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Issues: Normalized Energy & Purchase Power Expenses
Witness: Timothy D. Finnell
Sponsoring Party: Union Electric
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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. EC-2002-1

REBUTTAL TESTIMONY

OF

TIMOTHY D. FINNELL

ON

BEHALF OF

UNION ELECTRIC COMPANY
d/b/a AmerenUE

Exhibit No. 140
Date 7/10/02 Case No. EC-2002-1
Reporter KEM

St. Louis, Missouri
May, 2002

REBUTTAL TESTIMONY

OF

TIMOTHY D. FINNELL

CASE NO. EC-2002-1

Q. Please state your name and business address.

A. My name is Timothy D. Finnell. My business address is 1901 Chouteau Avenue, St. Louis, Missouri 63103.

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

A. I am employed by Ameren Services Company as Supervising Engineer of the Operations Analysis Group.

Q. Please describe your education.

A. I received my Bachelor of Science Degree in Industrial Engineering from the University of Missouri at Columbia in May 1973. I received my Masters of Science Degree in Engineering Management from the University of Missouri at Rolla in May 1978. I am a Registered Professional Engineer in the State of Missouri.

Q. Please describe your duties and qualifications.

A. I am the Supervising Engineer of the Operations Analysis Work Group, in the Energy Supply Operations Department of Ameren Services. My duties include developing the Corporate Fuel Budget, reviewing and updating economic dispatch parameters for the Ameren generating units, providing justification data for power plant projects, and performing other special studies.

I joined the Operations Analysis work group in 1978 as an engineer. As an engineer, I was responsible for updating the computer code of the System Simulation

Program, which was the Union Electric production costing model. I also have prepared the Union Electric Fuel Budget, performed economic studies for power plant projects, and prepared production cost modeling studies for Union Electric rate cases since 1978. I was promoted to Supervising Engineer of the Operations Analysis work group in 1985.

Q. **What is the purpose of your testimony?**

A. The purpose of my testimony is to describe the results of my analysis of the direct testimony and workpapers of Mr. Leon Bender in this case and to calculate an adjustment to the actual fuel and purchase power expenses to reflect normalized energy and purchase power expenses.

In my analysis I found that Mr. Bender did not accurately determine the normalized fuel and purchase power expenses of AmerenUE.

In addition, as part of my testimony, I have prepared an **Executive Summary** attached hereto as Appendix A.

Q. **Please summarize your testimony.**

A. Mr. Bender failed to properly calibrate the production cost model he used for determining fuel and purchase power expenses. This resulted in inaccurate fuel and purchase power expenses. Mr. Bender's production cost model of the AmerenUE generating units suffers from the following problems: equipment related load reductions were not modeled; fuel quality load reductions and maintenance outages were not modeled; 13 hypothetical combustion turbine generators (CTGs) are used to replace actual purchase power contracts; fuel costs are inaccurate; plant heat rates are out of date; and several generating units have an excessive number of hot and cold starts.

Another problem occurred when Mr. Bender utilized estimated purchase power prices for firm power purchases, which were lower than the actual purchase power prices.

Each of these improper modeling assumptions resulted in understated fuel and purchase power expenditures. Mr. Bender is <u>understating</u> the production costs by over $9,500,000.

Q. Do you consider Mr. Bender's production cost modeling to be adequate for rate making purposes?

A. No I do not. Mr. Bender's production modeling results have had a history of problems. A review of the production cost modeling supplied with his July 1,2001 testimony had the following problems:

- It did not contain the impact of the Joint Dispatch Agreement (JDA) between UE and Ameren Energy Generation. The lack of JDA results in fewer resources available for serving the AmerenUE load and results in higher than expected fuel and purchase power costs.
- The production cost model did not include all of the outages on the generating units. Missing outages included Callaway refueling outage coast down and start up deratings, short duration maintenance outages, and unit deratings due to equipment problems and fuel quality. The exclusion of these outages results in overstating the availability of generation resources, which cause production costs to be understated.

- The unit heat rates were lower than actually experienced. The heat rate error was due to the exclusion of the Efficiency Deviation Factor (EDF) for each generating unit. This error resulted in an understating of the quantity of fuel burned to produce each MWH of generating unit output and causes production costs to be understated.
- The actual energy costs of several long-term purchase power contracts were never trued up to actual costs. Mr. Bender used estimated costs that were lower than the actual costs of purchase power. The result is an understatement of purchase power expenses.
- The production cost model had some units cycling on and off more frequently than occur during real time operations. The excessive cycling of units creates unreliable modeling results. Some of the unrealistic model results include the Rush Island units setting generation records while the Sioux units produce less than 20% of their actual generation level. These unrealistic generation forecasts result in unreliable fuel and purchase power cost estimates.
- The production cost model recognized only coal as the primary fuel burned at the Meramec plant. Actually Meramec can burn coal or gas to produce electricity. By only recognizing the cost of

coal burned at Meramec, the production cost model understates the total fuel cost at Meramec.

- Mr. Bender did not model "operating reserves". A portion of the operating reserves is called "spinning reserves". The spinning reserves included units that are on-line but not fully loaded. The unused portion is available to respond to system emergencies, such as a forced outage on anther generating unit. The elimination of operating reserves will cause fuel and purchase power expenses to be understated.

Q: These problems were in his July 2001 filing. Have any of them been subsequently corrected?

A. A review of the production cost modeling results supplied with Mr. Bender's March 2, 2002 testimony indicated that he had fixed many of the problems found in the original testimony. The corrections were made as a result of errors found by the MPSC staff and as a result of questions asked of Mr. Bender in his original deposition. The corrected items include: modeling of the JDA, utilization of an EDF, inclusion of the Callaway refueling outage coast down and ramp up deratings.

Q: Do you consider Mr. Bender's <u>second</u> production cost modeling to be adequate for rate making purposes?

A: No. Several errors were not corrected, and new errors were made. The following is a list of problems found with the production cost model runs supplied with Mr. Bender's March 2, 2002 testimony:

Continuing Problems

- Callaway refueling outage coast down and start up deratings, short duration maintenance outages and unit deratings due to equipment problems and fuel quality were missing or calculated incorrectly.
- An EDF factor was utilized in the production cost model, however the EDF was not the most current value supplied to Mr. Bender by the Company. The impact of not using the most current EDF is that the fuel burn per MWH of generation calculated by the model will not be accurate.
- The energy costs of several long-term purchase power contracts were never trued up to actual costs.
- The production cost model continued to cycle some units on and off more frequently than real time operations would permit.

New Problems

- The generating unit fuel costs reported by the model did not vary from month to month. Since actual fuel and production cost model inputs do vary by month, there appeared to be a production cost model error.
- Mr. Bender eliminated the costs of several purchase power agreements and substituted the 13 hypothetical Combustion Turbines. The purchase power agreements that were eliminated included a 115 MW purchase from Mid American Electric, a 450 MW purchase from Ameren Energy Marketing and a 50 MW

purchase from American Electric Power. By replacing the purchase power agreements with 13 hypothetical CTGs, Mr. Bender significantly lowers the production costs actually incurred by AmerenUE.

Q. Do you know if Mr. Bender plans to correct any of the problems that exist in the production cost model runs used in the March 2 filing?

A. Yes. I believe that he plans to update his production cost model and he will have new results. At Mr. Bender's April 19, 2002 Deposition he indicated that several changes had been made to his production cost model run. The changes included a model update to correct a computer programming problem that resulted in erroneous fuel cost calculations. I have had discussions with Mr. Bender regarding the plant heat rates for the test year. I informed him that the EDF supplied to him in MPSC DR # 2918 covered the test year and would be the best EDF value for calculating plant heat rates. I assume that the new EDF will be incorporated in future production cost model runs. Also, in a telephone conversation I pointed out that Mr. Bender's data base for planned outages was inconsistent from year to year. Some years the planned outages had short-term maintnenace outages and other years the maintenance outages were missing. I have sent Mr. Mr. Bender an updated generating unit outage database and it is my assumption that he will correct this problem in future runs.

Q. Why are Mr. Bender's results so unreliable?

A. The most significant problem is that Mr. Bender failed to calibrate his production cost model. In addition, and importantly, he made several other errors which cause his results to be unreliable. I will discuss these in greater detail.

Q. What do you mean by the term "calibration"?

A. Calibration is the process by which one compares the outcome of a production cost model run with actual data. Calibration is done by setting up the production cost model to match known conditions, running the model, and comparing the results to actual data. If large variations in statistics such as unit generation levels, unit heat rates, and the number of generating unit start-ups occur, the production cost model inputs need to be reviewed and modified. Many runs may be needed before a production cost model is properly calibrated.

Q. Can you give some examples where this failure to calibrate the model indicates a problem with Mr. Bender's results?

A. Yes. One example is the number of hot starts for the Rush Island and Sioux generating units obtained from the work papers of Mr. Bender's direct testimony.

Q. Are the number of hot starts for the Rush Island and Sioux generating units submitted in Mr. Bender's work papers reasonable?

A. No, they are quite unreasonable. The following table shows a comparison of actual hot starts for the period July 2000 - June 2001 vs. Mr. Bender's forecast of hot starts for these units.

Unit	Actual Hot Starts for July 2000 - June 2001 Ameren Joint Dispatch Run	Mr. Bender's Forecast of Hot Starts Ameren Joint Dispatch Run
Rush #1	5	16
Rush #2	8	49
Sioux #1	2	84
Sioux #2	2	91

The large variation between actual hot starts and forecasted starts reported by Mr. Bender's production cost model indicates that the model is not calibrated correctly and will produce unreliable results.

Q. Did Mr. Bender have any information that would indicate that the number of hot starts projected by his model was unusually high?

A. Yes he did. The response to data request MPSC DR #2921 contained the number of hot starts for each Ameren generating unit for the period July 2000 through June 2001. Also, data provided in response to MPSC DR #2915 and #2917 indicated that these units were classified as "must run" units. The "must run" status means that the production cost model should run the unit whenever it is available and that it should not cycle the units on and off. The production cost modeling results from cycling the units on and off too frequently are typically lower than when a unit is left on all of the time.

Q. Why would a unit be classified as "must run"?

A. Units may be classified as "must run" because they incur increased operating and maintenance expenses and higher forced outage rates when they are cycled on and off. The extra costs are difficult to quantify. Thus, instead of adding these costs to the start-up costs, the unit is classified as "must run" and is not cycled on and off.

Q. Are the production costs for the other plants, as determined by Mr. Bender, also unreasonable?

A. Yes. For instance, Callaway generation is too high. The workpapers supplied by Mr. Bender indicated that coast-down deratings prior to the Callaway refueling outage and the start-up derating which follow the Callaway refueling outage resulted in 9,165 MWH of outages at Callaway. During the spring 2001 Callaway refueling outage, the plant had coast-down deratings of 47,030 MWH and start-up deratings of 98,836 MWH. The MWHs lost due to these deratings are equivalent to having an additional 5.3 days of Callaway outage associated with refueling. By not correctly considering the coast-down and start-up deratings, Mr. Bender's production cost modeling overstates the Callaway generation. Since Callaway is one of AmerenUE's lowest energy cost plants, the excess generation in the production cost model output results in understating the energy cost to supply the AmerenUE load.

Q. Are there other problems with Mr. Bender's production cost modeling of generating unit availabilities?

A Yes. Although Mr. Bender modeled planned outages and forced outages, he failed to model load reductions. *See, Bender Deposition November 19, 2001 at 79; 6-14.*

Q. What are load reductions?

A. Load reductions or partial outages are limitations that restrict the unit from generating at its rated capability. Load reductions can occur because of equipment problems, emissions constraints, fuel quality, or other operating practices.

Q. What happens if the load reductions are not included in the production cost model?

A. Since load reductions are not included in Mr. Bender's production cost model, the normalized unit generation will be higher than those that would occur during actual operations. The extra generation assumed in Mr. Bender's production cost model inaccurately results in lowering the fuel and purchase power costs because it assumes that the low cost units generate more energy than could be expected during actual operations.

Q. Did fuel quality load reductions occur during the test year period?

A. Yes, fuel quality load reductions occurred at the Sioux plant and Meramec plant.

Q. Why do fuel quality related load reductions occur?

A. Fuel quality load reductions occur when low Btu fuel is burned. Load reductions occur when the physical limits of the fuel handling and boiler are reached before the maximum generator output occurs. Fuel quality limitations began occurring when AmerenUE plants began burning low Btu coal from the Powder River Basin (PRB). The PRB coals were purchased because they are less expensive than higher Btu Illinois coals. Also, the PRB coals typically have lower SO2 emissions than Illinois coals.

Q. Does AmerenUE rely solely on PRB coals at Sioux and Meramec?

A. No. The Sioux and Meramec plants utilize a fuel blending strategy. Since burning PRB coals results in load reductions at these plants, the PRB coal is burned during low demand periods. The plants switch to higher Btu coal, which allow full plant output when demands rise. This fuel blending strategy results in minimizing overall production costs.

Q. What happens to energy cost projections when fuel quality load reductions are not modeled correctly?

A. Because fuel quality load reductions are not modeled properly, Mr. Bender's projected energy costs will be understated. The energy costs are understated because the production cost model has more generation than is possible from the fuel that was purchased and burned at the Sioux and Meramec plants.

Q. Did Mr. Bender's production cost model consider maintenance outages?

A. The work papers supplied by Mr. Bender indicated that he was inconsistent with the use of maintenance outages in his modeling. The data showed that 2001 planned outages included maintenance outages, however the planned outage data for 1997 through 2000 did not contain maintenance outages. Since Mr. Bender uses a 5 year average for planned outage hours, the missing maintenance outage hours over-state the generating unit's availability.

Q. What are maintenance outages?

A. Maintenance outages are short-term outages that are used to make repairs or improvements to the plant operations.

Q. What is the difference between planned outages and maintenance outages.

A. "Planned outages" are major unit overhaul outages that are usually planned months or years in advance. Planned outages are often five weeks or longer and have intervals of eighteen months or longer. Planned outages are done to perform normal maintenance activities and to install new equipment. "Maintenance outages" are short-term outages used to correct current operating problems. Maintenance outages typically last from one to seven days.

Q. What is the difference between a maintenance outage and a forced outage?

A. A forced outage occurs when a piece of equipment malfunctions and the unit must come off within a short period of time. One of the major differences between a forced outage and a maintenance outage is that the outage is classified as a maintenance outage if the unit can remain on line until the weekend following the equipment failure. Thus the maintenance outage has some potential for scheduling the unit outage, whereas a forced outage has very little scheduling flexibility.

Q. What happens if maintenance outages are not included in the production costs model?

A. Since maintenance outages are understated in Mr. Bender's production cost model, the normalized unit generation will be higher than that which would occur in the actual operations. The extra assumed generation would result in inaccurately lowering the fuel and purchase power costs because low cost units would be assumed to generate more energy than could be expected during actual operations.

Q. Did you find problems in how Mr. Bender modeled the input/output curves for the AmerenUE generating units?

A. Yes. The work papers provided by Mr. Bender indicated that he did not utilize the most current Efficiency Deviation Factor (EDF) for the AmerenUE generating units. An update to the EDF was provided to Mr. Bender in AmerenUE's response to MPSC DR 2918 REV.

Q. What is an Efficiency Deviation Factor?

A. The Efficiency Deviation Factor is a correction factor for a generating unit's input/output curve that updates the curve for changes that have occurred since the original input/output curve was developed.

Q. What is an input/output curve?

A. The input/output curve is the name of the relationship between the amount of fuel "input" to the boiler and the "output" of the generator. The typical units of the input/output curve are BTUs of fuel required to produce kilowatt-hours of net electrical output.

Q. How is an input/output curve and a heat rate curve related?

A. The input/output curve and the heat rate curve are directly related to one another. The input/output curve shows the total fuel required to produce a unit of electricity and the heat rate curve shows the average amount of fuel to produce a unit of electricity. The heat rate curve is calculated by dividing the input by the output for each output level. The units of a heat rate curve are "Btu/kWh".

Q. What is the impact of not using the most current Efficiency Deviation Factor?

Using the wrong EDF will result in inaccurate fuel consumption calculations, which would result in inaccurate fuel cost calculations.

Q. Is the Meramec fuel cost calculated correctly?

A. No. The Meramec fuel cost report listed in Mr. Bender's work papers is understated because it does not show a reasonable amount of gas burn. During the test year period, Meramec burned $3,047,884 of gas. Mr. Bender shows only $546,000 of gas burn in his production cost model results.

Q. Why does Meramec burn so much gas?

A. Meramec plant can burn coal or gas. If a coal mill is out of service the lost coal capacity can be replaced by burning gas. Also, there is some gas consumption for flame stabilization and for use when coal quality limits the generating unit's output.

Q. Were contract purchase power agreements used in Mr. Bender's production cost model?

A. Yes.

Q. Were the contract purchase power agreements modeled correctly?

A. No. The energy prices of the contract purchase power were not modeled correctly. Mr. Bender used prices supplied to the MPSC staff by AmerenUE for fulfillment of Commission Rule 4 CSR 240-20.080. The report contains hourly interchange volumes and prices. The prices listed for the contract purchases are estimated prices. The estimated prices are not trued up until after the end of the month when the company providing the energy produces an actual bill. This price discrepancy occurs with contract power purchases from Electric Energy Incorporated, Mid American Energy, and Arkansas Power & Light. For the Staff's test year period the estimated prices have been lower than the actual billed prices, thus Mr. Bender's production cost model results in lower purchase power costs than were actually incurred.

Q. Did Mr. Bender utilize all of the purchase power contracts that AmerenUE had during the test year period, October 1, 2001 through September 30, 2001?

A. No. He did not. Mr. Bender's production cost model run did not utilize the actual purchase power contracts with Mid American Energy, Ameren Energy Marketing, and American Electric Power. Mr. Bender replaced these resources with 13 hypothetical CTGs.

Q. What is the impact of eliminating the actual purchase power contracts and replacing them with combustion turbines?

A. Substituting an actual power source with a hypothetical power source makes calibration of the model very difficult because it can result in redispatching many of the generating units, thus making it difficult to compare model results to actual data. Also, in this case the elimination of the actual purchases power contracts lowers actual fuel and purchase power expensed below the level which actually occurred.

Q. Have you done production cost modeling for this case?

A. Yes, I have. I have made runs which are calibrated to the actual time period of October 1, 2000 through September 30, 2001. This time period coincides with Mr. Bender's production cost model runs.

Q. What production cost model was utilized?

A. The PROSYM production cost model was utilized.

Q. How long have you utilized the PROSYM production costs model?

A The PROSYM model was purchased in 1995. I have worked with the model extensively since that time.

Q. How does Ameren use the PROSYM model?

A. PROSYM is used for many different studies relating to power plant economics. The major applications are: fuel budgeting, environmental compliance studies, evaluation of plant upgrades, evaluating major unit overhaul schedules, and regulatory work.

Q. Please describe the PROSYM modeling that was done for this case.

A. Two production cost runs were completed for a test year period, October 1, 2000 through September 30, 2001. The first production cost model run was used to calibrate the model and is based on <u>actual</u> net output, actual fuel costs, and actual plant availability. The second production cost model run contained the normalized net output, actual fuel costs, actual plant availability, and normalized hydro.

Q. Are the production cost model results always reliable?

A. No, production cost model runs may not always be reliable. Production cost models may not be able to duplicate the real world and the results may contain problems that result in overstating or understating production costs. Several limitations are:

- The production cost model may be inadequate. A model is inadequate if it does not handle normal operating conditions such as load reductions, spinning reserves, unit ramp rates, or if it does not properly handle hydro pumped storage facilities like Taum Sauk.
- Actual data may not be readily available to prepare modeling inputs or it may be of poor quality. An example of data that is difficult to obtain is the depth and price of purchase power. Even though the actual price and volume may be known for a specific date and time, these parameters may change as conditions change with various production cost model run assumptions.
- There may be user input errors. Errors can occur when input data is entered incorrectly or the most current data is not utilized.
- The production cost modeler may be inexperienced. For example a production cost model may allow the user to select the number of passes the model makes for random forced outages. An experienced modeler

would know if five passes, ten passes or fifty passes would provide good model results.

- Actual unit dispatch may be less than ideal. This happens when units are held at a constant load for testing, plant operators or energy supply operations dispatchers intervene by restricting ramp rates or manually controlling unit loads, or energy supply operations dispatchers operate with higher than the minimum required reserve margins.

Q. **Do you recommend using a stand alone production cost model for determining adjustments to actual fuel and purchase power costs?**

A. No I do not. As I mentioned earlier, production cost models have limitations and may produce inaccurate results which may adversely impact the calculation of fuel and purchase power costs.

Q. **How do you solve the problem of production cost model limitations?**

A. My approach is to utilize two production cost model runs, which I have done in this case. The two production cost model runs were made to reduce the impact that modeling limitations have on the calculation of normalized production costs. Model limitations are the same in both runs; thus the difference between the two runs is a good measure of the adjustments necessary to go from actual production costs to normalized production costs. Thus, for the purposes of this case, the normalized production costs are based on the following formula:

> Normalized production costs = actual production costs + (model results of actual production costs – model results of normalized production costs).

Q. **What is meant by net output?**

A. Net output is equal to the energy sold to the AmerenUE customers plus the line losses between the generator and the customer meter. The net output is used in the production cost model because costs must be calculated for the energy used directly by the customer plus the energy losses associated with the energy transformations which occur between the generating units and the customer meters.

Q. What is normalized net output?

A. The normalized net output is an estimated net output based on normal usage patterns. The most common parameter for normalizing the net output is weather. Other normalization factors may include the addition or loss of customers and adjustments for unbilled customer usage.

Q. What is normalized hydro?

A. AmerenUE operates two traditional hydro plants, Osage and Keokuk. The generation from these plants is dependent on river flows. Since river flow is closely related to the weather conditions, normalized hydro generation should be used rather than actual hydro generation. Thus, the production cost model results will be consistent when normalizing key production cost parameters that are impacted by weather conditions.

Q. What were the results of your production cost model?

A. The results of the first run, which simulated actual fuel and purchase power expenses for October 1, 2000 through September 30, 2001, showed fuel and purchase power expenses to supply the AmerenUE load to be $410,732,712, a net output of 39,581,328 MWH and a rate of $10.38 /MWH. The results of the second run, which simulated the impact of normalized net output for the same time period, showed fuel and purchase power expenses of $373,112,603, a net output of 37,211,409 MWH and a rate of $10.03/MWH. The difference between these two production cost runs is a reduction in fuel and purchase power expenses of $37,620,109 and a reduction in net output of 2,369,919 MWH.

The fuel and purchase power expenses include: the fuel costs for start-up and plant operations and the energy charges of purchase power used to supply the net output requirements for AmerenUE. The costs exclude emissions costs, any variable plant O&M expenses, and any demand charges associated with the purchase power.

Q. How do these results compare to Mr. Bender's?

A. Mr. Bender's model run understates production costs by over $9,500,000 when using AmerenUE's normalized net output.

Q. How are your production cost model results used in this case?

A. The production cost model results are used by Mr. Gary Weiss. Mr. Weiss uses the difference between the two production model runs to make an adjustment to actual fuel and purchase power expenses. For the October 1, 2000 to September 30, 2001 test year period the adjustment made to actual fuel and purchase power expense to calculate the normalized net output is $37,620,109.

Q. Does this conclude your testimony?

A. Yes it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

The Staff of the Missouri Public Service Commission, Complainant,	)	
vs.	)	Case No. EC-2002-1
Union Electric Company, d/b/a AmerenUE, Respondent.	)	

AFFIDAVIT OF TIMOTHY D. FINNELL

STATE OF MISSOURI)
) ss
CITY OF ST. LOUIS)

Timothy D. Finnell, being first duly sworn on his oath, states:

1. My name is Timothy D. Finnell. I work in St. Louis, Missouri and I am employed by Ameren Services Company as Supervising Engineer of the Operations Analysis Group.

2. Attached hereto and made a part hereof for all purposes is my Rebuttal Testimony on behalf of Union Electric Company d/b/a AmerenUE consisting of 20 pages, Appendix A ~~and Schedule 1~~, all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

Timothy D. Finnell
Timothy D. Finnell

Subscribed and sworn to before me this 3rd day of May, 2002.

Debby Anzalone
Notary Public

My commission expires:

DEBBY ANZALONE
Notary Public - Notary Seal
STATE OF MISSOURI
St. Louis County
My Commission Expires: April 18, 2006

EXECUTIVE SUMMARY

Timothy D. Finnell

Supervising Engineer of the Operations Analysis Work Group in the Energy Supply Department of Ameren Services

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The "production cost model" runs by Staff witness Leon Bender must not be used to determine Ameren fuel and purchase power expenses. Most significantly, Mr. Bender failed to calibrate his model to actual data. If he had calibrated his model he would have found problems such as missing data relating to equipment-related load reductions, fuel quality load reductions, and maintenance outages. He chose to use hypothetical combustion turbines instead of actual purchase power contracts, his fuel costs were inaccurate, his plant heat rates were out of date, and he models grossly excessive hot and cold starts for several generating units. In addition, he used estimated purchase power prices, when actual prices were available.

A proper analysis of the Company's production costs, by running models correctly, shows that Mr. Bender understates the Company production costs by over $9,500,000.

Mr. Bender made many errors and omissions in the model run included in his original testimony filed in July 2001. After informing him of these errors, he corrected many, left some uncorrected, and I have since found additional errors in his model run included in his March 2002 filing.

Simply put, Mr. Bender's production cost modeling is not adequate for a true determination of Ameren's fuel and purchase power expenses in this case.