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Issues: Production Cost Model
Witness: Timothy D. Finnell
Sponsoring Party: Union Electric Company
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Case No.: ER-2007-0002
Date Testimony Prepared: June 29, 2006

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. ER-2007-0002

DIRECT TESTIMONY

OF

TIMOTHY D. FINNELL

ON

BEHALF OF

UNION ELECTRIC COMPANY
d/b/a AmerenUE

St. Louis, Missouri
July, 2006

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DIRECT TESTIMONY

OF

TIMOTHY D. FINNELL

CASE NO. ER-2007-0002

I. INTRODUCTION

Q. Please state your name and business address.

A. Timothy D. Finnell, Ameren Services Company ("Ameren Services"), One Ameren Plaza, 1901 Chouteau Avenue, St. Louis, Missouri 63103.

Q. What is your position with Ameren Services?

A. I am a Supervising Engineer in the Corporate Planning Function of Ameren Services. Ameren Services provides corporate, administrative and technical support for Ameren Corporation and its affiliates.

Q. Please describe your educational background and work experience, and the duties of your position.

A. I received my Bachelor of Science Degree in Industrial Engineering from the University of Missouri-Columbia in May 1973. I received my Master of Science Degree in Engineering Management from the University of Missouri-Rolla in May 1978. I am a Registered Professional Engineer in the State of Missouri. My duties include developing fuel budgets, reviewing and updating economic dispatch parameters for the generating units owned by Ameren Corporation subsidiaries, including Union Electric Company, d/b/a AmerenUE ("AmerenUE"), providing power plant project justification studies, and performing other special studies.

I joined the Operations Analysis group in 1978 as an engineer. In that capacity, I was responsible for updating the computer code of the System Simulation Program, which was the Union Electric Company ("UE") production costing model. I also prepared the UE fuel budget, performed economic studies for power plant projects, and prepared production cost modeling studies for the UE rate cases since 1978. I was promoted to Supervising Engineer of the Operations Analysis work group in 1985.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to explain how I normalized fuel costs, the variable component of purchased power costs and off-system sales revenues for this case. The fuel costs include nuclear, coal, oil, and natural gas costs associated with producing electricity from the AmerenUE generation fleet. The normalized costs and revenues which I calculated are utilized by AmerenUE witness Gary S. Weiss in developing the revenue requirement for this case as discussed in Mr. Weiss' direct testimony. A summary of my testimony appears in Attachment A.

Q. Please briefly summarize your testimony and conclusions.

A. The normalized system fuel costs, variable purchased power costs, and off-system sales revenues were calculated using the PROSYM production cost model. The normalized fuel costs, variable purchased power costs and off-system sales revenues calculated for this case are approximately $599 million, $26 million, and $311 million, respectively.

III. PRODUCTION COST MODELING - GENERAL

Q. What is a production cost model?

A. A production cost model is a computer application used to simulate an electric utility's generation system and load obligations. One of the primary uses of a production cost model is to develop production cost estimates used for planning and decision-making.

Q. Is the PROSYM model used by AmerenUE a commonly used production cost model?

A. Yes. PROSYM is a product of Global Energy Decisions ("GED"). The PROSYM production cost model is widely used either directly or indirectly by utilities around the world. By indirectly I mean that the PROSYM logic is used to run numerous other products that GED offers.

Q. How long has AmerenUE been using PROSYM?

A. UE began using PROSYM in 1985 and Ameren Services has continued to use it since Ameren Services was formed.

Q. How is PROSYM used at Ameren Services?

A. PROSYM is operated and maintained by the Operations Analysis Group. Some of the most common uses of PROSYM are: preparation of monthly and annual fuel burn projections; support for emissions planning; evaluation of major unit overhaul schedules; evaluation of power plant projects; and support for regulatory requirements such as PURPA filings and rate cases.

Q. What are the major inputs to the PROSYM model run used for calculating the fuel costs, variable purchased power costs and off-system sales revenues?

A. The major inputs include: normalized hourly loads, unit availabilities, fuel prices, unit operating characteristics, hourly energy market prices, and system requirements.

Q. Do different production cost models produce similar results?

A. Most models should have similar logic for optimizing generation costs and should produce similar results all else being equal. However, some models have a higher level of accuracy because, for example, they are able to perform a more detailed optimization for systems with run of river plants, stored hydroelectric plants, pumped storage plants, fuel allocation requirements, and reserve requirements. The dispatch of hydroelectric and pumped storage plants is an important part of the AmerenUE generation cost optimization and requires a model that is able to optimize those types of plants. PROSYM is such a model. Our experience with PROSYM indicates that it does a superior job of simulating complex generating systems such as the AmerenUE system.

Q. Are there other key issues relating to production cost modeling?

A. Yes. Another very important issue is how well the model is calibrated to actual results. Model calibration is done by using inputs that reflect actual (i.e. not normalized) data for a specific time period and comparing the simulated results produced by the model to the actual generation performance and costs for that time period. Production cost model outputs that should be compared to actual data to properly calibrate the model include: unit generation totals for the period being evaluated; hourly unit loadings; unit heat rates; number of hot and cold starts; and off-system sales volumes and prices.

Q. How well is the PROSYM model calibrated?

A. The PROSYM model is very well calibrated as demonstrated by the results of a calibration conducted under my supervision, which compared actual 2005 generation to model results. For example, the model results predicted that the generating output from the AmerenUE system would be 45,189,737 megawatt hours ("MWh"), which was within 0.5% of the actual results. Based upon my experience, these results demonstrate the high level of accuracy of the model. Detailed results of the calibration are shown in Schedule TDF-1.

Q. What must one do to achieve a high level of calibration in modeling a utility's generation?

A. One must look carefully at the model inputs that could affect the results. For example, if the model's results for generation output are too low when compared to actual values, there are several items that would need to be reviewed. These items include the analysis of whether (1) the dispatch price is too high; (2) the unit availability factor is too low; (3) the minimum load is too low; (4) the unit start-up costs are incorrect; (5) the minimum up and down times are incorrect; and (6) the off-system sales market is incorrectly modeled.

Q. What are the implications of using a less well calibrated model to support adjustments in rate cases?

A. A poorly calibrated model will inevitably lead to inaccurate adjustments to test year values.

IV. PRODUCTION COST MODEL INPUTS

Q. What type of load data is required by PROSYM?

A. PROSYM utilizes monthly energy with a historic hourly load pattern. The monthly energy reflects AmerenUE's kilowatt hour ("kWh") sales and line losses. AmerenUE's weather normalized sales are developed in the direct testimony of AmerenUE witness Richard A. Voytas. Line loss factors are provided in Schedule TDF-2. For this case, the historic load pattern applied to normalized monthly energy is based on modified 2005 data.

Q. Why was the 2005 hourly load data modified?

A. The 2005 hourly load data was modified for two major changes to the AmerenUE customer mix: (1) the transfer of the AmerenUE Metro East (Illinois) load from AmerenUE to AmerenCIPS on May 2, 2005; and (2) the addition of Noranda Aluminum, Inc. ("Noranda") as AmerenUE's largest customer on June 1, 2005. Thus, adjustments were made to the hourly loads to eliminate the Metro East load for the entire year and to add the Noranda load for the entire year.

Q. What operational data is used by PROSYM?

A. Operational data reflects the characteristics of the generating units used to supply the energy for native load customers and to make off-system sales. The major operational data includes: the unit input/output curve, which calculates the fuel input required for a given level of generator output; the generator minimum load, which is the lowest load level at which a unit normally operates; the maximum load, which is the highest level at which the unit normally operates; and fuel blending. Schedule TDF-3 lists the operational data used for this case.

Q. What availability data is used by PROSYM?

A. The availability data are categorized as planned outages, unplanned outages and deratings. The planned outages are the major unit outages that occur at scheduled intervals. The length of the scheduled outage depends on the type of work being performed. The outage intervals vary due to factors such as: type of unit; unplanned outage rates during the maintenance interval; and plant modification plans. A normalized planned outage schedule was used for this case, as reflected in Schedule TDF-4. For all of the units, except the Callaway Nuclear Plant, the length of the planned outages was based on a 6-year average of actual planned outages that occurred between 2000 and 2005. The Callaway planned outage length used in PROSYM was two-thirds of the 2005 scheduled outage. The Callaway outage length is consistent with the normalized Callaway refueling assumptions used by Mr. Weiss to calculate the revenue requirement for this case. In addition to the length of the outage, the time period when the outage occurs is also important. Planned outages are typically scheduled during the Spring and Fall months when system loads are low. Another important factor considered in scheduling planned outages is the market price of power. The planned outage schedule used in modeling AmerenUE's generation with the PROSYM model is shown in Schedule TDF-5.

Unplanned outages are short outages when a unit is completely off-line. These outages typically last from one to seven days and occur between the planned outages. The unplanned outages occur due to operational problems that must be corrected for the unit to operate properly. Several examples of causes of unplanned outages are: tube leaks, boiler and economizer cleanings, and turbine /generator repairs. The unplanned outage rate for this case is based on a 6-year average of unplanned outages that occurred between 2000 and 2005, and is reflected in Schedule TDF-6.

Deratings occur when a generating unit cannot reach its maximum output due to operational problems. The magnitude of the derating varies based on the operating issues involved and can result in reduced outputs ranging from 2% to 50% of the maximum unit rating. Several examples of causes of derating include: coal mill outages, boiler feed pump outages, exceeding opacity limits due to precipitator performance problems. The derating rate used in this case is based on a 6-year average of deratings that occurred between 2000 and 2005, and is reflected in Schedule TDF-7.

Q. What availability was assigned to Taum Sauk?

A. For purposes of this model, I presumed that AmerenUE's Taum Sauk plant was available as a generation resource for the entire year.

Q. What fuel cost data was used in PROSYM?

A. AmerenUE units consume four types of fuel: nuclear, coal, gas, and oil.

The nuclear fuel costs are based on the average nuclear fuel cost associated with Callaway Refueling Number 14, the refueling outage which was completed in November of 2005. The coal costs reflect coal and transportation costs based upon prices as of January 2007. These coal and transportation costs are discussed in detail in the direct testimony of AmerenUE witness Robert K. Neff.

The gas and oil prices are based on the average monthly dispatch price for the three major gas pipelines supplying gas to AmerenUE's combustion turbine generation ("CTG") fleet during the period January 2003 to December 2005, modified to eliminate the impact of the highly unusual 2005 hurricane season. The modification for the impact of the

2005 hurricanes reduces oil and gas dispatch fuel prices for the period September to December 2005. The impact of the 2005 hurricanes and coal conservation on energy prices, electric markets and gas markets is described in detail in the direct testimony of AmerenUE witness Shawn E. Schukar.

Q. What off-system purchase and sales data was used in PROSYM?

A. Off-system purchases are power purchases from energy sellers used to meet native load requirements. The purchases can be from long-term purchase contracts or short-term economic purchases. The only long-term power purchase contract included as an off-system purchase in PROSYM in this case is the purchase of 160 megawatts ("MW") from Arkansas Power & Light Company ("APL"). The price of the APL contract is based on the average price for the period January 2003 through December 2005. Short-term economic purchases are used to supply native load when the prices are lower than the cost of generation and the generating unit operating parameters are not violated. A violation of the generating unit operating parameters would occur when all units are operating at their minimum load and cannot reduce their output any further. In that case, short-term economic purchases are not made even when they are at lower costs than the cost of operating the AmerenUE generating units. The price of short-term economic purchases is based on hourly market prices. The hourly market prices are based on the average market prices for the period January 2003 through December 2005 modified for the impact of the 2005 hurricane season and coal conservation. The volume of short-term economic purchases was assumed to be unlimited.

No contract off-system sales were modeled in PROSYM; however, there were short-term economic off-system sales modeled in PROSYM. Short-term economic off-system sales occur when the cost of excess generation is below the market price for power. Excess generation is the generation that is not used to supply the native load customers. The market price used to determine for short-term economic sales is the same price as for short-term economic purchases, as previously described. The volume of short-term economic sales has limits based on the time of day and day of the week. The short-term economic sales limits are based on historical sales volumes for on-peak and off-peak sales.

Q. What system requirements are used in PROSYM?

A. The system requirements are the non-plant specific inputs that impact the dispatch of the generating units. The two major system requirements are the operation of a stand-alone AmerenUE generation system (i.e. without a Joint Dispatch Agreement, as addressed in the direct testimony of AmerenUE witness Warner L. Baxter) and the required operating reserves. The stand-alone system is a PROSYM simulation in which AmerenUE's generation is interconnected to the Midwest Independent Transmission System Operator, Inc. ("MISO") market and other bilateral markets, but is not directly interconnected to any Ameren affiliates, such as AmerenCIPS, AmerenCILCO, or AmerenIP. The operating reserves are comprised of spinning reserves and non-spinning reserves. The spinning reserves comprise the AmerenUE generating units that are on-line and not fully loaded. Thus, spinning reserves may be thought of as stranded MWs that are not used for supplying native load or for making off-system sales. The AmerenUE spinning reserve value used in PROSYM was 101 MW. The spinning reserve units are used for instantaneous response to changes in customer demand. The non-spinning reserve value used in PROSYM was 101 MW. The non-spinning reserve can be either spinning or quick-start generation that can be made available within 10 minutes. The non-spinning reserves are used to respond when an AmerenUE generating unit or a regional generating unit trips off-line. AmerenUE's quick start units include: Osage, Taum Sauk, Fairground CTG, Mexico CTG, Moberly CTG, Moreau CTG, and Meramec CTG #1.

Q. What are the normalized system fuel costs, variable purchased power costs and off-system sales revenues calculated by the PROSYM model?

A. The normalized fuel costs, variable purchased power costs and off-system sales revenues calculated by the PROSYM model are $599 million, $26 million, and $311 million, respectively. These results are utilized by Mr. Weiss in developing the revenue requirement for AmerenUE.

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 Union Electric Company d/b/a AmerenUE for Authority to File Tariffs Increasing Rates for Electric Service Provided to Customers in the Company's Missouri Service Area.	)))))	Case No. ER-2007-0002

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 the City of St. Louis, Missouri, and I am employed by Ameren Services Company as a Supervising Engineer.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Union Electric Company d/b/a AmerenUE consisting of 11 pages, Attachment A and Schedules TDF-1 through TDF-7, 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 29th day of June, 2006.

Carolyn J. Woodstock
Notary Public

My commission expires: May 19, 2008

CAROLYN J. WOODSTOCK
Notary Public - Notary Seal
STATE OF MISSOURI
Franklin County
My Commission Expires: May 19, 2008

EXECUTIVE SUMMARY

Timothy D. Finnell

Supervising Engineer of the Operations Analysis Work Group / Pricing and Analysis Department/Corporate Planning Function

* * * * * * * * *

The purpose of my testimony is to explain the production cost model used to normalize fuel costs, the variable component of purchased power costs and off-system sales revenues for this case. A production cost model is a computer application used to simulate an electric utility's generation system and load obligations. One of the primary uses of a production cost model is to develop production cost estimates used for planning and decision-making. The program I used for my analysis is PROSYM. AmerenUE's experience with this program indicates that it does a superior job of simulating complex generating systems such as AmerenUE's system.

PROSYM utilizes monthly energy with a historic hourly load pattern. The monthly energy reflects AmerenUE kilowatt hour ("kWh") sales and line losses. The 2005 hourly load data was modified for the transfer of the AmerenUE Metro East (Illinois) load to AmerenCIPS and for the addition of Noranda Aluminum, Inc. Adjustments were made so that each change was effective for the entire year.

The fuel expenses used include the nuclear, coal, oil, and natural gas costs associated with producing electricity from the AmerenUE generation fleet. For purposes of this model, it was presumed that AmerenUE's Taum Sauk plant was available as a generation resource for the entire year. The model also considers normalized hourly loads, unit availabilities, fuel prices, unit operating characteristics, hourly energy market prices, and system requirements.

The normalized fuel costs, variable purchased power costs and off-system sales revenues calculated by the PROSYM model are $599 million, $26 million, and $311 million, respectively. These results are utilized by AmerenUE witness Gary S. Weiss in developing the revenue requirement for AmerenUE.

Calibration Production Cost Model Results - Actual vs Calibration Run
January to November 2005

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV		Total	Calibration-Actual	% Error
Callaway	Actual	818,598	787,769	699,479	773,972	864,248	757,093	852,463	853,734	436,542	-5,959	282,786		7,120,725		
	Calibration	749,100	787,500	684,000	763,600	839,200	752,600	831,000	831,800	428,900	0	271,800		6,939,500	-181,225	-2.5%
Rush	Actual	457,670	751,953	725,495	842,676	807,684	804,266	740,895	806,427	794,365	725,942	677,693		8,135,066		
	Calibration	451,400	759,600	732,100	812,700	819,800	801,400	771,000	816,400	809,300	759,800	743,400		8,276,900	141,834	1.7%
Labadie	Actual	1,631,975	1,470,946	1,705,258	1,564,050	1,628,637	1,556,681	1,629,355	1,676,701	1,444,995	1,407,515	1,307,614		17,023,727		
	Calibration	1,625,900	1,448,200	1,667,500	1,543,400	1,648,000	1,578,700	1,633,900	1,708,800	1,481,300	1,456,700	1,300,900		17,093,300	69,573	0.4%
Sioux	Actual	591,982	497,073	318,096	315,218	625,625	545,552	597,925	672,280	631,629	651,728	563,525		6,010,633		
	Calibration	630,600	494,200	316,000	325,100	576,900	552,500	592,400	632,700	607,800	616,400	531,600		5,876,200	-134,433	-2.2%
Meramec	Actual	566,937	542,604	461,044	346,123	359,393	511,984	551,013	537,237	467,781	472,458	434,895		5,251,469		
	Calibration	582,700	536,900	460,500	323,900	343,800	488,200	518,900	527,700	487,900	475,700	426,700		5,172,900	-78,569	-1.5%
Taum	Actual	44,184	28,497	27,972	46,849	53,243	61,540	70,837	69,817	66,849	57,156	37,015		563,959		
	Calibration	61,600	44,400	41,800	56,100	38,800	44,100	47,900	54,200	49,900	57,900	52,900		549,600	-14,359	-2.5%
Osage	Actual	147,906	127,700	38,729	17,658	21,364	103,292	23,172	25,206	27,806	8,137	413		541,383		
	Calibration	148,600	126,200	41,000	17,000	21,700	101,500	24,000	26,600	26,000	8,300	5,200		546,100	4,717	0.9%
Keokuk	Actual	73,392	74,262	90,086	79,007	95,589	93,390	84,918	54,144	54,146	93,155	71,528		863,617		
	Calibration	74,000	73,900	90,000	78,300	90,800	93,700	84,800	54,400	56,400	90,200	74,300		860,800	-2,817	-0.3%
Ctg UE	Actual	1,638	-864	-686	11,382	10,107	85,010	130,763	139,633	55,964	26,498	7,595		467,040		
	Calibration	1,200	0	0	0	1,200	81,300	127,800	81,500	75,700	38,500	13,500		420,700	-46,340	-9.9%
TS PP	Actual	-61,856	-39,944	-38,321	-66,116	-72,030	-85,775	-98,808	-97,896	-93,530	-82,149	-51,821		-788,246		
	Calibration	-86,800	-62,800	-57,200	-79,700	-53,700	-61,200	-67,100	-76,200	-69,100	-81,900	-73,400		-769,100	19,146	-2.4%
UE	Actual	4,272,426	4,239,996	4,027,152	3,930,819	4,393,860	4,433,033	4,582,533	4,737,283	3,886,547	3,354,481	3,331,243		45,189,373		
Less TS Pump	Calibration	4,238,300	4,208,100	3,975,700	3,840,400	4,326,500	4,432,800	4,564,600	4,657,900	3,954,100	3,421,600	3,346,900		44,966,900	-222,473	-0.5%
JDA Off System	Actual	512,969	920,115	773,986	1,332,200	1,584,727	789,568	431,426	664,349	428,470	393,387	527,820		8,359,017		
Sales	Calibration	599,100	954,900	795,100	1,076,600	1,261,300	499,200	436,400	451,800	496,900	481,000	500,900		7,553,200	-805,817	-9.6%

Revised: March 1, 2006

TO: Bill Warwick

FROM: Dan Buss

RE: Revised UE-MO 2003 Loss Study Loss Multipliers

Please disregard the February 16, 2006 memo with its loss values. We discovered a minor error in the LV Distribution and Secondary loss multipliers.

We have completed the AmerenUE-Missouri loss study with the above mentioned revisions. Results are shown in the tables below. The study year was 2003 for the UE-MO service territory. The study will be documented in a report which is forth coming, but we thought you would want to have the results now.

The 2003 UE-MO Demand Loss Multipliers are:

Voltage Connection Point	Demand Loss Multipliers		
	By Voltage Level	To Generation	To Transmission
GSU	1.0030	1.0030	Not Applicable
Transmission	1.0150	1.0180	Not Applicable
HV Distribution	1.0156	1.0338	1.0156
LV Distribution	1.0287	1.0635	1.0447
Secondary	1.0360	1.1018	1.0823

The 2003 UE-MO Energy Loss Multipliers are:

Voltage Connection Point	Energy Loss Multipliers		
	By Voltage Level	To Generation	To Transmission
GSU	1.0046	1.0046	Not Applicable
Transmission	1.0101	1.0147	Not Applicable
HV Distribution	1.0123	1.0271	1.0123
LV Distribution	1.0215	1.0492	1.0340
Secondary	1.0378	1.0888	1.0731

Please see attached drawing illustrating the voltage classifications. Note that GSU is Generator Step-up Unit. This is what connects the generator terminals to the transmission system. A transmission voltage connection point would be a connection to the electric utility system for voltages from 138 kV through 345 kV system. The HV (High Voltage) Distribution system connection would be for voltage levels from 34.5 kV through 69 kV. The LV (Low Voltage) Distribution System would connect to the electric utility system for voltages from 2.4 kV through 25 kV. A secondary connection to the utility system would be for voltages less than or equal to 480 V.

The new Demand Loss Multipliers do not vary significantly from the previous set of UE multipliers. The new Energy Loss Multipliers to the transmission level are lower. They are noticeably lower at the HV and LV Distribution levels from the previous set of UE multipliers. Ameren has been installing more energy efficient equipment since the time of the last study. The other significant reason is that this 2003 loss study has significantly more detail in than the previous loss study.

The GSU level was itemized in these numbers due to MISO rules. MISO looks at what the generator injects into the transmission system at the high voltage connection to the GSU.

Attachment

Cc: Gary Brownfield
Hande Berk
Rick Voytas
Bob Willen

Production Cost Model - Unit Operating Data

Input / Output Curve #2

Unit Name	Minimum - Net	Maximum -Net #1	Primary Fuel Type	A	B	C	EDF
Callaway	800	1,190	Nuclear	-	9.984	-	1.00
Labadie 1	230	597	100% PRB Coal	0.00338	6.867	684.6	1.03
Labadie 2	230	595	100% PRB Coal	0.00338	6.867	684.6	1.03
Labadie 3	180	613	100% PRB Coal	0.00374	6.158	878.7	1.03
Labadie 4	338	611	100% PRB Coal	0.00374	6.158	878.7	1.03
Rush 1	234	593	100% PRB Coal	0.00161	7.875	814.4	0.99
Rush 2	234	592	100% PRB Coal	0.00161	7.875	814.4	0.99
Sioux 1	330	500	83%PRB/17% ILL Coal	0.00010	9.009	398.3	1.00
Sioux 2	330	503	83%PRB/17% ILL Coal	0.00010	9.009	398.3	1.00
Meramec 1	45	123	100% PRB Coal	0.01378	7.310	194.9	1.04
Meramec 2	48	125	100% PRB Coal	0.01378	7.310	194.9	1.04
Meramec 3	185	273	100% PRB Coal	0.00471	7.174	249.3	1.18
Meramec 4	169	356	100% PRB Coal	0.00164	9.458	173.4	1.07
Audrain CT 1	45	75	Gas	0.00010	8.590	245.9	1.00
Audrain CT 2	45	75	Gas	0.00010	8.590	245.9	1.00
Audrain CT 3	45	75	Gas	0.00010	8.590	245.9	1.00
Audrain CT 4	45	75	Gas	0.00010	8.590	245.9	1.00
Audrain CT 5	45	75	Gas	0.00010	8.590	245.9	1.00
Audrain CT 6	45	75	Gas	0.00010	8.590	245.9	1.00
Audrain CT 7	45	75	Gas	0.00010	8.590	245.9	1.00
Audrain CT 8	45	75	Gas	0.00010	8.590	245.9	1.00
Fairgrounds CT	20	55	Oil	0.00143	7.798	177.3	0.98
Goose Creek CT 1	45	75	Gas	0.00010	8.590	245.9	1.00
Goose Creek CT 2	45	75	Gas	0.00010	8.590	245.9	1.00
Goose Creek CT 3	45	75	Gas	0.00010	8.590	245.9	1.00
Goose Creek CT 4	45	75	Gas	0.00010	8.590	245.9	1.00
Goose Creek CT 5	45	75	Gas	0.00010	8.590	245.9	1.00
Goose Creek CT 6	45	75	Gas	0.00010	8.590	245.9	1.00
Howard Bend CT	20	43	Oil	0.00261	9.654	118.6	0.95
Kinmundy CT 1	80	116	Gas	0.00923	6.381	423.2	1.07
Kinmundy CT 2	80	116	Gas	0.00923	6.381	423.2	1.07
Kirksville CT	5	13	Gas	0.00261	9.654	118.6	1.20
Meramec CT 1	20	55	Oil	0.00143	7.798	177.3	0.96
Meramec CT 2	30	53	Gas	0.00261	9.654	118.6	1.00
Mexico CT	20	55	Oil	0.00143	7.798	177.3	1.00
Moberly CT	20	55	Oil	0.00143	7.798	177.3	1.00
Moreau CT	20	55	Oil	0.00143	7.798	177.3	1.00
Peno Creek CT 1	22	48	Gas	0.00010	8.467	94.1	1.00
Peno Creek CT 2	22	48	Gas	0.00010	8.467	94.1	1.00
Peno Creek CT 3	22	48	Gas	0.00010	8.467	94.1	1.00
Peno Creek CT 4	22	48	Gas	0.00010	8.467	94.1	1.00
Pinkneyville CT 1	23	44	Gas	0.01190	6.662	111.0	1.00
Pinkneyville CT 2	23	44	Gas	0.01190	6.662	111.0	1.00
Pinkneyville CT 3	23	44	Gas	0.01190	6.662	111.0	1.00
Pinkneyville CT 4	23	44	Gas	0.01190	6.662	111.0	1.00
Pinkneyville CT 5	23	36	Gas	0.00100	8.603	134.9	1.05
Pinkneyville CT 6	23	36	Gas	0.00100	8.603	134.9	1.05
Pinkneyville CT 7	23	36	Gas	0.00100	8.603	134.9	1.05
Pinkneyville CT 8	23	36	Gas	0.00100	8.603	134.9	1.05
Raccoon Creek CT 1	45	75	Gas	0.00010	8.882	225.7	1.00
Raccoon Creek CT 2	45	75	Gas	0.00010	8.882	225.7	1.00
Raccoon Creek CT 3	45	75	Gas	0.00010	8.882	225.7	1.00
Raccoon Creek CT 4	45	75	Gas	0.00010	8.882	225.7	1.00
Venice CT 1	10	26	Oil	0.00457	9.738	132.1	0.95
Venice CT 2	20	49	Gas	0.00010	8.467	94.1	1.00
Venice CT 3	135	169	Gas	0.00603	6.616	473.0	1.00
Venice CT 4	135	169	Gas	0.00603	6.616	473.0	1.00
Venice CT 5	80	117	Gas	0.00923	6.381	432.3	1.07
Viaduct CTG	10	26	Gas	0.00457	9.738	132.1	1.20
Osage		226	Pond Hydro				
Keokuk		134	Run of River Hydro				
Taum Sauk 1		215	Pumped Storage				
Taum Sauk 2		215	Pumped Storage				

Notes:

1 July Rating shown in this table.

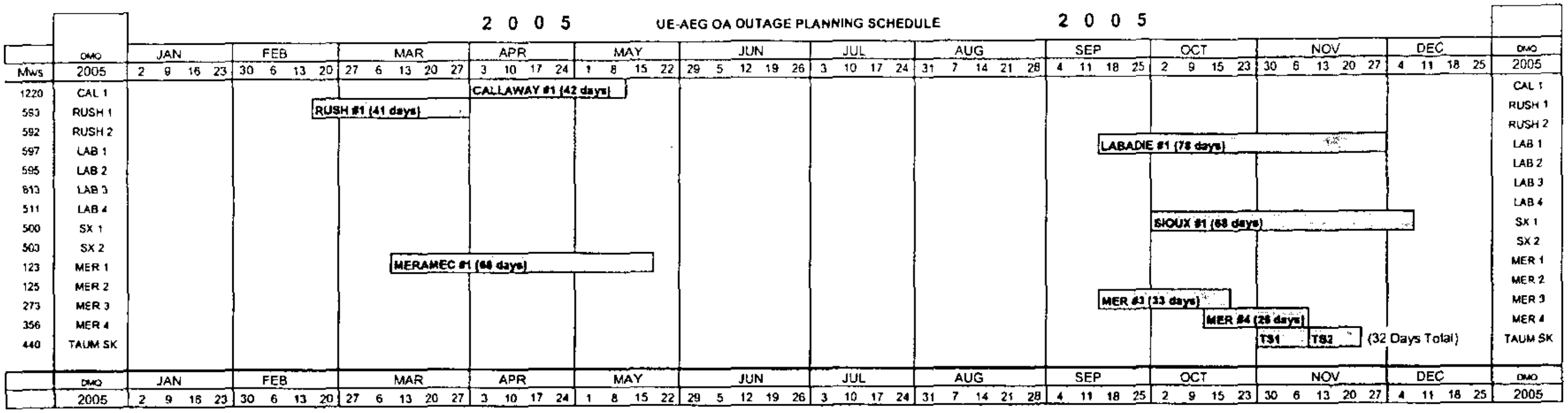
2 Input Output equation: mmbtu = (Pnet^2 x A + Pnet x B + C) x EDF, where Pnet = Net power level

Planned Outage Data

Sum of Eq Hrs		Total
Unit	Year	Planned Outages
Callaway 1	2000	
	2001	1,073
	2002	794
	2003	-
	2004	1,542
	2005	1,526
Callaway 1 Total		**4,935**
Labadie 1	2000	1,301
	2001	-
	2002	1,808
	2003	178
	2004	-
	2005	-
Labadie 1 Total		**3,287**
Labadie 2	2000	-
	2001	1,393
	2002	-
	2003	-
	2004	1,263
	2005	-
Labadie 2 Total		**2,656**
Labadie 3	2000	-
	2001	-
	2002	-
	2003	1,473
	2004	-
	2005	-
Labadie 3 Total		**1,473**
Labadie 4	2000	1,147
	2001	-
	2002	1,564
	2003	1,118
	2004	-
	2005	-
Labadie 4 Total		**3,829**
Meramec 1	2000	2,266
	2001	317
	2002	-
	2003	-
	2004	1,976
	2005	-
Meramec 1 Total		**4,559**
Meramec 2	2000	2,275
	2001	891
	2002	-
	2003	-
	2004	2,048
	2005	-
Meramec 2 Total		**5,214**
Meramec 3	2000	2,257
	2001	-
	2002	457
	2003	1,597
	2004	135
	2005	369
Meramec 3 Total		**4,815**
Meramec 4	2000	-
	2001	1,456
	2002	561
	2003	-
	2004	-
	2005	1,683
Meramec 4 Total		**3,700**

Planned Outage Data

Sum of Eq Hrs		Total
Unit	Year	Planned Outages
Rush Island 1	2000	-
	2001	1,474
	2002	-
	2003	-
	2004	-
	2005	-
Rush Island 1 Total		**1,474**
Rush Island 2	2000	1,092
	2001	-
	2002	1,502
	2003	1,152
	2004	661
	2005	-
Rush Island 2 Total		**4,407**
Sioux 1	2000	-
	2001	1,753
	2002	-
	2003	1,440
	2004	-
	2005	1,570
Sioux 1 Total		**4,763**
Sioux 2	2000	1,545
	2001	-
	2002	1,380
	2003	105
	2004	2,029
	2005	-
Sioux 2 Total		**5,059**


2 0 0 5
UE-AEG OA OUTAGE PLANNING SCHEDULE
2 0 0 5
DMO
2005
Mws
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
2 9 16 23 30 6 13 20 27 6 13 20 27 3 10 17 24 1 8 15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 4 11 18 25 2 9 15 23 30 6 13 20 27 4 11 18 25
1220 CAL 1
593 RUSH 1
592 RUSH 2
597 LAB 1
595 LAB 2
613 LAB 3
511 LAB 4
500 SX 1
503 SX 2
123 MER 1
125 MER 2
273 MER 3
356 MER 4
440 TAUM SK
CALLAWAY #1 (42 days)
RUSH #1 (41 days)
LABADIE #1 (78 days)
SIOUX #1 (68 days)
MERAMEC #1 (68 days)
MER #3 (33 days)
MER #4 (28 days)
TS1
TS2
(32 Days Total)

Unplanned Outage Data

Sum of Eq Hrs		
Unit	Year	
Callaway 1	2000	0.2%
	2001	2.8%
	2002	6.7%
	2003	4.1%
	2004	6.8%
	2005	4.6%
Callaway 1 Total		**4.0%**
Labadie 1	2000	9.8%
	2001	3.7%
	2002	10.8%
	2003	4.8%
	2004	5.6%
	2005	3.3%
Labadie 1 Total		**5.8%**
Labadie 2	2000	8.8%
	2001	8.4%
	2002	3.9%
	2003	5.7%
	2004	10.3%
	2005	6.0%
Labadie 2 Total		**6.9%**
Labadie 3	2000	4.7%
	2001	7.2%
	2002	6.9%
	2003	13.0%
	2004	4.1%
	2005	3.1%
Labadie 3 Total		**6.1%**
Labadie 4	2000	7.8%
	2001	7.3%
	2002	49.2%
	2003	5.0%
	2004	5.6%
	2005	3.3%
Labadie 4 Total		**11.2%**
Meramec 1	2000	14.4%
	2001	17.9%
	2002	5.2%
	2003	3.8%
	2004	6.4%
	2005	1.3%
Meramec 1 Total		**7.4%**
Meramec 2	2000	4.8%
	2001	6.8%
	2002	3.1%
	2003	6.1%
	2004	3.0%
	2005	1.6%
Meramec 2 Total		**4.1%**
Meramec 3	2000	34.3%
	2001	18.0%
	2002	13.0%
	2003	13.0%
	2004	8.0%
	2005	6.7%
Meramec 3 Total		**13.8%**
Meramec 4	2000	8.9%
	2001	4.3%
	2002	11.5%
	2003	12.7%
	2004	4.1%
	2005	9.6%
Meramec 4 Total		**8.7%**
Rush Island 1	2000	7.3%
	2001	24.2%
	2002	12.5%
	2003	7.2%
	2004	23.3%
	2005	13.3%

Unplanned Outage Data

Sum of Eq Hrs		
Unit	Year	
Rush Island 1 Total		**14.1%**
Rush Island 2	2000	3.6%
	2001	18.4%
	2002	14.5%
	2003	7.4%
	2004	14.0%
	2005	2.2%
Rush Island 2 Total		**10.0%**
Sioux 1	2000	15.7%
	2001	23.0%
	2002	8.7%
	2003	13.1%
	2004	8.0%
	2005	3.8%
Sioux 1 Total		**11.7%**
Sioux 2	2000	15.7%
	2001	4.8%
	2002	3.6%
	2003	3.8%
	2004	5.5%
	2005	2.7%
Sioux 2 Total		**5.6%**

Derate Outage Data

Sum of Eq Hrs		incl minis
Unit	Year	UnFul Rt
Callaway 1	2000	0.2%
	2001	2.8%
	2002	6.7%
	2003	4.1%
	2004	6.8%
	2005	4.6%
Callaway 1 Total		**4.0%**
Labadie 1	2000	9.8%
	2001	3.7%
	2002	10.8%
	2003	4.8%
	2004	5.6%
	2005	3.3%
Labadie 1 Total		**5.8%**
Labadie 2	2000	8.8%
	2001	8.4%
	2002	3.9%
	2003	5.7%
	2004	10.3%
	2005	6.0%
Labadie 2 Total		**6.9%**
Labadie 3	2000	4.7%
	2001	7.2%
	2002	6.9%
	2003	13.0%
	2004	4.1%
	2005	3.1%
Labadie 3 Total		**6.1%**
Labadie 4	2000	7.8%
	2001	7.3%
	2002	49.2%
	2003	5.0%
	2004	5.6%
	2005	3.3%
Labadie 4 Total		**11.2%**
Meramec 1	2000	14.4%
	2001	17.9%
	2002	5.2%
	2003	3.8%
	2004	6.4%
	2005	1.3%
Meramec 1 Total		**7.4%**
Meramec 2	2000	4.8%
	2001	6.8%
	2002	3.1%
	2003	6.1%
	2004	3.0%
	2005	1.6%
Meramec 2 Total		**4.1%**
Meramec 3	2000	34.3%
	2001	18.0%
	2002	13.0%
	2003	13.0%
	2004	8.0%
	2005	6.7%
Meramec 3 Total		**13.8%**
Meramec 4	2000	8.9%
	2001	4.3%
	2002	11.5%
	2003	12.7%
	2004	4.1%
	2005	9.6%
Meramec 4 Total		**8.7%**
Rush Island 1	2000	7.3%
	2001	24.2%
	2002	12.5%
	2003	7.2%
	2004	23.3%
	2005	13.3%

Derate Outage Data

Sum of Eq Hrs		incl minis
Unit	Year	UnFul Rt
Rush Island 1 Total		**14.1%**
Rush Island 2	2000	3.6%
	2001	18.4%
	2002	14.5%
	2003	7.4%
	2004	14.0%
	2005	2.2%
Rush Island 2 Total		**10.0%**
Sioux 1	2000	15.7%
	2001	23.0%
	2002	8.7%
	2003	13.1%
	2004	8.0%
	2005	3.8%
Sioux 1 Total		**11.7%**
Sioux 2	2000	15.7%
	2001	4.8%
	2002	3.6%
	2003	3.8%
	2004	5.5%
	2005	2.7%
Sioux 2 Total		**5.6%**