Exhibit No.:	
Issues:	Fuel Model; Purchase Power
Witness:	Leon C. Bender
Sponsoring Party:	MoPSC
Type of Exhibit:	Surrebuttal Testimony
Case No.:	ER-2001-299
Date Testimony Prepared:	May 17, 2001

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

SURREBUTTAL TESTIMONY

OF

LEON C. BENDER

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2001-299

Jefferson City, Missouri
May, 2001

Exhibit No. 38
Date 5/29/01 Case No. ER-2001-299
Reporter Ken

SURREBUTTAL TESTIMONY

OF

LEON C. BENDER

THE EMPIRE DISTRIC ELECTRIC COMPANY

CASE NO. ER-2001-299

Q. Please state your name and business address.

A. Leon C. Bender, P.O. Box 360, Jefferson City, Missouri, 65102.

Q. Are you the same Leon C. Bender who filed direct and rebuttal testimony in this case?

A. Yes, I am.

Q. What is the purpose of your surrebuttal testimony in this case, The Empire District Electric Company (EDE) rate case, Case No. ER-2001-299?

A. The purpose of my surrebuttal testimony is to respond to the rebuttal testimonies of Greg Sweet and Brad Beecher of EDE regarding the results of Staff's and EDE's electric production cost model simulation that is used to determine fuel and purchased power cost for EDE for the test year.

Q. Did you review the testimonies of EDE witnesses Gregg Sweet and Brad Beecher?

A. Yes, I did.

Q. What differences between Staff's production cost model and EDE's production cost model did Gregg Sweet and Brad Beecher address in their rebuttal?

A. The differences addressed in their rebuttal testimony were the differences in actual test year results, generating units used, fuel prices, amounts and prices of purchased power, capacity contracts used, the dispatch of the units by the model, and transmission constraints

Q. Were these differences discussed with EDE at the prehearing?

A. Yes. Contrary to the statement by Mr. Beecher in his rebuttal testimony that Staff offered no explanation, these differences were discussed with him and other employees of EDE during the prehearing conference the week of April 16, 2000.

Q. Should Staff's production cost model results represent actual test year expenses as alleged in Mr. Beecher's rebuttal testimony?

A. No. Actual expenses for the test year are not necessarily representative of expenses for any particular year. Each year is unique in the set of problems that arise because of weather, unit outages, fuel prices, market conditions, and management decisions. Staff normalizes as many of these factors as possible. It seeks to represent a normalized year and not necessarily match any one set of unique circumstances that may have arisen in a particular test year. It is not reasonable to assume the normalized expense would match that of any particular test year's actual result.

Q. Did EDE present a production cost model result of actual test year expenses?

A. No, the model results presented by EDE to Staff, were that of a looking forward basis. The model results presented by EDE represented what EDE anticipates its system will look like after the State Line Combined Cycle Unit (SLCC) is in service. All but one of the present capacity contracts were not included. EDE's model used futures gas prices rather than actual gas prices, and the energy spot market represented by EDE did not match test year actual data. It also based unit forced outages on anticipated trends in forced outages rather than on actual data. Any comparison of EDE's model expense results and actual test year expenses would be

unwarranted, and any fit that could be found, if such a comparison were to be made, would only be due to coincidence.

Q. What were the major differences in the generating units used in the Staff's production cost model?

A. These differences are discussed in my direct testimony. As stated in my direct testimony, these differences will be addressed in the true-up process.

Q. Has Staff made a production cost model run which more closely reflects the situation that will exist when the SLCC goes in service?

A. Yes, Staff has made production cost model runs that include the SLCC and removes the capacity contracts that will expire in the year 2001. One of these runs was used as a basis for the Stipulation and Agreement on fuel and purchase power expense between Staff, EDE and the Office of the Public Counsel.

Q. How does the production cost model dispatch the generating units?

A. The production cost model schedules generating units to dispatch in a least cost manner based upon the fuel cost and the cost of alternative purchased power. In considering whether to dispatch a unit, the must first be available.

Q. Greg Sweet stated in his rebuttal testimony that "the more efficient unit should run more than a less efficient one." Should the production cost model schedule a unit for dispatch simply because it is more efficient than others?

A. No. A unit should dispatch before another only if its cost is lower. Cost is determined by multiplying fuel price by heat rate. Among many things, the production cost model considers both the incremental cost of the next unit and the cost of purchased power when dispatching a unit. The incremental cost is the fuel price times the incremental heat rate. A unit with a higher heat rate (low efficiency), if available, will be dispatched before another unit with a

lower heat rate (high efficiency) if the total incremental cost is lower. Even though the heat rate of the SLCC unit is lower that of even Iatan, Asbury, and all other EDE units, its dispatch cost is still higher than other units and some available purchase power. The dispatch costs ($/MWH) are listed in my direct testimony in Schedule 1. To fashion a model that would favor running a higher cost unit before other lower cost alternatives, would not be appropriate.

Q. In Greg Sweet's and Brad Beecher's rebuttal testimony, they stated that the number of startups in Staff's production cost model was excessive. Have you compared this with actual number of starts?

A. No. EDE has not supplied that information. To make a proper comparison, EDE would need to document and supply to Staff information for the last five years on the total number of hot and cold startups on each of its units. The number of startups for SLCC does not yet exist.

Q. Have you looked at the factors controlling the number of startups?

A. Yes, I have. All the factors, that control the number of startups, were supplied to Staff by EDE. Staff will consider alternative numbers if EDE has mistakenly supplied us with incorrect numbers.

Q. Besides economical dispatch, what are these factors that control the number startups a unit will make?

A. The factors are listed below along with a brief explanation. Each factor is different for each unit.

Ramp Rate – This controls how fast units can start up and is in units of MW per minute. Typically gas turbines can start up and reach full load very quickly while larger coal units start up much slower.

Minimum Uptime – This controls the number of hours a unit must remain on line once it is started up. If a unit is already running and has a minimum uptime of 8 hours the model will continue to run that unit for 8 hours before it can shut it down. A large number in this field would cause the model to continue running this unit rather dispatch another unit.

Minimum Downtime – This controls the number of hours a unit must remain shut down once it is shut down by the model. By not allowing the unit to start up once it is shut down, one can control the dispatch and number of startups on a unit.

Defined Cold Hours – This field contains the number of down time hours it takes to cause a unit to require a cold start instead of a hot start. When a unit is down for at least this number of hours, the cold start values will be used the next time the unit is started.

Q. Are the factors mentioned above the only factors that determine whether or not a unit is started up?

A. No, but they are the major factors. A unit will dispatch if it is available and it is economical to do so.

Q. Does the number of starts a unit has impact the total expense?

A. Yes, each unit has a fixed cost to hot startup and a cold start up and this cost is multiplied by the number of starts and added to the total expense. Therefore, lowering the number of startups a unit performs will lower the total expense.

Q. Are the number of startups that Mr. Beecher and Mr. Sweet consider to be excessive hot startups or cold startups?

A. The numbers Mr. Beecher noted in his rebuttal testimony he consider to be excessive are hot startup numbers.

Q. Does a hot startup have the same expense as a cold startup?

A. No. Separate amounts are entered as an expense for hot and cold startups.

Q. Did the number of hot startups used by Staff's production cost model affect the total expense in this case?

A. No. EDE did not supply to Staff any expenses for hot startups as a response to Staff's data request 2910 therefore none were included in the Staff's production cost model. Thus the number of hot startups had no effect upon the total expense.

Q. Will you address fuel price in this surrebuttal testimony?

A. I used fuel prices supplied by Staff witness William Harris. His testimony will address this issue.

Q. What method is used by EDE to calculate non-contract (spot market) energy prices and availability for its model?

A. There is no description in EDE's testimony of the method EDE used to calculate the spot market energy prices and availability, nor did EDE offer an explanation at the prehearing conference.

Q. Does EDE believe spot market energy prices and capacity are volatile?

A. Yes. In both Brad Beecher's and Greg Sweet's testimony they stated that spot energy prices were very volatile.

Q. Did EDE use volatile energy prices as inputs to its production cost model?

A. No, the spot market energy prices used by EDE in its production cost model were constant for every hour of the month.

Q. Did EDE use volatile spot market energy capacity as inputs to its production cost model?

A. No. EDE used a constant spot market energy capacity of 60 MW for every hour of the year except for July and August. In those months EDE did not allow their production cost model to buy any spot market energy at all during the hours of 12:00 p.m. to 6 :00 p.m.

Q. Are EDE's spot market prices and energy capacity reasonable?

A. No. Both actual spot market price and capacity available vary every hour and, for most hours, vary within the hour depending upon the supplier. An example of this volatility is provided from EDE's actual information supplied to the Commission in the 4CSR 240- 20.080 (20.080 data) data found in Schedule 1 attached hereto. This shows EDE purchased 4 MW's at $80 MWH from supplier one, 16 MW's at $215 per MWH from supplier two and 50 MW's at $55 per MWH from supplier number five, all within the same hour. The data is too voluminous to present here but for most 8,784 hours of the test year, this example holds true. Also, during the hours that EDE made no energy available to its production cost model at all, as mentioned above, EDE actually purchased over 15,289 MW's according to the 20.080 data. Therefore, to assume prices and capacity will be constant and to not make energy available for spot market purchases during peak hours as EDE does in its production cost model, is inappropriate and is not supported by the actual data.

Q. Please discuss the alleged "irregularities" that EDE witness Gregg Sweet observed in Staff's production cost model.

A. In Greg Sweet's testimony he gave examples of "irregularities" he found in Staff's data , including the following:

1. "The highest price found in Staff's input production cost model is $139.97/MWH". Greg Sweet's rebuttal testimony, page 5, line 13.

This is incorrect. Staff provided $200.63 /MWH on May 31, 2000 at 6:00 p.m. as a spot market input price. I have explained Staff's method of calculating input spot market prices in direct testimony. A comparison of actual spot prices and Staff's input price to the production cost model can be found in Schedule 2 attachted hereto. An explanation of this curve is provided latter in this testimony.

I have noted above the volatility of spot market prices within even one hour. Because of the number of purchases made in one hour, each at a different price, Staff calculates a weighted average of the purchases for that hour. If I input instantaneous prices into the production cost model, the production cost model would choose only to buy the low priced energy and ignore the high priced energy unless absolutely necessary to meet load. Therefore, even if the actual instantaneous market price is higher than the input price for a given hour, the total cost is accounted for by Staff, by Staff using a weighted average price. Comparisons of highest price paid, as done in Gregg Sweet's testimony, are not meaningful unless they are coupled with the amount of energy bought at that price.

2. "There are numerous occurrences of hourly prices increasing $30 or more for one or two hours and then decreasing by the same amount." Greg Sweet's rebuttal testimony, page 5, line 22.

Although Staff's input spot market prices vary hour-to hour, they vary no more than $25 hour-to-hour only 4.2% of the time. The spot market is volatile as pointed out earlier, unlike EDE, Staff's input spot market prices reflect that volatility. Numerous examples can be pointed out in the actual 20.80 data that show this is. Therefore, to say that this is a problem with the input is not correct.

3. "In July, air conditioning drives our system demands and Empire typically reaches peak load at 4 to 5 p.m. Spot Market energy prices tend to peak during those afternoons hour, not at night when the load is declining." Greg Sweet's rebuttal testimony, page 6, line 3.

Actual 20.080 data show that the maximum price paid for spot market energy during July at 9:00 p.m. was $101/MWH, which is higher than all but one price paid between 4:00 p.m. and 5:00 p.m. in the afternoon on all days in July. The weighted average of actual spot market energy price at 9:00 p.m. was $77.27/MWH, which is higher than the weighted average of

$72.76 /MWH for the hours of 4:00 p.m. to 5:00 p.m. in the afternoon. Therefore, Staff's input spot market energy prices reflect the higher actual prices paid at 9:00 p.m. rather than at 4:00 p.m. or 5:00 p.m.

4. "Again from Empire's experience, spot market energy in that quantity is not likely to be available during a normal summer afternoon" Greg Sweet's rebuttal testimony, page 6, line 7.

As stated earlier in this surrebuttal testimony actual 20.080 data show that EDE actually purchased 15,289 MW of spot market energy during the hours of 12:00 p.m. and 6:00 p.m. in the months of July and August. For example, the actual 20.080 data also shows that EDE actually purchased 305 MW at 4:00 p.m. on and 400 MW at 9:00 p.m. on August 22d of the test year. If EDE actually purchased this energy, then Staff concludes it must have been available. This amount was available in Staff's production cost model for only six hours but not consecutively. The average amount available in staff's production cost model is much lower, as shown by actual data

5. "Even if Empire could purchase energy in the spot market in the quantities and at the prices that Staff has assumed, there is no guarantee that we could get it delivered to our system." Greg Sweet's rebuttal testimony, page 6, line 14.

The amount of energy made available to Staff's model to purchase was less than that actually purchased by EDE in three of the last five years. The fact that EDE actually did make these purchases indicates the energy was available and delivered. When asked to supply data on the number of hours that EDE could not purchase energy because it was unavailable or undeliverable, EDE could not do so. When the SLCC is placed in service EDE will have an additional 300 MW of capacity, which will make it less likely that EDE will need to purchase from the spot market during peak periods. This additional capacity should lessen the concerns over possible future transmission constraints and availability.

Q. Have you compared the input energy prices of Staff's and EDE's production cost model with the actual energy prices for the test year?

A. Yes. Schedule 2 is a plot of Staff's, EDE's production cost model prices input and actual energy prices paid in the test year.

Q. What does the curve in Schedule 2 represent?

A. The curve is a distribution curve that shows the range of spot purchased prices and the probability (relative frequency) of occurrence for each price in that range.

Q. Explain what this means?

A. Using the curves the probability for a certain spot energy price can be found. This curve shows that Staff's spot energy prices are much closer to the actual test year prices than those used by EDE.

Q. Does this conclude your surrebuttal 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 LEON C. BENDER

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

Leon C. Bender, 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 10 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.

Leon C. Bender

Leon C. Bender

Subscribed and sworn to before me this 17th day of May, 2001.

Dawn L. Hake

Notary Public

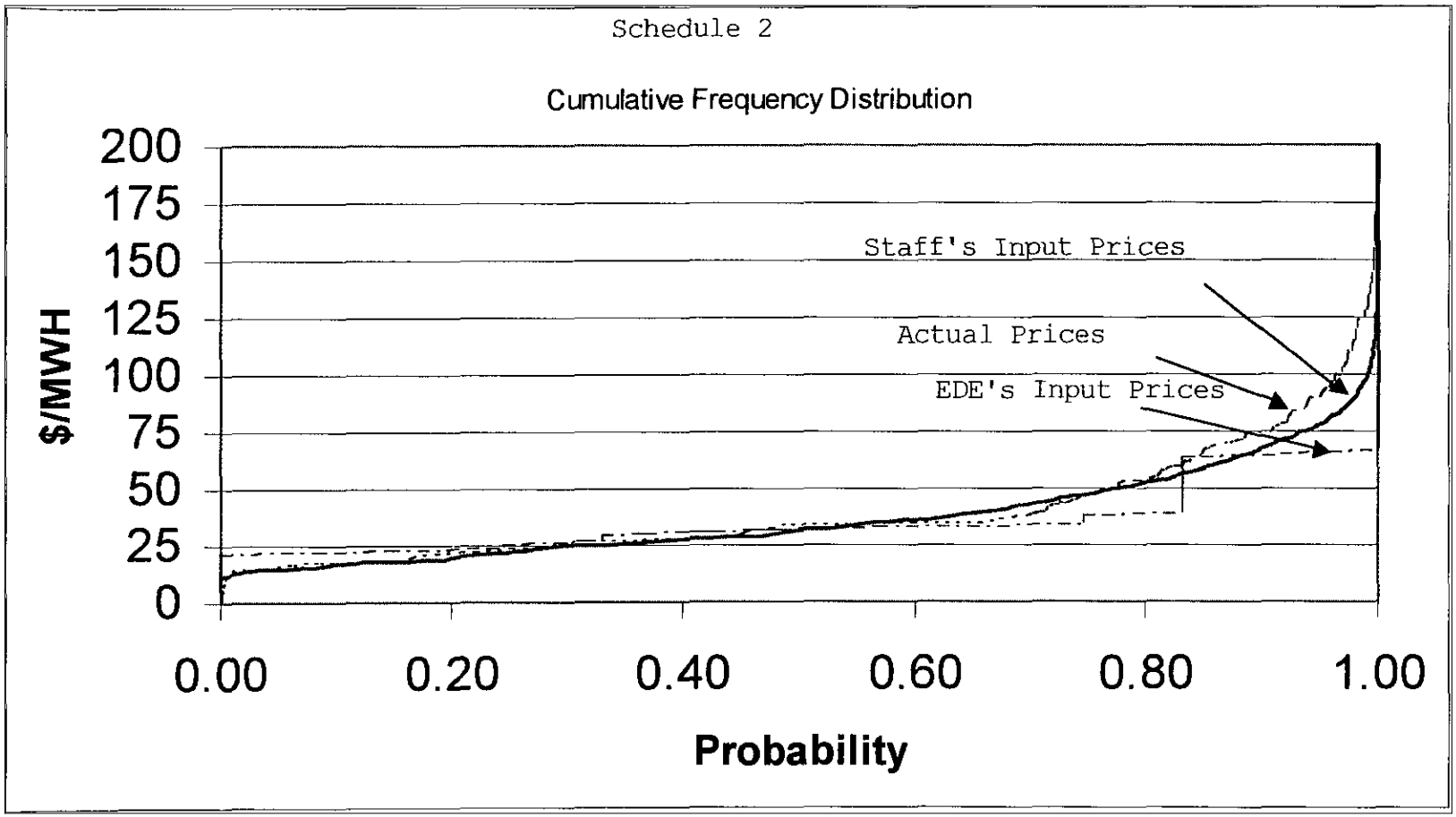
DAWN L. HAKE
Notary Public – State of Missouri
County of Cole
My Commission Expires Jan 9, 2005

My commission expires

Example Of Actual Spot Energy Price Volatility Within Same Hour

Supplier	Date	Hour	Energy Amount MW	Price $/MWH	Total Cost
Supplier One	5/9/2000	1400	4	$ 80.00	$ 320.00
Supplier Two	5/9/2000	1400	16	$ 215.00	$ 3,440.00
Supplier Three	5/9/2000	1400	26	$ 142.82	$ 3,713.32
Supplier Four	5/9/2000	1400	13	$ 142.82	$ 1,856.66
Supplier Five	5/9/2000	1400	50	$ 55.00	$ 2,750.00
Totals			109		$12,079.98
Weighted Average $/MWH	$ 110.83				
Supplier Six	03/31/00	0400	50	$ 18.60	$ 930.00
Supplier Seven	03/31/00	0400	73	$ 18.60	$ 1,357.80
Supplier Eight	03/31/00	0400	3	$ 28.25	$ 84.75
Supplier Nine	03/31/00	0400	1	$ 35.55	$ 35.55
Supplier Ten	03/31/00	0400	4	$ 38.16	$ 152.64
Totals			131		$ 2,560.74
Weighted Average $/MWH	$ 19.55				

Schedule 2



Schedule 2