Lake Road Generating Station
Procedure No. B4-004

Lake Road Boiler 4

Heat Rate Test
Data Sheet 1 - Page 1 of 3

		Collected by: Hour Time	Setting	1	2		
Boiler Gas Fuel Integrator	DCS INTEGRATOR	MCF	100000	100220	100440		
Boiler Gas Fuel	Calculated	MCF		220	220		
Gas HHV - Preliminary	Southern Star Pipeline	Btu/SCF	1000	1000	1000		
Gas HHV - As Fired	Outside Laboratory	Btu/SCF	1005	1005	1005		
Fuel Input - Preliminary	Calculated	MMBtu		220	220		
Fuel Input - As Fired	Calculated	MMBtu		221.1	221.1		
Boiler Feed Water Integrator	Boiler Panel Integrator	KLBS	200000	200165	200330		
Boiler Feed Water	Calculated	KLBS		165	165		
Boiler Feed Water Pressure	Boiler Panel Reading	PSIG	1200	1200	1200		
Boiler Feed Water Temperature	Boiler Panel Reading	F	340	342	344		
Boiler Feed Water Enthalpy		Btu/Lb	313	315	317		
Boiler Feed Water Input	Calculated	MMBtu		52.0	52.3		
Total Energy Inputs - Preliminary	Calculated	MMBtu		272.0	272.3		
Total Energy Inputs - Final	Calculated	MMBtu		273.1	273.4		
Boiler Steam Flow	Boiler Panel Reading	KLBS	200000	200150	200300		
Boiler Steam Flow	Calculated	KLBS		150	150		
Boiler SH Outlet Pressure	Boiler Panel Reading	PSIG	850	850	850		
Boiler SH Outlet Temperature	Boiler Panel Reading	F	870	880	870		
Boiler Steam Enthalpy		Btu/Lb	1436	1442	1436		
Boiler Steam Output	Calculated	MMBtu		216.3	215.4		
Boiler Blowdown	Calculated	KLBS		15	15		
Boiler Drum Pressure	Boiler Panel Reading	PSIG	900.0	900.0	900.0		
Boiler Blowdown Enthalpy		Btu/Lb		529	529		
Boiler Blowdown Output	Calculated	MMBtu		7.9	7.9		
Total Energy Outputs	Calculated	MMBtu		224.2	223.3		
Boiler Steam Flow	DCS	KLBS/HR					
Steam Flow Integrator	DCS INTEGRATOR	KLBS					
Superheater Outlet Pressure	DCS	PSIG					
Superheater Outlet Temperature	DCS	F					
Drum Pressure	DCS	PSIG					
Boiler Feed Water Flow	DCS	KLBS/HR					
Feedwater Flow Integrator	DCS INTEGRATOR	KLBS					
Feedwater Pressure	DCS	PSIG					
Feedwater Temperature	DCS	F					
Gas Flow	DCS	MCF/HR					
Gas Flow Integrator	DCS INTEGRATOR	MCF					
Boiler Excess O2	DCS	% O2					
FD Fan Amps	DCS	AMPS					
ID Fan Amps	DCS	AMPS					
Ambient Air Temperature Dry Bulb	Lake Road Lab	^{0}F					
Ambient Air Temperature Wet Bulb	Lake Road Lab	^{0}F					
Barometric Pressure	Lake Road Lab	IN HG					

Lake Road Generating Station
Procedure No. B4-004

Lake Road Boiler 4

Heat Rate Test
Data Sheet 1 - Page 2 of 3

Item	Source	Units	Collected by:				
			Hour	Settling	1	2	
			Time				
Boiler Efficiency - Preliminary	Calculated	%		82.4%	82.0%		
Boiler Efficiency - As Fired	Calculated	%		82.1%	81.7%		

FORMULA FOR CALCULATING BOILER EFFICIENCY

$$\text{Boiler Efficiency (\%)} = \frac{\text{Boiler Energy Output (MMBtu)} \times 100\%}{\text{Boiler Energy Input (MMBtu)}}$$

NOTES & COMMENTS

Lake Road Generating Station
Procedure No. B4-004

Lake Road Boiler 4

Heat Rate Test

Notes & Comments

Data collected by:

Reviewed by:

Approved by:

WRITTEN BY

Wayne Siebern

DEPARTMENT HEAD
APPROVED
Jim Parker

STATION SUPERINTENDENT
APPROVED
Mike Smith

LAKE ROAD BOILER 4 TESTING

PURPOSE:
Quantify efficiency for Lake Road Boiler 4, in accordance with requirements for the Fuel Adjustment Clause (FAC) as described in 4 CSR 240-3.161 (2)(P).

INFORMATION/BACKGROUND:

Initial spaces below as steps are completed.

1. _____ Testing shall be conducted at least once every 24 months.
2. _____ Testing should be conducted immediately following a Spring or Fall outage or when the boiler has been inspected and found to be in good operating condition.
3. _____ The test shall be performed using the input/output method on gas fuel only.
4. _____ There shall be a 30 minute settling period before the 2 hour test begins. The boiler shall be within 5% of the target load of 150,000 lb/hr throughout the settling period.
5. _____ Any deviations from load shall be noted on Data Sheet 1.

OPERATIONAL STEPS:

The following are the operational steps for the test:

6._____ Determine proper testing conditions. A preliminary run shall be performed prior to the test to verify that all equipment is operational and to acquaint test personnel with the test instruments and procedures. If there is equipment out of service, these items shall be noted on Data Sheet 1.

7._____ The test documentation shall include completed Maintenance Work Requests (WR) for the following instrument calibrations:

- Boiler gas flow meter
- Boiler steam flow meter
- Boiler steam pressure indicator
- Boiler steam temperature indicator
- Boiler drum pressure indicator
- Boiler feed water flow meter
- Boiler feed water pressure indicator
- Boiler feed water temperature indicator
- Boiler flue gas oxygen analyzer

8._____ Gas samples for the test shall be collected for each segment of the test including the settling period and 2 hour test. The gas samples are to be sent to an outside laboratory for a determination of the as-fired BTU/SCF value (higher heating value). Verify that all materials needed to obtain the gas samples are readily available on site.

9._____ Notify the appropriate Aquila fuels personnel of the testing schedule.

10._____ Notify Missouri PSC personnel, System Operations, Operations, and Maintenance personnel of the test date/time.

11._____ Put the boiler on line and load the boiler to 150,000 lb/hr for the 30 minute settling period. Maintain this boiler load and operating condition throughout the 2 hour test period. Subsequent tests shall be performed within 5% of this initial test load.

12._____ Begin the gas sample collection and verify that the samples have been collected. Initial below that the samples were collected.

_____ Settling _____ Hour 1 _____ Hour 2

13._____ Begin the hourly data collection according to Data Sheet 1. Collect all information on Data Sheet 1 at the end of the 30 minute settling period and at hourly intervals during the 2 hour test period. Initial below that the data was collected.

_____ Settling _____ Hour 1 _____ Hour 2

14._____ Review the data hourly to determine if test data is reasonable and accurate. If inaccurate, test will be stopped and performed at a later date. Initial below that data was reviewed and is accurate.

_____ Settling _____ Hour 1 _____ Hour 2

15._____ At the completion of the test, notify System Operations that the test has concluded and the boiler is released for normal operation.

16._____ At the test conclusion, compile data.

17._____ Evaluate data using the boiler manufacturer references.

18._____ Prepare the gas samples for shipping and analysis.

19._____ Complete preliminary input/output boiler efficiency calculations using the gas supplier BTU values. Record the results on the data sheet.

20._____ Compare baseline (initial test) and all subsequent data to actual test results and determine if adequate and consistent.

21._____ Attach copies of Data Sheet 1, and other Operator logs/test sheets, if necessary.
22._____ When the fuel sample results from the outside lab are obtained and reviewed, complete the final boiler efficiency calculations. Record the results on Data Sheet 1.
23._____ Include an executive summary of the findings with the test documentation, including Data Sheet 1.
24._____ Forward the test results to the appropriate contact for the Aquila Regulatory Department.

Lake Road Generating Station
Procedure No. B5-305

Lake Road Boiler 5

Data Sheet 1 - Page 1 of 3

DATE							
		DATA TAKEN BY					
		Hour	Setting	1	2	3	4
		Time					
INPUTS							
FEED WATER INTEGRATOR	Panel Integrator		100000	100220	100440	100660	100880
FEEDWATER FLOW	Calculated	KLBS		220	220	220	220
FEEDWATER PRESSURE	DCS	PSIG	1200	1200	1200	1200	1200
FEEDWATER TEMPERATURE	DCS	F	340	340	340	340	340
FEEDWATER ENTHALPY		BTU/LB	313	313	313	313	313
FEEDWATER MMBTU	Calculated	MMBTU	0.0	68.9	68.9	68.9	68.9
COAL BURNED INTEGRATOR	Panel Integrator	KLBS	100000	100030	100059	100090	100120
COAL BURNED	Calculated	KLBS		30	29	31	30
PRELIMINARY COAL HHV (LAKE ROAD LAB)	Lake Road Lab	BTU/LB		9290	9280	9290	9299
COAL MMBTU (LAKE ROAD LAB)	Calculated	MMBTU	0	278.7	269.12	287.99	278.97
FINAL COAL HHV (OUTSIDE LAB)	Outside Lab	BTU/LB		9350	9360	9370	9360
COAL MMBTU (OUTSIDE LAB)	Calculated	MMBTU	0	280.5	271.4	290.5	280.8
TOTAL INPUTS - (LAKE ROAD LAB)	Calculated	MMBTU		347.6	338.0	356.9	347.8
TOTAL INPUTS (OUTSIDE LAB)	Calculated	MMBTU		349.4	340.3	359.3	349.7
OUTPUTS							
STEAM FLOW INTEGRATOR	Panel Integrator	KLBS	100000	100200	100400	100600	100800
STEAM FLOW	Calculated	KLBS		200	200	200	200
STEAM PRESSURE	DCS	PSIG	890	890	890	890	890
STEAM TEMPERATURE	DCS	F	860	870	875	880	875
STEAM ENTHALPY		BTU/LB	1429	1435	1438	1441	1438
STEAM MMBTU	Calculated	MMBTU	0	287.0	287.6	288.2	287.6
BLOWDOWN FLOW	Calculated	KLBS		20	20	20	20
DRUM PRESSURE	DCS	PSIG	920	920	920	920	920
BLOWDOWN ENTHALPY		BTU/LB	532	532	532	532	532
BLOWDOWN MMBTU	Calculated	MMBTU		10.6	10.6	10.6	10.6
TOTAL OUTPUTS	Calculated	MMBTU	0	297.64	298.24	298.84	298.24

Lake Road Generating Station
Procedure No. B5-305

Lake Road Boiler 5

Data Sheet 1 - Page 2 of 3

		Collected by:					
		Hour	Settling	1	2	3	4
		Time					
OUTSIDE DATA							

Lake Road Generating Station
Procedure No. B5-305

Lake Road Boiler 5

Data Sheet 1 - Page 3 of 3

Item	Source	Units	Collected by: Hour Time	Settling	1	2	3	4
Ash Analysis (LOI)	Lake Road Laboratory	% Carbon						

COAL BLEND INFORMATION

Coal Type	Coal Mine
Low BTU (PRB)	
High BTU	
Coal Blend (% PRB)	

FORMULA FOR CALCULATING BOILER EFFICIENCY

$$\text{Boiler Efficiency (\%)} = \frac{\text{Output} \times 100\%}{\text{Input}}$$

PRELIMINARY BOILER EFFICIENCY CALCULATION

Boiler Efficiency Per Time Period (%)	**85.64%**	**88.24%**	**83.74%**	**85.74%**
Boiler Efficiency For Entire 4 Hour Period (%)	**85.81%**			

FINAL BOILER EFFICIENCY CALCULATION

Boiler Efficiency Per Time Period (%)	**85.20%**	**87.64%**	**83.17%**	**85.29%**
Boiler Efficiency For Entire 4 Hour Period (%)	**85.29%**			

NOTES & COMMENTS

BOILER 5

BOILER EFFICIENCY TEST ASSUMPTIONS

1. The continuous blowdown from the drum is to be considered an output and a saturated liquid at drum pressure.
2. The energy in the flue gas is a loss.
3. The steam leaving the boiler will be at the superheater outlet pressure and the temperature measured by the control room OIS screen.

LAKE ROAD BOILER 5 TESTING

PURPOSE:
Quantify efficiency for Lake Road Boiler 5, in accordance with requirements for the Fuel Adjustment Clause (FAC) as described in 4 CSR 240-3.161 (2)(P).

INFORMATION/BACKGROUND:

Initial spaces below as steps are completed.

The following are the operating parameters of the test:

1. _____ No wet coal shall be used during the testing and no significant pulverizer problems shall be in occurrence during the test period.
2. _____ No natural gas shall be burned during the test. The test coal blend shall be maintained for at least 24 hours prior to the test. No gas fuel shall be burned during the test; however, it may be burned prior to the test if needed for operational reasons.
3. _____ Testing shall be conducted at least once every 24 months.
4. _____ Testing should bre conducted as soon as possible following a Spring or Fall outage or when the boiler is free of ash deposits/accumulation.
5. _____ There shall be a 30 minute settling period before the 4 hour test begins. The boiler shall be within 5% of the target load of 200,000 lb/hour throughout the settling period. Only minor changes in unit control shall be made during this time as required to bring the boiler into normal, steady-state operation.
6. _____ Soot blowing and equipment starting/stopping should be kept to a minimum and logged on Data Sheet 1.
7. _____ Any deviations from load shall be noted on Data Sheet 1.
8. _____ Ensure the plant Distributed Control System (DCS) operating screens (described below in Step 18) are available for printing every 15 minutes.

OPERATIONAL STEPS:

The following are the operational steps for the test:

9._____ Determine proper testing conditions. A preliminary run shall be performed prior to the test to verify that all equipment is operational and to acquaint test personnel with the test instruments and procedures. If there is equipment out of service, these items shall be noted on Data Sheet 1.

10._____ The test documentation shall include completed Maintenance Work Requests (WR) for the following instrument calibrations:

- 5-1 Pulverizer coal scale
- 5-2 Pulverizer coal scale
- Boiler steam pressure
- Boiler steam temperature
- Boiler steam flow
- Boiler feed water pressure
- Boiler feed water temperature
- Boiler feed water flow
- Boiler drum pressure
- Flue gas oxygen

11_____ Ash samples (see Procedure number B5-300 for collecting ash samples) for the test shall be collected at the end of each segment of the test, including the settling period and each hour of the 4 hour test run.

12._____ Coal samples (see Procedure number B5-301 for collecting coal samples) for the test shall be collected at the end of each segment of the test, including settling period and each hour of the 4 hour test run.

13._____ Note the fuel blend on Data Sheet 1.

14._____ Notify Missouri PSC personnel, System Operations, Operations, and Maintenance personnel of the test date/time.

15._____ Put the boiler on line and load the boiler to 200,000 lb/hr for the 30 minute settling period. Maintain this boiler load and operating condition throughout the 4 hour test period. Subsequent tests shall be performed within 5% of this initial test load.

16._____ Begin the ash sample collection and verify that the samples have been collected. Initial below that the samples were collected.

_____ Settling _____ Hour 1 _____ Hour 2

17._____ Begin the coal sample collection and verify that the samples have been collected. Initial below that the samples were collected.

_____ Settling _____ Hour 1 _____ Hour 2

18._____ Begin the data collection process at the end of the 30 minute settling period. Print the applicable DCS screens at 15 minute intervals through the entire 4 ½ hour testing process, beginning at the start of the settling period. Obtain all data from other sources at hourly intervals through the entire testing process, beginning at the end of the settling period.

19._____ Record all information on Data Sheet 1 at the end of the 30 minute settling period and at one hour intervals during the 4 hour test period.

20._____ Review the data hourly to determine if test data is reasonable and accurate. If inaccurate, test will be stopped and performed at a later date. Initial below that data was reviewed and is accurate.

_____ Settling _____ Hour 1 _____ Hour 2

21._____ At the completion of the test, notify System Operations that the test has concluded and the boiler is released for normal operation.
22._____ At the test conclusion, compile and ensure that all data was collected.
23._____ Prepare the ash samples for testing and analysis per procedure number B5-300. The ash samples shall be tested by the Lake Road lab and shall include LOI.
24._____ Prepare the coal samples for testing and analysis per procedure number B5-301. One set of samples shall be tested by the Lake Road lab. The other set of samples will be sent to an outside laboratory to perform a short proximate analysis in addition to the testing done in house (BTU, ash, sulfur, moisture).
25._____ Complete preliminary boiler efficiency calculations using in-house Btu values. Record the results on the data sheet.
26._____ Attach copies of the DCS printouts, Data Sheet 1, and other Operator logs/test sheets, if necessary.
27._____ When fuel sample Btu results from the outside lab are obtained and reviewed, complete the final boiler efficiency calculations. Record the results on Data Sheet 1.
28._____ Include an executive summary of the findings with the test documentation, including Data Sheet 1, DCS reports, and heat rate calculations.
29._____ Forward the test results to the appropriate contact for the Aquila Regulatory Department.

Lake Road Generating Station
Procedure No. B8-004

Lake Road Boiler 8

Heat Rate Test
Data Sheet 1 - Page 1 of 3

		Collected by:					
		Hour	Settling	1	2		
		Time					
Boiler Gas Fuel Integrator	DCS Integrator	MCF	100000	100210	100420		
Boiler Gas Fuel	Calculated	MCF		210	210		
Gas HHV - Preliminary	Southern Star Pipeline	Btu/SCF	1000	1000	1000		
Gas HHV - As Fired	Outside Laboratory	Btu/SCF	1005	1005	1005		
Fuel Input - Preliminary	Calculated	MMBtu		210	210		
Fuel Input - As Fired	Calculated	MMBtu		211.1	211.1		
Boiler Feed Water Integrator	DCS Integrator	KLBS	200000	200160	200320		
Boiler Feed Water	Calculated	KLBS		160	160		
Boiler Feed Water Pressure	DCS	PSIG	500	500	500		
Boiler Feed Water Temperature	DCS	F	250	250	250		
Boiler Feed Water Enthalpy		Btu/Lb		220	220		
Boiler Feed Water Input	Calculated	MMBtu		35.2	35.2		
Total Energy Inputs - Preliminary	Calculated	MMBtu		245.2	245.2		
Total Energy Inputs - Final	Calculated	MMBtu		246.3	246.3		
Boiler Steam Flow Integrator	DCS Integrator	KLBS	200000	200150	200300		
Boiler Steam Flow	Calculated	KLBS		150	150		
Boiler SH Outlet Pressure	DCS	PSIG	325	325	325		
Boiler SH Outlet Temperature	DCS	F	700	705	700		
Boiler Steam Enthalpy		Btu/Lb		1367	1367		
Boiler Steam Output	Calculated	MMBtu		205.1	205.1		
Boiler Blowdown	Calculated	KLBS		10	10		
Boiler Drum Pressure	DCS	PSIG	350.0	350.0	350.0		
Boiler Blowdown Enthalpy		Btu/Lb		414	414		
Boiler Blowdown Output	Calculated	MMBtu		4.1	4.1		
Total Energy Outputs	Calculated	MMBtu		205.1	205.1		
Boiler Steam Flow	DCS	KLBS/HR					
Steam Flow Integrator	DCS Integrator	KLBS					
Superheater Outlet Pressure	DCS	PSIG					
Superheater Outlet Temperature	DCS	F					
Drum Pressure	DCS	PSIG					
Boiler Feed Water Flow	DCS	KLBS/HR					
Feedwater Flow Integrator	DCS Integrator	KLBS					
Feedwater Pressure	DCS	PSIG					
Feedwater Temperature	DCS	F					
Gas Flow	DCS	MCF/HR					
Gas Flow Integrator	DCS Integrator	MCF					
Boiler Excess O2	DCS	% O2					
FD Fan Amps	DCS	AMPS					
Ambient Air Temperature Dry Bulb	Lake Road Lab	^{0}F					
Ambient Air Temperature Wet Bulb	Lake Road Lab	^{0}F					
Barometric Pressure	Lake Road Lab	IN HG					

Lake Road Generating Station
Procedure No. B8-004

Lake Road Boiler 8

Heat Rate Test
Data Sheet 1 - Page 2 of 3

Item	Source	Units	Collected by:				
			Hour	Settling	1	2	
			Time				
Boiler Efficiency - Preliminary	Calculated	%		83.6%	83.6%		
Boiler Efficiency - As Fired	Calculated	%		83.3%	83.3%		

FORMULA FOR CALCULATING BOILER EFFICIENCY

$$\text{Boiler Efficiency (\%)} = \frac{\text{Boiler Energy Output (MMBtu)} \times 100\%}{\text{Boiler Energy Input (MMBtu)}}$$

NOTES & COMMENTS

Lake Road Generating Station
Procedure No. B8-004

Lake Road Boiler 8

Heat Rate Test

Data Sheet 1 - Page 3 of 3

Notes & Comments

Data collected by:

Reviewed by:

Approved by:

WRITTEN BY

Wayne Siebern

DEPARTMENT HEAD APPROVED

Jim Parker

STATION SUPERINTENDENT APPROVED

Mike Smith

LAKE ROAD BOILER 8 TESTING

PURPOSE:
Quantify efficiency for Lake Road Boiler 8, in accordance with requirements for the Fuel Adjustment Clause (FAC) as described in 4 CSR 240-3.161 (2)(P).

INFORMATION/BACKGROUND:

Initial spaces below as steps are completed.

1. _____ Testing shall be conducted at least once every 24 months.
2. _____ Testing should be conducted immediately following a Spring or Fall outage or when the boiler has been inspected and found to be in good operating condition.
3. _____ The test shall be performed using the input/output method on gas fuel only.
4. _____ There shall be a 30 minute settling period before the 2 hour test begins. The boiler shall be within 5% of the target load of 150,000 lb/hr throughout the settling period.
5. _____ Any deviations from load shall be noted on Data Sheet 1.

OPERATIONAL STEPS:

The following are the operational steps for the test:

6._____ Determine proper testing conditions. A preliminary run shall be performed prior to the test to verify that all equipment is operational and to acquaint test personnel with the test instruments and procedures. If there is equipment out of service, these items shall be noted on Data Sheet 1.

7._____ The test documentation shall include completed Maintenance Work Requests (WR) for the following instrument calibrations:

- Boiler gas flow meter
- Boiler steam flow meter
- Boiler steam pressure indicator
- Boiler steam temperature indicator
- Boiler drum pressure indicator
- Boiler feed water flow meter
- Boiler feed water pressure indicator
- Boiler feed water temperature indicator
- Boiler flue gas oxygen analyzer

8._____ Gas samples for the test shall be collected for each segment of the test including the settling period and 2 hour test. The gas samples are to be sent to an outside laboratory for a determination of the as-fired BTU/SCF value (higher heating value). Verify that all materials needed to obtain the gas samples are readily available on site.

9._____ Notify the appropriate Aquila fuels personnel of the testing schedule.

10._____ Notify Missouri PSC personnel, System Operations, Operations, and Maintenance personnel of the test date/time.

11._____ Put the boiler on line and load the boiler to 150,000 lb/hr for the 30 minute settling period. Maintain this boiler load and operating condition throughout the 2 hour test period. Subsequent tests shall be performed within 5% of this initial test load.

12._____ Begin the gas sample collection and verify that the samples have been collected. Initial below that the samples were collected.

_____ Settling _____ Hour 1 _____ Hour 2

13._____ Begin the hourly data collection according to Data Sheet 1. Collect all information on Data Sheet 1 at the end of the 30 minute settling period and at hourly intervals during the 2 hour test period. Initial below that the data was collected.

_____ Settling _____ Hour 1 _____ Hour 2

14._____ Review the data hourly to determine if test data is reasonable and accurate. If inaccurate, test will be stopped and performed at a later date. Initial below that data was reviewed and is accurate.

_____ Settling _____ Hour 1 _____ Hour 2

15._____ At the completion of the test, notify System Operations that the test has concluded and the boiler is released for normal operation.

16._____ At the test conclusion, compile data.

17._____ Evaluate data using the boiler manufacturer references.

18._____ Prepare the gas samples for shipping and analysis.

19._____ Complete preliminary input/output boiler efficiency calculations using the gas supplier BTU values. Record the results on the data sheet.

20._____ Compare baseline (initial test) and all subsequent data to actual test results and determine if adequate and consistent.

21._____ Attach copies of Data Sheet 1, and other Operator logs/test sheets, if necessary.
22._____ When the fuel sample results from the outside lab are obtained and reviewed, complete the final boiler efficiency calculations. Record the results on Data Sheet 1.
23._____ Include an executive summary of the findings with the test documentation, including Data Sheet 1.
24._____ Forward the test results to the appropriate contact for the Aquila Regulatory Department.

Lake Road Generating Station
Procedure No. T2-302

Lake Road Turbine 2

Heat Rate Test
Data Sheet 1 - Page 1 of 3

		Collected by: Hour Time	Settling	1	2	3	4
Indicated Gross Megawatts	DCS Indication	MW					
Indicated Station Use Megawatts	Panel Watt Meter	MW					
Net Megwatts	Calculated	MW	0	0	0	0	0
Indicated MVARS	DCS Indication	MVARS					
Turbine Steam Flow	Turbine Panel	KLBS/HR	245	245	245	245	245
Turbine Inlet Steam Pressure	Turbine Panel	PSIG	850	855	850	855	850
Turbine Inlet Steam Temperature	Turbine Panel	F	900	890	900	895	895
Turbine Inlet Steam Enthalpy	Turbine Panel	Btu/LB	1453	1448	1453	1450	1451
Turbine Inlet Steam Energy	Calculated	MMBTU		354.8	356.0	355.3	355.5
Condensate Flow	Turbine Panel	KLBS/HR	245	245	245	245	245
Exhaust Pressure	Turbine Panel	IN HG	3.0	3.4	3.2	3.0	3.0
Condensate Temperature	Turbine Panel	F	110	105	110	115	115
Condensate Enthalpy	Turbine Panel	Btu/LB	78	73	78	83	83
Condensate Energy	Calculated	MMBTU		17.9	19.1	20.3	20.3
Circulating Water Inlet Temperature	Turbine Panel	F					
Circulating Water Outlet Temperature	Turbine Panel	F					

Lake Road Generating Station
Procedure No. T2-302

Lake Road Turbine 2

Heat Rate Test
Data Sheet 1 - Page 2 of 3

Item	Source	Units	Collected by:				
			Hour	Settling	1	2	3	4
			Time					
Integrated Gross Generation	KWH Meter Integrator Reading	MWH		50000	50028	50057	50085	50113
Gross Generation MWH per Period	Calculated	MWH			28	29	28	28
Turbine Energy Input - Output	Calculated	Btu			336875000	336875000	334915000	335160000
Gross Turbine Heat Rate per Period	Calculated	Btu/KWH			12,031	11,616	11,961	11,970
Gross Turbine Heat Rate for Entire Period	Calculated	Btu/KWH			11,892			

FORMULA FOR CALCULATING GROSS TURBINE HEAT RATE

$$\text{Gross Turbine Heat Rate (Btu / KWH)} = \frac{\text{Turbine Energy Input - Output (Btu)}}{\text{Gross Generation (MWH) x 1000 (KWH / MWH)}}$$

NOTES & COMMENTS

Lake Road Generating Station
Procedure No. T2-302

Lake Road Turbine 2

Heat Rate Test

Data Sheet 1 - Page 3 of 3

Notes & Comments

Data collected by:

Reviewed by:

Approved by:

WRITTEN BY

Wayne Siebern

DEPARTMENT HEAD
APPROVED
Jim Parker

STATION SUPERINTENDENT
APPROVED
Mike Smith

Lake Road Generating Station
Procedure No. T3-303

Lake Road Turbine 3

Heat Rate Test
Data Sheet 1 - Page 1 of 3

		Collected by: Hour Time	Settling	1	2	3	4
Indicated Gross Megawatts	DCS Indication	MW					
Indicated Station Use Megawatts	Panel Watt Meter	MW					
Net Megwatts	Calculated	MW	0	0	0	0	0
Indicated MVARS	DCS Indication	MVARS					
Condensate Flow to DA	Turbine Panel	LBS/HR	140000	140000	145000	140000	140000
Turbine Inlet Steam Pressure	Turbine Panel	PSIG	230	230	230	230	230
Turbine Inlet Steam Temperature	Turbine Panel	F	530	525	530	535	530
Turbine Inlet Steam Enthalpy	Turbine Panel	Btu/LB	1281.2	1278.4	1281.2	1284.0	1281.2
Turbine Inlet Steam Flow	Calculated	LBS/HR	133000	134000	138550	133190	132900
3-2 Extraction Steam Pressure	2nd Floor Gauge	PSIG	29	30	31	28	29
3-2 Extraction Steam Temperature	2nd Floor Temp Ind	F	350	345	360	350	351
3-2 Extraction Steam Enthalpy		Btu/LB	1211.0	1208.4	1215.7	1211.2	1211.5
3-2 Extraction Steam Flow	Calculated Separately	LBS/HR	5000	4500	4750	5010	5200
3-1 Extraction Steam Pressure	2nd Floor Gauge	PSIG	0	-1	1	0	0
3-1 Extraction Steam Temperature	2nd Floor Temp Ind	F	250	255	245	260	255
3-1 Extraction Steam Enthalpy		Btu/LB	1168.8	1171.5	1166.1	1173.6	1171.2
3-1 Extraction Steam Flow	Calculated Separately	LBS/HR	2000	1500	1700	1800	1900
Turbine Exhaust Pressure	Control Room Panel	IN HG	4	3.5	4.1	3.5	4
Turbine Condensate Temperature	Turbine Hotwell Thermometer	F	120	115	121	118	120
Condensate Enthalpy		Btu/LB	88.0	83.0	89.0	86.0	88.0
Condensate to DA Temperature	2nd Floor Thermometer	F					
3-2 Condensate from Heater Temp	3rd Floor Recorder	F					
3-1 Condensate from Heater Temp	3rd Floor Recorder	F					
3-1 Condensate to Heater Temp	2nd Floor Thermometer	F					
Turbine Inlet Steam Energy	Calculated	MMBTU	170.40	171.30	177.51	171.01	170.27
3-2 Extraction Steam Energy	Calculated	MMBTU	6.06	5.44	5.77	6.07	6.30
3-1 Extraction Steam Energy	Calculated	MMBTU	2.34	1.76	1.98	2.11	2.23
Condensate Energy	Calculated	MMBTU	12.32	11.62	12.90	12.04	12.32
Ambient Air Temperature Dry Bulb	Lake Road Lab	^{0}F					
Ambient Air Temperature Wet Bulb	Lake Road Lab	^{0}F					
Barometric Pressure	Lake Road Lab	IN HG					

Lake Road Generating Station
Procedure No. T32-303

Lake Road Turbine 3

Heat Rate Test
Data Sheet 1 - Page 2 of 3

Item	Source	Units	Collected by:				
			Hour	Settling	1	2	3	4
			Time					
Integrated Gross Generation	KWH Meter Integrator Reading	MWH		50000	50012	50024	50036	50048
Gross Generation MWH per Period	Calculated	MWH			12	12	12	12
Turbine Energy Input - Output	Calculated	MMBTU		149.69	152.49	156.85	150.79	149.43
Gross Turbine Heat Rate per Period	Calculated	Btu/KWH			12,707	13,071	12,566	12,452
Gross Turbine Heat Rate for Entire Period	Calculated	Btu/KWH			12,699			

FORMULA FOR CALCULATING GROSS TURBINE HEAT RATE

$$\text{Gross Turbine Heat Rate (Btu / KWH)} = \frac{\text{Turbine Energy Input - Output (Btu)}}{\text{Gross Generation (MWH) x 1000 (KWH / MWH)}}$$

NOTES & COMMENTS

Lake Road Generating Station
Procedure No. T3-303

Lake Road Turbine 3

Heat Rate Test

Data Sheet 1 - Page 3 of 3

Notes & Comments

Data collected by:

Reviewed by:

Approved by:

WRITTEN BY

Wayne Siebern

DEPARTMENT HEAD
APPROVED
Jim Parker

STATION SUPERINTENDENT
APPROVED
Mike Smith

Lake Road Generating Station
Procedure No. T5-305

Lake Road Turbine 5

Heat Rate Test
Data Sheet 1 - Page 1 of 3

		Collected by: Hour Time	Settling	1	2
Gas Fuel Burn Rate	DCS	MCF/HR			
Gas Fuel Pressure Supplied to Turbine	DCS	PSIG			
Gas Fuel Temperature Supplied to Turbine		F			
Gas Fuel Supplier (MGE or SSCGP)					
East Side Inlet Air Temperature	DCS	F			
West Side Inlet Air Temperature	DCS	F			
Ambient Air Temperature Dry Bulb	Lake Road Lab	F			
Ambient Air Temperature Wet Bulb	Lake Road Lab	F			
Barometric Pressure	Lake Road Lab	In Hg			
Indicated Gross Megawatts	DCS	MW			
Indicated Megavars	DCS	MVAR			
Combustor Shell Pressure	DCS	PSIG			
Turbine Exhaust Pressure	DCS	PSIA			
Average Exhaust Temperature	DCS	F			
Average Blade Temperature	DCS	F			
East Scroll Air Inlet Pressure Drop	Turbine Enclosure Manometer	IN H2O			
West Scroll Air Inlet Pressure Drop	Turbine Enclosure Manometer	IN H2O			
East Air Inlet Static Pressure	Turbine Enclosure Manometer	IN H2O			
West Air Inlet Static Pressure	Turbine Enclosure Manometer	IN H2O			

Lake Road Generating Station
Procedure No. T5-305

Lake Road Turbine 5

Heat Rate Test
Data Sheet 1 - Page 2 of 3

Item	Source	Units	Collected by:		
Hour			Settling	1	2
Time					
Integrated Gross Generation	KWH Meter Integrator Reading	MWH	50000	50060	50121
Gross Generation MWH per Period	Calculated	MWH		60	61
Integrated Station Use	KWH Meter Integrator Reading	MWH	10000	10002	10004
Station Use MWH per Period	Calculated	MWH		2	2
Integrated Gas Burned	Gas Meter Integrator Reading	MCF	8000	8800	9650
Gas Burned per Period	Calculated	MCF		800	850
Preliminary Gas HHV	Southern Star Pipeline	Btu / CU FT	1005	1005	1005
Final Gas HHV	Outside Laboratory	Btu / CU FT	1006	1006	1006

FORMULA FOR CALCULATING GROSS HEAT RATE

$$\text{Gross Heat Rate (Btu / KWH)} = \frac{\text{Total Gas Burned (MCF) x 1000 (CU FT / MCF) x Gas HHV (Btu / CU FT)}}{\text{Gross Generation (MWH) x 1000 (KWH / MWH)}}$$

PRELIMINARY HEAT RATE CALCULATION

Gross Heat Rate Per Time Period (Btu/KWH)	**13,400**	**14,004**
Gross Heat Rate For Entire 2 Hour Period (Btu/KWH)	**13,705**	

FINAL HEAT RATE CALCULATION

Gross Heat Rate Per Time Period (Btu/KWH)	**13,413**	**14,018**
Gross Heat Rate For Entire 2 Hour Period (Btu/KWH)	**13,718**	

NOTES & COMMENTS

Lake Road Generating Station
Procedure No. T5-305

Lake Road Turbine 5

Heat Rate Test

Data Sheet 1 - Page 3 of 3

Notes & Comments

Data collected by:

Reviewed by:

Approved by:

WRITTEN BY

Wayne Siebern

DEPARTMENT HEAD
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STATION SUPERINTENDENT
APPROVED
Mike Smith

LAKE ROAD UNIT 5 HEAT RATE TESTING PROCEDURE

PURPOSE:
Quantify heat rate/efficiency for Lake Road Unit 5, in accordance with requirements for the Fuel Adjustment Clause (FAC) as described in 4 CSR 240-3.161 (2)(P).

INFORMATION/BACKGROUND:

Initial spaces below as steps are completed.

1. _____ Testing shall be conducted at least once every 24 months.
2. _____ There shall be a 15 minute settling period before the 2 hour test begins. The test shall be performed with the unit in the "base load" exhaust temperature control mode throughout the settling and testing periods. This will result in approximately 60 MW gross generation when the turbine compressor inlet temperature is 80° F.
3. _____ Any deviations from load shall be noted on Data Sheet 1.
4. _____ Ensure the turbine Distributed Control System (DCS) operating screens are available for obtaining data during the test period.

OPERATIONAL STEPS:

5._____ Determine proper testing conditions. If done during a Southwest Power Pool (SPP) Capability test, the ambient site conditions must be met and the test performed in the summer months (June-September). If not performed in conjunction with the SPP test, determine when instruments have been recently calibrated and minimal equipment is out of service, etc. If there is equipment out of service, these items shall be noted on Data Sheet 1.

6._____ The test documentation shall include completed Maintenance Work Requests (WR) for the following instrument calibrations:

- Gas fuel flow metering
- Gas fuel pressure to turbine
- Gas fuel temperature to turbine
- Turbine compressor inlet air temperature (east side)
- Turbine compressor inlet air temperature (west side)
- Air Compressor Section Flow Manometers
- Combustor shell pressure
- Gross Generation KWH Meter (done by Meter Department)

7._____ The test shall be performed on gas fuel only.
8._____ Notify the appropriate Aquila fuels personnel of the testing schedule.
9._____ Notify Missouri PSC personnel, System Operations, Operations, and Maintenance personnel of the test date/time.
10. _____ Place the evaporative coolers in service if necessary to obtain the desired 80° F turbine compressor inlet temperature. The turbine compressor inlet temperature during the test should be as close to 80 F as possible to minimize ambient conditions correction requirements.
11._____ Start the unit and raise load to the base load limit (approximately 60 MW gross) for the 15 minute settling period and continue holding at this load for the 2 hour test period. This shall be done for the initial "baseline test" and all subsequent tests.
12._____ Begin the gas sample collection and verify that the samples have been collected. Initial below that the samples were collected.

_____ Settling _____ Hour 1 _____ Hour 2

13._____ Begin the hourly data collection according to Data Sheet 1. Collect all information on Data Sheet 1 at the end of the 15 minute settling period and at hourly intervals during the 2 hour test period. Initial below that the data was collected.

_____ Settling _____ Hour 1 _____ Hour 2

14._____ Review the data hourly to determine if test data is reasonable and accurate. If inaccurate, test will be stopped and performed at a later date. Initial below that data was reviewed and is accurate.

_____ Settling _____ Hour 1 _____ Hour 2

15._____ At the completion of the test, notify System Operations that the test has concluded and the unit is released to dispatcher control.
16._____ At the test conclusion, compile data.
17._____ Evaluate data using the unit's Correction Curves.
18._____ Prepare the gas samples for shipping and analysis.
19._____ Complete the preliminary heat rate calculations using the gas supplier Btu values. Record the results on the data sheet.
20._____ Compare baseline (initial test) and all subsequent data to actual test results and determine if adequate and consistent.
21._____ Attach copies of the DCS printouts, Data Sheet 1, and other Operator logs/test sheets.
22._____ When the gas sample results from the outside lab are obtained and reviewed, complete the final heat rate calculations. Record the results of the calculations on Data Sheet 1.
23._____ Include an executive summary of the findings with the test documentation.
24._____ Forward the test results to the appropriate contact for the Aquila Regulatory Department.

Lake Road Generating Station
Procedure No. T6-306

Lake Road Turbine 6

Heat Rate Test
Data Sheet 1 - Page 1 of 3

		Collected by:			
		Hour	Settling	1	2
		Time			
Oil Fuel Burned	DCS	Gallons			
Ambient Air Temperature Dry Bulb	Lake Road Lab	F			
Ambient Air Temperature Wet Bulb	Lake Road Lab	F			
Barometric Pressure	Lake Road Lab	In Hg			
Inlet Air Temperature	DCS	F			
Indicated Gross Megawatts	DCS	MW			
Indicated Megavars	DCS	MVAR			
Average Exhaust Temperature	DCS	F			
Fuel Oil Temperature	Local Thermometer	F			
Fuel Oil Pump Discharge Pressure	Local Pressure Gauge	PSIG			

Lake Road Generating Station
Procedure No. T6-306

Lake Road Turbine 6

Heat Rate Test
Data Sheet 1 - Page 2 of 3

Item	Source	Units	Collected by:		
Hour			Settling	1	2
Time					
Integrated Gross Generation	KWH Meter Integrator Reading	MWH	50000	50020	50040
Gross Generation MWH per Period	Calculated	MWH		20	20
Integrated Oil Burned	Oil Meter Integrator Reading	Gallons	2000	4001	6005
Oil Burned per Period	Calculated	Gallons		2001	2004
Preliminary Oil HHV	Lake Road Laboratory	Btu / Gallon	138000	138000	138000
Final Oil HHV	Outside Laboratory	Btu / Gallon	138100	138100	138100

FORMULA FOR CALCULATING GROSS HEAT RATE

$$\text{Gross Heat Rate (Btu / KWH)} = \frac{\text{Total Oil Burned (Gallons) x Oil HHV (Btu / Gallon)}}{\text{Gross Generation (MWH) x 1000 (KWH / MWH)}}$$

PRELIMINARY HEAT RATE CALCULATION

Gross Heat Rate Per Time Period (Btu/KWH)	**13,807**	**13,828**
Gross Heat Rate For Entire 2 Hour Period (Btu/KWH)	**13,817**	

FINAL HEAT RATE CALCULATION

Gross Heat Rate Per Time Period (Btu/KWH)	**13,817**	**13,838**
Gross Heat Rate For Entire 2 Hour Period (Btu/KWH)	**13,827**	

NOTES & COMMENTS

Lake Road Generating Station
Procedure No. T6-306

Lake Road Turbine 6

Heat Rate Test

Data Sheet 1 - Page 3 of 3

Notes & Comments

Data collected by:

Reviewed by:

Approved by:

WRITTEN BY

Wayne Siebern

DEPARTMENT HEAD APPROVED

Jim Parker

STATION SUPERINTENDENT APPROVED

Mike Smith

LAKE ROAD UNIT 6 HEAT RATE TESTING

PURPOSE:
Quantify heat rate/efficiency for Lake Road unit 6, in accordance with requirements for the Fuel Adjustment Clause (FAC) as described in 4 CSR 240-3.161 (2)(P).

INFORMATION/BACKGROUND:

Initial spaces below as steps are completed.

The following are the operating parameters of the test:

1. _____ Testing shall be conducted at least once every 24 months.
2. _____ The # 2 oil flow meter that is displayed on the DCS will be used to determine the fuel used during the test.
3. _____ There shall be a 15 minute settling period before the 2 hour test begins. The unit shall be within 5% of the target load of 20 gross MW in the peak load control mode throughout the settling period. Only minor changes in unit control shall be made during this time as required to bring the unit into normal, steady-state operation.
4. _____ Any deviations from load shall be noted on Data Sheet 1.
5. _____ Ensure plant Distributed Control System (DCS) operating screens are available for obtaining data during the test period.

OPERATIONAL STEPS:

6._____ Determine proper testing conditions. If done during a Southwest Power Pool (SPP) Capability test, the ambient site conditions must be met and the test performed in the summer months (June-September). If not performed in conjunction with the SPP test, determine when instruments have been recently calibrated, minimal equipment out of service, etc. If there is equipment out of service, these items shall be noted on Data Sheet 1.

7._____ The test documentation shall include completed Maintenance Work Requests (WR) for the following instrument calibrations:

- Fuel oil flow meter
- Gross Generation KWH Meter (done by Meter Department)
- East Side Inlet Air Temperature
- West Side Inlet Air Temperature
- Exhaust Temperature DCS Indications (8 Total)

8._____ Fuel oil samples (see Procedure CP-302 for collecting fuel oil samples) for the test shall be collected for each segment of the test including the settling period and 2 hour test. The samples are to be sent to an outside laboratory for a determination of the as-fired BTU/Gallon value (higher heating value). Verify that all materials needed to obtain the fuel oil samples are readily available on site.
9._____ Notify Missouri PSC personnel, System Operations, Operations, and Maintenance personnel of the test date/time.
10._____ Start evaporative coolers, if available.
11._____ Raise load to Peak Load (approximately 20 MW gross) for the 15 minute settling period and continue holding for the 2 hour test period for the initial "baseline test". Subsequent tests shall be performed at the Peak Load condition without the need to obtain the same MW load.
12._____ Begin the fuel oil sample collection and verify that the samples have been collected. Initial below that the samples were collected.

_____ Settling _____ Hour 1 _____ Hour 2

13._____ Begin the hourly data collection according to Data Sheet 1. Collect all information on Data Sheet 1 at the end of the 15 minute settling period and at hourly intervals during the 2 hour test period. Initial below that the data was collected.

_____ Settling _____ Hour 1 _____ Hour 2

14._____ Review the data hourly to determine if test data is reasonable and accurate. If inaccurate, test will be stopped and performed at a later date. Initial below that data was reviewed and is accurate.

_____ Settling _____ Hour 1 _____ Hour 2

15._____ At the completion of the test, notify System Operations that the test has concluded and the unit is released to dispatcher control.
16. _____ At test conclusion, compile data.
17. _____ Evaluate data using Units Correction Curves
18._____ Prepare the oil samples for shipping and analysis per procedure CP-302.
19.____ Complete preliminary heat rate calculations using the Lake Road laboratory BTU value. Record the results on the data sheet.
20.___ Compare baseline (initial test) and all subsequent data to actual test results and determine if adequate and consistent.
21____ Attach copies of the DCS printouts, Data Sheet 1, and other Operator logs/test sheets, if necessary.
22_____ When the fuel sample results from the outside lab are obtained and reviewed, complete the final heat rate calculations. Record the results on Data Sheet 1.
23_____ Include an executive summary of the findings with the test documentation, including Data Sheet 1, DCS reports, and heat rate calculations.
24_____ Forward the test results to the appropriate contact for the Aquila Regulatory Department.

Lake Road Generating Station
Procedure No. T7-307

Lake Road Turbine 7

Heat Rate Test
Data Sheet 1 - Page 1 of 3

		Collected by:			
		Hour	Settling	1	2
		Time			
Oil Fuel Burned	DCS	Gallons			
Ambient Air Temperature Dry Bulb	Lake Road Lab	F			
Ambient Air Temperature Wet Bulb	Lake Road Lab	F			
Barometric Pressure	Lake Road Lab	In Hg			
Inlet Air Temperature	DCS	F			
Indicated Gross Megawatts	DCS	MW			
Indicated Megavars	DCS	MVAR			
Average Exhaust Temperature	DCS	F			
Fuel Oil Temperature	Local Thermometer	F			
Fuel Oil Pump Discharge Pressure	Local Pressure Gauge	PSIG			

Lake Road Generating Station
Procedure No. T7-307

Lake Road Turbine 7

Heat Rate Test
Data Sheet 1 - Page 2 of 3

Item	Source	Units	Collected by: Hour Time	Settling	1	2
Integrated Gross Generation	KWH Meter Integrator Reading	MWH		50000	50020	50040
Gross Generation MWH per Period	Calculated	MWH			20	20
Integrated Oil Burned	Oil Meter Integrator Reading	Gallons		2000	4001	6005
Oil Burned per Period	Calculated	Gallons			2001	2004
Preliminary Oil HHV	MGE	Btu / Gallon		138000	138000	138000
Final Oil HHV	Outside Laboratory	Btu / Gallon		138100	138100	138100

FORMULA FOR CALCULATING GROSS HEAT RATE

$$\text{Gross Heat Rate (Btu / KWH)} = \frac{\text{Total Oil Burned (Gallons) x Oil HHV (Btu / Gallon)}}{\text{Gross Generation (MWH) x 1000 (KWH / MWH)}}$$

PRELIMINARY HEAT RATE CALCULATION

Gross Heat Rate Per Time Period (Btu/KWH)	13,807	13,828
Gross Heat Rate For Entire 2 Hour Period (Btu/KWH)	**13,817**	

FINAL HEAT RATE CALCULATION

Gross Heat Rate Per Time Period (Btu/KWH)	13,817	13,838
Gross Heat Rate For Entire 2 Hour Period (Btu/KWH)	**13,827**	

NOTES & COMMENTS

Lake Road Generating Station
Procedure No. T7-307

Lake Road Turbine 7

Heat Rate Test

Data Sheet 1 - Page 3 of 3

Notes & Comments

Data collected by:

Reviewed by:

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WRITTEN BY

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STATION SUPERINTENDENT
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Mike Smith

LAKE ROAD UNIT 7 HEAT RATE TESTING

PURPOSE:
Quantify heat rate/efficiency for Lake Road unit 7, in accordance with requirements for the Fuel Adjustment Clause (FAC) as described in 4 CSR 240-3.161 (2)(P).

INFORMATION/BACKGROUND:

Initial spaces below as steps are completed.

The following are the operating parameters of the test:

1. _____ Testing shall be conducted at least once every 24 months.
2. _____ The # 2 oil flow meter that is displayed on the DCS will be used to determine the fuel used during the test.
3. _____ There shall be a 15 minute settling period before the 2 hour test begins. The unit shall be within 5% of the target load of 20 gross MW in the peak load control mode throughout the settling period. Only minor changes in unit control shall be made during this time as required to bring the unit into normal, steady-state operation.
4. _____ Any deviations from load shall be noted on Data Sheet 1.
5. _____ Ensure plant Distributed Control System (DCS) operating screens are available for obtaining data during the test period.

OPERATIONAL STEPS:

6._____ Determine proper testing conditions. If done during a Southwest Power Pool (SPP) Capability test, the ambient site conditions must be met and the test performed in the summer months (June-September). If not performed in conjunction with the SPP test, determine when instruments have been recently calibrated, minimal equipment out of service, etc. If there is equipment out of service, these items shall be noted on Data Sheet 1.

7._____ The test documentation shall include completed Maintenance Work Requests (WR) for the following instrument calibrations:

- Fuel oil flow meter
- Gross Generation KWH meter (done by Meter Department)
- East Side Inlet Air Temperature
- West Side Inlet Air Temperature
- Exhaust Temperature DCS Indications (8 Total)

8._____ Fuel oil samples (see Procedure CP-302 for collecting fuel oil samples) for the test shall be collected for each segment of the test including the settling period and 2 hour test. The samples are to be sent to an outside laboratory for a determination of the as-fired BTU/Gallon value (higher heating value). Verify that all materials needed to obtain the fuel oil samples are readily available on site.
9._____ Notify Missouri PSC personnel, System Operations, Operations, and Maintenance personnel of the test date/time.
10._____ Start evaporative coolers, if available.
11._____ Raise load to Peak Load (approximately 20 MW gross) for the 15 minute settling period and continue holding for the 2 hour test period for the initial "baseline test". Subsequent tests shall be performed at the Peak Load condition without the need to obtain the same MW load.
12._____ Begin the fuel oil sample collection and verify that the samples have been collected. Initial below that the samples were collected.

_____ Settling _____ Hour 1 _____ Hour 2

13._____ Begin the hourly data collection according to Data Sheet 1. Collect all information on Data Sheet 1 at the end of the 15 minute settling period and at hourly intervals during the 2 hour test period. Initial below that the data was collected.

_____ Settling _____ Hour 1 _____ Hour 2

14._____ Review the data hourly to determine if test data is reasonable and accurate. If inaccurate, test will be stopped and performed at a later date. Initial below that data was reviewed and is accurate.

_____ Settling _____ Hour 1 _____ Hour 2

15._____ At the completion of the test, notify System Operations that the test has concluded and the unit is released to dispatcher control.
16. _____ At test conclusion, compile data.
17. _____ Evaluate data using Units Correction Curves
18._____ Prepare the oil samples for shipping and analysis per procedure CP-302.
19.____ Complete preliminary heat rate calculations using the Lake Road laboratory BTU value. Record the results on the data sheet.
20.___ Compare baseline (initial test) and all subsequent data to actual test results and determine if adequate and consistent.
21____ Attach copies of the DCS printouts, Data Sheet 1, and other Operator logs/test sheets, if necessary.
22_____ When the fuel sample results from the outside lab are obtained and reviewed, complete the final heat rate calculations. Record the results on Data Sheet 1.
23_____ Include an executive summary of the findings with the test documentation, including Data Sheet 1, DCS reports, and heat rate calculations.
24_____ Forward the test results to the appropriate contact for the Aquila Regulatory Department.