Exhibit No.:	
Issues:	In-Service Criteria; Construction Audit; Maintenance Contract
Witness:	David Elliott
Sponsoring Party:	MoPSC
Type of Exhibit:	Direct Testimony
Case No.:	ER-2001-299
Date Testimony Prepared:	April 3, 2001

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

DIRECT TESTIMONY

OF

DAVID ELLIOTT

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2001-299

Jefferson City, Missouri
April, 2001

Exhibit No. 44
Date 5/29/01 Case No. ER-2001-299
Reporter Kim

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

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TABLE OF CONTENTS

DIRECT TESTIMONY

OF

DAVID W. ELLIOTT

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CASE NO. ER-2001-299

In-Service Test Criteria 2
Construction Audit 15
Maintenance Expense Contract 20

DIRECT TESTIMONY

OF

DAVID W. ELLIOTT

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2001-299

Q. Please state your name and business address.

A. David W. Elliott, 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 Electric Department of the Utility Operations Division.

Q. Please describe your educational and work background.

A. I graduated from Iowa State University with a Bachelor of Science degree in Mechanical Engineering in May 1975. I was employed by Iowa-Illinois Gas and Electric Company (IIGE) as an engineer from July 1975 to May 1993. While at IIGE, I worked at Riverside Generating Station, first as an assistant to the maintenance engineer, and then as an engineer responsible for monitoring station performance. In 1982, I transferred to the Mechanical Design Division of the Engineering Department where I was an engineer responsible for various projects at IIGE's power plants. In September 1993, I began my employment with the Commission.

Q. Have you filed testimony previously before the Commission?

A. Yes, I filed testimony in Case Nos. ER-94-163 (St. Joseph Light & Power Co.), HR-94-177 (St. Joseph Light & Power Co.), ER-94-174 (The Empire District Electric Co.), ER-95-279 (The Empire District Electric Co.), EM-96-149 (Union Electric Co.), ER-99-247 (St. Joseph Light & Power Co.), and EM-2000-369 (UtiliCorp United Inc. and The Empire District Electric Co).

Q. What are your responsibilities in The Empire District Electric Company (Empire) rate case, Case No. ER-2001-299?

A. My responsibilities are to address certain issues concerning Empire's State Line Station. These issues are: the in-service test criteria for the new State Line Combined Cycle Unit (SLCC), the construction audit for the new SLCC, and the cost savings of a maintenance contract for State Line.

In-Service Test Criteria

Q. What are in-service test criteria?

A. In-service test criteria are a set of operational tests to be performed by a particular generating unit to determine if it 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, which 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 are in-service test criteria developed?

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

Q. Why are in-service test criteria important?

A. In-service test criteria are the basis upon which the new unit is determined to be "fully operational and used for service" and is to be given rate-making treatment. A new unit may not have any historical operating information from which the Staff could make a recommendation to the Commission of whether the new unit is "fully operational and used for service." Therefore, test criteria need to be established and applied in order for Staff to make that recommendation.

Q. What do in-service criteria typically include?

A. Staff attempts to include certain tests that will give an indication of how the new unit will perform. Certain fundamental tests are included to prove whether the unit can start properly, or shut down properly, or operate at its full design capacity, or operate for a period of time without tripping off line, or operate at multiple load points, or operate at its design minimum load point. Other items the Staff would consider are whether the unit can meet the emission requirements, and whether the full output of the unit can be delivered into the electrical distribution/transmission system. An additional

factor the Staff would consider is whether the manufacturer has completed the final testing as per the contracts before the company accepts the unit from the manufacturer.

Q. Please describe the new SLCC Unit.

A. The new SLCC Unit is a nominal 500 MW combined cycle unit, which is a combination of two 150 MW combustion turbines and a 200 MW steam driven turbine. A typical combustion turbine burns natural gas or oil and creates combustion gases, which under pressure are used to turn a turbine, which is connected to a generator, which generates electricity. On a single combustion turbine, after the combustion gas has passed through the turbine it is typically exhausted to the atmosphere. In a combined cycle unit, after passing through the turbine, the combustion gases are directed through a heat recovery steam generator (HRSG) to create steam before exhausting to the atmosphere. This steam is then used to turn a steam turbine connected to a generator, which generates electricity. The combined cycle unit has been developed as a means of capturing more of the energy generated from burning natural gas.

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

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 capacity, maximum emissions, and minimum exhaust gas temperature.

Q. What happens if the new equipment does not meet the contract performance guarantees?

A. The manufacturer attempts to correct the problem(s) that are preventing the equipment from meeting the contract guarantees.

Q. What happens if the manufacturer cannot correct the problem(s)?

A. The contract between a company and the manufacturer may have specific liquidated damages, which the manufacturer would owe to the company if the contract performance guarantee is not met because the problem(s) was not correctable.

Q. What are liquidated damages?

A. Liquidated damages are known or readily ascertainable amounts of money that are paid for failure to meet an obligation, in this case, failure to meet the contract operating performance guarantees. Typical liquidated damage provisions for contract performance guarantees are based on an agreed incremental value of a contract operating guarantee parameter. The total liquidated damages amount is then calculated by multiplying the incremental value by the difference between the actual value and the contract operating performance guarantee value.

Q. Can you provide an example?

A. Yes. For example, assume a contract guaranteed heat rate is 8,800 Btu/kWh, and the actual tested heat rate is 8,850 BTU/kWh. Further assume the liquidated damage value assigned by the contract for heat rate is $10,000 for every BTU/kWh above 8,800 BTU/kWh. So, in this example, the liquidated damage payment would be $500,000: ((8,850-8,800) x $10,000). The numbers used in this example are used only to show the calculation method.

Q. Who manufactured the new combustion turbine and new steam turbine used in the SLCC Unit?

A. Siemens-Westinghouse.

Q. Does the contract between Empire and Siemens-Westinghouse include performance guarantees and liquidated damages provisions?

A. Yes. There are both performance guarantees and liquidated damages provisions relating to the new combustion turbine and to the new steam turbine installed at State Line.

Q. Who is responsible for conducting the contract performance guarantee testing?

A. **_____**

Q. Who manufactured the new HRSGs?

A. Nooter/Eriksen Inc.

Q. Does the contract between Empire and Nooter/Eriksen Inc. include performance guarantees and liquidated damages provisions?

A. Yes.

Q. Who is responsible for conducting the contract performance guarantee testing?

A. **_____**

Q. Is there any specific contract language in the turbine or HRSG contracts that relates to the testing for contract performance guarantees?

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A. Yes. **_____
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_____**

Q. **_____
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A. **_____
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Q. If the SLCC Unit produces a nominal 500 MW as per design, should the individual turbines and waste heat boilers be tested to determine if they meet the contract performance guarantees?

A. Yes. The SLCC Unit may be able to produce a nominal 500 MW even if one of the turbines or one of the HRSGs is under-performing, if one of the other turbines or HRSGs is over-performing. The net effect could be that the SLCC Unit would be producing a nominal 500 MW. In the future, the SLCC Unit may not be able to produce a nominal 500 MW, and without the individual equipment testing, it will be difficult to determine which piece of equipment is causing the problem.

Q. Why couldn't Empire have the manufacturer come back and repair the problem?

A. **_____
_____

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_____**

Q. After Empire accepts the equipment, who would be responsible for the repairs required to fix problems with the equipment **_____

_____**?

A. Empire.

Q. Ultimately, who would bear the burden for the costs of any such repairs?

A. Empire, who could possibly seek recovery of such costs from its ratepayers.

Q. Does Staff recommend that the contract performance guarantee tests be done?

A. Yes.

Q. Has the Staff developed in-service criteria for any units since Section 393.135 RSMo 2000, went into effect in 1977?

A. Yes. The Staff has developed in-service criteria for at least the following units: Wolf Creek and Callaway, which are nuclear units; Jeffrey Energy Center Units No. 1 and No. 2, Iatan, and Sibley Unit No. 3, which are coal fired units; and State Line Units No. 1 and No. 2, which are natural gas peaking units. Schedule 1 attached to this testimony provides a summary of the criteria developed for each of these units.

Q. Can the in-service test criteria the Staff developed for Iatan, Wolf Creek, Callaway, Jeffrey Energy Center, Sibley or State Line be used for the SLCC Unit?

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A. No. None of these other units is a combined cycle unit like the new SLCC Unit; therefore, any existing in-service criteria must be modified for the operational differences in the units.

Q. Does the Southwest Power Pool (SPP), of which Empire is a member, have specific criteria for new units?

A. Yes, however, Staff does not believe the SPP criteria are sufficient for determining in-service status.

Q. Why does Staff believe that these SPP criteria are insufficient for determining in-service status?

A. All of these SPP criteria are used only to determine the capability, or capacity output, of the unit. The SPP criteria are not the result of the Missouri statute which requires that a unit be "fully operational and used for service" before it can be reflected in rates. The criteria the Staff requires for in-service status thus serve a different purpose. Unlike the SPP criteria, the Staff's criteria are designed to determine when a unit is "fully operational and used for service" and therefore allowable in rate base. SPP's capacity criteria requires that the unit runs for only four hours and, therefore, does not give a clear picture of how the unit is likely to operate during an extended period of time. Because of the short duration of the SPP capacity test, the capacity test does not prove the unit is "fully operational and used for service".

Q. In the past, has Empire followed the Staff's requirements for in-service testing of new units?

A. Yes. The Staff required State Line Unit No. 1 and Unit No. 2, which are combustion turbines, to meet certain in-service test criteria before agreeing that these

units were fully operational and used for service. Empire tested State Line Unit No. 1 in 1995 and State Line Unit No. 2 in 1997.

Q. What in-service criteria does the Staff propose the Commission use for the SLCC Unit in this proceeding?

A. The Staff recommends the in-service criteria set forth in Schedule 2 attached to this testimony.

Q. How do these proposed criteria compare to the criteria the Staff has proposed for other units in the past?

A. As stated earlier, the proposed criteria for the new SLCC Unit are similar to those applied to the units at State Line, Iatan, and Jeffrey Energy Center.

Q. Are the criteria the Staff has proposed for the new SLCC Unit based on the criteria the Staff used for State Line Units Nos. 1 and 2?

A. Yes; however, because the new SLCC Unit is a combined cycle unit, and the State Line Units Nos. 1 and 2 are combustion turbines, the Staff modified the criteria it developed for State Line Units Nos. 1 and 2. Additionally, the Staff did not use the bonus/penalty section found in the criteria used for State Line Units Nos. 1 and 2.

Q. What is the bonus/penalty section?

A. The bonus/penalty section is nothing more than adjustments that could be made to the unit guarantees. If the test result of one particular item of the performance guarantee was better than the contract requirement, this fact could be used to offset a test result of a performance guarantee that was less than the contract requirement.

Q. Why did the Staff not include a bonus/penalty section for the SLCC Unit?

A. This bonus/penalty section was first used by the Staff in the in-service criteria for State Line Units Nos. 1 and 2. Upon further review, the Staff does not believe that the items found in that section are appropriate to use in determining whether the SLCC Unit is "fully operational and used for service." These types of potential contractual offsets are not truly relevant to the in-service status of a generating unit. Thus, the Staff's in-service criteria for the new SLCC Unit are not accompanied by a bonus/penalty section.

Q. Why is the Staff recommending that the new SLCC Unit be required to operate at or near 500 MW capacity when Empire only owns 60% (300 MW) of the unit?

A. In order for Empire to receive its full share of 300 MW, the SLCC Unit must operate at 500 MW. The Staff believes that the SLCC Unit should be tested at its full nominal capacity of 500 MW.

Q. How is it that Empire can ensure that the SLCC Unit will operate at 500 MW if it doesn't own 100% of the unit?

A. In order for the SLCC Unit to be tested at the 500 MW level so as to meet the Staff's criteria, Empire may be required to purchase 200 MW of hourly energy from the co-owner, Westar Generating Inc., for the tests.

Q. If so, how would the Staff treat this expense?

A. Staff witness Cary G. Featherstone of the Accounting Department will address this in his testimony.

Q. Please explain Staff's criteria Item 1.

A. Item 1 of Staff's criteria requires that the major construction work be completed to be "fully operational". In order for the SLCC Unit to meet the rest of the

criteria, it must be operational. Some minor work might be left to complete, such as painting, but nothing that will affect the operation of the unit. This is similar to Staff's criteria developed for Iatan, Jeffrey Energy Center Unit No. 2, and State Line Units Nos. 1 and 2.

Q. Please explain Staff's criteria item 2.

A. Item 2 of the Staff's criteria requires that the testing for contract performance guarantees take place, in order to ensure that the contractors are liable for any repairs or liquidated damages as per their contracts. This is similar to Staff's criteria developed for Iatan.

Q. Please explain Staff's criteria Item 3 and Item 4.

A. Item 3 and Item 4 of the Staff's criteria require the SLCC Unit to be able to start normally and stop normally. The Staff believes that for the SLCC Unit to be "fully operational and used for service" it should start and stop as it was designed. This is similar to Staff's criteria developed for State Line Units Nos. 1 and 2.

Q. Please explain Staff's criteria Item 5.

A. Item 5 of Staff's criteria requires the SLCC Unit to operate at the established minimum load. The unit may be required to operate at that load due to Empire's system requirements. Staff believes the unit's minimum load point should be proven by requiring the unit to operate at that point for one hour. This is similar to Staff's criteria developed for Iatan, Jeffrey Energy Center Units Nos. 2 and 3, and State Line Units Nos. 1 and 2.

Q. Please explain Staff's criteria Item 6.

A. Item 6 of the Staff's criteria requires that the SLCC Unit operate at 98% of nominal capacity for one hour and operate at 95% of nominal capacity for four hours. The Staff believes that it needs to be established that the SLCC Unit is capable of generating very close to its nominal capacity for a reasonable period of time. This is similar to Staff's criteria developed for Iatan, and Jeffrey Energy Center Units Nos. 1, 2, and 3.

Q. Please explain Staff's criteria Item 7.

A. Item 7 of Staff's criteria requires the SLCC Unit operate for a period of time to demonstrate that the expected capacity factor can be attained. This is similar to Staff's criteria developed for Iatan, Jeffrey Energy Center Units Nos. 1, 2, and 3, and State Line Units Nos. 1 and 2.

Q. Please explain Staff's criteria Item 8.

A. Item 8 of Staff's criteria requires that there be sufficient transmission facilities to carry the design net capacity of the SLCC Unit into Empire's electrical system. Staff believes the SLCC Unit energy cannot be "used for service" if it cannot be transmitted into the electrical system. This is similar to Staff's criteria for the Iatan Unit, and Jeffrey Energy Center Unit No. 3.

Q. Please explain Staff's criteria Item 9.

A. Item 9 of Staff's criteria requires that the SLCC Unit have no operational limits imposed on it by other agencies, such as the Missouri Department of Natural Resources. Some fine-tuning of the pollution controls on the unit may be required beyond the true-up period. The Staff's criteria Item 9 would give some assurance that the SLCC Unit would not be limited in its operation.

Q. Please explain Staff's criteria Item 10.

A. Item 10 of the Staff's criteria requires that all criteria testing should be completed by midnight of July 31, 2001. This requirement would give the Staff enough time to review the testing data and to indicate in its true-up testimony due on August 8, 2001, whether the SLCC Unit is "fully operational and used for service".

Q. When is the new SLCC Unit expected to be on-line?

A. Empire's response to Staff's Data Request No. 306 states that the unit will meet SPP in-service criteria on or about June 1, 2001.

Q. What happens if the SLCC Unit does not meet all of the in-service criteria?

A. Staff has included in its recommended criteria a statement that the Staff may review the operational data of the SLCC Unit to date, and depending on the results of its review, may waive application of any criterion if failure to meet that criterion is not deemed to be material to the "fully operational and used for service" status of the new SLCC Unit. If the Staff determines after this review that the unit is still not fully operational and used for service, the revenue impact of that finding will be presented by the Staff in the true-up part of this rate case.

Q. Please summarize the recommendations of your testimony.

A. I recommend that the Commission require that the new SLCC Unit meet the proposed criteria set out in Schedule 2 before the unit is given rate base treatment.

Construction Audit

Q. What is a construction audit?

A. A construction audit is the Staff's review of a construction project to determine the final cost of the project and whether the project was completed as planned and on time per schedule.

Q. Which Staff personnel perform construction audits?

A. Staff auditors and engineers do the construction audits.

Q. Is the construction audit in this case completed?

A. No. Since at this time the project is not completed, the Staff's audit by necessity is not complete at this time. The Staff is continuing to monitor the progress of the project and, if the project is complete before the end of the true-up period, the Staff will report on its final construction audit results at the time of its true-up testimony.

Q. What is your responsibility on the construction audit?

A. I am monitoring the progress of the project, and how close the project is to being completed.

Q. Has the Staff identified any concerns with the project schedule?

A. Yes. Empire had to replace the original contractor for the construction of the heat recovery steam generators (HRSG) construction contractor on the project.

Q. Has this impacted the schedule of the project?

A. Yes. Staff has reviewed Empire's response to Staff Data Request No. 220, which included Black & Veatch's Monthly Progress Report 24, and as of January 2001, ** _____ **.

Q. Has this impacted the cost of the project?

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A. Yes. The cost of the project has also been impacted by this problem due in part to switching from a fixed-price contract to a time-and-materials contract for the construction of the HRSGs. Staff's review of Empire's response to Staff Data Request No. 306 indicates the projected final cost of the construction of the HRSGs is **_____** the project budget.

Q. What are the details of this cost?

A. Staff witness Cary G. Featherstone of the Accounting Department will address this issue in his testimony.

Q. Please explain the difference between a fixed-price contract and a time-and-materials priced contract.

A. A fixed-price contract is a contract where all of the project labor and/or materials are supplied for a fixed sum of money. In making their bids for this type of contract, the bidders estimate their costs to do the project. In contrast, a time-and-materials contract is a contract where the contract prices are fixed per unit; i.e., wages are fixed per hour, materials are priced per unit of material, and equipment is priced per hour. The total contract price of a time-and-materials contract is determined by multiplying the per unit rate by the number of units used to complete the project.

Q. What are the advantages and disadvantages of a fixed-price contract versus a time-and-materials contract?

A. I have identified the advantages and disadvantages of fixed-priced and time-and-materials contracts in Schedule 3, attached to this testimony.

Q. Typically, do fixed-priced contract and time-and-materials contracts have anything in common?

NP

A. Yes. Most construction project contracts contain two sections. One section is the outline or description of the project to be bid on, and the second section is the general conditions and/or requirements imposed by the Company on the contractor for the construction project. Both types of contracts typically contain both of these sections.

Q. Please provide some examples of items included in the general conditions section of a construction contract.

A. The contract may contain information on how invoices will be paid, how much money will be withheld as "retainage", what kind of insurance requirements there are, what available parking there is, or what kind of on-site office space is available to the contractor. Other items included may cover certain legal matters, such as what constitutes a breach of contract, what happens if the contractor does not perform, or what happens if the contractor does not meet project schedules.

Q. Do any of the contracts Empire entered into for this project contain the project description and a general condition section?

A. **_____
_____**

Q. Identify the major construction contracts Empire had for this project.

A. A fixed-price contract for the construction of the HRSGs, a time-and-materials contract for the final construction of the HRSGs, and a fixed-price contract for the construction and installation of various components and equipment including the turbines.

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Q. Is there any section in these Empire contracts that references what happens if the contractor defaults, or the job is cancelled?

A. **_____

_____

_____**

Q. Please describe the difference between a contractor default and a contract termination.

A. **_____

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Q. What are the financial ramifications of contractor default and contract termination?

A. **_____

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Q. How are changes made to the project design and/or scope during the work on the project?

NP

A. Typically, any changes in the work from the original design are addressed through the company issuing a change order. Also, any extra or additional work is covered by a change order.

Q. What is a change order and what does it do?

A. A change order is usually an addition to the original purchase order or work order issued by the company to pay the contractor for the work done per contract. A change order is a method by which the contractor is informed of the change in the work and the cost.

Q. What is the importance of a change order?

A. A change order is a method by which the company can track any change in the cost of a project, and can provide specific information as to why the cost changed.

Q. On a fixed-price contract how are the costs determined for any change orders?

A. Typically there are two methods of determining the additional costs of change orders. The company may request the contractor to furnish a fixed price to complete the additional work, or the cost of the additional work is calculated using the labor and equipment rates in the contract.

Q. Are there hourly labor rates and hourly equipment rental usage rates identified in a fixed-price contract?

A. Yes. Usually hourly labor rates and hourly equipment usage rates are included in a fixed-price contract, to be used to calculate the cost of any changes or additional work.

Q. Has Empire issued change orders for the SLCC project?

A. Yes. The Staff continues to review the change orders to determine any project costs over-runs and will address this in its true-up testimony.

Q. Has Staff completed its review of the SLCC Unit project?

A. No. The project construction is still underway. Staff will conduct a final review of the project man-hours, project schedule, and project equipment status before the end of the true-up period to identify any cost over-runs. This review will provide Staff support for any recommended rate base treatment of these costs.

Maintenance Expense Contract

Q. What are maintenance expenses?

A. Maintenance expenses are the costs associated with maintaining the equipment at an optimum level of output and efficiency. Maintenance expenses include the costs to repair or replace parts that wear out under normal operating conditions.

Q. What are some of the more expensive generating unit parts that typically wear-out?

A. Turbine blades are subjected to high temperature and high stress, causing them to deteriorate. Boiler tubes are subjected to high temperatures and pressures, causing them to deteriorate. Burners in combustion turbines are exposed to high temperatures, causing them to deteriorate in a relatively short period of operating time. The life for these parts is based on hours of operation and/or number of starts. So, depending on how often the unit is run, and how long it is run, the parts may last for many years, but they could last less than two years.

Q. Is the normal maintenance of a combustion turbine similar to that of a steam turbine?

A. Both types of turbines have blades, but a combustion turbine blade generally requires more frequent repairs than a steam turbine blade. This is because the combustion turbine blade is subjected to the hot combustion gas and their impurities at a temperature of around 2000 degrees Fahrenheit, whereas a steam turbine blade is subjected to almost pure steam from a boiler at around 1000 degrees Fahrenheit. Also, combustion turbines are generally exposed to more load swings than most steam turbines, because these types of units are typically run to meet peak demands. These load swings cause additional stress to the blades.

Q. How is the maintenance schedule determined on a turbine?

A. Typically, the combustion turbine manufacturer bases the frequency schedule for maintenance on the number of unit starts, and the operating hours. Poor performance also affects the maintenance schedules.

Q. What is a long-term maintenance contract?

A. A long-term maintenance contract is often used to lock in the services of a contractor for the repair of turbines, and ensures the replacement parts availability.

Q. Is a long-term maintenance contract necessary?

A. No. Each normal maintenance outage can be planned for as it approaches. A turbine repair contractor can be hired, and replacement turbine parts can be ordered.

Q. What are the advantages of a long-term maintenance contract?

A. A long-term contract enables a contractor or manufacturer to produce the replacement parts for the company well in advance of an outage. Some replacement parts have lead times of months, or even years, and a long-term maintenance contract makes the manufacturer, not the company, responsible to make sure the parts are available at the

time they are needed for a maintenance outage. Another advantage is the contractor, not the company, is responsible for securing maintenance craftsmen at the time it is needed. Procuring a maintenance force with little notice may become difficult for the company, depending on the maintenance outages of units in the surrounding states.

Q. Does Empire have a maintenance contract for the State Line units?

A. No. At this time Empire is negotiating for a long-term maintenance contract for its State Line and Energy Center units.

Q. Do you have any supporting documentation for any claimed savings associated with long-term contracts?

A. No. At this time, I have not received any supporting documentation for any cost savings. I have reviewed the responses to Staff Data Request Nos. 2923 through 2935 to Empire on this matter, but have not yet received any detailed support documentation.

Q. When will Staff make a recommendation concerning any long-term maintenance contract for State Line Station?

A. At this time there is no executed contract for long-term maintenance. As discussed in the direct testimony of Staff witness Philip K. Williams of the Accounting Department, Staff will review this contract, and consider the inclusion of any associated costs in Empire's revenue requirement if the contract is executed before the true-up filing.

Q. Does this conclude your direct testimony?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

IN THE MATTER OF THE APPLICATION OF THE EMPIRE DISTRICT ELECTRIC COMPANY FOR A GENERAL RATE INCREASE	))))	Case No. ER-2001-299

AFFIDAVIT OF DAVID ELLIOTT

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

David Elliott, of lawful age, on his oath states: that he has participated in the preparation of the foregoing written testimony in question and answer form, consisting of 22 pages of testimony to be presented in the above case, that the answers in the attached written 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.

David Elliott

Subscribed and sworn to before me this 2nd day of April, 1999.

Notary Public

My commission expires_____

DAWN L. HAKE
Notary Public – State of Missouri
County of Cole
My Commission Expires Jan 9, 2005

Summary of In-Service Test Criteria
developed by the
Missouri Public Service Commission Staff

Callaway
Union Electric
Nuclear unit, new installation
Case No. ER-84-168/EO-85-17

1. Startup testing program successfully completed.
2. Pre-operational test program successfully completed.
3. Plant and transmission facilities tested for capability of supplying Missouri customer's full share of rated power with most critical transmission line out of service.
4. All licenses, which are needed to operate at full power, have been issued or acceptable commitments obtained.
5. Plant is operating and the NRC compliance history shows evidence of Company competence.
6. Exemptions from criteria #5 may be granted or the plant is "fully operational" at power level less than the rated full power for good cause.
7. Plant is supplying electricity to the company's system with output scheduled by the system load dispatcher.

Wolf Creek
Kansas City Power & Light Co.
Nuclear unit, new installation
Case No. EO-85-185/ER-85-128

1. Startup test program successfully completed
2. Pre-operational test program successfully completed
3. Plant and transmission facilities tested for full capability with one critical line out of service.
4. All licenses required to operate at full power have been issued or acceptable commitments obtained.
5. The plant is operating and the NRC compliance history shows evidence of competence.
6. For good cause exemptions from criteria #5 may be granted at some power level less than rated power originally proposed.
7. The plant output is supplying electricity to KCPL Missouri customers with output scheduled by the KCPL load dispatcher, subject to plant availability.

Iatan
Kansas City Power & Light Co., St. Joseph Light & Power Co., The Empire District Electric Co.
Coal unit, new installation
Case No. ER-81-42

1. Unit must demonstrate that it can operate at its design minimum power or above, continuously for at least 80% of 400 hours.
2. Unit must be able to operate at or above its design capacity factor for a period of time of 168 continuous hours.
3. Unit must operate at a capacity equal to 95% of its nameplate rating for 4 hours.
4. Unit must be operated for 30 days so as to show a clear and obvious trend toward the predominate use of coal as its primary fuel.
5. Unit must have finished the startup test program with all startup test procedures necessary for operation satisfactorily completed.
6. Sufficient transmission facilities shall exist to carry the total design net electrical capacity from the completed generating station into the system at the time the unit is declared fully operational and used for service.

Jeffrey Energy Center Unit #1
Missouri Public Service Co.
Coal unit, new installation
Case No. ER-79-60

1. Operating at its minimum level consistently.
2. Operation at expected load factor.
3. Operation at nameplate capacity.
4. Reliance upon its designed energy input.
5. Completion of testing.

Jeffrey Energy Center Unit #2
Missouri Public Service Co.
Coal unit, new installation
Case No. ER-80-231

1. Unit must demonstrate that it can operate at its design minimum power or above, equal to 80% of 400 hours.
2. Unit must be able to operate at or above its design capacity factor for a period of 168 hours. (capacity factor = 0.6 unless Company offers evidence otherwise)
3. Unit must operate at a capacity equal to 95% of its nameplate rating for 4 hours.

4. Unit must be operated so as to show a clear and obvious trend toward the predominate use of coal as its primary fuel.
5. Unit must have finished the startup test program with all startup test procedures necessary for operation satisfactorily completed.

The foregoing five criteria are interdependent and all must be satisfied before JEC-2 can be declared fully operational and used for service and thus a proper rate base addition.

Jeffrey Energy Center Unit #3
Missouri Public Service Co.
Coal unite, new installation
Case No. ER-83-40

1. Unit must demonstrate that it can operate at its design minimum power or above, equal to 80% of 400m hours.
2. Unit must be able to operate at or above its design capacity factor for a period of 168 hours. (capacity factor = 0.6 unless Company offers evidence otherwise)
3. Unit must operate at a capacity equal to 95% of its nameplate rating for 4 hours.
4. Unit must be operated so as to show a clear and obvious trend toward the predominate use of coal as its primary fuel.
5. Unit must have finished the startup test program with all startup test procedures necessary for operation satisfactorily completed.
6. Sufficient transmission facilities shall exist to carry the total design net electrical capacity from the completed generating station into the system at the time the unit is declared fully operational and used for service.

Sibley
Missouri Public Service Co.
Coal unit, fuel switch
Case No. ER-93-37

1. Compliance with environmental regulations.
2. Blending, and burning a blend, of two low sulfur western coals.
3. Showing consistency in carrying minimum load while burning the blend.
4. Showing the ability to operate at nameplate capacity while burning the blend.
5. Showing ability to operate at historical capacity factors while burning the blend.

State Line No. 1
The Empire District Electric Co.
Natural gas and oil unit, new installation
Case No. ER-95-279

State Line No. 2
The Empire District Electric Co.
Natural gas and oil unit, new installation
Case No. ER-97-81

1. All construction and pre-operational testing shall have been completed. This shall be determined through:
    a) Physical inspection conducted by a member or members of the Missouri Public Service Commission Staff,
    b) The Company's plant manager attesting to the fact that all pre-operational testing has been successfully completed in accordance with written test procedures, and
    c) Establishment that all liability for final payment of equipment and construction contracts is recorded on the books.
2. The generating unit shall demonstrate its ability to start when prompted only by a signal from a remotely located control center. Once burning natural gas and once while burning distillate oil.
3. The generating unit shall demonstrate its ability to smoothly and successfully shutdown when prompted only by a signal from a remotely located control center.
4. The generating unit shall demonstrate its ability to accept load increase from zero MW to 40 MW within ten minutes, starting from the cold, zero rpm condition.
5. The generating unit shall demonstrate its ability to accept load increase from zero megawatts to Base Capacity within twenty-two minutes, starting from the zero rpm condition. This twenty-two minute test period may include the ten minute ascension test to 40 MW, if the Company elects to integrate the two tests, or alternately the twenty-two minute test can be run as a separate test.
6. While burning natural gas, the generating unit shall run continuously for one hour at or above Peak Capacity to demonstrate maximum capability.
7. While burning natural gas, the generating unit shall run continuously for four hours at or above Base Capacity. (Bonus-penalty correction factor is calculated if unit exceeds or fails to meet Base Capacity for four hours.)

8. While burning natural gas and operating at the Base Capacity condition, the generating unit shall achieve the warranted heat rate. (Bonus-penalty correction factor is calculated if unit exceeds or fails to meet warranted heat rate.)
9. While burning natural gas and operating at the Base Capacity condition with an exhaust gas flow of a determined actual cubic feet per minute, the generating unit shall achieve the warranted NOx emission level. (Bonus-penalty correction factor is calculated if unit exceeds or fails to meet warranted NOx emission level.)
10. The generating unit shall demonstrate consistency in its ability to operate at or above a pre-defined minimum load by running for three days (72 hours) at or above 20 MW while under control of the system dispatcher. This test shall be conducted while burning natural gas, except that a transition to distillate oil shall be made sometime during the three-day period, after which, for an eight (8) hour period, only distillate oil shall be burned. A transition back to natural gas shall be made following the eight-hour oil burn and stabilization shall be achieved on natural gas before shutdown.
    The transition from natural gas to distillate oil fueling shall be made while the unit is in operation. If the unit drops below 20 MW when the fuel transition is made, then credit will be given for successfully testing on natural gas, if successfully completed previously, and an extended rerun on natural gas will not be necessary before attempting the transfer to oil.
    However, the rerun must be started on gas, followed by a successful transition to distillate oil, an 8 hour run on oil, and transfer back to natural gas. If the Company elects, The four hour Base Capacity and the one hour run at Peak Capacity can be included in this 72 hour run to demonstrate consistency in holding minimum load.

The Base Capacity and Peak Capacity were defined.
Total cumulative bonus factors used to offset any cumulative penalty factors.

STAFF IN-SERVICE TEST CRITERIA
State Line Combined Cycle Unit

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 new Siemens-Westinghouse Combustion Turbine, the new Siemens-Westinghouse steam turbine, and the new Nooter/Eriksen 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 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 continuous hours on natural gas fuel. During this test the unit will demonstrate its ability to operate at or above 98% of its nominal capacity for one hour.
7. The Combined Cycle Unit will demonstrate its ability to produce an amount of energy (Mwhr) within a 168 hour period that results in a capacity factor of at least 48.3 % during the period when calculated by the formula shown in note 4.
8. Sufficient transmission facilities shall exist to carry the total design net electrical capacity of the Combined Cycle Unit into Empire's distribution/transmission system.
9. There are no operational limits on the Combined Cycle Unit imposed by other agencies and/or government entities, such as Missouri Department of natural resources.
10. All testing will be completed by midnight on July 31, 2001.

NOTES:

1. If the unit cannot demonstrate its ability to meet any of the criteria for which failure to meet the proposed criteria is judged to be immaterial to the overall in-service status of the unit, the Staff for good cause may waive that particular criteria. In making a decision to wave any particular criteria, the Staff may review the completed testing documentation, and any additional unit operating data, to determine if the unit should be considered in-service, without further testing. Staff will provide it's rational in the event it decides to waive any particular criteria.
2. It is the Staff's intention, when possible, to witness the unit's ability to meet the criteria items. Regardless, Empire will provide to Staff all necessary documentation, including operating data logs, clearly demonstrating the capability of the unit to meet each of the criteria items.
3. The "nominal capacity" of the combined cycle unit shall be 500 megawatts, at ISO conditions (i.e., 59 degrees F and 60% relative humidity). The term "nominal heat rate" shall be defined as 7200 Btu/kWh HHV when operating at nominal capacity. Manufacturer supplied ambient correction factors will be used when operation occurs at other than ISO conditions.
4. Capacity Factor of 48.3% = (Mwhs generated in a 168 hour period) / ((nominal capacity) x (168 hours)).
5. The contract performance guarantees referenced in criteria item 2 can be found in the Westinghouse Combustion Turbine contract **_____**, the Westinghouse Steam Turbine contract **_____**, and the Nooter/Eriksen contract **_____**. Manufacturer supplied ambient correction factors will be used when operation occurs at other than ISO conditions.
6. If any test is completed using only Empire's ownership portion of 300 MW, instead of the nominal unit capacity of 500 MW, Empire will provide written documentation stating the reasons why Empire was required to operate the unit at 300 MW. Included in this documentation will be a summary of all conversations held with Western Resources, the joint owner, regarding the operation of the unit at 500 MW.

NP

Advantages and Disadvantages of Both Fixed Priced Contracts, and Time-and Materials Contracts

The Fixed Price Contract:

Advantages:

1. The company knows exactly how much the work will cost.
2. The burden of estimating the cost of the work is with the bidder.
3. Except for a few special circumstances, the bidder is responsible for cost overruns.
4. No need for company to follow and approve man-hours and equipment used for job.

Disadvantages:

1. The bidder may have under bid the job and cannot complete the work in a timely and workmanlike manner.
2. Limited flexibility or expensive to make changes in job scope.
3. Company must provide accurate information to bidders.
4. Cost may be higher to cover bidder's risks.

The Time-and-Materials Contract:

Advantages:

1. Any changes in the scope of the work can be added at a fixed incremental cost.
2. Work specifications do not need to be exact.
3. Reduces the possibility of the bidders including a high cost of risk for the project.

Disadvantages:

1. Company must keep track of man-hours and equipment used to determine if they are reasonable.
2. Company must keep track of work schedule to determine level of man-hours.
3. Company must monitor work productivity.
4. Bidder is not responsible for cost over runs.