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Production Cost Model Timothy D. Finnell Union Electric Co. Direct Testimony ER-2010

> FILED April 22, 2010 Missouri Public Service Commission

# MISSOURI PUBLIC SERVICE COMMISSION

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CASE NO. ER-2010-

## DIRECT TESTIMONY

### OF

## **TIMOTHY D. FINNELL**

ON

### **BEHALF OF**

## UNION ELECTRIC COMPANY d/b/a AmerenUE

St. Louis, Missouri July, 2009

Exhibit Date 3 2 410 Reporter ( File No. Fl. 2010-00

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1	DIRECT TESTIMONY
2	OF
3	TIMOTHY D. FINNELL
4	CASE NO. ER-2010
5	I. <u>INTRODUCTION</u>
6	Q. Please state your name and business address.
7	A. Timothy D. Finnell, Ameren Services Company ("Ameren Services"),
8	One Ameren Plaza, 1901 Chouteau Avenue, St. Louis, Missouri.
9	Q. What is your position with Ameren Services?
10	A. I am a Managing Supervisor, Operations Analysis in the Corporate
11	Planning Function of Ameren Services. Ameren Services provides corporate,
12	administrative and technical support for Ameren Corporation and its affiliates.
13	Q. Please describe your educational background and employment
14	experience.
15	A. I received my Bachelor of Science Degree in Industrial Engineering from
16	the University of Missouri-Columbia in May 1973. I received my Master of Science
17	Degree in Engineering Management from the University of Missouri-Rolla in May 1978.
18	My duties include developing fuel budgets, reviewing and updating economic dispatch
19	parameters for the generating units owned by Ameren Corporation subsidiaries, including
20	Union Electric Company d/b/a AmerenUE ("AmerenUE" or "Company"), providing
21	power plant project justification studies, and performing other special studies.
22	I joined the Operations Analysis group in 1978 as an engineer. In that
23	capacity, I was responsible for updating the computer code of the System Simulation
24	Program, which was the production costing model used by Union Electric Company

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("UE") at that time. I also prepared the UE fuel budget, performed economic studies for power plant projects, and prepared production cost modeling studies for UE rate cases since 1978. I was promoted to Supervising Engineer of the Operations Analysis work group in 1985. I became an Ameren Services employee in 1998, when UE and Central Illinois Public Service Company merged. My title was changed to Managing Supervisor in February 2008.

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### II. <u>PURPOSE AND SUMMARY OF TESTIMONY</u>

Q.

#### What is the purpose of your direct testimony in this proceeding?

9 A. The purpose of my testimony is to sponsor the determination of a 10 normalized level of net fuel costs, which was used by AmerenUE witness Gary S. Weiss 11 in determining AmerenUE's revenue requirement for this case. Net fuel costs consist of 12 nuclear fuel, coal, oil, and natural gas costs associated with producing electricity from the 13 AmerenUE generation fleet, plus the variable component of purchase power, less the 14 energy revenues from off-system sales.<sup>1</sup>

15

### Q. Please summarize your testimony and conclusions.

A. AmerenUE's normalized net fuel costs were calculated using the PROSYM production cost model. The major inputs for the production cost model include: hourly load data, generating unit operational data, generating unit availability data, fuel costs, off-system market data, and system requirements. The normalized

<sup>&</sup>lt;sup>1</sup> "Net fuel costs" as used in this testimony is slightly different than "net base fuel costs" ("NBFC") discussed in the direct testimony of Mr. Weiss and which is contained in the Company's fuel adjustment clause tariff. This is because NBFC also include items that are not the product of the PROSYM modeling but which are a part of total fuel and purchased power expense included in Mr. Weiss' revenue requirement, principally as follows: fixed gas supply costs, credits against the cost of nuclear fuel from Westinghouse arising from a prior settlement of a nuclear fuel contract dispute, Day 2 energy market expenses and Day 3 ancillary service market expenses and revenues from the Midwest Independent Transmission Operator, Inc. ("MISO"), excluding administrative fees, MISO Day 2 congestion charges, MISO Day 2 revenues, and capacity sales revenues.

Q.

annual net fuel costs are \$515 million, which consists of fuel costs of \$764 million and
variable purchase power costs of \$51 million, offset by off-system sales revenues of
\$299.6 million.<sup>2</sup>

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### III. PRODUCTION COST MODELING

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## What is a production cost model?

6 A. A production cost model is a computer application used to simulate an 7 electric utility's generation system and load obligations. One of the primary uses of a 8 production cost model is to develop production cost estimates used for planning and 9 decision making, including the development of a normalized level of net fuel costs upon 10 which a utility's revenue requirement can be based.

# Q. Is the PROSYM model used by Ameren Services a commonly used production cost model?

A. Yes. PROSYM is a product of Ventyx. 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 Ventyx offers.

# 17Q. How long has Ameren Services been using PROSYM to model18AmerenUE's system?

19

A. Ameren Services has been using PROSYM to model AmerenUE's system

20 since 1995.

<sup>&</sup>lt;sup>2</sup> Please note that the off-system sales revenues figures used in my testimony are on a "total company" (retail and wholesale) basis for AmerenUE. The Missouri retail share of these figures is lower by approximately 5%, and is accounted for by Mr. Weiss when he applies the Missouri jurisdictional allocation factor in computing the revenue requirement and NBFC.

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1	Q.	How is PROSYM used by Ameren Services?
2	A.	PROSYM is operated and maintained by the Operations Analysis Group.
3	Some of the 1	most common uses of PROSYM are: preparation of the monthly and annual
4	fuel burn pro	jections; support for emissions planning; evaluation of major unit overhaul
5	schedules; ev	valuation of power plant projects; and support for regulatory requirements
6	such as Fede	eral Energy Regulatory Commission Public Utility Regulatory Policy Act
7	("PURPA") f	ilings and rate cases such as this one.
8	Q.	What are the major inputs to the PROSYM model run used for
9	calculating a	normalized level of net fuel costs?
10	Α.	The major inputs include: normalized hourly loads, unit availabilities, fuel
11	prices, unit o	perating characteristics, hourly energy prices, and system requirements.
12	Q.	Do different production cost models produce similar results?
13	Α.	Most models should have similar logic for optimizing generation costs and
14	should produ	ace similar results, all else being equal. However, some models have a
15	higher level	of accuracy because, for example, they are able to perform a more detailed
16	optimization	for systems like AmerenUE's system with a run of river plant, a stored
17	hydroelectric	plant, a pumped storage plant, and reserve requirements. The dispatch of
18	hydroelectric	and pumped storage plants is an important part of AmerenUE's generation
19	cost optimiz	ation and requires a model that is able to optimize those types of plants.
20	PROSYM is	s such a model. Our experience with PROSYM indicates that it does a
21	superior job	of simulating complex generating systems such as AmerenUE's system.

Q.

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# 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 model 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 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.

9

# Q. How well is the PROSYM model calibrated?

10 Α. The PROSYM model is very well calibrated as demonstrated by the 11 results of a calibration conducted under my supervision which compared actual 2008 12 generation to model results. For example, the calibrated model results calculated the 13 generating output from AmerenUE to be 49.515.400 megawatt-hours ("MWh"). Actual generation was 49,336,396 MWhs, thus the model result was within less than 1/2% of the 14 15 actual generation. Another example of how well the model is calibrated is reflected in the predicted off-system sales produced by the model versus the actual off-system sales 16 17 for the study period. Those results (10,708,800 MWh from the model versus 10,456,820 18 MWh actual) was within 2.4% of the actual results. Based upon my experience, these 19 results demonstrate the high level of accuracy of the model. Detailed results of the 20 calibration are shown in Schedule TDF-E1.

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

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1	A. One must look carefully at the model inputs that could affect the results.
2	For example, if the model's result for generation output is too low compared to actual
3	values there are several items that would need to be reviewed. These items include the
4	analysis of whether (1) the dispatch price is too high; (2) the unit availability factor is too
5	low; (3) the minimum load is too low; (4) the unit start-up costs are incorrect; (5) the
6	minimum up and down times are incorrect; and (6) the off-system sales market is
7	incorrectly modeled.
8	Q. What are the implications of using a less well calibrated model to
9	determine revenue requirement in a rate case?
10	A. A poorly calibrated model will inevitably lead to an inaccurate
11	determination of a normalized level of net fuel costs.
12	IV. <u>PRODUCTION COST MODEL INPUTS</u>
13	Q. What type of load data is required by PROSYM?
14	A. PROSYM utilizes monthly energy with a historic hourly load pattern. The
15	monthly energy reflects AmerenUE kilowatt-hour ("kWh") sales and line losses.
16	AmerenUE's normalized sales plus line loss values were provided to me by AmerenUE
17	witness Steven M. Wills.
18	Q. What operational data is used by PROSYM?
19	A. Operational data reflects the characteristics of the generating units used to
20	supply the energy for native load customers and to make off-system sales. The major
21	operational data includes: the unit input/output curve, which calculates the fuel input
22	required for a given level of generator output; the generator minimum load, which is the
23	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-E2
 lists the operational data used for this case.

3

#### Q. What availability data is used by PROSYM?

4 The availability data are categorized as planned outages, unplanned A. 5 outages and deratings. Planned outages are major unit outages that occur at scheduled 6 intervals. The length of the scheduled outage depends on the type of work being 7 performed. Planned outage intervals vary due to factors such as: type of unit; unplanned 8 outage rates during the maintenance interval; and plant modifications. A normalized 9 planned outage length was used for this case, as reflected in Schedule TDF-E3. The 10 length of the planned outages is based on a 6-year average of actual planned outages that 11 occurred between April 1, 2003 and March 31, 2009 with one exception. The one 12 exception was to remove the 2005 Callaway Nuclear Plant refueling outage from the 13 6-year average because the 2005 Callaway refueling outage included non-recurring outage work relating to the complete replacement of the steam generators at Callaway. 14

In addition to the length of the planned outage, the time period when the planned 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 off-system power prices. The planned outage schedule used in modeling AmerenUE's generation with the PROSYM model is shown in Schedule TDF-E4.

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 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 April 1, 2003 and March 31, 2009, and is reflected in Schedule
 TDF-E5.

6 Derating occurs when a generating unit cannot reach its maximum output 7 due to operational problems. The magnitude of the derating varies based on the operating 8 issues involved and can result in reduced outputs ranging from 2% to 50% of the 9 maximum unit rating. Several examples of causes of derating include: coal mill outages, 10 boiler feed pump outages, and exceeding opacity limits due to precipitator performance 11 problems. The derating rate used in this case is based on a 6-year average of deratings 12 that occurred between April 1, 2003 and March 31, 2009, and is reflected in Schedule 13 TDF-E6.

14

### Q. How was the Taum Sauk Plant's availability modeled in PROSYM?

15 In order to insulate ratepayers from the financial impact of the Α. 16 unavailability of the Taum Sauk Plant, AmerenUE's system was modeled assuming that 17 Taum Sauk was in service. This lowers the normalized net fuel costs used in this case by 18 capturing the economic benefit of the Taum Sauk Plant to AmerenUE's system. For the 19 test year period, the annual operations of the Taum Sauk Plant resulted in a net fuel cost 20 benefit of \$28.2 million, \$24.8 million of which was determined by the PROSYM model 21 and \$3.4 million of which reflect capacity sales from the Taum Sauk Plant as addressed 22 in the direct testimony of AmerenUE witness Jamie Haro.

# 1 Q. What fuel cost data was used to determine AmerenUE's revenue 2 requirement?

3 Α. AmerenUE units burn four types of fuel: nuclear fuel, coal, natural gas, 4 and oil. The fuel costs are based on costs as of the end of the anticipated true-up period, 5 February 28, 2010. The nuclear fuel costs are based on the average nuclear fuel cost associated with Callaway Refueling Number 17 which will have fuel on site as of 6 7 December 2009. The coal costs reflect coal and transportation costs based upon coal and 8 transportation prices that become effective as of January 1, 2010. The natural gas and oil 9 prices are based on the average monthly prices for the period March, 2007 to 10 February 28, 2010.<sup>3</sup>

11

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

12 A. Off-system purchases are power purchases from energy sellers used to 13 meet native load requirements. The purchases can be from long-term purchase contracts 14 or short-term economic purchases. The only long-term power purchase contract included 15 as an off-system purchase in PROSYM in this case is the purchase of 102 megawatts 16 ("MW") from Horizon Wind Energy LLC, Pioneer Prairie Wind Farm under a purchase 17 power contract which begins September 1, 2009. The Arkansas Power & Light ("APL") purchase power contract of 160 megawatts ("MW), which was in place during the test 18 19 year ending March 31, 2009 was not modeled because the contract ends in August 2009. 20 Short-term economic purchases are used to supply native load when the power prices are 21 lower than AmerenUE's cost of generation and the generating unit operating parameters

<sup>&</sup>lt;sup>3</sup> Actual price data was used for the period March 1, 2007 through April 30, 2009, while forward gas prices were used for the remaining 10 months through February 28, 2010. Actual price data for those 10 months will be utilized as part of the true-up in this case.

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1 are not violated. A violation of the generating unit operating parameters would occur 2 when all units are operating at their minimum load and cannot reduce their output any 3 further. In that case, short-term economic purchases are not made even when they are at 4 lower costs than the cost of operating the AmerenUE generating units. The price of 5 short-term economic purchases is based on hourly market prices. The hourly market 6 prices are based on the average market prices for the period March 1, 2007 through 7 February 2010. An explanation of the use of power prices from this time period is 8 provided in Mr. Haro's testimony. Mr. Haro utilized 27 months of actual price data and 9 9 months of forward price data, subject to true-up later in this case. The volume of short-10 term economic purchases was assumed to be unlimited since AmerenUE is a participant 11 in the Day 2 Energy Markets sponsored by the MISO.

12 The PROSYM modeling contains only spot sales. Spot sales are short-13 term economic off-system sales that occur when the cost of excess generation is below 14 the market price of power. Excess generation is the generation that is not used to supply 15 the native load customers. The market price for short-term economic sales is the same 16 price as for short-term economic purchases, which were previously described. The 17 volume of short-term economic sales was assumed to be unlimited again, since 18 AmerenUE participates in the MISO's Day 2 Energy Markets. While no off-system 19 contract sales were included in my PROSYM run, because no off-system contract sales 20 existed at the time of the run, any off-system contract sales that exist through the true-up 21 cutoff date will be included in the true-up.

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## Q. What system requirements are used in PROSYM?

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1	A. The modeling of system requirements for regulation, spinning reserves
2	and supplemental reserves has been eliminated due to the MISO ancillary services market
3	("ASM"), which began in January 2009. Eliminating the modeling of system
4	requirements results in AmerenUE purchasing all of the ancillary services needed to
5	serve its load from the MISO ASM and allows the generating units to operate (in the
6	modeling) at full output. Allowing the generating units to operate at full output rather
7	than holding some of their capacity back for regulation or spinning reserves results in a
8	\$4.6 million reduction to net fuel costs. (Net fuel costs equal generation costs plus
9	purchase power costs less off-system sales revenues).
10	Q. Are there other net fuel costs that cannot be determined by the
11	PROSYM production cost model?
12	A. Yes. There are other costs and revenues that should be considered, such
13	as: capacity purchase costs, capacity sales revenues, revenue sufficiency guarantee make
14	whole payments, ancillary services costs and revenues, and the costs/revenues associated
15	with load forecasting deviations and generation forecasting deviations. Mr. Haro has
16	addressed all of the adjustments except for the load forecasting deviations, generation
17	forecasting deviations and ancillary services costs (which are accounted for by Mr. Weiss
18	in his Cost of Service Study).
19	Q. Please describe what you mean by load forecasting deviations and
20	generation forecasting deviations.
21	A. Load forecasting deviations and generation forecasting deviations are
22	related to the MISO day ahead and real time markets. The day ahead ("DA") market is
23	based on the market participants' estimates of loads and generation levels for the

1 following day and the real time ("RT") market is based on the market participants' actual 2 loads and generation levels. When there is a deviation between the day ahead values and 3 real time values there is extra revenue or expense which is calculated by multiplying the 4 MWh deviation times the difference between the day ahead locational marginal price 5 ("DA-LMP") and the real time locational marginal price ("RT-LMP"). For example, on 6 January 2, 2008, for the hour ending 1 a.m., the day ahead forecast was 5,183 MW and the modeled real time load was 5,431 MW. Thus, the load was under-forecasted by 7 8 248 MW. Also the DA-LMP was \$26.63/MWh and the RT-LMP was \$30.64/MWh, 9 resulting in an additional cost of \$4.01/MWh for meeting the extra load. The cost impact 10 of this load forecast deviation in that hour is \$994 (248 MW per hour x 4.01/MWh =11 \$994). To determine the load forecasting deviations, this calculation is done for every 12 hour and then the cost impacts for all the hours are summed for the period being 13 analyzed. For the generation forecasting deviations, this calculation is done for every 14 hour and for every generating unit except for the combustion turbine generators 15 ("CTGs") and then cost impacts for all the hours are summed for the period being 16 analyzed. The CTGs have been excluded from the analysis because of the way the MISO 17 dispatches the CTGs and because of the revenue sufficiency guarantee make whole 18 payments addressed in Mr. Haro's direct testimony.

19

Q. What is the total impact of the load forecasting deviations and the generation forecasting deviations? 20

21 Α. The impact of load forecasting deviations is an additional cost of \$10.7 22 million and the impact of generation forecast deviations is additional revenues of \$0.1

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- 1 million, resulting in a net impact of \$10.6 million of additional costs. This \$10.6 million
- 2 increases net fuel costs.

# Q. Does this complete your direct testimony?

4 A. Yes, it does.

## **BEFORE THE PUBLIC SERVICE COMMISSION** OF THE STATE OF MISSOURI

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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-2010-

### **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 Managing Supervisor, Operations Analysis.

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 13pages, Schedules TDF-E1 through TDF-E6, 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

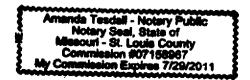
testimony to the questions therein propounded are true and correct.

Timothy D, Finnell Timothy D. Finnell

Subscribed and sworn to before me this 24 Hay of July, 2009.

Amande Tesdall Notary Public

My commission expires:



2008 ACTUAL vs PROSYM 2008															
		JAN	FEB	MAR	APR	МАУ	JUN	<b>JUI</b> ,	AUG	SEP	0CT	sov	DEC	Tota)	% Difference
Callaway	Actual	919,838	861,55	897,258	R80,210	904,505	861,545	878,976	889.454	869_370	281.840	579,384	554.694	9,378,629	
Canaway	Calib DA	915,900	<u> </u>		·	895,800	860,400		883,100	864,700	290.300	553,200	\$54,600		
	Actual - DA	3,938		_	390				· ·	4,670	-8,460	26,184	94		u.4%
	Action Pro-		<u> </u>		1		1	<u> </u>	0.04	1 14/12	-0.100				
Rush	Actual	767,113	754,909	797,173	648,955	667,418	731,433	769.220	718,417	638,028	774,990	708,330	782,446	8,758,432	
	Calib DA	802,200	764,200	818,700	704.200	713,800	754,500	768.300	730,900	646,300	794.900	700,900	813,000	9.011.900	
	Actual - DA	-35,087	-9.291	-21.527	-55,245	-46.382	-23,067	926	-12,48)	-8,272	-19.910	7,430	-30,554	-253,468	-2.9%
						<u> </u>									
Labadie	Actual	1,505,744		1.225,266	1.160.137	1.125.908	1,491,759		1.652.273	1,483,221	1,454,326	1.642.242	1.568,926	17,407,853	
	Calib DA	1.517,900	1	1,222,800		1.124,400	1.540,700		1,627,200	1,526,500	1,474,400	1.546,800	1.604,300	17.559,400	
	Actual - DA	-12,156	2,892	2,466	-24,463	1,508	-48,941	5,359	25,073	-43,279	-20,074	-4,558	-35,374	-151.547	-0.9%
	<u> </u>			<u> </u>	1	-	<u> </u>				<u> </u>				
Sioux	Actual	506.977	576,055	560,484		560.495	533.679			341,840	239.541	326.853	552,514	5,848,616	
	Calib DA	494,900		563.900 -3,416		548,500 11,995	516,600	-	568.300 22.770	329,600	222,600	285,200	503,900	5,632,200	3.7%
	Actual - DA	12.077	1,439	] -3,410	10.319	11,995	(7.079	16.653	22.110	12,240	10,941	41,653	48,614	216,416	3.776
Meramec	Actual	483,100	508,872	458,620	\$13,101	470.813	500,584	564,096	540,721	379,743	546.014	341.864	505,642	5,813,169	
	Calib DA	480,000	504,500	480,400	505,700	455,700	505,300	556,800	537,000	379.900	563,300	345,900	500,700	5.813,200	
	Actual - DA	3,100	4,372	-21,780	7,401	15.112	-4,716	7.296	3.72	-157	-17.286	-4,036	4,942	-2.031	0.0%
															-
Osage	Actual	32.053	61,710	113,679	114,901	149,053	111.362	150,100	29,613	92,702	\$1,012	31.663	10,807	948.655	
	Calib DA	35,700	60.600	111,300		149,100			29,800	91,000	50.500	29,700	10,800	944,600	
	Actual DA	-3,647	1,110	2.379	101	-47	38	200	-187	1.702	512	1,963	7	4,055	0.4%
Keokuk	Actual	81,079	81,023	67,998	52,311	46,661	25,160	76,429	80,964	73,611	74,003	77.167	66,508	802,914	
ACORDE	Calib DA	81,400	82,100	66,700	52,900	45,200	19,400		81,000	74,200	74,800	75,800	66,500	796.000	
	Actual - DA	-321	-1.077	1.298		1,461	5,760			-589	-797	1,367	8	6,914	0.9%
	<u> </u>														
UE CTG	Actual	35.948	16.687	5.598	23.558	11.418	45.097	119.556	46,817	38.051	24,079	5.394	9,209	381,412	
	Calib DA	43,600	3,100	1,800	2,400	0	93,800	123.900	35,300	49,300	4,000	6.100	48,000	411,300	
	Actual - DA	-7,652	13,587	3,798	21.158	11,418	-48,703	<u>_4_344</u>	11.512	-11.249	20,079	-706	-38,791	-29,888	_7.8%
	·														
Purchases	Actual	229,887	114,443	134,307	127,062	116.489	127,237	113.026	157,353	146,847	141,320	124.181	225,056	1,757,208	
	Calib DA	233,400	130,200	152.200	130,300 -3,238	131,700	23,737	117.300 -4.374	109,800 47,5 <u>53</u>	96,100 50.74?	172,800 -31,480	140,600	312,500	1,830,400 -73,192	-4.2%
	Execute DA	-3,515	10,007	-17,675	• <u>525</u> 6	-15,411	101,00	-4,2,14	47.555	30.747	-31.460	-10,419		-(3,192	4.2%
Sales	Actual	838,992	1,055,235	1,030,332	1.159.837	1,137.060	819.732	738.503	875,547	875.869	628,192	752.101	545,399	10,456,820	
<u> </u>	Calib DA	883,000	1.048.500	1,097,800	1,206,900	1,139,600	894,600	724,500	776,100	877,900	685.500	694,500	679,900	10,708,800	
	Actual - DA	-44,008	6.735	-67,468	47.063	-2,540	-74,858	14.003	99,447	-2.031	-57,308	57.601	-134,501	-251,980	-2.4%
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Net Output	Actual	3,722,396	3,494,748	3.229.778	2,897.915	2,915,534		3,977,036	3,830,912	3.187.301	2,958.688	3,084.625	3.729,924	40.636,784	
	Calib DA	3.722,000	3,491,900	3,232,100	2,890,000	2.924.600		3,973.200	3.826.300	3,179,700	2,962,100	3.089.700	3.734,400	40.637.000	
	Actual - DA	396	2.848	-2.322	7,915	-9,066	-3,072	3.836	4.612	7,601	-3,412	-5,075	-4,476	-216	0.0%
UE Coal	Actual	3.262,934	3,414.932	3,041.543	2,859,912	2,824,633	3.257,455	3,377.660	3,502.481	2,842.832	3,014,871	3.019,289	3,409,528	37,828,070	
	Calib DA	3,295,000	3,409,700	3,085,800	2,915,900	2,842,400	3,317,100	3.351.200	3,463,400	2,882,300	3,055,200	2,978,800	3,421,900	38,018,700	
	Actual - DA	-32,066	5,232	-44,257	-55,988	-17,767	-59.645	26,460	39,081	-39,468	-40,329	40,489	-12,372	-190,630	-0.5%
UE Hydro	Actual	113,132	142,733	181,677	167,212	195,714	136,522	226.529	110,577	166.313	125,015	108,830	77,315	1,751,569	
	Calib DA	117,100	142.700	178.000	167.700	194.300	130,800	225,900	110,800	165.200	125.300	105.500	77,300	1.740,600	
	Actual - DA	-3,968	33	3,677	488	1,414	5.722	629	-223	1.113	-285	3,330	15	10,969	0.6%
							1 800 /								
UE	Actual	4,331,501 4,371,600	4,435,560	4,125,803 4,177,700	3,930,690	3,936,105	4,300,423	4,602.513	4,549,106 4,492,600	3,916,323	3.445,560	3.712.545	4,050,267	49,336,396 49,515,400	
	Calib DA Actual - DA	4,371,600	4,410,200	4,177,700	3,966,600 -35,910	3,932,500	4,402,100	4,580,400	4,492,600	<u>3,961,300</u> -45,177	3,474,800	3.643,600 68,945	4,101,806	49,515,400	-0.4%
	Incluse - DA		0.500	-21,097	-33,910	3,003	101.077	ل) ارشد	10,300	-0.07	7.240	LW 2421		-177,0041	-9.476

### PROSYM CALIBRATION - Net MWH

Input	1	Output	Curve	#1
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Galaway         600         1.220         Nuclear         -         9,941         -         T         -         0.005         306.48         10.1           Labadel 2         300         655         PRB Coal         0.00167         7.844         794.5         10.1           Labadel 3         300         611         PRB Coal         0.00126         8.265         565.8         10.1           Labadel 4         300         611         PRB Coal         0.00127         8.737         679.6         68.7           Rush 1         275         591         PRB Coal         0.00127         8.737         679.6         69.7           Stax 2         307         503         PRBLILMOIS Coal         0.000128         8.314         597.1         10.1           Marame 2         48         125         PRB Coal         0.000770         5.168         804.7         0.9           Marame 3         160         264         PRB Coal         0.000710         10.618         160.4         0.9           Audrain CT 3         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 3         62         82         Natural Gas<					Input	Curve #1	#1			
Caffavery         800         1.20         Nuclear         -         9,941         -         T         T           Labadie         300         644         PRB Coal         0.00167         7.844         794.5         1.0           Labadie         300         611         PRB Coal         0.00166         8.265         555.8         1.0           Labadie         300         611         PRB Coal         0.00126         8.261         553.8         1.0           Rush 1         275         608         PRB Coal         0.00137         8.757.7         1.0           Sicux 1         307         500         PRBLILMOIS Coal         0.00138         8.314         597.7         1.0           Meramec 1         48         124         PRB Coal         0.00624         8.316         697.7         0.0           Meramec 3         160         264         PRB Coal         0.00070         5.168         804.7         0.9           Audrain CT 1         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 3         62         82         Natural Gas         0.00010         10.618         160.4         0.0	<u>Unit Name</u>	<u>Minimum - Net</u>	12 Month Avg Net	Primary Fuel Type	A	8	с	EDF		
Labadie 2 300 664 PRB Coal - 9,005 7,844 794.5 10 Labadie 3 300 611 PRB Coal 0,0016 8,265 55.8 10. Labadie 4 300 611 PRB Coal 0,0012 7,853 724.4 05 Rush 1 275 608 PRB Coal 0,0012 7,853 724.4 05 Sioux 1 307 500 PRB/LLNNIS Coal 0,0001 8,613 59.6 10. Sioux 2 307 503 PRB/LLNNIS Coal 0,0001 8,614 59.6 10. Meramec 1 48 124 PRB Coal 0,0014 8,214 59.7 10. Meramec 2 48 125 PRB Coal 0,0014 8,284 8,344 475.5 0. Meramec 3 160 264 PRB Coal 0,0014 8,248 8,344 475.5 0. Meramec 3 160 264 PRB Coal 0,0012 7,853 8,000 10. Meramec 3 160 264 PRB Coal 0,0014 8,248 8,344 475.5 0. Audrain CT 2 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 4 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Audrain CT 6 62 82 Natural Gas 0,0001 10,618 160.4 00 Faigrounds (T 61 61 61 0i 0,0014 3,7,788 17,73 00 Goose Creek CT 1 50 80 Natural Gas 0,0001 10,618 160.4 00 Faigrounds (T 61 61 0i 0,0014 3,7,78 17,73 00 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 80 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 50 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 50 Natural Gas 0,0001 8,808 237,6 0.0 Goose Creek CT 1 50 50 Natural Gas 0,0001 8,808 237,6 0.0 G	Callaway	800	1,220				-	1.000		
Labadie 3 300 695 PRB Coal 0.00167 7.844 794.5 t0 Labadie 4 300 611 PRB Coal 0.00126 8.265 555.8 t0 Labadie 4 300 611 PRB Coal 0.00127 8.757 75.6 0.0 Rush 1 275 606 PrR5 Coal 0.00137 8.757 75.6 0.0 Sioux 1 307 500 PRB/LLNNS Coal 0.00058 8.314 957.7 10. Sioux 2 307 603 PRB/LLNNS Coal 0.00058 8.314 957.7 10. Sioux 2 307 603 PRB/LLNNS Coal 0.00058 8.314 957.7 10. Sioux 2 307 603 PRB/LLNNS Coal 0.00058 8.314 957.7 10. Sioux 2 48 125 PRB Coal 0.01123 9.314 106.9 0.0 Meramec 1 48 124 PRB Coal 0.01027 5.168 804.7 457.5 0.0 Meramec 3 160 264 PRB Coal 0.00027 5.168 804.7 0.0 Audran CT 1 62 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 2 62 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 3 6.2 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 3 6.2 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 3 6.2 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 3 6.2 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 3 6.2 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 3 6.2 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 4 61 61 00 Audran CT 5 6.2 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 5 6.2 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.0 Audran CT 6 60 80 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 1 50 80 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 2 50 80 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 4 50 80 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 4 50 80 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 4 50 80 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 4 50 80 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 4 50 80 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 4 50 50 Natural Gas 0.00010 8.608 227.8 0.0 Goose Creek CT 4 51 61 G1 G1 0.00143 7.798 17.7.3 1.0 Meramec CT 1 62 62 01 0.00143 7.798 17.7.3 1.0 Meramec CT 1 50 50 Natural Gas 0.00010 9.191 52	Labadie 1	300	614	PRB Coal	-		304.8	1.013		
Labadie 3 300 611 PRB Coal 0.00106 8.256 965.8 10. 1 Labadie 4 300 611 PRB Coal 0.00126 8.256 965.8 10. 1 Rush 1 275 608 PRB Coal 0.00129 7.859 724.4 05 Sixux 1 307 500 PRB/LLINOIS Coal 0.00001 8.451 359.6 10. Sixux 2 307 503 PRB/LLINOIS Coal 0.00001 8.41 359.6 10. Meramec 1 48 124 PRB Coal 0.01123 9.314 106.9 0.5 Meramec 3 160 264 PRB Coal 0.0123 9.314 106.9 0.5 Meramec 3 160 264 PRB Coal 0.0027 5.168 800.7 0.5 Meramec 3 160 264 PRB Coal 0.00010 10.618 160.4 0.5 Meramec 3 160 264 PRB Coal 0.00010 10.618 160.4 0.5 Meramec 3 160 264 PRB Coal 0.00101 10.618 160.4 0.5 Audrain CT 1 62 82 Natural Gas 0.00010 10.618 160.4 0.5 Audrain CT 3 62 82 Natural Gas 0.00010 10.618 160.4 0.5 Audrain CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.5 Audrain CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.5 Audrain CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.5 Audrain CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.5 Audrain CT 6 62 82 Natural Gas 0.00010 10.618 160.4 0.5 Fairgrounds GT 61 61 61 0i 0i 0.00143 7.738 17.3 0.5 Goose Creek CT 1 50 80 Natural Gas 0.00010 10.618 160.4 0.5 Goose Creek CT 1 50 80 Natural Gas 0.00010 10.618 160.4 0.5 Goose Creek CT 1 50 80 Natural Gas 0.00010 10.618 160.4 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 10.618 160.4 0.5 Goose Creek CT 1 50 80 Natural Gas 0.00010 10.618 160.4 0.5 Goose Creek CT 1 50 80 Natural Gas 0.00010 10.618 160.4 0.5 Goose Creek CT 1 50 80 Natural Gas 0.00010 10.618 160.4 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 80 Natural Gas 0.00010 18.608 237.8 0.5 Goose Creek CT 4 50 50 Natural Gas 0.00010 18.603 134.9 10 Meramec CT	Labadie 2	300	595		0.00167			1.013		
Labadie 4         300         611         PR6 Coal         0.00126         B_221         G33.2         11           Rush 1         275         608         PR6 Coal         0.00137         8.757         673.6         0           Sloux 1         307         500         PR8/LLINOIS Coal         0.00018         8.641         353.6         10           Sloux 2         307         503         PR8/LLINOIS Coal         0.00058         8.314         597.7         10           Merame 2         48         125         PR8 Coal         0.0123         9.314         106.9         0           Merame 3         160         264         PR8 Coal         0.00270         5.168         804.7         0           Audrain CT 1         62         82         Natural Gas         0.00010         10.618         160.4         0           Audrain CT 2         62         82         Natural Gas         0.00010         10.618         160.4         0           Audrain CT 3         62         82         Natural Gas         0.00010         10.618         160.4         0           Audrain CT 4         62         82         Natural Gas         0.00010         10.618         160.4	Labadie 3	300	611					1.013		
Ruph 1         275         606         PHB Coal         0.00129         7.263         72.4         0.00           Sloux 1         307         500         PRB Coal         0.00101         8.611         359.6         10           Sloux 1         307         500         PRB/LLINOIS Coal         0.00001         8.611         359.6         10           Mearame 2         48         125         PRB Coal         0.01407         8.209         216.1         10           Mearame 3         160         264         PRB Coal         0.00624         8.344         475.5         0.0           Mearame 4         185         352         PRB Coal         0.00010         10.618         160.4         0.0           Audrain CT 3         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1.013</td>								1.013		
Ruh 2         275         591         PHB Coal         0.00137         8.757         673.6         0           Slox 4         307         500         PFR/LLINOIS Coal         0.00058         8.314         597.7         10           Slox 2         307         503         PFR/LLINOIS Coal         0.00058         8.314         597.7         10           Meramec 2         48         124         PFB Coal         0.01123         9.314         106.9         0           Meramec 3         160         264         PFB Coal         0.002770         5.168         804.7         0.9           Audrain CT 1         62         82         Naturai Gas         0.00010         10.618         160.4         0.9           Audrain CT 4         62         82         Naturai Gas         0.00010         10.618         160.4         0.9           Audrain CT 5         62         82         Naturai Gas         0.00010         10.618         160.4         0.9           Audrain CT 6         62         82         Naturai Gas         0.00010         10.618         160.4         0.9           Audrain CT 6         62         82         Naturai Gas         0.00010         10.618         1								0.986		
Slox 1         307         500         PER/LLING'S Coal         0.00001         8.41         356.4         1           Mearane 2         48         125         PRB Coal         0.01407         8.209         216.1         06           Mearane 2         48         125         PRB Coal         0.01407         8.209         216.1         06           Mearane 3         160         264         PRB Coal         0.00270         5.168         804.7         0.9           Audrain CT 1         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 3         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Goose Creek CT 1         50         80         Natural Gas         0.00010         16.618								0.986		
Sioux 2         307         503         PPB/LLIND/IS Coal         0.00058         31.4         597.7         10           Merame: 1         48         124         PRB Coal         0.01407         8.209         216.1         0.0           Marame: 2         48         125         PRB Coal         0.0123         9.314         106.9         0.0           Marame: 4         185         352         PRB Coal         0.000770         5.168         804.7         0.9           Audrain CT 1         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 3         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 8         62         82         Natural Gas         0.00010         8.008         237.8         0.9           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.008										
Meramics 1         48         124         PRB Coal         0.01407         3.209         216.1         0.0           Meramics 2         48         125         PRB Coal         0.00624         8.384         475.5         0.0           Maramec 3         160         264         PRB Coal         0.00624         8.384         475.5         0.0           Maramec 4         185         352         PRB Coal         0.0070         5.168         604.7         0.9           Audrain C1 1         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 3         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 6         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 7         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 7         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 7         63         80         Natural Gas         0.00010         8082 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>										
Meramec 2         48         125         PRB Coal         0.01123         9.314         106.5         0.00           Meramec 4         185         352         PRB Coal         0.00624         8.384         475.5         0.00           Audrain CT 1         62         82         Natural Gas         0.00010         10.618         160.4         0.00           Audrain CT 3         62         82         Natural Gas         0.00010         10.618         160.4         0.00           Audrain CT 4         62         82         Natural Gas         0.00010         10.618         160.4         0.00           Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0.00           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0.00           Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4         0.00           Audrain CT 8         62         82         Natural Gas         0.00010         10.618         160.4         0.00           Goose Creek CT 1         50         80         Natural Gas         0.00010 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1.001</td></t<>								1.001		
Meramec 3         160         264         PRB Coal         0.00624         8.384         4.75.5         0.0           Maramec 4         185         352         PRB Coal         0.00770         5.168         60.7         0.9           Audrain CT 1         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 2         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 4         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.08         237.8         0.9           Goose Creek CT 3         50         80         Natural Gas         0.00010         8.08								0.975		
Meramec 4         185         352         PRB Coal         0.00770         5.168         804.7         0.0           Audrain C1 1         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 2         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 3         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 5         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 6         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain C1 7         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Goese Creek C1 1         50         80         Natural Gas         0.00010         8.608         237.8         0.0           Goese Creek C1 2         50         80         Natural Gas         0.00010         8.608         237.8         0.0           Goese Creek C1 2         50         80         Natural Gas         0.00010								0.975		
Audrain CT 1         62         82         Natural Gas         0.00010         10.618         160.4         0           Audrain CT 2         62         82         Natural Gas         0.00010         10.618         160.4         0           Audrain CT 3         62         82         Natural Gas         0.00010         10.618         160.4         0           Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0           Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.608         237.8         0           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 5         50         80         Natural Gas         0.00010         8								0.975		
Audrain CT 2         62         B2         Naturai Cess         0.00010         10.618         160.4         0.00           Audrain CT 3         62         82         Naturai Ges         0.00010         10.618         160.4         0.00           Audrain CT 5         62         82         Naturai Ges         0.00010         10.618         160.4         0.00           Audrain CT 5         62         82         Naturai Ges         0.00010         10.618         160.4         0.00           Audrain CT 6         62         82         Naturai Ges         0.00010         10.618         160.4         0.00           Audrain CT 7         62         82         Naturai Ges         0.00010         10.618         160.4         0.00           Goose Creek CT 1         50         80         Naturai Ges         0.00010         8.608         237.8         0.9           Goose Creek CT 1         50         80         Naturai Ges         0.00010         8.608         237.8         0.9           Goose Creek CT 4         50         80         Naturai Ges         0.00010         8.608         237.8         0.9           Goose Creek CT 5         50         80         Naturai Ges         0.000	Weramec 4	105	352	PKB LOal	0.00770	5.168	804.7	0. <del>9</del> 75		
Audrain CT 3         62         Ratural Gas         0.00010         10.618         160.4         0.0           Audrain CT 4         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Fairgrounds UT         61         61         61         60         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 5         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 6         45         60         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 6         45         60         Natural Gas				Natural Gas	0.00010	10.618	160.4	0.927		
Audrain CT 4         62         82         Natural Case         0.00010         10.618         160.4         0.0           Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Faigrounds GT 6         61         61         01         0.00113         7.798         177.3         0.9           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.08         237.8         0.9           Goose Creek CT 3         50         80         Natural Gas         0.00010         8.08         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.08         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.08         237.8         0.9           Goose Creek CT 5         50         80         Natural Gas         0.00010					0.00010	10.618	160.4	0.927		
Audrain CT 5         62         82         Natural Gas         0.00010         10.618         160.4         0.09           Audrain CT 6         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Audrain CT 8         62         82         Natural Gas         0.00010         10.618         160.4         0.9           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 2         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         9.219         21.7         9.10           Kinmundy CT 1         77         118         Natural Gas         0.00010				Natural Gas	0.00010	10.618	160.4	0.927		
Audrain CT 6       62       82       Naturai Case       0.00010       10.618       160.4       0.9         Audrain CT 7       62       82       Naturai Gas       0.00010       10.618       160.4       0.9         Fairgrounds GT       61       61       01       0.0010       3.7798       177.3       0.9         Goose Creek CT 1       50       80       Naturai Gas       0.00010       8.608       237.8       0.9         Goose Creek CT 3       50       80       Naturai Gas       0.00010       8.608       237.8       0.9         Goose Creek CT 4       50       80       Naturai Gas       0.00010       8.608       237.8       0.9         Goose Creek CT 4       50       80       Naturai Gas       0.00010       8.608       237.8       0.9         Goose Creek CT 5       50       80       Naturai Gas       0.00010       8.808       237.8       0.9         Goose Creek CT 4       50       80       Naturai Gas       0.00010       9.654       118.6       0.6         Kimmurdy CT 1       77       118       Naturai Gas       0.00010       9.219       217.9       1.0         Kinswile CT       14       4			82	Natural Gas	0.00010	10.618	160.4	0.927		
Audrain CT 7         62         82         Natural Gas         0.00010         10.618         160.4         0.0           Audrain CT 8         62         82         Natural Gas         0.00101         10.618         160.4         0.9           Goose Creek CT 1         50         80         Natural Gas         0.00101         8.008         237.8         0.9           Goose Creek CT 2         50         80         Natural Gas         0.00010         8.008         237.8         0.9           Goose Creek CT 3         50         80         Natural Gas         0.00010         8.008         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.008         237.8         0.9           Goose Creek CT 5         50         80         Natural Gas         0.00010         8.008         237.8         0.9           Goose Creek CT 6         45         80         Natural Gas         0.00010         9.219         217.9         1.0           Kinnundy CT 1         777         118         Natural Gas         0.00261         9.654         118.6         1.1           Meramec CT 1         62         62         01         0.00143				Natural Gas	0.00010	10.618	160.4	0.927		
Audrain CT 8         62         82         Natural Gas         0.00010         10.618         160.4         0.7           Fairgrounds QT         61         61         01         0.00143         7.798         177.3         0.3           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.608         237.8         0.3           Goose Creek CT 2         50         80         Natural Gas         0.00010         8.608         237.8         0.3           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.608         237.8         0.3           Goose Creek CT 5         50         80         Natural Gas         0.00010         8.608         237.8         0.5           Goose Creek CT 6         45         80         Natural Gas         0.00010         8.208         237.8         0.5           Kimmurdy CT 1         77         118         Natural Gas         0.00010         9.654         118.6         1.1           Kirksvile CT         14         Natural Gas         0.00261         9.654         118.6         1.1           Meramec CT 1         62         62         01         0.0143         7.798	Audrain CT 6	62	82	Natural Gas	0.00010	10.618	160.4	0.927		
Fairpounds GT         61	Audrain CT 7	62	82	Natural Gas	0.00010	10.618	160.4	0.927		
Fairgrounds GT         61         61         01         0.0143         7.798         177.3         0.5           Goose Creek CT 1         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 2         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 3         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 5         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 6         45         60         Natural Gas         0.00010         8.208         237.8         0.5           Goose Creek CT 6         46         46         Oil         0.00261         9.654         11.8         0.9         11.77.3         0.2         11.79         1.0           Kimmundy CT 1         77         118         Natural Gas         0.00261         9.654         11.8         1.2         17.73         0.2         11.8         1.1         1.4         Natural Gas         0.00143         7.798         17.73         0.2         1.2         1.0	Audrain CT 8	62	82	Natural Gas	0.00010	10.618	160.4	0.927		
Goose Creek CT 1         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 3         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 6         45         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 6         45         80         Natural Gas         0.00010         9.654         118.6         0.9           Howard Bend CT         77         118         Natural Gas         0.00010         9.219         217.9         10           Kinmundy CT 1         77         118         Natural Gas         0.00216         9.654         118.6         1.1           Meramec CT 2         26         50         Natural Gas         0.00143         7.798         177.3         0.9           Meramec CT 2         50         50         Natural Gas         0.0010	Fairgrounds QT	61	61	Oil				0.980		
Goose Creek CT 2         50         80         Natural Gas         0.00010         8.608         237.8         0.9           Goose Creek CT 3         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 5         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 6         45         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 6         46         46         0il         0.00261         9.654         118.6         11.8         6.00010         9.219         217.9         1.0           Kimmudy CT 1         77         118         Natural Gas         0.00261         9.654         118.6         11.8         6.64         118.6         11.7         1.8         Matural Gas         0.00261         9.654         118.6         17.7         1.0           Meramec CT 2         26         50         Natural Gas         0.00013         7.798         177.3         0.9           M	Goose Creek CT 1	50	80	Natural Gas				0.986		
Goose Creek CT 3         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 4         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 5         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 6         45         80         Natural Gas         0.00010         8.808         237.8         0.9           Howard Band CT         46         46         0il         0.00210         9.654         118.6         0.9           Kimundy CT 1         77         118         Natural Gas         0.00010         9.219         217.9         1.0           Kimundy CT 2         77         118         Natural Gas         0.00143         7.798         177.3         0.9           Meramec CT 2         26         52         0il         0.00143         7.798         177.3         0.9           Mohorey CT         61         61         Oli         0.00143         7.798         177.3         0.9           Moreau CT         61         61         Oli         0.001013         7.798         17	Goose Creek CT 2	50	80					0.986		
Goose Creek CT 4         50         80         Natural Gas         0.00010         8.00         237.8         0.9           Goose Creek CT 5         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 6         45         80         Natural Gas         0.00010         8.808         237.8         0.9           Howard Bend CT         46         46         Oil         0.00261         9.654         118.6         0.9           Kimmundy CT 1         77         118         Natural Gas         0.00010         9.219         217.9         1.0           Kimmundy CT 2         77         118         Natural Gas         0.00261         9.654         118.6         1.1           Meramec CT 1         62         62         Oil         0.0143         7.798         177.3         0.9           Motaral Gas         0.00010         9.191         52.1         1.0         0.00143         7.798         177.3         0.9           Motaral Gas         0.00010         9.191         52.1         1.0         0.00143         7.798         177.3         0.9           Peno Creek GT 1         50         50         Natural Gas	Goose Creek CT 3	50	80					0.986		
Goose Creek CT 5         50         80         Natural Gas         0.00010         8.808         237.8         0.9           Goose Creek CT 6         45         60         Natural Gas         0.00010         8.808         237.8         0.9           Howard Band CT         46         46         Oil         0.00261         9.654         118.6         0.9           Kimrundy CT 1         77         118         Natural Gas         0.00010         9.219         217.9         10           Kimrundy CT 2         77         118         Natural Gas         0.00261         9.654         118.6         1.2           Meramec CT 1         62         62         Oil         0.00143         7.798         177.3         0.9           Mobedry CT         61         61         Oil         0.00143         7.798         177.3         0.9           Mobedry CT         61         61         Oil         0.00143         7.798         177.3         0.9           Peno Creek CT 1         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek CT 2         50         50         Natural Gas         0.00010         7.796         84.7	Goose Creek CT 4	50	80					0.986		
Goose Creek CT 6         45         80         Natural Gas         0.00010         8.808         237.8         0.9           Howard Bend CT         46         46         0ii         0.00261         9.654         118.6         0.9           Kimmundy CT 1         77         118         Natural Gas         0.00010         9.219         217.9         10           Kimmundy CT 2         77         118         Natural Gas         0.00010         9.219         217.9         10           Kirksville CT         14         14         Natural Gas         0.00261         9.654         118.6         11           Meramec CT I         62         62         0ii         0.0143         7.798         177.3         0.9           Metamec CT I         61         61         Oii         0.00143         7.798         177.3         0.9           Moberly CT         61         61         Oii         0.00143         7.798         177.3         0.9           Peno Creek GT 1         50         50         Natural Gas         0.00010         9.191         52.1         10           Peno Creek GT 3         50         50         Natural Gas         0.00010         7.796         84.7		50	80					0.986		
Howard Band CT         46         Oil         0.00261         9.654         118.6         0.9           Kinnundy CT 1         77         118         Natural Gas         0.00010         9.219         217.9         10.           Kinnundy CT 2         77         118         Natural Gas         0.00010         9.219         217.9         10.           Kirksville CT         14         14         Natural Gas         0.00261         9.654         118.6         12.           Meramec CT 1         62         62         Oil         0.00143         7.798         177.3         0.9           Moberly CT         61         61         Oil         0.00143         7.798         177.3         0.9           Mocrau CT         61         61         Oil         0.00143         7.798         177.3         0.9           Peno Creek CT 1         50         50         Natural Gas         0.00010         9.191         52.1         10.0           Peno Creek CT 3         50         50         Natural Gas         0.00010         9.191         52.1         10.0           Peno Creek CT 2         43         43         Natural Gas         0.00010         7.796         84.7         10.0<	Goose Creek CT 6							0.986		
Kinmundy CT1         77         118         Natural Gas         0.00010         9.219         217.9         1.0           Kinmundy CT2         77         118         Natural Gas         0.00210         9.219         217.9         1.0           Kirksville CT         14         14         Natural Gas         0.00261         9.654         118.6         1.2           Meramec CT I         62         62         0il         0.00143         7.798         177.3         0.9           Meramec CT I         61         61         0il         0.00143         7.798         177.3         0.9           Moreau CT         61         61         0il         0.00143         7.798         177.3         0.9           Peno Creek CT         61         61         Oil         0.00143         7.798         177.3         0.9           Peno Creek CT 1         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek CT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Pinkneyville CT 1         43         43         Natural Gas         0.00010         7.796         84.7 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.950</td>								0.950		
Kinmundy CT 2         77         118         Natural Gas         0.00010         9.219         217.9         10.0           Kirksville CT         14         14         Natural Gas         0.00261         9.654         118.6         1.2           Meramec CT 1         62         62         Oil         0.00143         7.798         177.3         0.9           Meramec CT 2         26         56         Natural Gas         0.00261         9.654         118.6         1.1           Mexico CT         61         61         Oil         0.00143         7.798         177.3         0.9           Mohoefty CT         61         61         Oil         0.00143         7.798         177.3         0.9           Peno Creek CT 1         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek CT 2         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek CT 2         43         43         Natural Gas         0.00010         7.96         84.7         1.0           Pinkneyville CT 3         43         Natural Gas         0.00010         7.796         84.7 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1.013</td></t<>								1.013		
Kirksville CT       14       14       Natural Gas       0.00261       9.654       118.6       1.2         Meramec CT I       62       62       0il       0.00143       7.798       177.3       0.9         Meramec CT 2       26       56       Natural Gas       0.00261       9.654       118.6       1.1         Mexico CT       61       61       0il       0.00143       7.798       177.3       0.9         Moherau CT       61       61       0il       0.00143       7.798       177.3       0.9         Peno Creek QT 1       50       50       Natural Gas       0.00010       9.191       52.1       1.0         Peno Creek QT 2       50       50       Natural Gas       0.00010       9.191       52.1       1.0         Peno Creek QT 3       50       50       Natural Gas       0.00010       9.191       52.1       1.0         Peno Creek QT 2       43       43       Natural Gas       0.00010       7.796       84.7       1.0         Pinkneyville QT 4       43       43       Natural Gas       0.00010       7.796       84.7       1.0         Pinkneyville QT 5       39       39       Natural Gas								1.013		
Meramec CT I         62         62         Oit         0.00143         7.798         177.3         0.9           Meramec CT 2         26         56         Natural Gas         0.00261         9.654         118.6         11           Mexico CT         61         61         61         0.01         0.00143         7.798         177.3         0.9           Moberly CT         61         61         61         0.01         0.00143         7.798         177.3         0.9           Peno Creek CT 1         50         50         Natural Gas         0.0010         9.191         52.1         1.0           Peno Creek CT 2         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek CT 3         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Pinkneyville CT 1         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville CT 3         39         39         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville CT 7         39         39         Natural Gas         0.00	· · · -									
Meramec CT.2         26         56         Natural Gas         0.00261         9.654         118.6         1.1           Mexico CT         61         61         61         0ii         0.00143         7.798         177.3         0.9           Moberty CT         61         61         0ii         0.00143         7.798         177.3         0.9           Peno Creek CT 1         50         50         Natural Gas         0.0010         9.191         52.1         1.0           Peno Creek CT 2         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek CT 3         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek CT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Pinkneyville CT 4         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville CT 3         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville CT 4         43         A3         Natural Gas         0.00100         8.603										
Mexico CT         61								0.960		
Moberly CT         61         61         61         Cit         0.00143         7.798         177.3         1.0           Moreau CT         61         61         61         01         0.00143         7.798         177.3         0.9           Peno Creek QT 1         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 3         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 4         50         50         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 2         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 5         39         39         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 6         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville QT 7         39         39         Natural Gas								1.140		
Moreau         CT         61         61         61         01         0.00143         7.798         177.3         0.9           Peno Creek QT 1         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 2         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 3         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 4         50         50         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 2         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 5         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville QT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville QT 7         39         39         Natural G								0.970		
Peno Creek QT 1         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 2         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 3         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek QT 4         43         Valural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 2         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 3         43         43         Natural Gas         0.00100         7.796         84.7         1.0           Pinkneyville QT 4         43         43         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville QT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville QT 7         39         39         Natural Gas         0.00100	•							1.000		
Peno Creek GT 2         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek GT 3         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek GT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek GT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Pinkneyville GT 4         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville CT 3         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville CT 5         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 8         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 7         39         39         Natural Gas <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0.980</td></t<>								0.980		
Peno Creek GT 3         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Peno Creek GT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Pinkneyville GT 1         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville GT 2         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville GT 4         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville GT 5         39         39         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville CT 6         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 8         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 8         39         39         Natural Gas								1.000		
Peno Creek QT 4         50         50         Natural Gas         0.00010         9.191         52.1         1.0           Pinkneyville QT 1         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 2         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 3         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 4         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville QT 5         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville QT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville QT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville QT 8         39         39         Natural Gas         0.00100         8.503         134.9         1.0           Raccoon Creek CT 1         42         81         Natural Gas								1.000		
Pinkneyville \$T 1         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville \$T 2         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville \$T 3         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville \$T 3         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville \$T 4         43         43         Natural Gas         0.00100         7.796         84.7         1.0           Pinkneyville \$T 5         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville \$T 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville \$T 8         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Raccoon Creak CT 1         42         81         Natural Gas         0.0010         8.553         269.0         0.9           Raccoon Creak CT 3         42         81         Natural Gas								1.000		
Pinkneyville ÇT 2         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville ÇT 3         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville ÇT 3         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville ÇT 4         43         43         Natural Gas         0.0010         7.796         84.7         1.0           Pinkneyville ÇT 5         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 6         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 8         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 8         39         39         Natural Gas         0.00100         8.553         269.0         0.9           Raccoon Creek CT 1         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 3         42         81         Natural Gas								1.000		
Pinkneyville ÇT 3         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville ÇT 4         43         43         Natural Gas         0.00010         7.796         84.7         1.0           Pinkneyville ÇT 4         43         43         Natural Gas         0.00100         7.796         84.7         1.0           Pinkneyville ÇT 5         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 6         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 8         39         39         Natural Gas         0.00100         8.553         269.0         0.9           Raccoon Creek CT 1         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas </td <td></td> <td></td> <td></td> <td>Natural Gas</td> <td>0.00010</td> <td></td> <td></td> <td>1.000</td>				Natural Gas	0.00010			1.000		
Pinkneyville ÇT 4         43         43         Natural Gas         0.00010         7.766         84.7         1.0           Pinkneyville ÇT 5         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 6         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville ÇT 8         39         Natural Gas         0.00100         8.603         134.9         1.0           Raccoon Creek CT 1         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0				Natural Gas	0.00010	7.796	84.7	1.000		
Pinkneyville CT 5         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 6         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 6         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 8         39         Natural Gas         0.00100         8.603         134.9         1.0           Raccoon Creek CT 1         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 3         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Venice CT 1         10         27         Oil         0.00457         9.738         132.1         0.9           Venice CT 3         130         178         Natural Gas         0.00010			43	Natural Gas	0.00010	7.796	84.7	1.000		
Pinkneyville CT 6         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 8         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Raccoon Creek CT 1         42         81         Natural Gas         0.0010         8.553         269.0         0.9           Raccoon Creek CT 3         42         81         Natural Gas         0.0010         8.553         269.0         0.9           Raccoon Creek CT 3         42         81         Natural Gas         0.0010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.0010         8.553         269.0         0.9           Venice CT 1         10         27         Oil         0.00457         9.738         132.1         0.9           Venice CT 2         52         52         Natural Gas         0.00	Pinkneyville ÇT 4		43	Natural Gas	0.00010	7.796	84.7	1.000		
Pinkneyville CT 7         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 8         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Pinkneyville CT 8         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Raccoon Creek CT 1         42         81         Natural Gas         0.00100         8.553         269.0         0.9           Raccoon Creek CT 2         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Venice CT 1         10         27         Oil         0.0457         9.738         132.1         0.9           Venice CT 2         52         52         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 4         130         178         Natural Gas         0.000	Pinkneyville ¢T 5	39	39	Natural Gas	0.00100	8.603	134.9	1.050		
Pinkneyville (T 8         39         39         Natural Gas         0.00100         8.603         134.9         1.0           Raccoon Creek CT 1         42         81         Natural Gas         0.00100         8.603         134.9         1.0           Raccoon Creek CT 2         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 2         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 3         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Venice CT 1         10         27         Oil         0.00457         9.738         132.1         0.9           Venice CT 2         52         52         Natural Gas         0.00010         9.932         29.4         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010 </td <td>Pinkneyville ¢1 6</td> <td>39</td> <td>39</td> <td>Natural Gas</td> <td>0.00100</td> <td>8.603</td> <td>134.9</td> <td>1.050</td>	Pinkneyville ¢1 6	39	39	Natural Gas	0.00100	8.603	134.9	1.050		
Raccoon Creek CT 1         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 2         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 2         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 3         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Venice CT 1         10         27         Oil         0.00457         9.738         132.1         0.9           Venice CT 2         52         52         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Viaduct CTG         29         29         Natural Gas         0.00010	Pinkneyville ÇT 7	39	39	Natural Gas	0.00100	8.603	134.9	1.050		
Raccoon Creisk CT 2         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creisk CT 3         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creisk CT 3         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creisk CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Venice CT 1         10         27         Oil         0.0457         9.738         132.1         0.9           Venice CT 2         52         52         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 4         130         176         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010	Pinkneyville ÇT 8	39	39	Natural Gas	0.00100	8.603	134.9	1.050		
Raccoon Creek CT 2         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 3         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 3         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Venice CT 1         10         27         Oil         0.00457         9.738         132.1         0.9           Venice CT 2         52         52         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010	Raccoon Creek CT 1	42	81	Natural Gas	0.00010	8.553	269.0	0.979		
Raccoon Creek CT 3         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269.0         0.9           Venice CT 1         10         27         Oil         0.00457         9.738         132.1         0.9           Venice CT 2         52         52         Natural Gas         0.00010         9.332         29.4         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 4         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         29         29         Natural Gas         0.00457         9.738         132.1         1.2           Osage         233         Pond Hydro         Keokuk         132         Run of River H	Raccoon Creick CT 2	42	81	Natural Gas	0.00010		269.0	0.979		
Raccoon Creek CT 4         42         81         Natural Gas         0.00010         8.553         269,0         0.9           Venice CT 1         10         27         Oil         0.00457         9.738         132,1         0.9           Venice CT 2         52         52         Natural Gas         0.00010         9.932         29.4         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190,2         1.0           Venice CT 4         130         178         Natural Gas         0.00010         9.479         190,2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.367         205.5         1.0           Viaduct CTG         29         29         Natural Gas         0.00120         9.367         205.5         1.0           Osage         233         Pond Hydro         132         Run of Rwer Hydro         132         Run of Rwer Hydro           Keokuk         132         Run of Rwer Hydro         220         Pumped Storage         132         Natural Storage	Raccoon Creesk CT 3	42	81	Natural Gas				0.979		
Venice CT 1         10         27         Oil         0.00457         9.738         132,1         0.9           Venice CT 2         52         52         Natural Gas         0.00010         9.932         29.4         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.932         29.4         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 4         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 4         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Viaduct CTG         29         29         Natural Gas         0.00010         9.367         205.5         1.0           Osage         233         Pond Hydro         Keokuk         132         Run of River Hydro         Taum Sauk 1         220         Pumped Storage         132.1         1.2	Raccoon Creek CT 4	42	81	Natural Gas				0.979		
Venice CT 2         52         52         Natural Gas         0.00010         9.932         29.4         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 4         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.479         190.2         1.0           Valuet CTG         29         29         Natural Gas         0.00010         9.367         205.5         1.0           Osage         233         Pond Hydro         Keokuk         132         Run of Rwer Hydro         Taum Sauk 1         220         Pumped Storage         Venice Hydro         Venice Hydro         Venice CT Support         Venice CT Supor	Venice CT 1	10	27					0.950		
Venice CT 3         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 4         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 4         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.367         205.5         1.0           Viaduct CTG         29         29         Natural Gas         0.00457         9.738         132.1         1.2           Osage         233         Pond Hydro         Keokuk         132         Run of River Hydro         Yent Storage         Yent Sto	Venice CT 2	52	52	Natural Gas				1.011		
Venice CT 4         130         178         Natural Gas         0.00010         9.479         190.2         1.0           Venice CT 5         77         118         Natural Gas         0.00010         9.367         205.5         1.0           Viaduct CTG         29         29         Natural Gas         0.00457         9.738         132.1         1.2           Osage         233         Pond Hydro         Keokuk         132         Run of River Hydro         Taum Sauk 1         220         Pumped Storage								1.011		
Venice CT 5         77         118         Natural Gas         0.00010         9.367         205.5         1.0           Viaduct CTG         29         29         Natural Gas         0.000457         9.738         132.1         1.2           Osage         233         Pond Hydro         Keokuk         132         Run of River Hydro         Taum Sauk 1         220         Pumped Storage	Venice CT 4							1.011		
Viaduct CTG         29         29         Naturat Gas         0.00457         9.738         132.1         1.2           Osage         233         Pond Hydro         132         Run of River Hydro         132         Run of River Hydro         132         Pumped Storage         133         <								1.011		
Keokuk     132     Run of River Hydro       Taum Sauk 1     220     Pumped Storage								1.200		
Keokuk     132     Run of River Hydro       Taum Sauk 1     220     Pumped Storage	Osane		200	Bood Use-						
Taum Sauk 1 220 Pumped Storage										
· · · ·										
reuni vauk 4. 220 Pumped Storage	Taum Sauk 2		220	Pumped Storage						

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Note:

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

#### PLANNED OUTAGES

Actual Labadie 1 Labadie 2	2003 (1) (hrs) 178 0	<b>2004</b> ( <u>hrs)</u> 0 1,263	<b>2005</b> ( <u>hrs)</u> 0 0	<b>2006</b> (hrs) 0 0	2007 (hrs) 0 0	<b>2008</b> (hrs) 2,095 0	<b>2009 (2)</b> ( <u>hrs)</u> 0 0	<b>Total</b> <u>(hrs)</u> 2,273 1,263	Day / Year <u>(daγs)</u> 16 9	Totał Days for Similar Units <u>(days)</u>	
Labadie 3	1,473	0	ŏ	õ	õ	ŏ	õ	1,473	10		
Labadie 4	1,118	0	Ō	Ō	Ō	Ō	Ō	1,118	8		
Labadie 1-4				• <u> </u>						43	
Meramec 1	0	2,019	0	0	0	o	0	2,019	14		
Meramec 2 Meramec 1-2	0	2,058	0	0	0	0	0	2,058	14	28	
Meramec 1-2										20	
Meramec 3	0	135	369	1,548	0		0	2,051	14		
Meramec 4	0	0	1,685	0	0	0	0	1,685	12		
Rush Island 1	0	0	0	Ũ	2,381	0	0	2,381	17		
Rush Island 2	1,152	661	ŏ	ŏ	0	ŏ	õ	1.813	13		
Rush 1-2										29	
Sioux 1	1,102	0	1,570	0	0	1,794	0	4,466	31		
Sioux 2	157	2,041	0	1,383	0	0	0	3,581	25		
Sioux 1-2										56	
Actual											
Callaway 1	<u>2003 (1)</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009 (2)</u>	<u>Total</u>	<u>Day / Year</u>		
Hours per year	D	1,542	1,526	0	919	672	0	4,659	32		
Days / Refuel		64	64		38	28	0	166	# of Refuel <u>Outages</u> 4	Avg Days / <u>Refuel Outage</u> 42	Annual Refuel <u>Outage Length</u> * 28
** Adjusted - Re	moved 2005	Refuel Out	age								
Days / Refuel		64	**		38	28	0	131	Э	44	29

\* Annual Refuel Outage Length = Avg Days / Refuel Outage x 2/3

(1) 2003 data is for April 1-December 31, 2003. (2) 2009 data is for January 1- March 31, 2009. •

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		JAN	FFB.	1 MAR	APR		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DMQ
Mws		28 4 11 18 25			29 5 1	2 19 26			28 5 12 19 2			4 11 18 25	1 8 15 22	29 6 13 20	2009
1220	CAL 1				1		+					CALLAWAY #1	) (10/3) 29	1	CAL 1
608	RUSH 1	)											RUSH #1	(10/31) 29	RUSH 1
591	RUSH 2		[	1	1		1	}	1		)				RUSH 2
614	LAB 1	1	í .	1	LABADIE	#1	(3/28) 43	1	í	1	1	ĺ	Í	ſ	LAB 1
595	LAB 2														LAS 2
611	LAB 3				1		1	1			l	{	{		LAB 3
611	LAB 4														LAB 4
500	SX 1	ļ	j	SIOUX #1		2/	28) 56	J	1				]	]	SX 1
500	SX 2						1								SX 2
124	MER 1			MERAMEC #1	(2/28) 28								1		MER 1
125	MER 2		1		(		6	1	(		1		L	1	MER 2
264	MER 3												M #3 (10/31)		MER 3
352	MER 4					_	<u> </u>		l			L	M #4	(11/14) 12	]_MER 4
								-		T – – –	r — — —				
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									1	1	1		1		10000
0.0%	EA Impact	JAN	FEB	MAR	APR		MAY	JUN		AUG	SEP		NOV	DEC	Joppa
0.0%		28 4 11 18 25												29 6 13 20	2009

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# Unplanned Outage Rates - Full Outages

	2003 (1)	<u>2004</u>	2005	2006	2007	2008	2009 (2)	Average
Callaway 1	1.9%	5.3%	3.6%	4.9%	1.3%	3.4%	13.5%	3.9%
Labadie 1	5.0%	5.6%	3.2%	4.9%	4.9%	4.8%	10.2%	5.0%
Labadie 2	5.6%	8.4%	5.9%	5.0%	2.8%	6.6%	6.6%	5.7%
Labadie 3	10.4%	4.1%	3.1%	12.0%	7.0%	3.3%	8.6%	6.5%
Labadie 4	2.7%	5.6%	3.3%	4.0%	3.1%	5.1%	4.8%	4.1%
Meramec 1	4.8%	3.9%	1.3%	3.4%	5.1%	4.1%	8.9%	4.0%
Meramec 2	7.0%	1.9%	1.6%	5.5%	7.6%	4.1%	1.8%	4.5%
Meramec 3	9.6%	7.8%	6.7%	4.7%	9.6%	13.7%	17.1%	9.1%
Meramec 4	10.3%	3.8%	7.0%	15.5%	10.3%	14.3%	9.4%	10.3%
Rush Island 1	6.5%	23.2%	13.2%	7.0%	15.5%	2.1%	0.0%	10.7%
Rush Island 2	6.8%	12.5%	2.2%	7.1%	4.4%	5.6%	3.6%	6.2%
Sioux 1	8.3%	8.0%	2.9%	5.5%	5.4%	5.7%	0.0%	5.7%
Sioux 2	4.2%	3.7%	2.7%	6.1%	4.6%	6.7%	7.8%	4.8%

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(1) 2003 data is for April 1-December 31, 2003.
 (2) 2009 data is for January 1- March 31, 2009.

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Callaway 1	<u>2003 (1)</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009 (2)</u>	<u>Average</u>
	0.4%	0.3%	0.7%	0.4%	0.1%	0.9%	0.6%	0.5%
Labadie 1	0.4%	1.2%	0.7%	0.6%	1.3%	4.6%	3.2%	1.5%
Labadie 2	2.2%	2.1%	1.5%	1.2%	1.0%	2.6%	3.7%	1.8%
Labadie 3	4.0%	0.7%	1.5%	1.9%	0.5%	2.5%	1.9%	1.7%
Labadie 4	1.2%	0.7%	2.1%	2.2%	0.8%	2.4%	1.2%	1.6%
Meramec 1	7.1%	0.7%	0.1%	0.6%	0.8%	1.1%	5.6%	1.7%
Meramec 2	0.1%	0.6%	0.4%	0.3%	1.6%	2.2%	9.6%	1.3%
Meramec 3	2.7%	2.6%	0.6%	3.9%	4.5%	2.3%	0.5%	2.7%
Meramec 4	2.9%	6.2%	2.9%	1.5%	5.0%	4.9%	3.6%	4.0%
Rush Island 1	2.4%	0.3%	0.7%	2.0%	1.6%	1.0%	3.1%	1.4%
Rush Island 2	2.7%	3.2%	1.5%	1.2%	2.2%	2.2%	2.9%	2.2%
Sioux 1	2.2%	0.2%	0.2%	1.3%	0.5%	0.8%	0.6%	0.8%
Sioux 2	0.3%	0.0%	0.3%	1.4%	0.4%	0.3%	0.0%	0.4%

(1) 2003 data is for April 1-December 31, 2003.(2) 2009 data is for January 1- March 31, 2009.

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