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MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

DIRECT TESTIMONY

OF

MICHAEL E. TAYLOR

KANSAS CITY POWER & LIGHT COMPANY

CASE NO. ER-2006-0314

Jefferson City, Missouri
August 2006

****Denotes Highly Confidential Information****

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BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of the Application of Kansas City Power & Light Company for Approval to Make Certain Changes in its Charges for Electric Service to Begin the Implementation of Its Regulatory Plan	)))))	Case No. ER-2006-0314

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 12 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 7th day of August, 2006.

Dawn L. Hake
DAWN L. HAKE Notary Public
My Commission Expires
March 16, 2009
Cole County
Commission #05407647

NOTARY PUBLIC SEAL OF MISSOURI

My commission expires_____

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OF

MICHAEL E. TAYLOR

KANSAS CITY POWER & LIGHT COMPANY

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DIRECT TESTIMONY

OF

MICHAEL E. TAYLOR

KANSAS CITY POWER & LIGHT COMPANY

CASE NO. ER-2006-0314

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.

EXECUTIVE SUMMARY

Q. Please provide an executive summary of your testimony.

A. This testimony details the in-service criteria review for eleven (11) Kansas City Power & Light Company (KCPL) generating units. Ten (10) of the units are operational and have been utilized for greater than three (3) years. One facility (Spearville Wind Energy Facility) is not operational at this time. The ten (10) operational units (West Gardner Units 1, 2, 3, and 4; Osawatomie Unit 1; and Hawthorn Units 5, 6, 7, 8, and 9) have satisfactorily met the in-service criteria established in Case No. EO-2005-0329 and should be considered "fully operational and used for service". The Spearville Wind Energy Facility (Spearville) will be evaluated at the end of the true-up period (September 30, 2006).

PROJECT DESCRIPTIONS

Q. Please describe the project at West Gardner.

A. There are four (4) units at West Gardner (West Gardner Units 1, 2, 3, and 4). All four (4) units are combustion turbines with a nominal output of 72 MW each. Each unit is a simple-cycle, natural gas-fired turbine driving a generator. The West Gardner units are supplied natural gas by a KCPL-owned transmission pipeline. The West Gardner units are designed as a peaking facility. The units were installed in 2003.

Q. Please describe the project at Osawatomie.

A. There is one (1) unit at Osawatomie. The unit is a combustion turbine similar to the West Gardner units with a nominal output of 72 MW. The unit is a simple-cycle, natural gas-fired turbine driving a generator. The Osawatomie unit is designed as a peaking facility. The unit was installed in 2003. The Osawatomie site is designed for seven additional units similar to Unit 1. The West Gardner units and the Osawatomie unit are jointly referred to as the Paola Project in some KCPL records.

Q. Please describe the project designated as Hawthorn 6.

A. Hawthorn 6 was installed as a simple-cycle combustion turbine with a nominal output of 132 MW. As installed, the unit could be fired with natural gas or fuel oil. Subsequent to startup testing, the oil-fired option was eliminated. The unit was installed in 1997.

Q. Please describe the project designated as Hawthorn 9.

A. Hawthorn 9 is comprised of a heat recovery steam generator (HRSG) and a re-powered steam turbine (formerly designated as Hawthorn 4). Steam is produced in the HRSG by utilizing the high temperature exhaust gas from Hawthorn 6. Using the waste heat from Unit 6 exhaust provides a nominal rating of 55 MW for Unit 9. The capability also exists for supplemental duct firing (duct burners) with natural gas. Utilizing the waste heat from Unit 6 exhaust and the duct firing provides a nominal rating of 137 MW for Unit 9. Hawthorn Unit 9 was installed in 2000.

Q. Please describe the project designated as Hawthorn 7 and 8.

A. Hawthorn 7 and 8 are two (2) combustion turbines with a nominal output of 72 MW each. Each unit is a simple-cycle, natural gas-fired turbine driving a generator. The Hawthorn 7 and 8 units are designed as a peaking facility. The units were installed in 2000.

Q. Please describe the project designated as Hawthorn 5.

A. Hawthorn 5 was initially operational in 1969 with a nominal capacity rating of 476 MW. Hawthorn 5 is a steam plant using coal as the predominate fuel. In 1999, a boiler explosion caused significant damage to the unit. The Hawthorn 5 rebuild was completed in June 2001. Following the rebuild, the nominal capacity of the unit is 590 MW (gross). In addition to the rebuild of the unit itself, emission control equipment was installed. This equipment includes a selective catalytic reduction system (SCR) for nitrous oxides removal, spray dry absorbers (SDA) for sulfur dioxide removal, and fabric filter dust collectors (baghouse) for particulate removal. Prior to the rebuild, Hawthorn 5 emissions control equipment consisted of an electrostatic precipitator for particulate removal.

Q. Please describe the project designated as the Spearville Wind Energy Facility.

A. Spearville is currently under construction. It is designed to include sixty-seven (67) wind turbines for a nominal electrical capacity of 100.5 MW. At this time, Spearville has not been completed. The facility status will be reviewed at the end of the true-up period (September 30, 2006) for this case.

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

A. Yes.

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 criteria were developed and approved in the KCPL Experimental Regulatory Plan (Case No. EO-2005-0329).

Q. Why are in-service criteria important?

A. The criteria established in Case No. EO-2005-0329 provides an accepted 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. The evaluation in this case is different from some other cases in that these units are not “new” units from a chronological perspective (except Spearville), but have not been evaluated in a ratemaking proceeding relative to in-service criteria. The newest unit, other than Spearville, from a chronological perspective is Osawatomie Unit 1 and it was installed in 2003. These units have significant operating experience.

Appendix H from the Stipulation and Agreement in EO-2005-0329 contains the in-service criteria and is attached to this testimony as Schedule 1.

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.

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.

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. Who manufactured the new combustion turbines?

A. Hawthorn Unit 6 was acquired from Siemens and all other units were acquired from General Electric.

Q. Were there performance guarantees in the contracts?

A. Yes.

Q. Who manufactured the HRSG associated with Hawthorn 9?

A. The HRSG was manufactured by Nooter/Eriksen.

Q. Were there performance guarantees in the contract?

A. Yes.

Q. Who manufactured the boiler and emission control equipment associated with the rebuild of Hawthorn 5?

A. The boiler and emission control equipment were manufactured by Babcock & Wilcox.

Q. Were there performance guarantees in the contract?

A. Yes.

Q. Did all of the contractors meet the performance guarantees for the equipment listed above?

A. The contractors met all of the performance guarantees for all of the projects except for the Hawthorn 9 project. I will discuss this project in greater detail later in my testimony.

Q. Who manufactured the major equipment associated with the Spearville Wind Energy Facility?

A. The wind turbines were manufactured by General Electric.

Q. Are there performance guarantees in the contract?

A. Yes.

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

A. With the exception of Spearville, the Staff has completed the in-service evaluation for all units.

Q. What were the results of those 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 2 through Schedule 10, as listed below:

Schedule 2	West Gardner Unit 1
Schedule 3	West Gardner Unit 2
Schedule 4	West Gardner Unit 3
Schedule 5	West Gardner Unit 4
Schedule 6	Osawatomie Unit 1
Schedule 7	Hawthorn Units 6 and 9
Schedule 8	Hawthorn Unit 7
Schedule 9	Hawthorn Unit 8
Schedule 10	Hawthorn Unit 5

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

A. Yes. Two specific items were recognized as not specifically satisfying the criteria as written, but further evaluation determined that the intent of the criteria was satisfied.

Q. Please explain the first item.

A. For the combustion turbine generators (Hawthorn Units 7 and 8; Osawatomie Unit 1; and West Gardner Units 1, 2, 3, and 4), in-service criteria item 4 required verification

of the fast start capability (if the unit was equipped with that capability). These units are all equipped with the fast start capability. However, that capability had not been demonstrated for the units.

Q. What is fast start capability?

A. Fast start capability is a modification of the automated start sequence which shortens the duration of some startup events. These startup events are a programmed series of mechanical, electrical, and control system actuations that take the unit from a standing start to an operating configuration. The fast start allows the unit to start, attain normal operating speed, and load in a shorter elapsed time.

Q. How was this item resolved?

A. Since the fast start capability had not been demonstrated, the Staff investigated the deviation. KCPL employees stated that KCPL does not intend to utilize the fast start capability. Use of the fast start capability results in shortened maintenance intervals; therefore it is not a preferred mode of operation. Additionally, there was no cost to KCPL associated with the installation of the fast start capability. The capability is included as a standard feature on the digital control system for the combustion turbine. Since (1) the capability was included as part of the standard software control package, (2) the utility does not intend to utilize the capability, and (3) the capability was not purchased as an optional (extra cost) item, the lack of capability demonstration does not affect the rate base aspects of the in-service criteria.

Q. Please explain the second item.

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Q. Please explain these failures.

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Q. How did these failures affect the HRSG/steam turbine performance?

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Q. What is your conclusion regarding in-service criteria for West Gardner Units 1, 2, 3, and 4; Osawatomie Unit 1; and Hawthorn Units 5, 6, 7, 8, and 9?

A. Based on my review and analysis of the data and inspection of the facilities, West Gardner Units 1, 2, 3, and 4; Osawatomie Unit 1; and Hawthorn Units 5, 6, 7, 8, and 9 have met all of the required in-service criteria. Therefore, I recommend that West Gardner Units 1, 2, 3, and 4; Osawatomie Unit 1; and Hawthorn Units 5, 6, 7, 8, and 9 be considered fully operational and used for service.

Q. Does this conclude your direct testimony?

A. Yes, it does.

In-Service Test Criteria

Coal Plant In-Service Test Criteria

1. Unit must demonstrate that it can operate at its design minimum load or above.

   Hours at or above design minimum load / 400 hours >= 0.80

2. Unit must be ale to operate at or above its design capacity factor for a reasonable period of time. If the design capacity factor is not specified it will be assumed to be 0.60 unless the utility can offer evidence justifying a lower value.

   Design capacity factor <= energy generated for a continuous period of 168 hours / (design full load X 168 hours)

3. Unit must operate at an average capacity equal to 98% of its design maximum continuous rating for four (4) hours.

4. Unit must be operated so as to show a clear and obvious trend toward the predominate use of coal as it primary fuel. Test period will be thirty (30) days. The following items will be used as an indication of the trend for coal operation.

   a) Boiler control tuning completed such that the unit can operate safely with all controls systems in auto.

   b) Ash build up in the furnace and backpass areas shall be monitored and be within expected levels.

   c) All boiler/turbine interlocks shall be proven to work as designed.

   d) Sootblowing timing and sequences shall be set properly to clean the tube areas.

   e) All critical alarms brought into the control room shall be operational and functioning properly.

f) At the end of the test period, oil burn levels, if applicable, will be at or near design levels while burning coal.

g) Oil ignitors are functioning in accordance with specifications.

5. Unit must have successfully completed all major equipment startup test procedures.
6. Sufficient transmission interconnection facilities shall exist for the total plant design net electrical capacity at the time the newest unit is declared fully operational and used for service.
7. Sufficient transmission facilities shall exist for KCPL's share of the total plant design net electrical capacity from the generating station into the KCPL service territory at the time the newest unit is declared fully operational and used for service.
8. Equipment installed to comply with emission requirements shall be operational and demonstrate the ability to remove 93% or more of the NOX, SO_2, particulate, and mercury emissions they were installed to remove over a continuous four (4) hour period while operating at or above 95% of its design load. This equipment shall also be required to demonstrate that it is able to remove 88% or more of these same emissions it was installed to remove over a continuous 120 hour period while operating at or above 80% of its design load.

Note: Items 4.f and 4.g above reference oil burn levels and oil ignitors. It is understood that oil is not utilized as a supplemental fuel or an ignition fuel at Hawthorn 5. To verify the intent of Items 4.f and 4.g, natural gas consumption records and documentation of the use of natural gas for ignition should be reviewed.

Wind Turbine In-Service Test Criteria

1. All major construction for each of the units to be considered for inclusion in rate base shall be completed.
2. All preoperational tests for each of the units to be considered for inclusion in rate base shall be completed.
3. Unit has operated at several different wind speeds and delivered power output near or in excess of anticipated output based on guaranteed power curve while vibrations are within design limits. The analysis necessary to meet this requirement will involve: 1) taking the guaranteed power curve for each of the unit types and dividing the range of design wind speeds into three (3) equal ranges of wind speeds, 2) reviewing wind speed data vs. power output for each of the units being evaluated, 3) confirming that each of the units being evaluated had a power output of 95% or more of guaranteed output for the wind speed observed in at least two (2) of the three (3) wind speed ranges noted above with at least one point at or above the 50% design wind speed, and 4) confirming that each of the units being evaluated did not exhibit any unusual vibration outside of design specification requirements.
4. The operational testing required in item 3 above shall be conducted on the first five (5) units constructed and if all five (5) operate in an acceptable manner as described in item 3 above, testing will only be required on every other unit built thereafter at each particular wind generation site utilizing these exact unit types. If any of the units tested during the period where every other unit is being tested fails to operate in an acceptable manner as described in item 3 above, the next five (5) units installed

will be required to be tested and operated in an acceptable manner as described in item 3 above before testing can resume on an every other unit basis again.

5. Unit rotor lock or brake has been checked and confirmed to be installed correctly for each of the units considered for inclusion in rate base.
6. Sufficient transmission interconnection facilities shall exist to carry the total net electrical capacity from the completed number of generating units into the distribution/transmission system.
7. Only units that have been constructed and are operating in an acceptable manner as described in item 3 above shall be considered for inclusion in rate base. Units under construction or that have been constructed but have not met these in-service criteria will not be considered for inclusion in rate base, until such time units have met in-service criteria.

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

1. All major construction is completed.
2. All pre-operational tests have been successfully completed.
3. Unit will successfully demonstrate 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 will normally be operated.
4. If unit has fast start capability, unit will demonstrate the ability to meet fast start criteria.

5. Unit will successfully demonstrate the 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 will be normally operated.
6. Unit will successfully demonstrate the ability to operate at minimum load for one (1) hour.
7. Unit will successfully demonstrate the ability to operate at or above 98% of peak load for one (1) hour, after adjusting for ambient conditions.
8. Unit will successfully demonstrate its ability to operate at or above 98% of base load for four (4) hours, after adjusting for ambient conditions.
9. Unit will successfully meet all operational guarantees.
10. Sufficient transmission interconnection facilities shall exist for the total plant design net electrical capacity at the time the newest unit is declared fully operational and used for service.
11. Sufficient transmission facilities shall exist for KCPL's share of the total plant design net electrical capacity from the generating station into KCPL service territory at the time the newest unit is declared fully operational and used for service.

Combined Cycle Unit In-Service Test Criteria

1. Major construction work and pre-operational tests have been successfully completed such that the combined cycle unit may be operated and successfully complete criteria items 2 through 7.

2. All contract performance guarantee testing will be successfully performed in accordance with the contracts for the combustion turbine, the steam turbine, and the heat recovery steam generators.
3. The combined cycle unit will demonstrate its ability to startup from turning gear operation to nominal capacity on natural gas fuel when prompted by the operator.
4. The combined cycle unit will demonstrate its ability to shut down from minimum load resulting in turning gear operation when prompted by the operator.
5. The combined cycle unit will demonstrate its ability to operate at minimum load for one (1) hour on natural gas fuel.
6. The combined cycle unit will demonstrate its ability to operate at or above 95% of nominal capacity for four (4) continuous hours on natural gas fuel, after adjusting for ambient conditions. During this test the unit will demonstrate its ability to operate at or above 98% of its nominal capacity for one (1) hour, after adjusting for ambient conditions.
7. The combine cycle unit must be able to operate at or above its design capacity factor for a reasonable period of time. If the design capacity factor is not specified it will be assumed to be 0.60 unless the utility can offer evidence justifying a lower value.

   Design capacity factor <= energy generated for a continuous period of 168 hours / (design full load X 168 hours)
8. Sufficient transmission facilities shall exist to carry the total design net electrical capacity of the combined cycle unit to KCPL's distribution/transmission system.
9. Combustion turbine unit which is equipped to operate in any of the following modes will demonstrate its ability to operate in the applicable modes before the equipment

costs associated with these operation modes will be considered for inclusion in the rate base.

a) Generator operating as a synchronous condenser at rated speed and turbine operating at turning gear speed.

b) Startup of gas turbine driven by the generator and frequency converter.

c) Shutdown of gas turbine alone without the generator,

In-Service Criteria for Unit Which is Operational

1. Unit must have adequate recent operational history (January 2003 through December 2005). Unit shall be considered for this review if the unit has been operational for at least six (6) months and has at least 500 hours of operation.
2. Staff will review all unit operational data available to determine if a specific in-service test criterion can be met without operating the unit.
3. If data is inadequate, the unit will be run to meet the specific deficient in-service test criterion.

In-Service Test Criteria

KCPL—West Gardner Unit 1

General Electric MS7001EA gas turbine (Serial number 298284) Model PG7121
Brush 8DAX-8365ER air-cooled generator
Simple-cycle, natural gas fuel
72 MW base, 77 MW peak
Dry Low NOx combustion system
Construction begin: Summer 2002
Construction complete: March 2003
KCPL acceptance date: May 2003

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1. All major construction is completed.

   Based on review of the Final Installation and Start-Up Report for West Gardner Unit 1; construction was completed by March 2003 to support start-up testing. Additionally, based on personal observations of the facility on July 11, 2006; all major construction is completed.

2. All pre-operational tests have been successfully completed.

   Based on review of the Final Installation and Start-Up Report for West Gardner Unit 1; pre-operational tests were completed in May 2003.

3. Unit will successfully demonstrate 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 will normally be operated.

   Based on review of computer trend plot data for operation on July 23, 2005; the unit successfully demonstrated a proper start sequence from zero (0) speed to base load when prompted by the operator.

4. If unit has fast start capability, unit will demonstrate the ability to meet fast start criteria.

   The unit has not demonstrated the "Fast Load Start" capability. However, this capability is not an optional item. No additional cost was incurred to obtain this operational capability. Kansas City Power & Light does not utilize this capability. Since, (1) this capability was included as part of the standard software control

package, (2) the utility does not intend to utilize the capability and (3) the capability was not purchased as an optional (extra cost) item; the lack of capability demonstration does not affect the rate base aspects of the in-service criteria.

5. Unit will successfully demonstrate the 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 will be normally operated.

   Based on review of computer trend plot data for operation on July 27, 2003; the unit successfully demonstrated a proper shutdown sequence from base load to zero (0) speed when prompted by the operator.

6. Unit will successfully demonstrate the ability to operate at minimum load for one (1) hour.

   Based on review of computer trend plot data for operation on July 22-23, 2005; the unit operated successfully at minimum load for greater than one (1) hour.

7. Unit will successfully demonstrate the ability to operate at or above 98% of peak load for one (1) hour, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on May 13, 2003; the unit operated successfully at or above 98% of peak load for greater than one (1) hour.

8. Unit will successfully demonstrate its ability to operate at or above 98% base load for four (4) continuous hours, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on July 22-23, 2005; the unit operated successfully at or above 98% of base load for greater than four (4) hours.

9. Unit will successfully meet all operational guarantees.

   Based on review of West Gardner Performance Test Report for West Gardner Unit 1; performance tests were completed in May 2003. The unit met operational contract guarantees for electrical output and heat rate when operated under base load and peak load conditions.

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

    Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the West Gardner units to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

    a. *The West Gardner units at full rated capacity and all lines in service.*
    b. *The West Gardner units at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

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

    See Item 10, listed above.

In-Service Test Criteria

KCPL—West Gardner Unit 2

General Electric MS7001EA gas turbine (Serial number 298285) Model PG7121
Brush 8DAX-8365ER air-cooled generator
Simple-cycle, natural gas fuel
72 MW base, 77 MW peak
Dry Low NOx combustion system
Construction begin: Summer 2002
Construction complete: April 2003
KCPL acceptance date: May 2003

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1. All major construction is completed.

   Based on review of the Final Installation and Start-Up Report for West Gardner Unit 2; construction was completed by April 2003 to support start-up testing. Additionally, based on personal observations of the facility on July 11, 2006; all major construction is completed.

2. All pre-operational tests have been successfully completed.

   Based on review of the Final Installation and Start-Up Report for West Gardner Unit 2; pre-operational tests were completed in May 2003.

3. Unit will successfully demonstrate 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 will normally be operated.

   Based on review of computer trend plot data for operation on August 17, 2003; the unit successfully demonstrated a proper start sequence from zero (0) speed to base load when prompted by the operator.

4. If unit has fast start capability, unit will demonstrate the ability to meet fast start criteria.

   The unit has not demonstrated the "Fast Load Start" capability. However, this capability is not an optional item. No additional cost was incurred to obtain this operational capability. Kansas City Power & Light does not utilize this capability. Since, (1) this capability was included as part of the standard software control

package, (2) the utility does not intend to utilize the capability and (3) the capability was not purchased as an optional (extra cost) item; the lack of capability demonstration does not affect the rate base aspects of the in-service criteria.

5. Unit will successfully demonstrate the 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 will be normally operated.

   Based on review of computer trend plot data for operation on August 17, 2003; the unit successfully demonstrated a proper shutdown sequence from base load to zero (0) speed when prompted by the operator.

6. Unit will successfully demonstrate the ability to operate at minimum load for one (1) hour.

   Based on review of computer trend plot data for operation on July 24, 2005; the unit operated successfully at minimum load for greater than one (1) hour.

7. Unit will successfully demonstrate the ability to operate at or above 98% of peak load for one (1) hour, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on May 15, 2003; the unit operated successfully at or above 98% of peak load for greater than one (1) hour.

8. Unit will successfully demonstrate its ability to operate at or above 98% base load for four (4) continuous hours, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on May 15, 2003; the unit operated successfully at or above 98% of base load for greater than four (4) hours.

9. Unit will successfully meet all operational guarantees.

   Based on review of West Gardner Performance Test Report for West Gardner Unit 2; performance tests were completed in May 2003. The unit met operational contract guarantees for electrical output and heat rate when operated under base load and peak load conditions.

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

Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the West Gardner units to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

a. *The West Gardner units at full rated capacity and all lines in service.*
b. *The West Gardner units at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

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

    See Item 10, listed above.

In-Service Test Criteria

KCPL—West Gardner Unit 3

General Electric MS7001EA gas turbine (Serial number 298286) Model PG7121
Brush 8DAX-8365ER air-cooled generator
Simple-cycle, natural gas fuel
72 MW base, 77 MW peak
Dry Low NOx combustion system
Construction begin: Summer 2002
Construction complete: April 2003
KCPL acceptance date: May 2003

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1. All major construction is completed.

   Based on review of the Final Installation and Start-Up Report for West Gardner Unit 3; construction was completed by April 2003 to support start-up testing. Additionally, based on personal observations of the facility on July 11, 2006; all major construction is completed.

2. All pre-operational tests have been successfully completed.

   Based on review of the Final Installation and Start-Up Report for West Gardner Unit 3; pre-operational tests were completed in May 2003.

3. Unit will successfully demonstrate 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 will normally be operated.

   Based on review of computer trend plot data for operation on May 19, 2003; the unit successfully demonstrated a proper start sequence from zero (0) speed to base load when prompted by the operator.

4. If unit has fast start capability, unit will demonstrate the ability to meet fast start criteria.

   The unit has not demonstrated the "Fast Load Start" capability. However, this capability is not an optional item. No additional cost was incurred to obtain this operational capability. Kansas City Power & Light does not utilize this capability. Since, (1) this capability was included as part of the standard software control

package, (2) the utility does not intend to utilize the capability and (3) the capability was not purchased as an optional (extra cost) item; the lack of capability demonstration does not affect the rate base aspects of the in-service criteria.

5. Unit will successfully demonstrate the 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 will be normally operated.

   Based on review of computer trend plot data for operation on August 4, 2005; the unit successfully demonstrated a proper shutdown sequence from base load to zero (0) speed when prompted by the operator.

6. Unit will successfully demonstrate the ability to operate at minimum load for one (1) hour.

   Based on review of computer trend plot data for operation on July 25, 2003; the unit operated successfully at minimum load for greater than one (1) hour.

7. Unit will successfully demonstrate the ability to operate at or above 98% of peak load for one (1) hour, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on May 19, 2003; the unit operated successfully at or above 98% of peak load for greater than one (1) hour.

8. Unit will successfully demonstrate its ability to operate at or above 98% base load for four (4) continuous hours, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on August 4-5, 2005; the unit operated successfully at or above 98% of base load for greater than four (4) hours.

9. Unit will successfully meet all operational guarantees.

   Based on review of West Gardner Performance Test Report for West Gardner Unit 3; performance tests were completed in May 2003. The unit met operational contract guarantees for electrical output and heat rate when operated under base load and peak load conditions.

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

    Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the West Gardner units to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

    a. *The West Gardner units at full rated capacity and all lines in service.*
    b. *The West Gardner units at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

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

    See Item 10, listed above.

In-Service Test Criteria

KCPL—West Gardner Unit 4

General Electric MS7001EA gas turbine (Serial number 298287) Model PG7121
Brush 8DAX-8365ER air-cooled generator
Simple-cycle, natural gas fuel
72 MW base, 77 MW peak
Dry Low NOx combustion system
Construction begin: Summer 2002
Construction complete: April 2003
KCPL acceptance date: May 2003

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1. All major construction is completed.

   Based on review of the Final Installation and Start-Up Report for West Gardner Unit 4; construction was completed by April 2003 to support start-up testing. Additionally, based on personal observations of the facility on July 11, 2006; all major construction is completed.

2. All pre-operational tests have been successfully completed.

   Based on review of the Final Installation and Start-Up Report for West Gardner Unit 4; pre-operational tests were completed in May 2003.

3. Unit will successfully demonstrate 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 will normally be operated.

   Based on review of computer trend plot data for operation on August 8, 2005; the unit successfully demonstrated a proper start sequence from zero (0) speed to base load when prompted by the operator.

4. If unit has fast start capability, unit will demonstrate the ability to meet fast start criteria.

   The unit has not demonstrated the "Fast Load Start" capability. However, this capability is not an optional item. No additional cost was incurred to obtain this operational capability. Kansas City Power & Light does not utilize this capability. Since, (1) this capability was included as part of the standard software control

package, (2) the utility does not intend to utilize the capability and (3) the capability was not purchased as an optional (extra cost) item; the lack of capability demonstration does not affect the rate base aspects of the in-service criteria.

5. Unit will successfully demonstrate the 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 will be normally operated.

   Based on review of computer trend plot data for operation on August 8, 2005; the unit successfully demonstrated a proper shutdown sequence from base load to zero (0) speed when prompted by the operator.

6. Unit will successfully demonstrate the ability to operate at minimum load for one (1) hour.

   Based on review of computer trend plot data for operation on April 17-18, 2006; the unit operated successfully at minimum load for greater than one (1) hour.

7. Unit will successfully demonstrate the ability to operate at or above 98% of peak load for one (1) hour, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on May 21, 2003; the unit operated successfully at or above 98% of peak load for greater than one (1) hour.

8. Unit will successfully demonstrate its ability to operate at or above 98% base load for four (4) continuous hours, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on May 21, 2003; the unit operated successfully at or above 98% of base load for greater than four (4) hours.

9. Unit will successfully meet all operational guarantees.

   Based on review of West Gardner Performance Test Report for West Gardner Unit 4; performance tests were completed in May 2003. The unit met operational contract guarantees for electrical output and heat rate when operated under base load and peak load conditions.

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

Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the West Gardner units to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

a. *The West Gardner units at full rated capacity and all lines in service.*
b. *The West Gardner units at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

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

    See Item 10, listed above.

In-Service Test Criteria

KCPL—Osawatomie Unit 1

General Electric MS7001EA gas turbine (Serial number 298283) Model PG7121
Brush 8DAX-8365ER air-cooled generator
Simple-cycle, natural gas fuel
72 MW base, 77 MW peak
Dry Low NOx combustion system
Construction begin: Winter 2002
Construction complete: June 2003
KCPL acceptance date: June 2003

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1. All major construction is completed.

   Based on review of the Final Installation and Start-Up Report for Osawatomie Unit 1; construction was completed by June 2003 to support start-up testing. Additionally, based on personal observations of the facility on July 11, 2006; all major construction is completed.

2. All pre-operational tests have been successfully completed.

   Based on review of the Final Installation and Start-Up Report for Osawatomie Unit 1; pre-operational tests were completed in June 2003.

3. Unit will successfully demonstrate 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 will normally be operated.

   Based on review of computer trend plot data for operation on June 16, 2003; the unit successfully demonstrated a proper start sequence from zero (0) speed to base load when prompted by the operator.

4. If unit has fast start capability, unit will demonstrate the ability to meet fast start criteria.

   The unit has not demonstrated the "Fast Load Start" capability. However, this capability is not an optional item. No additional cost was incurred to obtain this operational capability. Kansas City Power & Light does not utilize this capability. Since, (1) this capability was included as part of the standard software control

package, (2) the utility does not intend to utilize the capability and (3) the capability was not purchased as an optional (extra cost) item; the lack of capability demonstration does not affect the rate base aspects of the in-service criteria.

5. Unit will successfully demonstrate the 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 will be normally operated.

   Based on review of computer trend plot data for operation on June 27, 2005; the unit successfully demonstrated a proper shutdown sequence from base load to zero (0) speed when prompted by the operator.

6. Unit will successfully demonstrate the ability to operate at minimum load for one (1) hour.

   Based on review of computer trend plot data for operation on August 27, 2004; the unit operated successfully at minimum load for greater than one (1) hour.

7. Unit will successfully demonstrate the ability to operate at or above 98% of peak load for one (1) hour, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on June 16, 2003; the unit operated successfully at or above 98% of peak load for greater than one (1) hour.

8. Unit will successfully demonstrate its ability to operate at or above 98% base load for four (4) continuous hours, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on June 27, 2005; the unit operated successfully at or above 98% of base load for greater than four (4) hours.

9. Unit will successfully meet all operational guarantees.

   Based on review of Osawatomie Performance Test Report for Osawatomie Unit 1; performance tests were completed in June 2003. The unit met operational contract guarantees for electrical output and heat rate when operated under base load and peak load conditions.

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

Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the Osawatomie unit to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

a. *The Osawatomie unit at full rated capacity and all lines in service.*
b. *The Osawatomie unit at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

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

    See Item 10, listed above.

In-Service Test Criteria

KCPL--Hawthorn Unit 6/9

Unit 6
Siemens V84.3A1 turbine
Siemens TLRI 108/36-36 air-cooled generator
Simple cycle/Combined cycle, natural gas fuel
132 MW—Simple cycle or Combined cycle
60 MVAR synchronous condenser (@17 kV overexcited output)
Construction complete: May 1997
KCPL acceptance date: July 1999

Unit 9
Nooter/Eriksen heat recovery steam generator (HRSG) and Westinghouse steam turbine generator (repowered)
Steam turbine generator formerly identified as Hawthorn Unit 4
Supplemental natural gas duct firing
55 MW without supplemental duct firing
137 MW with supplemental duct firing
HRSG—Selective Catalytic Reduction Device (NO_x emission control)
Construction begin date (HRSG): September 1999
Commercial acceptance date: July 2000
Performance testing: HRSG—October 2000; Turbine/Generator—October 2000

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1. Major construction work and pre-operational tests have been successfully completed such that the combined cycle unit may be operated and successfully complete criteria items 2 through 7.

   Major construction work and pre-operational tests were completed on Unit 6 by June 1999 to support performance testing. Initial construction was complete in 1997, but due to problems that developed, final simple-cycle performance testing did not occur until June 1999.

   Major construction work and pre-operational tests were completed on the heat recovery steam generator and Unit 9 steam turbine to support performance testing in October 2000.

   Additionally, based on personal observations of the facility on June 15, 2006; all major construction is completed.

2. All contract performance guarantee testing will be successfully performed in accordance with the contracts for the combustion turbine, the steam turbine, and the heat recovery steam generator.

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3. The combined cycle unit will demonstrate its ability to startup from turning gear operation to nominal capacity on natural gas fuel when prompted by the operator.

Based on review of computer tabular data and computer trend plot data, the unit (Units 6 & 9) started up from turning gear operation to nominal capacity on September 6, 2005.

4. The combined cycle unit will demonstrate its ability to shut down from minimum load resulting in turning gear operation when prompted by the operator.

   Based on review of computer tabular data and computer trend plot data, the unit (Units 6 & 9) shut down from minimum load to turning gear operation on September 5, 2005.

5. The combined cycle unit will demonstrate its ability to operate at minimum load for one (1) hour on natural gas fuel.

   Based on review of tabular computer data, the combined cycle unit (Units 6 & 9) operated at minimum load for 1 hour from 10:00 until 11:00 on September 1, 2005.

6. The combined cycle unit will demonstrate its ability to operate at or above 95% of nominal capacity for four (4) continuous hours on natural gas fuel, after adjusting for ambient conditions. During this test the unit will demonstrate its ability to operate at or above 98% of its nominal capacity for one (1) hour, after adjusting for ambient conditions.

   Based on review of tabular computer data, the combined cycle unit (Units 6 & 9) achieved greater than 95% nominal capacity for 4 hours and greater than 98% nominal for 1 hour (operating on natural gas fuel) for the data points logged as 17:00 to 20:00 on September 13, 2005. For a 4 hour period at 95% capacity factor, the unit would generate 1022.2 Megawatt-Hours. For the 4 hour period evaluated, the unit generated 1060.94 Megawatt-Hours. For a 1 hour period at 98% capacity factor, the unit would generate 263.62 Megawatt-Hours. For the 1 hour period evaluated, the unit generated 267.875 Megawatt-Hours.

7. The combined cycle unit must be able to operate at or above its design capacity factor for a reasonable period of time. If the design capacity factor is not specified it will be assumed to be 0.60 unless the utility can offer evidence justifying a lower value. Design capacity factor <= energy generated for a continuous period of 168 hours / (design full load X 168 hours)

   Based on review of tabular computer data, the combined cycle unit (Units 6 & 9) achieved greater than 60% nominal capacity for 168 hours for the data points logged as 00:00, 9/7/05 to 23:00, 9/13/05. For 168 hours operation at 60% capacity factor, the unit would generate 27,115.2 Megawatt-Hours. During the 168 hour period evaluated, the unit generated 31,900.84 Megawatt-Hours.

8. Sufficient transmission facilities shall exist to carry the total design net electrical capacity of the combined cycle unit to KCPL's distribution/transmission system.

   Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the combined cycle unit to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

   1) *All Hawthorn generating units at full rated capacity and all lines in service.*
   2) *All Hawthorn generating units at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

9. Combustion turbine which is equipped to operate in any of the following modes will demonstrate its ability to operate in the applicable modes before the equipment costs associated with these operation modes will be considered for inclusion in rate base.

   a) Generator operating as a synchronous condenser at rated speed and turbine operating at turning gear speed.

   Based on review of computer displays (printed copies) and test records, the unit operated as a synchronous condenser on several occasions during the month of November 1999.

   b) Startup of gas turbine driven by the generator and frequency converter.

   Based on information provided by utility employees, startup of the gas turbine driven by the generator and frequency converter is the normal starting procedure for the unit. Startup capability was verified in Item 3 above.

   c) Shutdown of gas turbine alone without the generator.

   Based on review of computer displays (printed copies) and test records, the unit operated as a synchronous condenser on several occasions during the month of November 1999. During some of these occasions, the turbine was shutdown from load operation without shutting down the generator (generator was shifted to synchronous condenser operation and remained in operation).

In-Service Test Criteria

KCPL--Hawthorn Unit 7

General Electric MS7001EA gas turbine (Serial number 297369) Model PG7121
General Electric 7A7 air-cooled generator
Simple-cycle, natural gas fuel
72 MW base, 77 MW peak
Dry Low NOx combustion system
Construction begin: Fall 1999
Construction complete: May 2000
KCPL acceptance date: May 2000

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1. All major construction is completed.

   Based on review of the Final Installation and Start-Up Report for Hawthorn Station Unit 7; construction was completed by May 2000 to support start-up testing. Additionally, based on personal observations of the facility on June 15, 2006; all major construction is completed.

2. All pre-operational tests have been successfully completed.

   Based on review of the Final Installation and Start-Up Report for Hawthorn Station Unit 7; pre-operational tests were completed in May 2000.

3. Unit will successfully demonstrate 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 will normally be operated.

   Based on review of computer sequence of events data for operation on June 10, 2006; the unit successfully demonstrated a proper start sequence from zero (0) speed to base load when prompted by the operator.

4. If unit has fast start capability, unit will demonstrate the ability to meet fast start criteria.

   The unit has not demonstrated the "Fast Load Start" capability. However, this capability is not an optional item. No additional cost was incurred to obtain this operational capability. Kansas City Power & Light does not utilize this capability. Since, (1) this capability was included as part of the standard software control

package, (2) the utility does not intend to utilize the capability and (3) the capability was not purchased as an optional (extra cost) item; the lack of capability demonstration does not affect the rate base aspects of the in-service criteria.

5. Unit will successfully demonstrate the 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 will be normally operated.

   Based on review of computer sequence of events data for operation on June 10, 2006; the unit successfully demonstrated a proper shutdown sequence from base load to zero (0) speed when prompted by the operator.

6. Unit will successfully demonstrate the ability to operate at minimum load for one (1) hour.

   Based on review of computer trend plot data for operation on April 8, 2003; the unit operated successfully at minimum load for greater than one (1) hour.

7. Unit will successfully demonstrate the ability to operate at or above 98% of peak load for one (1) hour, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on April 8, 2003; the unit operated successfully at or above 98% of peak load for greater than one (1) hour.

8. Unit will successfully demonstrate its ability to operate at or above 98% base load for four (4) continuous hours, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on July 31, 2002; the unit operated successfully at or above 98% of base load for greater than four (4) hours.

9. Unit will successfully meet all operational guarantees.

   Based on review of Thermal Performance Test Report for Hawthorn Station Unit 7; performance tests were completed in May 2000. The unit met operational contract guarantees for electrical output and heat rate when operated under base load and peak load conditions.

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

Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the unit to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

a. *All Hawthorn generating units at full rated capacity and all lines in service.*
b. *All Hawthorn generating units at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

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

    See Item 10, listed above.

In-Service Test Criteria

KCPL--Hawthorn Unit 8

General Electric MS7001EA gas turbine (Serial number 297370) Model PG7121
General Electric 7A7 air-cooled generator
Simple-cycle, natural gas fuel
72 MW base, 77 MW peak
Dry Low NOx combustion system
Construction begin: Fall 1999
Construction complete: May 2000
KCPL acceptance date: July 2000

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1. All major construction is completed.

   Based on review of the Final Installation and Start-Up Report for Hawthorn Station Unit 8; construction was completed by June 2000 to support start-up testing. Additionally, based on personal observations of the facility on June 15, 2006; all major construction is completed.

2. All pre-operational tests have been successfully completed.

   Based on review of the Final Installation and Start-Up Report for Hawthorn Station Unit 8; pre-operational tests were completed in June 2000.

3. Unit will successfully demonstrate 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 will normally be operated.

   Based on review of computer sequence of events data for operation on June 10, 2006; the unit successfully demonstrated a proper start sequence from zero (0) speed to base load when prompted by the operator.

4. If unit has fast start capability, unit will demonstrate the ability to meet fast start criteria.

   The unit has not demonstrated the "Fast Load Start" capability. However, this capability is not an optional item. No additional cost was incurred to obtain this operational capability. Kansas City Power & Light does not utilize this capability. Since, (1) this capability was included as part of the standard software control

package, (2) the utility does not intend to utilize the capability and (3) the capability was not purchased as an optional (extra cost) item; the lack of capability demonstration does not affect the rate base aspects of the in-service criteria.

5. Unit will successfully demonstrate the 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 will be normally operated.

   Based on review of computer sequence of events data for operation on June 10, 2006; the unit successfully demonstrated a proper shutdown sequence from base load to zero (0) speed when prompted by the operator.

6. Unit will successfully demonstrate the ability to operate at minimum load for one (1) hour.

   Based on review of computer trend plot data for operation on December 14, 2004; the unit operated successfully at minimum load for greater than one (1) hour.

7. Unit will successfully demonstrate the ability to operate at or above 98% of peak load for one (1) hour, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on November 28, 2005; the unit operated successfully at or above 98% of peak load for greater than one (1) hour.

8. Unit will successfully demonstrate its ability to operate at or above 98% base load for four (4) continuous hours, after adjusting for ambient conditions.

   Based on review of computer trend plot data for operation on May 7, 2003; the unit operated successfully at or above 98% of base load for greater than four (4) hours.

9. Unit will successfully meet all operational guarantees.

   Based on review of Thermal Performance Test Report for Hawthorn Station Unit 8; performance tests were completed in June 2000 and February 2001. The unit met operational contract guarantees for electrical output and heat rate when operated under base load and peak load conditions.

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

    Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the unit to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

    a. *All Hawthorn generating units at full rated capacity and all lines in service.*
    b. *All Hawthorn generating units at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

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

    See Item 10, listed above.

In-Service Test Criteria

KCPL—Hawthorn Unit 5

Babcock & Wilcox natural circulation, single drum, single reheat, top-supported radiant boiler
General Electric steam turbine generator
Rebuilt following a 1999 boiler explosion
Commercial acceptance (rebuilt unit): June 2001
Selective Catalytic Reduction Device, Spray Dry Absorbers, Fabric Filter Dust Collector
590 MW (gross)

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1. Unit must demonstrate that it can operate at its design minimum load or above.

   Hours at or above design minimum load / 400 hours >=0.80

   Based on review of computer trend plot data, the unit operated at or above approximately 490 MW from March 7, 2005 through March 26, 2005 (a period of 20 days = 480 hours). This load (490 MW) is above the design minimum load as explained below.

   Based on interview of Kansas City Power & Light personnel, the minimum load for Hawthorn 5 is approximately 275-300 Megawatts (dependent on ambient conditions). This minimum load requirement is controlled by the temperature of the flue gas entering the spray dry absorber units.

2. Unit must be able to operate at or above its design capacity factor for a reasonable period of time. If the design capacity factor is not specified it will be assumed to be 0.60 unless the utility can offer evidence justifying a lower value.

   Design capacity factor <= energy generated for a continuous period of 168 hours / (design full load X 168 hours)

   Based on review of computer trend plot and tabular data, the unit operated at a capacity factor of greater than 60% for 168 hours during the period: March 12, 2005 through March 18, 2005. During most of this period the unit operated at or near 580 MW (gross output). The only significant departure from this power output was approximately 3 hours on March 16, 2005. The unit was at approximately 555 MW during this three hour period. This results in a capacity factor (for the 168 hour period) in excess of 95%.

Note: due to a main generator step-up transformer fire in August 2005, the unit capacity was reduced by approximately 60 MW (due to temporary replacement transformer capacity). The permanent replacement transformer was installed in June 2006. Based on personal observation, Hawthorn 5 was operating at rated capacity (590 MW gross) on June 28, 2006.

3. Unit must operate at an average capacity equal to 98% of its design maximum continuous rating for four (4) hours.

   Based on review of computer trend plot and tabular data, the unit operated at a capacity factor greater than 98% for 4 hours during the period: 1300 through 1700 on March 15, 2005. During this period unit output averaged approximately 590.5 MW (gross). This results in a capacity factor (for the 4 hour period) in excess of 99%.

4. Unit must be operated so as to show a clear and obvious trend toward the predominate use of coal as its primary fuel. Test period will be thirty (30) days. The following items will be used as an indication of the trend for coal operation:

   a) Boiler control tuning completed such that the unit can operate safely with all control systems in auto.

      Based on review of shift foreman operating logs (narrative), boiler side round sheets (checklist), turbine PEO round sheets (checklist), and computer trend plots for various plant components; the unit operated safely with control systems in automatic during the period March 15 through April 15, 2006.

   b) Ash build up in the furnace and backpass area shall be monitored and be within expected levels.

      Based on review of shift foreman operating logs (narrative) and boiler side round sheets (checklist) for the period of March 15 through April 15, 2006; no unusual ash buildup was noted. The unit operated at various loads during this time period.

   c) All boiler/turbine interlocks shall be proven to work as designed.

      Based on review of the burner management system (BMS) analysis [conducted by an outside consultant] and the plant startup checklist; interlocks, permissives and trip signals were verified to function properly. The BMS analysis identified no areas of non-compliance with applicable NFPA codes for Hawthorn 5. No recommendations were made for the BMS at the

conclusion of the analysis. The plant startup checklist is utilized for plant startups. In addition to providing directions for operator activities, it verifies certain permissives and interlocks during the startup process.

d) Sootblowing timing and sequencing shall be set properly to clean the tube areas.

Based on review of shift foreman operating logs (narrative), boiler side round sheets (checklist), and maintenance request records (on-line review) for the period March 15 through April 15, 2006; the sootblowing system timing and sequencing was operating properly (no significant maintenance items identified that would impair the design operation of the system).

e) All critical alarms brought into the control room shall be operational and functioning properly.

Critical alarm history was reviewed for the periods: 0000, March 15, 2006 through 2400, April 15, 2006 (normal operations); 0705, June 5, 2006 through 0657, June 6, 2006 (scheduled plant shutdown); and 1100, June 18, 2006 through 1059, June 19, 2006 (plant startup). Based on this review, critical alarms were operational and functioning properly. Note: the startup and shutdown periods (outside of the 30 day test period) were reviewed to validate the 30 day test period review, during transient conditions.

f) At the end of the test period, oil burn levels, if applicable, will be at or near design levels while burning coal.

Based on review of Detail Fuel Reports for the period March 15, 2006 through April 15, 2006, 2005; the unit burned approximately 7071 tons of coal per day and zero (0) MCF of natural gas. The unit utilizes natural gas as a supplementary fuel in lieu of fuel oil.

g) Oil ignitors are functioning in accordance with specifications.

Based on an on-line review of maintenance request records for the period of March 15 through April 15, 2006; the ignitors were operating properly. Note: The plant utilizes natural gas as a fuel source for the ignitors rather than oil.

5. Unit must have successfully completed all major equipment startup test procedures.

Based on review of the Guarantee Test Report for Hawthorn Station Unit 5, all startup tests were completed by March 2002 to support testing and operation.

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

   Based on review of transmission system load flow models for two cases, there are sufficient transmission facilities to carry the total design net electrical capacity of the unit to KCPL's system. Both cases are based on summer peak loads. The two cases are listed below:

   1) *All Hawthorn generating units at full rated capacity and all lines in service.*
   2) *All Hawthorn generating units at full rated capacity and all lines, except for the heaviest loaded line in Case 1, in service.*

7. Sufficient transmission facilities shall exist for KCPL's share of the total plant design net electrical capacity from the generating station into the KCPL service territory at the time the newest unit is declared fully operational and used for service.

   See Item 6, listed above.

8. Equipment installed to comply with emission requirements shall be operational and demonstrate the ability to remove 93% or more of the NOX, SO_2, particulate, and mercury emissions they were installed to remove over a continuous four (4) hour period while operating at or above 95% of its design load. This equipment shall also be required to demonstrate that it is able to remove 88% or more of these same emissions it was installed to remove over a continuous120 hour period while operating at or above 80% of its design load.

   The manufacturer guarantees for emissions removal equipment were as follows: SO_2 = 0.10 lb/MMBtu; NO_X = 0.08 lb/MMBtu; Particulate = 0.015 lb/MMBtu; and Opacity = ≤10%.

   The emission limitations (in accordance with the Air Quality Permit) are: SO_2 = 0.12 lb/MMBtu; NO_X = 0.08 lb/MMBtu; Particulate = 0.018 lb/MMBtu; and Opacity = 20% (6-minute average). SO_2 and NO_X limits are 30 day rolling averages.

   The Air Quality Permit does not require continuous monitoring for particulate emissions. Annual monitoring is required for demonstrating compliance with the particulate emission limits. Based on the results of the annual particulate emission monitoring for calendar year 2005, the particulate emissions were 0.012 lb/MMBtu. Since there are no continuous monitoring results available for particulate, opacity results from the continuous monitoring system were reviewed.

At this time, no regulatory limits or emissions removal equipment guarantees have been established for mercury. However, there is some mercury removal coincident with existing emissions control.

Based on a 144 hour period from 00:00, March 15, 2006 through 23:00, March 20, 2006; the following information was determined. Minimum unit load during this period was 88.3% and average load was 99.1%.

The average SO_2 emission rate was 0.07 lb/MMBtu. The highest and lowest SO_2 emission rates were 0.24 lb/MMBtu and 0.05 lb/MMBtu, respectively. The Air Quality Permit allows 1.6 lb/MMBtu (averaged on a 3 hour basis). The high value of 0.24 lb/MMBtu was for 1 hour and the three hour average at this point in time was 0.16 lb/MMBtu (a factor of 10 below the 3 hour limit).

The average NO_X emission rate was 0.07 lb/MMBtu. The highest and lowest NO_X emission rates were 0.08 lb/MMBtu and 0.07 lb/MMBtu, respectively.

The average Opacity reading was 3.7%. The highest and lowest Opacity readings were 5.1% and 3.5%, respectively.

Based on a 12 hour period from 12:00, March 20, 2006 through 23:00, March 20, 2006; the following information was determined. Minimum unit load during this period was 99.69% and average load was 99.78%.

The average SO_2 emission rate was 0.07 lb/MMBtu. The highest and lowest SO_2 emission rates were 0.07 lb/MMBtu and 0.06 lb/MMBtu, respectively.

The average NO_X emission rate was 0.07 lb/MMBtu. The highest and lowest NO_X emission rates were 0.07 lb/MMBtu and 0.07 lb/MMBtu, respectively.

The average Opacity reading was 3.7%. The highest and lowest Opacity readings were 3.8% and 3.7%, respectively.