Exhibit No.:
Issues: In Plant Service

Witness: Michael E. Taylor
Sponsoring Party: MO PSC Staff
Type of Exhibit: Direct Testimony
Case No.: ER-2007-0002
Date Testimony Prepared: December 15, 2006

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

DIRECT TESTIMONY

OF

MICHAEL E. TAYLOR

UNION ELECTRIC COMPANY d/b/a AMERENUE

CASE NO. ER-2007-0002

Jefferson City, Missouri
December 2006

** Denotes Highly Confidently Information **

NP

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a AmerenUE for Authority to File Tariffs Increasing Rates for Electric Service Provided to Customers in the Company's Missouri Service Area.	)))))	Case No. ER-2007-0002

AFFIDAVIT OF MICHAEL E. TAYLOR

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Michael E. Taylor, of lawful age, on his oath states: that he has participated in the preparation of the following Direct Testimony in question and answer form, consisting of 9 pages of Direct Testimony to be presented in the above case, that the answers in the following Direct Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true to the best of his knowledge and belief.

Michael E. Taylor

Subscribed and sworn to before me this 13th day of December, 2006.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

SUSAN L SUNDERMEYER
My Commission Expires
September 21, 2010
Callaway County
Commission #06942086

Notary Public

My commission expires 9-21-10

TABLE OF CONTENTS

DIRECT TESTIMONY

OF

MICHAEL E. TAYLOR

UNION ELECTRIC COMPANY d/b/a AMERENUE

CASE NO. ER-2007-0002

DIRECT TESTIMONY

OF

MICHAEL E. TAYLOR

UNION ELECTRIC COMPANY d/b/a AMERENUE

CASE NO. ER-2007-0002

Q. Please state your name and business address.

A. Michael E. Taylor, P.O. Box 360, Jefferson City, Missouri, 65102.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Public Service Commission (Commission) as a Utility Engineering Specialist III in the Energy Department of the Utility Operations Division.

Q. Please describe your educational and work background.

A. I graduated from the University of Missouri-Rolla with a Bachelor of Science degree in Mechanical Engineering in May 1972 and a Master of Science degree in Engineering Management in August 1987. I served as an officer in the United States Navy (Submarine Service) from June 1972 to January 1979. I was employed by Union Electric Company (AmerenUE) from February 1979 until January 2003. While at AmerenUE, I worked at Callaway Plant in various departments including operations, work control, engineering, and quality assurance. In addition to these specific department functions; my work experience also included quality control, instrumentation and controls, fire protection, industrial safety, outage scheduling, daily scheduling and work planning. I was licensed as a Senior Reactor Operator from 1983 until 1998. I served as an Emergency Duty Officer/Emergency Coordinator and Recovery Manager in the plant emergency response

organization. During my employment with AmerenUE, I also participated in corporate activities related to other electrical generating and transmission facilities. These activities included task group evaluation of existing generating units and recommendations regarding the company's generation portfolio. In March 2003, I began my employment with the Commission.

Q. Have you filed testimony previously before the Commission?

A. Yes. I filed testimony in Case No. ER-2006-0314, the pending rate increase case of Kansas City Power & Light Company.

Q. Have you been responsible for review of any in-service criteria prior to this case while employed by the Commission?

A. Yes. Please refer to Schedule 1 for a list of the generating units that I have reviewed for in-service criteria.

EXECUTIVE SUMMARY

Q. Please provide an executive summary of your testimony.

A. This testimony details the in-service criteria review for twenty-four (24) AmerenUE generating units. All of the units are available for dispatch by the Midwest Independent Transmission System Operator and have been utilized for greater than one (1) year. The twenty-four (24) units (Venice CTG 3 and CTG 4; Pinckneyville 1, 2, 3, 4, 5, 6, 7, and 8; Audrain 1, 2, 3, 4, 5, 6, 7, and 8; and Goose Creek 1, 2, 3, 4, 5, and 6) have satisfactorily met the in-service criteria developed by Staff and should be considered "fully operational and used for service". In-service evaluations for twelve (12) additional units (Venice CTG 2 and CTG 5; Peno Creek 1, 2, 3, and 4; Kinmundy 1 and 2; and Raccoon Creek 1, 2, 3, and 4) is ongoing. The conclusions for these incomplete evaluations will be

provided in supplemental direct testimony. This supplemental testimony should be filed prior to January 31, 2007.

FACILITY DESCRIPTIONS

Q. Please describe the facility at Venice.

A. The Venice facility is located at the site of the former AmerenUE Venice steam-electric generating plant. The steam-electric plant was built in the 1940s, but has been out of service since 2002. There are five (5) combustion turbine generator (CTG) units at Venice (Venice CTG 1, 2, 3, 4, and 5). Venice CTG 1 was not included in this review since it is an older unit (commissioned in 1967) and has previously been added to rate base. Units 2, 3, 4, and 5 are simple-cycle turbines driving generators. Venice CTG 2 is a Pratt & Whitney FT-8 aeroderivative combustion turbine rated at 48 megawatts (MW). Venice CTG 2 has two engines (fuel oil or natural gas-fired) driving a common generator. It was installed in June 2002. Venice CTG 3 and 4 are Siemens-Westinghouse 501FD natural gas-fired combustion turbines rated at 165 MW each. They were installed in June 2005. Venice CTG 5 is a Siemens-Westinghouse 501D5A natural gas-fired combustion turbine rated at 117 MW. It was installed in November 2005. The Venice CTG units are designed as a peaking facility and are located at Venice, Illinois (south of the McKinley Bridge).

Q. Please describe the facility at Peno Creek.

A. There are four (4) units at Peno Creek. The units are Pratt & Whitney FT-8 aeroderivative combustion turbines rated at 48 MW each. The units have two engines (fuel oil or natural gas-fired) driving a common generator. The units were installed in May 2002. The Peno Creek units and Venice CTG 2 are identical units. The Peno Creek units are designed as a peaking facility and are located near Bowling Green, Missouri.

Q. Please describe the facility at Kinmundy.

A. There are two (2) units at Kinmundy. The units are Siemens-Westinghouse 501D5A combustion turbines rated at 116 MW each. The units are simple-cycle, fuel oil or natural gas-fired turbines driving a generator. The units were installed by AmerenEnergy Generating (non-regulated affiliate) in April and May 2001 and were purchased by AmerenUE in May 2005. The Kinmundy units are designed as a peaking facility and are located near Kinmundy, Illinois.

Q. Please describe the facility at Pinckneyville.

A. There are eight (8) units at Pinckneyville. Units 1, 2, 3, and 4 are General Electric LM6000 aeroderivative combustion turbines rated at 44 MW each. Units 1-4 are simple-cycle, natural gas-fired turbines driving a generator. Units 1-4 were installed by AmerenEnergy Generating in June 2000 and were purchased by AmerenUE in May 2005. Units 5, 6, 7, and 8 are General Electric MS6001B combustion turbines rated at 36 MW each. Units 5-8 are simple-cycle, natural gas-fired turbines driving a generator. Units 5-8 have black-start capability (started by diesel reciprocating engines). The eight (8) units were installed by AmerenEnergy Generating in June and July 2001 and were purchased by AmerenUE in May 2005. The eight (8) Pinckneyville units are designed as a peaking facility and are located near Pinckneyville, Illinois.

Q. Please describe the facility at Audrain.

A. There are eight (8) units at Audrain. The units are General Electric MS7001EA combustion turbines rated at 80 MW each. The units are simple-cycle, natural gas-fired turbines driving a generator. They were purchased by AmerenUE from NRG

Energy in March 2006. The Audrain units are designed as a peaking facility and are located near Vandalia, Missouri.

Q. Please describe the facility at Goose Creek.

A. There are six (6) units at Goose Creek. The units are General Electric MS7001EA combustion turbines rated at 75 MW each. The units are simple-cycle, natural gas-fired turbines driving a generator. They were purchased by AmerenUE from Aquila, Inc. in April 2006. The Goose Creek units are designed as a peaking facility and are located near Monticello, Illinois.

Q. Please describe the facility at Raccoon Creek.

A. There are four (4) units at Raccoon Creek. The units are General Electric MS7001EA combustion turbines rated at 83.5 MW each. The units are simple-cycle, natural gas-fired turbines driving a generator. They were purchased by AmerenUE from Aquila, Inc. in April 2006. The Raccoon Creek units are designed as a peaking facility and are located near Flora, Illinois.

Q. Have you personally visited each of the facilities being considered in this testimony?

A. Yes. I inspected the Peno Creek and Audrain sites on September 14, 2006. I inspected the remainder of the locations on November 13 and 14, 2006.

IN-SERVICE CRITERIA

Q. What are in-service criteria?

A. In-service criteria are a set of operational tests or operational requirements developed by the Staff to determine whether a new unit is "fully operational and used for service."

Q. Where does the phrase "fully operational and used for service" come from?

A. The phrase comes from Section 393.135, RSMo. 2000, a statute that was adopted by Initiative, Proposition No. 1, on November 2, 1976. Section 393.135, RSMo. 2000, provides as follows:

> Any charge made or demanded by an electrical corporation for service, or in connection therewith, which is based on the costs of construction in progress upon any existing or new facility of the electrical corporation, or any other cost associated with owning, operating, maintaining, or financing any property before it is fully operational and used for service, is unjust and unreasonable, and is prohibited. (Emphasis added)

Q. How were the in-service test criteria developed for this case?

A. The Staff develops its criteria, based on its review of the new unit's specifications and discussions with AmerenUE.

Q. Why are in-service criteria important?

A. The criteria provide a defined basis for in-service evaluation. In-service criteria are the basis upon which a unit is determined to be "fully operational and used for service" and is to be given ratemaking treatment. While the criteria include specific requirements, Staff has the ability to utilize alternate data and information to determine if this alternate data and information indicates that the unit meets or exceeds the intent of the criteria and the unit is "fully operational and used for service." The evaluation in this case, ER-2007-0002, is different from some other cases in that these units are not "new" units from a chronological perspective, but have not been evaluated previously in a ratemaking proceeding relative to in-service criteria. These units have significant operating experience.

The in-service criteria applicable to the units addressed in this testimony are attached to this testimony as Schedules 2 and 3.

Q. Are the in-service criteria for all the units the same?

A. No, since there are several different types of generating units being considered, the evaluation criteria have some differences. The MW rating of the units is used to determine which criteria apply. The units being considered in this case, ER-2007-0002, are all designated as peaking units. Base load or intermediate units would also have different in-service criteria. However, there may be some overlap in the defined criteria between base load, intermediate, and peaking units.

Q. What do the established in-service criteria generally include?

A. Certain fundamental tests are included to prove whether the unit can start properly, shut down properly, operate at its full design capacity, operate for a period of time without tripping off line, operate at multiple load points, and operate at its design minimum load point. Other items the Staff considers are whether the unit can meet the contract guarantees, demonstrate any specific design attributes, and whether the full output of the unit can be delivered into the electrical distribution/transmission system. Which means that a unit could meet all design specifications but not be in-service if there isn't transmission capacity available to deliver the output of the unit to the company service area.

Q. What does a utility typically require from the manufacturer before final acceptance of a new unit?

A. Usually there are certain equipment operating parameters or conditions in the contract between the utility and the manufacturer, which the manufacturer guarantees to meet. The utility typically requires the manufacturer to prove the new equipment meets these contract performance guarantees. Examples of such contract performance guarantees would include a full load maximum heat rate (the amount of energy required to generate a kWh of

electricity), an expected level of electrical energy delivered over a specified time interval, and measurement of various emissions (when applicable).

Q. Were any units required to be operated specially to satisfy the Staff's in-service criteria in this proceeding?

A. Yes, specific operation of some units will be required prior to January 1, 2007 to satisfy in-service criteria. Staff has agreed that actual, verifiable, differential costs/benefits for these operational tests may be included in rate base for the respective unit.

Q. Has the Staff evaluated all the generating units utilizing the established in-service criteria?

A. Yes. However, the in-service evaluation is not complete on twelve (12) units. In-service evaluations for Venice CTG 2 and CTG 5; Peno Creek 1, 2, 3, and 4; Kinmundy 1 and 2; and Raccoon Creek 1, 2, 3, and 4 are ongoing. Due to the large number of generating units being considered and varied history of the units, the in-service evaluation has taken considerably longer than anticipated in the rate case schedule. Eight (8) of the units were installed by AmerenUE, ten (10) of the units were installed by an AmerenUE affiliate, and eighteen (18) of the units were installed by other companies (not AmerenUE affiliates). This varied history has resulted in difficulties in recovering all the required records. The conclusions for these ongoing evaluations will be provided in supplemental direct testimony at a later date.

Q. What were the results of the completed evaluations?

A. The results are generally consistent with the in-service criteria established for the specific units. The results of the evaluations are summarized in Schedule 4 through Schedule 8, as listed below:

Schedule 4	Venice CTG 3 and CTG 4
Schedule 5	Pinckneyville Units 1-4
Schedule 6	Pinckneyville Units 5-8
Schedule 7	Audrain Units 1-8
Schedule 8	Goose Creek Units 1-6

Q. Were there any significant deviations during the performance of the evaluations that should be discussed?

A. No.

Q. What is your conclusion regarding in-service criteria for Venice CTG 3 and CTG 4; Pinckneyville 1, 2, 3, 4, 5, 6, 7, and 8; Audrain 1, 2, 3, 4, 5, 6, 7, and 8; and Goose Creek 1, 2, 3, 4, 5, and 6?

A. Based on my review and analysis of the data and inspection of the facilities, the generating units at these facilities have met the required in-service criteria. Therefore, I recommend that Venice CTG 3 and CTG 4; Pinckneyville 1, 2, 3, 4, 5, 6, 7, and 8; Audrain 1, 2, 3, 4, 5, 6, 7, and 8; and Goose Creek 1, 2, 3, 4, 5, and 6 be considered fully operational and used for service. However, at this time, there is not sufficient data available for me to recommend Venice CTG 2 and 5; Peno Creek 1, 2, 3, and 4; Kinmundy 1 and 2; and Raccoon Creek 1, 2, 3, and 4 be considered fully operational and used for service. I will be filing supplemental direct testimony respecting these units.

Q. Does this conclude your direct testimony at this time?

A. Yes, it does.

Generating Plants Reviewed for In-Service Criteria

Kansas City Power & Light Company

Unit	Type	MW Rating	Fuel
Hawthorn 5	Steam	590	Coal/Natural Gas
Hawthorn 6/9	Combined Cycle	269	Natural Gas
Hawthorn 7 & 8	Combustion turbine	72 (each)	Natural Gas
Osawatomie 1	Combustion turbine	72	Natural Gas
West Gardner 1-4	Combustion turbine	72 (each)	Natural Gas
Spearville	67 wind turbines	1.5 (each)	Wind

Combustion Turbine Unit In-Service Test Criteria (Nameplate Capacity of < 95 MW)

1. All major construction work is complete.

2. All preoperational tests have been successfully completed.

3. Unit successfully meets all contract operational guarantees.

4. Unit successfully demonstrates its ability to initiate the proper start sequence resulting in the unit operating from zero (0) rpm (or turning gear) to base load when prompted at a location (or locations) from which it is normally operated.

5. If unit has fast start capability, the unit demonstrates its ability to meet the fast start capability.

6. Unit successfully demonstrates its ability to initiate the proper shutdown sequence from base load resulting in zero (0) rpm (or turning gear) when prompted at a location (or locations) from which it is normally operated.

7. Unit successfully demonstrates its ability to operate at minimum load for one (1) hour.

8. Unit successfully demonstrates its ability to operate at or above 98% of peak load for one (1) hour.

9. Unit successfully demonstrates its ability to operate at or above 98% of base load for four (4) hours.

10. Sufficient transmission interconnection facilities shall exist for the total plant design net electrical capacity at the time the unit is declared fully operational and used for service.

11. Sufficient transmission facilities shall exist for the total plant design net electrical capacity from the generating station into the utility service territory at the time the unit is declared fully operational and used for service.

12. If unit has dual fuel capability, the unit will successfully demonstrate the ability to start on the back-up/secondary fuel as described in Item 4.

13. If unit has dual fuel capability, the unit will demonstrate the ability to transfer between the two fuels while on line.

14. If unit has dual turbines, the unit will demonstrate the ability to operate in single-turbine mode and transfer from single-turbine mode to dual-turbine mode (and vice versa) while on line.

Combustion Turbine Unit In-Service Test Criteria (Nameplate Capacity of ≥ 95 MW)

1. All major construction work is complete.

2. All preoperational tests have been successfully completed.

3. Unit successfully meets all contract operational guarantees.

4. Unit successfully demonstrates its ability to initiate the proper start sequence resulting in the unit operating from zero (0) rpm (or turning gear) to full load when prompted at a location (or locations) from which it is normally operated.

5. If unit has fast start capability, the unit demonstrates its ability to meet the fast start capability.

6. Unit successfully demonstrates its ability to initiate the proper shutdown sequence from full load resulting in zero (0) rpm (or turning gear) when prompted at a location (or locations) from which it is normally operated.

7. Unit successfully demonstrates its ability to operate at minimum load for one (1) hour.

8. Unit successfully demonstrates its ability to operate at or above 95% of nominal capacity for four (4) continuous hours.

9. Unit successfully demonstrates its ability to produce an amount of energy (MWhr) within a 72 hour period that results in a capacity factor of at least 50% during the period when calculated by the formula: capacity factor = (MWhr generated in 72 hours) / (nominal capacity x 72 hours).

10. Sufficient transmission interconnection facilities shall exist for the total plant design net electrical capacity at the time the unit is declared fully operational and used for service

11. Sufficient transmission facilities shall exist for the total plant design net electrical capacity from the generating station into the utility service territory at the time the unit is declared fully operational and used for service.

12. If unit has dual fuel capability, the unit successfully demonstrates its ability to start on the back up/secondary fuel as described in item 4.

13. If unit has dual fuel capability, the unit successfully demonstrates its ability to transfer between the two fuels while on line.

SCHEDULE 4
IS
HIGHLY
CONFIDENTIAL
IN ITS
ENTIRETY

SCHEDULE 5
IS
HIGHLY
CONFIDENTIAL
IN ITS
ENTIRETY

SCHEDULE 6
IS
HIGHLY
CONFIDENTIAL
IN ITS
ENTIRETY

SCHEDULE 7
IS
HIGHLY
CONFIDENTIAL
IN ITS
ENTIRETY

SCHEDULE 8
IS
HIGHLY
CONFIDENTIAL
IN ITS
ENTIRETY