PREPARED TESTIMONY

OF

RONALD M. FLUEGGE

Missouri Public Service Commission

CASE NO. ER-81-42

KANSAS CITY POWER & LIGHT COMPANY

March, 1981

Staff 2
Date
Reporter

PREPARED TESTIMONY

OF

RONALD M. FLUEGGE
Assistant Director of Utilities Division
in charge of
Generating Facilities Department
Missouri Public Service Commission

Q. Please state your name and business address.

A. My name is Ronald M. Fluegge and my business address is 100 East Capitol, Jefferson City, Missouri 65102.

Q. What is your present position with the Missouri Public Service Commission?

A. I am the Assistant Director in charge of the Generating Facilities Department of the Utility Division.

Q. Could you please review your qualifications, educational background and professional experience.

A. I am duly registered and authorized to practice as a Professional Engineer by law in the State of Missouri. My registration number is E-18563. I have a Bachelor of Science degree in Metallurgical Engineering (Nuclear Engineering Option) from the University of Missouri at Rolla. My previous work experience has been as a performance engineer assigned to the Electric Production Department of Baltimore Gas & Electric Company. Work assignments included fossil-fueled plant operations and maintenance including turbine-generator overhaul and boiler repair for the units identified in Schedule RF-1. I was later assigned to the Nuclear Fuel Management Group of the Electric Production Department for the Calvert Cliffs Nuclear Power Plant Units Nos. 1 and 2. I was a startup engineer for the Maine Yankee Atomic Power Station and a shift test supervisor for the initial startup of Calvert Cliffs Nuclear Power Plant Unit No. 1. I was later employed as a Reactor Engineer in the Reactor Systems Branch of the Office of Nuclear Reactor Regulation of the U. S. Nuclear Regulatory Commission. I have been on the Staff of the Utility Division of the Missouri Public Service Commission since May, 1979.

Q. What is the purpose of your testimony in this case?

A. The purpose of my testimony is to state the criteria that was used to evaluate the commercial operation date of the Iatan Steam Electric Generating Station Unit No. 1 and to summarize my findings and conclusions.

Q. What are the criteria that were used to recommend when the unit should be considered fully operational and used for service?

A. The criteria are shown in Report RF-1.

Q. Why do you use the phrase "fully operational and used for service?

A. Staff counsel has advised me that under Section 393.135 RSMo 1978 that an electric utility cannot include in its rates any charges for the fixed or operating costs of a plant which is not "fully operational and used for service." The phrase is taken directly from the statute.

Q. Was Report RF-1 prepared by you or under your direction and supervision?

A. I prepared Report RF-1 dealing with the Staff recommendation on fully operational and used for service.

Q. What conclusions did you draw from your analysis?

A. I reviewed the operation of the unit for the period December 28, 1979 through January 18, 1981. As a result of this review, I have concluded that the startup and operation of Iatan Unit No. 1 demonstrates that the Unit met the Staff criteria on May 5, 1980; the date the unit was declared commercial. I, therefore, recommend that Iatan Unit No. 1 be considered fully operational and used for service as of MAY 5, 1980.

Q. Does this conclude your testimony?

A. Yes, it does.

Unit	Name Plate Rating MWe
Fossil-fueled:	
C. P. Crane Unit 1	190.4
C. P. Crane Unit 2	209.4
H. A. Wagner Unit 1	132.8
H. A. Wagner Unit 2	136.0
H. A. Wagner Unit 3	359.0
Riverside Unit 1	60.0
Riverside Unit 2	60.0
Riverside Unit 3	60.0
Riverside Unit 4	72.3
Riverside Unit 5	81.3
Nuclear-fueled:	
Calvert Cliffs Unit 1	918.0
Calvert Cliffs Unit 2	911.0
Maine Yankee Atomic Power Station	864.0

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the matter of Kansas City Power & Light Company of Kansas City, Missouri, for authority to file tariffs increasing rates for electric service to customers in the Missouri service area of the Company.	Case No. ER-81-42

AFFIDAVIT OF RONALD M. FLUEGGE

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Ronald M. Fluegge, of lawful age, on his oath states: That this report, consisting of 49 pages, to be presented in the above case was prepared by him or under his supervision; that he is a duly registered Professional Engineer under the laws of the State of Missouri; and that such matters are true to the best of his knowledge and belief.

Ronald M. Fluegge
Ronald M. Fluegge

Subscribed and sworn to before me this 6th day of March, 1981.

DORIS K. ADAMS
NOTARY PUBLIC STATE OF MISSOURI
COLE CO.
MY COMM. ...

Doris K. Adams

My Commission expires January 29, 1984.

Report RF-1

IATAN STEAM ELECTRIC GENERATING STATION
UNIT NO. 1

Staff Recommendations on Commercial Operation

Kansas City Power & Light Company
Case No. ER-81-42

Ronald M. Fluegge
Generating Facilities Department
Missouri Public Service Commission

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UNIT IDENTIFICATION

STATION: Iatan Steam Electric Generating Station

UNIT: Unit No. 1

LOCATION: Approximately 30 miles northwest of Kansas City, Missouri

OWNERS: Kansas City Power & Light Company
St. Joseph Light & Power Company
The Empire District Electric Company
(Referred to herein as the "Companies")

OPERATOR: Kansas City Power & Light Company

DESCRIPTION OF FACILITY

MAJOR COMPONENT DESCRIPTION

Steam Generator

The unit is a balanced draft pulverized coal-fired Carolina type Radiant boiler. Furnace dimensions are 82 feet wide, 51 feet deep and 176 feet high from the roof to lower headers.

The boiler is a watertube type with superheater, reheater, economizer and air heater, and is front and rear fired by 56 burners, which are fed by seven pulverizers. The design fuel firing rate and heat input for the boiler is 812,300 lb/hr at 8,125 Btu/lb and 6,600 x 10^6 Btu/hr. Unit 1 has two forced draft fans and four induced draft fans to produce a balanced draft firing system.

Normal capacity is 4,500,000 lb/hr main steam flow and 4,100,000 lb/hr reheat flow with a feedwater temperature of 480 F. Maximum normal capacity (5% overpressure) is 4,725,000 lb/hr main steam flow and 4,305,000 lb/hr reheat with a feedwater temperature of 485 F.

Turbine throttle pressure is 2400 psi at normal capacity and 2520 psi at maximum normal capacity.

Main and reheat steam temperatures are controlled by spray attemperation.

The major items of fuel equipment are MPS-89 pulverizers and 42" dual register burners. Lighters are steam atomized MPO Type for #2 fuel oil.

The performance coal was specified as 61 grindability with maximum surface moisture of 10% from Bell Ayre, Wyoming mine by Amax. The raw coal must be crushed to 1-¼" or smaller for the pulverizers.

The typical characteristics of this type of coal are as follows:

Ultimate Analysis, %	Amax
Moisture	30.00
Carbon	48.50
Hydrogen	3.38
Nitrogen	0.67
Chlorine	0.01
Sulfur	0.32

Ash	5.80
Oxygen	11.32

Heating Value = 8,125 BTU/lb

The coal handling system includes a rotary car dumper, conveyors, stacker reclaimer, transfer towers, crusher building and storage silos. The system is designed to unload unit trains of up to 115 cars, with 100 to 110 ton capacity each, within 4 hours of arrival at the plant site and to supply Unit 1 firing at a maximum burn rate of 430 tons per hour.

Environmental Quality Control System

The Unit 1 air pollution control equipment consists of two parallel, cold side Lodge-Cottrell Model B12LCSF-12x40-180 electrostatic precipitators. Each precipitator is a rigid frame type with four electrical fields, 30 transformer-rectifier sets, 60 bus sections, four gas duct hopper outlets and 40 ash hopper outlets. Both precipitators have a design gas volume at full load of 2,643,000 acfm at 302°F and 27.97 in. Hg abs, a design pressure drop of 2.0 in H_2O and a guaranteed collection efficiency of 99.4% with an inlet particulate burden of 1.13 to 3.61 gr/acf.

The precipitators are operated continuously and maintained as required and during annual boiler outages.

The boiler gas that passes through the precipitators, which collect the particulate matter from the gas stream, and induced draft fans is emitted into the atmosphere through a concrete stack with a steel liner. The stack is 706 feet in height.

A United Conveyor Corporation vacuum system and positive pressure system removes and transports all of the dry fly ash from the precipitator hoppers through pipes to an ash collector and separator, and then to a dry storage silo. All bottom ash and pyrites are removed from the boiler by sluicing with water, and are transported through pipes to a settling pond. The bottom ash system is designed to handle 100 tons per hour and the fly ash disposal system is designed to handle 100 tons per hour.

Turbine Generator

The main turbine is a tandem-compound reheat unit with four-flow, low-pressure stages.

The turbine consists of four double-shell sections: a high-pressure section, a double-flow reheat section, and two double-flow low-pressure sections. Steam passes through the four control valves, which are in a separately mounted valve chest, enters the turbine at the generator end of the high-pressure section and flows toward the front standard. After passing through the high-pressure stages, the steam is returned to the reheat section of the boiler. The reheated steam returns to the turbine through the combined reheat stop valves and intercept valves. Upon entering the center of the reheat section the steam divides, part flowing toward the generator end of the section and part toward the turbine end. The steam leaves the reheat section through the crossover pipes which connect to the inlet of the low-pressure elements. One half of the steam enters the "A" double-flow section and one half of the steam continues to the "B" double-flow section. After passing through the low-pressure stages, the steam is exhausted downward into the condensers.

The main turbine is a 670,203 kW, 3600 RPM, tandem compound four flow reheat steam turbine with 30" last stage buckets designed for steam conditions of 2400 psig, 1000 degrees F, with reheat to 1000 degrees F, 1.5" Hg Abs exhaust pressure and 3.0% makeup while extracting for normal feedwater heating and for boiler feedpump turbine operation.

The main generator is a 806,500 kVA, 3600 RPM, direct connected, 3 phase, 60 Hertz, 24 KV conductor cooled synchronous generator rated at 0.90 PF.

Turbine Capability

As stated in General Electric Company Proposal No. G66-48440 (Turbine Performance Section), Turbine Generator and Boiler Feed Pump Turbine (Specification 6376-M-10A):

Guaranteed: "The turbine is guaranteed to produce 661,573 kW when operating with initial steam conditions of 2400 PSIG, 1000 degrees F, with reheat to 1000 degrees F, while exhausting at 1.5" Hg. Abs. back pressure, 3.0% make-up and while extracting for normal feedwater heating and feedpump turbine drive as shown on heat balance 441HB503, dated 3/8/74."

Expected: "The turbine is expected (not guaranteed) to produce 725,830 kW when operating at valves wide open, 5% overpressure with the steam and cycle conditions as shown on heat balance 441HB504, dated 3/8/74."

Guaranteed: "The turbine is guaranteed to pass 4,466,797 pounds of steam per hour when operating with the cycle as shown on heat balance 441HB503, dated 3/8/74."

Expected: "The turbine is expected (not guaranteed) to pass 4,939,829 pounds of steam per hour when operating with the cycle as shown on heat balance 441HB504, dated 3/8/74."

Heat Rate
(As defined per Black & Veatch specification)

As stated in General Electric Company Proposal No. G66-48440 (Turbine Performance Section), Turbine Generator and Boiler Feed Pump Turbine (Specification 6376-M-10A):

Guaranteed: "The turbine-generator is guaranteed to produce a net heat rate of 7868 Btu/Kw hr. when operating with the cycle as shown on heat balance 441HB503, dated 3/8/74."

Expected: "The turbine-generator is expected (not guaranteed) to produce a net heat rate of 8006 Btu/Kw-hr. when operating with the cycle as shown on heat balance 441HB504, dated 3/8/74."

PLANT ARRANGEMENT

Iatan Unit No. 1 was built at a new site, between Missouri State Highway No. 45 and the Missouri River. The site is located approximately 30 miles northwest of Kansas City, Missouri.

The power block is arranged on the east-west axis with the turbine building located at the extreme east. The turbine-generator unit is on the north-south axis in the building; the north end is the high pressure turbine and the south, the generator. The turbine building west wall is common to the control wing and the boiler structure.

At the east end of the boiler structure are the coal silos, feeders, pulverizers and the coal conveying equipment, which brings coal in from the crusher building on the north side. West of the pulverizers and bunkers are the boiler's furnace section and the bottom ash pit. The control wing is directly south of the boiler, with a common wall.

West of the boiler structure are the primary and secondary air preheaters, forced draft fans and primary air fans. These are arranged in rows from north to south with a primary air preheater and primary air fan at each end; the secondary air preheaters and forced draft fans are in the center.

West of the air preheaters and fans are the two precipitators. The gas flow through the precipitators is from the north and south towards the centerline of the power block. West of the precipitators are the induced draft fans and the stack.

The principal power block elevations are as follows:

Ground Floor	785'
Operating Deck	825'
1st Burner Platform	841'6"
Precipitator Hot Deck	857'
Air Preheater Platform	863'
Cascade Conveyor Platform	939'
Steam Drum Platform	993'

The intake and discharge structures are located west of the power block; the intake structure is on the north and the discharge on the south. East of the turbine building is the transformer area and further east, the switchyard. Attached to the north side of the turbine building is the machine shop and to the northeast, connected by the breezeway, the office service building. The water management building and tanks are north of the power block, along with the fuel oil storage tank. The coal handling area and bottom ash disposal pond are northeast of the main plant.

STARTUP HISTORY

Startup is the time period required to bring the steam-electric generating unit from an inactive condition, to the state ready for commercial operation. The startup period includes inspection and checkout of equipment and supporting subsystems; trial, test, initial operation and placing in service of supporting equipment and subsystems; initial operation of the complete steam-electric generating unit; operation of the complete unit to obtain data, perform calibration and corrective work; shutdown, inspection and adjustment prior to obtaining commercial operating status.

The unit was first rolled and synchronized to the electrical grid on December 28, 1979 at 12:41 a.m. The average daily power output history is shown on Figure RF-1.

Performance tests were conducted during the unit startup to ensure that components and systems operate as designed. The performance tests that are required prior to commercial operation were evaluated as a part of the Criterion 5 review.

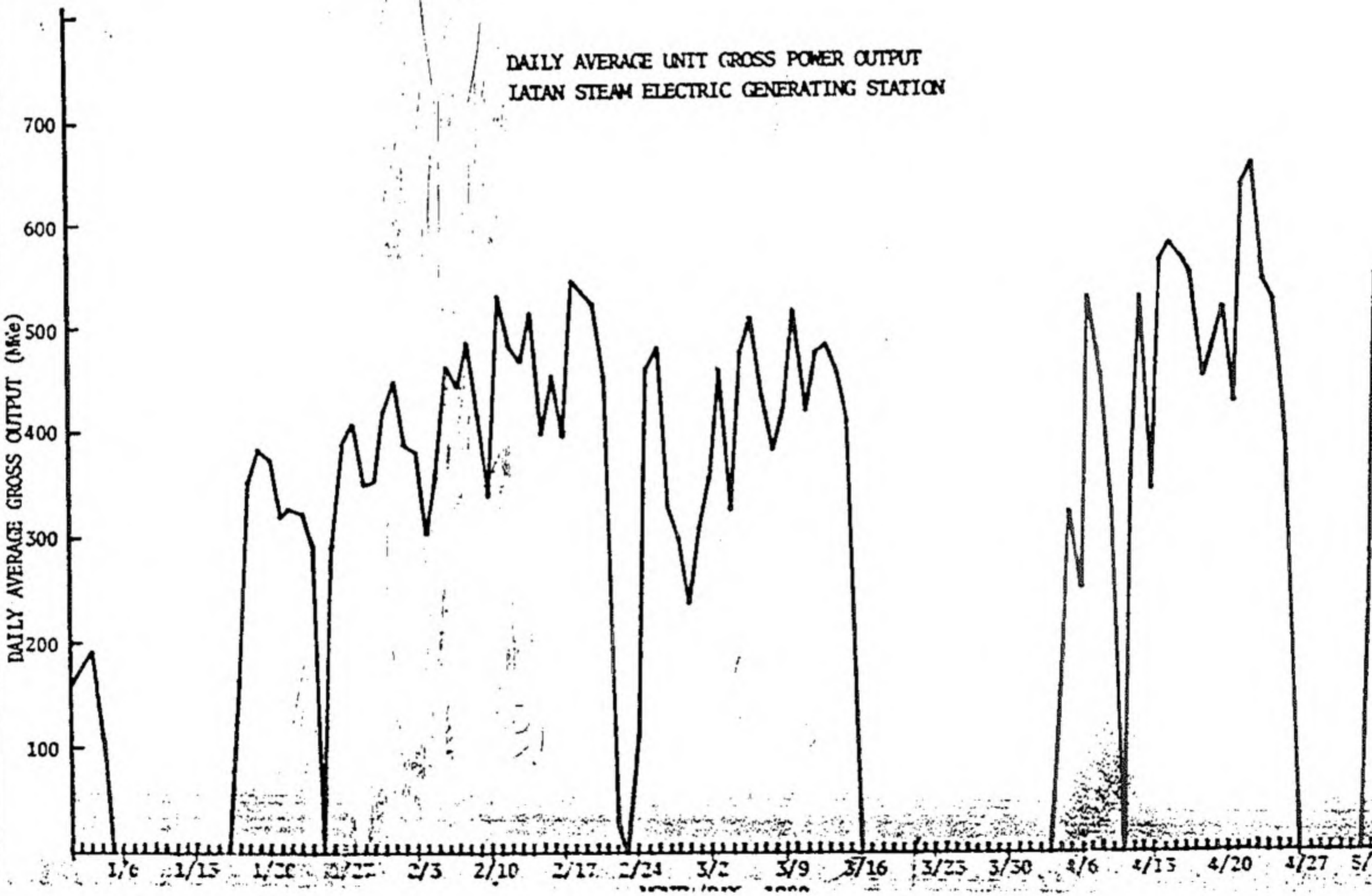
DAILY AVERAGE UNIT GROSS POWER OUTPUT
IATAN STEAM ELECTRIC GENERATING STATION
DAILY AVERAGE GROSS OUTPUT (MWe)
700
600
500
400
300
200
100
2/3
2/10
2/24
3/9
3/16
3/30
4/13
4/20
4/27

FIGURE RF-1

STAFF CRITERIA

The criteria used to evaluate the commercial operation date are shown on pages 9 and 10.

The evaluation of the Iatan Unit No. 1 startup based on a comparison with the requirements of each criterion begins on page 11.

IATAN UNIT NO. 1

STAFF CRITERIA FOR DETERMINING THE OPERATIONAL STATUS OF NEW COAL-FIRED ELECTRIC POWER PLANTS

1. A UNIT MUST DEMONSTRATE THAT IT CAN OPERATE AT ITS DESIGN MINIMUM POWER OR ABOVE.[1]

This requirement is fulfilled if any 400 continuous hours of operation result in the satisfying of the following equation

$$\frac{\text{hours at design minimum power or above}}{\text{400 hours}} \geq 0.C$$

2. A UNIT MUST BE ABLE TO OPERATE AT OR ABOVE ITS DESIGN CAPACITY FACTOR FOR A REASONABLE PERIOD OF TIME.[1]

This criterion will be satisfied if:

$$\text{design capacity factor} \leq \frac{\text{energy generated in a continuous 168 hour period (MWhe)}}{\text{name plate rating (MWe)} \times \text{168 hours}}$$

If the design capacity factor is not specified it will be assumed to be 0.6 unless the utility can offer evidence justifying a lower value.

Name plate rating is the full-load continuous rating of a generator, prime mover or other electrical equipment under specified conditions as designated by the manufacturer. It is usually indicated on a name plate attached mechanically to the individual machine or device. The name plate rating of a steam electric turbine-generator set is the guaranteed continuous output in kilowatts or kVA and power factor at generator terminals when the turbine is clean and operating under specified throttle steam pressure and temperature, specified reheat temperature, specified exhaust pressure, and with full extraction from all extraction openings.

3. A UNIT MUST OPERATE AT A CAPACITY EQUAL TO 95% OF ITS NAME PLATE RATING FOR 4 HOURS.[2]

4. A UNIT MUST BE OPERATED SO AS TO SHOW A CLEAR AND OBVIOUS TREND TOWARD THE PREDOMINATE USE OF COAL AS ITS PRIMARY FUEL.[1]

The test period will be 30 days.

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[1] Staff testimony in Case No. ER-79-60, Missouri Public Service Company, Jeffrey Energy Center Unit No. 1

[2] Staff testimony in Case No. ER-80-231, Missouri Public Service Company, Jeffrey Energy Center Unit No. 2

5. A UNIT MUST HAVE FINISHED THE STARTUP TEST PROGRAM WITH ALL STARTUP TEST PROCEDURES NECESSARY FOR OPERATION SATISFACTORILY COMPLETED.[1]

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.[2]

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[1] Staff testimony in Case No. ER-79-60, Missouri Public Service Company, Jeffrey Energy Center Unit No. 1

[2] Staff testimony in Case No. ER-80-231, Missouri Public Service Company, Jeffrey Energy Center Unit No. 2

CRITERION NO. 1

A UNIT MUST DEMONSTRATE THAT IT CAN OPERATE AT ITS DESIGN MINIMUM POWER OR ABOVE.

This requirement is fulfilled if any 400 continuous hours of operation result in the satisfying of the following equation.

$$\frac{\text{hours at design minimum power or above}}{\text{400 hours}} \geq 0.8$$

Discussion

I. - Calculations are based on a 400-hour period beginning at 0001 hours on January 18, 1980. Design minimum power = 168.432 MWe

Date	Hours ≥ 168 MWe	Hours < 168 MWe	Average Hourly Gross Generation MWe Maximum	Minimum
1/18	24	0	410	240
1/19	24	0	430	310
1/20	24	0	400	290
1/21	24	0	410	208
1/22	24	0	433	208
1/23	24	0	409	206
1/24	20	4	451	0
1/25	0	24	0	0
1/26	21	3	397	1
1/27	24	0	406	368
1/28	24	0	428	283
1/29	24	0	407	207
1/30	24	0	415	208
1/31	24	0	577	231
2/1	24	0	640	270
2/2	24	0	505	283
2/3	16	0	435	289
TOTAL	369	31		

$$\frac{\text{hours at design minimum power or above}}{\text{400 hours}} = \frac{369}{400} = 0.92$$

II. Calculations are based on a 400-hour period beginning at 0001 hours on April 5, 1980. Design minimum power = 168.432 MWe

Date	Hours ≥ 168 MWe	Hours < 168 MWe	Average Hourly Gross Generation MWe	
			Maximum	Minimum
4/5	24	0	385	271
4/6	24	0	288	190
4/7	24	0	712	246
4/8	24	0	623	283
4/9	20	4	677	0
4/10	0	24	0	0
4/11	18	6	586	2
4/12	24	0	687	292
4/13	24	0	490	222
4/14	24	0	693	298
4/15	24	0	718	313
4/16	24	0	716	299
4/17	24	0	706	286
4/18	20	4	713	0
4/19	19	5	711	0
4/20	24	0	680	336
4/21	24	2	709	0
TOTAL	355	45		

$$\frac{\text{hours at design minimum power or above}}{\text{400 hours}} = \frac{355}{400} = 0.89$$

THEREFORE, CRITERION NO. 1 HAS BEEN SATISFIED.

Data Sources:

1. Iatan Unit No. 1 Turbine & Electrical Log
2. Dispatch computer displays nos. 1348 and 1349 (Iatan Unit No. 1)
3. Iatan Unit No. 1 Periodic Log

CRITERION NO. 2

A UNIT MUST BE ABLE TO OPERATE AT OR ABOVE ITS DESIGN CAPACITY FACTOR FOR A REASONABLE PERIOD OF TIME.

This criterion will be satisfied if:

$$\text{design capacity factor} \leq \frac{\text{energy generated in a continuous 168 hour period (MWhe)}}{\text{name plate rating (MWe)} \times \text{168 hours}}$$

If the design capacity factor is not specified it will be assumed to be 0.6 unless the utility can offer evidence justifying a lower value.

Name plate rating is the full-load continuous rating of a generator, prime mover or other electrical equipment under specified conditions as designated by the manufacturer. It is usually indicated on a name plate attached mechanically to the individual machine or device. The name plate rating of a steam electric turbine-generator set is the guaranteed continuous output in kilowatts or kVA and power factor at generator terminals when the turbine is clean and operating under specified throttle steam pressure and temperature, specified reheat temperature, specified exhaust pressure, and with full extraction from all extraction openings.

Discussion

I. Calculations are based on a 168-hour period beginning February 10, 1980 at 0001 hours. Design capacity factor = 0.62 Name plate rating = 673.728 MWe

Date	Energy Generated (MWhe) (Data Source 1)	Generator Watt-Hour Meter (Data Source 2)
2/10	8,127	222,880
2/11	12,749	
2/12	11,577	
2/13	11,213	
2/14	12,359	
2/15	9,560	
2/16	10,904	299,350
TOTAL	76,489	DIFFERENCE 76,470

$$\frac{\text{energy generated in 168 hours}}{\text{(name plate rating)} \times \text{(168 hours)}} = \frac{\text{76,489 MWhe}}{\text{(673.728 MWe) (168 hours)}} = 0.68$$ (Based upon Data Source 1)

$$\frac{\text{energy generated in 168 hours}}{\text{(name plate rating)} \times \text{(168 hours)}} = \frac{\text{76,470 MWhe}}{\text{(673.728 MWe) (168 hours)}} = 0.68$$ (Based upon Data Source 2)

II. Calculations are based on a 168-hour period beginning March 9, 1980 at 0001 hours. Design capacity factor = 0.62

Date		Energy Generated (MWhe) (Data Source 1)		Generator Watt-Hour Meter (Data Source 2)
3/9		10,146		482,780
3/10		12,405		
3/11		10,071		
3/12		11,380		
3/13		11,580		
3/14		10,980		
3/15		9,884		559,260
	TOTAL	76,446	DIFFERENCE	76,480

$$\frac{\text{energy generated in 168 hours}}{(\text{name plate rating}) \times (168 \text{ hours})} = \frac{76{,}446 \text{ MWhe}}{(673.728 \text{ MWe})\ (168 \text{ hours})} = 0.68$$ (Based upon Data Source 1)

$$\frac{\text{energy generated in 168 hours}}{(\text{name plate rating}) \times (168 \text{ hours})} = \frac{76{,}480 \text{ MWhe}}{(673.728 \text{ MWe})\ (168 \text{ hours})} = 0.68$$ (Based upon Data Source 2)

III. Calculations are based on a 168 hour period beginning April 12, 1980 at 0001 hours. Design capacity factor = 0.62

Date		Energy Generated (MWhe) (Data Source 1)		Generator Watt-Hour Meter (Data Source 2)
4/12		12,745		617,100
4/13		8,299		
4/14		13,515		
4/15		13,939		
4/16		13,650		
4/17		13,236		
4/18		10,850		703,340
	TOTAL	86,234	DIFFERENCE	86,240

$$\frac{\text{energy generated in 168 hours}}{(\text{name plate rating}) \times (168 \text{ hours})} = \frac{86{,}234 \text{ MWhe}}{(673.728 \text{ MWe})\ (168 \text{ hours})} = 0.76$$ (Based upon Data Source 1)

$$\frac{\text{energy generated in 168 hours}}{(\text{name plate rating}) \times (168 \text{ hours})} = \frac{86{,}240 \text{ MWhe}}{(673.278 \text{ MWe})\ (168 \text{ hours})} = 0.76$$ (Based upon Data Source 2)

SINCE THE CALCULATIONS SHOW A VALUE GREATER THAN THE DESIGN CAPACITY FACTOR OF 0.62, CRITERION NO. 2 HAS BEEN SATISFIED.

Data Sources:

1. Dispatch computer displays nos. 1348 and 1349
2. Iatan Unit No. 1 Turbine & Electrical Log

CRITERION NO. 3

A UNIT MUST OPERATE AT A CAPACITY EQUAL TO 95% OF ITS NAME PLATE RATING FOR 4 HOURS.

Discussion

The name plate rating of the turbine-generator is 673.728 MWe.

Capacity required is (0.95) x (673.728 MWe) = 640.04

Date	Time (Hours)	Average Gross (MWe)	Continuous Period (Hours) For Average Gross (MWe) ≥ 640.04	≥ 673.728
2-11-80	1200	653	12	
	1300	647		
	1400	657		
	1500	669		
	1600	668		
	1700	666		
	1800	668		
	1900	664		
	2000	660		
	2100	664		
	2200	663		
	2300	653		
2-14-80	1000	669	6	
	1100	677		
	1200	669		
	1300	661		
	1400	660		
	1500	660		
4-7-80	1300	673	11	9
	1400	678		
	1500	677		
	1600	696		
	1700	697		
	1800	688		
	1900	685		
	2000	689		
	2100	707		
	2200	712		
	2300	640		

Date	Time (Hours)	Average Gross (MWe)	Continuous Period (Hours) For Average Gross (MWe) ≥ 640.04	≥ 673.728
4-12-80	1000	687	6	
	1100	668		
	1200	674		
	1300	655		
	1400	669		
	1500	664		
4-14-80	0900	677	14	13
	1000	682		
	1100	684		
	1200	689		
	1300	689		
	1400	690		
	1500	687		
	1600	675		
	1700	667		
	1800	676		
	1900	685		
	2000	687		
	2100	692		
	2200	693		
4-15-80	0800	686	15	15
	0900	696		
	1000	690		
	1100	690		
	1200	688		
	1300	676		
	1400	676		
	1500	678		
	1600	691		
	1700	699		
	1800	718		
	1900	710		
	2000	708		
	2100	700		
	2200	695		
4-16-80	0900	641	14	13
	1000	685		
	1100	688		
	1200	691		
	1300	686		
	1400	706		
	1500	706		
	1600	699		
	1700	696		
	1800	702		
	1900	713		
	2000	709		
	2100	716		
	2200	707		

Date	Time (Hours)	Average Gross (MWe)	Continuous Period (Hours) For Average Gross (MWe) ≥ 640.04	≥ 673.728
4-17-80	0900	650	13	11
	1000	683		
	1100	705		
	1200	703		
	1300	702		
	1400	665		
	1500	687		
	1600	690		
	1700	700		
	1800	699		
	1900	703		
	2000	706		
	2100	698		
4-18-80	1000	690	10	10
	1100	685		
	1200	701		
	1300	711		
	1400	705		
	1500	704		
	1600	708		
	1700	706		
	1800	712		
	1900	713		
4-19-80	1300	681	11	
	1400	655		
	1500	674		
	1600	702		
	1700	708		
	1800	707		
	1900	711		
	2000	706		
	2100	707		
	2200	708		
	2300	674		
4-20-80	1500	659	4	
	1600	656		
	1700	657		
	1800	649		
4-21-80	0900	688	6	6
	1000	692		
	1100	700		
	1200	702		
	1300	708		
	1400	709		

Date	Time (Hours)	Average Gross (MWe)	Continuous Period (Hours) For Average Gross (MWe) ≥ 640.04	≥ 673.728
4-22-80	0900	683	37	34
	1000	689		
	1100	672		
	1200	719		
	1300	691		
	1400	691		
	1500	688		
	1600	689		
	1700	687		
	1800	687		
	1900	691		
	2000	687		
	2100	687		
	2200	685		
	2300	685		
	2400	683		
4-23-80	0100	691		
	0200	690		
	0300	691		
	0400	691		
	0500	689		
	0600	692		
	0700	698		
	0800	696		
	0900	697		
	1000	698		
	1100	694		
	1200	697		
	1300	697		
	1400	697		
	1500	696		
	1600	691		
	1700	696		
	1800	696		
	1900	701		
	2000	699		
	2100	694		
4-24-80	0900	670	14	5
	1000	681		
	1100	678		
	1200	678		
	1300	676		
	1400	677		
	1500	673		
	1600	672		
	1700	675		
	1800	675		
	1900	676		
	2000	675		
	2100	671		
	2200	650		

Date	Time (Hours)	Average Gross (MWe)	Continous Period (Hours) For Average Period (MWe) ≥ 640.04	≥ 673.728
4-25-80	1200	640	11	
	1300	640		
	1400	641		
	1500	653		
	1600	654		
	1700	656		
	1800	655		
	1900	656		
	2000	660		
	2100	659		
	2200	654		
5-5-80	1000	659	13	
	1100	668		
	1200	671		
Commercial Operation	1300	669		
	1400	669		
	1500	670		
	1600	667		
	1700	669		
	1800	680		
	1900	683		
	2000	668		
	2100	657		
	2200	656		

THEREFORE, CRITERION NO. 3 HAS BEEN SATISFIED.

Data Sources:

1. Dispatch computer displays nos. 1348 and 1349.

CRITERION NO. 4

A UNIT MUST BE OPERATED SO AS TO SHOW A CLEAR AND OBVIOUS TREND TOWARD THE PREDOMINATE USE OF COAL AS ITS PRIMARY FUEL.

The test period will be 30 days.

Discussion

Shown in Table RF-1 is the daily quantity of oil and coal burned in the boiler during power operation. Also shown is the fraction of the total heat input to the boiler that results from the burning of the coal. A fraction 1.00 indicates that 100% of the heat input to the boiler is from coal only.

The information listed in the column entitled FRACTION OF INPUT STATION FROM COAL FIRED is shown graphically in Figure RF-2.

The unit has burned coal consistently except for the oil usage during startup following the unit being off line.

BASED UPON MY EVALUATION OF THE FUEL USAGE, I HAVE CONCLUDED THAT CRITERION NO. 4 HAS BEEN SATISFIED.