	18.85	39.0	3.37		38.5	335	399
12-8	1030-1130		37.0	322	384	28.0	462	551	69.5	16.07	19.14	39.0	3.37		37.5	325	387
12-8	1130-1230		41.5	368	433	7.5	50	59	69.5	16.07	18.93	37.0	3.17		38.5	335	395
12-8	1230-1330		41.5	368	433	7.5	50	59	69.8	16.14	19.02	37.0	3.17		38.5	335	395
12-8	1330-1430		42.5	378	445	7.5	50	59	69.5	16.07	18.93	37.0	3.17		38.5	335	395
12-8	1430-1530		42.5	378	446	8.0	60	71	69.0	15.94	18.83	37.5	3.22		36.0	310	366
12-8	1530-1630	—	41.5	368	437	8.0	60	72	68.5	15.82	18.79	38.5	3.32		31.0	260	309
12-9	1355-1455		36.0	314	370	16.0	221	261	69.5	16.27	19.19	37.0	3.20		37.0	320	378
12-9	1455-1601		38.0	334	393	14.0	181	213	69.5	16.27	19.14	36.5	3.15		39.0	340	400

GAS CONCENTRATION CALCULATION

Date 12-9 & 10-84 Operator _____ Avg Gas Response, D_{avg}

Test No. _____ Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

HI 20 PPM/DIV

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-9	1600-1700		39.5	349	412	17.0	241	284	70.0	16,39	19,34	37.0	3,20		38.0	330	389
12-9	1700-1800		40.0	354	417	17.0	241	284	70.5	16,52	19,43	36.5	3,15		36.5	315	371
12-9	1800-1900		40.0	354	418	18.0	261	308	70.5	16,52	19,49	37.0	3,20		35.5	305	360
12-9	1900-2000		40.5	359	423	18.0	261	308	70.8	16,60	19,56	36.8	3,18		33.5	285	336
12-9	2000-2100		39.5	349	411	19.0	281	331	70.5	16,52	19,43	36.5	3,15		36.0	310	365
12-9	2100-2200		38.0	334	393	16.0	221	260	70.5	16,52	19,43	36.5	3,15		39.0	340	400
12-9	2200-2300		35.5	309	363	17.0	241	284	70.5	16,52	19,43	36.5	3,15		39.0	340	400
12-9	2300-2400		33.5	288	338	16.0	221	259	70.5	16,52	19,38	36.0	3,10		37.0	320	375
12-10	2400-0100		32.5	278	327	18.0	261	307	70.5	16,52	19,43	36.5	3,15		35.0	300	353
12-10	0200-0200		32.5	278	325	19.0	281	329	70.8	16,60	19,41	35.5	3,05		34.0	290	339
12-10	0200-0300		33.0	283	333	18.0	261	307	70.5	16,52	19,43	36.5	3,15		33.0	280	329
12-10	0300-0400		33.0	283	355	20.0	301	378	66.5	15,51	19,45	42.5	4,25		30.0	250	313
12-10	0400-0500		31.5	268	337	19.0	281	354	66.5	15,51	19,50	48.0	4,30		28.5	235	296

GAS CONCENTRATION CALCULATION

Date 12-10-84 Operator _____ Avg Gas Response, D_{avg}

Test No. _____ Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Hi 20 PPM/DIN Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-10	0500-0600		35.0	304	382	19.0	281	354	66.5	15.51	19.50	48.0	4.30		29.5	245	308
12-10	0600-0700	—	36.5	319	401	27.0	442	556	66.0	15.38	19.35	48.0	4.30		30.5	255	321
12-10	0815-0915		46.5	419	518	7.8	56	70	66.5	15.58	19.29	48.5	4.104		38.0	330	409
12-10	0915-1015		50.0	454	557	7.6	52	64	67.0	15.70	19.28	44.0	3.89		39.5	345	423
12-10	1015-1115		48.5	439	537	7.0	40	49	67.5	15.83	19.38	43.5	3.84		40.0	350	428
12-10	1500-1600	—	36.0	313	361	INK OUT	—	—	69.0	16.21	18.69	33.0	2.79		39.0	340	392
12-10	1720-1820		46.0	412	472	8.5	73	84	73.0	16.77	19.23	31.8	2.68		42.5	375	430
12-10	1820-1920		42.5	377	431	8.0	69	72	74.0	17.02	19.48	31.5	2.65		40.5	355	406
12-10	1920-2020		42.0	372	425	8.5	73	84	74.5	17.14	19.62	31.5	2.65		38.0	330	378
12-10	2020-2120		44.5	397	453	8.5	73	84	74.5	17.14	19.56	31.0	2.60		38.5	335	382
12-10	2120-2220		42.5	377	432	8.5	73	84	74.5	17.14	19.67	32.0	2.70		37.0	320	367
12-10	2220-2320		40.5	357	408	8.5	73	84	74.5	17.14	19.62	31.5	2.65		36.5	315	360
12-10	2320-0020		41.5	367	421	8.5	73	84	74.0	17.02	19.53	32.0	2.70		41.5	365	419

GAS CONCENTRATION CALCULATION

Date 12-11-84 Operator _____ Avg Gas Response, D_{avg}

Test No. _____ Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Hi 20 PPM/DIV Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-11	0020-0120		46.0	412	473	8.5	73	84	74.0	17.02	19.53	32.0	2.70		42.5	375	430
12-11	0120-0220		45.0	402	461	8.0	63	73	74.0	17.02	19.53	32.0	2.70		43.5	385	442
12-11	0220-0320		43.5	387	444	8.5	73	84	74.0	17.02	19.53	32.0	2.70		42.5	375	430
12-11	0320-0420		43.5	387	444	8.0	63	73	74.0	17.02	19.53	32.0	2.70		41.5	365	419
12-11	0420-0520		46.5	417	477	8.5	73	84	74.0	17.02	19.48	31.5	2.65		41.0	360	412
12-11	0520-0620		45.0	402	461	7.5	53	61	74.0	17.02	19.53	32.0	2.70		40.5	355	407
12-11	0620-0720	—	47.0	422	483	8.0	63	72	74.0	17.02	19.48	31.5	2.65		41.0	360	412
12-11	1108-1200		44.0	394	450	7.2	43	49	71.5	16.53	18.89	31.0	2.62		38.2	332	379
12-11	1200-1300		47.5	429	490	7.5	49	56	71.5	16.53	18.89	31.0	2.62		40.2	352	402
12-11	1300-1400	—	46.0	414	474	7.5	49	56	71.5	16.53	18.94	31.5	2.67		36.5	315	361
12-11	1700-1800		50.0	452	517	19.0	69	79	72.8	16.71	19.12	31.5	2.64		31.5	265	303
12-11	1800-1900		46.5	417	477	19.0	69	80	73.5	16.89	19.35	31.8	2.67		31.5	265	304
12-11	1900-2000		45.5	407	463	19.0	69	79	74.0	17.01	19.35	30.5	2.54		32.5	275	313

GAS CONCENTRATION CALCULATION

Date 12-11-84 Operator _____ Avg Gas Response, D_{avg}

Test No. _____ Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

HI 20 PPM/DIV

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-11	2000-2100		44.5	397	457	19.0	69	79									
12-11	2100-2200		41.5	367	418	22.0	84	96									
12-11	2200-2300		36.0	311	358	30.0	124	142									
12-11	2300-2400		24.0	191	223	→ OFF SCALE	—	—									
12-12	2400-0100		22.0	171	201	→ OFF SCALE	—	—									
12-12	0100-0200		22.0	171	201	→ OFF SCALE	—	—									
12-12	0200-0300		25.5	206	239	→ OFF SCALE	—	—									
12-12	0300-0400		33.0	281	322	70.0	322	368									
12-12	0400-0500		33.0	281	322	90.0	420	481									
12-12	0500-0600		35.0	301	344	90.0	420	480									
12-12	0600-0700	—	43.0	382	431	75.0	346	391									
12-12	0900-1000		49.0	443	504	7.5	50	57									
12-12	1000-1100		49.5	448	511	8.0	60	69									

(For data on CO_2, O_2, and SO_2, see page C-11)

GAS CONCENTRATION CALCULATION

Date 12-11-84 Operator _____ Avg Gas Response, D_{avg}

Test No. _____ Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

HI 20 PPM/DIV

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	Davg	GA	Ga@0%	Davg	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-11	2000-2100								74.5	17.13	19.46	30.2	2.51		35.5	305	346
12-11	2100-2200								74.5	17.13	19.52	30.8	2.57		35.0	300	342
12-11	2200-2300								73.8	16.96	19.51	32.5	2.74		33.5	285	328
12-11	2300-2400								72.5	16.64	19.42	35.2	3.01		33.5	285	333
12-12	2400-0100								71.8	16.47	19.36	36.5	3.14		33.0	280	329
12-12	0100-0200	(For data on NO_x and CO, see page C-10)							72.0	16.52	19.47	37.0	3.19		32.5	275	324
12-12	0200-0300								72.5	16.64	19.30	34.0	2.89		34.0	290	336
12-12	0300-0400								73.8	16.96	19.40	31.5	2.64		35.0	300	343
12-12	0400-0500								74.0	17.01	19.46	31.5	2.64		35.0	300	343
12-12	0500-0600								74.5	17.13	19.55	31.0	2.59		34.5	295	337
12-12	0600-0700								75.0	17.26	19.48	29.0	2.39		30.0	250	282
12-12	0900-1000								72.5	17.20	19.57	30.5	2.55		26.0	210	237
12-12	1000-1100								72.0	17.07	19.48	31.0	2.60		25.5	205	234

GAS CONCENTRATION CALCULATION

Date 12-12-84 Operator _____

Test No. _____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	Davg	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-12	1100-1200		48.5	438	501	8.0	60	69	71.0	16.82	19.24	31.5	2.65		28.2	232	266
12-12	1200-1300		49.0	443	507	7.5	50	57	70.5	16.69	19.10	31.5	2.65		27.5	225	257
12-12	1330-1430		46.5	418	478	8.0	60	69	71.0	16.82	19.24	31.5	2.65		25.5	205	235
12-12	1430-1530		45.0	402	463	14.0	180	208	70.0	16.56	19.05	32.5	2.73		28.0	230	265
12-12	1530-1630	———	26.0	211	248	35.0	601	707	68.5	16.18	19.01	36.0	3.13		27.5	225	264
12-12	1700-1800		41.5	368	479	15.0	200	234	72.0	16.34	19.05	35.0	2.99		27.0	220	257
12-12	1800-1900		41.5	368	479	17.0	241	280	73.0	16.58	19.33	35.0	2.99		25.5	205	239
12-12	1900-2000		41.5	368	429	17.0	241	280	73.5	16.70	19.47	35.0	2.99		25.5	205	237
12-12	2000-2100		37.1	328	383	17.0	241	281	73.2	16.63	19.44	35.5	3.04		24.5	195	228
12-12	2100-2200		32.5	277	335	15.0	200	242	71.5	16.22	19.61	41.5	3.63		23.5	185	224
12-12	2200-2300		31.5	267	337	14.0	180	227	69.0	15.60	19.66	48.5	4.33		23.0	180	227
12-12	2300-2400		33.5	287	373	11.0	120	156	67.5	15.24	19.79	53.5	4.83		23.0	180	234
12-13	2400-0100		33.5	287	385	9.5	90	121	65.5	14.75	19.76	58.5	5.33		22.5	175	235

GAS CONCENTRATION CALCULATION

Date 12-13-84 Operator _____ Avg Gas Response, D_{avg}

Test No. _____ Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	Davg	GA	Ga@0%	Davg	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-13	0100-0200		33.5	287	396	8.5	70	97	64.0	14.38	19.84	63.0	5.77		23.0	180	248
12-13	0200-0300		31.0	262	371	12.0	140	199	62.0	13.89	19.68	67.0	6.17		NO INK		
12-13	0300-0400		31.5	267	376	11.5	130	183	62.8	14.09	19.82	66.0	6.07		NO INK		
12-13	0400-0500		30.5	257	368	15.0	200	287	62.0	13.89	19.88	68.5	6.32		NO INK		
12-13	0500-0600		23.5	187	269	22.0	341	491	61.0	13.65	19.66	69.5	6.42		NO INK		
12-13	0600-0700		27.2	224	320	27.0	441	631	61.8	13.84	19.81	68.5	6.32		NO INK		

INSTRUMENT CALIBRATION

DATE 12-7-84
TEST NO. 1
TIME OF INITAL CALIBRATION 1340
TIME OF FINAL CALIBRATION 1640

Plant COMANCHE
Operator D. C.

HI RANGE
0-2000
1

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	13.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0 ~~25.0~~	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.3	4.8	5.3
Initial Span Response, S_i (Div)	86.5	25.0	99.0	85.0	85.0
Final Span Response, S_f (Div)	85.3	25.0	98.3	85.0	84.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.15	4.9	5.15
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.9	25.0	98.65	85.0	84.75
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.3	-0.2	0.3
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-1.2	0.0	-0.8	0.2	-0.8

INSTRUMENT CALIBRATION

DATE 12-7-84
TEST NO. 1
TIME OF INITAL CALIBRATION 1340
TIME OF FINAL CALIBRATION 1640

Plant COMANCHE
Operator D.C.

HI RANGE
0-2000
1

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0 ~~25.0~~	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.3	4.8	5.3
Initial Span Response, S_i (Div)	86.5	25.0	99.0	85.0	85.0
Final Span Response, S_f (Div)	85.3	25.0	98.3	85.0	84.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.15	4.9	5.15
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.9	25.0	98.65	85.0	84.75
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.3	-0.2	0.3
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-1.2	0.0	-0.8	0.2	-0.8

INSTRUMENT CALIBRATION

DATE 12-7-84
TEST NO. 1
TIME OF INITAL CALIBRATION ~~0~~ 1700
TIME OF FINAL CALIBRATION 0730

Plant COMANCHE
Operator D.E.C

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	13.45	8.0	8~~2~~0
Initial Zero Response, Z_i (Div)	5.0	5.0	5.3	5.0	5.3
Final Zero Response, Z_f (Div)	5.1	4.8	5.3	4.5	5.1
Initial Span Response, S_i (Div)	85.3 ~~85.5~~	25.0	98.3	85.0	84.5
Final Span Response, S_f (Div)	86.3	25.0	96.5	84.6	82.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.05	4.9	5.3	4.75	5.2
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.8	25.0	97.4	84.8	83.25
Zero Drift, (%) $= (Z_f - Z_i)$	0.1	-0.2	0.0	-0.5	-0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.9	0.2	-1.8	0.1	-2.3

INSTRUMENT CALIBRATION

DATE 12-8-84
TEST NO. 2
TIME OF INITAL CALIBRATION 0900
TIME OF FINAL CALIBRATION 1718

Plant COMANCHE
Operator D.E.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.5	5.0
Initial Span Response, S_i (Div)	86.3	25.0	99.0	85.0	85.0
Final Span Response, S_f (Div)	86.5	25.0	99.1	85.6	71.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.0	5.25	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.4	25.0	99.05	85.3	78.0
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.0	0.5	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.2	0.0	0.1	0.1	-14.0

INSTRUMENT CALIBRATION

DATE 12-9-89
TEST NO. ~~3~~ 3
TIME OF INITAL CALIBRATION ~~1445~~ 1330
TIME OF FINAL CALIBRATION 0724

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.0	5.0
Initial Span Response, S_i (Div)	86.3	25.0	98.8	85.0	85.0
Final Span Response, S_f (Div)	85.8	25.0	97.0	85.0	82.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.0	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.05	25.0	97.9	85.0	83.5
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.0	0.0	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.5	0.0	-1.8	0.0	-3.0

INSTRUMENT CALIBRATION

DATE 12-10-84
TEST NO. 4
TIME OF INITAL CALIBRATION 0745
TIME OF FINAL CALIBRATION 1650

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.93	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.3	4.8
Initial Span Response, S_i (Div)	86.2	25.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.4	25.0	96.0	85.0	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.0	5.15	4.9
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.3	25.0	97.5	85.0	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.0	0.3	-0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.2	0.0	-3.0	-0.3	-1.8

INSTRUMENT CALIBRATION

DATE 12-10-84
TEST NO. 4
TIME OF INITAL CALIBRATION 1705
TIME OF FINAL CALIBRATION 0735

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	~~4.8~~ 0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.8	5.2	5.0	5.0
Initial Span Response, S_i (Div)	86.5	~~24.8~~ 24.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.8	24.4	101.0	84.9	85.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.9	5.0	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.65	24.6	100	84.95	86.4
Zero Drift, (%) $= (Z_f - Z_i)$	5.0	-0.2	0.4	0.0	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.3	-0.2	1.4	-0.1	-1.2

INSTRUMENT CALIBRATION

DATE 12-11-84 Plant COMANCHE

TEST NO. 5 Operator DEC

TIME OF INITAL CALIBRATION 0750

TIME OF FINAL CALIBRATION 1614

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.1	5.7	4.7	5.0
Initial Span Response, S_i (Div)	86.3	25.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.1	25.1	99.2	84.5	85.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.05	5.35	4.85	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.2	25.05	99.1	84.75	86.25
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.1	0.7	-0.3	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.2	0.0	-0.5	-0.2	-1.5

INSTRUMENT CALIBRATION

DATE 12-11-84 Plant COMANCHE

TEST NO. 5 Operator DEC

TIME OF INITAL CALIBRATION 1628

TIME OF FINAL CALIBRATION 0725

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.9	5.2	5.0	5.2
Initial Span Response, S_i (Div)	86.3	86.0 ~~75.0~~	99.0	85.0	87.0
Final Span Response, S_f (Div)	87.0	86.5	101.0	85.6	86.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.95	5.1	5.0	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.5	86.25	100.0	85.3	86.75
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	-0.1	0.2	0.0	0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.7	0.6	1.8	0.6	-0.7

12.5
4%

INSTRUMENT CALIBRATION

DATE 12-12-84 Plant COMANCHE

TEST NO. 6 Operator DEC

TIME OF INITAL CALIBRATION 0742

TIME OF FINAL CALIBRATION 1640

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	4.8	5.1	5.0
Initial Span Response, S_i (Div)	86.5	25.0	99.0 ~~160~~	85.0	87.0
Final Span Response, S_f (Div)	86.5	25.1	95.0	85.0	85.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	4.9	5.05	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.5	25.05	97.0	85.0	86.25
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	-0.2	0.1	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.0	0.1	-3.8	-0.1	-1.5

INSTRUMENT CALIBRATION

DATE 12-12-84 12/13/84 Plant COMANCHE

TEST NO. 6 Operator DEC

TIME OF INITAL CALIBRATION 1653

TIME OF FINAL CALIBRATION 0734

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	~~5.0~~	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.4	5.0	5.3
Initial Span Response, S_i (Div)	86.3	25.0	99.0	85.0	~~87.0~~
Final Span Response, S_f (Div)	86.3	25.1	103.0	85.7	86.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.2	5.0	5.15
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.3	25.05	101.0	85.35	86.5
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.4	0.0	0.3
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.0	0.1	3.6	0.7	-1.3

-54

80.7 - 82.0

-1.3

COMMANCHE DATA SUMMARY
WITH POINTS TAKEN OFF STRIP
CHART TO CORRESPOND TO
INSTANTANEOUS CONTROL ROOM READINGS

Data Summary

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ppm@0%O_2	CO ppm@0%O_2		
1445-1455	270	147,182	—	2.70	503	46	12-12	10% 270
1455-1505	295	147,182	—	2.65	496	80	"	20%
1505-1515	291	147,182	—	2.55	494	125	"	30%
1515-1525	285	147,182	—	2.70	366	299	"	40%
1525-1535	294	148.72	—	2.75	304	923	"	50
1535-1545	302	148.72	—	2.85	271	1102	"	60
1545-1555	315	—	—	2.90	260	1512	"	70 315MW
1555-1610	305	—	—	3.15	258	590	"	80
1610-1620	295	—	—	3.15	240	755	"	90
1620-1630	293	—	—	3.15	223	825	"	100%
NO_x vs OFA % open								

Comanche Data Summary - All Mills in service

	POINT NUMBER	LOAD MWe	COAL FLOW 2000 lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm @ 3% O_2~~	CO ~~ppm @ 3% O_2~~	NOx lb/mbtu	CO lb/mbtu	
12-11	1100	257	150.92	—	3.1 / 2.60	428	46	428	46	OFA closed
	1130	263	150.02	—	3.1.5 / 2.65	441	57	441	57	
	1300	290	150.19	—	3.1.5 / 2.65	503	57	503	57	
	1330	262	~~150~~ 147.8	—	3.1.5 / 2.65	435	57	435	57	
	1400	262	~~149~~ 134	—	3.0 / 2.50	426	68	426	68	
	1430	261	~~140~~ 144.6	—	3.2 / 2.70	442	46	442	46	
12-8	1300	269	131	-	3.25	455	59	OFA closed		
	1330	253	131	-	3.2	437	59			
	1400	259	131	-	3.25	444	59			
	1430	268	131	-	3.2	448	59			
	1500	265 (131.5)	132	-	3.25	450	71			
	1530	254	132	-	3.25	450	59			
	1600	252	132	-	3.40	430	72			
12-10	830	334	138	-	4.05	514	62	OFA OPEN		
	900	336	141	-	3.95	523	62			
	930	360	143	-	3.95	536	62			*
	1000	345	145	-	3.90	540	49	OFA CLOSED		*
	1030	329	146	-	3.95	542	49			
	1100	333	148	-	3.85	533	49			
	1300	301	149	-	2.70	493	46			
	1330	296	149	-	2.75	495	46			

O Full load - Hi Excess Air
Δ Full load - Lo Excess Air
□

Comanche Data Summary

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm@6%O2~~	CO ~~ppm@6%O2~~	NO_x 0%O_2	CO 0%O_2	
12-10 0830	334.	138.28	—	3.5 4.05	415	50	514	62	OFA open
0900	336.	140.51	—	4.1 3.95	420	50	523	62	
0930	360.	143.07	—	4.1 3.95	435	50	536	62	
1000	345.	144.89	—	4 3.90	440	40	540	49	OFA closed
1030	329	146.27	—	4.1 3.95	440	40	542	49	
1100	333.	147.52	—	4.3 3.85	435	40	533	49	
1300	301.	149.13	—	3.2 2.70	430	40	493	46	
1330	296.	149.32	—	3.2 2.75	430	40	495	46	
1500	273	149.04	2A	3.4 2.90	3.6 315	—	363	—	
1530	261.	148.75	2A	3.3 2.80	3.5 300	—	346	—	
1600	273	148.67	2A	3.2 2.75	3.6 315	—	362	—	
1630	281.	148.69	2A	3.5 3.0	3.5 300	—	[illegible]	—	OFA open
12-11 ~~0830~~									

Comanche Data Summary

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm corr to 3% O_2~~	CO ~~ppm corr to 3% O_2~~	NO_x %	CO %	
1100	257	150.92	—	3% 2.60	42.5 375	7 40	428	46	OFA closed
1130	263	150.02	—	3.5 2.65	49.5 385	7.5 50	441	57	
1300	290	150.19	—	3.5 2.65	49 440	7.5 50	503	57	
1330	262	149.86	—	3.5 2.65	43 380	7.5 50	435	57	
1400	262	149.47	—	3% 2.50	42.5 375	8 60	426	68	
1430	261	148.86	—	3% 2.70	43.5 385	7 40	442	46	

12-11

Comanche Data Summary

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm@3%O2~~	CO ~~ppm@3%O2~~	NOx ng/J	CO ng/J
800	334	136	—	30.1 2.55	51 460	7.5 50	524	57
830	319	138	=					
900	321	140	—	31 2.60	50.5 455	7 40	519	46
930	307	141	—	30 2.50	48.5 435	7.5 50	494	57
1000	318	142	—	31 2.60	49 440	8.5 70	502	80
1030	318	143	—	32 2.70	50 450	7.5 50	516	57
1100	293	144	—	31 2.6	48 430	8 60	491	70
1130	305	145	—	31 2.6	48 430	8 60	491	68
1300	297	146	—	31 2.6	48.5 435	7.5 50	496	57
1330	306	147	—	31.5 2.65	48.5 435	7 40	498	46
1400	290	147	—	32 2.7	45.5 405	8.5 70	465	80
1430	291	147	—	32.5 2.75	47.0 420	8 60	483	69
~~1500~~	~~319~~	~~148~~						
~~1530~~	~~343~~	~~149~~		OFA test				
	306	494						
	319	512						

OFA closed

12-12

Comanche Data Summary

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm corr O_2~~	CO ~~ppm corr O_2~~	NO_x corr O_2	CO corr O_2	
12-7 1345	265	139.8	2A	~~3.4~~	~~175~~	~~150~~	209	13.3	OFA closed
1400	259	139.74	2A	3.25	375	180	325	213	
1415	257	139.67	2A	3.2	375	200	324	307	
1430	259	139.55	2A	3.25	315	180	373	213	
1445	227	139.27	2A	3.3	250	280	332	332	
1500	231	139.04	2A	3.15	375	260	323	306	
1515	238	138.82	2A	3.10	350	170	328	199	
1530	210	138.38	2A	3.35	265	200	315	238	
1545	210	137.97	2A	3.25	265	190	314	225	
1615	209	137.17	2A	3.20	250	180	295	212	
12-8 0930	152	128.70	2A	3.35	285	250	339	297	
1000	232	127.77	2A	3.4	255	260	304	310	
1030	267	128.99	2A	3.35	285	400	339	476	
~~1100~~	~~286~~	~~129.86~~	2A	3.30	20.5	2.00?	243	23720	
~~1130~~	~~264~~	~~130.07~~	2A	3.2	375	50	442	59	
12-8 1300	269	130.72	—	3.25	385	50	455	59	closed
1330	253	130.76	—	3.2	370	50	437	59	
1400	259	131.01	—	3.25	375	50	444	59	
1430	268	131.31	—	3.2	380	50	448	59	
1500	265	131.51	—	3.25	380	60	450	71	
1530	254	131.53	—	3.35	360	50	450	59	
1600	252	131.54	—	3.40	360	60	430	72	

Comanche Data Summary - All Mills in Service

POINT NUMBER	LOAD MWe	COAL FLOW 2000 lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm@3%O2~~	CO ~~ppm@3%O2~~	NO_x %	CO %
800	334	136	—	30.1 2.55			524	57
830	319	138	—				MAINT.	
900	321	140	—	31 2.60			519	46
930	307	141	—	30 2.50			494	57
1000	318	142	—	31 2.60			502	80
1030	318	143	—	32 2.70			516	57
1100	293	144	—	31 2.6			491	70
1130	305	145	—	31 2.6			491	68
1300	297	146	—	31 2.6			496	57
1330	306	147	—	31.5 2.65			498	46
1400	290	147	—	32 2.7			465	80
1430	291	147	—	32.5 2.75			483	69

correlation this page only

Coal flow $tons/hr = -.227$ load, MW + 213

coal flow

0 MW_L 330

306	494	
319	512	

CFA

12-12

EXXON – Comanche Data Summary

100 pos

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ppm@0%O_2	CO ppm@0%O_2	OFA % open
5-31 - 1	350	/	—	4.6	446	168	60
2	350	/	—	4.4	370	238	80
6-1 - 3	352.5	439.75	—	4.4	476	106	70
4	356.5	501.25	—	4.9	670	26	20
5	357.5	499.5	—	5.2	847	22	0
6	355	449	—	4.5	324	74	100
6-2 - 7	352.5	489.75	—	5.2	505	21	80
8	355.5	560.5	—	5.7	839	16	20
9	353.5	—	—	5.7	615	16	50
10	350.5	398.25	—	4.8	406	79	80
6-3 - 11	274	308	—	5.4	467	16	40
12	275.5	381.5	—	5.6	708	14	0
13	272.5	368.5	—	5.0	362	19	80
6-7-14	347.5	—	—	4.8	415	93	100
14A	348.5	471	—	4.7	379	163	100
6-9 - 15a	354.0	476.5	—	6.9	715	106	30
15b	354.0	476.5	—	5.4	715	163	30
6-14-16	336	502.75	—	4.9	570	23	30
	coal flow = 1.58 load - 83.5						
			corr fact = 0.82				

C-2

COMANCHE BOILER OPERATING DATA
MONITORED BY B&W SERVICE ENGINEER

PLANT OPERATING DATA

DATA ITEM	UNITS		2				
Test No.			ON LOAD DEMAND	→	→	→	→
Date			12/7/84	→	→	→	→
Time	Hours		1030	1045	1100	1130	
UNIT LOAD GROSS	MW		282	282	280	278.8	
		COMPUTER					
BOILER TEMPERATURES		(POINTS)					
~~Water to Econ~~	~~F~~	(509)	461.0	461.0	460.4	459.9	
Water Lvg Econ	F	(311)	548.8	548.4	550.2	549.6	
Stm Lvg Pri SH	F	514/515	753.7/753.0	760.7/759.8	759.8/758.3	759.1/749.6	
Stm Ent Plat SH	F	—	—	—	—	—	
Stm Lvg Plat SH	F	—	—	—	—	—	
Stm Ent Sec SH	F	(7 / 8)	753/751.4	752.6/758	745/747	739.3/743.4	
Stm Lvg Sec SH	F	(9)	1013.4	1022.6	1003.2	1009.2	
Stm to RH Attemp	F	(11)	617.3	621.7	608.6	606.7	
Stm Lvg RH Attemp	F	(511)	547.4	550.7	529.3	548.2	
Stm Lvg RH	F	(602)	1013.2	1015.4	1001.6	994.4	
Water to SH Attemp	F	(507)	261.3	262.1	262.0	262.2	
Water to RH Attemp	F	(507)	261.3	262.1	262.0	262.2	
BOILER PRESSURES							
Water to Econ	PSIG	(605)	2660.5	2670.5	2678.5	2684.5	
Drum Press	PSIG	(606)	2531.2	2529.6	2524.8	2537.7	
PSH in Press	PSIG	—	—	—	—	—	
Stm Lvg Sec SH	PSIG	601	2394.8	2399.0	2392.7	2401	
RH Inlet	PSIG	604	464.2	464.2	464.2	464	
RH Outlet	PSIG	603	413.7	413.7	413.7	413.4	
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F	—					
FW Ent #1 Htr	~~F~~ °C	(3)	128.3	128.5	128.2	128.4	
FW Ent #2 Htr	~~F~~ C	(5)	150.5	150.5	150.2	150.2	
#1 Htr Drain	~~F~~ C	(4)	134.3	134.2	133.9	134.1	
#2 Htr Drain	~~F~~ C	(6)	160.3	159.8	159.8	160.1	
Stm to #1 Htr - Temp	~~F~~ ~~F~~ C	(1)	603.4	607.1	596.3	600.5	
Stm to #1 Htr - Press	PSIG	LOCAL	74	73	72	70	
Stm to #2 Htr - Temp	~~F~~ ~~F~~ C	(2)	798.9	802.1	790.6	795.5	
Stm to #2 Htr - Press	PSIG	LOCAL	174	173	171	169	
FW ENT #3 HTR TEMP	C	(7)	191.9	191.5	191.4	191.2	
STM TO #3 HTR TEMP	~~F~~ C	(10)	546.3	552.0	543.8	548.5	
STM TO #3 HTR PRESS	PSIG	LOCAL	440	440	430	430	
#3 HTR DRAIN TEMP	C	(8)	198.5	197.9	197.7	197.8	

JOB NUMBER: RB-502

CUSTOMER: PUBLIC SERVICE OF COLORADO
PUEBLO COLORADO

BY: SVT.

1

	DATA ITEM	UNITS		2				
	Test No.			ON LOAD DEMAND				
	Date			12/7/84				
	Time	Hours		1030	1045	1100	1130	
			Computer					
	AIR & GAS TEMPERATURES		(Points)					
(2)	~~Flue Gas Lvg Econ~~	~~F~~	(24/25)	604.2/69.5	606/613	595.2/62	597.3/61.9	
(3)	~~Flue Gas Lvg AH~~	F	(20/21)	264.2/262.9	267/267	268.4/265.4	270.3/272	
(4)	Flue Gas Lvg Hot Precip	F	(26/27)	558.9/557.7	564/565	563.8/563.4	564.3/563	
(3)	Flue Gas Lvg Pri AH	F	—					
	Air Lvg FD Fan	F	(12/13)	69.0/69.2	70.7/70.7	72.2/72.5	74/74.3	
(5)	Air Ent Sec AH	F	(14/15)	112.2/117.0	114/118	116.5/120.6	117.4/121.9	
(6)	Air Lvg Sec AH	F	(22/23)	514/507.5	522/511	523.4/512.8	525.1/514.9	
	Air Lvg PA Fan	F	—					
(5)	Air Ent Pri AH	F	—					
(6)	Air Lvg Pri AH	F	—					
	Air Ent Pulv	F	—					
(1)	Ambient Air	F	[18(I)]	58.1	58.5	59.2	61.8	
	MISCELLANEOUS							
	Feedwater Flow	LB/HR	(702)	1713.4	1675.6	1738.6	1708.1	
	SH Spray Flow	LB/HR	(704)	—	—	7.9	8.22	
	RH Spray Flow	LB/HR	(703)	38.51	38.71	42.3	34.82	
	SH Spray Valve Posit	%						
	RH Spray Valve Posit	%						
	*HP Extraction Flow	LB/HR						
(9)	O_2 Lvg Econ	%	(306/307)	2.99/3.1	2.97/3.35	2.91/3.46	3.07/3.21	
(8)	CO_2 Lvg Econ	%						
	NOx (if avail)							
(9)	O_2 Lvg AH	%						
(8)	CO_2 Lvg AH	%						
	O_2 Lvg Hot Precip	%						
	CO_2 Lvg Hot Precip	%						
	O_2 in Windbox	%						
	CO_2 in Windbox	%						
	NOx or CFA Port Posit							
	+ Fuel Analysis							
	Burner # Out Serv					-		
(22)	Relative Humidity	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high-pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

DATA ITEM	UNITS		2				
Test No.			ON LOAD DEMAND	→	→	→	→
Date			12/7/84	→	→	→	→
Time	Hours		1030	1045	1100	1130	
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow TONS/HR	~~MLB/HR~~	813	140.28	140.54	140.71	141.07	
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

(2) - Efficiency data

PLANT OPERATING DATA

DATA ITEM	UNITS		2				
Test No.			UNIT ON LOAD DEMAND, LOW 210MW, HI 280MW				
Date			12/7/84	→	→	→	→
Time	Hours		1345	1400	1415	1430	1445
UNIT LOAD GROSS	MW		265	259	257	259	227
		COMPUTER					
BOILER TEMPERATURES		(POINTS)					
~~Water to Econ~~	~~F~~	(509)	454.5	451.7	450.6	450.7	438.8
Water Lvg Econ	F	(311)	542.5	535.9	535.1	530.6	520.8
Stm Lvg Pri SH	F	(514/515)	751.4/749	740.8/740.6	743.2/734.5	737/736.6	725.6/724.9
Stm Ent Plat SH	F	—	—	—	—	—	—
Stm Lvg Plat SH	F	—	—	—	—	—	—
Stm Ent Sec SH	F	(7/8)	747/745	734/729	734/731	739/738	726/725
Stm Lvg Sec SH	F	(9)	983	963	974	983	951
Stm to RH Attemp	F	(11)	584	565	563	575	548
Stm Lvg RH Attemp	F	(511)	576.8	562.4	560.1	557.5	540.7
Stm Lvg RH	F	(602)	982.4	976.2	966.8	965.8	954.2
Water to SH Attemp	F	(507)	257.9	257.7	257.1	255.7	252.2
Water to RH Attemp	F	(507)	257.9	257.7	257.1	255.7	252.2
BOILER PRESSURES							
Water to Econ	PSIG	(605)	2676.5	2690.6	2678.5	2658.4	2660.5
Drum Press	PSIG	(606)	2528.0	2542.6	2526.4	2516.7	2518.3
PSH in Press	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	PSIG	601	2402.1	2415.6	2404.2	2390.6	2408.3
RH Inlet	PSIG	604	421.5	421.9	421.6	421.7	372.0
RH Outlet	PSIG	603	377.2	369.2	368.9	364	316.9
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F	—					
FW Ent #1 Htr	~~F~~ C	(3)	127	126	126	126	123
FW Ent #2 Htr	~~F~~ C	(5)	149	148	147	147	144
#1 Htr Drain	~~F~~ C	(4)	132	132	132	131	128
#2 Htr Drain	~~F~~ C	(6)	158	157	156	157	153
Stm to #1 Htr - Temp	F	(1)	582	577	568	568	567
Stm to #1 Htr - Press	PSIG	LOCAL	67	66	64	65	58
Stm to #2 Htr - Temp	F	(2)	775	768	758	760	757
Stm to #2 Htr - Press	PSIG	LOCAL	163	160	156	158	142
FW ENT #3 HTR TEMP	C	(7)	189	188	187	739	726
STM TO #3 HTR TEMP	F	(10)	575	556	553	564	537
STM TO #3 HTR PRESS	PSIG	LOCAL	420	400	400	400	370
#3 HTR DRAIN TEMP	C	(8)	196	194	193	194	189

JOB NUMBER: RB-502

CUSTOMER: PUBLIC SERVICE OF COLORADO
PUEBLO COLORADO

BY: SVT.

NOTE: EER TESTING STARTED 1315 HRS DEC. 7. 1984
OVERFIRE AIRPORTS CLOSED AT 1400 HRS.

1

	DATA ITEM	UNITS		2	—	—	—	→
	Test No.							
	Date			12/7/84	—	—	—	→
	Time	Hours		1345	1400	1415	1430	1445
			Computer					
	AIR & GAS TEMPERATURES		(Points)					
(4)	~~Flue Gas Lvg Econ~~	F	(24/25)	585/592	576/585	575/582	578/587	566/575
(3)	~~Flue Gas Lvg AH~~	F	(20/21)	265/264	267/265	268/267	268/268	268/265
(4)	Flue Gas Lvg Hot Precip	F	(26/27)	548/549	547/549	548/549	547/550	544/547
(3)	Flue Gas Lvg Pri AH	F	—					
	Air Lvg FD Fan	F	(12/13)	79/80	80/81	81/82	81.2/81.7	82/83
(5)	Air Ent Sec AH	F	(14/15)	122/127	124/130	126/131	124/129	129/135
(6)	Air Lvg Sec AH	F	(22/23)	510/502	509/505	571/505	509/505	510/507
	Air Lvg PA Fan	F	—					
(5)	Air Ent Pri AH	F	—					
(6)	Air Lvg Pri AH	F	—					
	Air Ent Pulv	F	—					
(1)	Ambient Air	F	[18(I)]	66.4	64.8	62.9	64.2	63.7
	MISCELLANEOUS							
	Feedwater Flow	LB/HR	(702)	1679.4	1692.0	1670	1625.6	1446.8
	SH Spray Flow	LB/HR	(704)	—	—	—	—	—
	RH Spray Flow	LB/HR	(703)	—	—	—	—	—
	SH Spray Valve Posit	%						
	RH Spray Valve Posit	%						
	*HP Extraction Flow	LB/HR						
(9)	O_2 Lvg Econ	%	(306/307)	2.85/3.26	3.11/3.18	3.07/2.90	2.9/3.36	3.03/3.05
(8)	CO_2 Lvg Econ	%						
	NOx (if avail)							
(9)	O_2 Lvg AH	%						
(8)	CO_2 Lvg AH	%						
	O_2 Lvg Hot Precip	%						
	CO_2 Lvg Hot Precip	%						
	O_2 in Windbox	%						
	CO_2 in Windbox	%						
	NOx or CFA Port Posit							
	+ Fuel Analysis							
	Burner # Out Serv							
(22)	Relative Humidity	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

DATA ITEM	UNITS		2				
Test No.							
Date			12/7/84				
Time	Hours		1345	1400	1415	1430	1445
		COMPUTER					
		POINTS					
DRAFT LOSS DATA							
FD Fan Disch	" Wg						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow	MLB/HR	813	139.80	139.74	139.67	139.55	139.27
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
MILL A COAL/AIR TEMP	F	(16)	MILL	2-A	OFF-L	INE	
B COAL/AIR TEMP	F	(17)	115	116	116	115	117
C COAL/AIR TEMP	F	(18)	121	121	122	120	122
D COAL/AIR TEMP	F	(19)	123	123	124	123	124
E COAL/AIR TEMP	F		N/A				

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
(2) Efficiency data

PLANT OPERATING DATA

DATA ITEM	UNITS		2				
Test No.							
Date			12/7/84				
Time	Hours		1500	1515	1530	1545	1615
UNIT LOAD GROSS	MW		231	238	209.5	210.2	208.6
		COMPUTER (POINTS)					
BOILER TEMPERATURES							
Water to Econ	F	(509)	441.2	443.7	432.9	432.9	423.3
Water Lvg Econ	F	(311)	521.7	522.1	510.8	510.7	509.0
Stm Lvg Pri SH	F	514/515	733.6/732	734.1/730	720.7/718.7	724.3/723.5	727.3/726.5
Stm Ent Plat SH	F	—	—	—	—	—	—
Stm Lvg Plat SH	F	—	—	—	—	—	—
Stm Ent Sec SH	F	(7/8)	727/729	733/731	724/721	725/722	724/722
Stm Lvg Sec SH	F	(9)	978	979	958	960	968
Stm to RH Attemp	F	(11)	560	563	541	543	545
Stm Lvg RH Attemp	F	(511)	548.5	552.1	529.9	528.9	523.5
Stm Lvg RH	F	(602)	959.9	966.5	940.4	943.9	920.4
Water to SH Attemp	F	(507)	251.2	250.9	247.1	246.3	245.5
Water to RH Attemp	F	(507)	251.2	250.9	247.1	246.3	245.5
BOILER PRESSURES							
Water to Econ	PSIG	(605)	2650.4	2658.4	2628.3	2646.4	2636.4
Drum Press	PSIG	(606)	2513.5	2503.8	2494.1	2482.8	2474.7
PSH in Press	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	PSIG	601	2406.3	2399	2406.3	2396.9	2397.9
RH Inlet	PSIG	604	329.1	386.2	343.7	343.8	343.7
RH Outlet	PSIG	603	324.3	331.8	287.1	287.2	287.1
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F	—					
FW Ent #1 Htr	°C	(3)	123	123	121	121	120
FW Ent #2 Htr	°C	(5)	144	144	141	141	141
#1 Htr Drain	°C	(4)	128	129	126	125	125
#2 Htr Drain	°C	(6)	152	153	149	149	149
Stm to #1 Htr - Temp	F	(1)	562	567	554	554	541
Stm to #1 Htr - Press	PSIG	LOCAL	58	54	54	54	54
Stm to #2 Htr - Temp	F	(2)	753	759	741	743	728
Stm to #2 Htr - Press	PSIG	LOCAL	143	133	128	128	129
FW ENT #3 HTR TEMP	C	(7)	184	184	180	180	180
STM TO #3 HTR TEMP	F	(10)	548	549	528	530	531
STM TO #3 HTR PRESS	PSIG	LOCAL	370	350	330	330	340
#3 HTR DRAIN TEMP	C	(8)	189	190	185	185	185

JOB NUMBER: RB-582

CUSTOMER: PUBLIC SERVICE OF COLORADO
PUEBLO COLORADO

BY: SVT.

1

	DATA ITEM	UNITS		2	—	—	—	6
	Test No.							
	Date							
	Time	Hours						
			COMPUTER					
	AIR & GAS TEMPERATURES		(POINTS)					
(4)	~~Flue Gas Lvg Econ~~	F	(24/25)	562/569	565/572	550/557	551/557	549/556
(3)	Flue Gas Lvg AH	F	(20/21)	266/268	266/270	261/273	260/272	258/271
(4)	Flue Gas Lvg Hot Precip	F	(26/27)	540/545	537/541	533/537	529/534	523/529
(3)	Flue Gas Lvg Pri AH	F	—					
	Air Lvg FD Fan	F	(12/13)	82.5/82.9	82.5/83.0	82.6/83.1	82.5/82.9	81.5/81.9
(5)	Air Ent Sec AH	F	(14/15)	129/136	128/135	130/138	131/138	130/137
(6)	Air Lvg Sec AH	F	(22/23)	508/502	506/498	502/500	491/500	493/494
	Air Lvg PA Fan	F	—					
(5)	Air Ent Pri AH	F	—					
(6)	Air Lvg Pri AH	F	—					
	Air Ent Pulv	F	—					
(1)	Ambient Air	F	[18(I)]	63.1	63.0	62.7	62.5	59.5
	MISCELLANEOUS							
	Feedwater Flow	LB/HR	(702)	1462.7	1499.0	1273.9	1334.2	1374.2
	SH Spray Flow	LB/HR	(704)	—	—	—	—	—
	RH Spray Flow	LB/HR	(703)	—	—	—	—	—
	SH Spray Valve Posit	%						
	RH Spray Valve Posit	%						
	*HP Extraction Flow	LB/HR						
(9)	O_2 Lvg Econ	%	(306/307)	2.92/3.1	3.01/2.81	2.93/2.99	2.96/2.98	2.92/3.19
(8)	CO_2 Lvg Econ	%						
	NOx (if avail)							
(9)	O_2 Lvg AH	%						
(8)	CO_2 Lvg AH	%						
	O_2 Lvg Hot Precip	%						
	CO_2 Lvg Hot Precip	%						
	O_2 in Windbox	%						
	CO_2 in Windbox	%						
	NOx or CFA Port Posit							
	+ Fuel Analysis							
	Burner # Out Serv							
(22)	Relative Humidity	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

DATA ITEM	UNITS						
Test No.							
Date							
Time	Hours						
DRAFT LOSS DATA							
FD Fan Disch	" Wg						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow	MLB/HR	813	139.04	138.92	138.38	137.97	137.17
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
MILL A COAL/AIR TEMP	F	OFF	LINE	—	—	—	—
B COAL/AIR TEMP	F		117	116	118	118	117
C COAL/AIR TEMP	F		122	121	122	122	122
D COAL/AIR TEMP	F		124	124	125	125	124
E COAL/AIR TEMP	F		—	—	—	—	—

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
(2) - Efficiency data

PLANT OPERATING DATA

DATA ITEM		UNITS	2	2	2	2	2	2
Test No.								
Date			12/8/84	→	→	→	→	→
Time		Hours	0900	0930	1000	1030	1100	1130
UNIT ON LOAD DEMAND				NOTE ①			NOTE ②	
INSTANT. GROSS MW			238.05	252.17	232.33	266.60	295.72	263.53
BOILER TEMPERATURES								
~~Water to Econ~~	509	F	443.5	445.2	441.5	454.1	459.2	453.1
Water Lvg Econ	311	F	526.9	536	533.3	532.6	536.5	534.7
Stm Lvg Pri SH	514 / 515	F	740.9/738.8	753.5/751	744.9/736	738.3/731.2	737.6/732.4	746.4/739.6
Stm Ent Plat SH	—	F						
Stm Lvg Plat SH	—	F						
Stm Ent Sec SH	7 / 8	F	742/739.8	746.8/745.2	728.9/731.3	743.3/742.9	750.6/748.1	746/739
Stm Lvg Sec SH	9	F	1006.7	1013.7	991.8	1017.9	997	979.8
Stm to RH Attemp	11	F	599.4	596.8	576.0	613.3	605.9	596
Stm Lvg RH Attemp	511	F	540.7	552.8	549.7	464.6	535.7	557.3
Stm Lvg RH	602	F	983.4	1000.6	980.9	935.4	961.1	970.5
Water to SH Attemp	507	F	252.5	252.4	253.8	257.8	261.5	258.9
Water to RH Attemp	507	F	252.5	252.4	253.8	257.8	261.5	258.9
BOILER PRESSURES								
Water to Econ	605	PSIG	2638.4	2642.4	2658.4	2648.4	2682.5	2664.5
Drum Press	606	PSIG	2484.4	2494.1	2508.6	2474.7	2516.7	2505.4
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2395.8	2402.1	2419.8	2382.3	2393.7	2393.7
RH Inlet	604	PSIG	386.1	392.7	378.5	437.1	464	428.8
RH Outlet	603	PSIG	331.7	338.6	323.7	385.2	413.4	376.5
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	124.6	123.9	123.8	126.1	128.2	127.2
FW Ent #2 Htr	5	F C	145.5	145.4	144.1	148.3	150.4	148.4
#1 Htr Drain	4	F C	129.9	129.3	128.9	132	134.3	132.8
#2 Htr Drain	6	F C	154.2	154.8	152.2	157.8	160.9	157.6
Stm to #1 Htr - Temp	1	F	589.6	588.3	575.7	603.9	586.7	594.4
Stm to #1 Htr - Press	LOCAL	PSIG	60	62	57	67	74	67
Stm to #2 Htr - Temp	2	F	785	784	768.6	801.3	784.1	766.9
Stm to #2 Htr - Press	LOCAL	PSIG	146	154	140	164	178	162
FW ENT #3 HP HTR TEMP	7	C	185.8	196.6	183.8	189.7	192.0	188.9
STM TO #3 HP HTR TEMP	10	F	552.4	558.9	561.4	517.4	526.3	564.6
STM TO #3 HP HTR PRESS	LOCAL	PSIG	380	400	360	430	460	420
#3 HP HTR DRAIN TEMP	8	C	191.5	192.4	186.4	195.9	198.9	195.2

NOTE ① : OVERFIRING PORTS DAMPERS CLOSED @ 0916 HRS.

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.

JOB NO. : RB-502

NOTE ② : BROUGHT 2-A PULV. ON LINE @ 11:10 HRS.

PLANT OPERATING DATA

	DATA ITEM		UNITS	2	2	2	2	2	2
	Test No.								
	Date			12/8/84	→	→	→	→	→
	Time		Hours	0900	0930	1000	1030	1100	1130
	AIR & GAS TEMPERATURES								
(4)	Flue Gas Lvg Econ	24/25	F	578.2/582.6	570.8/574.5	563.8/569.1	585.1/587.5	602.2/606.3	587.4/591.9
(3)	Flue Gas Lvg AH	20/21	F	253.3/250.2	254.7/251.8	252/252.7	253.8/250.0	255.5/251.4	254.4/251.5
(4)	Flue Gas Lvg Hot Precip	26/27	F	540.2/540.2	539.4/537.7	536.9/538.5	539.8/540.2	550.7/551.1	552/554.8
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—		
	Air Lvg FD Fan	12/13	F	57.1/58.1	57.5/57.8	58.7/58.7	56.7/57.1	56.7/56.6	56.2/56.9
(5)	Air Ent Sec AH	14/15	F	111.4/115.2	109.8/111.3	112.7/118.4	108.6/113	107.5/109.4	106.5/110.8
(6)	Air Lvg Sec AH	22/23	F	503.1/494.5	502.3/493.7	501.8/454.1	500.6/492.5	508/498.2	512.4/502.6
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	39.8	40.2	42.8	41.5	41.8	41.8
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1443.5	1400.2	1355.8	1616.1	1741.1	1620.8
	SH Spray Flow	704	LB/HR	—	—	—	—	—	—
	RH Spray Flow	703	LB/HR	17.04	17.04	17.05	47.57	23.82	—
	SH Spray Valve Posit	—	%						
	RH Spray Valve Posit	—	%						
	*HP Extraction Flow	—	LB/HR						
(9)	O_2 Lvg Econ	306/307	%	3.18/3.02	3.12/3.11	3.16/2.73	3.26/3.10	3.15/3.10	3.08/3.02
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

2

JOB NUMBER - 82-507

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.							
Date		12/8/84	→	→	→	→	→
Time	Hours	0900	0930	1000	1030	1100	1130
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	128.73	128.70	128.77	128.99	129.86	130.07
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV. 2-A COAL/AIR TEMP	F	OFF LINE	→	→	→	→	119.7
PULV 2-B COAL/AIR TEMP	F	115.5	115.2	116.6	115	118.4	125.5
PULV 2-C COAL/AIR TEMP	F	121.1	120.9	121.8	121.1	121.0	123.4
PULV 2-D COAL/AIR TEMP	F	122.7	122.3	123.0	122.8	122.6	125.7

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
(2) Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO
TAB NUMBER 84-503

PLANT OPERATING DATA

DATA ITEM		UNITS	2	—	—	—	—	→
Test No.								
Date			12/8/84	—	—	—	—	→
Time		Hours	1300	1330	1400	1430	1500	1530
INSTANT. GROSS MW			268.79	253.25	259.30	267.65	264.66	253.75
BOILER TEMPERATURES								
~~Water to Econ~~	509	F	452.6	449.1	460.8	454.4	455.9	453.3
Water Lvg Econ	311	F	540	531.9	542.8	542.2	540.9	535.4
Stm Lvg Pri SH	514 / 515	F	746.4/737.9	746.2/734.4	761.7/751.4	752.6/743.6	754.4/740.7	746.5/740.3
Stm Ent Plat SH	—	F	—	—	—	—	—	—
Stm Lvg Plat SH	—	F	—	—	—	—	—	—
Stm Ent Sec SH	7 / 8	F	751.4/738.2	745/733.6	741.1/735.4	752.1/741.9	741.2/734.6	738.9/737.6
Stm Lvg Sec SH	9	F	1007.8	999.6	1000.2	1010.0	1012.2	1005.6
Stm to RH Attemp	11	F	605.8	523.6	589.9	605.7	605.4	592.1
Stm Lvg RH Attemp	511	F	521.3	573.5	557.8	540.8	541.0	534.2
Stm Lvg RH	602	F	982.1	1007.5	1010.7	983.1	984.6	967.4
Water to SH Attemp	507	F	259.2	255.4	258.7	259.8	259.1	256.7
Water to RH Attemp	507	F	259.2	255.4	258.7	259.8	259.1	256.7
BOILER PRESSURES								
Water to Econ	605	PSIG	2680.5	2656.4	2668.5	2664.5	2664.5	2658.4
Drum Press	606	PSIG	2519.9	2502.2	2507.0	2513.5	2500.5	2490.8
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2415.6	2399.0	2385.4	2404.2	2399.0	2391.7
RH Inlet	604	PSIG	421.6	400.5	464.0	427.7	435.9	421.7
RH Outlet	603	PSIG	367.9	346.8	413.4	376.4	383.9	369.0
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F	—	—	—	—		
FW Ent #1 Htr	3	F C	126.3	125.4	125.3	128.2	126.9	125.7
FW Ent #2 Htr	5	F C	148.6	146.5	147.0	149.7	148.6	147.0
#1 Htr Drain	4	F C	132.3	130.9	130.7	133.8	132.5	131.1
#2 Htr Drain	6	F C	159.9	155.6	156.1	158.7	157.7	156.1
Stm to #1 Htr - Temp	1	F	595.9	579.1	598.0	601.2	583.8	572.6
Stm to #1 Htr - Press	LOCAL	PSIG	68	63	68	69	68	64
Stm to #2 Htr - Temp	2	F	796.3	772.0	794.3	795.0	777.1	763.1
Stm to #2 Htr - Press	LOCAL	PSIG	166	154	166	166	166	154
FW ENT #3 HP HTR TEMP	7	C	190.6	186.9	188.2	190.3	189.4	187.6
STM TO #3 HP HTR TEMP	10	F	542.5	572.6	507.5	538.0	545.4	526.4
STM TO #3 HP HTR PRESS	LOCAL	PSIG	420	400	430	420	420	400
#3 HP HTR DRAIN TEMP	8	C	196.9	192.9	193.8	196.6	195.5	193.6

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS	2					
	Test No.								
	Date			12/8/84					
	Time		Hours	1300	1330	1400	1430	1500	1530
	AIR & GAS TEMPERATURES								
(4)	Flue Gas Lvg Econ	24/25	F	590.2/595.9	582.3/590.9	582.9/588.2	589.9/597.2	586.6/592.8	582.8/588.9
(3)	Flue Gas Lvg AH	20/21	F	254.8/252.5	255.9/254.2	256.6/253.8	258.8/253.1	259.1/256.2	263.0/260.6
(4)	Flue Gas Lvg Hot Precip	26/27	F	546.9/548.6	548.5/551.3	549.8/550.2	553.2/554.8	553.5/555.9	551.8/554.6
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
	Air Lvg FD Fan	12/13	F	61.9/62.3	61.3/61.9	62.2/62.4	62.1/62.6	66.0/66.5	73.4/73.9
(5)	Air Ent Sec AH	14/15	F	109/113.6	110.3/116.1	111.9/118.1	108.4/113.8	111.4/116.6	119.1/124.5
(6)	Air Lvg Sec AH	22/23	F	506.1/459.2	510.1/502.4	511.9/503.7	511.9/505.0	513.6/506.7	514.6/506.1
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	49.4	48.9	47.2	45.8	48.9	59.3
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1542.3	1512.4	1716.7	1637.4	1592.9	1585.9
	SH Spray Flow	704	LB/HR	—	—	—	—	9.95	—
	RH Spray Flow	703	LB/HR	36.44	—	38.03	33.97	29.9	30.11
	SH Spray Valve Posit	—	%	—	—	—	—	—	—
	RH Spray Valve Posit	—	%	—	—	—	—	—	—
	*HP Extraction Flow	—	LB/HR	—	—	—	—	—	—
(9)	O_2 Lvg Econ	306/307	%	3.19/2.93	3.13/2.80	3.21/2.96	3.24/2.98	3.24/2.75	3.01/3.00
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO
JOB NUMBER = D12-507

PLANT OPERATING DATA

DATA ITEM	UNITS	2	2	2	2	2	2
Test No.							
Date		12-8-84	→	→	→	→	→
Time	Hours	1300	1330	1400	1430	1500	1530
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	130.72	130.76	131.01	131.31	131.51	131.53
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV. 2A COAL/AIR TEMP	F	125.2	126.0	127.6	127.2	127.2	128.2
PULV. 2B COAL/AIR TEMP	F	126.8	129.0	129.2	129.5	129.0	129.1
PULV. 2C COAL/AIR TEMP	F	123.4	123.9	124.7	124.2	124.2	124.8
PULV. 2D COAL/AIR TEMP	F	128.6	126.4	127.4	127.0	126.9	127.5

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
(2) Efficiency data

3
CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO
TAB NUMBER DB-502

PLANT OPERATING DATA

DATA ITEM		UNITS	2	2				
Test No.								
Date			12/8/84	12/8/84				
Time		Hours	1600	1630				
INSTANT GROSS MW			252.10	274.78				
UNIT ON LOAD DEMAND								
BOILER TEMPERATURES								
~~Water to Econ~~	509	~~F~~	449.9	462.7				
Water Lvg Econ	311	F	536.9	534.4				
Stm Lvg Pri SH	514/515	F	753.7/744.8	769.6/757.4				
Stm Ent Plat SH	—	F	—	—				
Stm Lvg Plat SH	—	F	—	—				
Stm Ent Sec SH	7/8	F	741/736.5	748.3/740.1				
Stm Lvg Sec SH	9	F	1004.1	999.2				
Stm to RH Attemp	11	F	591	603.2				
Stm Lvg RH Attemp	511	F	525.4	563.8				
Stm Lvg RH	602	F	975.2	1003.4				
Water to SH Attemp	507	F	255.8	261.4				
Water to RH Attemp	507	F	255.8	261.4				
BOILER PRESSURES								
Water to Econ	605	PSIG	2652.4	2682.5				
Drum Press	606	PSIG	2495.7	2518.7				
PSH in Press	—	PSIG	—	—				
Stm Lvg Sec SH	601	PSIG	2397.9	2396.9				
RH Inlet	604	PSIG	407.5	464.1				
RH Outlet	603	PSIG	354.1	413.6				
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	125.7	127.6				
FW Ent #2 Htr	5	F C	147	150.0				
#1 Htr Drain	4	F C	131.1	133.4				
#2 Htr Drain	6	F C	155.8	159.7				
Stm to #1 Htr - Temp	1	F	576.7	592.6				
Stm to #1 Htr - Press	LOCAL	PSIG	64	75				
Stm to #2 Htr - Temp	2	F	770.5	789.7				
Stm to #2 Htr - Press	LOCAL	PSIG	154	178				
FW ENT #3 HP HTR TEMP	7	C	187.3	191.3				
STM To #3 HP HTR TEMP	10	F	524.1	546.9				
STM To #3 HP HTR PRESS	LOCAL	PSIG	400	450				
#3 HP HTR DRAIN TEMP	8	C	193.1	197.9				

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

1

PLANT OPERATING DATA

	DATA ITEM		UNITS						
	Test No.								
	Date								
	Time		Hours						
	AIR & GAS TEMPERATURES								
(4)	Flue Gas Lvg Econ	24/25	F	583.2/588.1	590.9/596.6				
(3)	Flue Gas Lvg AH	20/21	F	262.7/261.9	261.6/259				
(4)	Flue Gas Lvg Hot Precip	26/27	F	551.9/553.5	550.5/551.3				
(3)	Flue Gas Lvg Pri AH	—	F	—	—				
	Air Lvg FD Fan	12/13	F	75.3/75.6	71.4/71.4				
(5)	Air Ent Sec AH	14/15	F	119.7/125.7	115.3/119.5				
(6)	Air Lvg Sec AH	22/23	F	511.6/506.1	509.3/504				
	Air Lvg PA Fan	—	F	—	—				
(5)	Air Ent Pri AH	—	F	—	—				
(6)	Air Lvg Pri AH	—	F	—	—				
	Air Ent Pulv	—	F	—	—				
(1)	Ambient Air	18	F	61.2	53.1				
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1512.7	1806.7				
	SH Spray Flow	704	LB/HR	3.62	44.91				
	RH Spray Flow	703	LB/HR	30.43	29.55				
	SH Spray Valve Posit	—	%	—					
	RH Spray Valve Posit	—	%	—					
	*HP Extraction Flow	—	LB/HR	—					
(9)	O_2 Lvg Econ	306/307	%	3.19/2.98	3.0/2.92				
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip.		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.							
Date							
Time	Hours						
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	131.54	131.91				
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	128.2	127.3				
2-B	F	129.1	127.7				
2-C	F	124.6	124.0				
2-D	F	127.5	127.0				

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

(2) Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

TAR NUMBER DA-507

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.								
Date			12/10/84					
Time		Hours	0800	0830	0900	0930	1000	1030
INSTANT. GEN. GROSS MW			336.63	334.45	336.05	360.35	344.51	328.64
BOILER TEMPERATURES								
[illegible]	509	F	477.7	478.6	484.5	485	476.7	478.6
Water Lvg Econ	311	F	563.8	563	571.4	574.2	563.3	565.7
Stm Lvg Pri SH	514/515	F	765.6/753.4	770.8/763.6	773.6/765.7	773/767.0	760.1/754.1	762/757.8
Stm Ent Plat SH	—	F		—	—	—	—	—
Stm Lvg Plat SH	—	F		—	—	—	—	—
Stm Ent Sec SH	7/8	F	764.1/755.1	761.1/752.4	760.7/755.8	772.1/756.9	760.5/767.7	760.7/755.7
Stm Lvg Sec SH	9	F	998.3	1005.6	1003.0	995.7	1001.6	1011.7
Stm to RH Attemp	11	F	629.8	632.9	633.4	638.2	634.1	634.1
Stm Lvg RH Attemp	511	F	569.7	578.9	579.8	572.8	575.6	567.2
Stm Lvg RH	602	F	1001.9	1021.6	1015.7	1011.9	987.5	1015.4
Water to SH Attemp	507	F	272.8	272.8	274.8	277	273.1	272.6
Water to RH Attemp	507	F	272.8	272.8	274.8	277	273.1	272.6
BOILER PRESSURES								
Water to Econ	605	PSIG	2742.8	2738.7	2750.8	2750.8	2744.8	2736.7
Drum Press	606	PSIG	2568.4	2565.2	2560.3	2578.1	2558.7	2545.0
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2403.1	2399	2386.5	2401	2399	2393.7
RH Inlet	604	PSIG	549.2	554.8	591.6	598.8	542.2	549
RH Outlet	603	PSIG	502.9	508.8	547.4	555	495.6	502.7
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	134.9	134.3	134.5	137.1	136.7	134.3
FW Ent #2 Htr	5	F C	156.6	155.9	156.2	159.5	158.9	156.6
#1 Htr Drain	4	F C	142.0	141.1	141.3	144.5	143.3	140.9
#2 Htr Drain	6	F C	168.7	168.2	169.6	171.8	169.9	167.6
Stm to #1 Htr - Temp	1	F	600.0	595.9	601.6	608.1	596.3	590.7
Stm to #1 Htr - Press	LOCAL	PSIG	90	88	91	97	89	87
Stm to #2 Htr - Temp	2	F	797.6	791.3	797.5	803.5	791.7	786.5
Stm to #2 Htr - Press	LOCAL	PSIG	210	210	214	228	208	208
FW ENT #3 HP HTR TEMP	7	C	199.4	198.7	199.7	202	200.4	199.3
STM TO #3 HP HTR TEMP	10	F	567.4	579.1	568.1	575.0	565.6	568.3
STM TO #3 HP HTR PRESS	LOCAL	PSIG	530	530	540	570	530	520
#3 HP HTR DRAIN TEMP	8	C	207.7	207.1	207.5	211.1	208.9	206.3

UNIT RUNS WITH OVERFIRE DAMPER OPEN @ 187°(R) AND 109°(L) UNTIL DAMPERS CLOSED @ 0935 HRS

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO.: RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS	2					
	Test No.								
	Date			12/10/84					
	Time		Hours	0800	0830	0900	0930	1000	1030
	AIR & GAS TEMPERATURES								
(4)	~~Flue Gas Lvg Econ~~	24/25	F	653.0/653.9	649.2/651.7	642.9/645.7	666.9/661.9	663.9/666.0	648.5/651.8
(3)	Flue Gas Lvg AH	20/21	F	259.9/264.5	260.6/267.5	260.6/269.9	261.8/268.6	264.3/272.3	267.1/275.8
(4)	Flue Gas Lvg Hot Precip	26/27	F	594.6/594.5	558.6/600.7	597.2/600.8	603.5/609.3	616.6/617.8	609/611
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	
	Air Lvg FD Fan	12/13	F	43.0/44.6	44.9/46.3	46.4/47.1	46.4/47.4	49/49.7	52.7/52.9
(5)	Air Ent Sec AH	14/15	F	101.3/97.6	95.1/95.8	93.2/96.1	91.1/93.6	88.8/96.4	93.9/101.5
(6)	Air Lvg Sec AH	22/23	F	539.1/532.6	544.8/539.5	547/541.3	551/545.3	559.5/554.2	557.2/551.1
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	29.9	32.6	32.7	33.9	35.6	39.5
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	2122.3	2057.6	2212.8	2279.8	2101.3	2099.1
	SH Spray Flow	704	LB/HR	—	—	—	—	—	—
	RH Spray Flow	703	LB/HR	44.23	50.06	48.94	53.32	36.96	52.32
	SH Spray Valve Posit	—	%						
	RH Spray Valve Posit	—	%						
	*HP Extraction Flow	—	LB/HR						
(9)	O_2 Lvg Econ	306/307	%	3.12/2.81	3.11/2.70	3.0/2.76	2.88/2.86	2.92/2.65	2.98/2.78
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.
* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.
+ - Report data available - specific requirements will be requested.
(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF 2 COLORADO, PUEBLO COLORADO
JOB NUMBER - 0.3 EAT

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.							
Date							
Time	Hours	0800	0830	0900	0930	1000	1030
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	135.94	138.28	140.51	143.07	144.89	146.27
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP 16	F	125.9	127.2	127.3	126.8	127.7	128.1
PULV 2-B COAL/AIR TEMP 17	F	123.3	124.2	124.7	124.2	125.7	125.8
PULV 2-C COAL/AIR TEMP 18	F	120.7	121.4	121.9	121.6	122.5	122.7
PULV 2-D COAL/AIR TEMP 19	F	123.9	124.4	124.7	124.6	125.7	126.0

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

(2) - Efficiency data

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.								
Date			12/10/84					
Time		Hours	1100	1130	1300	1330	1400	1430
INSTANT GEN. GROSS		MW	332.65	315.39	301.07	296.45	280.70	269.15
UNIT ON LOAD DEMAND							NOTE (1)	
BOILER TEMPERATURES								
~~Water to Econ~~	509	F	476.7	470.7	460.2	462.9	461.5	459.6
Water Lvg Econ	311	F	566.4	535.7	545.4	546.7	541.1	543.3
Stm Lvg Pri SH	514/515	F	767.8/760.9	755.2/747.6	745.1/738.8	750.6/742.4	745.4/738.1	753.6/750.9
Stm Ent Plat SH	—	F	—	—	—	—		—
Stm Lvg Plat SH	—	F	—	—	—	—		—
Stm Ent Sec SH	7/8	F	767.4/760.1	756/750.3	752.6/745.6	751.3/743.5	744.5/738.7	737.3/735.7
Stm Lvg Sec SH	9	F	1012.2	974.6	981.9	959.8	973.5	974.9
Stm to RH Attemp	11	F	640.7	604.0	607.2	591.6	586.1	580.3
Stm Lvg RH Attemp	511	F	558.9	551.4	516.2	577.5	514.9	590.9
Stm Lvg RH	602	F	1007.2	977.1	967.7	984.3	960.8	1010.3
Water to SH Attemp	507	F	272.4	269.8	264.5	263.7	262.4	260.1
Water to RH Attemp	509	F	272.4	269.8	264.5	263.7	262.4	260.1
BOILER PRESSURES								
Water to Econ	605	PSIG	2744.8	2728.7	2710.6	2710.6	2690.6	2702.6
Drum Press	606	PSIG	2555.5	2552.3	2511.9	2537.7	2523.2	2536.1
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2406.3	2410.4	2406.3	2403.1	2397.9	2410.4
RH Inlet	604	PSIG	541.8	519	463.8	467.1	463.6	463.6
RH Outlet	603	PSIG	495.1	471.2	413.2	416.7	413.0	413.0
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	134.4	133.7	131.9	130.7	129.2	127.5
FW Ent #2 Htr	5	F C	156.9	155.6	153.9	153.0	151.1	149.1
#1 Htr Drain	4	F C	141.0	140.1	138.1	136.9	135.2	133.3
#2 Htr Drain	6	F C	168.1	165.9	163.9	163.3	161.0	158.8
Stm to #1 Htr - Temp	1	F	607.0	588.9	596.2	576.2	581.7	575.7
Stm to #1 Htr - Press	LOCAL	PSIG	87	86	74	76	72	73
Stm to #2 Htr - Temp	2	F	804.0	780.9	788.9	769.2	772.2	769.1
Stm to #2 Htr - Press	LOCAL	PSIG	206	204	176	184	172	174
FW ENT #3 HP HTR TEMP	7	C	199.1	196.4	195.0	194.5	191.9	189.9
STM To #3 HP HTR TEMP	10	F	557.5	550.2	542.2	525.7	575.6	571.3
STM To #3 HP HTR PRESS	LOCAL	PSIG	520	520	460	460	440	450
#3 HP HTR DRAIN TEMP	8	C	207.2	204.1	202.1	201.7	198.8	196.3

NOTE (1) PULV. 2-A WAS TAKEN OFF-LINE @ 1410 HRS

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

1

PLANT OPERATING DATA

	DATA ITEM		UNITS	2					
	Test No.								
	Date			12/10/84					
	Time		Hours	1100	1130	1300	1330	1400	1430
	AIR & GAS TEMPERATURES								
(4)	Flue Gas Lvg Econ	24/25	F	649.9/651.3	636.5/639.4	615.4/625.4	615.7/620.2	609.4/612.4	601.9/604.7
(3)	Flue Gas Lvg AH	20/21	F	266.3/276.3	266.5/275.0	263.2/272.1	265.8/272.4	271.3/277.9	265.5/273.5
(4)	Flue Gas Lvg Hot Precip	26/27	F	606.9/610.1	602.7/605.1	587.2/589.2	582.3/584.7	580.0/582.9	574.5/577.6
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
	Air Lvg FD Fan	12/13	F	56.2/56.9	60.0/60.3	66.2/66.4	68.2/69.0	71.9/72.6	74.1/74.9
(5)	Air Ent Sec AH	14/15	F	96.5/103.4	101.5/107.6	107.5/113.7	109.8/116.0	114.7/120.7	117.4/124.5
(6)	Air Lvg Sec AH	22/23	F	555.5/551.4	552.6/548.5	540.3/536.3	536.7/533.4	536.9/535.6	533/528.2
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	44.6	45.2	49.4	52.9	55.5	56.7
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	2113.8	2057.3	1797.1	1855.8	1733.9	1754.5
	SH Spray Flow	704	LB/HR	—	—	—	—	—	—
	RH Spray Flow	703	LB/HR	54.23	37.15	7.95	—	44.15	—
	SH Spray Valve Posit	—	%		—	—	—	—	—
	RH Spray Valve Posit	—	%		—	—	—	—	—
	*HP Extraction Flow	—	LB/HR			—	—	—	—
(9)	O_2 Lvg Econ	306/307	%	3.07/2.76	2.89/2.62	2.99/2.58	3.01/2.64	3.01/2.77	2.84/2.53
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NUMBER = D12E07

PLANT OPERATING DATA

DATA ITEM	UNITS	2					
Test No.							
Date		12/10/84					
Time	Hours	1100	1130	1300	1330	1400	1430
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	147.52	148.29	149.13	149.32	149.33	149.28
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	129.2	130.8	131.5	131.1	144.7	—
PULV 2-B COAL/AIR TEMP	F	128.3	127.7	127.9	127.0	124.2	124.5
PULV 2-C COAL/AIR TEMP	F	123.0	123.9	123.8	123.4	121.7	121.5
PULV. 2-D COAL/AIR TEMP	F	126.3	127.2	127.1	126.5	124.4	124.6

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

(2) Efficiency data

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.								
Date			12/10/84	→	→	→		
Time		Hours	1500	1530	1600	1630		
INSTANT GENERATION GROSS MW			272.85	261.10	273.13	281.32		
UNIT ON LOAD DEMAND						NOTE (1)		
BOILER TEMPERATURES								
~~Water to Econ~~	509	~~F~~	454.5	453.1	459.3	460.9		
Water Lvg Econ	311	F	530.3	534.5	542.0	543.4		
Stm Lvg Pri SH	514/515	F	735.2/731.5	745.7/741.3	753.3/757.9	752.7/748		
Stm Ent Plat SH	—	F	—	—	—	—		
Stm Lvg Plat SH	—	F	—	—	—	—		
Stm Ent Sec SH	7/8	F	747.4/738.9	736.4/738.5	743.1/742.6	750.8/748.8		
Stm Lvg Sec SH	9	F	975.5	981.3	955.2	1003.2		
Stm to RH Attemp	11	F	580.9	576.5	592.1	608.0		
Stm Lvg RH Attemp	511	F	559.7	571.9	591.7	536.9		
Stm Lvg RH	602	F	958.0	977.1	1010.7	974.9		
Water to SH Attemp	507	F	257.3	256.2	258.1	261.6		
Water to RH Attemp	509	F	257.3	256.2	258.1	261.6		
BOILER PRESSURES								
Water to Econ	605	PSIG	2688.6	2666.5	2692.6	2692.6		
Drum Press	606	PSIG	2513.5	2570.2	2519.9	2524.8		
PSH in Press	—	PSIG	—	—	—	—		
Stm Lvg Sec SH	601	PSIG	2393.7	2394.8	2390.6	2395.8		
RH Inlet	604	PSIG	442.3	428.2	463.5	463.5		
RH Outlet	603	PSIG	390.7	375.9	412.9	412.9		
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F	—	—	—	—		
FW Ent #1 Htr	3	F C	128.5	126.6	127.2	128.5		
FW Ent #2 Htr	5	F C	150.1	147.9	149.2	150.7		
#1 Htr Drain	4	F C	134.3	132.3	133.2	134.3		
#2 Htr Drain	6	F C	159.6	157.4	159.1	160.4		
Stm to #1 Htr - Temp	1	F	591.5	570.4	586.5	609.2		
Stm to #1 Htr - Press	LOCAL	PSIG	70	65	68	74		
Stm to #2 Htr - Temp	2	F	784.1	761.4	780.7	805.1		
Stm to #2 Htr - Press	LOCAL	PSIG	170	156	165	174		
FW ENT #3 HP HTR TEMP	7	C	190.9	188.3	190.4	192.1		
STM TO #3 HP HTR TEMP	10	F	572.8	565.9	581.9	539.8		
STM TO #3 HP HTR PRESS	LOCAL	PSIG	440	400	430	440		
#3 HP HTR DRAIN TEMP	8	C	197.3	194.7	197.1	198.6		

NOTE (1) overfire ports open at 1415 hrs @ 16% open (R) 14% open (L).

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.

JOB NO. : RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS	2	—	—	—		
	Test No.								
	Date			12/10/84	12/10/84	12/10/84	12/10/84		
	Time		Hours	1500	1530	1600	1630		
	AIR & GAS TEMPERATURES								
(4)	Flue Gas Lvg Econ	24/25	F	607/616	596/598.9	2652/608.8	614.1/615.3		
(3)	Flue Gas Lvg AH	20/21	F	264.4/273.5	264.3/275.9	265.8/272.5	262.2/270.3		
(4)	Flue Gas Lvg Hot Precip	26/27	F	574/577.3	569.5/572.4	586.9/588.9	572.8/572.2		
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—		
	Air Lvg FD Fan	12/13	F	74.5/75.0	75.8/75.2	75.1/74.6	72.5/73.0		
(5)	Air Ent Sec AH	14/15	F	116.8/123.3	118.8/125.4	116.5/122.5	115.3/121.6		
(6)	Air Lvg Sec AH	22/23	F	531.7/528	527.6/526.4	523.7/522.5	527/523.3		
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	56.5	56.7	55.2	57.9		
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1713.7	1659.3	1806.1	1741.7		
	SH Spray Flow	704	LB/HR	—	—	—	—		
	RH Spray Flow	703	LB/HR	—	—	—	39.43		
	SH Spray Valve Posit	—	%	—	—	—	—		
	RH Spray Valve Posit	—	%	—	—	—	—		
	*HP Extraction Flow	—	LB/HR	—	—	—	—		
(9)	O_2 Lvg Econ	306/307	%	2.48/2.49	3.15/2.95	3.15/2.97	2.87/2.71		
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv						-		
(22)	Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

2

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

JOB NUMBER - 0.2-E07

PLANT OPERATING DATA

DATA ITEM	UNITS	2	→	→	→		
Test No.							
Date		12/10/84	→	→	→		
Time	Hours	1500	1530	1600	1630		
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	149.04	148.75	148.67	148.69		
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP.	F	OFF-LINE	—	—	—		
PULV 2-B " "	F	123.8	123.6	122.7	123.0		
PULV 2-C " "	F	121.0	121.2	120.3	120.4		
PULV 2-D " "	F	124.1	123.9	123.1	123.4		

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
(2) Efficiency data

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.								
Date			12/11/84					
Time		Hours	0730	0800	0830	0900	0930	1000
BOILER TEMPERATURES								
[illegible]	509	F	454.7	462.4	451.1	460.0	455.4	458.3
Water Lvg Econ	311	F	539.6	545.4	532.3	538.4	540.5	543.3
Stm Lvg Pri SH	514/515	F	742.5/736.3	746.6/741.9	746.7/733.4	758.4/743.4	754.6/746.5	750.2/742.2
Stm Ent Plat SH	—	F						
Stm Lvg Plat SH	—	F						
Stm Ent Sec SH	7/8	F	752.6/746.5	743.3/741.1	744.5/731.8	741.8/736.4	746.5/739.6	760.5/751.1
Stm Lvg Sec SH	9	F	973.8	998.4	980.6	993.9	992.8	1017.7
Stm to RH Attemp	11	F	583.4	596.8	576.1	584.4	590.2	614.0
Stm Lvg RH Attemp	511	F	566.9	530.1	572.3	535.2	513.2	529.1
Stm Lvg RH	602	F	977.7	984.0	994.4	1026.6	1004.1	982.8
Water to SH Attemp	507	F	260.9	262.4	256.6	258.0	259.5	261.3
Water to RH Attemp	507	F	260.9	262.4	256.6	258.0	259.5	261.3
BOILER PRESSURES								
Water to Econ	605	PSIG	2688.6	2692.6	2674.5	2680.5	2676.5	2686.5
Drum Press	606	PSIG	2526.4	2524.9	2513.5	2523.2	2524.8	2537.7
PSH in Press	—	PSIG						
Stm Lvg Sec SH	601	PSIG	2410.4	2406.0	2401.0	2394.8	2410.4	2401.0
RH Inlet	604	PSIG	428.3	463.6	414.0	463.6	428.2	449.4
RH Outlet	603	PSIG	376.0	413.0	361.0	413.0	375.9	398.1
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	129.6	127.5	126.9	126.1	127.1	127.5
FW Ent #2 Htr	5	F C	151.1	149.2	147.9	147.4	148.4	149.6
#1 Htr Drain	4	F C	135.5	133.2	132.4	131.6	132.7	133.6
#2 Htr Drain	6	F C	160.9	159.5	157.1	156.6	157.8	159.8
Stm to #1 Htr - Temp	1	F	600.9	581.7	566.4	593.7	601.3	600.5
Stm to #1 Htr - Press	LOCAL	PSIG	74	68	65	65	66	70
Stm to #2 Htr - Temp	2	F	796.2	775.4	754.0	789.5	796.6	795.5
Stm to #2 Htr - Press	LOCAL	PSIG	176	170	156	156	162	170
FW ENT #3 HP HTR TEMP	7	C	192	190.2	188.0	188.2	189.3	191.4
STM To #3 HP HTR TEMP	10	F	575.2	586.2	563.5	574.5	573.2	535.4
STM To #3 HP HTR PRESS	LOCAL	PSIG	460	440	400	400	420	440
#3 HP HTR DRAIN TEMP	8	C	198.8	197.3	194.4	194.3	195.4	198.1

OVERFIRE PORTS CLOSED @ 0840 HRS.

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

1

PLANT OPERATING DATA

	DATA ITEM		UNITS	2					
	Test No.								
	Date			12/11/84					
	Time		Hours	0730	0800	0830	0900	0930	1000
	AIR & GAS TEMPERATURES								
(4)	~~Flue Gas Lvg Econ~~	24/25	F	264.7/268.3	[illegible]	[illegible]	254.4/257.3	256.5/260.0	259.1/262.0
(3)	~~Flue Gas Lvg AH~~	20/21	F	264.2/271.8	262.1/270.6	260.0/268.8	257.5/266.8	257.7/266.4	259.2/267.8
(4)	Flue Gas Lvg Hot Precip	26/27	F	587.8/588.2	574.4/577.2	570.0/572.0	563.6/565.2	565.5/566.7	564.7/566.9
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
	Air Lvg FD Fan	12/13	F	61.6/61.3	61.3/62.4	60.9/61.9	61.7/62.9	64.1/64.6	65.4/66.1
(5)	Air Ent Sec AH	14/15	F	105.4/110.8	109.5/113.4	100.7/116.1	110.5/117.5	110.2/117.4	108.9/115.1
(6)	Air Lvg Sec AH	22/23	F	541.8/534.5	533.7/528	529.1/525.6	524.1/522.0	523.5/517.8	522/510.7
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	46.9	46.9	45.8	47.5	50.1	51.7
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1736.6	1772.3	1628.7	1790.7	1607.7	1709.5
	SH Spray Flow	704	LB/HR	—	—	—	—	—	—
	RH Spray Flow	703	LB/HR	—	45.06	—	43.53	43.59	41.41
	SH Spray Valve Posit	—	%	—	—	—	—	—	—
	RH Spray Valve Posit	—	%	—	—	—	—	—	—
	*HP Extraction Flow	—	LB/HR			—	—	—	—
(9)	O_2 Lvg Econ	306/307	%	3.21/2.63	3.05/2.69	2.99/2.62	3.03/2.58	3.08/2.63	2.93/2.83
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

JOB NUMBER - 2

PLANT OPERATING DATA

DATA ITEM	UNITS	2					
Test No.							
Date		12/11/84					
Time	Hours	0730	0800	0830	0900	0930	1000
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	154.39	153.98	153.08	152.38	151.84	151.50
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV. 2-A COAL/AIR TEMP	F	128.3	129.5	128.2	129.5	128.1	126.5
2-B	F	127.5	126.6	127.3	127.8	127.0	125.2
2-C	F	123.2	122.9	123.2	125.8	123.0	121.9
2-D	F	126.1	125.7	125.8	126.3	125.9	124.8

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

(2) Efficiency data

3

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.			2					
Date			12/11/84					
Time		Hours	1030	1100	1130	1300	1330	1400
INSTANT. GENERATION GROSS		MW	278.29	256.57	262.94	290.04	262.00	261.88
BOILER TEMPERATURES								
~~Water to Econ~~	509	F	452.9	451.3	457.7	463.5	452.8	452.0
Water Lvg Econ	311	F	538.4	533.9	538.5	550.1	536.2	535.6
Stm Lvg Pri SH	514/515	F	742.8/735.8	~~744.1/741.1~~ 743.2/736.5	735.6/741.6	758.6/749.2	746.8/735	746.4/740
Stm Ent Plat SH	—	F	—	—	—	—	—	—
Stm Lvg Plat SH	—	F	—	—	—	—	—	—
Stm Ent Sec SH	7/8	F	752.7/747.8	742.6/732.8	744.3/736.5	758.4/748.6	741.4/735.7	739.5/739.1
Stm Lvg Sec SH	9	F	1012.1	985.5	992.4	994.6	975.3	993.7
Stm to RH Attemp	11	F	609.9	576.6	586.4	607.5	574.6	588.6
Stm Lvg RH Attemp	511	F	535.7	569.5	590.5	546.0	567.6	572.1
Stm Lvg RH	602	F	971.8	980.6	1005.6	991.8	972.7	1003.1
Water to SH Attemp	507	F	260.1	256.1	256.7	264.1	257.6	256.8
Water to RH Attemp	507	F	260.1	256.1	256.7	264.1	257.6	256.8
BOILER PRESSURES								
Water to Econ	605	PSIG	2688.6	2670.5	2678.5	2704.6	2684.5	2686.5
Drum Press	606	PSIG	2536.1	2510.2	2518.3	2545.8	2502.2	2507.0
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2416.7	2397.9	2392.7	2399.0	2401	2399
RH Inlet	604	PSIG	414.0	414.0	449.3	463.5	421.1	414.1
RH Outlet	603	PSIG	361.0	361.0	398.0	412.9	368.4	361.1
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	127.4	126.3	126.5	129.3	128.3	126.4
FW Ent #2 Htr	5	F C	149.4	147.3	148.0	151.8	149.3	148.0
#1 Htr Drain	4	F C	133.4	131.8	132.3	135.5	134.0	132.1
#2 Htr Drain	6	F C	159.5	156.7	157.5	162.0	157.8	157.2
Stm to #1 Htr - Temp	1	F	602.2	576.6	583.2	598.5	575.4	587.4
Stm to #1 Htr - Press	LOCAL	PSIG	72	65	66	75	67	69
Stm to #2 Htr - Temp	2	F	798.4	768.2	775.3	793.1	765.1	782.8
Stm to #2 Htr - Press	LOCAL	PSIG	174	158	160	180	160	158
FW ENT #3 HP HTR TEMP	7	C	191.3	187.9	188.9	193.6	188.8	188.7
STM TO #3 HP HTR TEMP	10	F	599.7	565.6	574.2	554.1	564.8	578.0
STM TO #3 HP HTR PRESS	LOCAL	PSIG	450	400	410	460	460	410
#3 HP HTR DRAIN TEMP	8	C	197.6	194.0	195.2	200.6	195.1	194.9

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS	2					
	Test No.								
	Date			12/11/84					
	Time		Hours	1030	1100	1130	1300	1330	1400
	AIR & GAS TEMPERATURES								
(4)	Flue Gas Lvg Econ	24/25	F	~~599.5~~/603.0	586.3/592.4	~~590.0~~/594.9	607/612.7	599.4/604.3	593.5/598.0
(3)	Flue Gas Lvg AH	20/21	F	259.7/267.5	258.4/263.2	263.0/270.6	265.1/273.2	268.9/272.6	263.8/272.2
(4)	Flue Gas Lvg Hot Precip	26/27	F	582.7/585.9	561.1/563.5	577.2/577.6	575.2/578.5	574.5/576.6	567.3/570.3
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
	Air Lvg FD Fan	12/13	F	66.1/66.8	66.9/67.9	68.6/69.5	73.2/74.0	74.8/74.9	73.6/73.8
(5)	Air Ent Sec AH	14/15	F	110.9/116.8	113.8/121.2	114.2/118.6	114.7/120.4	117.8/124.1	118/124.1
(6)	Air Lvg Sec AH	22/23	F	520.7/519.9	520.8/518.3	~~518.8~~/514.7	530.5/527.2	533.1/527.8	526.7/523.5
	Air Lvg PA Fan	—	F	—	—	—		—	
(5)	Air Ent Pri AH	—	F	—	—	—			
(6)	Air Lvg Pri AH	—	F	—	—	—			
	Air Ent Pulv	—	F	—	—	—			
(1)	Ambient Air	18	F	52.7	52.9	56.1	58.5	~~62.1~~/58.5	61.2
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1628.7	1604.9	1729.9	1851.0	1680.9	1061.5
	SH Spray Flow	704	LB/HR	—	—	—	—	—	—
	RH Spray Flow	703	LB/HR	1.07	—	—	31.3	—	—
	SH Spray Valve Posit	—	%	—	—	—	—	—	—
	RH Spray Valve Posit	—	%	—	—	—	—	—	—
	*HP Extraction Flow	—	LB/HR	—	—	—	—	—	—
(9)	O_2 Lvg Econ	306/307	%	3.15/2.61	3.12/2.67	3.1/2.65	3.09/2.79	2.98/2.69	3.11/2.60
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

(2) Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO 2

JOB NUMBER: RR-502

DATA ITEM	UNITS	2					
Test No.							
Date		12/11/84					
Time	Hours	1030	1100	1130	1300	1330	1400
DRAFT LOSS DATA							
~~FD Fan Disch~~	"Wg						
SCAH In (Out)	"Wg						
AH Air In	"Wg						
AH Air Out	"Wg						
Windbox	"Wg						
Furnace	"Wg						
Econ Out	"Wg						
AH Gas In	"Wg						
AH Gas Out	"Wg						
Precip In	"Wg						
Precip Out	"Wg						
ID Fan In	"Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	151.06	150.42	150.02	150.19	149.86	149.47
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	"Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP.	F	126.8	128.1	127.9	126.2	129.3	128.7
" 2-B " "	F	125.8	127.4	127.0	125.6	128.5	127.7
" 2-C " "	F	122.4	123.5	123.1	122.4	124.3	123.8
" 2-D " "	F	124.9	126.1	125.9	125.2	127.4	126.8

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
(2) Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO
TDR NUMBER RR-502

PLANT OPERATING DATA

DATA ITEM		UNITS	2	2				
Test No.								
Date			12/11/84	12/11/84				
Time		Hours	1430	1500				
			261.20	259.95				
BOILER TEMPERATURES								
~~Water to Econ~~	509	F	450.2	452.5				
Water Lvg Econ	311	F	538.4	538.1				
Stm Lvg Pri SH	514/515	F	747.4/738.7	745/739.9				
Stm Ent Plat SH	—	F						
Stm Lvg Plat SH	—	F						
Stm Ent Sec SH	7/8	F	750.7/743	743.5/737.8				
Stm Lvg Sec SH	9	F	997.1	990.4				
Stm to RH Attemp	11	F	588.8	584.0				
Stm Lvg RH Attemp	511	F	571.3	574.8				
Stm Lvg RH	602	F	998.4	992.5				
Water to SH Attemp	507	F	255.4	256.5				
Water to RH Attemp	507	F	255.4	256.5				
BOILER PRESSURES								
Water to Econ	605	PSIG	2672.5	2674.5				
Drum Press	606	PSIG	2511.9	2515.1				
PSH in Press	—	PSIG						
Stm Lvg Sec SH	601	PSIG	2399.0	2399				
RH Inlet	604	PSIG	407.0	414.0				
RH Outlet	603	PSIG	353.6	361.0				
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	126.2	126.2				
FW Ent #2 Htr	5	F C	147.7	147.7				
#1 Htr Drain	4	F C	131.7	131.7				
#2 Htr Drain	6	F C	157.0	157.1				
Stm to #1 Htr - Temp	1	F	600.6	589.7				
Stm to #1 Htr - Press	LOCAL	PSIG	64	65				
~~Stm to #2 Htr - Temp~~	2	F	796	783.1				
~~Stm to #2 Htr - Press~~	LOCAL	PSIG	158	160				
FW ENT #3 HP HTR TEMP	7	C	188.7	188.5				
STM TO #3 HP HTR TEMP	10	F	577	574.3				
STM TO #3 HP HTR PRESS	LOCAL	PSIG	400	410				
#3 HP HTR DRAIN TEMP	8	C	194.8	194.8				

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO.: RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS						
	Test No.								
	Date			12/11/84	12/11/84				
	Time		Hours	1430	1500				
	AIR & GAS TEMPERATURES								
(4)	Flue Gas Lvg Econ	24/25	F	590.8/597.7	585.3/589.4				
(3)	Flue Gas Lvg AH	20/21	F	261.5/270.6	259.2/271.1				
(4)	Flue Gas Lvg Hot Precip	26/27	F	583.1/585.5	556/560.9				
(3)	Flue Gas Lvg Pri AH	—	F	—	—				
	Air Lvg FD Fan	12/13	F	74.2/74.6	75.1/75.5				
(5)	Air Ent Sec AH	14/15	F	118.1/124.3	118.8/125.6				
(6)	Air Lvg Sec AH	22/23	F	518.3/520.3	517.3/515.7				
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	60.2	60.2				
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1573.2	1631.2				
	SH Spray Flow	704	LB/HR	—	—				
	RH Spray Flow	703	LB/HR	—	—				
	SH Spray Valve Posit	—	%	—	—				
	RH Spray Valve Posit	—	%	—	—				
	*HP Extraction Flow	—	LB/HR	—	—				
(9)	O_2 Lvg Econ	306/307	%	3.05/2.80	3.04/2.75				
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	~~Relative Humidity~~		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO
JOB NUMBER = RP-502

PLANT OPERATING DATA

DATA ITEM	UNITS	2	2				
Test No.							
Date		12/11/84	12/11/84				
Time	Hours	1430	1500				
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	148.86	148.76				
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	128.9	129.4				
" 2-B " "	F	127.8	128.3				
" 2-C " "	F	124.0	124.4				
" 2-D " "	F	126.6	127.2				
"							

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
(2) Efficiency data

3

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO
JOB NUMBER RR-502

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.								
Date			12/12/84					
Time		Hours	0800	0830	0900	0930	1000	1030
INSTANT GROSS		MW	333.58	319.37	320.84	307.09	318.32	317.54
BOILER TEMPERATURES								
~~Water to Econ~~	509	F	476.4	473.4	473.6	469.4	473.8	473.7
Water Lvg Econ	311	F	561.7	562.5	558.4	554.8	558.0	558.9
Stm Lvg Pri SH	514/515	F	758.6/752.2	753.2/753.3	755.5/750.7	756.4/745.9	759.6/755.2	756.6/750
Stm Ent Plat SH	—	F	—	—	—	—	—	—
Stm Lvg Plat SH	—	F	—	—	—	—	—	—
Stm Ent Sec SH	7/8	F	755.4/748.8	750.1/745.2	752.5/749.6	753.5/744.1	760/753.9	754.3/744.5
Stm Lvg Sec SH	9	F	991.7	996.6	994.9	1001.9	1010.2	984.8
Stm to RH Attemp	11	F	624.3	622.7	621.5	620.0	629.8	614.7
Stm Lvg RH Attemp	511	F	574.6	565.6	579.2	570.3	562.9	540.6
Stm Lvg RH	602	F	1009.7	1010.7	1008.5	995.9	1022.9	995.0
Water to SH Attemp	507	F	270	271.2	269.8	268.2	269.4	269.3
Water to RH Attemp	507	F	270	271.2	269.8	268.2	269.4	269.3
BOILER PRESSURES								
Water to Econ	605	PSIG	2740.8	2730.7	2726.7	2714.7	2718.7	2724.7
Drum Press	606	PSIG	2568.4	2581.4	2528.4	2535.5	2550.6	2545.8
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2402.1	2422.9	2404.2	2402.1	2404.2	2403.1
RH Inlet	604	PSIG	541.6	527.4	520.5	499.2	520.9	520.7
RH Outlet	603	PSIG	494.9	480.0	472.8	450.4	473.2	473.0
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	133.8	133.9	133.1	132.0	132.9	133.1
FW Ent #2 Htr	5	F C	156.5	156.0	155.5	154.0	155.2	155.4
#1 Htr Drain	4	F C	140.7	140.4	139.6	138.5	139.4	139.2
#2 Htr Drain	6	F C	168.1	166.7	166.4	164.5	166.0	166.5
Stm to #1 Htr - Temp	1	F	587.4	600.3	599.9	591.9	608.5	591.5
Stm to #1 Htr - Press	LOCAL	PSIG	78	87	85	82	93	85
~~Stm to #2 Htr - Temp~~	2	F	792.9	797.8	796.1	785.4	807.3	784.5
~~Stm to #2 Htr - Press~~	LOCAL	PSIG	208	206	202	184	196	200
FW ENT #3 HP HTR TEMP	7	C	198.8	197.7	197.4	195.7	197.3	197.2
STM To #3 HP HTR TEMP	10	F	577.4	565.3	575.0	571.1	560.9	535.3
STM To #3 HP HTR PRESS	LOCAL	PSIG	520	520	510	500	500	500
#3 HP HTR DRAIN TEMP	8	C	207.1	205.5	205.2	203.1	204.9	205.2

BOTH OVERFIRE PORTS CLOSED AT 0745 HRS.

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO.: RB-502

1

PLANT OPERATING DATA

	DATA ITEM		UNITS	2					
	Test No.								
	Date			12/12/84					
	Time		Hours	0800	0830	0900	0930	1000	1030
	AIR & GAS TEMPERATURES								
(4)	~~Flue Gas Lvg Econ~~	24/25	F	653.2/654.4	652.1/653.3	649.1/650.6	649.2/650.3	649.5/650.9	641.3/642.4
(3)	~~Flue Gas Lvg AH~~	20/21	F	260.8/266.8	261/268.3	261.8/267.0	264.3/271.5	260.9/272.1	260.3/267.5
(4)	Flue Gas Lvg Hot Precip	26/27	F	597.9/601.1	605.6/606.4	605.9/609.6	604.1/606.6	604.9/607.8	600/602.5
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
	Air Lvg FD Fan	12/13	F	47.9/48.6	47.5/47.7	47.3/46.7	47.2/46.0	45.6/45.8	45.7/45.6
(5)	Air Ent Sec AH*	14/15	F	97.5/97.1	95.5/98.1	94.4/97.1	97.9/97.9	97.1/98.4	100/96.8
(6)	Air Lvg Sec AH	22/23	F	544.5/540	551.9/546.6	551.4/547.7	553.2/547.5	552.4/548.3	549.1/546.3
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	30.4	29.3	29.7	31.3	31.9	30.7
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	2094.9	2025.4	2002.6	1897.7	1947.7	2037.0
	SH Spray Flow	704	LB/HR	—	—	—	—	—	—
	RH Spray Flow	703	LB/HR	35	42.32	31.29	31.83	48.45	52.44
	SH Spray Valve Posit	—	%						
	RH Spray Valve Posit	—	%						
	*HP Extraction Flow	—	LB/HR						
(9)	O_2 Lvg Econ	306/307	%	3.05/2.74	2.93/2.75	3.16/2.68	3.23/2.54	3.14/2.62	2.99/2.67
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(2)	~~Relative Humidity~~		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.
* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.
+ - Report data available - specific requirements will be requested.
(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO
2

PLANT OPERATING DATA

DATA ITEM	UNITS	2 →					
Test No.							
Date		12/12/84 →					
Time	Hours	0800	0830	0900	0930	1000	1030
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	136.0	138.07	139.66	140.85	142.0	142.97
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	126	128.0	128.0	128.9	128.4	128.2
" 2-B " "	F	125.6	127.4	127.1	127.7	127.2	127.3
" 2-C " "	F	121.7	123.0	122.8	123.2	123.0	123.4
" 2-D " "	F	125.4	126.6	122.6	127.0	126.7	126.8

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

(2) Efficiency data

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.								
Date			12/12/84					
Time		Hours	1100	1130	1300	1330	1400	1430
INSTANT GROSS GEN.		MW	292.65	305.06	296.52	305.83	290.37	290.89
UNIT ON LOAD DEMAND								
BOILER TEMPERATURES								
[illegible]	509	F	462.8	469.4	465.0	469.0	465.0	465.1
Water Lvg Econ	311	F	554.3	553.6	554.9	559.4	547.2	549.9
Stm Lvg Pri SH	514/515	F	751.6/740.4	752.7/747.5	754.3/749.5	759/754.2	747.8/742.2	753.6/745
Stm Ent Plat SH	—	F	—	—	—	—	—	—
Stm Lvg Plat SH	—	F	—	—	—	—	—	—
Stm Ent Sec SH	7/8	F	746.1/736.3	750.5/745.2	750.4/745.0	758.1/754.0	746.3/742.6	750.8/742.7
Stm Lvg Sec SH	9	F	985.1	994.2	996.3	986.6	983.8	1001.4
Stm to RH Attemp	11	F	608.1	616.1	613.9	607.6	593.9	610.7
Stm Lvg RH Attemp	511	F	584.2	547.8	541.6	559.6	554.5	537.9
Stm Lvg RH	602	F	987.8	1008.5	1010.3	1000.0	973.0	981.8
Water to SH Attemp	507	F	267.5	267.8	267.0	267.1	266.0	265.3
Water to RH Attemp	507	F	267.5	267.8	267.0	267.1	266.0	265.3
BOILER PRESSURES								
Water to Econ	605	PSIG	2718.7	2716.7	2726.7	2720.7	2698.6	2704.6
Drum Press	606	PSIG	2552.3	2537.7	2549.0	2537.7	2523.2	2529.6
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2426.0	2412.5	2424.0	2408.3	2404.2	2409.4
RH Inlet	604	PSIG	463.8	499.3	478.8	499.5	464.1	466.5
RH Outlet	603	PSIG	413.2	450.5	429.0	450.7	413.6	416.1
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	131.2	131.8	131.5	132.1	130.4	130.5
FW Ent #2 Htr	5	F C	153.1	153.9	153.5	154.1	151.9	152.3
#1 Htr Drain	4	F C	137.4	138.2	137.8	138.4	136.6	136.8
#2 Htr Drain	6	F C	163.2	164.3	163.6	164.5	162.0	162.5
Stm to #1 Htr - Temp	1	F	587.8	600.6	603.7	597.1	580.5	583.0
Stm to #1 Htr - Press	LOCAL	PSIG	80	80	77	81	76	80
Stm to #2 Htr - Temp	2	F	780.8	795.0	799.0	792.4	772.4	774.9
Stm to #2 Htr - Press	LOCAL	PSIG	190	190	184	192	182	190
FW ENT #3 HP HTR TEMP	7	C	194.5	195.6	195.1	195.5	193.1	193.6
STM To #3 HP HTR TEMP	10	F	562.9	545.6	543.3	567.3	551.9	536.6
STM To #3 HP HTR PRESS	LOCAL	PSIG	480	480	470	490	460	480
#3 HP HTR DRAIN TEMP	8	C	201.5	203.0	202.1	203.1	200.1	200.8

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS	2					
	Test No.								
	Date			12/12/84					
	Time		Hours	1100	1130	1300	1330	1400	1430
	AIR & GAS TEMPERATURES								
(4)	~~Flue Gas Lvg Econ~~	24/25	F	627.7/628.9	622.4/621.2	631.7/630.4	630.4/628.8	620.4/621.2	622.9/622.9
(3)	~~Flue Gas Lvg AH~~	20/21	F	260.4/268.2	260.4/269.0	260.2/265.0	259.8/266.0	258/266.6	263/266.4
(4)	Flue Gas Lvg Hot Precip	26/27	F	595.9/600.8	593.2/598.5	593.8/597.5	590.9/596.4	587.7/591.8	583.7/588.2
(3)	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
	Air Lvg FD Fan	12/13	F	46.4/46.1	46.8/46.9	47.8/47.5	48/47.7	48.4/48.1	48.7/48.7
(5)	Air Ent Sec AH	14/15	F	100.2/99.4	103.9/99.1	102/100.4	102.4/98.3	102.6/101.4	103.3/101.0
(6)	Air Lvg Sec AH	22/23	F	545/545.4	542.8/542.4	542/541.6	541.2/539.9	540.1/538.8	536.5/534.5
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	31.1	31.1	30.8	30.5	31.0	31.1
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1887.2	1890.7	1876.2	1964.2	1842.9	1819.6
	SH Spray Flow	704	LB/HR	—	—	—	—	—	—
	RH Spray Flow	703	LB/HR	0.3	45.05	44.67	25.9	25.22	44.37
	SH Spray Valve Posit	—	%						
	RH Spray Valve Posit	—	%						
	*HP Extraction Flow	—	LB/HR						
(9)	O_2 Lvg Econ	306/307	%	2.93/2.63	2.97/2.75	2.87/2.66	2.98/2.87	2.87/2.77	2.96/2.67
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(7)	~~Relative Humidity~~		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

\+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

PLANT OPERATING DATA

DATA ITEM	UNITS	2					
Test No.							
Date		12-12-84					
Time	Hours	1100	1130	1300	1330	1400	1430
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SC AH In (Gas)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 813	MLB/HR	143.80	144.51	146.46	146.98	147.22	147.35
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	128.4	128.8	128.9	127.7	128.9	127.9
" 2-B " "	F	127.7	127.7	128.6	127.0	127.8	127.0
" 2-C " "	F	123.5	123.5	123.7	123.0	123.0	123.8
" 2-D " "	F	126.8	127.1	127.5	126.3	127.0	126.3

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units; provide conversion factor.
(2) Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.								
Date			12/12/84					
Time		Hours	1500	1530	1600	1630		
INSTANT GEN. GROSS		MW	319.43	343.17				
BOILER TEMPERATURES								
[illegible]	509	F	473.6	480.1				
Water Lvg Econ	311	F	564.4	573.6				
Stm Lvg Pri SH	514/515	F	763.4/759.5	777.6/765.3				
Stm Ent Plat SH	—	F						
Stm Lvg Plat SH	—	F						
Stm Ent Sec SH	7/8	F	760.1/757.3	757/748.4				
Stm Lvg Sec SH	9	F	1014.7	1021.7				
Stm to RH Attemp	11	F	633.1	651.5				
Stm Lvg RH Attemp	511	F	569	597.2				
Stm Lvg RH	602	F	1002.2	1053.6				
Water to SH Attemp	507	F	267.6	271.5				
Water to RH Attemp	507	F	267.6	271.5				
BOILER PRESSURES								
Water to Econ	605	PSIG	2714.7	2738.7				
Drum Press	606	PSIG	2534.5	2547.4				
PSH in Press	—	PSIG	—	—				
Stm Lvg Sec SH	601	PSIG	2391.7	2392.7				
RH Inlet	604	PSIG	521.1	556.0				
RH Outlet	603	PSIG	473.4	510				
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	F C	132.2	134.2				
FW Ent #2 Htr	5	F C	154.8	157.2				
#1 Htr Drain	4	F C	139.0	141.0				
#2 Htr Drain	6	F C	166.1	168.6				
Stm to #1 Htr - Temp	1	F	588	625.4				
Stm to #1 Htr - Press	LOCAL	PSIG	88	90				
Stm to #2 Htr - Temp	2	F	782.3	826.8				
Stm to #2 Htr - Press	LOCAL	PSIG	210	212				
FW ENT #3 HP HTR TEMP	7	C	197.0	199.8				
STM TO #3 HP HTR TEMP	10	F	569.9	598.5				
STM TO #3 HP HTR PRESS	LOCAL	PSIG	530	540				
#3 HP HTR DRAIN TEMP	8	C	205.1	209.1				

NOTE: BOTH OVERFIRE PORTS OPEN TO 10% @ 1445 HRS, TO 20% @ 1455, TO 30% @ 1505, TO 40% @ 1517 HRS.

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.

JOB NO.: RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS	2					
	Test No.								
	Date			12/12/84					
	Time		Hours	1500	1630				
	AIR & GAS TEMPERATURES								
(4)	~~Flue Gas Lvg Econ~~	24/25	F	~~640.2/642.5~~	~~662.5/665.7~~				
(3)	~~Flue Gas Lvg AH~~	20/21	F	259/236.8	262.1/268.9				
(4)	Flue Gas Lvg Hot Precip	26/27	F	588.3/591.5	603/607.5				
(3)	Flue Gas Lvg Pri AH	—	F	—	—				
	Air Lvg FD Fan	12/13	F	48.2/48.2	48.4/47.8				
(5)	Air Ent Sec AH	14/15	F	99.6/97.3	94.9/95.7				
(6)	Air Lvg Sec AH	22/23	F	536.1/534.5	545.9/505.1				
	Air Lvg PA Fan	—	F						
(5)	Air Ent Pri AH	—	F						
(6)	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
(1)	Ambient Air	18	F	30.4	30.4				
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1960.5	2128.1				
	SH Spray Flow	704	LB/HR	—	30.77				
	RH Spray Flow	703	LB/HR	43.93	43.73				
	SH Spray Valve Posit	—	%						
	RH Spray Valve Posit	—	%						
	*HP Extraction Flow	—	LB/HR						
(9)	O_2 Lvg Econ	306/307	%	3.03/2.90	3.28/2.31				
(8)	CO_2 Lvg Econ		%						
	NOx (if avail)								
(9)	O_2 Lvg AH		%						
(8)	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
(22)	~~Relative Humidity~~		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

(2) - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO 2

PLANT OPERATING DATA

DATA ITEM	UNITS	2	2				
Test No.							
Date		12/12/84	12/12/84				
Time	Hours	1500	1530				
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
(23) * Coal Flow 8/3	MLB/HR	147.82	148.72				
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV. 2-A COAL/AIR TEMP	F	126.9	126.6				
" 2-B " "	F	125.4	124.7				
" 2-C " "	F	122.6	122.1				
" 2-D " "	F	125.2	124.6				

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units; provide conversion factor.
(2) Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO. PUEBLO, COLORADO

C-3

WYODAK

GASEOUS EMISSION DATA

SUMMARY OF GASEOUS EMISSIONS

DATE	TIME	GROSS LOAD MWe	FUEL FLOW KLB (Qty)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/MBtu)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
1-31-85	1500	360		D	293	40	15.53	3.95	486	310		49	19.18	598
	1600	359		D	277	53	15.66	3.90	471	340		65	19.23	578
	1700	358		D	277	68	15.63	3.93	441	340		84	19.24	542
	1800	360		D	277	44	15.65	3.95	425	341		54	19.28	525
	1900	360		D	282	56	15.77	3.50	364	338		68	18.93	437
	2000	359		D	275	62	15.77	4.05	344	340		76	19.55	426
	2100	359		D	302	46	15.77	4.15	339	376		58	19.66	422
	2200	359		D	271	46	15.65	4.25	344	340		58	19.62	431
	2300	361		D	291	39	15.65	4.25	359	366		49	19.62	450
1-31-85	2400	361		D	277	31	15.52	4.35	364	349		40	19.58	459
2-1-85	0100	359		D	287	31	15.52	4.30	394	360		39	19.52	496
	0200	366		D	282	31	15.52	4.35	339	355		40	19.58	491
	0800	359		D	280	35	15.15	4.38	417	354		44	19.14	527
	1100	362		D	309	28	15.61	4.15	357	385		35	19.45	444
	1200	357		D	322	27	15.61	4.05	390	399		34	19.34	483
	1300	356		D	289	26	15.54	4.15	395	360		33	19.36	492
	1400	356		D	312	24	15.54	4.05	415	386		30	19.25	515
	1500	354		D	289	23	—	4.10	446	359		28	—	554
	1600	357		D	292	21	—	4.05	466	362		26	—	577
	1800	357		D	289	30	15.33	4.00	505	357		36	18.94	623
	1900	362		D	299	29	15.78	3.92	490	368		35	19.40	602
	2000	359		D	309	29	15.70	4.04	480	383		35	19.44	594
	2100	361		D	297	29	15.70	3.92	490	365		35	19.31	602
	2200	360		D	314	30	15.70	4.02	500	388		37	19.42	618
	2300	357		D	294	29	15.65	4.02	510	364		35	19.36	643
2-1-85	2400	364		D	297	29	15.70	4.02	535	367		35	19.42	661

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O_2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/10⁶ BTU)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-2-85	0100	356		D	316	29	15.70	4.02	736	391		35	19.42	595
	0200	364		D	314	30	15.69	3.97	727	387		36	19.27	590
	0300	361		D	297	29	15.58	4.15	698	370		36	19.41	560
	0400	363		D	297	29	15.70	4.05	687	368		35	19.46	555
	0500	361		D	307	29	15.70	4.02	680	380		35	19.42	550
	0600	354		D	294	31	15.75	3.97	653	363		38	19.43	530
	0700	352		D	289	44	15.88	3.87	643	354		54	19.46	525
	1100	364		D	279	42	15.60	3.90	582	342		52	19.16	714
	1200	364		D	284	40	15.69	3.82	568	347		49	19.18	694
	1300	364		D	303	35	15.57	3.96	603	373		44	19.19	743
	1400	360		D	291	50	15.69	3.80	628	355		62	19.10	767
	1500	361		D	305	45	15.57	3.90	628	374		56	19.12	772
	1600	362		D	292	41	15.16	3.92	663	359		51	18.64	816
	1700	362		D	294	29	15.48	3.96	638	362		35	19.08	786
	1800	354		D	292	30	15.60	3.92	628	359		37	19.18	772
	1900	364		D	289	27	15.60	3.95	603	356		33	19.22	742
	2000	358		D	306	39	15.70	3.90	572	376		47	19.28	703
	2100	355		D	302	36	15.60	4.00	552	373		45	19.27	682
	2200	356		D	299	41	15.68	3.85	547	366		50	19.19	670
	2300	360		D	310	-	15.65	3.90	522	383		-	19.31	644
2-2-85	2400	359		D	289	-	15.60	3.95	562	356		-	19.22	693

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/10^6 BTU)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-3-85	0100	355		D	292	–	15.73	3.95	567	359		–	19.37	699
	0200	358		D	290	–	15.68	3.95	572	357		–	19.31	705
	0300	357		D	306	–	15.65	4.05	554	379		–	19.39	687
	0400	359		D	274	–	15.35	4.35	542	345		–	19.37	684
	0500	358		D	287	–	15.60	4.12	542	357		–	19.41	674
	0600	362		D	293	–	15.73	3.90	552	360		–	19.31	678
	0700	358		D	272	–	15.70	4.00	542	336		–	19.39	670
	0800	360		D	278	–	15.85	3.95	567	342		–	19.52	697
	1100	354		D	281	64	15.62	3.80	648	345		78	19.07	792
	1200	359		D	294	54	15.50	4.17	643	367		67	19.33	803
	1300	358		D	270	47	15.75	4.18	679	337		58	19.48	848
	1400	356		D	280	57	15.64	4.00	695	358		70	19.32	859
	1500	355		D	286	42	15.62	4.07	725	355		51	19.37	899
	1600	356		D	290	42	15.72	3.97	730	358		51	19.38	900
	1700	360		D	275	42	15.69	4.04	730	341		51	19.43	903
	1800	364		D	282	47	15.74	3.99	735	348		57	19.44	907
	1900	357		D	272	47	15.72	4.02	760	337		58	19.44	940
	2000	359		D	291	49	15.74	3.97	770	359		61	19.41	950
	2100	356		D	273	47	15.74	4.02	785	338		58	19.47	971
	2200	361		D	287	52	15.69	4.07	801	356		64	19.46	993
	2300	363		D	285	49	15.69	4.07	831	354		61	19.46	1031
2-3-85	2400	356		D	278	49	15.62	4.15	831	347		61	1949	1036

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O_2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lb/10^6 BTU)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-4-85	0100	361		D	280	94	15.62	4.12	831	379		92	19.43	1034
	0200	356		D	292	52	15.62	4.20	811	365		64	19.52	1014
	0300	358		D	280	47	15.50	4.12*	806	348		58	19.28	1002
	0400	358		D	280	49	15.55	4.12*	785	348		61	19.34	977
	0500	355		D	263	57	15.62	4.12*	785	327		71	19.43	977
	0600	353		D	276	59	15.62	4.12*	791	343		73	19.43	984
	0700	368		D	295	44	15.55	4.12*	780	367		55	19.34	971
	0900	353		D	272	67	15.45	4.07	774	337		83	19.00	961
	1000	361		D	279	92	15.55	4.09	769	346		114	19.32	955
	1100	360		D	278	54	15.53	4.09	759	345		67	19.29	943
	1200	364		D	289	52	15.60	3.94	724	355		64	19.21	891
	1300	363		D	279	42	15.78	3.94	663	343		51	19.42	816
	1400	367		D	292	42	15.90	3.96	607	359		51	19.60	748
	1500	364		D	303	31	—	4.09	556	376		38	—	690
	1600	358		D	324	29	15.58	3.78	592	395		36	19.00	722
	1700	365		NONE	316	36	15.61	3.89	558	388		44	19.16	685
	1800	360		NONE	316	36	15.61	3.84	553	387		43	19.10	676
	1900	363		NONE	323	48	15.96	3.82	516	395		59	19.51	631
	2000	356		NONE	313	33	15.96	3.87	501	384		40	19.57	614
	2100	355		C	313	38	16.09	3.67	506	380		46	19.49	613
	2200	362		C	298	30	15.96	3.79	465	369		37	19.48	567
	2300	358		C	314	30	15.96	3.77	479	383		37	19.45	548
2-4-85	2400	357		C	308	28	15.84	3.92	423	379		35	19.47	521

* BASED ON CO_2 CONCENTRATION

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lb/10^6 BTU)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-5-85	0100	352		C	308	31	15.96	3.82	434	377		38	19.51	530
	0200	352		C	303	29	15.84	3.92	429	375		36	19.47	527
	0300	359		C	313	30	15.96	3.75	444	381		37	19.43	541
	0400	358		C	326	-	15.96	3.71	465	391		-	19.38	564
	0500	360		C	308	-	15.96	3.67	449	374		-	19.34	544
	0600	353		C	312	-	16.01	3.67*	434	378		-	19.40	526
	0700	359		C	313	-	16.01	3.67*	447	380		-	19.40	584
	0900	352		C	299	34	15.60	3.70	433	363		42	18.94	574
	1000	355		C	297	36	15.65	3.66	463	360		44	18.95	561
	1100	353		C	307	31	15.80	3.76	458	374		38	19.24	558
	1200	354		C	312	31	15.90	3.70	443	379		38	19.30	537
	1300	358		C	305	28	15.95	3.75	478	371		35	19.41	582
	1400	361		C	309	28	16.27	3.70	503	375		34	19.75	611
	1500	355		C	314	23	15.90	3.88	579	385		29	19.50	710
	1600	366		C	293	28	15.90	3.90	639	360		34	19.52	785
	1700	364		NONE	330	30	15.38	3.78	601	402		37	18.76	733
	1800	362		NONE	320	34	15.72	3.78	596	391		41	19.17	726
	1900	359		NONE	329	30	15.86	3.80	586	402		37	18.37	715
	2000	363		NONE	325	31	15.9	3.78	651	397		38	19.41	769
	2100	363		NONE	373	29	15.86	3.83	671	420		35	19.40	820
	2200	360		D	282	35	15.74	3.93	701	347		44	19.37	862
	2300	359		D	296	48	15.86	3.90	721	364		59	19.48	885
2-5-85	2400	348		D	292	34	15.82	4.03	726	362		43	19.57	898

*BASED ON CO_2 CONCENTRATION

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/10⁶ BTU)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-6-85	0100	364		D	277	45	15.84	3.93	721	341		56	19.49	887
	0200	357		D	274	35	15.86	3.98	711	338		44	19.57	877
	0300	363		D	277	45	15.94	3.94	686	341		56	19.62	844
	0400	363		D	284	38	15.99	3.88	691	349		46	19.61	847
	0500	363		D	292	40	15.91	4.03	691	362		50	19.69	843
	0600	368		D	272	38	15.91	3.98	681	336		47	19.63	840
	0700	364		D	268	38	15.86	3.98	651	331		47	19.57	803
	1000	361		D	260	40	14.95	4.00	668	321		50	18.46	825
	1100	352		D	254	42	15.38	4.06	708	315		52	19.07	878
	1200	352		D	259	43	15.31	3.93	724	318		53	18.83	890
	1300	355		D	269	40	15.55	3.88	655	330		49	19.07	
	1400	352		D	274	40	15.24	3.96	830	337		50	18.77	
	1500	353		D	269	40	15.31	3.96	896	331		50	18.86	
	1600	354		D	267	35	15.48	3.93	891	328		43	19.04	
	1800	354		D	289	55	14.99	4.03	794	357		69	18.55	982
	1900	349		D	264	45	14.99	4.08	763	327		56	18.61	947
	2000	353		D	285	46	14.99	4.13	788	354		57	18.66	981
	2100	351		D	269	50	14.95	4.16	814	335		63	18.63	1015
	2200	349		D	277	58	14.99	4.13	788	345		72	18.66	981
	2300	351		D	267	55	15.07	4.13	783	332		69	18.75	975
2-6-85	2400	357		D	279	54	15.07	4.16	778	348		68	18.79	971

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/10⁶ BTU)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-7-85	0100	356		D	276	44	15.56	4.10	763	343		54	19.33	948
	0200	361		D	266	44	15.64	4.07	783	330		54	19.39	972
	0300	356		D	268	49	15.64	4.07	778	332		60	19.39	965
	0400	351		D	251	56	15.69	4.07	794	311		69	19.46	984
	0500	349		D	254	56	15.64	4.10	819	316		70	19.43	1016
	0600	359		D	260	58	15.69	4.02	834	321		72	19.40	1032
	0700	351		D	256	54	15.76	4.02	865	316		66	19.49	1069
	1100	355		D	254	58	15.81	3.98	799	313		72	19.51	986
	1200	364		D	247	68	16.06	3.83	717	302		84	19.64	877
	1300	353		D	259	30	—	4.18	687	323		39	—	857
	1400	362		D	259	28	15.68	3.98	717	320		34	19.35	885
	1600	362		D	265	40	15.12	3.95	866	326		50	18.62	1067
	1700	362		D	267	38	15.47	3.88	958	327		46	18.97	1175
	1800	360		D	267	38	15.73	3.88	958	327		46	19.30	1175
	1900	362		D	275	43	15.86	3.81	953	336		52	19.37	1164
	2000	358		D	275	43	15.73	3.88	917	337		52	19.30	1125
	2100	359		D	269	43	15.73	3.88	917	330		52	19.30	1125
2-7-85	2200	326		D	251	40	15.42	4.18	—	313		50	19.25	—

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DATE	TIME	GROSS LOAD MWe	EXCESS KVR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O_2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/MBtu)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-10-85	1100	362		D	263	35	15.65	3.91	675	326		43	19.24	830
	1200	364		D	270	31	15.45	3.96	645	333		39	19.05	795
	1300	362		D	275	31	15.65	3.94	638	339		39	19.27	785
	1400	362		D	290	29	15.65	3.96	630	358		36	19.29	776
	1500	363		D	275	25	15.50	4.14	630	343		31	19.31	784
	1600	363		D	280	22	15.83	4.01	632	346		28	19.57	781
	1700	366		D	275	16	15.95	3.94	638	339		20	19.64	785
	1800	363		D	265	20	15.93	3.98	618	327		25	19.69	774
	1900	365		D	288	25	16.08	3.81	609	352		30	19.65	744
	2000	361		D	285	17	15.95	4.06	604	354		17	19.78	749
	2400	363		D	278	15	15.90	3.96	604	343		18	19.60	745
	2200	361		D	295	15	15.78	4.16	584	366		19	19.68	728
	2300	363		D	285	14	15.70	4.21	579	357		17	19.64	724
2-10-85	2400	363		D	275	14	15.83	4.08	564	342		18	19.65	699

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NOx (lbs/10⁶ BTU)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-11-85	0100	361		D	280	17	15.70	4.11	545	348		22	19.33	675
	0200	363		D	278	17	15.58	4.11	516	346		22	19.37	641
	0300	366		D	291	19	15.65	4.11	487	362		24	19.46	606
	0400	364		D	279	20	15.65	4.16	470	348		25	19.52	586
	0500	368		D	295	21	15.70	4.08	442	366		26	19.49	548
	0600	365		D	280	23	15.70	4.14	435	349		29	19.56	541
	0700	362		D	285	26	15.65	4.24	442	357		32	19.61	553
	0900	357		D	290	28	15.64	4.13	535	361		35	19.46	666
	1000	362		D	278	32	15.71	4.08	550	345		40	19.50	683
	1100	364		D	283	33	15.76	4.00	545	350		41	19.47	673
	1200	366		D	292	34	15.51	4.26	489	366		42	19.46	613
	1300	366		D	268	34	15.64	4.15	484	334		42	19.49	603
	1400	363		D	268	39	15.64	4.15	484	334		48	19.49	603
	1500	366		D	265	41	15.76	4.15	471	329		51	19.53	583
	1600	367		D	285	39	15.26	4.05	487	356		48	19.05	608
	1700	364		D	269	50	15.38	4.18	454	332		62	19.23	561
	1800	370		D	279	50	15.58	3.99	414	348		62	19.43	516
	1900	365		D	269	43	15.58	4.16	414	336		53	19.43	516
	2000	362		D	265	38	15.65	4.16	419	330		47	19.49	521
	2100	364		D	284	33	15.70	4.13	404	354		41	19.55	503
	2200	362		D	284	30	15.58	4.13	389	357		38	19.54	487
	2300	366		D	274	35	15.65	4.13	381	342		35	19.49	475
2-11-85	2400	364		D	284	30	15.65	4.16	371	355		30	19.52	463

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/10^6 BTU)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-12-85	0100	361		D	272	33	15.58	4.16	368	340		41	19.43	459
	0200	361		D	264	35	15.58	4.16	363	330		44	19.43	453
	0300	363		D	271	45	15.58	4.18	361	339		56	19.45	451
	0400	366		D	269	35	15.65	4.16	361	336		44	19.52	451
	0500	365		D	289	32	15.58	4.16	358	361		39	19.43	447
	0600	361		D	264	37	15.65	4.13	368	329		46	19.49	459
	0700	362		D	274	34	15.70	4.13	360	342		42	19.55	459
	0800	367		D	288	46	15.22	4.08	376	357		57	18.89	467
	0900	361		D	270	36	15.30	3.98	381	333		44	18.87	470
	1000	366		D	283	51	15.47	3.93	382	348		69	19.03	470
	1100	365		D	290	61	15.64	3.88	439	356		75	19.19	539
	1200	365		D	272	52	15.60	3.76	502	331		68	18.99	611
	1300	367		D	268	101	15.72	3.68	602	325		122	19.06	730
	1400	367		D	270	111	15.72	3.68	648	327		134	17.06	785
	1500	367		D	270	66	15.84	3.78	658	329		80	19.32	802
	1600	364		D	267	66	15.83	3.85	712	328		81	19.38	872
	1700	363		D	264	66	15.83	3.82	692	323		81	19.35	846
2-12-85	2400	363		D	228	101	—	3.82	561	278		123	—	686

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O_2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/MBtu)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-13-85	0100	362		D	230	111	–	3.87	548	281		136	–	671
	0200	357		D	240	96	–	3.92	538	295		118	–	661
	0300	362		D	235	91	–	3.97	541	289		112	–	667
	0400	360		D	255	68	–	4.05	566	317		85	–	701
	0500	362		D	249	61	–	4.02	574	307		75	–	710
	0600	364		D	261	66	–	4.02	581	323		82	–	719
	0700	364		D	250	51	–	4.00	614	308		63	–	759
	0900	319		D	230	42	15.09	4.61	607	295		54	19.33	778
	1000	273		D	202	31	14.66	4.59	612	258		40	18.76	784
	1100	275		D	202	29	14.97	4.60	604	260		37	19.23	774
	1200	273		D	198	27	14.84	4.74	597	256		35	19.19	772
	1300	275		D	200	30	14.94	4.54	599	256		38	19.06	765
	1400	310		NONE*	246	41	15.38	4.20	589	269		51	19.22	737
	1500	366		NONE*	259	68	15.72	4.00	599	319		85	19.42	740
	1600	367		D	256	54	15.74	4.01	609	316		66	19.45	753
	1700	367		D	256	44	15.74	4.00	601	327		54	19.45	743
	1800	365		D	265	45	15.74	4.00	620	327		56	19.45	765
	1900	368		D	266	58	15.84	3.90	604	326		72	19.46	742
	2000	366		D	264	56	15,79	3.95	630	325		69	19.45	775
	2100	364		D	264	63	15.84	3.95	623	325		78	19.51	767
	2200	368		D	279	50	15,82	3,95	620	343		61	19.84	763
	2300	368		D	289	39	15.74	4.05	635	358		48	19.51	786
2-13-85	2400	364		D	279	41	15.67	4.05	645	345		51	19.412	799

REDUCED LOAD. FLOW TO D MILL

DATE	TIME	GROSS LOAD MWe	PACKER MIX (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/MBtu)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
1-14-85	0100	362		D	263	44	15.62	4.10	635	316		51	19.41	789
	0200	366		D	274	50	15.82	4.08	606	340		61	19.63	753
	0300	362		D	263	44	15.67	4.02	620	325		54	19.38	766
	0400	364		D	276	49	15.62	4.18	620	344		61	19.50	786
	0500	363		D	269	68	15.69	4.18	645	335		85	19.60	805
	0600	328		D	251	41	15.42	4.35	655	316		52	19.46	800
1-14-85	0700	324		D	241	44	15.50	4.35	637	303		55	19.55	803

GAS CONCENTRATION CALCULATION

Date 1-31-85 Operator _____

Test No. 1-31-1 → 1-31-13

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s/(S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	Econo Out LOCATION	NO_x blue			CO orange			CO_2 brown			O_2 black			SO_2 violet		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ca@0%	D_{avg}	G_A	$G_A@0\%$
1423 1430	1-31-1 ECONO OUT	~~34.5~~	~~303~~	374	~~12~~	38	46	~~45.5~~	~~10.05~~	~~12.42~~	~~45~~	4.0	not	~~52.5~~	calibrated	
1450 1510	1-31-2 ECONO OUT	33.5	293	310	12.5	40	49	67.5	15.53	19.13	44.5	3.95		53.5	486	598
1520 1529	1-31-3 8th Floor soot	33	287	352	12.5	40	49	63.7	14.59	17.86	43.5	3.85		53.3	484	592
1537	1-31-4 7th floor	33	287	353	13	43	52	67.5	15.53	19.08	44	3.90		52.5	476	584
1601	1-31-5 furnace exit	32	277	340	15	53	65	68	15.66	19.23	44	3.90		52	471	578
1601 1607	1-31-6 1K 9-10	31.8	275	338	17	63	77	68	15.66	19.23	44	3.90		52	471	578
1607 1612	1-31-7 1K 11-12	32	277	342	14	48	59	68	15.66	19.34	45	4.00		52	471	581
1612 1617	1-31-8 1K 15-16	32	277	340	19	73	89	68	15.66	19.23	44	3.90		51.5	466	572
1617 1623	1-31-9 1K 17-18	32.5	282	349	20	78	96	68.3	15.73	19.43	45	4.00		51.5	466	575
1623 1629	1-31-10 1K 13-14	32.5	282	347	16	58	71	68	15.66	19.23	44	3.90		50	451	553
1629 1635	1-31-11 1K 19-20	32.3	280	344	17	63	77	68	15.66	19.23	44	3.90		51	461	566
1635 1639	1-31-12 1K 23-24	32.5	282	346	16.5	60	74	68	15.66	19.17	43.5	3.85		50.5	456	558
1639 1643	1-31-13 1K 25-26	32.5	282	346	16.5	60	74	68.3	15.73	19.26	43.5	3.85		51	461	564

1500 EFFECT OF BOOTBLOWING

* large effect

C-4

WYODAK

PLANT BOILER LOGS

FORM NO 3198 9-80

WYODAK POWER PLANT – STATION LOG

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter	Gross Generation MW	Auxiliary Transformer Meter	Auxiliary Transformer MW	Start-up Transformer Meter	Start-up Transformer MW	NET GEN MWH
	11955		09419		68349		
1	12315	360	09449	30			330
2	12675	360	09479	30			330
3	13032	357	09508	29			328
4	13388	356	09538	30			326
5	13747	359	09567	29			330
6	14106	359	09599	30			329
Sub Total	2151	2151	178	178			1973
7	14462	356	09627	30			326
8	14816	354	09658	31			323
9	15175	359	09688	30			329
10	15534	359	09718	30			329
11	15896	362	09749	31			331
12	16255	359	09779	30			329
13	16614	359	09809	30			329
14	16974	360	09839	30			330
Sub Total	5819	2869	42 0	242			2626
15	17336	362	09870	31			331
16	17696	360	09901	31			329
17	18059	363	09931	30			333
18	18420	361	09961	30			331
19	18783	363	09991	30			333
20	19146	363	10021	30			333
21	19508	362	10051	30			332
22	19871	363	10081	30			333
Sub Total	7916	2897	662	242			2655
23	20234	363	10111	30			333
24	20598	364	10141	30			334
Day Total	8643	8643	722	722			7921
Prv Total							
TI to Date							
		360					

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	95291	04866	02780	67079	57919	50062	96818	15648
Prev	77382	04748	02784	66496	57919	49722	96752	18637
Total	7909	118	–	583	-	340	66	11
1st Mo								

Coal Integrators	A	B	C	D	E	SCALES H1	H2
Pres	510315	302102	403980	104110	126110	94098	14659
Prev	485308	273663	375430	104110	098017	91015	11795
Total	25007	28439	28550	–	21093	3083	2862
1st Mo							

1350 1421 1417 1484 5745

5492

WYODAK
PLANT OPERATOR LOG

Day MONDAY Date JAN 28 1985

HOUR ENDING	IND GEN	IND AUX	IND START-UP	VARS	VOLTS	Bio Oil Press	Bio Oil Temp	Lube Oil Press	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Coil End Temp A	Coil End Temp B	AIR HEATER GAS IN - OUT A	AIR HEATER GAS IN - OUT B	HOUR ENDING
1	355	30	-	35	22	44.9	114	42.5	1532	27	1950	1824	29	9.5	131		197	206	5.0/124	5.5/113.4	1
2	363	30		28	22	44.7	110	42.7	1535	27	1947	1814	28	7.8	136		199	201	5.0/123	5.7/113.8	2
3	351	30		30	22	44.8	114	43.3	1535	27	1950	1826	27	10.5	138		191	199	5.1/123	5.4/113.2	3
4	354	30		28	22	44.5	114	42.1	1537	27	1951	1832	30	10.0	142		190	195	5.1/126	5.7/116	4
5	358	30		28	22	44.6	114	44.4	1537	27	1949	1826	27	9.5	141		189	198	5.4/128	5.7/113.8	5
6	358	30		38	22	44.8	115	46.3	1527	27	1951	1834	33	10.7	147		197	207	5.4/124	5.2/113.2	6
7	357	32	-	46	22	44.9	115.1	44.9	1527	27	1950	1824	24	10.3	140	-	201	205	5.3/127	5.6/114.0	7
8	362	31	-	50	22	44.8	114.7	47.0	1537	27	1949	1822	31	8.6	157	-	194	202	5.3/124	5.2/113.7	8
9	360	31	-	58	22	44.8	115.2	47.0	1537	27	1950	1824	31	7.8	153	-	194	203	4.7/124	5.5/112.9	9
10	363	31	-	58	22	44.7	114.8	46.6	1537	27	1947	1826	33	8.1	154	-	196	206	5.4/126	5.8/113.6	10
11	361	31	-	50	22	44.8	115	46.1	1529	27	1949	1821	30	8.3	155	-	203	204	5.8/129	5.9/113.7	11
12	357	31	-	50	22	44.8	115	45.9	1532	27	1945	1822	31	7.7	157	-	200	209	5.4/125	5.2/113.1	12
13	360	31	-	47	22	44.8	114.8	45.6	1531	27	1941	1818	31	9.2	160	-	199	205	5.1/125	5.7/113.8	13
14	362	31	-	43	22	44.7	114.8	45.2	1532	27	1946	1823	31	8.2	155	-	198	208	5.1/124	5.6/113.9	14
15	360	31	-	50	22	44.8	114.8	44.9	1531	27	1948	1826	31	7.3	152	-	193	214	5.2/124	5.2/114.5	15
16	360	32	-	20	22	44.9	114	44.6	1532	27	1945	1825	31	6.6	142	-	200	211	5.1/124	5.5/113.9	16
17	360	31	-	50	22	44.9	115	44.4	1530	27	1952	1828	30	8.7	159	-	197	206	5.1/126	5.5/113.2	17
18	356	31	-	35	22	44.8	114.8	44.1	1531	27	1949	1826	31	8.1	156	-	196	205	5.1/127	5.4/113.6	18
19	360	31	-	50	22	44.8	114.9	43.7	1534	27	1946	1823	32	6.8	145	-	195	206	5.2/124	6.1/114	19
20	357	31	-	40	22	44.9	114.9	43.5	1530	27	1949	1822	34	7.0	151	-	200	210	5.5/124	5.3/114	20
21	360	31	-	38	22	44.8	114.8	43.1	1530	27	1946	1826	31	7.9	149	-	196	204	5.1/123	5.8/113.7	21
22	357	31	-	28	22	44.8	115	46.6	1531	27	1945	1824	32	8.1	156	-	197	206	5.3/121	5.9/114	22
23	358	31		32	22	44.9	114	46.2	1530	27	1946	1822	27	6.6	148		200	211	5.4/128	5.3/113.8	23
24	360	31		28	22	44.8	114	45.9	1531	27	1946	1824	30	6.7	148		195	203	5.1/126	5.0/113.6	24
TOTAL																					TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Suphtr Temp	Reheat Temp	Suphtr Attemp Flow A	Suphtr Attemp Flow B	Rht Spray Flow	HOUR ENDING
1	43	200	56		52	378	382	166	158	270	270	1010	1007	130	170	45	1
2	43	200	56		52	380	380	162	156	272	272	1006	1008	140	180	80	2
3	43	200	56		53	380	384	160	160	266	268	1009	1005	130	170	55	3
4	43	200	56		52	380	384	160	160	270	270	1007	998	120	170	60	4
5	43	202	56		52	380	384	162	162	270	270	1003	1002	140	176	65	5
6	43	202	56		52	378	384	162	162	272	272	998	1008	110	180	85	6
7	44	201	56		52	381	384	164	164	274	273	997	995	80	140	67	7
8	43	190	56		52	380	384	164	162	273	271	1005	1006	130	170	75	8
9	43	201	56		52	380	382	162	160	267	268	1008	1008	110	160	70	9
10	43	202	56		52	380	384	164	164	272	272	1002	1005	130	170	78	10
11	43	200	56		52	381	384	162	162	276	275	1000	991	90	150	60	11
12	43	200	56		52	382	384	164	164	272	271	1008	1003	120	160	50	12
13	43	201	56		52	381	384	164	164	273	272	1008	999	100	170	70	13
14	43	200	56		52	380	384	164	164	274	274	1006	1005	140	170	58	14
15	43	202	56		52	382	384	166	166	278	278	1007	1007	120	162	78	15
16	43	201	56		52	383	386	166	166	278	278	1006	1006	115	155	40	16
17	43	201	56		52	383	386	166	166	278	278	1009	1000	100	160	53	17
18	43	200	56		52	381	386	166	166	278	278	1009	1005	130	165	50	18
19	43	201	56		52	381	386	166	166	278	278	1004	1007	90	160	60	19
20	43	200	56		52	380	384	164	164	278	278	1008	1001	80	140	70	20
21	43	202	56		52	380	384	166	166	278	278	1006	1005	125	160	52	21
22	43	202	56		52	380	384	166	166	278	278	1008	1008	100	160	73	22
23	43	202	56		52	380	384	164	164	278	278	1010	1001	95	160	58	23
24	43	200	56		52	380	384	164	164	274	274	997	1002	110	160	48	24
Total																	

WATER

	Raw - Wtr Tank	Filter - Wtr Tank	Treated - Wtr Tank	Fuel
23	25	29		25.5
1	30	29	-	25
18	29	29	-	25.5

IN PLANT SILOS

	23	7	15
A	F	F	F
B	F	F	F
C	F	F	F
D	F	F	F
E	4.21	4.25	4.18

UNIT OPERATOR

2300 0700 Matt

0700 1500

1500 2300

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	
0700 - 1500		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X	
1500 2300		XXXX	XXXX	XXX	XXX	XXX	XXX	XXXX	X	

25

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C-95

FORM NO. 3198 9-83

WYODAK POWER PLANT – STATION LOG

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter	Gross Generation MW	Auxiliary Transformer Meter	Auxiliary Transformer MW	Start-up Transformer Meter	Start-up Transformer MW	NET GEN MWH
	20598		10141		68349		
1	20962	364	10171	30			334
2	21320	358	10201	30			328
3	21680	360	10231	30			330
4	22041	361	10261	30			331
5	22401	360	10290	29			331
6	22766	359	10320	30			329
Sub Total	2162	2162	179	179			1983
7	23119	353	10350	30			323
8	23476	357	10381	31			326
9	23832	356	10411	30			326
10	24187	355	10441	30			325
11	24544	357	10472	31			326
12	24899	355	10503	31			324
13	25255	356	10534	31			325
14	25614	359	10569	35			324
Sub Total	5016	2854	923	744			4610
15	25978	364	10595	31			333
16	26340	362	10625	30			332
17	26701	361	10656	31			330
18	27061	360	10686	30			330
19	27421	360	10717	31			331
20	27785	362	10747	30			332
21	28145	360	10777	30			330
22	28500	355	10807	30			325
Sub Total	7902	2886	666	273			2643
23	28855	355	10837	30			325
24	29213	358	10867	30			328
Day Total	8615	8615	726	726			7889
Pre Total							
Yr to Date			359				

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Prev	93166	04985	02284	61662	57919	50362	76877	18662
Prev	85291	04866	02201	60079	57919	50062	76818	18648
Total	7875	119	—	583	—	300	59	14
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Prev	534660	330475	437282	104110	154130	96720	18107	
Prev	510315	302102	403980	104110	126110	94098	14657	
Total	24345	28373	33302	—	28030	2622	3450	
1st Mo								

1318 1418 1415 1401

5452 6072

WYODAK PLANT OPERATOR LOG

Day TUESDAY Date JAN 29 1985

HOUR ENDING	IND GEN	IND AUX	IND START-UP	VARS	VOLTS	Blo Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN - OUT A	AIR HEATER GAS IN - OUT B	HOUR ENDING
1	360	31		36	22	44.8	115	45.5	1522	27	1545	1538	29	8.9	155		196	205	5.3/13.5	5.7/13.8	1
2	360	31		30	22	44.8	114	45.3	1521	27	1546	1824	32	7.9	154		195	205	5.8/14.4	5.6/13.4	2
3	360	31		30	22	44.9	114	44.6	1521	27	1545	1826	35	8.7	158		193	202	5.4/13.4	5.6/13.6	3
4	362	31		30	22	44.7	115	44.6	1521	27	1553	1836	27	8.3	157		192	202	5.7/14.0	5.7/14.2	4
5	360	31		32	22	44.8	114	44.3	1522	27	1542	1824	27	8.9	159		196	207	6.3/14.4	5.7/14.2	5
6	360	31		35	22	44.6	114	44.0	1521	27	1542	1822	31	8.6	158		196	206	5.3/14.4	5.2/13.5	6
7	359	31		40	22	44.8	114	44.2	1520	27	1540	1820	33	7.1	K	—	196	208	5.5/14.4	5.4/13.6	7
8	359	31	—	210	22	44.5	114	44.2	1520	27	1540	1820	33	9.3	K	—	201	211	5.8/14.5	5.6/13.7	8
9	350	31	—	49	22	44.7	114	44.1	1519	27	1539	1806	32	10.4	162	—	203	213	5.8/14.5	5.7/13.8	9
10	355	31	—	50	22	44.7	115	44.2	1520	27	1542	1820	36	8.4	161	—	203	211	5.8/14.5	5.7/13.8	10
11	360	31	—	50	22	44.7	115	44.2	1521	27	1541	1822	36	8.4	163	—	202	209	5.5/14.2	5.4/13.5	11
12	360	32	—	51	22	44.8	114	44.3	1521	27	1542	1822	36	8.4	K	—	198	206	5.3/13.9	5.2/13.4	12
13	360	31	—	55	22	44.9	114	44.7	1521	27	1543	1822	21	9.0	160	—	201	208	5.5/14.2	5.4/13.5	13
14	359	32	—	51	22	44.9	114	44.6	1519	27	1541	1822	18	9.5	162	—	201	211	5.5/14.2	5.4/13.5	14
15	355	32	—	50	22	44.8	114.9	44.3	1520	27	1542	1822	16	8.8	160	—	202	214	5.5/14.2	5.4/13.2	15
16	352	32	—	46	22	44.8	114.8	43.8	1520	27	1546	1821	15	8.1	157	—	200	216	5.4/13.6	5.3/13.0	16
17	350	31	—	48	22	44.9	115	43.4	1517	27	1541	1820	13	8.7	160	—	200	210	5.4/14.1	5.4/13.2	17
18	353	31	—	52	22	44.9	115	43.1	1516	27	1540	1822	11	7.0	152	—	199	209	5.4/13.9	5.3/13.6	18
19	354	31	—	55	22	44.8	114.3	42.5	1513	27	1543	1822	12	7.7	155	—	198	208	5.5/14.1	5.4/13.4	19
20	357	31	—	53	22	44.9	114.9	40.2	1514	27	1545	1822	11	9.4	158	—	201	213	5.5/14.2	6.1/14.2	20
21	350	30	—	45	22	44.8	114.8	41	1515	27	1542	1825	4	9.8	161	—	200	211	5.2/13.6	5.8/13.6	21
22	350	30	—	45	22	44.8	114.7	46.7	1515	27	1542	1826	9	10	167	—	197	209	5.3/13.9	5.8/13.9	22
23	352	30		32	22	44.7	114	46.1	1520	27	1544	1824	4	10.7	171		206	219	5.5/14.3	5.7/13.8	23
24	356	30		30	22	44.7	114	45.6	1522	27	1543	1826	4	9.5	164		201	212	5.3/14.0	5.6/13.9	24
TOTAL																					TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Sushi Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow	HOUR ENDING
1	43		207	56		52	380	384	164	162	277	272	1006	1007	120	166	54	1
2	43		202	56		52	390	386	163	162	272	272	1006	1002	110	160	48	2
3	42		202	56		52	390	386	163	162	272	270	998	1006	100	160	50	3
4	43		202	56		52	380	384	162	162	270	270	1005	1008	140	170	64	4
5	43		202	56		52	380	384	162	162	270	270	996	1005	110	170	80	5
6	43		207	56		52	380	384	166	166	274	274	1011	1009	140	170	60	6
7	43	—	201	56	—	52	380	384	166	166	274	274	1014	1010	140	170	60	7
8	43	—	201	56	—	52	380	384	166	166	274	274	1014	1011	140	170	60	8
9	43	—	201	56	—	52	380	384	166	166	274	274	1011	1010	140	170	60	9
10	43	—	200	56	—	52	380	384	166	166	274	274	1008	1009	140	170	60	10
11	43	197	197	56	—	52	380	384	166	166	274	274	997	1009	140	170	60	11
12	43	—	201	56	—	52	380	384	166	166	274	274	1004	1011	140	170	60	12
13	43	—	200	55	—	52	382	385	166	166	274	274	998	998	160	180	60	13
14	41	—	201	56	—	52	382	386	166	166	274	274	1006	1004	140	180	64	14
15	41	—	206	56	—	52	382	386	166	166	274	274	998	998	1012	140	170	84	15
16	41	—	207	56	—	52	382	386	167	168	272	272	1014	994	140	160	62	16
17	41	—	207	56	—	52	383	386	167	168	280	280	1014	1009	120	170	70	17
18	41	—	206	56	—	52	381	386	166	166	272	270	1010	1005	138	170	62	18
19	40	—	206	56	—	52	382	386	166	166	272	272	987	999	120	165	65	19
20	40	—	207	56	—	52	385	388	166	168	280	280	1000	1015	120	165	165	20
21	40	—	206	56	—	52	381	385	163	162	272	272	612	1007	130	160	70	21
22	40	—	208	56	—	52	382	387	164	168	276	276	998	1008	105	165	72	22
23	40		208	56		52	382	388	168	168	276	276	998	1009	90	160	86	23
24	40		208	56		52	380	386	164	164	278	276	1013	1007	144	180	78	24
Total																		Total

WATER

	Raw Water Tank	Filter Water Tank	Treated Water Tank	Fuel Oil
23	34	33		3.5
T	2015	29	—	2.65
15	2015	29	—	2.65

IN PLANT SILOS

	23	7	15
A	F	F	F
B	F	F	F
C	F	F	F
D	F		F
E	↓19		↓27

UNIT OPERATER

2300 0700 Williamson

0700 1500 Williamson

1500 2300 Williamson

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IR's & IR's Out of Service
2300 - 0700		XXXXX	XXXXX	XXX	XXX	XXX	XXX	XX	X	
0700 - 1500		XXX	XXX	XXX	XXX	XXX	XXX	X		
1500 - 2300		XXXXX	XXXXX	XXX	XXX	XXX	XXX	X		

-96-C

FORM NO 3198 9 80

WYODAK POWER PLANT – STATION LOG

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter	Gross Generation MW	Auxiliary Transformer Meter	Auxiliary Transformer MW	Start-up Transformer Meter	Start-up Transformer MW	NET GEN MWH
	29213		10867		68349		
1	29570	357	10897	30			327
2	29920	350	10927	30			320
3	30270	350	10957	30			320
4	30630	360	10988	31			329
5	30987	357	11018	30			327
6	31347	360	11047	29			331
Sub Total	2134	2134	180	180			1954
7	31725	378	11077	30			348
8	32062	337	11106	29			308
9	32417	355	11136	30			325
10	32767	350	11166	30			320
11	33127	360	11196	30			330
12	33478	351	11226	30			321
13	33835	357	11255	29			328
14	34190	355	11285	30			325
Sub Total	4977	7843	418	738			2605
15	34542	352	11314	29			323
16	34902	360	11343	29			331
17	35262	360	11372	29			331
18	35618	356	11401	29			327
19	35975	357	11431	30			327
20	36332	357	11460	29			328
21	36689	357	11490	30			327
22	37046	357	11519	29			328
Sub Total	7833	2856	652	294			2632
23	37402	356	11548	29			327
24	37750	348	11578	30			318
Day Total	8537	8537	711	711			7826
Prv Total							
TI to Date			366				

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Prev	00986	05105	02384	68228	57919	50492	96919	18479
Prev	93166	04985	02284	67662	57919	50362	96877	18662
Total	7820	120	–	566	–	130	42	16
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2
Prev	535885	359611	460903	104110	181942	96720	24151
Prev	514690	330175	439782	104110	154130	96720	18107
Total	21165	29316	21121	—	27812		6044
1st Mo							

1058 1410 1406 1390

5264

WYODAK PLANT OPERATOR LOG

Day WEDNESDAY Date JAN 30 1985

HOUR ENDING	IND GEN	IND AUX	IND START-UP	VARS	VOLTS	Bio Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Coil End Temp A	Coil End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1	356	30		24	22	44.8	115	45.2	1537	27	1942	1824	3	7.6	141		199	211	5.4/14.0	5.6/14.4	1
2	350	30		26	22	44.7	114	44.7	1532	27	1941	1824	5	10.9	170		197	210	5.1/13.6	5.4/13.6	2
3	356	30		32	22	44.9	114	44.2	1529	27	1939	1826	4	9.3	163		200	211	5.4/14.0	5.6/14.3	3
4	366	30		37	22	44.9	115	illegible	illegible	27	illegible	illegible	illegible	7.2	illegible		illegible	illegible	illegible	illegible	4
5	360	30		38	22	44.8	114	illegible	illegible	27	illegible	illegible	illegible	8.1	illegible		illegible	illegible	illegible	illegible	5
6	360	30		illegible	22	illegible	114	illegible	illegible	27	illegible	illegible	illegible	illegible	illegible		illegible	illegible	illegible	illegible	6
7	illegible	31	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	7
8	360	31	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	8
9	illegible	31	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	9
10	illegible	31	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	10
11	360	31	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	11
12	illegible	31	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	12
13	illegible	31	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	13
14	illegible	30		illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible		illegible	illegible	illegible	illegible	14
15	350	30	—	39	22	45.0	114.8	41.7	1530	27	1943	1824	1	12.3	176	—	204	216	5.5/14.3	5.7/14.8	15
16	359	30	—	39	22	44.8	115.1	41.3	1541	27	1948	1830	2	8.4	160	—	203	215	5.1/14.0	5.7/14.0	16
17	357	30	—	42	22	44.8	114.7	40.9	1539	27	1949	1826	0	10.0	166	—	199	210	illegible	illegible	17
18	362	30	—	illegible	22	44.7	115.0	illegible	illegible	27	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	18
19	360	30	—	illegible	22	illegible	illegible	illegible	illegible	27	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	19
20	361	30	—	illegible	22	illegible	illegible	illegible	illegible	27	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	20
21	illegible	30	—	illegible	22	illegible	illegible	illegible	illegible	27	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	21
22	illegible	30	—	illegible	22	illegible	illegible	illegible	illegible	27	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	22
23	illegible	30	—	illegible	22	illegible	illegible	illegible	illegible	27	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	23
24	illegible	30	—	illegible	22	illegible	illegible	illegible	illegible	27	illegible	illegible	illegible	illegible	illegible	—	illegible	illegible	illegible	illegible	24
TOTAL																					TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Suphtr Temp	Reheat Temp	Suphtr Attemp Flow A	Suphtr Attemp Flow B	Rht Spray Flow	WATER Raw Wtr Tank	WATER Filter Wtr Tank	WATER Treated Wtr Tank	Fuel Oil	HOUR ENDING
1	40		208	56		52	380	386	illegible	illegible	illegible	illegible	1009	1004	130	130	60					1
2	40		204	56		52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	23	30.5	29		2
3	40		208	56		52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	7	30	illegible	—	3
4	40		196	56		52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	15	21	28.5	—	4
5	40		208	56		52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					5
6	40		208	56		52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					6
7	illegible	—	illegible	illegible	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					7
8	illegible	—	illegible	illegible	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					8
9	illegible		illegible	illegible		illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					9
10	illegible	illegible	—	illegible	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					10
11	illegible	illegible	—	illegible	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					11
12	illegible	illegible	—	illegible	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					12
13	illegible	illegible	—	illegible	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					13
14	illegible	illegible	—	illegible	—	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					14
15	38	198	—	56	—	52	383	387	illegible	illegible	illegible	illegible	1002	illegible	illegible	illegible	illegible					15
16	38	198	—	56	—	52	illegible	386	illegible	illegible	illegible	illegible	1010	1007	illegible	illegible	illegible					16
17	38	illegible	—	56	—	52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					17
18	38	illegible	—	56	—	52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					18
19	38	200	—	57	—	52	383	386	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					19
20	39	illegible	—	56	—	52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					20
21	39	illegible	—	56	—	52	385	389	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					21
22	illegible	200	—	56	—	52	380	384	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					22
23	39	200		56		52	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					23
24	39	200		56		52	382	386	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible	illegible					24
Total																						

IN PLANT SILOS

	23	7	15
A	F	illegible	F
B	F	illegible	F
C	F	illegible	F
D	F	illegible	F
E	illegible	illegible	illegible

UNIT OPERATOR

2300 0700 illegible

0700 1500 illegible

1500 2300 Thorne

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		illegible	illegible	illegible	illegible	illegible	illegible	illegible		
0700 - 1500		illegible	illegible	illegible	illegible	illegible	illegible	illegible	X	
1500 2300		illegible	illegible	illegible	illegible	illegible	illegible	illegible	X	

C-97

FORM NO 3198 9 80

WYODAK POWER PLANT — STATION LOG

WYODAK GENERATION

HOUR ENDING	37750 Gross Generation Meter	MW	11578 Auxiliary Transformer Meter	MW	68349 Start up Transformer Meter	MW	NET GEN MWH
1	38100	350	11607	29			321
2	39455	355	11636	29			326
3	38811	356	11666	30			326
4	39166	355	11696	30			325
5	39520	354	11725	29			325
6	39871	351	11754	29			322
Sub Total	21121	2121	176	176			1945
7	40219	348	11783	29			319
8	40575	356	11811	28			328
9	40928	353	11843	32			321
10	41270	342	11873	30			323
11	41668	398	11903	30			368
12	42005	337	11933	30			326
13	42361	356	11963	30			326
14	42730	369	11994	31			328
Sub Total	14970	1499	416	240			1659
15	43308	360	12028	30			330
16	43439	359	12059	30			329
17	43797	358	12089	30			328
18	44157	360	12119	30			330
19	44517	360	12143	31			329
20	44876	359	12175	30			329
21	45235	359	12204	29			330
22	45594	359	12234	30			329
Sub Total	7844	2874	656	240			2634
23	45955	361	12263	29			332
24	46291	336	12297	30			331
Day Total	8566	722	715	59			1663
Prv Total							
Tl to Date							
	361						

	Net Main Xmer	Gen Vars Out	Gen Vars In	Aux Xmir Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	09826	05223	03	68794	57919	50678	96783	1869
Prev	00986	05105	02984	68228	57919	50492	96919	18678
Total	7840	118	—	566	—	186	64	13
1st Mo					—			

	Coal Integrators A	B	C	D	E	SCALES H1	H2
Pres	670465	277 5	0	104110	710865	96220	300121
Prev	555985	358961	460403	104110	1321942	96220	294151
Total	21160	1784	1207		28873	—	5870
1st Mo	10580	892	603	—	144363	—	

5 S 1 2 WYODAK PLANT OPERATOR LOG 5870

Day THURSDAY Date JAN 31 1985

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Bio Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Remover Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1	357	30	—	36	22	44.8	114	42.5	1537	27	1946	1814	-2	11.4	171		203	214	5.4/144	6.0/144	1
2	356	30	—	36	22	44.7	114	42.1	1544	27	1948	1826	-1	11.2	175		202	214	5.3/144	6.1/145	2
3	356	30	—	40	22	44.8	114	41.7	1538	27	1947	1824	-2	9.2	164		200	211	5.3/144	5.6/144	3
4	356	30	—	40	22	44.8	114	41.3	1540	27	1950	1834	0	11.1	175		201	214	5.4/144	6.1/145	4
5	357	30	—	40	22	44.7	115	41.0	1536	27	1953	1831	-2	11.6	179		203	214	5.5/144	6.0/144	5
6	350	30	—	36	22	44.8	114	40.8	1535	27	1951	1824	-2	11.6	177		201	210	5.4/144	5.6/144	6
7	360	31	—	36	22	44.8	114	40.8	1536	27	1952	1824	-2	10.5	167	—	200	209	5.3/144	5.5/144	7
8	366	31	—	50	22	44.9	114	41.0	1538	27	1948	1828	-1	10.6	166	—	200	209	5.3/144	5.5/144	8
9	360	31	—	50	22	44.9	114	42.0	1542	27	1948	1833	1	10.7	167	—	202	209	5.4/144	5.6/144	9
10	360	31	—	50	22	44.9	114	42.0	1542	27	1948	1832	1	10.5	167	—	202	209	5.4/144	5.6/144	10
11	360	31	—	50	22	44.9	114	42.0	1542	27	1948	1832	1	10.0	165	—	202	209	5.4/144	5.6/144	11
12	360	31	—	50	22	44.9	114	42.0	1542	27	1948	1832	1	8.4	158	—	200	207	5.4/144	5.6/144	12
13	360	31	—	50	22	44.9	114	42.0	1542	27	1948	1832	1	11.9	172	—	200	209	5.4/144	5.6/144	13
14	359	31	—	48	22	44.9	114	42.0	1542	27	1948	1832	0	11.9	165	—	201	212	5.4/144	5.7/144	14
15	360	31	—	39	22	44.8	114.7	40.9	1583	27	1950	1832	12	9.2	162	—	212	224	5.4/143	5.9/143	15
16	359	31	—	34	22	44.8	114.6	40.5	1529	27	1953	1824	12	7.9	164	—	208	219	5.4/136	5.6/137	16
17	361	31	—	38	22	44.8	114.8	40.1	1529	27	1945	1824	10	9.1	161	—	202	214	5.3/142	6.2/141	17
18	359	31	—	56	22	44.9	114.3	40.7	1521	27	1950	1827	6	9.6	163	—	215	228	5.4/135	5.7/134	18
19	362	31	—	55	22	44.8	114.5	40.2	1521	27	1948	1822	6	8.7	160	—	213	226	5.4/134	6.2/134	19
20	361	20	—	47	22	44.8	116.3	44.0	1531	27	1949	1824	8	9.1	161	—	211	223	5.5/142	6.1/142	20
21	364	31	—	51	22	44.8	114.8	43.5	1538	27	1948	1824	-1	7.7	153	—	217	231	5.4/138	6.1/134.8	21
22	355	30	—	40	22	44.8	115.1	43.2	1521	27	1949	1824	-1	9.7	163	—	214	227	5.4/144	5.9/144	22
23	363	31	—	40	22	44.8	114.9	43.0	1529	27	1950	1826	1	7.1	153	—	212	225	5.4/144	5.9/144	23
24	350	31	—	40	22	44.9	114.9	42.8	1529	27	1950	1826	-5	10	168	—	217	233	5.4/144.8	6.4/144.8	24
TOTAL																					TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induced Draft Fan Amps A	B	Suphi Temp	Reheat Temp	Suphi Attemp Flow A	B	Rht Spray Flow	WATER Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Bd
1	39	200		56		52	387	396	166	164	269	248	1008	1008	130	120	50	23	21	21	—
2	39	200		56		52	388	388	164	163	283	283	1006	1014	150	120	52	7	22	21	—
3	39	200		56		52	380	388	164	163	278	278	1014	1005	140	120	65	15	24.5	24	—
4	39	200		56		52	384	386	170	168	280	280	1008	1008	150	120	80				
5	39	200		56		52	384	385	166	166	280	280	1008	1006	140	120	80				
6	39	196		56		52	385	386	166	164	278	278	1004	1005	120	120	50				
7	38	195	—	56	—	52	387	388	167	170	280	280	1008	1008	150	120	70				
8	40	195	—	56	—	52	385	387	169	170	280	280	1008	1008	150	120	80				
9	40	195	—	56	—	52	385	389	169	170	280	280	1008	1008	150	120	80				
10	40	197	—	56	—	52	386	389	170	170	281	280	1008	1008	150	120	80				
11	40	199	—	56	—	52	386	389	170	170	280	280	1008	1008	150	120	80				
12	40	199	—	56	—	52	386	389	170	170	280	280	1008	1008	150	120	80				
13	40	199	—	56	—	52	386	389	170	170	280	280	1008	1008	150	120	80				
14	40	199	—	56	—	52	386	389	170	170	280	280	1008	1008	150	120	80				
15	41	195	—	56	—	52	385	389	169	166	280	278	998	999	100	165	80				
16	41	196	—	56	—	52	384	388	164	163	271	271	1011	1005	120	160	49				
17	41	197	—	52	—	52	385	389	170	167	280	279	997	1008	150	120	83				
18	41	198	—	56	—	52	386	389	178	172	285	280	1009	1001	120	165	68				
19	41	198	—	57	—	52	386	390	176	172	281	280	994	997	135	160	82				
20	41	198	—	57	—	52	385	389	171	170	285	281	1012	1009	150	120	80				
21	41	199	—	57	—	52	386	390	178	172	289	288	999	1014	135	165	89				
22	41	198	—	56	—	52	384	389	172	170	281	280	1012	1005	135	165	65				
23	41	196	—	57	—	53	387	390	173	170	283	282	1000	1006	145	120	80				
24	41	196	—	56	—	52	385	389	173	170	278	282	997	997	90	155	70				
Total																					

WATER

	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank
23	21	21	
7	22	21	—
15	24.5	24	—

IN PLANT SILOS

	23	7	15
A	F		F
B	F		F
C	F		F
D	F		F
E	↓ 22	↓ 18	↓ 18

UNIT OPERATOR

2300 0700
0700 1500 JG, mm
1500 2300 Thacker

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	TK's & TR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	-	
0700 - 1500		XXX	XXX	XX	X	X	XXX	XX	X	
1500 - 2300		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	

C-98-3

FORM NO 3198 9 80

WYODAK POWER PLANT -- STATION LOG

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter	Gross Generation MW	Auxiliary Transformer Meter	Auxiliary Transformer MW	Start up Transformer Meter	Start up Transformer MW	NET GEN MWH
1	46635		12273	30			331
2	47041	326	12332	29			337
3	47364	363	12402	30			333
4	47764	365	12441	29			376
5	48132	336	12441	30			333
6	48493	361	12470	29			332
Sub Total	2777	2777	137	177			2000
7	48854	361	12500	30			327
8	49213	359	12530	30			328
9	49568	355	12559	29			326
10	49928	360	12586	27			332
11	50290	362	12617	31			333
12	50647	357	12647	30			327
13	51003	356	12676	29			327
14	51359	356	12706	30			326
Sub Total	38477	2866	4113	236			2670
15	51716	357	12736	30			327
16	52072	356	12765	29			327
17	52428	356	12794	29			327
18	52788	360	12823	29			331
19	53147	359	12852	29			330
20	53506	359	12881	29			330
21	53864	358	12911	30			328
22	54220	356	12940	29			327
Sub Total	7904	2861	649	234			2627
23	54576	356	12969	29			327
24	54936	360	12998	29			331
Day Total	8620	716	705	58			658
Prv Total							
TI to Date							
	259						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	16729	53327	02284	69356	57919	50809	97024	18703
Prev	08826	05322	02284	12794	57919	50628	96287	17680
Total	7903	104	-	562	-	130	41	12
Tot Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	5991239	4187940	5193227	104110	240204	96720	36002	
Prev	5770			104110	2108		30021	
Total	220949	301955	297917	-	29389	-	5981	
Tot Mo	1104717	1509775	1485885	-	146945	-		

5981

5570

WYODAK
PLANT OPERATOR LOG

Day Wed Date 2-8-85

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN - OUT A	AIR HEATER GAS IN - OUT B	HOUR ENDING
1	330	31	-	23	22	48	166	42			1915	1811	-6	6.5	146	-	210	212	5.3/	5.3/	1
2	330	31	-	23	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/	2
3	330	31	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/	3
4	330	31	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/	4
5	330	31	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/	5
6	330	31	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	6
7	330	31	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	7
8	330	31	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	8
9	330	31	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	9
10	330	30	-	29	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	10
11	330	30	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	11
12	330	30	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	12
13	330	30	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	13
14	330	30	-	20	22	48	166	42			1915	1811	-9	5.8	147	-	201	219	5.3/14.3	5.3/14.2	14
15	350	30	-	21	22	47.5	114.8	41.5	1583	26	1952	1826	25	14.0	168	-	208	219	5.3/13.8	5.2/13.9	15
16	360	30	-	22	22	44.5	114.8	41.2	1583	25	1949	1822	14	9.2	161	-	200	211	5.4/14.1	5.3/14.0	16
17	359	30	-	30	22	44.5	114.9	40.9	1583	25	1954	1810	12	9.8	163	-	199	210	5.5/14.2	5.3/14.2	17
18	355	30	-	45	22	44.4	114.8	45.7	1586	25	1954	1826	12	10.0	165	-	196	207	6.2/14.1	5.6/14.2	18
19	361	30	-	40	22	44.4	114.8	45.1	1583	25	1953	1824	9	9.6	162	-	193	204	5.4/14.4	5.2/14.3	19
20	360	30	-	40	22	44.4	115.0	44.7	1582	25	1960	1830	10	9.5	162	-	200	211	5.5/14.4	6.0/14.2	20
21	361	30	-	38	22	44.6	115.0	44.3	1584	25	1946	1822	6	8.6	158	-	198	209	5.2/12.9	5.5/13.9	21
22	355	30	-	52	22	44.6	115.1	43.9	182	25	1950	1822	5	11.2	169	-	202	215	5.3/14.5	5.9/14.8	22
23	350	30	-	48	22	44.6	114.6	43.6	1581	25	1956	1825	10	10	165	-	200	216	5.3/14.2	5.6/14.2	23
24	353	30	-	46	22	44.5	114.6	43.1	1580	25	1950	1825	0	10	165	-	197	208	5.5/14.4	5.6/14.1	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Suphtr Temp	Reheat Temp	Suphtr Attemp Flow A	Suphtr Attemp Flow B	Rht Spray Flow	WATER Raw	WATER Filter	WATER Treated	Fuel
1	411	170	-											1015	145		80	Wtr Tank	Wtr Tank	Wtr Tank	Oil
2	411	170	-	20	-	2	381	382			220	221	10	1016				23			
3	411	170	-															7			
4	411	-	288	17	-	53			120	120	20			1010	150			15			
5	411	-	288	-	50	53								992	150						
6	411	-	288	-	50	53									155		80				
7	411	-	170	-	51	53	380	384	174	170	220	220			160	170	82				
8	411	-	201	-	54	53			171					1011	1024			IN PLANT SILOS			
9		-	210	-	54	53	380	384	170	170	220	220	1017	1015	160	170	80		23	7	15
10	415	-	210	-	54	53	380	384	170	170	220	220	1016	1014	160	170	80	A	F		F
11	415	-	207	-	54	53	380	384	170	170	220	220	1016	1014	160	170	80	B	F		F
12	415	-	207	-	54	53	380	384	170	170	220	220	1016	1014	160	170	80	C	F		F
13	415	-	207	-	54	53	380	384	170	170	220	220	1016	1014	160	170	80	D	F	F	F
14	415	-	207	-	54	53	380	384	170	170	220	220	1016	1014	160	170	80	E	F	F	F
15	415	-	181	-	53	52	380	385	165	164	223	224	1012	1004	110	155	79				
16	415	-	203	-	54	53	381	386	167	165	229	229	1011	1004	125	170	81				
17	415	-	203	-	54	53	381	386	168	165	230	229	1011	1008	125	170	66	2300 0700			
18	415	-	206	-	54	53	383	388	168	165	230	229	990	1002	95	165	59	0700 1500			
19	415	-	206	-	54	53	383	387	170	168	232	230	1003	1006	140	170	71	1500 2300			
20	415	-	206	-	54	53	384	388	165	165	229	228	993	1005	95	165	79				
21	415	-	205	-	54	53	384	387	165	165	229	228	1008	1007	125	170	65				
22	415	-	205	-	54	53	384	386	171	169	235	231	997	1008	125	170	78				
23	415	-	207	-	54	53	383	386	169	165	230	230	1004	1009	120	155	80				
24	415	-	207	-	54	53	383	386	170	170	230	230	1004	1008	140	160	82				
Total																					

UNIT OPERATOR

2300 0700 [illegible]
0700 1500 [illegible]
1500 2300 Thomas

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXX	XXXX	XXX			XXX	XX	X	
0700 - 1500										
1500 2300		XXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	

C-99

FORM NO 3198 9 80

WYODAK POWER PLANT — STATION LOG

HOUR ENDING	WYODAK GENERATION Gross Generation Meter (54436)	MW	Auxiliary Transformer Meter (12998)	MW	Start up Transformer Meter (68349)	MW	NET GEN MWH
1	55276	360	13028	30			330
2	55656	360	13057	29			331
3	56019	363	13087	30			333
4	56377	358	1311[illegible]	29			[illegible]
5	56739	362	13146	30			332
6	57098	359	1317[illegible]	29			330
Sub Total	2162	2162	177	177			1985
7	57455	357	13204	29			328
8	57811	356	13234	30			326
9	58163	357	13263	29			328
10	[illegible]	[illegible]	13293	30			[illegible]
11	58888	360	13323	30			330
12	59248	360	13353	30			330
13	[illegible]	[illegible]	[illegible]	30			[illegible]
14	[illegible]	356	[illegible]	29			[illegible]
Sub Total	5030	2868	414	237			2631
15	60326	360	13441	29			331
16	60685	359	13471	30			329
17	61046	361	13500	29			332
18	61407	361	13529	29			332
19	61765	358	13558	29			329
20	62120	355	13588	30			325
21	62478	358	13617	29			329
22	62832	354	13646	29			325
Sub Total	2896	2866	648	234			2632
23	63186	354	13676	30			324
24	63542	356	13705	29			327
Day Total	8606	710	707	59			651
Prv Total							
Tl to Date							
	359						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	24615	05439	02285	[illegible]	[illegible]	50939	97073	18707
Prev	16729	05327	02285	59356	[illegible]	50808	97024	[illegible]
Total	7886	112	–	566	–	131	49	4
1st Mo			–		–			

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	620589	447248	540987	[illegible]	268260	76720	42109	
Prev	589144	418940	519327	[illegible]	240204	76720	36002	
Total	31445	28308	[illegible]	–	28356	–	6107	
1st Mo	107235	149654	14330		14178	–		

5363 6107

WYODAK
PLANT OPERATOR LOG

Day Saturday Date Feb 2 85

HOUR ENDING	IND GEN	IND AUX	IND START-UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	Air Heater Gas In/Out A	Air Heater Gas In/Out B	HOUR ENDING
1	350	30	–	[illegible]	[illegible]	44.6	115	42	[illegible]	[illegible]	[illegible]	[illegible]	0	10	159	–	[illegible]	[illegible]	[illegible]	[illegible]/137	1
2	[illegible]	30	–	45	22	44.6	[illegible]	42	1584	25	1952	1825	1	9.2	151	–	[illegible]	213	[illegible]	[illegible]	2
3	356	30	–	42	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	9.0	160	–	206	217	5.4/[illegible]	[illegible]/144	3
4	[illegible]	30	–	[illegible]	22	[illegible]	[illegible]	41.6	[illegible]	[illegible]	[illegible]	[illegible]	3	9.2	161	–	[illegible]	[illegible]	[illegible]	[illegible]	4
5	[illegible]	31	–	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		3	9.2	[illegible]	–	200	[illegible]	[illegible]	[illegible]	5
6	350	31	–	41	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	11.7	172	–	205	217	[illegible]	[illegible]	6
7	[illegible]	30	–	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	–	199	[illegible]	[illegible]	[illegible]	7
8	365	30	–	45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	4	9.8	[illegible]	–	207	212	[illegible]	[illegible]	8
9	360	31	–	47	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	1832	3	10.6	162	–	201	[illegible]	[illegible]	[illegible]	9
10	[illegible]	[illegible]	–	50	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	2	[illegible]	161	–	[illegible]	[illegible]	[illegible]	[illegible]	10
11	351	31	–	47	22	[illegible]	114	42.6	[illegible]	25	[illegible]	[illegible]	2	[illegible]	160	–	[illegible]	212	[illegible]	[illegible]	11
12	[illegible]	31	–	40	22	[illegible]	114	[illegible]	[illegible]	25	[illegible]	1827	4	9.7	161	–	[illegible]	211	[illegible]	[illegible]	12
13	[illegible]	31	–	[illegible]	22	[illegible]	115	[illegible]	[illegible]	25	[illegible]	[illegible]	6	9	159	–	[illegible]	[illegible]	[illegible]	[illegible]	13
14	359	30	–	30	22	44.4	115	41.6	[illegible]	25	[illegible]	1830	7	11.1	162	–	202	212	[illegible]	[illegible]	14
15	362	30	–	21	22	44.5	114.8	41.2	1580	25	1953	1826	8	9.1	157	–	206	217	5.4/14.3	5.8/14.5	15
16	[illegible]	30	–	24	22	44.5	114.7	40.9	1580	25	1956	1830	9	8.0	155	–	203	214	5.3/13.7	5.6/13.8	16
17	362	30	–	31	22	44.6	115.0	40.6	1580	25	1954	1828	12	8.8	159	–	199	210	5.3/14.1	5.7/14.2	17
18	361	30	–	41	22	44.6	114.8	40.3	1578	25	1952	1824	7	9.9	159	–	195	205	5.4/14.0	5.5/14.0	18
19	355	30	–	45	22	44.4	114.9	44.4	1583	25	1956	1828	8	10.5	166	–	197	208	5.3/14.1	5.5/14.1	19
20	351	30	–	41	22	44.5	115.0	44.0	1583	25	1950	1824	7	11.7	171	–	196	207	5.4/14.0	5.7/14.1	20
21	359	30	–	29	22	44.5	115.0	43.6	1583	25	1961	1830	2	10.0	163	–	201	213	5.3/14.2	5.5/14.2	21
22	353	30	–	34	22	44.5	115.0	43.2	1580	25	1954	1828	2	11.2	169	–	195	207	5.4/14.2	5.9/14.2	22
23	[illegible]	30	–	30	22	44.6	115	42.9	1578	25	[illegible]	1826	1	11.7	171	–	201	217	5.5/14.0	5.8/14.7	23
24	348	30	–	30	22	44.6	[illegible]	[illegible]	[illegible]	25	[illegible]	1824	0	10.1	164	–	198	210	5.1/14	5.6/14	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induced Draft Fan Amps A	B	Supht Temp	Reheat Temp	Supht Attemp Flow A	B	Rht Spray Flow
1	45	–	206	–	54	53	381	385		[illegible]	[illegible]	[illegible]	1008	1010	140	170	60
2	45		208	–	54	53	383	386	[illegible]	[illegible]	210	220	1001	1010	120	160	80
3	45		208	–	54	53	[illegible]	[illegible]		[illegible]	228	226	[illegible]	981	100	[illegible]	[illegible]
4	45		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	–	201	–	54		[illegible]	386	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	80
6	45	–	207	–	54	53	382	[illegible]		[illegible]	228	228	1015	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	–	190	–	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	163	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	–	204	–	[illegible]	[illegible]	384	[illegible]	[illegible]	162	278	277	1011	1007	120	[illegible]	[illegible]
9	[illegible]	–	201	–	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	279	272	991	1002	130	[illegible]	[illegible]
10	[illegible]	–	[illegible]	–	[illegible]	[illegible]	384	[illegible]	161	166	280	[illegible]	[illegible]	1009	[illegible]	165	61
11	45	–	202	–	54	[illegible]	[illegible]	379	171	163	[illegible]	274	990	1001	100	[illegible]	60
12	[illegible]	–	[illegible]	–	54	53	[illegible]	380	170	164	281	279	1001	1011	130	165	80
13	[illegible]		[illegible]			[illegible]	[illegible]	387	[illegible]	164	[illegible]	282	991	1011	[illegible]	165	[illegible]
14	[illegible]	–	206	–	54	[illegible]	[illegible]	387	[illegible]	162	276	273	[illegible]	1006	115	160	50
15	45	–	194	–	54	53	384	386	170	169	281	279	998	1006	125	165	68
16	45	–	204	–	54	53	381	386	168	162	273	273	1014	1006	125	155	42
17	45	–	202	–	54	53	385	388	169	165	279	278	990	1000	105	165	63
18	45	–	206	–	54	53	383	386	169	165	280	279	1003	1004	135	120	60
19	45	–	201	–	54	53	384	386	169	168	282	279	1007	1003	115	160	51
20	45	–	208	–	54	53	385	388	165	164	279	278	1000	1007	125	165	63
21	45	–	171	–	54	53	385	389	166	165	280	279	991	1004	75	165	61
22	45	–	207	–	54	53	383	386	162	160	278	276	1010	1008	130	160	58
23	45	–	207	–	54	53	384	389	170	168	282	280	998	1008	110	165	75
24	45	–	178	–	54	53	[illegible]	375	[illegible]	162	278	275	1013	1006	120	160	45
Total																	

WATER	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	[illegible]	[illegible]	–	[illegible]
7	[illegible]	[illegible]	–	[illegible]
15	22.5	24	–	26.5

IN PLANT SILOS	23	7	15
A	F	F	F
B	[illegible]	[illegible]	F
C	[illegible]		F
D	[illegible]		F
E	[illegible]	17	↓29

UNIT OPERATOR	
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	X	
0700 - 1500		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXX	X	
1500 - 2300		XXXX	XXXX	XXX	XXX	XXXX	XXXX	[illegible]	X	

C-100

FORM NO 3198 9 80

C-101

WYODAK POWER PLANT — STATION LOG

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter (63542?)	Gross Generation MW	Auxiliary Transformer Meter (13205)	Auxiliary Transformer MW	Start-up Transformer Meter (68319)	Start-up Transformer MW	NET GEN MWH
1	63900	358	13735	30			328
2	[illegible]	358	[illegible]	29			329
3	64617	359	[illegible]	30			329
4	64976	359	[illegible]	30			329
5	[illegible]	360	[illegible]	29			[illegible]
6	[illegible]	[illegible]	13823	30			330
Sub Total	[illegible]	[illegible]	176	[illegible]			1976
7	[illegible]	359	13772	29			[illegible]
8	66411	356	13742	30			326
9	66767	356	13971	29			327
10	[illegible]	357	14001	30			[illegible]
11	67478	354	14030	29			[illegible]
12	67837	359	14060	30			329
13	68193	356	14089	29			327
14	[illegible]	357	14118	29			328
Sub Total	5008	2854	413	235			2619
15	68905	355	14147	29			326
16	69259	354	14176	29			325
17	69616	357	14206	30			327
18	69977	361	14236	30			331
19	70338	361	14265	29			332
20	70699	361	14294	29			332
21	71059	360	14324	30			330
22	71419	360	14353	29			331
Sub Total	7877	2869	648	235			2634
23	71779	360	14386	29			331
24	72141	362	14411	29			333
Day Total	8599	722	206	58			664
Prv Total							
Tl to Date							
	358						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	32505	[illegible]75	[illegible]	20986	[illegible]	51073	97121	18765
Prev	[illegible]	[illegible]	[illegible]	[illegible]	53919	50939	97073	16707
Total	7890	136	-	564	-	134	48	8
1st Mo			-		-			

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	[illegible]288	[illegible]	[illegible]	[illegible]	297816	96784	48397	
Prev	[illegible]84	[illegible]8	54[illegible]27	[illegible]0	268560	96720	42129	
Total	21704	[illegible]706	21495	-	21256	64	6268	
1st Mo	10852	[illegible]465.3	14742.5	-	1462.8			

5508.05 — 6352

WYODAK
PLANT OPERATOR LOG

Day [illegible] Date [illegible]

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	Air Heater Gas In/Out A	Air Heater Gas In/Out B	HOUR ENDING
1	[illegible]	31	—	[illegible]	22	[illegible]	[illegible]	[illegible]				[illegible]	2	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	1
2	[illegible]	[illegible]	—	52	22	[illegible]		[illegible]					-1	9.5	154	—	[illegible]	[illegible]	[illegible]	[illegible]	2
3	360	[illegible]	—	52	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10.8	156	—	[illegible]	[illegible]	[illegible]	[illegible]	3
4	[illegible]	31	—	[illegible]	22	[illegible]		41	1580	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]		[illegible]	[illegible]	4
5	351	31	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	5
6	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	-2	[illegible]	160	—	[illegible]	[illegible]	[illegible]	[illegible]	6
7	[illegible]	30	—	30	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	-2	10.5	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	7
8	359	30	—	51	22	[illegible]	[illegible]	[illegible]	1580	25	1942	[illegible]	[illegible]	11.9	[illegible]	—	[illegible]	206	[illegible]	[illegible]	8
9	362	30	—	59	22	44.5	115	43.4	1581	25	[illegible]	1826	0	11.2	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	9
10	[illegible]	30	—	[illegible]	22	44.6	115	42.4	[illegible]	25	[illegible]	1826	6	10.7	[illegible]	—	[illegible]	211	5.1/14	[illegible]/14	10
11	353	31	—	48	22	[illegible]	114	42	1580	25	[illegible]	1826	12	11.2	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	11
12	360	31	—	50	22	44.6	115	42	[illegible]	25	[illegible]	1826	16	10.7	[illegible]	—	208	220	[illegible]	[illegible]	12
13	361	31	—	50	22	44.4	115	42.3	[illegible]	25	[illegible]	1826	12	24	[illegible]	—	204	220	[illegible]	[illegible]	13
14	[illegible]	30	—	44	22	44.4	114	42.0	[illegible]	25	[illegible]	1826	12	9.2	[illegible]	—	202	211	[illegible]	[illegible]	14
15	355	30	—	32	22	44.5	115.0	41.6	1579	25	1953	1828	12	10.2	166	—	210	222	5.2/13.7	5.9/13.7	15
16	352	30	—	40	22	44.5	114.8	41.4	1581	25	1945	1826	11	12.0	172	—	204	214	5.2/13.6	5.8/13.6	16
17	364	31	—	59	22	44.4	115.0	41.1	1580	25	1948	1828	16	8.1	156	—	203	216	5.2/12.5	5.4/12.6	17
18	366	31	—	79	22	44.5	115.0	40.8	1518	25	1941	1822	10	8.6	158	—	200	212	5.7/14.0	5.4/14.1	18
19	362	30	—	60	22	44.5	115.1	40.5	1579	25	1946	1830	5	8.9	159	—	198	210	5.4/14.6	5.3/13.7	19
20	365	30	—	52	22	44.4	115.0	45.0	1580	25	1946	1826	3	8.2	156	—	198	209	5.3/14.6	5.8/13.9	20
21	359	30	—	50	22	44.4	115.0	44.6	1580	25	1947	1828	2	9.7	163	—	198	210	4.9/13.0	4.7/13.0	21
22	360	30	—	48	22	44.5	115.0	44.1	1579	25	1945	1828	5	10.2	165	—	196	207	5.2/13.6	5.6/13.6	22
23	350	[illegible]	—	40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1826	2	10	135	—	194	[illegible]	[illegible]	[illegible]	23
24	355	30	—	38	22	44.5	[illegible]	43.3	1580	[illegible]	[illegible]	1818	2	8.6	158	—	198	210	5.3/14	5.7/13.8	24
TOTAL																					TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1	[illegible]	—	208	—	54	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]78	999	1002	[illegible]	160	50
2	[illegible]	—	195	—	[illegible]	53	[illegible]	385	167	[illegible]	280	[illegible]	[illegible]	[illegible]	175	[illegible]	76
3	[illegible]		[illegible]	—	[illegible]	53	383	386	[illegible]	[illegible]0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	155	80
4	45		[illegible]	—	[illegible]	[illegible]	[illegible]	387	[illegible]	[illegible]	[illegible]	[illegible]0	[illegible]	[illegible]	105	150	[illegible]0
5	[illegible]	—	170	—	54	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	175	165	50
6	45	—	[illegible]	—	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1000	1010	150	[illegible]	[illegible]
7	[illegible]		202	—	54	53	[illegible]	[illegible]	162	161	280	277	1002	[illegible]	95	175	[illegible]
8	45	—	202	—	[illegible]	[illegible]	[illegible]	384	161	[illegible]	[illegible]	280	1007	1009	160	170	[illegible]
9	[illegible]		201	—	54	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1001	1002		[illegible]	58
10	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	991	[illegible]	170	[illegible]	60
11	45	—	202	—	54	53	[illegible]	384	168	[illegible]	271	272	1000	1009	160	170	[illegible]
12	[illegible]	—	[illegible]	—	[illegible]	53	[illegible]	[illegible]	[illegible]	164	[illegible]	[illegible]	998	1011	175	170	[illegible]
13	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	387	[illegible]	[illegible]	270	271	1001	1001	110	[illegible]	[illegible]
14	[illegible]		202	—	54	[illegible]	[illegible]	387	[illegible]	[illegible]	271	271	[illegible]	1009	130	165	62
15	45	—	203	—	54	53	384	386	162	161	271	271	1008	1007	95	155	41
16	46	—	203	—	54	53	384	386	166	164	272	272	1007	1010	125	165	59
17	46	—	204	—	54	53	383	386	167	168	270	270	1012	1010	110	155	40
18	46	—	202	—	54	53	385	386	169	168	279	278	1008	1011	135	165	78
19	46	—	201	—	54	53	385	387	164	161	271	271	1010	1011	135	165	56
20	46	—	204	—	54	53	385	387	169	168	279	276	1000	1010	170	165	78
21	45	—	202	—	54	53	388	388	161	160	269	269	1008	1008	110	155	48
22	45	—	202	—	54	53	384	384	165	162	271	271	1002	1008	135	165	78
23	[illegible]	—	202	—	54	53	[illegible]	388	163	162	[illegible]	[illegible]	1005	[illegible]	120	160	60
24	[illegible]	—	202	—	54	53	[illegible]	389	163	162	[illegible]	273	992	1005	90	160	60
Total																	

WATER

	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	[illegible]	[illegible]	[illegible]	[illegible]
7	22	[illegible]	[illegible]	[illegible]
15	24.5	29	—	26.5

IN PLANT SILOS

	23	7	15
A	[illegible]	/	F
B			F
C		[illegible]	F
D		[illegible]	F
E	[illegible]0	[illegible]	↓24

UNIT OPERATOR

Shift	Operator
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		[illegible]XX	[illegible]	[illegible]	[illegible]	[illegible]	XX[illegible]	[illegible]	X	
0700 - 1500		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXX	X	
1500 2300		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	IK-26

FORM NO 3198 9 80

WYODAK POWER PLANT — STATION LOG

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter	Gross Generation MW	Auxiliary Transformer Meter	Auxiliary Transformer MW	Start up Transformer Meter	Start up Transformer MW	NET GEN MWH
1							
2							
3							
4							
5							
6							
Sub Total							
7	74646	360		10			350
8	75009	363	14648	30			333
9	75369	360	14717	29			331
10	75725	356	14796	30			327
11	76080	355	14736	30			325
12	76441	361	14796	30			331
13	76803	362	14796	30			332
14	77165	362	14826	30			332
Sub Total	5374	1871	415	238			2641
15	77528	363	14856	30			333
16	77892	364	14886	30			334
17	78252	360	14915	29			331
18	78613	361	14945	30			331
19	78975	362	14975	30			332
20	79335	360	15005	30			330
21	79691	356	15037	29			327
22	80049	358	15063	29			329
Sub Total	7908	2884	652	237			2647
23	80406	357	15097	29			328
24	80763	357	15122	30			327
Dev Total	8522	714	711	59			655
Prv Total							
Tl to Date							
	359						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	42405	5502	02205	7052	02479	5121	1971	18729
Prev	39505					5023	2021	18564
Total	2900	127	—	566	—	140	50	165
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2
Pres	6 [illegible]	5106192	6012271	11218	2 1008	96784	54327
Prev	[illegible]	[illegible]	[illegible]	3210	[illegible]	90784	48347
Total	2147	1738	23789	8008	[illegible]	—	5980
1st Mo	1082	1136	1189	1004	141		

WYODAK
PLANT OPERATOR LOG

5523.7

5980

Day [illegible] Date [illegible]

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Out Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1																					1
2																					2
3																					3
4																					4
5																					5
6																					6
7																					7
8	361	31	—	45	22	44.4	115.1	41.6	1578	25	1952	1822	-3	10.2	164	—	199	202	5.4/14.6	5.4/14.6	8
9	360	31	—	55	22	44.4	114.6	42.9	1579	25	1957	1824	0	8.6	157	—	193	202	5.4/13.5	5.4/13.5	9
10	360	31	—	60	22	46.4	115.1	44.6	1580	25	1947	1822	0	9.3	160	—	193	203	5.4/13.2	5.4/13.4	10
11	360	31	—	53	22	44.4	115.0	44.0	1580	25	1947	1822	3	8.2	156	—	197	207	5.4/13.2	5.5/13.2	11
12	362	31	—	50	22	44.5	115.0	43.6	1580	25	1944	1822	6	7.2	151	—	199	209	5.6/13.1	5.7/13.1	12
13	365	31	—	41	22	44.4	115.1	43.2	1578	25	1954	1824	7	6.2	146	—	206	220	5.7/14.2	5.5/14.2	13
14	362	21	—	40	22	44.4	114.7	42.8	1578	25	1950	1824	9	6.2	155	—	204	214	5.7/14.4	5.7/14.8	14
15	366	31	—	36	22	44.5	115.0	42.4	1579	25	1954	1830	9	8.0	155	—	205	219	5.4/14.5	5.7/14.8	15
16	360	30	—	38	22	44.4	115.1	42.1	1578	25	1952	1824	9	7.8	153	—	209	223	5.0/14.0	5.4/14.2	16
17	364	31	—	42	22	44.5	114.8	41.8	1580	25	1948	1824	7	8.5	157	—	205	218	5.2/13.7	5.2/13.7	17
18	360	30	—	51	22	44.5	115.0	41.4	1578	25	1950	1826	4	7.8	162	—	203	214	5.1/12.6	5.6/13.5	18
19	362	30	—	54	22	44.5	115.1	41.2	1580	25	1946	1822	5	9.3	160	—	204	216	5.3/13.8	5.7/13.8	19
20	361	30	—	42	22	44.6	115.0	40.9	1580	25	1946	1824	7	9.9	162	—	203	215	5.4/13.8	5.4/13.7	20
21	365	20	—	34	22	44.4	115.0	45.2	1580	25	1950	1824	6	7.3	157	—	208	220	5.3/14.1	5.5/14.1	21
22	360	30	—	31	22	44.4	115.0	44.5	1578	25	1952	1828	7	5.7	157	—	207	218	5.0/13.5	5.3/13.8	22
23	[illegible]	30	—	35	22	44.5	115	44.1	1578	25	1950	1826	6	10	164	—	[illegible]	[illegible]	[illegible]	[illegible]	23
24	[illegible]	30	—	33	22	44.5	[illegible]	43.6	[illegible]	[illegible]	1952	1826	6	9.5	163	—	213	225	[illegible]	[illegible]	24
TOTAL																					TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Suphtr Attemp Flow A	Suphtr Attemp Flow B	Rht Spray Flow	WATER Raw Wtr Tank	WATER Filter Wtr Tank	WATER Treated Wtr Tank	Fuel Oil
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					
16																					
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					
Total																					

IN PLANT SILOS

	23	7	15
A			F
B			F
C			F
D			F
E			F

UNIT OPERATOR

2300 0700	
0700 1500	
1500 2300	

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700										
0700 - 1500		XXXX	XXXX	XXXX	XXX	XXXX	XXXX	XXX	X	
1500 2300		XXXXX	XXXXX	XXXX	XXXX	XXXX	XXXX	XX	X	

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FORM NO 3198 9 80

WYODAK POWER PLANT — STATION LOG

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter (32263?)	Gross Generation MW	Auxiliary Transformer Meter (15122)	Auxiliary Transformer MW	Start-up Transformer Meter ([illegible])	Start-up Transformer MW	NET GEN MWH
1	81176?	353	1515?	28			325
2	[illegible]	355	[illegible]	29			326
3	[illegible]	355	[illegible]	29			[illegible]
4	[illegible]	[illegible]	15237?	29			325
5	[illegible]	358	[illegible]	29			[illegible]
6	[illegible]	[illegible]	[illegible]	29			330
Sub Total	[illegible]	2134?	173	173?			1961?
7	83252	355	15325	30			325
8	83611	359	15354	29			330
9	83967	356	15383	29			327
10	84320	353	15412	29			324
11	84675	355	15442	30			325
12	85028	353	15471	29			324
13	85380	352	15501	30			322
14	85738	358	15530	29			329
Sub Total	4975	2841	408	235			2606
15	86095	357	15557	29			328
16	86454	359	15589	30			329
17	86816	362	15619	30			332
18	87175	359	15649	30			329
19	87537	362	15680	31			331
20	87896	359	15710	30			329
21	88257	361	15741	31			330
22	88615	358	15771	30			328
Sub Total	7852	2877	649	241			2636
23	88973?	357?	15801	30			328
24	81337?	366	15831	30			330?
Day Total	8570	718	709	60			658
Prv Total							
Tl to Date							
	367						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	18255?	05209?	02285	71622	57919	51433	97256	18740
Prev	40405?	05702	02285	71052	57919	[illegible]	[illegible]	18729?
Total	7850	107	–	570	–	220	85	11
1st Mo			–		–			

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	663922?	[illegible]	[illegible]	126331	354729	96784	60339	
Prev	[illegible]	[illegible]	[illegible]	112118	[illegible]	96784?	54377?	
Total	21372?	22280?	7593?	14213	28871	–	5962	
1st Mo	10796	[illegible]	33765	121065	144455	–		

5598.45 5962

WYODAK
PLANT OPERATOR LOG

Day [illegible] Date [illegible]

Station Log

HOUR ENDING	IND GEN	IND AUX	IND START-UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	Air Heater Gas In/Out A	Air Heater Gas In/Out B	HOUR ENDING
1	[illegible]	30	–	32	22	44.5?	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1825	5	11.1	170	–	[illegible]	217	[illegible]	[illegible]	1
2	[illegible]	30?	–	32	22	[illegible]	115	42.0?	[illegible]	[illegible]	[illegible]	[illegible]	12	11	168		[illegible]	217	[illegible]	[illegible]	2
3	[illegible]	30	–	[illegible]	[illegible]	44.5?	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12?	11	158		[illegible]	220?	[illegible]	[illegible]	3
4	350	30		[illegible]	22	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	11.3?	169?	–	[illegible]	[illegible]	5.1/1?	[illegible]	4
5		[illegible]		[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	5
6	[illegible]	[illegible]		31	22	[illegible]				[illegible]	[illegible]	[illegible]	8?	10	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	6
7	358	30		50	22	44.4	114	41.0	1579	25	1949	1824	8	10.4	165		206	217	5.4/11.?	5.?/10.?	7
8	358	30		50	22	44.5	114	40.7	1578	25	1953	1826	9	10.7	165		211	223	5.4/11.8	5.?/11.?	8
9	352?	30		44	22	44.6	114	41.1	[illegible]	25	1952	1824	13	11.3	[illegible]		214	225	5.1/11.?	[illegible]	9
10	[illegible]	30		46	22	44.5	[illegible]	45.0	1577	25	1953	1824	20	10.1	164		[illegible]	225	5.1/13.8	[illegible]	10
11	[illegible]	30		48	22	44.4	114	44.3?	[illegible]	25	1948	[illegible]	22	8.7	158		217	225	[illegible]	5.8/11.?	11
12	354	30		48	22	44.4	115	42.9?	157?	25	1944?	[illegible]	29	10.7	[illegible]		[illegible]	227	5.0/13.8?	[illegible]	12
13	354?	30	–	42	22	44.6	115.1?	42.3	1578	25	1952	1820	25	8.8	150	–	217	217?	4.9/10?	[illegible]	13
14	354?	30		48	22	44.5	115	42.9	1579	25	1946	1826	25	8.8	152		215?	221	5.0/12.6	5.7/12.6	14
15	359?	30	–	34?	22	44.4	115.1	42.2	1577	25	1951	1820	25	8.1	154	–	217	220	5.1/12.7	5.4/12.6	15
16	360	30	–	28	22	44.5	115.0	42.1	1577	25	1948	1826	26	8.3	155	–	214	226	5.2/12.6	5.4/12.6	16
17	361	31	–	29	22	44.4	115.0	41.7	1579	25	1952	1833	24	8.9	160	–	215	228	5.0/13.8	5.4/13.7	17
18	361	31	–	40	22	44.5	114.7	41.4	1579	25	1941	1822	23	8.3	155	–	214	226	4.8/11.1	4.8/11.1	18
19	363	30	–	41	22	44.6	115.0	41.1	1580	25	1946	1822	21	8.3	155	–	211	224	5.2/12.7	5.2/13.6	19
20	361	32	–	26	22	44.6	114.8	40.5	1581	25	1943	1812	23	9.1	158	–	213	226	5.2/13.7	5.2/13.7	20
21	365	32	–	32	22	44.5	114.6	40.4	1577	25	1908	1826	23	7.8	153	–	219	233?	5.2/14.2	5.3/14.1	21
22	357	31	–	29	22	44.5	115.2	41.0	1577	25	1950	1828	21	8.9	158	–	210	222	5.0/13.4	5.5/13.4	22
23	[illegible]	31	–	32?	22	44.5	115	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	23	9.8	162	–	207	218	5.2/14	5.8/1?	23
24	356	31	–	22?	22	44.4	115	[illegible]	1528?	25	[illegible]	1800?	23?	8.2	153	–	211	225	5.3/14	5.2/14	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1	45	–	[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]	165?	[illegible]	[illegible]	[illegible]	[illegible]	1008	140?	[illegible]	[illegible]
2	45?	[illegible]	200	–	54?	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	222	1009	1005	150?	152	58
3	45		200?	–	54?	53	[illegible]	[illegible]	170	168	[illegible]	[illegible]	1000	1008	110	156	75?
4	45		[illegible]			53	[illegible]	[illegible]	[illegible]	12?	[illegible]	[illegible]	[illegible]	1010	[illegible]	170?	82
5	[illegible]		[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	110	165	[illegible]
7	45		200		54	53	385	390	168	168	278	278	1004	1014	160	170	85
8	45		178		54	53	386	390	177	170	282?	280	1001	1014	180	170	85
9	44		200		54	53	386	390	162?	166	274	274	1013	1004	120?	175?	60
10	45		200		54	53	386	390	165	166	270	270	1005	1004	120	160	50?
11	45		200		54	53	386	385?	[illegible]	168	274	272	987	1000	136	16?	57
12	45		200		54	53	388	388	168	[illegible]	272	272	1005	1002	150	156?	67
13	45?	–	200	–	54	52	383	383	16?	165	[illegible]	[illegible]	1008	1003	120	160	60
14	45		200		54	52	382	386?	170	168	288	288	998	1005	144	176	70
15	45	–	201	–	54	53	384	386	168	160	271	271	1005	1002	145	170	52
16	45	–	200	–	54	53	381	386	168	165	272	270	1012	1004	135	160	58
17	45	–	201	–	54	53	385	386	166	161	275	273	1004	1010	135	163	85
18	45	–	201	–	54	53	384	386	162	160	270	269	1011	1006	155	165	71
19	45	–	198?	–	54	53	385	387	166	162	274	271	980	995	135	165	82
20	45	–	200	–	54	53	384	386	170	165	275	271	1003	1005	155	165	80
21	45	–	201	–	54	53	385	387	161	160	279	275	991	1001	85	155	25
22	45	–	201	–	54	53	386	388	160	160	271	270	1010	1003	125	135	41
23	[illegible]	–	200	–	54?	53	38?	385?	[illegible]	[illegible]	[illegible]	[illegible]	1000?	1008	135	160	66
24	45	–	198?	–	54	53	382	387	[illegible]	165?	278	278	[illegible]	1002	90?	150	60
Total																	

WATER

	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	[illegible]	27?	–	7?
7	22	25		27.5
15	25	27	–	27.?

IN PLANT SILOS

	23	7	15
A	/	F	F
B	/	F	F
C	/	F	F
D	[illegible]	F	F
E	[illegible]		[illegible]

UNIT OPERATOR

Shift	Operator
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SOOT BLOWING LOG

SHIFT	FURNACE SLAG CONDITION	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		VXXX	XXX	X X	X X	[illegible]	[illegible]	X X	X	
0700 - 1500										
1500 2300		XXXX	XXXX	XXXXX	XXXX	XXXX	XXXX	XX	X	

FORM NO 3198 9 80

WYODAK POWER PLANT – STATION LOG

HOUR ENDING	WYODAK GENERATION						NET GEN
	Gross Generation		Auxiliary Transformer		Start up Transformer		
	Meter	MW	Meter	MW	Meter	MW	MWH
1	89333		15821		65519		
2	90053	360	15871	30			330
3	90407	354	15921	30			334
4	90765	358	15971	30			328
5	91120	361	16021	30			327
6	91498	378	16070	29			373
Sub Total		1791		179			1976
7	91850	362	16040	30			332
8	92213	363	16069	29			334
9	92574	361	16099	30			331
10	92931	357	16128	29			328
11	93310	379	16158	30			327
12	93646	356	16188	30			326
13	93996	350	16220	32			318
14	94342	346	16253	33			313
Sub Total	5093	2554	422	243			3411
15	94694	352	16287	33			320
16	95047	353	16317	31			321
17	95397	350	16348	31			319
18	95750	353	16380	32			320
19	96098	348	16412	32			317
20	96445	347	16443	31			316
21	96792	347	16474	31			318
22	97140	347	16506	32			316
Sub Total	7811	2802	675	253			2549
23	97487	347	16537	31			316
24	97828	341	16568	31			323
Day Total	8512	7601	737	60			6339
Prv Total							
TI to Date	365						

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Bio Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Coil End Temp A	Coil End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1	350	30		22										11	162	–					1
2		30		22							1950				161	–	200	215			2
3															160		196	210			3
4															153		190	210			4
5				32				42				1800			155		200	210			5
6		30		22											156		200	213			6
7	360	30		22						25			8	76	152		196	209			7
8	360	30		48	22	46.6	115			25			7	7.9	154		192	206			8
9	360	30		40	22	46.4	115			25				6.2	145		202	216			9
10	358	30		28	22	44.6	115			25			11	9.1	153		201	213			10
11	360	32	–	40	22	44.5	117.3	42.2		25				4.1	141	–	201	214			11
12	356	32	–	42	22	44.5	114.5	41.3		25				10.1	164	–	202	214			12
13	356	32		24	22	44.4	115			25				7.2	151		200	210			13
14		33	–	28	22	44.4	114.8			25				8.7			201	221			14
15																					15
16		32	–	24												–					16
17			–	22																	17
18		32	–	42																	18
19			–	40																	19
20			–	42												–					20
21		32	–	40	22											–					21
22		32	–	41												–					22
23		32	–	38	22											–					23
24		32	–	37	22											–					24
TOTAL																					TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comd Amps A	Soot Blow Air Comd Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow	HOUR ENDING
1																		1
2																		2
3																		3
4																		4
5																		5
6																		6
7																		7
8																		8
9																		9
10																		10
11																		11
12																		12
13																		13
14																		14
15																		15
16																		16
17																		17
18																		18
19																		19
20																		20
21																		21
22																		22
23																		23
24																		24
Total																		

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	56009	03709		14	57919	51605	97706	18251
Prev	17255	03307	2485	1622	57919	51597	97556	18240
Total	7754	100		512	–	172	50	11
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	20800	56733	61658	136531	383540	96784	60319	
Prev	18507	55465	59871	136531	355000	96784	60319	
Total	22293	28766	27794	–	28541	–	5680	
1st Mo	1106.1	1448.05	1439.7		192705			

5420.9

WYODAK
PLANT OPERATOR LOG

Day ____ Date 1 26 85

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IR's & IR's Out of Service
2300 - 0700										
0700 - 1500										
1500 2300										

WATER	Raw	Filter	Treated	Fire
	Wtr Tank	Wtr Tank	Wtr Tank	Oil
23				
7	26			
15	25			

IN PLANT SILOS

	23	7	15
A	E	F	
B	E	F	
C	E	F	
D	E	F	
E	116	426	422

UNIT OPERATOR

2300 0700
0700 1500
1500 2300

C-104

C-105

FORM NO 3198 9 80

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter (97845)	Gross Generation MW	Auxiliary Transformer Meter ([illegible])	Auxiliary Transformer MW	Start up Transformer Meter (68349)	Start up Transformer MW	NET GEN MWH
1	[illegible]	355	16600	32			323
2	[illegible]	354	[illegible]	[illegible]			321
3	[illegible]	360	16664	[illegible]			328
4	[illegible]	353	16695	31			322
5	[illegible]	353	[illegible]	32			321
6	[illegible]	351	[illegible]	31			320
Sub Total	[illegible]	2126	190	190			[illegible]
7	00327	352	16790	32			320
8	00676	353	16822	32			321
9	01030	354	16853	31			323
10	01387	357	16885	32			325
11	01746	359	16917	32			327
12	02100	354	16949	32			322
13	02459	359	16981	32			327
14	02815	356	17014	33			323
Sub Total	4920	2844	446	256			2588
15	[illegible]	360	[illegible]	32			327
16	[illegible]	361	[illegible]	32			329
17	[illegible]	[illegible]	[illegible]	32			[illegible]
18	[illegible]	361	[illegible]	[illegible]			329
19	[illegible]	[illegible]	17110	32			329
20	[illegible]	[illegible]	[illegible]	33			327
21	[illegible]	[illegible]	[illegible]	[illegible]			327
22	[illegible]	354	[illegible]	32			322
Sub Total	[illegible]	[illegible]	703	257			2621
23	[illegible]	272	17300	29			243
24	06079	114	17318	18	68355	6	
Day Total	5234	386	750	47		6	
Prv Total							
Tl to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	63481	06025	02285	72817	57932	51855	97365	18762
Prev	56009	[illegible]	[illegible]	72219	[illegible]	51605	[illegible]	18751
Total	7472	116	0	604	13	250	57	11
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2
Pres	730050	592581	665225	136402	410288	97462	70643
Prev	708049	564453	637608	136331	383540	96784	66019
Total	22001	28128	27617	71	26748	678	4624
1st Mo							

1100.05 1406.4 1380.85 3.55 1337.4 5302

5228.25

WYODAK PLANT OPERATOR LOG

Day: Thursday Date: Feb 7, 85

WYODAK POWER PLANT — STATION LOG

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	Air Heater Gas In/Out A	Air Heater Gas In/Out B	HOUR ENDING
1	[illegible]	32		31	22	44.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9	10	163	—	198	209	54/142	58/142	1
2	[illegible]	[illegible]		30	22	[illegible]	115	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9	7.5	161	—	[illegible]	208	51/[illegible]	56/[illegible]	2
3	[illegible]	32		[illegible]	22	44.4	114.6	40.1	[illegible]	25	[illegible]	[illegible]	8	7.3	160	—	197	212	53/14	56/142	3
4	[illegible]	32		32	22	44.5	[illegible]	40	[illegible]	[illegible]	[illegible]	[illegible]	7	11	168	—	[illegible]	211	[illegible]	53/136	4
5	[illegible]	32		40	22	[illegible]	[illegible]	44	[illegible]	[illegible]	[illegible]	[illegible]	9	7.8	160	—	[illegible]	[illegible]	[illegible]	61/[illegible]	5
6	[illegible]	[illegible]		[illegible]	[illegible]	44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11	5.9	159	—	197	210	54/14	57/14	6
7	352	32		35	22	44.4	115	43.6	[illegible]	25	[illegible]	1772	10	9.6	162		197	209	53/136	[illegible]	7
8	355	32		40	22	44.4	115	43	[illegible]	25	[illegible]	[illegible]	11	10.5	170		197	215	57/125	53/125	8
9	358	[illegible]		50	22	44.5	[illegible]	42.7	[illegible]	25	[illegible]	[illegible]	14	6.4	[illegible]		[illegible]	[illegible]	49/124	51/[illegible]	9
10	356	32		50	22	44.5	114	42.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9.0	[illegible]		[illegible]	217	55/126	[illegible]/128	10
11	354	32		[illegible]	22	44.5	114	41.9	[illegible]	25	[illegible]	1776	23	8.8	161		[illegible]	215	51/125	57/126	11
12	[illegible]	33		35	22	44.5	114	41.5	[illegible]	25	1932	[illegible]	[illegible]	7.1	145		[illegible]	220	[illegible]	[illegible]	12
13	[illegible]	33		40	22	44.5	114	41.3	[illegible]	[illegible]	[illegible]	[illegible]	34	7.7	155		[illegible]	215	50/142	54/14	13
14	360	33		42	22	44.4	113	40.2	[illegible]	25	[illegible]	[illegible]	36	7.3	150		[illegible]	222	51/[illegible]	51/[illegible]	14
15	360	[illegible]	—	[illegible]	22	[illegible]	114	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	222	[illegible]	[illegible]	15
16	[illegible]	[illegible]		[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	141	—	[illegible]	[illegible]	[illegible]	[illegible]	16
17	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	17
18	362	33	—	60	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	46	6.6	147	—	210	222	[illegible]	[illegible]	18
19	[illegible]	[illegible]	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	176	—	[illegible]	221	[illegible]	[illegible]	19
20	361	33	—	70	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	[illegible]	3.6	146	—	[illegible]	228	[illegible]	[illegible]	20
21	[illegible]	32	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	21	[illegible]	[illegible]	[illegible]	[illegible]	149	—	[illegible]	223	[illegible]	[illegible]	21
22	360	33	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	49	55	146	—	[illegible]	[illegible]	/	/	22
23																			/	/	23
24																			/	/	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1	45	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1002	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	389	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	142	[illegible]
3	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	389	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1009	80	125	[illegible]
4	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1005	110	136	[illegible]
5	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	166	[illegible]	224	224	[illegible]	1001	80	120	[illegible]
6	45	[illegible]	[illegible]	—	54	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1005	[illegible]	[illegible]	[illegible]
7	45	207	208		54	53	286	390	164	164	228	228	1003	1003	169	[illegible]	30
8	45	260	207		54	53	390	[illegible]	164	164	224	272	990	996	96	160	30
9	45	196	196		54	53	[illegible]	[illegible]	[illegible]	162	272	272	1003	1004	116	156	44
10	45	[illegible]	202		54	53	384	[illegible]	170	162	[illegible]	276	990	1004	[illegible]	[illegible]	66
11	45	200	204		54	53	386	390	[illegible]	164	274	272	1004	999	112	160	[illegible]
12	45	198	206		54	53	383	[illegible]	[illegible]	[illegible]	[illegible]	270	1004	1004	100	140	20
13	45	198	204		54	53	383	386	[illegible]	[illegible]	[illegible]	[illegible]	1003	1004	90	140	[illegible]
14	45	196	202		54	53	384	388	[illegible]	[illegible]	228	276	995	999	80	140	[illegible]
15	[illegible]	[illegible]	192	—	54	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	992	[illegible]	140	20
16	[illegible]	[illegible]	[illegible]	—	54	[illegible]	380	384	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1010	110	141	60
17	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	105	140	[illegible]
18	[illegible]	[illegible]	[illegible]	—	[illegible]	53	[illegible]	[illegible]	[illegible]	170	[illegible]	[illegible]	[illegible]	986	85	155	[illegible]
19	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	281	[illegible]	[illegible]	1002	120	150	56
20	[illegible]	[illegible]	[illegible]	—	[illegible]	53	387	391	[illegible]	[illegible]	[illegible]	[illegible]	984	986	80	140	60
21	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	170	[illegible]	278	[illegible]	1006	[illegible]	140	[illegible]
22													1003	1003	[illegible]	120	47
23																	
24																	
Total																	

WATER

	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	50	15	—	27
7	23	27.5		27.5
15	[illegible]	[illegible]		[illegible]

IN PLANT SILOS

	23	7	15
A	F	F	F
B	F	F	F
C	F	16	F
D	F	F	F
E	↓18	↓20	[illegible]

UNIT OPERATOR

2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	XX	[illegible]	IR [illegible]
0700 - 1500		[illegible]								
1500 - 2300		[illegible]	X [illegible]	[illegible]		✓ [illegible]	[illegible]	[illegible]	✓	

FORM NO 3198 9 80

WYODAK POWER PLANT – STATION LOG

WYODAK GENERATION

HOUR ENDING	Gross Generation Meter	Gross Generation MW	Auxiliary Transformer Meter	Auxiliary Transformer MW	Start-up Transformer Meter	Start-up Transformer MW	NET GEN MWH
	06079		17318		68355		
1					68374	19	
2					68392	18	
3					68409	17	
4					68425	16	
5					68440	15	
6					68453	13	
Sub Total					98	98	
7					68466	13	
8					68477	11	
9					68483	6	
10					68488	5	
11					68494	6	
12					68499	5	
13					68502	3	
14					68505	3	
Sub Total					150	52	
15					68509	4	
16					12	3	
17					15	3	
18					18	3	
19					22	4	
20					26	4	
21					31	5	
22					68535	4	
Sub Total					180	30	
23					68547	12	
24					68561	14	
Day Total					206	26	
Prv Total							
TI to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	63481	06025	02285	72818	58095	51855	97363	18776
Prev	63481	06015	02285	72818	57932	51855	97163	18762
Total	0	10	0	0	153	0	0	14
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	2700508	592581	665275	136402	410388	97463	21177	
Prev	2700500	592561	665275	136402	410288	97462	20643	
Total	8	0	0	0	0	1	534	
1st Mo								

WYODAK
PLANT OPERATOR LOG

Day Fri Date 2-8-85

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Blo Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN - OUT A	AIR HEATER GAS IN - OUT B	HOUR ENDING
1																			/	/	1
2																			/	/	2
3																			/	/	3
4																			/	/	4
5																			/	/	5
6																			/	/	6
7																			/	/	7
8																			/	/	8
9																			/	/	9
10																			/	/	10
11																			/	/	11
12																			/	/	12
13																			/	/	13
14																			/	/	14
15																			/	/	15
16																			/	/	16
17																			/	/	17
18																			/	/	18
19																			/	/	19
20																			/	/	20
21																			/	/	21
22																			/	/	22
23																			/	/	23
24																			/	/	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Suphtr Attemp Flow A	Suphtr Attemp Flow B	Rht Spray Flow
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
Total																	

WATER

	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	29.5	27	—	27
7	21	53		27
15	31	29		21

IN PLANT SILOS

	23	7	15
A			
B			
C			
D			
E			

UNIT OPERATOR

2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700										
0700 - 1500										
1500 2300										

C-106

FORM NO 3198 9 80

WYODAK POWER PLANT — STATION LOG

WYODAK GENERATION

HOUR ENDING	06079 Gross Generation Meter	MW	17318 Auxiliary Transformer Meter	MW	68561 Start up Transformer Meter	MW	NET GEN MWH
1					68576	15	
2					68592	16	
3					68611	19	
4					68630	19	
5					68648	18	
6					68667	19	
Sub Total					106	106	
7					68687	20	
8					68705	18	
9					68723	18	
10					68742	19	
11					68761	19	
12					68780	19	
13					68798	18	
14					68815	17	
Sub Total					254	148	
15					68834	19	
16					68851	17	
17					69	18	
18					86	17	
19	06084	5			965	19	-14
20	06126	42	17324	6	68918	13	23
21	06235	109	17344	20			92
22	06377	142	17375	31			139
Sub Total	324	324	57	57	357	103	
23	06581	173	17403	27			146
24	06751	170	17428	26			144
Day Total	672	343	110	53	357		290
Prv Total							
TI to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	69037	06028	02285	72908	58361	97935	97367	18781
Prev	63481	06025	02285	72814	58315	97355	97362	18776
Total								5
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2
Pres	733524	59680	665275	1364.02	410288	97645	71177
Prev	729658	59256	664715	1364.02	410269	97463	71177
Total	3866	4419	0	0	0	180	0
1st Mo							

193.3 220.95
419.25

WYODAK
PLANT OPERATOR LOG

Day Sat Date 2-9-85

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Bio Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Coil End Temp A	Coil End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1																			/	/	1
2																			/	/	2
3																			/	/	3
4																			/	/	4
5																			/	/	5
6																			/	/	6
7																			/	/	7
8																			/	/	8
9																			/	/	9
10																			/	/	10
11																			/	/	11
12																			/	/	12
13																			/	/	13
14																			/	/	14
15																			/	/	15
16																			/	/	16
17																			/	/	17
18																			/	/	18
19																			/	/	19
20																			/	/	20
21																			/	/	21
22																			/	/	22
23																			/	/	23
24																			/	/	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induted Draft Fan Amps A	B	Suphtr Temp	Reheat Temp	Suphtr Attemp Flow A	B	Rht Spray Flow
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
Total																	

WATER

	Raw Wtr Tank	Filtered Wtr Tank	Treated Wtr Tank	Fuel Oil
23	21.5	27	—	21
7	23.5	22.5		22.5
15	22.3	21	—	24

IN PLANT SILOS

	23	7	15
A	F	F	F
B	F	E	F
C	F	F	F
D	F	F	F
E	45'	45	F

UNIT OPERATOR

2300 0700	Therese
0700 1500	Rickin
1500 2300	Hamm

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700										
0700 - 1500										
1500 2300										

70-71-72

1763

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WYODAK POWER PLANT — STATION LOG

WYODAK GENERATION

HOUR ENDING	06751	12428	68918	NET GEN
	Gross Generation	Auxiliary Transformer	Start-up Transformer	
	Meter / MW	Meter / MW	Meter / MW	MWH
1	06917 / 166	17455 / 27		139
2	07083 / 168	17481 / 26		142
3	07260 / 175	17508 / 27		148
4	07477 / 217	17536 / 28		189
5	07801 / 324	17568 / 32		252
6	08161 / 360	17598 / 30		330
Sub Total	1410 / 1410	170 / 170		1240
7	08520 / 359	17628 / 30		329
8	08877 / 357	17658 / 30		327
9	09237 / 360	17687 / 29		331
10	09601 / 364	17716 / 29		335
11	09963 / 362	17746 / 30		332
12	10324 / 361	17776 / 30		331
13	10686 / 362	17806 / 30		332
14	11047 / 361	17836 / 30		331
Sub Total	4296 / 2886	408 / 238		2648
15	11409 / 357	17866 / 30		327
16	11762 / 358	17896 / 30		328
17	12124 / 362	17926 / 30		332
18	12487 / 363	17956 / 30		333
19	12851 / 364	17986 / 30		334
20	13215 / 364	18016 / 30		334
21	13578 / 363	18046 / 30		333
22	13937 / 359	18076 / 29		329
Sub Total	7186 / 7190	6476 / 239		2661
23	14297 / 360	18105 / 30		330
24	14659 / 362	18134 / 29		323
Day Total	7908 / 722	706 / 59		7202
Prv Total				
To Date				

361.1 Max

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	71218	06110	02285	73991	50361	52173	99429	18784
Prev	64027	06028	02255	73408	50361	51933	97267	18781
Total	7181	82	0	583	0	240	62	3
1st Mo								

Coal Integrators	A	B	C	D	E	SCALES H1	SCALES H2	
Pres	255506	625828	669861	136402	432858	03140	71182	
Prev	233664	597180	646275	136402	410288	02643	71177	
Total	21842	28648	23586	0	22570	5497	5	
1st Mo								

1079.1 1442.4 1175.3 0 1128.5 5502

4029.3

WYODAK PLANT OPERATOR LOG

Day Fri. Date 2-10-05

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1	168	28	—	-13	21.8	44.9	115.1	43.4	1573	25	1324	1255	20	5.4	140	—	118	148	3.0/12.4	2.9/12.6	1
2	166	28	—	8	22	44.5	114.9	41.9	1571	25	1345	1311	19	7.1	150	—	118	129	2.9/12.6	3.1/12.8	2
3																			/	/	3
4																			/	/	4
5	355	31	—	19	22	44.5	114.7	40.9	1568	25	1945	1821	17	6.3	144	—	155	168	4.6/12.0	4.9/12.0	5
6	361	31	—	21	22	44.4	114.7	40.6	1567	25	1964	1833	21	7.5	151	—	158	171	4.7/12.2	5.0/12.4	6
7	360	31		24	22	44.4	115	40.3	1566	25	1948	1822	16	7.3	149		155	168	4.6/12.0	4.7/12.2	7
8	360	31		24	22	44.4	115	40.0	1566	25	1946	1822	16	5.1	122		155	166	4.6/12.0	4.5/12.0	8
9	360	31		40	22	44.3	114	45.0	1564	25	1943	1821	17	7.3	143		158	170	4.5/12.0	4.5/12.6	9
10	366	31		60	22	44.5	115	44.1	1566	25	1961	1841	19	5.0	144		155	160	4.4/12.2	5.1/12.6	10
11	362	31		45	22	44.4	114	43.5	1567	25	1956	1822	23	6.0	143		162	177	4.4/12.6	4.9/12.4	11
12	362	31		40	22	44.4	115	43.9	1567	25	1953	1821	23	6.0	150		162	176	4.5/12.6	5.1/12.7	12
13	360	31		40	22	44.4	115	43.3	1566	25	1952	1821	25	7.7	153		171	186	4.7/12.6	5.0/12.6	13
14	362	31		32	22	44.4	115	41.9	1567	25	1956	1822	23	6.0	141		178	192	4.6/12.6	5.1/12.9	14
15	361	31		40	22	44.4	115	42.5	1567	25	1955	1821	23	6.0	141		178	192	4.6/12.6	5.1/12.9	15
16	361	31		40	22	44.4	115	42.5	1567	25	1955	1821	23	6.0	141		178	192	4.6/12.6	5.1/12.9	16
17	362	32		32	22	44.4	115	42.3	1567	25	1954	1821	23	6.0	141		178	192	4.6/12.6	5.1/12.9	17
18	360	31		32	22	44.4	115	42.3	1566	25	1952	1821	25	7.7	153	—	171	186	4.7/12.6	5.0/12.6	18
19	362	31		34	22	44.4	114	42.1	1567	25	1954	1821	23	6.0	141		178	192	4.6/12.6	5.1/12.9	19
20	362	31		32	22	44.4	114	41.9	1567	25	1956	1822	23	6.0	141	—	178	192	4.6/12.6	5.1/12.9	20
21	360	30	—	31	22	44.4	114	42.0	1566	25	1956	1821	21	5.9	139	—	178	192	4.6/12.6	5.1/12.9	21
22		31																			22
23	362	31	—	21	22	44.4	115.3	41.3	1567	25	1953	1824	23	6.4	145	—	184	181	4.6/12.4	5.1/12.9	23
24	361	31	—	21	22	44.3	115.6	41.0	1570	25	1953	1824	26	7.3	150	—	191	181	5.1/12.5	5.6/12.4	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Suphtr Attemp Flow A	Suphtr Attemp Flow B	Rht Spray Flow
1	45	200	205	—	46	48	305	320	140	140	251	250	1009	927	15	30	—
2	45	180	204	—	48	48	307	320	180	140	250	250	1008	938	—	40	—
3													997	1001			
4																	
5	45	—	200	—	55	54	379	325	155	155	261	260	997	1001	95	120	15
6	45	—	201	—	55	54	361	386	156	157	264	263	1001	999	75	100	41
7	45		200		55	54	380	344	156	156	263	262	1003	1005	100	116	30
8	45		200		55	54	380	344	156	156	263	262	1006	1005	101	118	30
9	45		200		55	54	380	344	156	156	264	264	1003	998	96	118	30
10	45		196		54	53	380	344	156	156	264	264	1004	1004	104	114	55
11	45		200		54	53	380	344	156	156	264	264	1004	1001	96	110	30
12	45		200		54	53	380	344	156	156	264	264	1004	1001	96	120	30
13	45		200		54	53	380	344	156	156	264	264	1004	1001	96	120	30
14	45		200		54	53	380	344	156	156	264	264	1004	1001	96	120	30
15	45		201	—	55	54	379	325	155	155	261	260	997	1001	95	120	15
16	45		201	—	55	54	361	386	156	157	264	263	1001	999	75	100	41
17	45		200		55	54	380	344	156	156	263	262	1003	1005	100	116	30
18	45		200		55	54	380	344	156	156	263	262	1006	1005	101	118	30
19	45		200		55	54	380	344	156	156	264	264	1003	998	96	118	30
20	45		196		54	53	380	344	156	156	264	264	1004	1004	104	114	55
21	45		200		54	53	380	344	156	156	264	264	1004	1001	96	110	30
22	45		200		54	53	380	344	156	156	264	264	1004	1001	96	120	30
23	45	—	207	56	53	—	376	383	161	166	270	272	1003	1002	105	150	49
24	45	—	204	56	53	—	374	380	160	161	269	270	1002	1002	90	145	38
Total																	

WATER	Raw Wtr Tank	Filter Wtr Tank	T-mated Wtr Tank	Fuel Oil
23	21	24	—	315
7	11	14	—	
15				

IN PLANT SILOS

	23	7	15
A	412	F	F
B	411	F	F
C	F	F	1
D	F	F	1
E	F	417	16

UNIT OPERATOR

2300 0700	Thomas
0700 1500	
1500 2300	

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700										
0700 - 1500										
1500 - 2300		XXX	XXX	XXX	XXX	XXX	XXX	XXX	X	

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FORM NO 3198-9-80

WYODAK POWER PLANT – STATION LOG

WYODAK GENERATION

HOUR ENDING	146 59 Gross Generation Meter	MW	18134 Auxiliary Transformer Meter	MW	68918 Start-up Transformer Meter	MW	NET GEN MWH
1	15020	361	18164	30			331
2	15380	360	18194	30			330
3	15741	361	18224	30			331
4	16102	361	18253	29			332
5	16464	362	18283	30			332
6	16825	361	18313	30			331
Sub Total	2166	2166	179	179			1987
7	17190	365	18343	30			335
8	17549	359	18373	30			329
9	17910	361	18407	30			331
10	18267	357	18433	30			327
11	18628	361	18463	30			329
12	18991	363	18493	30			333
13	19356	365	18523	30			335
14	19717	361	18554	29			332
Sub Total	5058	2892	448	299			2657
15	20078	361	18582	28			333
16	20443	365	18612	30			335
17	20803	360	18642	30			330
18	21170	367	18672	30			336
19	21536	366	18702	30			336
20	21899	363	18733	31			332
21	22258	359	18767	34			325
22	22621	363	18771	30			333
Sub Total	7963	3404	657	239			2665
23	22983	362	18821	30			332
24	23346	363	18850	29			334
Day Total	2687	725	716	59			666
Prv Total							
TI to Date	367						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	79177	16207	02285	74081	55261	52480	42505	18794
Prev	71218	16110	02285	73991	55261	52172	41927	18754
Total	7959	97	0	590	0	307	76	40
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2
Pres	727601	655117	716970	136402	460657	07512	72710
Prev	655506	585828	646161	126402	452658	03140	71182
Total	72095	69289	70809	10000	7999	4373	1528
1st Mo							

1105.75 1469.45 1403.95 1588.95 5701

5362.6

WYODAK
PLANT OPERATOR LOG

Day 14th Date 2-11-85

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H_2 Press	Exc Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1	362	31	—	31	22	44.2	114.8	40.5	156	25	1797	1821	27	8.4	155	—	182	181	4.1/10.6	4.1/12.8	1
2	362	31	—	29	22	44.4	114.8	43.7	1568	25	1917	1824	27	7.4	150	—	183	183	5.0/13.1	5.3/13.2	2
3	362	31	—	21	22	44.5	114.8	44.2	1566	25	1950	1824	26	7.8	152	—	184	192	5.2/13.8	5.7/13.7	3
4	363	31	—	24	22	44.4	114.9	42.7	1566	25	1950	1824	25	7.3	149	—	184	188	5.1/13.5	5.5/13.6	4
5	361	31	—	26	22	44.4	114.8	43.3	1566	25	1950	1822	25	8.6	156	—	188	192	5.1/13.6	5.6/13.6	5
6	363	31	—	21	22	44.4	115.1	42.7	1567	25	1951	1828	25	7.6	151	—	187	192	5.1/13.6	5.4/13.1	6
7	362	31	—	35	22	44.3	115.1	41.7	1567	25	1951	1822	24	7.5	152	—	183	191	5.0/13.5	5.0/13.6	7
8	362	31	—	28	22	44.5	115.1	41.6	1568	25	1951	1822	23	7.3	154	—	182	190	5.2/13.6	5.1/13.7	8
9	362	31	—	38	22	44.3	115.1	43.9	1568	25	1950	1822	25	7.3	150	—	182	198	4.7/12.6	4.8/13.7	9
10	363	31	—	39	22	44.4	115.1	43.5	1568	25	1950	1821	27	7.4	153	—	193	199	5.4/13.2	5.4/13.1	10
11	363	31	—	40	22	44.4	115.1	44.4	1566	25	1948	1824	42	7.8	153	—	195	202	5.4/13.2	5.4/13.1	11
12	363	31	—	36	22	44.5	115.1	43.2	1566	25	1948	1824	44	7.2	150	—	196	222	5.1/13.8	5.6/13.8	12
13	364	31	—	48	22	46.4	115.0	42.8	1569	25	1948	1826	45	7.1	149	—	203	227	4.9/12.1	5.3/13.2	13
14	365	31	—	45	22	46.7	114.8	42.5	1568	25	1949	1824	45	7.0	148	—	203	226	4.6/11.8	5.1/12.8	14
15	364	31	—	44	22	46.6	114.8	42.0	1568	25	1949	1824	45	7.2	152	—	202	224	4.8/12.3	5.2/13.3	15
16	364	31	—	34	22	46.6	114.8	41.9	1568	25	1949	1824	45	7.2	152	—	201	224	4.8/12.3	5.2/13.3	16
17	363	31	—	29	22	46.4	114.8	41.8	1568	25	1948	1824	42	7.3	152	—	201	223	4.8/12.3	5.2/13.2	17
18	363	31	—	32	22	46.4	114.8	41.8	1568	25	1948	1824	42	7.1	150	—	200	223	4.8/12.3	5.2/13.2	18
19	362	31	—	37	22	46.6	114.8	40.3	1570	25	1948	1821	42	7.2	149	—	198	222	5.0/13.3	5.3/13.3	19
20	363	31	—	40	22	46.4	114.8	41.8	1568	25	1946	1824	42	7.0	148	—	197	222	4.9/12.8	5.1/13.3	20
21	362	31	—	38	22	46.4	114.8	41.8	1568	25	1947	1824	42	7.0	148	—	196	222	4.8/12.4	5.1/12.9	21
22	361	31	—	37	22	46.3	115.0	41.6	1567	25	1947	1824	42	7.2	152	—	203	224	4.9/12.7	5.2/13.2	22
23	364	31	—	20	22	46.4	115.0	43.1	1569	25	1946	1824	36	5.6	139	—	198	223	5.0/13.2	5.4/12.0	23
24	365	31	—	20	22	44.3	114.7	42.4	1570	25	1946	1826	34	7.3	149	—	203	229	5.0/13.8	5.7/13.7	24
TOTAL																					TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induced Draft Fan Amps A	B	Suphtr Temp	Reheat Temp	Suphtr Attemp Flow A	B	Rht Spray Flow	WATER Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
1	45	—	201	56	53	—	377	383	158	160	265	266	1000	1001	105	165	68				
2	45	—	204	56	53	—	378	384	160	161	270	271	1002	1001	105	157	48	23	39	—	31.5
3	45	—	205	56	54	—	375	382	161	165	275	276	995	1001	95	160	25	7	38	—	43
4	44	—	206	56	52	—	374	380	160	161	272	271	1005	1003	110	155	51	15	39	—	33
5	45	—	205	56	52	—	378	384	161	164	272	273	997	1001	100	160	72				
6	45	—	206	56	53	—	376	383	160	161	271	270	1001	1001	110	155					
7	45	—	205	56	53	—	377	383	161	162	272	270	1003	1001	110	160	50				
8	44	—	172	55	53	—	375	382	159	161	272	271	1002	1001	120	170	28				
9	45	—	205	56	54	—	375	381	160	160	267	267	1005	1001	90	140	80				
10	45	—	202	56	53	—	379	384	159	160	268	267	1010	1010	110	160	50				
11	45	—	202	56	53	—	379	383	161	162	272	271	1008	1008	120	170	80				
12	45	—	202	56	53	—	375	381	174	169	280	275	994	1002	100	170	60				
13	45	—	201	56	53	—	375	380	167	161	271	269	1001	998	100	170	57				
14	45	—	200	56	53	—	376	381	163	162	267	268	996	998	100	170	50				
15	44	—	201	56	53	—	378	382	162	161	268	267	1003	1003	105	170	60				
16	44	—	201	56	53	—	378	382	162	161	270	269	1002	1002	110	170	70				
17	44	—	201	56	53	—	378	382	162	161	270	269	1003	1001	100	160	63				
18	45	—	201	56	53	—	378	382	163	162	270	269	999	1001	100	160	55				
19	44	—	201	56	53	—	378	382	163	162	270	269	1001	1001	100	160	58				
20	44	—	201	56	53	—	378	382	163	162	270	269	998	1001	100	160	58				
21	45	—	201	56	53	—	378	384	163	162	270	269	1000	1001	115	165	55				
22	45	—	201	56	53								998	998							
23	45	—	201	56	53	—	376	379	169	161	271	269	1005	1001	115	160	49				
24	45	—	199	56	53	—	379	380	172	168	278	271	996	1001	100	160	68				
Total																					

IN PLANT SILOS

	23	7	15
A	F	F	6
B	F	F	7
C	F	F	8
D	F	F	F
E	7	8	5

UNIT OPERATOR

2300 0700 Thomas
0700 1500 S.C.
1500 2300 Williams

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXX	XXX	XXX	XXX	XXX	XXX	XXX	X	IK's 1, 4, 5
0700 - 1500		XXXX	XXXX	XXX	XXX	XXX	XXX	XXX	X	
1500 - 2300		XXX	XXX	XXX	XXX	XXX	XX	X	X	IR 12

C-109

FORM NO 3198 9 80

WYODAK POWER PLANT — STATION LOG

HOUR ENDING	WYODAK GENERATION							NET GEN
	23346		18850		68918			
	Gross Generation		Auxiliary Transformer		Start up Transformer			
	Meter	MW	Meter	MW	Meter	MW		MWH
1	23707	361	18879	29				332
2	24069	362	18909	30				332
3	24427	360	18938	29				331
4	24790	361	18967	29				332
5	25152	362	18997	30				332
6	25513	361	19026	29				332
Sub Total	2167	2167	176	176				1991
7	25874	361	19055	29				332
8	26236	362	19084	29				333
9	26598	362	19113	29				333
10	26961	363	19143	30				335
11	27321	360	19173	30				334
12	27691	370	19204	31				333
13	28053	362	19235	31				332
14	28415	362	19265	30				335
Sub Total	5073	2156	415	239				2667
15	28788	366	19296	31				335
16	29150	362	19327	31				332
17	29510	360	19358	31				331
18	657	116	19368	10	68924	6		
19					68938	14		
20					68954	16		
21	658	32			68972	18		
22	20762	104	19389	21	68994	22		
Sub Total	6116	1743	539	124	56	86		1163
23	30014	252	19916	27	68974	0		225
24	30369	355	19946	30				325
Day Total	2023	607	596	57	56	0		550
Prv Total								
TI to Date								

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	85578	06272	022285	79585	58708	52784	97692	18805
Prev	79177	06207	022285	79051	58261	52480	97505	18794
Total	6401	65	0	504	47	304	87	11
1st Mo								

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	796707	677359	739230	136402	482040	11652	72962	
Prev	727621	655117	716030	136402	460627	07513	72710	
Total	19086	24122	23200	0	21403	4139	252	
1st Mo								

9543 1206.1 1115 0 1070.16 4391

4345.55

WYODAK
PLANT OPERATOR LOG

Day Tues Date 2-12-85

HOUR ENDING	IND GEN	IND AUX	IND STARTUP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H_2 Press	E/C Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN - OUT A	AIR HEATER GAS IN - OUT B	HOUR ENDING
1	362	31	—	31	22	44.4	115.2	41.7	1570	25	1949	1824	47	7.7	152	—	202	227	9.7/13.1	5.1/12.0	1
2	360	31	—	30	22	44.4	115.0	41.4	1570	25	1953	1824	38	8.3	154	—	199	224	9.7/12.6	4.6/12.6	2
3	362	30	—	28	22	44.4	115.0	40.9	1571	25	1944	1821	40	8.1	153	—	200	225	9.8/13.6	5.6/12.6	3
4	360	30	—	29	22	44.4	114.8	40.5	1570	25	1942	1821	40	8.5	155	—	198	223	9.8/13.9	5.3/12.0	4
5	362	30	—	29	22	44.3	115.1	43.9	1570	25	1944	1821	42	7.5	150	—	201	224	9.8/13.6	5.1/12.6	5
6	361	30	—	28	22	44.5	115.0	42.4	1572	25	1951	1824	45	7.4	150	—	205	230	9.9/14.0	5.4/12.0	6
7	360	30	—	26	22	44.4	114.9	46.8	1571	25	1956	1824	43	7.2	149	—	204	233	9.8/13.7	4.5/12.7	7
8	357	30	—	27	22	44.5	114.9	46.1	1570	25	1960	1818	45	7.3	150	—	204	231	9.8/13.5	4.7/13.1	8
9	358	31	—	36	22	44.4	115	44.1	1570	25	1960	1818	45	6.0	142	—	191	210	9.7/12.2	5.3/11.1	9
10	360	33	—	35	22	44.5	115	41.6	1566	25	1952	1825	52	6.8	147	—	196	213	9.8/13.3	5.4/13.3	10
11	363	31	—	36	22	44.5	115	40.1	1571	25	1963	1825	55	7.2	149	—	201	214	9.7/13.4	5.2/13.4	11
12	364	31	—	24	22	44.5	114.9	44.1	1571	25	1960	1825	52	5.8	142	—	200	213	9.7/10.6	5.1/12.7	12
13	359	31	—	23	22	44.4	115	43.8	1571	25	1960	1825	52	6.6	140	—	195	216	9.7/12.8	5.2/12.8	13
14	360	31	—	30	22	44.5	115	43.8	1571	25	1960	1818	55	6.9	140	—	195	216	9.7/12.8	5.1/13.0	14
15	362	31	—	27	22	44.5	114	42.1	1571	25	1960	1821	55	6.8	141	—	196	219	9.8/13.2	5.4/13.0	15
16	361	32	—	10	22	44.5	114	43.1	1571	25	1960	1821	54	7.0	141	—	197	219	9.8/13.1	5.4/13.0	16
17	360	32	—	29	22	44.5	115	43.4	1571	25	1960	1821	54	7.0	142	—	198	219	9.8/13.1	5.4/13.1	17
18		31	—	29	27														/	/	18
19																			/	/	19
20																			/	/	20
21																			/	/	21
22																			/	/	22
23																			/	/	23
24	358	31	—	29	22	44.4	114.7	45.3	1562	25	1953	1828	37	7.7	153	—	198	225	9.6/13.4	4.9/12.3	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Suphtr Temp	Reheat Temp	Suphtr Attemp Flow Φ	Suphtr Attemp Flow B	Rht Spray Flow
1	45	—	200	56	53	—	375	381	163	161	270	269	1004	1001	115	160	48
2	45	—	201	56	53	—	375	381	167	161	269	265	1006	1003	105	160	40
3	47	—	200	56	53	—	374	381	171	165	275	271	998	999	120	170	20
4	45	—	200	56	53	—	376	381	170	161	269	266	1002	1002	115	165	50
5	45	—	200	56	53	—	378	385	172	164	274	270	998	1002	105	165	72
6	45	—	198	56	53	—	376	381	166	160	267	267	1011	1000	115	160	44
7	46	—	200	56	53	—	377	382	167	162	272	270	1000	1000	115	162	60
8	46	—	200	56	53	—	377	382	165	162	272	270	1000	1000	110	160	40
9	45	—	196	56	53	—	377	382	165	162	272	270	1000	1000	110	160	40
10	45	—	196	56	53	—	377	382	165	162	272	270	1003	1001	110	160	45
11	45	—	200	56	53	—	378	384	167	164	272	270	1000	1000	110	165	50
12	45	—	200	56	53	—	378	384	167	164	272	270	1000	1000	110	165	50
13	45	—	200	56	53	—	376	382	166	162	270	268	1008	1001	110	165	50
14	45	—	200	56	53	—	376	382	166	162	270	268	1008	1001	110	165	50
15	45	—	200	56	53	—	376	382	166	162	270	268	1008	1001	110	165	50
16	45	—	200	56	53	—	376	382	166	162	270	268	1008	1001	110	165	50
17	45	—	200	56	53	—	376	382	166	162	270	268	1008	1001	110	165	50
18																	
19																	
20																	
21																	
22																	
23																	
24	45	—	205	56	53	—	379	385	164	160	265	265	1003	1003	80	170	20
Total																	

HOUR ENDING	WATER Raw Wtr Tank	WATER Filter Wtr Tank	WATER T-water Wtr Tank	Fuel Oil
1				
2	23 25	28	—	
3	7		—	
4	15 20	28	—	
5				
6				
7				
8				

IN PLANT SILOS	23	7	15
A	F	F	F
B	F	F	F
C	F	F	F
D	F	F	F
E	17	20	16

UNIT OPERATOR

2300 0700	Thorne
0700 1500	Thomas Tyree
1500 2300	

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XXX	XXXX	XXXX	XX	X	IR 12
0700 - 1500		XXXX	XXXX	XXX	XX	X	XX	XX		IR
1500 2300		XXX	XXX	XX	XX	XX	X	XX		

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FORM NO 3198 - 80

WYODAK POWER PLANT – STATION LOG

WYODAK GENERATION

HOUR ENDING	30369 Gross Generation Meter	MW	19446 Auxiliary Transformer Meter	MW	68774 Start up Transformer Meter	MW	NET GEN MWH
1	30720	351	19476	30			321
2	31079	359	19506	30			329
3	31437	358	19536	30			328
4	31798	361	19566	30			331
5	32158	360	19597	31			329
6	32517	359	19627	30			329
Sub Total	2148	2148	181	181			1967
7	32876	359	19656	29			330
8	33239	363	19686	30			333
9	33596	357	19715	29			328
10	33876	280	19743	28			252
11	34150	274	19770	27			247
12	34417	267	19797	27			242
13	34690	273	19825	28			245
14	34970	228	19852	27			251
Sub Total	4601	2453	406	225			
15	35320	350	19882	30			320
16	35681	361	19913	31			330
17	36047	366	19943	30			336
18	36413	366	19973	30			336
19	36778	365	20003	30			335
20	37141	363	20033	30			333
21	37504	363	20063	30			333
22	37870	366	20093	30			336
Sub Total	2501	2900	647	241			2659
23	38235	365	20123	30			335
24	38597	362	20153	30			324
Day Total	8230	729	707	60			669
Prv Total							
TI to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	93089	06151	022285	75169	58408	53102	97654	18815
Prev	89571	06212	022255	74595	58408	52784	97592	18805
Total	3518	79	0	579	0	318	62	10
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	8172617	7070415	765702	1364021	5085611	11652	78641	
Prev	7981707	6991[illegible]	765702	1359[illegible]	4982040	11652	72962	
Total	20990	27804	26672	0	26521	0	5679	
1st Mo								

1049.5 1390.3 1373.6 0 1326.05

5099.45

WYODAK
PLANT OPERATOR LOG

Day Wed. Date 2-13-85

wt stm line

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Bio-Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1	358	31	—	21	22	44.4	118.7	45.6	1565	25	1955	1826	36	7.3	151	—	194	221	4.6/12.4	4.6/12.0	1
2	358	31	—	31	22	44.4	115.0	45.2	1564	25	1950	1824	33	7.6	152	—	195	222	5.1/12.6	5.5/12.4	2
3	361	31	—	31	22	44.4	114.9	44.8	1569	25	1957	1826	32	7.8	153	—	192	216	4.9/12.8	5.3/12.6	3
4	360	31	—	30	22	44.4	114.8	44.4	1567	25	1953	1828	32	7.8	153	—	199	225	4.9/12.8	4.9/12.7	4
5	360	31	—	29	22	44.4	114.6	44.0	1566	25	1949	1824	34	6.5	146	—	195	219	4.9/12.5	5.0/12.6	5
6	362	31	—	31	22	44.5	114.8	43.7	1568	25	1952	1826	34	6.7	147	—	199	223	4.7/12.9	5.2/12.7	6
7	355	31	—	21	22	44.4	114.6	43.3	1560	25	1942	illegible	33	6.0	144	—	195	220	4.9/12.7	5.2/12.8	7
8	357	31	—	40	22	44.4	115	43.1	1567	25	1953	1826	32	6.0	146	—	197	206	4.6/12.5	5.0/12.8	8
9	360	28	—	22	22	44.4	115	42.6	1569	25	1924	1828	36	8.0	151	—	199	224	4.8/12.7	4.8/12.4	9
10	270	28	—	20	22	44.6	illegible	42.2	1567	25	1886	1821	38	6.9	148	—	121	163	3.2/12.3	3.2/12.3	10
11	366	29	—	18	22	44.4	illegible	41.9	1568	25	1956	1823	41	6.2	145	—	169	177	3.3/12.4	3.5/12.5	11
12	367	29	—	19	22	44.5	114.7	41.7	1567	25	1850	illegible	43	6.5	146	—	129	126	3.1/12.1	3.2/12.1	12
13	369	29	—	8	22	44.5	illegible	44.5	1568	25	1885	1823	45	5.8	142	—	166	176	3.2/12.2	3.2/12.2	13
14	320	30	—	12	22	44.5	115	illegible	illegible	25	illegible	illegible	43	6.0	145	—	178	187	5.1/11	5.1/11	14
15	366	31		20	22	44.4	115	40.9	1566	25	1938	1815	44	6.4	146		190	203	5.1/12.0	5.2/12.0	15
16	362	31		18	22	44.5	115	40.6	1567	24	1934	1821	47	6.3	145		190	203	5.1/12.8	5.5/12.8	16
17	364	31		20	22	44.4	114	40.4	1566	24	1949	1821	42	5.7	142		188	201	5.3/12.0	5.4/12.0	17
18	364	31		32	22	44.5	114	40.3	1567	24	1946	1818	41	6.9	143		188	200	4.7/12.8	5.2/12.6	18
19	366	31		32	22	44.4	114	40.1	1567	24	1949	1821	38	5.8	142		187	200	5.1/12.8	5.5/12.8	19
20	366	31		32	22	44.4	115	39.5	1570	24	1945	1818	37	6.5	147		186	198	4.6/12.6	5.0/12.6	20
21	362	31		30	22	44.3	115	39.2	1570	24	1941	1817	34	7.5	152		184	197	4.9/12.9	5.2/12.9	21
22																			/	/	22
23	366	31	—	11	22	44.5	115.0	43.3	1570	24	1955	1822	31	6.6	147	—	193	207	5.4/12.6	5.6/12.7	23
24	362	31	—	20	22	44.5	114.7	43.2	1568	24	1941	1817	30	7.0	149	—	185	197	5.1/12.9	5.5/12.9	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induced Draft Fan Amps A	B	Suphtr Temp	Reheat Temp	Suphtr Attemp Flow A	B	Rht Spray Flow	WATER Raw Wtr Tank	Filter Wtr Tank	T-based Wtr Tank	Fuel Oil
1	45	—	206	56	53	—	379	385	160	159	263	261	1008	1001	65	130	—	23	23	—	—	—
2	45	—	206	56	53	—	379	385	166	160	269	269	1000	1002	85	150	50	23	illegible	illegible	—	illegible
3	45	—	206	56	53	—	377	385	164	160	270	269	1006	1002	85	140	38	17	illegible	illegible	—	illegible
4	45	—	201	56	53	—	378	384	163	160	269	268	1001	1004	80	145	60	15	22.5	28		31.5
5	45	—	205	56	53	—	376	382	161	158	269	265	1006	1004	85	140	25					
6	45	—	200	56	53	—	378	383	165	160	269	266	999	1002	85	150	50					
7	45	—	200	56	53	—	380	384	illegible	158	268	266	1007	1003	85	140	25					
8	illegible	—	206	57	53	—	379	384	160	160	270	268	930	992	80	140	40					
9	45	—	203	53	49	—	380	383	illegible	156	240	240	1004	994	150	96	15					
10	illegible	—	202	52	48	—	380	384	135	135	240	240	1003	993	50	90	—	A	F	F	F	
11	illegible	—	200	52	118	—	380	384	135	135	240	240	996	964	50	90	—	B	F	F	F	
12	45	—	202	52	48	—	380	386	160	160	240	240	1006	969	50	90	—	C	F	F	F	
13	45	—	201	52	48	—	378	385	162	162	240	240	1001	959	40	90	—	D	F	F	F	
14	45	197	—	55	51	—	365	365	150	150	255	255	1009	991	80	120	—	E	319	4	6	
15	45	200		56	53		378	383	160	160	270	268	1001	1004	100	160	64					
16	45	200		56	53		378	382	160	160	268	268	1005	1005	108	160	90					
17	45	200		56	53		380	384	160	160	270	270	1004	1002	100	160	40					
18	45	200		56	53		378	382	158	160	270	270	1003	1001	100	156	38					
19	45	198		56	53		378	382	158	158	270	270	1005	1004	100	160	40					
20	45	196		56	53		380	384	158	158	268	266	993	995	90	160	50					
21	45	200		56	53		378	382	158	160	270	270	1003	1003	110	160	55					
22																						
23	45	198	—	57	54	—	380	384	161	160	272	270	988	983	55	120	62					
24	45	197	—	56	52	—	377	381	160	160	270	269	1008	1002	115	160	55					
Total																						

IN PLANT SILOS

	23	7	15
A	F	F	F
B	F	F	F
C	F	F	F
D	F	F	F
E	319	4	6

UNIT OPERATOR

2300 0700 Terrance
0700 1500 [illegible]
1500 2300 [illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XXXX	XXXX	XXX	XX	X	5, 11
0700 - 1500		XXXX	XXXX	XXX	XX	XX	XX	XX	X	3, 12, 15
1500 2300		XXXX	XXXX	XXX	XX	XXX	XXX	XX	X	

C-111

C-5

WYODAK

COAL AND ASH ANALYSIS

WYODAK COAL ANALYSIS

Date	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-9	2-10	2-11	2-12	2-13	2-14	Avg
Time	2300	1700	400	1530	1523	1010	300	2330	800	1600	434	311	500	
Ultimate (wt% dry)														
Carbon	64.36	62.34	60.90	61.75	61.94	59.52	57.07	56.60	59.77	57.73	57.65	58.50	57.1	59.63
Hydrogen	4.77	4.90	4.66	4.31	4.59	4.82	4.43	4.20	4.45	4.17	4.14	4.58	4.45	4.50
Nitrogen	.86	.80	.85	.91	.88	.84	.80	.82	.86	.84	.84	.78	.76	0.84
Sulfur	.68 .67	.98 .91	.73 .73	.37 .36	.58 .59	1.86 1.89	1.09 1.03	0.63 .60	.71 .69	.33 .31	.35 .34	1.03 .96	.67 .71	0.76
Ash (ASTM)	6.81	6.31	8.38	10.32	6.49	10.03	12.11	9.57	6.64	9.67	10.99	10.57	11.14	9.16
Ash (240B)	6.00	5.56	8.08	6.08	6.40	9.99	12.18	10.33	6.37	10.30	10.89	10.05	11.03	
CaO (wt% ash)	24.49	22.58	17.95	23.19	21.37	12.94	11.83	13.45	22.49	13.91	10.45	11.46	10.65	

WYODAK ASH SAMPLE ANALYSIS

Sample Number	925	942	945	950	982	983	002	004	005	006	930	953	940	984
Date	2/2	2/3	2/4	2/5	2/6	2/7	2/9	2/11	2/12	2/13	2/14	2/4	2/2	2/6
Type of Ash	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Bottom	Bottom	Tip
Ultimate (wt% dry)														
Carbon	.08	.42	.09	.14	.07	.20	.12	.10	.15	.28	.28	.25	.37	.26
Hydrogen	.02	.02	.01	.01	.01	.01	.02	.01	.01	.02	.04	.04	.05	.01
Nitrogen	.00	.04	.02	.00	.00	.00	.02	.01	.02	.01	.00	.00	.06	.01
Sulfur	.41 .43	.36 .28	.44 .43	.47 .43	.47 .48	.44 .42	1.03 1.06	.40 .41	.37 .33	.42 .44	.40 .41	.15 .17	.09 .11	.09 .08
Ash (ASTM)	99.68	99.60	99.76	99.76	99.73	99.74	99.29	99.73	99.73	99.75	99.70	99.58	99.13	99.44
Ash (240B)	99.66	99.36	99.79	99.58	99.83	99.75	99.26	99.79	99.81	99.48	99.71	98.76	97.39	99.45
CaO (wt% ash)	19.32	17.88	18.57	18.69	17.51	16.46	21.14	17.19	17.93	18.17	17.93	11.27	11.77	8.72

PACIFIC POWER & LIGHT
COAL ANALYSIS

JANB5

DAY	TONS	%MOISTURE	%ASH	%SULFUR	BTU/LB
1	5829	31.6	5.9	.51	7957
2	5740	32.2	5.2	.35	7924
3	5946	29.6	5.7	.36	8278
4	5832	30.5	5.4	.39	8011
5	5941	29.1	6.8	.28	8126
6	5398	30.5	5.9	.27	8223
7	5446	29.1	5.8	.35	8315
8	6308	30.0	6.1	.43	7941
9	5811	29.6	5.8	.34	8134
10	5934	29.3	6.1	.43	8261
11	5752	29.7	5.4	.45	8195
12	6013	29.3	5.9	.37	8119
13	5851	29.1	6.1	.42	8231
14	5725	30.8	5.5	.25	7946
15	5826	30.9	5.4	.30	7983
16	5815	30.2	5.7	.40	8081
17	5779	30.0	5.5	.39	8127
18	5888	30.2	6.1	.46	8008
19	6650	30.4	4.6	.30	8160
20	6164	30.4	5.3	.32	8066
21	5341	27.3	6.0	.40	8289
22	6560	29.3	6.4	.78	8137
23	5752	30.7	6.6	.67	7909
24	5742	30.3	6.1	.65	8081
25	5547	31.6	6.0	.40	7970
26	6105	31.8	6.4	.35	7812
27	6038	30.8	6.5	.52	7950
28	5945	29.0	8.0	.70	7982
29	5518	29.8	6.3	.64	8148
30	6044	30.5	6.3	.54	7963
31	5870	29.5	6.3	.44	8109
WEIGHTED AVERAGES					
	182110	30.1	6	.44	8077

cc: Plant Manager-Plant Operations-Plant Engineering
Thermal Operations Dept.-900 PSB, Resources Dept.-300 PSB

PACIFIC POWER & LIGHT
COAL ANALYSIS FEB85

DAY	TONS	%MOISTURE	%ASH	%SULFUR	BTU/LB
1	5981	28.9	6.9	.57	8126
2	6107	29.9	6.2	.50	8131
3	6352	29.9	6.9	.56	7993
4	5980	29.5	6.3	.46	7987
5	5962	29.5	6.5	.56	8081
6	5680	29.1	6.5	.59	8123
7	5302	30.1	6.4	.62	8012
8					
9					
10	5502	29.9	6.1	.40	8028
WEIGHTED AVERAGES					
	46866	29.6	6.5	.54	8060

cc: Plant Manager-Plant Operations-Plant Engineering
Thermal Operations Dept.-900 PSB, Resources Dept.-300 PSB

DATE: 12-13-91

MILL NO. A

DATA TAKEN BY SSW

KW ON MILL: 400 KW

PRIMARY AIR FLOW: 55 %

PRIMARY AIR TEMPERATURE: 360 °F

MILL OUTLET TEMPERATURE: 115 °F (175° MAX.)

FEEDER SPEED: 87 %

COAL PIPES SAMPLED: 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.4327	.44	99.56
100	3.2932	3.38	96.18
200	12.4772	12.82	83.36
GRAMS IN PAN	81.0992	83.36	
TOTAL SAMPLE WT.	97.3023	10000	

REMARKS AND COMMENTS:

PULVERIZER FINENESS

DATE: 01-16-85

MILL NO. B

DATA TAKEN BY MWM

KW ON MILL: 425 KW

PRIMARY AIR FLOW: 96 %

PRIMARY AIR TEMPERATURE: 76 °F

MILL OUTLET TEMPERATURE: 130 °F (175° MAX.)

FEEDER SPEED: 88 %

COAL PIPES SAMPLED: 1. ☐ 2. ☑ 3. ☑ 4. ☑ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.5267	.5412	99.45
100	7.0156	7.2088	92.25
200	18.3133	18.8175	73.43
GRAMS IN PAN	71.4648	73.4325	
TOTAL SAMPLE WT.	97.3204	100	

REMARKS AND COMMENTS: _____

PULVERIZER FINENESS

DATE: 1/16/85

MILL NO. C

DATA TAKEN BY MWM

KW ON MILL: 400 KW

PRIMARY AIR FLOW: 94 %

PRIMARY AIR TEMPERATURE: 80 °F

MILL OUTLET TEMPERATURE: 115 °F (175° MAX.)

FEEDER SPEED: 86 %

COAL PIPES SAMPLED: 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.8404	.8677	99.13
100	6.6658	6.8823	92.25
200	15.9809	16.4996	75.75
GRAMS IN PAN	74.3254	75.7504	
TOTAL SAMPLE WT.	97.8125	100	

REMARKS AND COMMENTS: _____

PULVERIZER FINENESS

DATE: 1/ /85

MILL NO. D

DATA TAKEN BY M. M

KW ON MILL: 360 KW

PRIMARY AIR FLOW: 66 %

PRIMARY AIR TEMPERATURE: 76 °F

MILL OUTLET TEMPERATURE: 120 °F (175° MAX.)

FEEDER SPEED: 68 %

COAL PIPES SAMPLED: 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.2664	.2767	99.72
100	5.8700	6.0969	93.63
200	24.4559	25.4012	68.23
GRAMS IN PAN	65.7262	68.2252	
TOTAL SAMPLE WT.	96.2785	100	

REMARKS AND COMMENTS: _____

PULVERIZER FINENESS

DATE: 1/16/85

MILL NO. E

DATA TAKEN BY MWM

KW ON MILL: 420 KW

PRIMARY AIR FLOW: 95 %

PRIMARY AIR TEMPERATURE: 80 °F

MILL OUTLET TEMPERATURE: 110 °F (175° MAX.)

FEEDER SPEED: 88 %

COAL PIPES SAMPLED: 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.2058	.2372	99.76
100	3.4900	3.5228	96.24
200	9.7348	11.2190	84.52
GRAMS IN PAN	73.3399	84.5217	
TOTAL SAMPLE WT.	86.7705	100	

REMARKS AND COMMENTS: _____

C-6

WYODAK

FURNACE GAS TEMPERATURE DATA

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2/80 LOCATION Wyodak 10th floor west, water injected at 9½ other side of boiler

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H_2O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O_2
1525	10th	W	3'	0	6.5	-5.5	80	610°C		4.15
			5.5'		6.5	-5.5	80	654°		4.15
			12'		6.5	-5.5	80	768 max	t/c was pulled back into sheath	4.15
1550			~~8~~					1120	wall blowers off	4.0
1558			~~12~~ 8'					1216 2221	wall blowers on	4.1
1602			8'					1120	avg reading same condition (1080 low)	3.75
1609								1055° 1931°F		3.95
1612								1020		4.0
1615								1008	stable	4.05
1628					plugged			977	Back to 1Ks in S/H region (too close)	4.05
1629								961	lowest temp while blowing just below	4.0

C-123

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2/7/85 LOCATION Wyandotte

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP Orifice in H_2O	P Vacuum in Hg	AIR TEMP °F	GAS TEMP °C	COMMENT	O_2
10:12	10th	West	10'	0				1108	all sootblowers in boiler off	3.9
10:14	↓	↓	12'	↓				1104		3.9
10:16			8					1075		3.9
10:18			10'	0				1120	avg 1132 max 1150	3.9
10:20			10'	30°				1120	avg 1100 - 1130 IK's on at conclusion of this point	3.9
12:36	10th	west	10'	0°	6'	5.5	80	1120	1140 high were on S/H - IK's wall blowers just started 2" slag	4.0
13:45	10th	EAST	10'	0°	3	4.0	80	1250	IK just blown 4" slag	3.85
13:47			12'	0°				1256		3.85
			8'	0°				1210	1180-1220	↓
			10'	20°				1220		
			10'	0°				1210°	tip still clear	

C-124

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-11-85 LOCATION 9½th floor Wyodak

TIME	FLOOR	PORT	DEPTH ft	ANGLE	ΔP Orifice in H_2O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O_2
1025	9½	W	12	0	6.0	6.5	80	1370	S/H sootblowing just completed	4.05
1029			16	0				1351-62	"	4.05
1031			20	0				1315-32	"	4.05
1034			8					1175	large tip not on when extracted	4.05
1125	9½	W	4					1380	just completed one cycle- max since sootblowing normally- now on A/H	4.05
1128			8					1416	tip ok	4.05
1131			12					1384		4.05
1133			14					1377		4.05
1140			20	0	3.5	3.5	80	1324		4.05
1142			16	0				1340	tip broken?	4.05
1144			16	10				1308		4.05
1147			12	10				1180	tip broken	4.2

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-11-86 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	$\Delta P_{orifice}$ in H_2O	P_{vacuum} in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O_2
1216	9½	W	20'	0				1330	still blowing air heater - max temp expected	4.2
			20'	15				1345	max time since in furnace	4.2
			16'					1354	soot blowing	4.2
			12'					1383		4.2
			8'					1402		4.2
									in-furnace soot blowing commences again	

C-126

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2/11/85 LOCATION

TIME	FLOOR	PORT	DEPTH	ANGLE	$\Delta P_{orifice}$ in H_2O	P_{vacuum} in Hg	AIR TEMP °F	GAS TEMP °C	COMMENT	O_2
1428	9½	E	20	0	6.0	6	90	1309	sootblowing in rear of S/H section	4.05
1429			16	0	6.0	6	95	1317		4.05
1432 1430			12	0	6.0	6	95	1300 1290	Slag on SH tubes about 1½" thick	4.05
1433			8	0	5.5	6	95	1320		4.05
1545	9½	E	20	0	7.0	7.0	95	1324	End of A/H blowing slag 3½"	4.15
1547			16	0	6.5	7.0		1349		4.15
1550			12	0	6.2	7.0		1330-1352		4.15
1552			8	0	5.8	8.0		1338		4.15

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-11-85 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	$\Delta P_{orifice}$ in H_2O	P_{vacuum} in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O_2
1623	9½	Front center	10'	0° vertical				1311	5" vert [redacted]" horiz - vertical angle	4.1
1627			12'					1290	16" east [redacted]5" North	4.1
1629			8'					1220-1330		4.1
			5'					1290-1320	rapid fluctuation	

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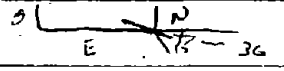
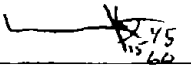
FURNACE GAS TEMPERATURE DATA SHEET

DATE 2/12 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H_2O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT	
10:55	7th	SE	18'	45°	7	6.5	90	1180	last sootblowing 9:30 ↙	3.88
1102			5'	45°				1283	↙	3.88
1330	7	NE	5'	45	7	6.5	90	1453		3.68
1334				45	6.5	7.2		1490		3.68
1336			12	45	6.0	7.8		1491		3.68
			16	45				1501		
			16	30				1490		
			16	60				1412		
		↓	19	45				1484		

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FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-12-85 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H_2O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT
1408	7th	NE	5'	45	7.5	6.0	90	1415	nearby IR's just blown (was 1453 earlier) (1490)
			8		6.0	6.5		1453	(1451)
			12		5.0	7.0		1474	(1541)
1415			16	45				1480	
			16	30				1469	30
			16	60				1372	60°
1422			19	45	3.0 plugging	10.0		1446	pulled out - plugged
1427			20	45	7.0	6.0		1535	
1430			16	45	6.0	6.0		1505	
1433			16	60	6.0	6.0		1418	

3.68

3.72

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-12-85 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H_2O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT
1500	7th	NW	5'	45	4.0	3.0	80	1126	no blowing since 14:00
1504			8'	45	4	3		1179	
1506			8'	45	4	3		1194	
1508			12'	45	4	3		1137	
1510			16'		2.0	3.0		1207	
1512			20		2.0	3.0		1334	
1526			20		7.0	6.0		1334	~~7th~~ ~~soot blo~~ no soot blowing yet
			16						soot blower ruined TC
1600	7	NW	5'	45	6.5	5.0		1120	after soot blowing
1604			20	45				1222	(was 1334) B4 soot blow
			16	~~45~~				1180-1204	E L N W 30°
			16	30				960	E L N W 60°
			16	60				1280	
			12	45	7.0	6.0		1110	
			8'					1116-1130	

O_2
3.78
3.85

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