TABLE RF-1

Date	Coal Burned (Tons)	Oil Burned (Bbls)	Fraction of Input From Coal Fired
12-29-79	6	876	0.02
12-30-79	1002	1041	0.74
12-31-79	890	3515	0.42
1-1-80	3472	808	0.93
1-2-80	3472	720	0.93
1-3-80	2998	1202	0.88
1-4-80	1763	356	0.94
1-5-80	0	0	
1-6-80	0	0	
1-7-80	0	0	
1-8-80	0	0	
1-9-80	0	0	
1-10-80	0	0	
1-11-80	0	0	
1-12-80	0	0	
1-13-80	0	0	
1-14-80	0	0	
1-15-80	0	0	
1-16-80	0	527	0
1-17-80	4642	1302	0.91
1-18-80	5106	186	0.99
1-19-80	5106	217	0.99
1-20-80	5107	0	1.00
1-21-80	4964	168	0.99
1-22-80	5007	66	1.00
1-23-80	4985	124	0.99
1-24-80	4302	155	0.99
1-25-80	0	992	0
1-26-80	4419	124	0.99
1-27-80	5687	93	0.99
1-28-80	5907	37	1.00
1-29-80	5229	60	1.00
1-30-80	5270	47	1.00
1-31-80	6186	217	0.99
2-1-80	6646	403	0.98
2-2-80	5721	62	1.00
2-3-80	5736	186	0.99
2-4-80	4532	155	0.99
2-5-80	5488	961	0.94
2-6-80	6998	93	1.00
2-7-80	6721	372	0.98
2-8-80	6078	775	0.96
2-9-80	6077	248	0.99
2-10-80	6078	558	0.97

Date	Coal Burned (Tons)	Oil Burned (Bbls)	Fraction of Input From Coal Fired
2-11-80	8255	518	0.98
2-12-80	6284	544	0.97
2-13-80	6724	80	1.00
2-14-80	7795	137	0.99
2-15-80	5563	350	0.98
2-16-80	6754	186	0.99
2-17-80	6479	186	0.99
2-18-80	7923	8	1.00
2-19-80	7595	295	0.99
2-20-80	7369	252	0.99
2-21-80	6705	62	1.00
2-22-80	309	0	1.00
2-23-80	0	0	
2-24-80	1843	837	0.87
2-25-80	6696	248	0.99
2-26-80	6977	208	0.99
2-27-80	4753	576	0.96
2-28-80	4629	217	0.98
2-29-80	3870	163	0.99
3-1-80	4764	163	0.99
3-2-80	5610	163	0.99
3-3-80	6872	162	0.99
3-4-80	5318	496	0.97
3-5-80	6364	155	0.99
3-6-80	7593	155	0.99
3-7-80	6294	31	1.00
3-8-80	5531	217	0.99
3-9-80	6349	62	1.00
3-10-80	7403	27	1.00
3-11-80	6076	103	0.99
3-12-80	8370	97	1.00
3-13-80	6788	93	1.00
3-14-80	6854	0	1.00
3-15-80	6174	186	0.99
3-16-80	0	0	
3-17-80	0	0	
3-18-80	0	0	
3-19-80	0	0	
3-20-80	0	0	
3-21-80	0	0	
3-22-80	0	0	
3-23-80	0	0	
3-24-80	0	0	
3-25-80	0	0	
3-26-80	0	0	
3-27-80	0	0	
3-28-80	0	0	
3-29-80	0	0	
3-30-80	0	0	
3-31-80	0	0	

Date	Coal Burned (Tons)	Oil Burned (Bbls)	Fraction of Input From Coal Fired
4-1-80	0	0	
4-2-80	0	174	0
4-3-80	158	1054	0.30
4-4-80	2310	1023	0.87
4-5-80	4972	186	0.99
4-6-80	4075	62	0.99
4-7-80	7503	62	1.00
4-8 80	6547	214	0.99
4-9-80	1587	312	0.94
4-10-80	0	341	0
4-11-80	4988	1240	0.92
4-12-80	7660	124	0.99
4-13-80	4992	124	0.99
4-14-80	8086	60	1.00
4-15-80	8266	64	1.00
4-16-80	8216	81	1.00
4-17-80	7985	124	0.99
4-18-80	6452	93	1.00
4-19-80	6614	434	0.98
4-20-80	7344	62	1.00
4-21-80	6002	403	0.98
4-22-80	9247	0	1.00
4-23-80	9557	31	1.00
4-24-80	7835	31	1.00
4-25-80	7625	93	1.00
4-26-80	5967	124	0.99
4-27-80	68	31	0.86
4-28-80	0	93	0
4-29-80	0	0	
4-30-80	0	17	0
5-1-80	0	12	0
5-2-80	0	0	
5-3-80	102	775	0.28
5-4-80	3322	1333	0.88
5-5-80	7502	140	0.99

Heat Value

Coal: 8,420 BTU/lb.

Oil: 137,700 BTU/gal.

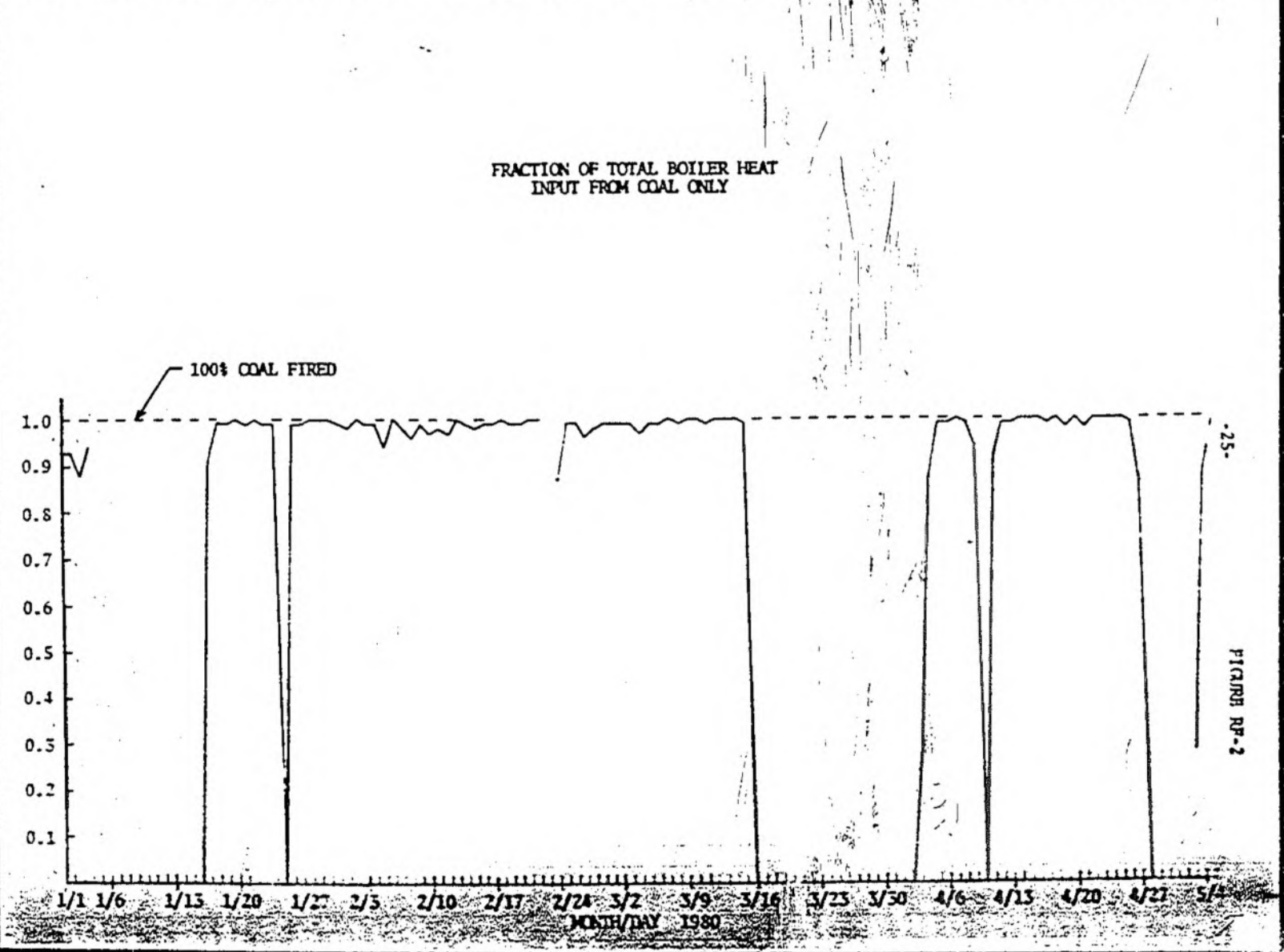

FRACTION OF TOTAL BOILER HEAT
INPUT FROM COAL ONLY
100% COAL FIRED
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1/1 1/6 1/13 1/20 1/27 2/3 2/10 2/17 2/24 3/2 3/9 3/16 3/23 3/30 4/6 4/13 4/20 4/27 5/4
MONTH/DAY 1980

FIGURE RP-2

CRITERION NO. 5

A UNIT MUST HAVE FINISHED THE STARTUP TEST PROGRAM WITH ALL STARTUP TEST PROCEDURES NECESSARY FOR OPERATION SATISFACTORILY COMPLETED.

Discussion

LaCygne Unit 2 experienced problems with the control of the superheat and reheat temperatures. Control is the regulation of steam temperature during operation without changing the arrangement of equipment (e.g., operation of a spray attemperator). The LaCygne Unit 2 had been operated with the maximum desuperheat spray flows, nearly continuous operation of wall sootblowers, minimal operation of the superheat and reheat sootblowers, very little gas recirculation and considerably more than 17 per cent excess air. This mode of operation was the best for lowering steam temperatures.

Since LaCygne Unit 2 and Iatan Unit 1 are of similar steam generator design, Kansas City Power & Light Company and the manufacturer of the steam generator (Babcock & Wilcox) determined that an adjustment should be incorporated into Iatan Unit 1 to better regulate the superheat and reheat temperatures. An adjustment is a change in the arrangement of equipment which affects steam temperature but cannot be used to vary steam temperature during operation (e.g., removal of superheater tubes).

Many operating variables affect steam temperatures in drum- or separator-type units. To maintain constant steam temperature, means must be provided to compensate for the effect of such variables, the most important of which are:

Load: As the load increases, the quantity and temperature of combustion gases increases. In a convection superheater, steam temperature increases with load, the slope of the curve being less steep as superheater location is brought closer to the furnace. In a radiant superheater, steam temperature decreases as load increases. A convection and a radiant superheater of proper proportions are installed in series to maintain substantially constant steam temperature over a considerable range of load.

Excess Air: For a change in the amount of excess air entering at the burners there is a corresponding change in the quantity of gas flowing over a convection superheater, and therefore an increase in excess air tends to raise the steam temperature.

Feedwater Temperature: Increase in feedwater temperature causes a reduction in superheat since, for a given steam flow, less fuel is fired and less gas passes over the superheater.

Heating-surface Cleanliness: Removal of ash or slag deposits from heat-absorbing surfaces ahead of the superheater will reduce gas temperature and steam temperature. Removal of deposits from superheater surface will increase superheater absorption and raise steam temperature.

Use of Saturated Steam: If saturated steam from the boiler is used for sootblowers or for auxiliaries, such as pumps and fans, an increased firing rate is required to maintain constant main steam output, and this raises the steam temperature.

Blowdown: The effect of blowdown is similar to the use of saturated steam but in lesser degree because of the low enthalpy of water as compared with steam.

Burner Operation: The distribution of heat input among burners at different positions or a change in the adjustment of a burner usually has an effect on steam temperature through changes in furnace heat-absorption rate.

Fuel: Variations in steam temperature may result from changing the type of fuel burned or from changes in the characteristics of a given fuel from time to time.

A power generating unit represents a large capital investment, and means are provided at a reasonable cost for the regulation of steam temperature to meet changed conditions that may be more or less permanent in nature. For instance, if a fuel change that has a considerable effect on steam temperature is anticipated, it is good engineering to design for compensating physical alterations of the equipment. This is not necessarily so, however, if the type and range of control provided are adequate to meet the varied requirements without loss in boiler efficiency.

Adjustment for regulating steam temperature is required when the actual operating conditions depart from the conditions on which the design is based. To provide for ultimate adjustment to meet such variations in operation, allowance should be made in the design for the required change at minimum expense.

Quite often a plant is designed with some future change in mind that would affect steam temperature, as, for example, a different fuel or a higher operating pressure. Here again the superheater and reheater must be so designed that an economical adjustment can be effected.

The basic method of adjustment for regulating steam temperature is by the addition or the removal of superheater and/or reheater surface. A good design provides for an economical way of doing so.

Adjustment is also possible by a reduction or increase in the amount of saturated surface ahead of the steam-heating elements. Such alterations will modify the gas temperature at the inlet to these elements. If saturated surface is removed to increase steam temperature, this type of adjustment is relatively simple and, in general, will cost less than the addition of steam-heating elements. However, the addition of saturated surface in order to decrease steam temperature is liable to be difficult and expensive, or even impractical.

Babcock & Wilcox proposed a two-step program for the adjustment to the steam temperature regulation. There are two primary superheater sections in series with four flow paths through each section. These primary superheaters are located one above the other just above the economizer. Step 1 adjustment involves removing half of the first primary superheater section and using some of the tubing removed to direct the flow that would go through the removed tube sections up to the upper primary superheater section. It was anticipated that this would lower the primary superheater outlet temperature which would thereby reduce the superheat spray water required, increase the energy exchanged in the economizer, increase the economizer gas outlet temperature somewhat, and slightly decrease the gas temperature entering the reheater.

The Step 2 adjustment, if required, would convert the entire primary superheater lower section into the economizer.

Additional sootblowers were to be installed in the upper furnace walls above the burners for improving heater surface cleanliness to also reduce steam temperatures.

Iatan Unit 1 had the Step 1 adjustment ("Phase 1") which consists of removing half of the first bank of primary superheater; adding the additional sootblowers; and the taking out of service of the gas recirculation system by blocking the furnace ports with refractory, installing blanking plates before and after the fans and providing required sealing air.

In order to ensure that Iatan Unit 1 has finished the startup test program with all startup test procedures necessary for operation satisfactorily completed following the modifications for the adjustment in steam temperature regulation, I performed the following:

(1) a review of the contract documents;

(a) Turbine Generator And Boiler Feed Pump Turbine (Specification 6376-M-10A) - General Electric Company

(b) Steam Generator (Specification 6376-M-34A) - The Babcock & Wilcox Company

(c) Electrostatic Precipitators (Specification 6376-M-2A) - Lodge-Cottrell Division; Dresser Industries, Inc.

(2) a review of the manufacturer's operating instructions;

(a) Instructions for the Operation of High and Low Pressure Feedwater Heaters and Drain Cooler - Foster Wheeler

(b) Instructions for the Care and Operation of Babcock & Wilcox Equipment Furnished on Contract RB-554

(b) Turbine and Electrical Log (12/29/79 through 5/5/80)

(c) Dispatch computer printout (Display 1348/1349) (12/28/79 through 12/31/80)

(13) a review of equipment turnover lists and equipment transfer forms; and

(14) an evaluation of unit maintenance outages (Appendices B and C).

The review concentrated upon ensuring that the unit was completed as necessary for operation and that contract performance specifications and guarantees have been met as demonstrated by the startup test program and by the unit performance before and after commercial operation. Each of these areas is discussed below.

Unit Physical Construction

A review of the Black & Veatch Engineering Summary, Iatan Unit 1 Completion Report, schedule completion drawings, Equipment Turnover Lists and Equipment Transfer Forms has shown that all major components and systems were completed prior to May 5, 1980.

Steam Generator Contract Specification 6376-M-34A

Specific stipulations were agreed upon in the Companies' acceptance of Babcock & Wilcox's proposal and were made a part of the original contract for Iatan Unit 1. Paragraph 16, Page BA-2, BASIS OF CONTRACT AWARD, states "The Contractor's Technical Clarifications and Exceptions page 10-1 through 10-7 ... are hereby accepted and made a part of the contract documents."

Babcock & Wilcox's Proposal P2-951, Section TECHNICAL CLARIFICATIONS AND EXCEPTIONS, Page 10-4, Paragraphs 2.05 and 2.06 states the following:

Paragraph 2.05 states 'The Company (Babcock & Wilcox) limits its guarantees to those specifcally set forth in the Performance Section of the (B&W) Proposal." (Clarification added)

Paragraph 2.06 states "The Company (B&W) limits its responsibility to tests and condition specifically set forth in the Performance Section of this (B&W) Proposal." (Clarification added)

The Performance Section of the B&W Proposal (P2-951) is found on pages 9-1 through 9-11 as discussed below:

1. B&W guaranteed the equipment to perform as follows "[b]ased on the unit being fired with the specified coal fuel and on the other performance conditions shown on Boiler Performance Summary Sheet P2-951-8Y1-1SO at the capacity of 4,500,000 lbs/hr at 2,500 psig at the superheater outlet with a feedwater temperature of 480F and reheater inlet steam conditions of 4,100,000 lbs/hr and 550 psig and 627F:"

(a)"The efficiency of the unit will not be less than 84.38 percent."

(c) Instruction Manual for Installation, Operation and Maintenance of 292,600 Square Foot Surface Condenser - Southwestern Engineering

(d) Turbine Generator Operating Instructions - General Electric Company

(3) a review of KCPL operating instructions;

(a) Operating Guide 4536.1 - Boiler Feedwater System

(b) Operating Guide 4521.2 - Condensate System

(c) Operating Guide 4535 - High Pressure & Low Pressure Extraction System Systems

(d) Operating Guide 4515.12 - High Pressure Steam System

(e) Operating Guide 4545.2 - Heater Drip System

(4) a review of test reports and installation data;

(a) Source Emissions Compliance Test Report (April 1980) - Performance Testing & Consultants, Inc.

(b) Control and Instrument Installation Data - Black & Veatch Consulting Engineers

(5) a review of monthly/annual heat rate tests (see Table RF-2);

(6) a review of the MO-KAN accreditation test (8/19/80);

(7) a review of the Engineering Summary - Black & Veatch Consulting Engineers;

(8) a review of the Final Environmental Statement prepared by the U.S. Army Engineer District, Kansas City, Missouri;

(9) a review of the Completion Report by Daniel International and Black & Veatch Consulting Engineers and DIC Project Closeout Procedures;

(10) site visits during unit operation;

(11) a review of design drawings and schedule completion drawings and schedules;

(12) an evaluation of unit operation;

(a) DAS Daily Periodic Log (12/28/79 through 1/18/81)

(b)"The average temperature of the steam leaving the superheater will be 1,005F, plus or minus 10F."

(c)"The average temperature of the steam leaving the reheater will be 1,005F, plus or minus 10F." (page 9-5)

2."Based on the unit being fired with the specified coal fuel and on the other performance conditions shown on Boiler Performance Summary Sheet P2-951-8Y1-1S0, the unit will have a maximum normal capacity of 4,725,000 lbs. of main steam flow per hour at 2,620 psig at the superheater outlet, with a feedwater temperature of 485F and reheater inlet steam conditions of 4,305,000 lbs/hr and 605 psig and 634F." (page 9-6)

3."Based on the unit being fired with the specified coal fuel and on the other performance conditions shown on Boiler Performance Summary Sheet P2-951-8Y1-1S0:"

(a) "The average temperature of the steam leaving the superheater at any steady load from 4,725,000 lbs. of main steam per hour to 2,250,000 lbs. of main steam per hour will be 1005F, plus or minus 10F."

(b) "The average temperature of steam leaving the reheater at any steady load from 4,725,000 lbs. of main [sic] steam flow per hour to 2,250,000 lbs. of main steam flow per hour will be 1005F, plus or minus 10F." (page 9-6)

4."Based on the unit being fired with the specified coal fuel and on other performance conditions shown on Boiler Performance Sheet P2-951-8Y1-1S0, [Babcock & Wilcox] guarantees the following:"

(a) "Reheat spray water quantities required for reheater steam temperature control will not exceed 173,000 lbs. per hour with reheat spray water temperatures as stated in the [Companies'] specifications." (page 9-7)

(b) "Superheat spray water quantities required for main steam temperature control will not exceed 540,000 lbs. per hour with main steam spray water temperatures as stated in the [Companies'] specifications." (page 9-7)

5."Based on the unit being fired with the specified fuel, the unit will be capable of operating for extended periods at 15% of rated capacity when the unit is operated in accordance with prescribed operating procedures."

I have thoroughly reviewed the startup of the Iatan Unit No. 1 steam generator and compared its performance to the contract terms. The specific items identified above are discussed below:

1(a) As shown on Table RF-2, the steam generator (boiler) efficiency exceeded the contract limit of 84.38% during the test performed on May 8, 1980. The lower efficiencies after that date are due to air heater seals leaking more than during the earlier tests. The tests are performed by KCPL on a regular basis to ensure efficient operation of the unit. Similar tests are performed on the major steam-electric units.

(b)"The average temperature of the steam leaving the superheater will be 1,005F, plus or minus 10F."

(c)"The average temperature of the steam leaving the reheater will be 1,005F, plus or minus 10F." (page 9-5)

2."Based on the unit being fired with the specified coal fuel and on the other performance conditions shown on Boiler Performance Summary Sheet P2-951-8Y1-1S0, the unit will have a maximum normal capacity of 4,725,000 lbs. of main steam flow per hour at 2,620 psig at the superheater outlet, with a feedwater temperature of 485F and reheater inlet steam conditions of 4,305,000 lbs/hr and 605 psig and 634F." (page 9-6)

3."Based on the unit being fired with the specified coal fuel and on the other performance conditions shown on Boiler Performance Summary Sheet P2-951-8Y1-1S0:"

(a) "The average temperature of the steam leaving the superheater at any steady load from 4,725,000 lbs. of main steam per hour to 2,250,000 lbs. of main steam per hour will be 1005F, plus or minus 10F."

(b) "The average temperature of steam leaving the reheater at any steady load from 4,725,000 lbs. of main [sic] steam flow per hour to 2,250,000 lbs. of main steam flow per hour will be 1005F, plus or minus 10F." (page 9-6)

4."Based on the unit being fired with the specified coal fuel and on other performance conditions shown on Boiler Performance Sheet P2-951-8Y1-1S0, [Babcock & Wilcox] guarantees the following:"

(a) "Reheat spray water quantities required for reheater steam temperature control will not exceed 173,000 lbs. per hour with reheat spray water temperatures as stated in the [Companies'] specifications." (page 9-7)

(b) "Superheat spray water quantities required for main steam temperature control will not exceed 540,000 lbs. per hour with main steam spray water temperatures as stated in the [Companies'] specifications." (page 9-7)

5."Based on the unit being fired with the specified fuel, the unit will be capable of operating for extended periods at 15% of rated capacity when the unit is operated in accordance with prescribed operating procedures."

I have thoroughly reviewed the startup of the Iatan Unit No. 1 steam generator and compared its performance to the contract terms. The specific items identified above are discussed below:

1(a) As shown on Table RF-2, the steam generator (boiler) efficiency exceeded the contract limit of 84.38% during the test performed on May 8, 1980. The lower efficiencies after that date are due to air heater seals leaking more than during the earlier tests. The tests are performed by KCPL on a regular basis to ensure efficient operation of the unit. Similar tests are performed on the major steam-electric units.

1(b)(c), 3(a)(b) A thorough review of the Efficiency Log, Turbine & Electrical Log, and the DAS Periodic Log has shown that the superheat and reheat temperature guarantees have been met although some temperatures are beyond the guarantee. Based upon my observations, guaranteed temperatures are maintainable, although occasional deviations from guaranteed limits may occur.

2. On the basis of my analysis of the plant operating logs, the maximum normal capacity guarantees have been demonstrated under the Criterion No. 3 evaluation.

4. The superheater and reheater control capabilities were demonstrated during tests performed by the B&W Service Department and Bailey Meter on February 11 and 13, 1980, and were discussed in a March 4, 1980 conference memorandum. In a letter dated April 25, 1980, Babcock and Wilcox states ". . . the steam temperature control problem seems to be solved and meets the contract specifications. . .". Based on the operational experience of the unit and the information received from the result of the LaCygne Unit 2 Phase 2 modifications, KCPL has decided not to proceed with the Phase 2 modifications at Iatan at this time. According to Company officials, Iatan has demonstrated its ability to perform satisfactorily and within contract specifications in its present condition.

5. The minimum load requirements were demonstrated in the Criterion No. 1 evaluation at a 25% minimum load.

Electrostatic Precipitators Contract Specification 6376-M-2A

On April 24, 1980 a source emission compliance test was conducted on the unit by Performance Testing & Consultants, Inc. The purpose of the compliance testing was to determine the particulate, sulfur dioxide and nitrogen oxides (expressed as NO_2) emission rates from Unit 1. The emission testing was witnessed by representatives from the U.S. Environmental Protection Agency, Surveillance and Analysis Division and Enforcement Division, Region VII and the Missouri Department of Natural Resources. Unit 1's actual generated load during the testing averaged 683 MegaWatts gross.

The test report was published in April 1980 and shows compliance with applicable New Source Performance Standards. The report shows nitrogen oxide emissions considerably below 70% of the standard, thereby exempting the plant from NOX continuous emission monitoring requirements.

Turbine Generator Contract Specification 6376-M-10A

The main turbine nameplate rating is 673,728 MWe at 1.0 in. Hg abs, 0% makeup, tandem-compound four flow reheat with 30 inch last stage buckets at 3600 rpm, 2400 psig, 1000°F. The generator nameplate rating is 806,500 kVA at 60 psig H_2 pressure and 0.90 pf.

The turbine generator maximum guaranteed rating is 661,573 MWe at 1.5 in. Hg abs, 3% makeup, with 125,000 lb. per hour extraction for air preheating with initial steam conditions of 2400 psig, 1000°F with reheat to 1000°F at 3600 rpm as shown on heat balance 4411B503 dated 3/8/74.

The price of the unit is based on its maximum guaranteed rating corrected to 3.5 inches Hg absolute exhaust pressure and 3% makeup and the highest initial steam conditions for which the unit is guaranteed.

Because of the margins provided to take care of contingencies, it frequently is possible to operate the turbine generator set at loads greater than the contract commitments. For instance, to assure that the turbine will pass the throttle flow required for maximum contract commitments, considering variations in flow coefficients from expected values, shop tolerance on drawing areas, and other variables which may affect the flow, the turbine has been designed to pass a greater throttle flow to cover these contingencies.

Consistent with this, the turbine has been designed for safe operation with valves wide open provided that initial steam conditions are within the limits defined by General Electric Company.

However, it must be recognized that operation at such conditions, to the extent that loads in excess of contract commitments are produced, while not likely to cause any immediate difficulties, will encroach upon the design margins built into the turbine and generator.

Therefore, in order to provide for manufacturing tolerances and variations in flow coefficients, the turbine is designed with 5% flow margin above that flow required to meet the guaranteed output. The turbine will be safe for continuous operation at 105% of rated pressure with the control valves in the wide-open position and all extractions in full operation.

The turbine is expected (not guaranteed) to produce 725,830 MW when operating at valves wide open, 5% overpressure with the steam and cycle conditions as shown on heat balance 441IB504 dated 3/8/74.

Tests were conducted on May 8, May 29 and May 30, 1980 as a part of the annual heat rate test. These test heat rates measure overall Iatan Unit 1 performance, but are not in accordance with the defined net heat rate for load condition G of the guarantee.

During the May 8, 1980 test, the unit generation exceeded 716 MWe gross. According to the test results, the corrected heat rate curve was found to be about 160 Btu/kWh better than the design heat rate curve made by Black & Veatch resulting from the actual boiler efficiency being better than design.

Based upon the fact that tests were conducted on May 8, 1980 (i.e., within 3 days after the Companies' commercial operation date of May 5, 1980), it is my conclusion that the turbine generator was also performing as well on or before May 5, 1980.

Unit Operations and Performance

To ensure that the unit was capable of continued operation beyond the Companies' commercial operation date of May 5, 1980, I reviewed the unit operations and performance for the period beginning May 5, 1980 through January 18, 1981.

A MO-KAN test was conducted on the unit on August 19, 1980. Based upon this test data, the unit was accredited for the MO-KAN Power Pool at 670 MegaWatts-electric net. This corresponds to an output of approximately 701 MegaWatts-electric gross based upon test data.

The unit performance during the period June 29 through August 31, 1980 is shown on Figure RF-3. This shows the unit generation (net) at the time of daily peak.

The unit outages for the period May 5, 1980 through October 1980 are shown in Appendix C.

Conclusions

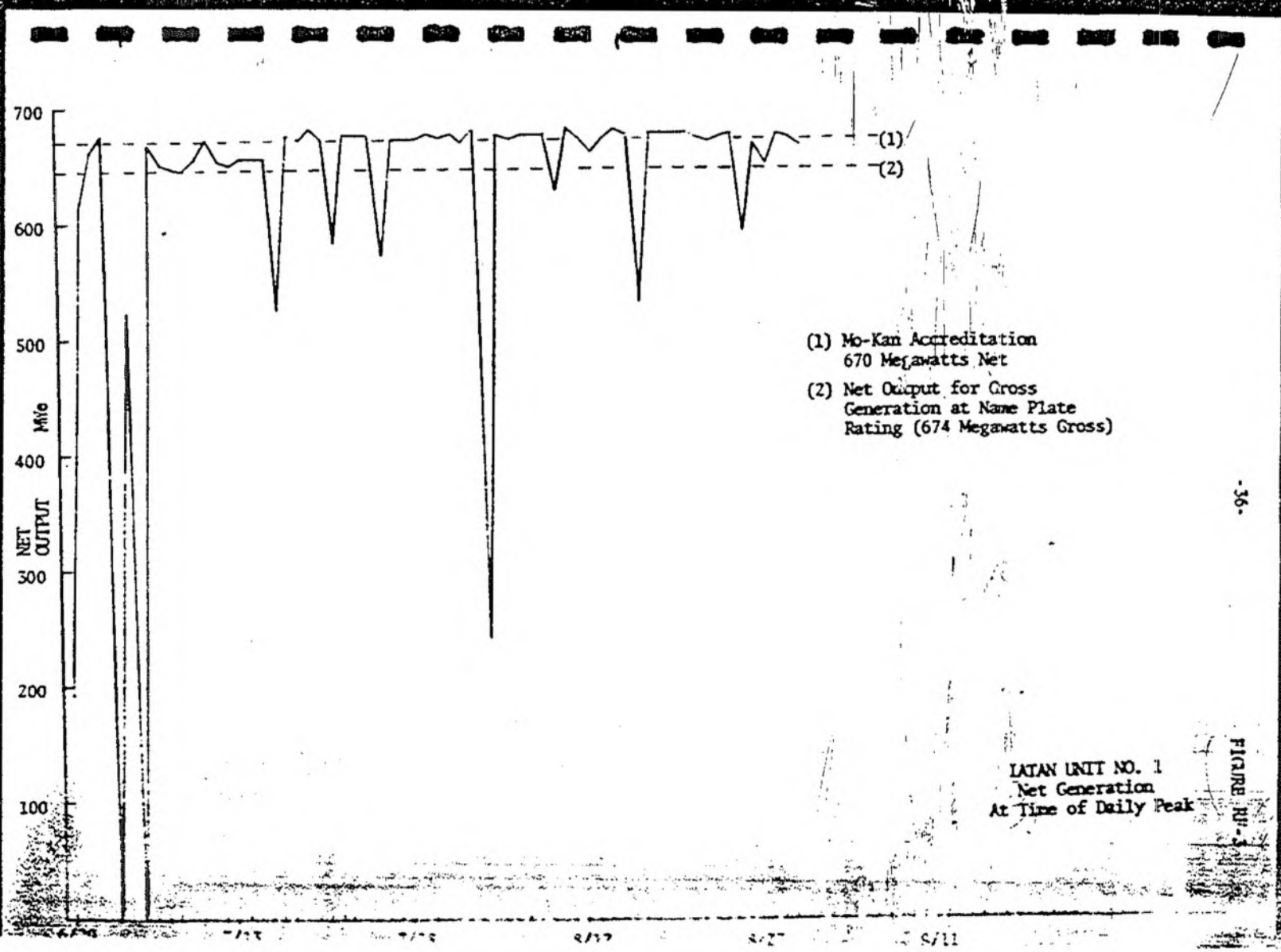
BASED UPON MY EVALUATION OF THE ABOVE IN REFERENCE TO CRITERION 5, I HAVE CONCLUDED THAT CRITERION NO. 5 HAS BEEN SATISFIED.

TABLE RF-2

MONTHLY/ANNUAL HEAT RATE TESTS

Test Date	Gross Generation (MWe)	Net Generation (MWe)	Boiler Efficiency (%)	Actual Heat Rate (BTU/kWh)	Corrected Heat Rate* (BTU/kWh)
5/8/80	716.06	686.33	86.01	9,651	9,632
5/29-30/80	590.16	563.99	85.66	9,824	9,744
	497.12	473.12	86.29	9,809	9,808
	310.21	288.91	86.94	10,145	10,077
	396.37	374.40	87.27	N/A	N/A
7/2/80	423.12	399.32	88.92	9,300	9,182
9/29/80	421.05	398.06	85.81	9,596	9,520
10/17/80	613.99	586.15	84.11	9,812	9,790
11/20/80	695.65	665.90	84.10	9,849	9,844
12/9/80	692.97	662.37	83.57	10,344	10,221

*Corrected for superheat and reheat temperatures, superheat pressure and condenser back pressure.


700
600
500
400
300
200
100
NET OUTPUT MWe
(1)
(2)
(1) Mo-Kan Accreditation
670 Megawatts Net
(2) Net Output for Gross
Generation at Name Plate
Rating (674 Megawatts Gross)
LATAN UNIT NO. 1
Net Generation
At Time of Daily Peak
FIGURE HP-3

CRITERION NO. 6

SUFFICIENT TRANSMISSION FACILITIES SHALL EXIST TO CARRY THE TOTAL DESIGN NET ELECTRICAL CAPACITY FROM THE COMPLETED GENERATING STATION INTO THE SYSTEM AT THE TIME THE NEWEST UNIT IS DECLARED FULLY OPERATIONAL AND USED FOR SERVICE

Discussion

Upon reviewing the construction completion schedule, I determined that both the St. Joseph and the Craig 345-kV transmission lines were completed and capable of carrying the Unit No. 1 total design electrical capacity designated for each line respectively prior to May 5, 1980.

STAFF RECOMMENDATIONS

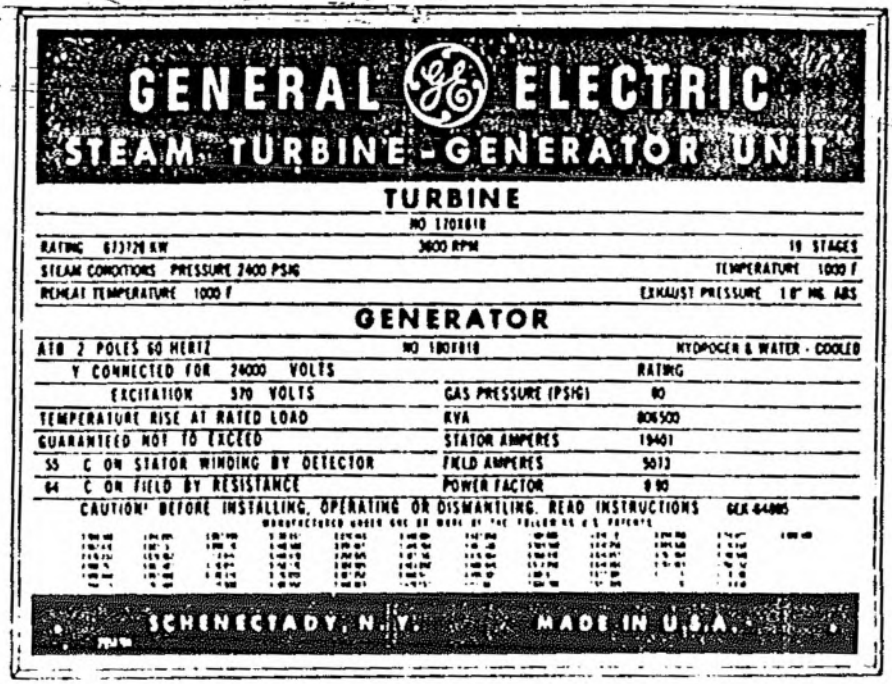
The Companies declared Iatan Unit No. 1 "commercial" on May 5, 1980.

I have reviewed the startup and operation of Iatan Unit No. 1 through January 18, 1981. Based upon my detailed evaluation using the Staff criteria, I have determined that Iatan Unit No. 1 has satisfied the Staff criteria.

I, therefore, recommend that Iatan Unit No. 1 be considered fully operational and used for service as of May 5, 1980. The phrase "fully operational and used for service" is taken directly from Section 393.135 RSMo 1978.

APPENDIX A - STEAM TURBINE-GENERATOR UNIT NAMEPLATE

IATAN STEAM ELECTRIC GENERATING STATION
UNIT NO. 1


GENERAL ELECTRIC
STEAM TURBINE-GENERATOR UNIT

TURBINE

NO 170X818

RATING 673270 KW	3600 RPM	19 STAGES
STEAM CONDITIONS PRESSURE 2400 PSIG		TEMPERATURE 1000 F
REHEAT TEMPERATURE 1000 F		EXHAUST PRESSURE 1.0" HG ABS

GENERATOR

ATB 2 POLES 60 HERTZ	NO 180X818	HYDROGEN & WATER - COOLED
Y CONNECTED FOR 24000 VOLTS		RATING
EXCITATION 370 VOLTS	GAS PRESSURE (PSIG)	60
TEMPERATURE RISE AT RATED LOAD	KVA	806500
GUARANTEED NOT TO EXCEED	STATOR AMPERES	19401
55 C ON STATOR WINDING BY DETECTOR	FIELD AMPERES	5073
64 C ON FIELD BY RESISTANCE	POWER FACTOR	0.90

CAUTION! BEFORE INSTALLING, OPERATING OR DISMANTLING, READ INSTRUCTIONS GEK-64805

SCHENECTADY, N.Y. MADE IN U.S.A.

Nameplate
(295X766)

APPENDIX B - OUTAGES PRIOR TO COMMERCIAL OPERATION

RECORD OF UNIT OUTAGES PRIOR TO COMMERCIAL OPERATION

IATAN UNIT NO. 1

DATE	TIME (HOURS) On	Off	
12-28-79	0041		Generator synchronized
		0101	Generator tripped - motoring relay
	0143		Synchronized
		0145	Generator tripped - unknown
	0241		Synchronized
		0310	Tripped by operators due to high vibration on Nos. 5, 6 & 8 bearings
12-29-79	0852		Synchronized
		1211	Generator off - boiler tripped on high drum level, Results Department
	1340		Synchronized
		2233	Generator tripped - high vibration , No. 7 bearing, 11.4 Mils
12-30-79	0428		Synchronized
		1456	Generator off - field breaker opened to run over-speed tests. Then came down for repairs. B & W repaired wall tube leaks, north side center.
12-31-79	0709		Synchronized
1-4-80		0800	Generator off - "A" induced draft fan tripped - reason unknown; loss of fan tripped boiler on high furnace pressure.
1-[illegible]-80	0949		Synchronized
		1157	Generator off - lost flow to Deaerator Tube repairs
1-17-80	0502		Synchronized
1-24-80		2058	Generator off - to repair leak in cold reheat flange
1-26-80	0102		Synchronized
2-4-80		1110	Generator tripped - lost boiler on forced draft fan trip
2-4-80	1250		Synchronized
2-22-80		0212	Tripped boiler while running turbine tests. Master fuel relay tripped. Generator off for repair of primary superheater tube leaks.

DATE	TIME (HOURS) On	Off	
2-24-80	0949		Synchronized
2-27-80		0733	Generator off - boiler tripped while running hot reheat stop/intercept valve test on No. 1 valve.
	0949		Synchronized
		1439	Generator off - boiler tripped while attempting to run EVA test.
	1553		Synchronized
3-4-80		0652	Boiler tripped - "A" & "B" induced draft fans were overloaded and tripped - furnace pressure trip. Generator off.
	0756		Synchronized
		1308	Boiler tripped - lost "A" & "B" primary air fans - ("B" - overcurrent; "A" - unknown).
	1418		Synchronized
		1422	Boiler tripped on high drum level
	1702		Synchronized
3-15-80		2358	Planned maintenance. Boiler modification. Replace air heater coils.
4-3-80	2352		Synchronized
4-9-80		2008	Generator off - economizer tube leak
4-10-80	2342		Synchronized
4-11-80		0708	Unit off - furnace pressure erratic - tripped boiler.
	0843		Synchronized
4-18-80		1940	Lost Unit due to loss of cooling water to air compressors.
4-19 80	0312		Synchronized
4-21-80		1415	Lost Unit - flue gas combustibles > 3% spurious (indication).
	1643		Synchronized
4-26-80		2339	Boiler feed pump trouble.
5-3-80	2301		Synchronized

APPENDIX C - OUTAGES AFTER COMMERCIAL OPERATION

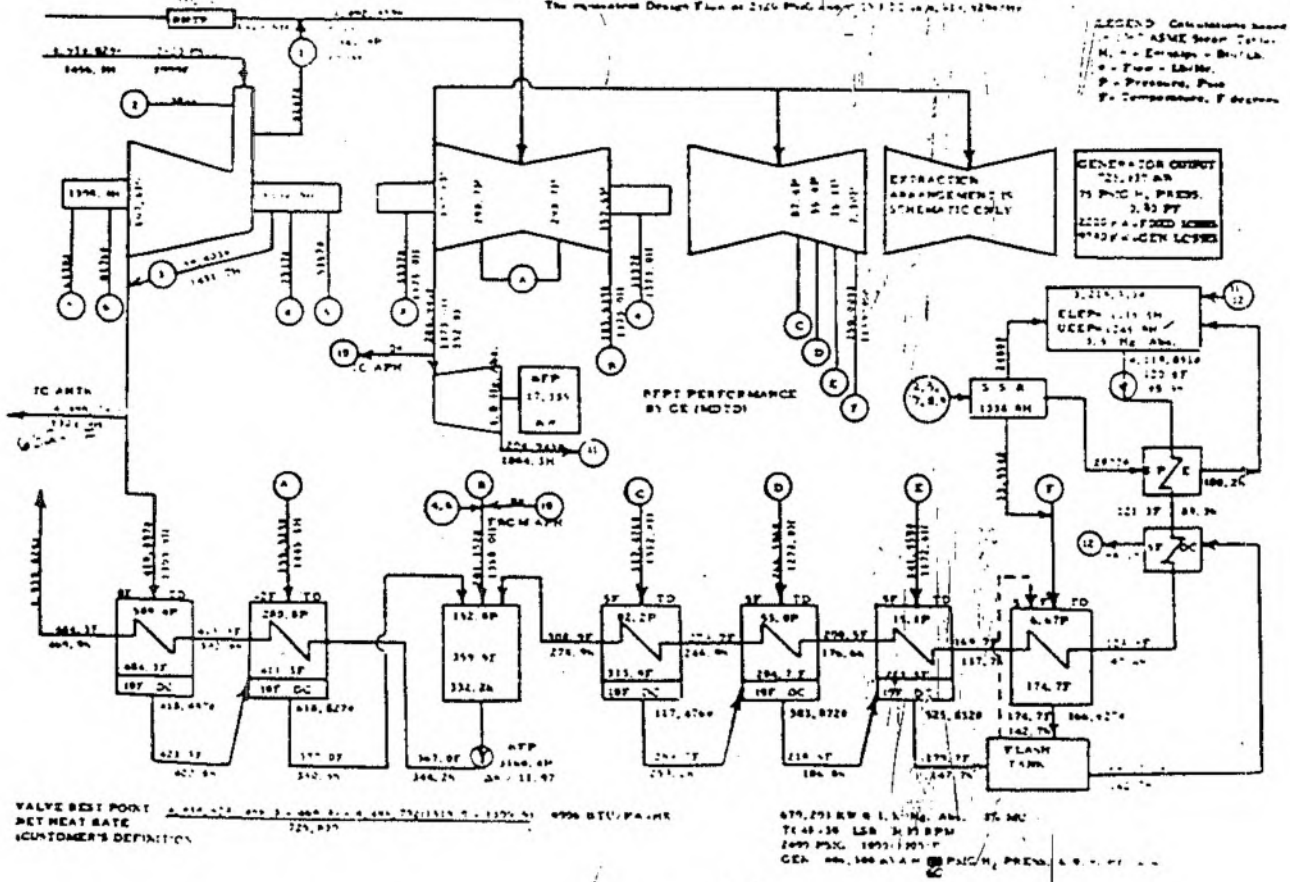
UNIT OUTAGE REPORT

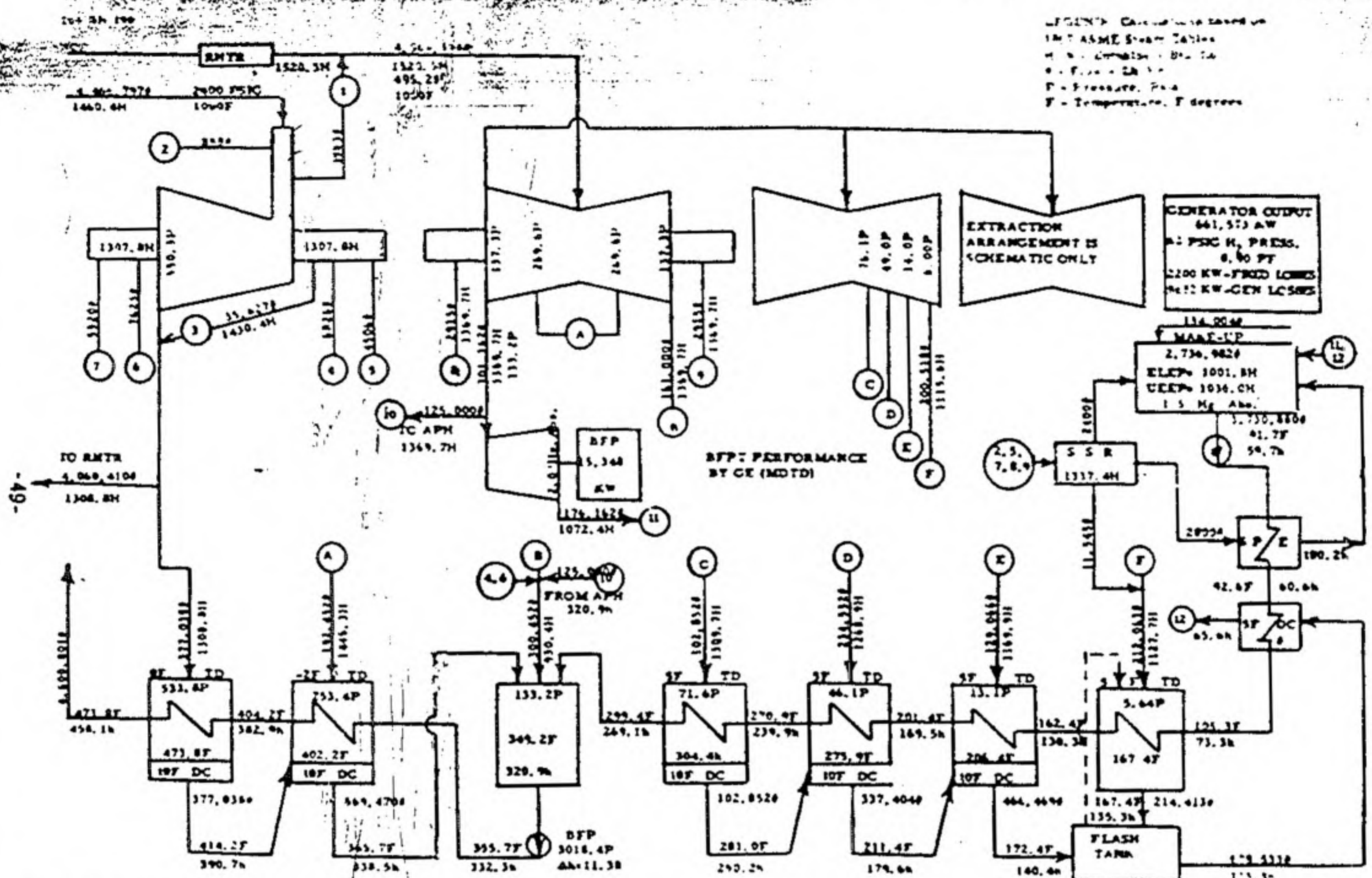
DATE			
Out of Service	Returned To Service	Type of Outage	Reason for Outage
5/27/80	5/27/80	Forced	MFT low drum level
5/30/80	5/31/80	Forced	Clean BFP suction strainer
6/5/80	6/5/80	Forced	6.9 kV bus opened on bus differential
6/5/80	6/5/80	Forced	Unit failed to transfer from full arc to partial arc admission
6/18/80	6/18/80	Forced	Boiler tripped on high negative furnace pressure
6/22/80	6/22/80	Forced	Lost fire due to boiler upset/ concrete in pulverizer feeders tripped 2 of 4 in service
6/25/80	6/29/80	Forced	Erroneous trip signal on #4 TG bearing/locked up BFP
7/2/80	7/4/80	Forced	Boiler feed pump recirc control valve plugged
7/4/80	7/6/80	Forced	EHC fluid leak
8/4/80	8/4/80	Forced	Loss of coal (large chunks of coal in feeders)

LOAD LIMITATION (Partial Outage)

May 1980	660 MW	3 Hrs	Boiler Feed Pump vibration
	620 MW	1 Hr)	
	615 MW	1 Hr)	Metal in "D" Coal Feeder
	610 MW	2 Hrs)	
	350 MW	2 Hrs	"B" Precip Outlet Damper would not open.
	350 MW	4 Hrs	Same as above.
	620 MW	4 Hrs	"D" & "H" lighter trouble.
	540 MW	1 Hr)	
	580 MW	2 Hrs)	Boiler Feed Pump Suction
	560 MW	1 Hr)	Strainer high Δ p.
	670 MW	11 Hrs)	
June 1980	350 MW	6 Hrs	Clean Condenser
	350 MW	2 Hrs	Clean Condenser
	570 MW	4 Hrs	Clean "B" Aux Cooling Heat Exchanger
	470 MW	1 Hr	Clean Condenser
	470 MW	4 Hrs	Clean Condenser
	570 MW	1 Hr	"F" Ignitor trouble
July 1980	550 MW	6 Hrs	Traveling Screen Trouble
August 1980	330.5 MW	31 Hrs	Large chunks of coal in bunkers

APPENDIX D - HEAT BALANCES 441HB503 & 441HB504


EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY
GENERATOR OUTPUT
FEPT PERFORMANCE BY GE (MOTOR)
VALVE BEST POINT
NET HEAT RATE
(CUSTOMER'S DEFINITION)



VALVE BEST POINT - 4,466,792(1463.4 - 458.1) + 4,060,410(1520.5 - 1308.8) - 125,000(1369.7 - 320.9) = 7868 BTU/KW-HR.
NET HEAT RATE
(CUSTOMER'S DEFINITION)
661,573

673,721 KW @ 1.0" Hg. Abs.
TC4F-30" LSB 3600 RPM
2400 PSIG 1000/1000°F
GEN: 806,500 KVA @ 60 PSIG H_2 PRESS. & 0.90PF(LIQ)

GENERAL ELECTRIC COMPANY SCHENECTADY, NEW YORK

Revised 5-3-74