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Witness:	David W. Elliott
Sponsoring Party:	MO PSC Staff
Type of Exhibit:	Direct Testimony
Case No.:	ER-2004-0570
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MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

DIRECT TESTIMONY

OF

DAVID W. ELLIOTT

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2004-0570

Jefferson City, Missouri
September 2004

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

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BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of the tariff filing of The Empire District Electric Company to implement a general rate increase for retail electric service provided to customers in its Missouri service area	)))))	Case No. ER-2004-0570

AFFIDAVIT OF DAVID W. ELLIOTT

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

David W. Elliott, 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 17 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.

DD W. Elliott
David W. Elliott

Subscribed and sworn to before me this 17th day of September, 2004.

Dawn L. Hake
Notary Public

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

My commission expires

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DIRECT TESTIMONY

OF

DAVID W. ELLIOTT

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2004-0570

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 Energy 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. Please refer to Schedule 1 for the list of cases I have filed in.

Q. What is the purpose of your testimony in The Empire District Electric Company (Empire) rate case, Case No. ER-2004-0570?

A. The purpose of my testimony is to address certain issues concerning Empire's Energy Center. These issues are: the in-service criteria and the construction audit for the two new Energy Center Combustion Turbine Units.

Q. Have you been responsible for any in-service criteria or construction audit issues prior to this case?

A. Yes. Please refer to Schedule 2 for the list of units.

Q. Please describe the new units at Empire's Energy Center.

A. There are two new units at Energy Center (EC3 and EC4). Both are aero-derivative combustion turbines with a nominal output of 50 MW each. An aero-derivative turbine is based on a design very similar to the engines on a large jet. Each unit consists of two of these engines, which turn one generator. The aero-derivative type units are able to withstand the stress of starting and stopping better than larger combustion turbines. This ability allows these smaller units to follow the peak load requirements better.

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, 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 criteria important?

A. In-service criteria are the basis upon which a new unit is determined to be "fully operational and used for service" and is to be given ratemaking 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." In such situations, operational tests must be established and applied to new generating units in order for Staff to file its recommendation.

Q. What do in-service criteria typically include?

A. If there is little or no historical operating data available to show the unit capabilities or identify serious operating problems, Staff attempts to include certain operational 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, shut down properly, operate at its full design capacity, operate for a period of time without tripping

off line, and operate at multiple load points, operate at its design minimum load point. Other items the Staff would consider are whether the unit can meet the contract guarantees, and whether the full output of the unit can be delivered into the electrical distribution/transmission system.

Q. Do these units have some operational history?

A. Yes. Staff has been able to review the historical operational data to determine if there were any problems with the operation of the new unit. This review of historical data along with the testing of contract guarantees discussed below, constitutes the in-service criteria.

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 capacity, maximum emissions, and minimum exhaust gas temperature.

Q. Who manufactured the new combustion turbines?

A. Pratt & Whitney.

Q. Were there performance guarantees in the contract with Pratt & Whitney?

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; State Line Units No. 1 and No. 2, which are natural gas/oil peaking units, and the State Line Combined Cycle unit. Schedule 3 attached to this testimony provides a summary of the criteria developed for each of these units.

Q. Can any of the in-service test criteria the Staff developed for Iatan, Wolf Creek, Callaway, Jeffrey Energy Center, Sibley or State Line Combined Cycle be used for the EC3 and EC4 units?

A. No. The listed units are not combustion turbines and would not have the same operational characteristics of a combustion turbine.

Q. Can the in-service criteria the Staff developed for the State Line Units 1 and 2 be used?

A. Yes, with minor changes they could. The criteria for State Line Units 1 and 2 were based on tests alone. However since there is historical operational data available for both the EC3 and EC4 Units, this historical data can be reviewed instead of testing.

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, State Line Unit No. 2, and State Line Combined Cycle Unit, 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, State Line Unit No. 2 in 1997, and State Line Combined Cycle Unit in 2001.

Q. What in-service criteria does the Staff propose the Commission use for the new Energy Center units in this proceeding?

A. The Staff recommends the in-service criteria set forth in Schedule 4 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 Energy Center Units are similar to those applied to the combustion turbine units at State Line, but are based more on a review of historical operational data. There are three specific differences between the criteria for Energy Center units and the State Line combustion turbine units:

- Staff removed the criterion for operating at a specific load for 72 hours. Energy Center combustion turbines are aero-derivative units and State Line combustion turbines are larger capacity units. Since aero-derivative units can be started and stopped more frequently than the larger combustion turbines, the Energy Center aero-derivative units are used for short term peaking and therefore do not need to prove that they can be operated over long periods of time.
- Staff removed the criterion of proving that there are no Missouri Department of Natural Resources (MoDNR) imposed limitations on operation due to emissions. MoDNR has the responsibility to determine if the units would be required to

have operational limits based on the guaranteed emissions. Also these units are peaking units, which operate only a limited number of times during the year.

- Staff removed the bonus/penalty section, which 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 EC3 and EC4 units are "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.

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 EC3 and EC4 Units to meet the rest of the criteria, the units must be operational. 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. Has this criterion been met?

A. Yes. I visited the site on July 19, 2004, and found all major construction work completed.

Q. Please explain Staff's criteria item 2.

A. Item 2 of the Staff's criteria requires that all the pre-operational tests have been successfully completed.

Q. Has this criterion been met?

A. Yes. I have reviewed the Pratt & Whitney commissioning manuals for the turbines and the Bush generator commissioning report for the generators. I found all

pre-operational tests completed. Copies of the cover and table of contents pages are shown in Schedule 5.

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

A. Item 3 and Item 4 of the Staff's criteria require the new EC3 and EC4 Units to be able to start normally and stop normally. The Staff believes that for the EC3 and EC4 Units to be "fully operational and used for service" the units should start and stop as designed. This is similar to Staff's criteria developed for State Line Units Nos. 1 and 2.

Q. Have these two criterion been met?

A. Yes. I have reviewed the operational logbooks for both units covering the period of time from April 2003 through June 2004, which indicate the units have met this criterion.

Q. Please explain Staff's criteria Item 5.

A. Item 5 of Staff's criteria requires that the unit has demonstrated the capability to operate as designed at a minimum load. The unit may be required to operate at that load due to Empire's system requirements. Staff believes the units should be able to operate at the minimum load point.

Q. Have the units met this criterion?

A. Yes. I have reviewed the operating data for both units from May 2003 through July 2004. During this period EC3 Unit operated at or near the minimum load point for 66 hours, and EC4 Unit has operated at or near the minimum load point for 101 hours indicating that the units have met this criterion. See Schedule 6.

Q. Please explain Staff's criteria Item 6.

A. Item 6 of the Staff's criteria requires that the units demonstrate the capability to operate as designed at nominal load. The Staff believes that it needs to be established that the EC3 and EC4 Units are capable of generating close to its nominal capacity for a reasonable period of time.

Q. Have the units met this criterion?

A. Yes. I have reviewed the operating data for both units from May 2003 through July 2004. During this period EC3 Unit operated at or above the nominal load point for 193 hours, and EC4 Unit operated at or above the nominal load point for 197 hours. This indicates that the units have met this criterion. See Schedule 6.

Q. Please explain Staff’s criteria Item 7.

A. Item 7 of Staff’s criteria requires that the units to have successfully met all contract operational guarantees.

Q. Have the units met this criterion?

A. Yes. I have reviewed the results of the performance testing done for both units. The units met all operational guarantees. Copies of the summary pages are shown in Schedule 7.

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 EC3 and EC4 Units into Empire's electrical system. Staff believes the EC3 and EC4 Units energy cannot be "used for service" if the energy they produce cannot be transmitted into the electrical system.

Q. Has this criterion been met?

A. Yes. I have reviewed the transmission planning results for the Empire's system including the new units (Beecher Direct schedule BPB-4), and the design capacity ratings of the transmission lines from Energy Center Plant. My review of these documents indicates that there is sufficient transmission capacity. See Schedule 8.

Q. Please explain Staff's criteria Item 9.

A. Item 9 of Staff's criteria requires that the EC3 and EC4 Units will successfully demonstrate the ability to start on liquid fuel. These units are capable of operating on both natural gas and fuel oil. Staff's criteria require that the units can start on the back up fuel oil.

Q. Has this criterion been met?

A. Yes. I have reviewed the operational log (Beecher Direct Schedule BPB-4) and operating data sheets (See Schedule 9) for the start up on oil.

Q. Please explain Staff's criteria Item 10.

A. Item 10 of the Staff's criteria require the Units to successfully demonstrate the ability to transfer from natural gas fuel to liquid fuel.

Q. Has this criterion been met?

A. Yes. I have reviewed the operational log (Beecher Direct schedule BPB-4), which demonstrate that the units have the ability to transfer from natural gas to fuel oil.

Q. What is your conclusion regarding in-service testing of the EC3 and EC4 Units?

A. Based on my review and analysis of the data, the EC3 and EC4 Units have met all of the required in-service criteria. Therefore, I recommend that the EC3 and EC4 Units be considered fully operational and used for service.

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. Has Staff previously performed a construction audit on an Empire project?

A. Yes. Most recently the Staff audited the construction of the State Line Combined Cycle unit in 2001.

Q. Which Staff personnel performed the construction audit of EC3 and EC4?

A. Staff witness Roberta McKiddy and I, in conjunction with the Staff Co-Case Coordinator, Steve Rackers conducted the construction audit.

Q. What was your responsibility on the construction audit?

A. I monitored the progress of the project during construction and reviewed the costs associated with the project.

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

A. Yes. During the construction of EC3 and EC4, Empire had to remove the primary contractor, Patch Construction L.L.C. (Patch) from the project, resulting in additional costs to complete the project above the adjusted contract price.

Q. Why did Empire remove Patch from the project?

A. Empire removed Patch from the project on January 28, 2003, because Patch was unable to complete the project for the adjusted contract price.

Q. Did this impact the schedule of the project?

A. No. Empire was able to meet its original completion date of spring 2003.

Q. Did this impact the cost of the project?

A. Yes. The cost of the project was impacted primarily because of the inability of Patch to properly manage the cost of the project. Staff's review of Empire's Expense report for Energy Center FT8 TwinPac project dated 7/29/04 indicates the final project cost included an additional $4,052,535 paid to the subcontractors above the approved adjusted contract amount.

Q. Is this the total cost incurred due to the problems with Patch?

A. No. This was only the cost to pay the subcontractors to complete the project after Patch, the project construction contractor, was paid the full amount of its contract and the project was still not completed. To complete the project, Empire also paid $253,687 to Black & Veatch for safety and accounting personnel to finish the project, and paid $15,135 in legal fees to pursue a judgment for damages against Patch. The total cost incurred by Empire due to the problems with Patch is $4,321,356 (See Schedule 10).

Q. What would the consequences have been if Empire had not paid the subcontractors to complete the work?

A. Without paying the subcontractors to finish the work, the project would have stopped, delaying the operational date of the turbines. Empire needed capacity for

the summer of 2003, and any delay would have meant that Empire most likely would have had to purchase capacity through a short-term capacity agreement.

Q. Was there anything in the contract Empire had with Patch that should have prevented this cost overrun?

A. Yes. Article 5.5 and Exhibit G of the original contract between Empire and Patch required Patch to provide Empire with a performance bond within 21 business days after the contract was signed on February 15, 2002.

Q. What is a performance bond?

A. Black's Law Dictionary, Seventh Edition, page 1158 defines a performance bond as: " 1. A bond given by a surety to ensure the timely performance of a contract. . . . 2. A third party's agreement to guarantee the completion of a construction contract upon the default of the general contractor."

Q. Did Patch provide a performance bond to Empire as required by the contract?

A. No.

Q. Does Staff believe this $4,321,356 should be included in rate base?

A. Staff witness Roberta McKiddy of the Accounting Department will address the ratemaking treatment of this amount in her testimony.

Q. Did you review other cost overruns for this project?

A. Yes. I reviewed the change orders written to modify the cost of the project from the initial contract cost.

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

A. A change order is a method by which the contractor receives approval from the company to initiate a change in the work and/or the cost specified in the original contract. Change orders provide a method by which the company can track any changes in the cost of the project and provide specific information as to why the cost changed.

Q. Has Empire issued change orders for the EC3 and EC4 construction project?

A. Yes.

Q. Have you identified any additional concerns with the cost overruns associated with the project other than the $4,321,356 already discussed above?

A. No. I reviewed the cost overruns incurred on the project by reviewing all change orders and Empire has provided information to the Staff to adequately explain and justify the additional cost overruns incurred for the Energy Center project

Q. What is the amount of additional cost overruns incurred by the Company for the EC3 and EC4 Units?

A. The Staff reviewed change orders in the amount of ** HC ** .

Q. Can you summarize the cost overruns?

A. Yes. Schedule 11 identifies the major change order cost overruns.

Q. Is it unusual to have cost overruns on a project of this size?

A. No. Most construction projects have cost overruns. The larger the project, the more complex the project is. The more complex a project is, the more likely it is that unforeseen situations will occur as construction progresses.

Q. Does Schedule 11 and your previous discussion explain all of the cost overruns on this project?

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A. Yes.

Q. What information did you review to identify the cost overruns?

A. I reviewed the change orders relating to increased project cost estimates, and discussed them with Empire personnel.

Q. Did you group these change order costs into major categories?

A. Yes. I have identified four categories in which the major change orders can be grouped. These four categories are:

I. Change orders due to the final design decisions.

II. Change orders due to additions made to the project design by Empire.

III. Change orders due to the changes made for unexpected conditions discovered during the construction.

IV. Change orders due to minor changes to work.

Q. Please explain category I.

A. These change orders were required because this project, as most large projects are, was bid before final design decisions were made. As a result some contracts were issued with the expectation that change orders would need to be written later based on final design requirements. An example would be the ** HC HC **. The original bid proposal ** HC HC **. Empire reviewed the original proposal and ** HC **.

Q. Please explain category II.

A. These change orders were written for the additional design changes made by Empire as the project progressed. An example of this would be the entrance to the

basement control cable room for the combustion turbines. Empire made a decision to add an entryway to the basement replacing the ladder access arrangement in the original design.

Q. Please explain category III.

A. These change orders were written for the additional work and/or material needed to overcome unforeseen problems that occurred during the construction. An example of this would be the additional excavation work required after the project started. The original design required a specific amount of excavation to be done based on preliminary borings, but after the site excavation started an excessive amount of rock was encountered that had to be removed.

Q. Please explain category IV.

A. On any project there is a possibility that some of the work will not follow the original design or the planned construction. A project of this size, involves many different pieces of equipment built by different suppliers, which are designed to be assembled into one operating unit. Under these circumstances, the number of possible construction problems increases. Typically, the engineer on a project attempts to plan for this kind of work by including a contingency amount to cover the costs incurred for this unexpected or unforeseen work

Q. What is the Staff's recommendation of the EC3 and EC4 Units revised project costs based on the change orders?

A. The Staff recommends the change order costs of ** HC ** be subject to rate base treatment.

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Q. Do you think Empire needs to do a better job of tracking project costs in the future?

A. Yes. I found room for improvement. Staff has been informed by Empire, that it ** HC HC **. Also, from discussions with Empire personnel during Integrated Resource Planning meetings, Staff is aware that Empire is ** HC HC HC ** With these possible future projects, Empire needs to improve how it tracks its own project costs. This would allow anyone, including Empire's internal and/or external auditors, to be able to follow the changes in the costs and verify the reasons why the final project cost was different than the initial budgeted cost even years later. Staff would be glad to meet with Empire on an informal basis to discuss how to set up a system that would work better at tracking Empire's future project construction costs.

Q. Does this conclude your direct testimony?

A. Yes, it does.

NP