Exhibit No. 3603
Issue: Revenue Requirement
Witness: Judah Rose
Sponsoring Party: Dogwood Energy, LLC
Type of Exhibit: Surrebuttal Testimony
Case No.: ER-2010-0356

BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION

In the Matter of the Application of KCP&L Greater Missouri Operations Company for Approval to Make Certain Changes to its Charges for Electric Service.	))))	Case No. ER-2010-0356

PUBLIC VERSION

SURREBUTTAL TESTIMONY – REVENUE REQUIREMENT

OF JUDAH ROSE ON BEHALF OF

DOGWOOD ENERGY, LLC

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January 12, 2011

Dogwood Exhibit No. 3603-NP
Date 2-15-11 Reporter TC
File No. ER-2010-0356

[redacted] Designates "Highly Confidential" Information that Has Been Removed

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STATE OF Virginia)
) SS.
COUNTY OF Fairfax)

BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION

In the Matter of the Application of KCP&L Greater Missouri Operations Company for Approval to Make Certain Changes to its Charges for Electric Service.	)))))	Case No. ER-2010-0356

AFFIDAVIT OF JUDAH ROSE

COMES NOW Judah Rose, of lawful age, sound of mind and being first duly sworn, deposes and states:

1. My name is Judah Rose; I am a consultant for Dogwood Energy, LLC, and a managing director of ICF International.

2. Attached hereto and made a part hereof for all purposes is my Surrebuttal Testimony in the above-referenced case.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge, information and belief.

Judah Rose
Judah Rose

SUBSCRIBED AND SWORN to before me, a Notary Public, this 5th day of Jan., ~~2010.~~ 2011

Bonnie D Sella
Notary Public

My Commission Expires: 2/29/2012
(SEAL)

SURREBUTTAL TESTIMONY OF JUDAH ROSE ON BEHALF OF DOGWOOD ENERGY, LLC

SECTION I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.

A. My name is Judah Rose. I am a Managing Director of ICF International ("ICF"). My business address is 9300 Lee Highway, Fairfax, Va. 22031.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL QUALIFICATIONS.

A. After receiving a degree in economics from the Massachusetts Institute of Technology ("MIT") and a Masters Degree in Public Policy from the John F. Kennedy School of Government at Harvard University, I joined ICF in 1982. I have worked at ICF for nearly 30 years and am Managing Director of ICF's wholesale power practice. I also have been a member of the Board of Directors of ICF International and am one of three people (in a consulting firm of approximately 4,000 people) to have been given ICF's honorary title of Distinguished Consultant.

Q. DOES ICF HAVE PUBLIC SECTOR CLIENTS?

A. Yes. ICF has been the principal power consultant to the U.S. Environmental Protection Agency ("EPA") continuously for over 35 years, specializing in the analysis of the impact of air emission programs, especially cap and trade programs. We also have worked with the U.S. Department of Energy ("DOE"),

the Federal Energy Regulatory Commission ("FERC"), Environment Canada, and numerous foreign governments. We also have worked with state regulators and state energy agencies, including those in California, Connecticut, Kentucky, New Jersey, New York, Ohio, Texas, and Michigan.

Q. DOES ICF HAVE PRIVATE SECTOR CLIENTS?

A. Yes. ICF has provided forecasts and other consulting service for over 35 years to numerous major US electric utilities including recently for companies such as American Electric Power, Dominion Power, Delmarva Power & Light, Duke Energy, FirstEnergy, Entergy, Florida Power & Light, National Grid, Northeast Utilities, PHI Holdings, Southern California Edison, Sempra, PacifiCorp, Nevada Power, and Tucson Electric. ICF also provides assistance to financial institutions including Credit Suisse and Merrill Lynch, power marketers including Mirant and BP, fuel companies including Peabody Coal Company and Rio Tinto, and independent power producers such as Calpine, Reliant Resources, and NRG. ICF also works with Regional Transmission Organizations ("RTOs") and similar organizations including the Midwest Independent Transmission System Operator ("MISO"), the Electric Reliability Council of Texas ("ERCOT"), the Western Electric Coordination Council ("WECC"), and the Florida Regional Coordinating Council ("FRCC").

Q. WHAT TYPE OF WORK DO YOU TYPICALLY PERFORM?

A. I have extensive experience in assessing wholesale power markets and related environmental, transmission, and fuel markets. This work often involves

computer modeling of wholesale power market conditions and valuing power plants. I also have extensive experience in wholesale power contracting, Integrated Resource Planning (IRP) and Request for Proposal (RFP) evaluation and utility planning.

Q. DO YOU HAVE EXPERT TESTIMONY EXPERIENCE IN THE POWER SECTOR?

A. Yes, I have testified in many legal and regulatory proceedings related to the power sector. I have testified before or made presentations to the FERC, an international arbitration tribunal, federal courts, arbitration panels, and to state regulators and legislators in twenty states and provinces including: Arizona, Arkansas, California, Florida, Indiana, Kentucky, Louisiana, Massachusetts, Minnesota, New Jersey, Nevada, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Quebec, South Carolina, and Texas. I provided expert testimony on wholesale power contracts at FERC, and I have testified extensively on utility planning and the development of new generation resources. In addition, I have authored numerous articles in industry journals and spoken at scores of industry conferences. For specific details, please see my resume, attached hereto as **Rose Schedule A.**

Q. HAVE YOU TESTIFIED PREVIOUSLY IN MISSOURI?

A. Yes. I submitted written testimony on behalf of Dogwood Energy, LLC in Case No. ER-2009-0090.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of Dogwood Energy, LLC. Dogwood Energy, LLC owns the 650MW[1] Dogwood natural gas-fueled combined cycle power plant located in Pleasant Hill, Missouri. This location is within the service territory of KCP&L-GMO ("GMO"). The Dogwood combined cycle generation plant was formerly known as Aries. As indicated in the Rebuttal Testimony submitted in this case by Robert Janssen, Dogwood Energy, LLC ("Dogwood") responded to GMO RFPs in 2007 and in 2008 by offering power supply from the Dogwood plant, as well as offering an asset purchase structure. Dogwood also made an offer to sell a fractional share or all of the Dogwood plant generating capacity during April 2010.

Q. WHAT DOES YOUR TESTIMONY ADDRESS?

A. My surrebuttal testimony responds to the rebuttal testimony of Burton Crawford submitted on December 15, 2010 on behalf of GMO. Specifically, I respond to his claims that the Crossroads Energy Center ("Crossroads") provided the lowest 20-year Net Present Value of Revenue Requirements (NPVRR) including the cost of transmission service. He presented similar testimony in 2009 in Case No. ER-2009-0090 regarding the results of a GMO RFP in 2007, to which I responded by means of prepared surrebuttal testimony explaining that the Dogwood bid was lower. In his testimony in this case, he reiterates his conclusions about the 2007 RFP and also asserts that the GMO April 2010 Stipulation 8 Capacity Study confirms those conclusions. That study is attached to his testimony and states that

[1] Rebuttal Testimony – Revenue Requirement of Robert Janssen on behalf of Dogwood Energy before the Missouri Public Service Commission, Case No. ER-2010-0356, December 15, 2010, p. 1.

the 20-year NPVRR is ** [redacted] ** lower for Crossroads than Dogwood's offer which is identified as the ** [redacted] **[2] There are strong reasons to believe the opposite is true, namely the Dogwood offer had a lower NPVRR than the Crossroads peaking plant in 2007 and 2008, and has even a greater advantage based on the lower April 2010 offer from Dogwood Energy described in Mr. Janssen's rebuttal testimony.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. My testimony has five sections. Section I (this section) introduces my testimony. Section II summarizes my testimony. Section III presents background information on GMO's proposed use of the Crossroads Energy Center. Section IV presents my concerns regarding the economic analysis of Crossroads versus Dogwood. The economic analysis has four subsections: (1) economic analysis of the electrical energy cost savings provided, (2) analysis of transmission costs and risks, (3) past economic analysis I conducted in 2009 of Dogwood and Crossroads which accounted for all the costs including the capital costs and energy savings, and (4) additional considerations affecting the choice between Dogwood and Crossroads. Section V presents my conclusions.

SECTION II. SUMMARY

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

[2] GMO, Stipulation 8 Capacity Study, page 29-30.

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A. My testimony responds to the testimony of Burton Crawford of GMO submitted on December 15, 2010 where he states on pages 9 and 10 that Crossroads had the lowest customer cost (expected NPVRR) over a 20 year period including the cost of transmission service, among the options examined. He bases that assertion on his prior analysis of the 2007 RFP bids, which I previously contradicted in my testimony in Case No. ER-2009-0090. He also bases it on a more recent study that GMO conducted, attached to his testimony as Schedule BLC 2010-10. That study indicates at page 29 that the NPVRR advantage of Crossroads versus Dogwood was **[redacted]** This analysis is referred to as the GMO Stipulation 8 Capacity Study.

My analysis indicates that the NPVRR of the Dogwood option is actually lower than the NPVRR of the Crossroads option. I base this conclusion on:

- **Apparent Errors in the GMO Analysis** – These include misspecifications of Dogwood's heat rate, misspecification of Dogwood's transmission costs, under-estimation of Dogwood's energy sales revenues due to a methodological error, under-estimation of Crossroads transmission losses relative to Dogwood, and under-estimation of transmission security risks that confront Crossroads.
- **ICF Analyses in 2009 and in 2011** – My concerns are reinforced by analyses I conducted in 2009 and 2011 which show that Dogwood would result in much lower costs for consumers than Crossroads.

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- **Methodological Flaw in GMO Analysis** – In the course of my 2009 investigation, I uncovered a methodological flaw in the GMO analysis conducted in the 2007 GMO study of supply options. This flaw is the failure to consider off-system sales revenues. GMO appears to have continued to "turn-off" the off-system power sales feature of the computer model used. Put another way, I have seen no evidence that my methodological concerns about off-system sales have been addressed in the Stipulation 8 Capacity Study. Such a decision would disproportionately affect the Dogwood plant because it has significant potential to sell electrical energy off-system, but Crossroads does not. This is significant because the much lower ratepayer's costs of the Dogwood plant are the result of Dogwood's higher off-system sales revenues which offset its higher purchase price. Dogwood has much higher off-system sales potential because of its lower per MWh operating costs than Crossroads resulting from its **[redacted]**[3] percent higher thermal efficiency for both base block and duct in the conversion of natural gas fuel energy to electricity.[4] Net revenues from off-system sales should be

[3] **[redacted]**

[4] A combined-cycle gas turbine power plant consists of one or more gas turbine generators equipped with heat recovery steam generators to capture heat from the gas turbine exhaust. The base block is the combustion turbine, heat recovery steam generator and steam turbine operating without supplemental combustion via ducts in the heat recovery steam generator. Steam produced in the heat recovery steam generators powers a steam turbine generator to produce additional electric power. Additional peaking capacity can be obtained by use of various power augmentation features, including inlet air chilling and duct firing (direct combustion of natural gas in the heat recovery steam generator). For example, an additional 20 to 50 megawatts can be gained from a single-train plant by use of duct firing. Though the

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considered since they offset the costs of production charged to ratepayers such as by means of fuel adjustment charges. Competitiveness vis-à-vis the wholesale power market is especially important because of the successful establishment of the Southwest Power Pool's (SPP) hourly Energy Imbalance Services (EIS) market, the commitment of SPP to an expanded and mandatory SPP day-ahead and real time energy market starting in 2014, an already existing hourly electrical energy market in nearby MISO[5] and GMO's membership in SPP which was approved by the Missouri Public Service Commission.

- **Transmission Advantage of Dogwood** – Dogwood also must have lower electricity transmission costs than Crossroads because it is located in GMO's service territory near GMO's load center, whereas, in contrast, Crossroads is located approximately 400 miles away (see Schedule JLR-1). I am not aware of any U.S. peaking combustion turbine plant located so far from the utility's load center. In contrast, the Dogwood plant is in the GMO service territory. Crossroad's anomalous transmission situation creates risks and issues not normally present in asset acquisitions and not present for Dogwood. In fact, SPP now confirms that transmission capacity may not be fully available for Crossroads. The analytic treatment

incremental thermal efficiency of duct firing is lower than that of the base combined-cycle plant, the incremental cost is low and the additional electrical output can be valuable during peak load periods.

[5] MISO has adopted an energy market, an ancillary services market and a capacity market over the last couple of years; the capacity market is not yet fully in place. The location of the plant is now in SPP, but it is close to MISO. Therefore, not only is there the real chance to sell into MISO via an export, there is also another market price measure supplementing the SPP EIS market which is not as mature a market.

of this issue by GMO continues to appear highly inadequate and inconsistent with proper treatment of system reliability. It appears when higher transmission losses and the impacts of greater transmission service interruptions are considered, Crossroads effective capacity may be closer to 200 MW, not 300 MW. This important conclusion is further discussed below.

- **Qualitative Considerations Favor Dogwood** – Beyond the potential cost savings provided by Dogwood, there are also additional qualitative considerations favoring the Dogwood bid. These include diversification of supply and lower emissions of CO_2. Dogwood offers also have the virtue of providing actual in-state local generation available to meet GMO's actual need.
- **Impacts of Dogwood's April 2010 Offer** – The cost advantage of Dogwood over Crossroads **[redacted]** based on the April 2010 offer identified by Robert Janssen of Dogwood Energy in his December 15, 2010 rebuttal testimony. This offer is lower than the 2008 bid used in the 2010 GMO analysis and the updated bid alone eliminates the purported advantage of Crossroads.

Based on available information, I conclude that the Dogwood plant should be used to meet GMO's need for capacity. It is a real solution to a real problem that appears to be more economic than Crossroads. The Commission should not

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approve inclusion of the Crossroads plant or its excessive costs in GMO's rate base.

SECTION III. BACKGROUND

Q. PLEASE BRIEFLY DESCRIBE GMO'S REQUEST IN THIS PROCEEDING.

A. GMO has requested that this Commission increase its retail rates for electric service in its service territories in Missouri. GMO asserts that since its rates were adjusted last, it has undertaken substantial additional investment in rate base. As Mr. Crawford testifies on rebuttal, GMO proposes that its rates include recovery for Crossroads.

Q. WHAT IS THE BACKGROUND TO GMO'S POSITION THAT THE CROSSROADS PLANT SHOULD BE INCLUDED IN ITS RATE BASE?

A. Mr. Crawford testifies that GMO issued an RFP for supply resources in March 2007. He further testifies that GMO's analysis of the responses to the RFP concluded that Crossroads would result in the lowest 20-year NPVRR. He includes with his testimony the presentation GMO made to Staff in October 2007 regarding this analysis. GMO took the same position in its last rate case, ER-2009-0090, and in my surrebuttal testimony I demonstrated that their conclusions were wrong. I provide the same conclusions in this testimony. Stipulation 8, which emerged from the settlement of the 2009 rate case, required an analysis of capacity options for GMO. GMO completed this analysis in April 2010 (Stipulation 8 Capacity Study) and the results are presented by Mr. Crawford in

his December 15, 2010 rebuttal testimony. This study concludes that there was a 20-year NPVRR advantage for Crossroads over Dogwoods **[redacted] ** As noted above, the GMO analysis showed that the advantage was **[redacted]**

Q. WHAT DID THE STAFF CONCLUDE IN ITS TESTIMONY REGARDING THE CROSSROADS PLANT?

A. On page 3 of the December 15, 2010 rebuttal testimony of Cary Featherstone of the Missouri Public Service Commission, Utility Services Division, Mr. Featherstone states:

> *"The Commission should reject GMO's proposed inclusion of Crossroads in rate base in this case."*

Q. WHAT IS YOUR UNDERSTANDING REGARDING PRIOR COMMISSION REVIEW OF GMO'S PROPOSAL TO INCLUDE CROSSROADS IN ITS RATE BASE?

A. My understanding is that the Commission has not ruled on whether or not Crossroads is a prudent component of GMO's rate base.

Q. DID YOU REVIEW GMO'S STIPULATION 8 CAPACITY STUDY THAT IT COMPLETED IN APRIL 2010?

A. Yes.

Q. WHAT ARE THE PRINCIPAL CAPACITY OPTIONS WHICH YOU REVIEWED REGARDING GMO'S CAPACITY NEEDS?

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A. I concentrated my review on two capacity options considered by GMO: (1) the Crossroads 300 MW GE 7EA peaking power plant (four 75 MW units) located in Clarksdale, Mississippi, and (2) 300 MW from the natural gas fueled combined cycle plant owned by Dogwood Energy and located in Missouri in GMO's service territory.

Q. WHY DID YOU REVIEW THESE TWO OPTIONS?

A. In GMO's 2010 analysis, these two existing options have **[redacted]**

These two existing options are also currently available to meet the actual need for capacity of GMO, albeit assuming transmission is available in the case of Crossroads. The Dogwood plant provides an answer to the Staff's preference for steel-in-the-ground, and capacity located and sized to meet the customer's needs.[6] There are also no affiliate issues regarding Dogwood. Furthermore, Mr. Janssen of Dogwood Energy in his December 15, 2010 rebuttal testimony reiterated Dogwood's availability under a range of arrangements including its most recent proposal, made in April 2010.

Q. WHAT DID GMO CONCLUDE REGARDING THE CHOICE BETWEEN THESE TWO OPTIONS?

A. GMO chose the Crossroads combustion turbine peaking plant over Dogwood Energy's combined cycle as well as other resource alternatives.

Q. WHAT WAS THE BASIS OF THAT DECISION?

[6] Rebuttal Testimony of Staff Witness Lena Mantle, p. 2.

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A. Mr. Crawford testifies that GMO conducted an analysis of various capacity options across 42 scenarios. The expected NPVRR over the 20 years period was **[redacted]** for Crossroads compared to the Dogwood option, the option with **[redacted].** Put another way, according to GMO's study **[redacted]**

Q. WHAT IS YOUR OPINION OF GMO'S ANALYSIS?

A. While I have not yet completed a full review of GMO's analysis, I have identified problems in the analysis that bias the results in favor of Crossroads over Dogwood. Correction of these problems would change the result to favor the Dogwood option:

- First, GMO used a full load **[redacted]** heat rate for Dogwood. The full load heat rate for the Dogwood base block is **[redacted]** or 6.8 percent lower. The heat rate for the entire plant including the Duct portion is **[redacted].** The heat rate measures the plant's thermal efficiency of converting fuel energy into electrical energy supplied to the grid. The lower the heat rate, the less energy is needed to produce electrical energy. In light of the concern I have regarding GMO's treatment of off-system sales discussed below, this apparent heat rate misspecification is particularly relevant.
- Second, GMO appears to have ignored the higher losses in electrical transmission for Crossroads compared to other options such as Dogwood.

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For example, the capacity contribution of Crossroads should be derated by up to 9 percent by the higher losses of Crossroads relative to Dogwood.

- Third, the reliability contribution of Crossroads appears to be overstated. SPP has provided GMO a special transmission arrangement known as Special Protection Service. Under a transmission line contingency, one fourth of the output of Crossroads is unavailable. In transmission reliability and security studies, this contingency would be assumed to be in place decreasing available supply. This is on top of the up to 9 percent marginal loss at peak. As a result, the reliability contribution of Crossroads could be as low as only 205 MW [(300-75) x 0.91] versus 300 MW for Dogwood. This is a nearly one-third derate. However, no differential adjustment to Crossroads capacity appears to have been made in the GMO analysis.
- Fourth, the power transmission costs of Crossroads appear to be understated. Mr. Crawford stated in his rebuttal that "While the cost of electric transmission for Crossroads is currently higher than it would be if the plant were located in the GMO area, these costs were included along with other plant-related costs in the analysis."[7] However, Mr. Crawford did not identify the transmission costs assumed for Crossroads. Our preliminary estimate is that Crossroad's transmission costs are 2.5 times higher than Dogwood's.

[7] Crawford rebuttal testimony, page 10, lines 3-7.

- Fifth, in the past, GMO chose to operate its computer model in a mode that does not consider the potential for off-system sales. The model only considered the potential for the resource options to displace power purchases or displace generation of its own plants; I see no evidence this methodological error has been corrected in the Stipulation 8 Capacity Study.

Q. WHY WOULD THE FAILURE TO ACCOUNT FOR OFF-SYSTEM SALES BE A FUNDAMENTAL METHODOLOGICAL FLAW?

A. When considering a plant like Dogwood which has low energy costs compared to other natural gas-fired units, the failure to permit off-system sales of power can bias the results in favor of plants with much higher variable operating costs such as Crossroads. Allowing Dogwood to offset power purchases, but not make off-system sales is not sufficient. This is because the utility's demand may be too small to allow full use of the plant. Consider the following illustrative example:

The wholesale market price for power is $50/MWh, the plant has 300 MW of capacity, the plant's costs are $40/MWh, and utility's internal demand net of coal generation (coal is assumed to have lower variable costs) is 150 MW. Failure to give the option for off-system sales underestimates the plant's benefits in every such hour by $10/MWh x 150 MW.

Q. SHOULD OFF-SYSTEM SALES BE CONSIDERED?

A. Yes. There should be no less economic benefits to consumers from a plant decreasing costs by offsetting other power sources than from a plant making

profits via off-system sales, all else equal. This failure to properly treat the electrical energy component of the proposed alternative plants has little or no effect on Crossroads, a high cost peaking unit with little or no off-system sales potential, but artificially decreases the estimated value of Dogwood.

Q. IN THE PAST, DID YOU PROVIDE ANALYSIS THAT CORRECTED FOR THIS FUNDAMENTAL FLAW?

A. Yes. In 2009, I conducted an independent analysis with the proper methodological approach. I have partially updated this analysis. However, all the analysis supports my concern that the GMO result is the opposite of what actually is the correct result. Namely, the Dogwood option actually has lower NPVRR. The results of my analyses are summarized below.

Q. IN THE PAST, DID CONCERNS ABOUT THE ECONOMIC ANALYSIS OF TRANSMISSION LEAD YOU TO ADDITIONAL STUDIES?

A. Yes. In 2009, I believed GMO's related transmission analysis was also flawed. Therefore, I conducted transmission studies of Crossroads and Dogwood. I did not update these studies, but I summarize these results below. I see no evidence that there has been adequate resolution of these concerns. They are significant enough such that their full correction alone would lead to the conclusion that Dogwood has the lower NPVRR.

SECTION IV. ECONOMIC EVALUATION OF DOGWOOD AND CROSSROADS

Section IV.1 Introduction

Q. WHAT WAS THE PURCHASE PRICE OF THE CROSSROADS PEAKING PLANT OPTION?

A. The Crossroads plant bid appears to be a sale or transfer from the deregulated part of GMO to the regulated Missouri utility. **[redacted][8][redacted] [redacted]**

Q. WHAT IS YOUR UNDERSTANDING OF HOW THE CROSSROADS PRICE WAS DETERMINED?

A. The price is represented by GMO as the approximate book value net of depreciation, in its depreciation schedules.

Q. WHAT WAS THE PURCHASE PRICE OF THE DOGWOOD COMBINED CYCLE PLANT USED IN THE 2010 GMO STIPULATION ANALYSIS?

A. The sale price of the Dogwood power plant used in the Stipulation 8 Capacity Study is **[redacted]**[10] **[redacted] [redacted]** Thus, an examination of the purchase prices alone favors Crossroads because Crossroads' cost is lower. However, there are ther factors that favor Dogwood that must be

[8] Source: Stipulation 8 Capacity Study, page 43, Appendix B, Table 21.
[9] Crawford Rebuttal, pages 38 and 43, Tables 15 and 21.
[10] Assumes 2.5% inflation

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considered to be determine which bid has the lowest total net costs to ratepayers. When these other factors are properly included the result from the GMO analysis showing the Dogwood option has **[redacted]** as the Crossroads option will change and I believe correction of the analysis will show Dogwood's total net costs are significantly lower.

Q. WHAT ARE THOSE FACTORS?

A. There are two prominent cost factors: (1) the higher net energy cost savings of the Dogwood plant compared to Crossroads, and (2) the higher transmission related costs of the Crossroads resource option compared to Dogwood.

Section IV.2 Energy Cost Savings

Q. WHY ARE THE NET ENERGY COST BENEFITS (LOWER ON-SYSTEM PRODUCTION COSTS AND MORE NET OFF-SYSTEM SALES PROFITS) OF CROSSROADS WORSE THAN THAT OF DOGWOOD?

A. The energy cost savings of Crossroads are very low compared to Dogwood because its heat rate is, as would be expected, much higher than that of the Dogwood plant. The heat rate of the Crossroads peaking facility is over **[redacted]**[11]. In comparison, the heat rate of the Dogwood combined cycle is at full load (base block) **[redacted]** for both base block and duct firing. Therefore, failure to properly treat the energy production

[11] Stipulation 8 Capacity Study, page 41, Table 18.

potential of plants (e.g., the failure to properly include the potential for off-system electrical energy sales) will, all else equal, greatly affect Dogwood, but not affect peaking units like Crossroads.

Q. WHAT IS A HEAT RATE?

A. Heat rate measures the thermal efficiency of the plant in converting fuel energy into electrical energy, and is the ratio of chemical energy input per unit of electrical energy delivered to the grid. The lower the heat rate, the higher the efficiency. In fact, the thermal efficiency of the Dogwood unit's base block is **[redacted]**[12] **[redacted]**[13] for Crossroads. Thus, Dogwood's base block is **[redacted]**[14] percent more efficient.

Q. IS IT SURPRISING THAT A PEAKING UNIT'S HEAT RATE IS HIGHER (AND THERMAL EFFICIENCY IS LOWER) THAN A COMBINED CYCLE'S?

A. No. Note, however, the Crossroads heat rate is higher than the heat rate of the standard combustion turbine peaking unit, the 7FA, which is approximately 10,900 Btu/kWh. Thus, even among peaking units, Crossroads is thermally inefficient and therefore, has high variable operating cost. Specifically, not only is the heat rate **[redacted]**[15] higher than Dogwood's, it is at least **[redacted]**[16] **[redacted]** than that of a new peaking unit. Even more importantly,

[12] **[redacted]** Note, the Base Block represents approximately **[redacted]** percent of Dogwood's total capacity.
[13] **[redacted]**
[14] **[redacted]**
[15] Base block
[16] Assuming 7FA combustion turbine technology

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the greater the gap between the performance parameters of Dogwood and Crossroads, the greater potential is for evaluation errors to bias the results in favor of Crossroads.

Q. WHY ARE THE PLANTS' HEAT RATES IMPORTANT?

A. Plants with low heat rates (i.e., high thermal efficiency) can provide the owners with significant cost savings either by displacing the operation of the owner's higher cost plants, by displacing purchases from the market, or by profitably making off system sales in the wholesale power markets such as SPP's EIS market. Profits from off-system sales would decrease the net purchase power and fuel costs of GMO benefiting ratepayers. Note, since a prudent utility is required to pursue both off-system sales profits and cost savings, both need to be considered.

Q. HOW LARGE ARE THE COST SAVINGS/SALES PROFITS OF DOGWOOD?

A. In 2009, I made two estimates of the cost savings and sales profits of Dogwood. I have updated one of them, and hence, there are now three studies. These studies are relevant because: (1) they highlight the higher off-system energy sales benefits of Dogwood, (2) they emphasize the importance of proper treatment of off-system sales, and (3) they highlight the developments in the GMO marketplace of a liquid, highly regulated, wholesale electrical energy market in which GMO participation becomes mandatory in 2014. The first estimate, made in 2009, was that the Dogwood cost savings/sales profits are very large, and more

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than offset the higher capital cost of Dogwood. This was based on the actual SPP EIS prices at the KCP&L/GMO node over the 12-month period of January – December 2008. This estimate can be qualitatively understood by comparing the EIS implied system heat rate (the ratio of power to gas prices) in Btu/kWh to the heat rate of Dogwood. The capacity factor is based on a plant's net energy margin in the EIS energy market. If the plant variable costs (heat rate*fuel cost + variable O&M) are less than the energy price, the plant is assumed to be running. As a result, the estimated capacity factor for Dogwood was relatively high compared to a peaker like Crossroads.

Q. WHAT DOES YOUR UPDATE SHOW?

A. The update for both Dogwood and Crossroads I recently performed was based on January 2010 to December 2010 SPP EIS prices. The value of Dogwood off-system sales were again very large at **[redacted]** compared to that of Crossroads (Schedule JLR-2). The Crossroads plant is located in the Entergy region where no observable hourly power price is available. For purpose of this update, the SPP EIS prices for the MPS-LA parent node are used for Crossroads and prices at the MPSPHILLUNDOGWOOD node for Dogwood. To provide perspective on the magnitude of the savings, if the **[redacted]** sales profit estimated for Dogwood remains constant for the next 20 years in real terms, the resulting net present value of Dogwood electrical energy sales profits equals **[redacted]**[17] which **[redacted]

[17] Using a 4% real discount rate.

[redacted]** Also, these large energy profits are occurring in a year of lower natural gas and power prices. Dogwood is also providing more capacity due to lower losses and better transmission service. Lastly, Dogwood makes greater use of Missouri resources.

Q. WHY IS A COMPARISON OF MARKET PRICES AND PLANT OPERATING COSTS THE CORRECT MEASURE OF PLANT ENERGY VALUE?

A. If the market price is above a utility plant's short-run variable costs, and the plant is not operating, there are off-system sales profits that are not being achieved. If the price is below the unit's variable costs, it should not be operating since more cost savings potential exists via purchase power.[18] As noted earlier, "turning off" the potential for off-system sales in the GMO evaluation is fundamentally incorrect. Either the utility's analysis is different than actual operations, i.e., it makes off-system sales when economic but is not modeling them, or its operations are incorrect and it has conformed the model to simulate this erroneous operational approach.

Q. PLEASE DESCRIBE SPP'S EIS POWER MARKET?

A. The EIS market started in January 2007 and is run by SPP. GMO is part of SPP. This market provides hourly prices by location based on locational marginal costs including short run variable costs (e.g., fuel, non-fuel variable O&M and emission allowance costs), transmission congestion costs, and losses. Thus, since January

[18] The only exception relates to start costs and the potential for must run losses in off-peak hours.

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2007, there is a valuable information source about market prices and the value of the power plant options. SPP is also planning an expanded day ahead and real time set of locational energy markets for 2014. Thus, the performance of utility operations can be measured against the market more closely than in even the recent past.

Q. DOES THIS MEAN THAT PRIOR TO THE EIS MARKET, GMO WAS NOT ABLE OR REQUIRED TO FULLY ANALYZE OFF-SYSTEM SALES AND PURCHASES?

A. No. Rather, this market's existence reemphasizes the importance of this issue. Furthermore, in light of the mandatory must-offer requirements in SPP starting in 2014, this issue cannot be ignored.

Q. WHAT WAS THE SECOND ESTIMATE MADE IN 2009?

A. In 2009, I made a second estimate using an ICF computer modeling forecast of the next twenty years, i.e., for the 2009 to 2028 period. Specifically, I conducted a computer forecasting exercise using two models: (1) MAPS in the near-term, and (2) ICF's IPM® model of the wholesale power market in the long-term. In this modeling projection, the levelized[19] energy profits were somewhat less than in the 2008 EIS market based estimate, but still very large. The net present value of energy profits for the next 20 years was also very high and close to the cost of the plant.

Q. DID YOU UPDATE THIS ANALYSIS?

[19] Annuity level that provides the same present value.

A. No.

Q. DO YOU EXPECT CROSSROADS TO PROVIDE SIGNIFICANT OFF-SYSTEM ELECTRICAL ENERGY SALES PROFITS?

A. No, I expect Crossroads energy sales profits to be small in light of the plant's very high heat rate[20]. My 2009 modeling analysis corroborated this finding.

Q. WHAT MODEL DID YOU USE IN THE 2009 FORECASTING ANALYSIS?

A. I used the GE MAPS model. This model is specifically designed to reproduce SPP energy market conditions that prevail to a degree today and which will fully prevail in 2014 under SPP's current plan. This modeling approach also represents the systems already in place elsewhere in the U.S., as described below[21]. MAPS performs a Security Constrained Unit Commitment (SCUC) and a Security Constrained Economic Dispatch (SCED) of all generating facilities in the SPP power market and surrounding areas (i.e., the entire Eastern Interconnect) to meet energy demand and operating reserve requirements. MAPS is a highly detailed model that chronologically calculates hour-by-hour production costs while recognizing the constraints on the dispatch of generation imposed by the transmission system. MAPS models a detailed representation of the SPP transmission system and simulate power system operation from the perspective of an independent system operator such as SPP.

[20] During system shortages, I assume both plants provide equal reliability except for differential losses and transmission service differences as discussed later.
[21] About two thirds of Americans are served by such entities. Source: SNL, November 2, 2010.

MAPS uses a detailed electrical model of the entire transmission network, along with generation shift factors determined from a solved AC load flow, to calculate the real power flows for each generation dispatch. This enables MAPS to capture the economic penalties of re-dispatching generation to satisfy transmission line flow limits and security constraints. MAPS outputs include: (A) hourly LMP for all generator and load busses; (B) hourly congestion across transmission lines and interfaces and associated congestion cost; (C) system-wide congestion cost; (D) hourly dispatch of generation units; and (E) total production cost for all generation units. ICF also used the MAPS model to determine nodal prices at all substations within the SPP and other markets for all hours in each year studied. ICF incorporated SPP and other power flow models in the study, thus providing a detailed representation of the SPP transmission system and substations. Therefore ICF believes that as best as could be known at the time of the study, the nodes included in ICF's study are the same as those that would be used in the existing EIS and planned SPP nodal market.

Q. IS IT WIDELY USED AND ACCEPTED?

A. Yes. ICF and others have used this model for RTOs, utilities, and other clients.

Q. WHAT IS IPM®?

A. IPM® is a production cost simulation model that focuses on analyzing wholesale power markets and assessing competitive market prices of electrical energy, based on an analysis of supply and demand fundamentals. The model also projects power plant generation levels, new power plant construction, fuel consumption,

and inter-regional power flows. The model determines generation, and therefore production costs and prices, using a linear programming optimization routine with dynamic effects.

Q. IS IT WIDELY USED?

A. Yes, IPM® is widely used by private and public entities. For example, the U.S. Environmental Protection Agency uses this model to assess the power industry. ICF has used this model to provide support to a very large share of the U.S. electric power industry, and the model has been used in numerous due diligence, valuation, and expert testimony assignments.

Q. WHAT WERE THE KEY ASSUMPTIONS IN THE 2009 MAPS/IPM® MODELING ANALYSIS?

A. Key assumptions included future regional electricity demand growth, new unit costs and performance characteristics, existing unit characteristics including operational constraints, electricity transmission capabilities, fuel prices and environmental regulations (e.g., future potential CO_2 emission regulations). In addition, the modeling assumed that the wholesale power market is efficient and competitive. As a consequence, power plant operations, transmission flows and incremental investments were made economically and in a timely manner so as to minimize the present value of the costs of meeting demand for electrical energy and capacity to ensure reliability.

Section IV.3 Transmission Costs

Q WHY ARE CROSSROADS TRANSMISSION COSTS HIGHER THAN THOSE OF DOGWOOD'S?

A. The transmission costs of the Crossroads plant are higher than those of Dogwood because of the very large difference in plant location vis~a~vis load. One aspect of transmission costs is the tariff charges for using the system. The Dogwood plant is located in GMO's service territory (it is located in Pleasant Hill, in Cass County, Missouri) and only one transmission tariff charge is required (the SPP transmission charge). In contrast, the Crossroads power plant which is located in Clarksdale, Mississippi is about 400 miles from GMO's load center. Accordingly, Crossroads is located in the system of a different Transmission Provider: Entergy. Crossroads requires two transmission tariff charges - i.e., the charges of both the Southwest Power Pool and Entergy. Specifically, the Crossroads power must be wheeled through both the Entergy system to the border of the Southwest Power Pool (SPP) and through SPP to the GMO system which is part of SPP. This adds an additional transmission charge (i.e., Entergy's) for Crossroads. This cost was not provided by Mr. Crawford. My preliminary estimate is that this cost could be **[redacted]** based on my review of tariff information.

Q. IN CONTRAST, WHAT ARE THE TRANSMISSION CHARGES RELATED TO DOGWOOD?

NP

A. Dogwood's transmission charge is estimated to be **[redacted].** My estimate is based on the SPP network transmission charge relevant for GMO.

Q. IN ADDITION TO TRANSMISSION CHARGES, ARE THERE OTHER TRANSMISSION COSTS?

A. Yes. In addition to tariff charges, there are losses, reliability/economic costs due to transmission service problems at Crossroads, and upgrade costs.

Q. WHAT ARE TRANSMISSION LOSSES?

A. Transmission losses are due to heat loss during electricity transmission. Losses are roughly proportional to distance and increase as load peaks. For example, a 9 percent loss rate means that 91 out of 100 MW injected into the power grid can be used. The utility must make up losses by obtaining replacement power to offset lost capacity. Similarly, when a utility plans to meet its reserve margin requirement, it must demonstrate that it has enough MW after losses to meet demand. Losses increase ratepayer costs by the amount of cost associated with replacement power.

Q. ARE LOSSES AND THE LOSS OF CAPACITY TYPICALLY LARGE ISSUES IN UTILITY PLANNING?

A. No. This is because the loss characteristics are usually similar across options or because utilities have used average loss systems. However, it is far from typical to be comparing a peaker 400 miles away with a locally sited plant and in such a situation the losses on the 400 mile plant are much higher than for locally sited

supply. Furthermore, it is only in the last 2-5 years that U.S. markets have committed to incorporating marginal losses. Marginal losses are higher than average losses during the system peak. This is exactly when peakers like Crossroads are supposed to operate. SPP is committed to joining the rest of the U.S. organized markets in this regard. Therefore, a typical approach is very inappropriate in this case.

Q. WHAT IS THE MOST DISTANT GMO UNIT AT THIS TIME OTHER THAN CROSSROADS?

A. The most distant GMO unit, the Nevada unit, is approximately 108 miles from GMO's load center (see Schedule JLR-1). The average distance of GMO units, excluding Crossroads, to the load center (Kansas City) is 69 miles. In contrast, and as noted, Crossroads is roughly 400 miles away.

Q. ARE YOU AWARE OF ANY OTHER COMBUSTION TURBINE PEAKING PLANTS IN THE UNITED STATES LOCATED SO FAR FROM THE UTILITY LOAD CENTER.

A. No.

Q. HOW ARE LOSSES CURRENTLY HANDLED?

A. Today, for each transmission transaction, a loss factor is provided. Entergy currently has a single loss rate - regardless of the specific power movement - of approximately 3 percent. SPP uses a MW-mile loss system which increases the loss factor of long distance movements and vice versa. Loss factors in SPP range from 1.9 percent for Zone 6-KCP&L to 7.2 percent for Zone 8-Midwest Energy.

Therefore, even today, before the introduction of marginal losses, there can be a large variance in the loss factors for power movements in SPP.

Q. IN YOUR ECONOMIC ANALYSIS, WHAT LOSS FACTORS DO YOU USE?

A. I have conservatively used approximately 6.0 percent for Crossroads versus 1.92 percent for Dogwood in my calculations. However, by 2014, the loss factor for Dogwood could be negative albeit only slightly (i.e., its operation will reduce losses) and the loss factor for Crossroads will be closer to 9 percent. Thus, the loss gap will be much larger for Crossroads.

Q. WHY ARE YOU OF THE OPINION THAT THE LOSS FACTOR OF CROSSROADS COULD ULTIMATELY BE 9 PERCENT AND SLIGHTLY NEGATIVE FOR DOGWOOD?

A. In 2009, I conducted a preliminary load flow modeling analysis of the grid and estimated marginal losses for each plant.[22] I estimated the marginal losses for the movement within the SPP to be 6 percent for Crossroads and as low as slightly negative for Dogwood. 9 percent for Crossroads is the sum of 6 percent within SPP based on marginal losses, and 3 percent based on average losses in Entergy. As discussed below, SPP is planning to introduce marginal losses starting in 2014.[23]

[22] The load flow model is not only highly confidential, but review of the details requires Critical Infrastructure Information (CII) clearance.

[23] SPP Integrated Marketplace Workshop, October 25, 2010, page 6. All U.S. regions with full nodal markets use marginal losses including Cal-ISO, ERCOT, MISO, PJM, New York, New England.

Q. WHAT IS THE STATUS OF OBTAINING FIRM SERVICE AND FIRM TRANSMISSION UPGRADE COST ESTIMATES?

A. In my 2009 testimony, I emphasized the risks and costs of transmission related to Crossroads. As it turns out, SPP has provided GMO Special Protection Service for Crossroads rather than the more typical firm service. In the event of a transmission line outage on one of two key transmission lines, GMO must decrease its output by 25%. As I noted in 2009, "near-term firm transmission may not be available regardless of cost." This large decrease in capacity may be much larger than the effects of transmission charge differences.

Q. ARE LOSSES A MAJOR CONCERN?

A. Yes. I see no evidence that the NPVRR analysis gives any consideration to the lower deliverable capacity of Crossroads supply. Failure to address this problem highlights this highly unusual transmission situation where a plant (Dogwood) in the GMO service territory is being compared to a peaking unit located in Mississippi 400 miles away.

Q. HAVE YOU REVIEWED THE TREATMENT OF TRANSMISSION BY GMO?

A. I have not been able to fully review their treatment. However, there is no evidence that GMO accounts for differential losses (i.e., between options) when considering the contribution of Crossroads to meeting reserve margin. Thus, rather than decreasing the 300 MW of Crossroads capacity to make a proper comparison to Dogwood and accounting for the costs of purchasing additional

capacity to make up for the losses, they appear to totally ignore this issue. If GMO is in fact ignoring this issue, this is very problematic given SPP's commitment to the use of marginal losses starting in 2014. A nine percent incremental loss combined with a 25 percent loss in capacity decreases Crossroads' capacity by nearly one-third (300-0.25x300) x 0.91 = 205 MW, not 300 MW. *There is no evidence that GMO uses 205 MW or a similar de-rated capacity in its analysis of the Crossroads option; rather it appears to use 300 MW for both Crossroads and Dogwood in spite of Crossroads problems.* Lower reliability is not acceptable for GMO ratepayers.

Q. IS IT STANDARD TO TAKE INTO ACCOUNT MARGINAL LOSSES?

A. As mentioned, marginal losses are becoming ubiquitous in organized U.S. markets. All U.S. RTO (Regional Transmission Organizations) and ISOs (Independent System Operators) power systems with hourly day-ahead and real time markets have recently adopted a marginal loss approach as opposed to an average loss approach. Systems using marginal losses include ERCOT, Cal-ISO, MISO, PJM, ISO-NE, and NY-ISO. SPP too will use marginal losses when the region moves to a "Day-2" style electrical energy market in 2014 similar to the other RTO markets in the above regions. All plants must participate in the SPP market starting in 2014. *Thus, every day, from the system peak in the summer to*

the hour late at night in fall, GMO's ratepayers will be directly affected by off-system sales and marginal losses[24]*, such as by means of GMO's FAC.*

Q. ARE THERE ADDITIONAL TRANSMISSION RISKS THAT FAVOR DOGWOOD OVER CROSSROADS?

A. Yes. They include:

- The tariff charges are not fixed for the lifetime of the plant. Rather, they are subject to future transmission costs and demand levels. The extra transmission charge (i.e., the Entergy) adds to the uncertainty that does not exist with one transmission charge.
- The delivery point for Crossroads power into the SPP system is not near GMO's territory. Thus there is potential "basis" risk for Crossroads in the EIS market and in the future nodal market that SPP is creating that does not exist for Dogwood. Basis risk refers to price differences between market locations than can create economic problems. As an illustrative example, when power prices are high in the GMO sub-region of SPP (e.g., $100/MWh), and the prices for Crossroads are low at its SPP delivery point (e.g., $50/MWh), the utility would sell for $50/MWh and have to pay $100/MWh. Hence, the Crossroads plant cannot effectively hedge against basis risks as the utility has net costs of $50/MWh (100-50). In contrast, if the utility owned Dogwood, its sales and purchase price would be $100/MWh and the net costs due to price differences would be zero.

[24] There may be some sharing of FAC costs between the utility and ratepayers, but this only mitigates the impacts.

While this has been less of a concern in the past, the mandatory full SPP energy market which starts in 2014 will make this an even more important issue.

Section IV.4 Economic Analysis Of Dogwood And Crossroads

Q. FACTORING IN ALL THE COSTS AND BENEFITS OF THE TWO OPTIONS, WHAT DO YOU CONCLUDE?

A. I conclude the Dogwood plant is preferred to the GMO Crossroads plant because it has much lower net costs to ratepayers By including Crossroads in the rate base the higher cost would be paid by Missouri ratepayers. In my 2009 analysis I presented the evidence of resulting large savings if the Dogwood option is selected by GMO using 2008 actual prices.

Q. IN 2009, DID YOU REACH A SIMILAR CONCLUSION USING ICF FORECASTS?

A. Yes.

Q. **WHAT WOULD BE YOUR ESTIMATE OF THE BENEFITS OF DOGWOOD IF ICF 2009 FORECASTS OF ENERGY SALES ARE USED?**

A. In 2009 I used the ICF forecasts and the **[redacted]** to estimate energy sales profits for Dogwood. Using this approach, Dogwood costs appeared to be significantly lower compared to Crossroads. This lower cost for the 300 MW of supply would result in a substantial savings to the Missouri ratepayers. This higher cost for selecting the Crossroads option would be paid by Missouri ratepayers.

Q. WHAT IS THE RESULTS OF YOUR 2011 ANALYSIS USING 2010 ACTUAL SPP HOURLY PRICES?

NP

A. I conclude that Dogwood costs are lower than Crossroads costs (see Schedule JLR-2) This advantage increases if the costs of purchasing additional capacity are included to make up for Crossroads unavailability. Even at lower transmission costs for Crossroads than my preliminary estimate, Dogwood would still be preferred (Schedule JLR-2).

Q. HOW DID THE DOGWOOD OFFER MR. JANSSEN MADE IN APRIL 2010 COMPARE TO THE DOGWOOD OFFER USED BY GMO I ITS 2010 STIPULATION 8 CAPACITY STUDY?

A. His offer was **[redacted]**[25]**[redacted]

Q. HOW DOES THIS PROPOSAL CHANGE THE RESULTS OF YOUR ANALYSIS?

A. The cost advantage of Dogwood over Crossroads increases by **[redacted]**[26]. This alone can eliminate the **[redacted]** advantage of Crossroads calculated by GMO of **[redacted].** This also increases the advantage of Dogwood in my analyses.

[25] Rebuttal Testimony – Revenue Requirement of Robert Janssen on behalf of Dogwood Energy Before the Missouri Public Service Commission, Case No. ER-2010-0356, December 15, 2010. Schedule RJ-2P (Proprietary).

[26] **[redacted]**

NP

Section IV.5 Other Considerations

Q. ARE THERE OTHER CONSIDERATIONS THAT FAVOR DOGWOOD?

A. Yes. GMO currently does not have any combined cycle capacity, but has peaking and coal units. Thus, the Dogwood plant would diversify the utility's power plant capacity mix.

Q. ARE THERE OTHER BENEFITS?

A. Yes. The plant has lower emissions per MWh than Crossroads or other GMO plants. This is particularly significant in the case of CO_2 emissions. Crossroads emits 0.742 tons CO_2 per MWh versus Dogwood which emits 0.434 tons per MWh.[27]

Q. ARE THERE OTHER UNITS SIMILAR TO DOGWOOD IN THE MISSOURI-KANSAS REGION (MOKAN)?

A. No. This means an opportunity to purchase a low emitting local plant may be lost. Indeed, it was the loss of Dogwood (then called Aries) supply in 2005 that precipitated this entire situation.

[27]Tons per MWh calculated by multiplying the plant's heat rate by 117 lb/MMBtu, which is resulting emissions CO_2 from combusting of natural gas energy per Btu, then converting to tons per MWh. Source: EPA, http://www.epa.gov/airmarkets/progsregs/epa-ipm/docs/v410/Chapter11.pdf, page 11-4, Table 11-4 Fuel Emission Factor Assumptions in EPA Base Case.

SECTION V. CONCLUSIONS

Q. WHAT DO YOU RECOMMEND?

A. I recommend that GMO choose the Dogwood plant to meet GMO's need for capacity. It is a real solution to a real problem that is more economic than Crossroads. Were GMO to correct its analyses, it will likely show, as do the three analyses I have conducted (2008 historical, 2010 historical, and the 2009 vintage forecast) and as supported by the implications of the likely flaws in the GMO analyses, that Dogwood results in lower ratepayer costs and rates than Crossroads and less risks. This savings level could be high; to provide perspective, the estimated savings per kW could be greater than the total capital cost of Crossroads at **[redacted].** This estimate of savings does not fully include the benefits of higher reliability per kW due to Dogwood's proximity to load, and does not account for the benefits of greater use of Missouri resources by GMO by choosing Dogwood rather than Crossroads. This savings is so large because Dogwood is so much more efficient and has lower transmission costs and risks. Accordingly, the Commission should not approve inclusion of the Crossroads plant or its excessive costs in GMO's rate base.

Q. DO YOU HOLD THE OPINIONS YOU EXPRESS IN THIS TESTIMONY TO A REASONABLE DEGREE OF CERTAINTY AS AN EXPERT REGARDING ELECTRICAL POWER GENERATION AND TRANSMISSION MARKETS AND FACILITIES?

A. Yes.

HC

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does. However, I reserve the right to revise my responses in the event additional information becomes available.

SCHEDULE A
Judah L. Rose Resume

JUDAH L. ROSE

EDUCATION

1982 M.P.P., John F. Kennedy School of Government, **Harvard University**

1979 S.B., Economics, **Massachusetts Institute of Technology**

EXPERIENCE

Judah L. Rose joined ICF in 1982 and currently serves as a Managing Director of ICF International. Mr. Rose has 30 years of experience in the energy industry. Mr. Rose's clients include electric utilities, financial institutions, law firms, government agencies, fuel companies, and IPPs. Mr. Rose is one of ICF's Distinguished Consultants, an honorary title given to three of ICF's 3,500 employees, and has served on the Board of Directors of ICF International as the Management Shareholder Representative.

Mr. Rose has supported the financing of tens of billion dollars of new and existing power plants and is a frequent counselor to the financial community.

Mr. Rose frequently provides expert testimony and litigation support. Mr. Rose has provided testimony in over 100 instances in scores of state, federal, international, and other legal proceedings.

Mr. Rose has also addressed approximately 100 major energy conferences, authored numerous articles published in Public Utilities Fortnightly, the Electricity Journal, Project Finance International, and written numerous company studies. Mr. Rose has also appeared in TV interviews.

Mr. Rose received a M.P.P. from the John F. Kennedy School of Government, Harvard University, and an S.B. in Economics from the Massachusetts Institute of Technology.

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TESTIMONY

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104. Declaration of Judah Rose in re: Boston Generating LLC, et al., Chapter 11, Case No. 10-14419 (SCC) Jointly Administered, September 29, 2010.

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69. Rebuttal Testimony, FPL – CO_2 Emissions and the Everglades Coal-Fired Power Plant, Docket No. 070098-EL, March 2007

68. Rebuttal Testimony, Electric Utility Power Hedging, on behalf of Duke Energy Indiana, Cause No. 38707-FAC6851, May 2007.

67. Direct Testimony for Southwestern Electric Power Company, Before the Louisiana Public Service Commission, Docket No. U-29702, in re: Application of Southwestern Electric Power Company for the Certification of Contracts for the Purchase of Capacity for 2007, 2008, and 2009 and to Purchase, Operate, Own, and Install Peaking, Intermediate and Base Load Coal-Fired Generating Facilities in Accordance with the Commission's General Order Dated September 20, 1983. Consolidated with Docket No. U-28766 Sub Docket B in re: Application of Southwestern Electric Power Company for Certification of Contracts for the Purchase of Capacity in Accordance with the Commission's 'General Order of September 20, 1983, February 2007.

66. Second Supplemental Testimony on Behalf of Duke Energy Ohio Before the Public Utility Commission of Ohio, Case No. 03-93-EL-ATA, 03-2079, EL-AAM, 03-2081, EL-AAM, 03-2080, EL-ATA, February 28, 2007.

65. Electric Utility Power Hedging, on behalf of Duke Energy Indiana, Cause No. 38707-FAC6851, February 2007.

64. CPCN for Cliffside Coal-Fired Plant, on behalf of Duke Carolinas, Docket No. E7, SUB790, December 2006.

63. Expert Report, Chapter 11, Case No. 01-16034 (AJG) and Adv. Proc. No. 04-2933 (AJG), November 6, 2006.

62. IGCC Coal Plant, Testimony on behalf of Duke Energy Indiana, Cause No. 43114, October 2006.

61. Market Power and the PSEG Exelon Merger on Behalf of the NJBPU Staff, NJBPU, BPU Docket No. EM05020106, OAL Docket No. PUC-1874-05, Supplemental Testimony March 20, 2006.

60. Market Power and the PSEG Exelon Merger on Behalf of the NJBPU Staff, NJBPU, BPU Docket No. EM05020106, OAL Docket No. PUC-1874-05, Surrebuttal Testimony December 27, 2005.

59. Market Power and the PSEG Exelon Merger on Behalf of the NJBPU Staff, NJBPU, BPU Docket No. EM05020106, OAL Docket No. PUC-1874-05, November 14, 2005.

58. Brazilian Power Purchase Agreement, confidential international arbitration, October 2005.

57. Cost of Service and Fuel Clause Issues, Rebuttal Testimony on behalf of Public Service of New Mexico, Docket No. EL05-151, November 2005.

56. Cost of Service and Peak Demand, FERC, Testimony on behalf of Public Service of New Mexico, September 19, 2005, Docket No. EL05-19.

55. Cost of Service and Fuel Clause Issues, Testimony on behalf of Public Service of New Mexico, FERC Docket No. EL05-151-000, September 15, 2005.

54. Cost of Service and Peak Demand, FERC, Responsive Testimony on behalf of Public Service of New Mexico, August 23, 2005, Docket No. EL05-19.

53. Prudence of Acquisition of Power Plant, Testimony on behalf of Redbud, September 12, 2005, No. PUD 200500151.

52. Proposed Fuel Cost Adjustment Clause, FERC, Docket Nos. EL05-19-002 and ER05-168-001 (Consolidated), August 22, 2005.

51. Market Power and the PSEG Exelon Merger on Behalf of the NJBPU, FERC, Docket EC05-43-000, May 27, 2005.

50. New Air Emission Regulations and Investment in Coal Power Plants, rebuttal testimony on behalf of PSI, April 18, 2005, Causes 42622 and 42718.

49. Rebuttal Report: Damages due to Rejection of Tolling Agreement Including Discounting, February 9, 2005, CONFIDENTIAL.

48. New Air Emission Regulations and Investment in Coal Power Plants, supplemental testimony on behalf of PSI, January 21, 2005, Causes 42622 and 42718.

47. Damages Due to Rejection of Tolling Agreement Including Discounting, January 10, 2005, CONFIDENTIAL.

46. Discount rates that should be used in estimating the damages to GTN of Mirant's bankruptcy and subsequent abrogation of the gas transportation agreements Mirant had entered into with GTN, December 15, 2004. CONFIDENTIAL

45. New Air Emission Regulations and Investment in Coal Power Plants, testimony on behalf of PSI, November 2004, Causes 42622 and 42718.

44. Rebuttal Testimony of Judah Rose on behalf of PSI, "Certificate of Purchase as of yet Undetermined Generation Facility" Cause No. 42469, August 23, 2004.

43. Rebuttal Testimony of Judah Rose on behalf of the Hopi Tribe, Case No. A.02-05-046, Mohave Coal Plant Economics, June 4, 2004.

42. Supplemental Testimony "Retail Generation Rates, Cost Recovery Associated with the Midwest Independent Transmission System Operator, Accounting Procedures for Transmission and Distribution System, Case No. 03-93-EL-ATA, 03-2079, EL-AAM, 03-2081, EL-AAM, 03-2080, EL-ATA for Cincinnati Gas & Electric, May 20, 2004.

41. "Application of Southern California Edison Company (U338-E) Regarding the Future Disposition of the Mohave Coal-Fired Generating Station," May 14, 2004.

40. "Appropriate Rate of Return on Equity (ROE) TransAlta Should be Authorized For its Capital Investment Related to VAR Support From the Centralia Coal-Fired Power Plant", for TransAlta, April 30, 2004, FERC Docket No. ER04-810-000.

39. "Retail Generation Rates, Cost Recovery Associated with the Midwest Independent Transmission System Operator, Accounting Procedures for Transmission and Distribution System, Case No. 03-93-EL-ATA, 03-2079, EL-AAM, 03-2081, EL-AAM, 03-2080, EL-ATA for Cincinnati Gas & Electric, April 15, 2004.

38. "Valuation of Selected MIRMA Coal Plants, Acceptance and Rejection of Leases and Potential Prejudice to Leasors" Federal Bankruptcy Court, Dallas, TX, March 24, 2004 CONFIDENTIAL.

37. "Certificate of Purchase as of yet Undetermined Generation Facility", Cause No. 42469 for PSI, March 23, 2004.

36. "Ohio Edison's Sammis Power Plant BACT Remedy Case", In the United States District Court of Ohio, Southern Division, March 8, 2004.

35. "Valuation of Power Contract," January 2004, confidential arbitration.

34. "In the matter of the Application of the Union Light Heat & Power Company for a Certificate of Public Convenience and Necessity to Acquire Certain Generation Resources, etc.", before the Kentucky Public Service Commission, Coal-Fired and Gas-Fired Market Values, July 21, 2003.

33. "In the Supreme Court of British Columbia", July 8, 2003. ONFIDENTIAL

32. "The Future of the Mohave Coal-Fired Power Plant – Rebuttal Testimony", California P.U.C., May 20, 2003.

31. "Affidavit in Support of the Debtors' Motion", NRG Bankruptcy, Revenues of a Fleet of Plants, May 14, 2003. CONFIDENTIAL

30. "IPP Power Purchase Agreement," confidential arbitration, April 2003.

29. "The Future of the Mohave Coal-Fired Power Plant", California P.U.C., March 2003.

28. "Power Supply in the Pacific Northwest," contract arbitration, December 5, 2002. CONFIDENTIAL

27. "Power Purchase Agreement Valuation", Confidential Arbitration, October 2002.

26. "Cause No. 42145 - In support of PSI's petition for authority to acquire the Madison and Henry County plants, rebuttal testimony on behalf of PSI. Filed on 8/23/02."

25. "Cause No. 42200 - in support of PSI's petition for authority to recover through retail rates on a timely basis. Filed on 7/30/02."

24. "Cause No. 42196 - in support of PSI's petition for interim purchased power contract. Filed on 4/26/02."

23. "Cause No. 42145 - In support of PSI's petition for authority to acquire the Madison and Henry County plants. Filed on 3/1/2002."

22. "Analysis of an IGCC Coal Power Plant", Minnesota state senate committees, January 22, 2002

21. "Analysis of an IGCC Coal Power Plant", Minnesota state house of representative committees, January 15, 2002

20. "Interim Pricing Report on New York State's Independent System Operator", New York State Public Service Commission (NYSPSC), January 5, 2001

19. "The need for new capacity in Indiana and the IRP process", Indiana Utility Regulatory Commission, October 26, 2000

18. "Damage estimates for power curtailment for a Cogen power plant in Nevada", August 2000. CONFIDENTIAL

17. "Valuation of a power plant in Arizona", arbitration, July 2000. CONFIDENTIAL

16. Application of FirstEnergy Corporation for approval of an electric Transition Plan and for authorization to recover transition revenues, Stranded Cost and Market Value of a Fleet of Coal, Nuclear, and Other Plants, Before PUCO, Case No. 99-1212-EL-ETP, October 4, 1999 and April 2000.

15. "Issues Related to Acquisition of an Oil/Gas Steam Power plant in New York", September 1999 Affidavit to Hennepin County District Court, Minnesota

14. "Wholesale Power Prices, A Cost Plus All Requirements Contract and Damages", Cajun Bankruptcy, July 1999. Testimony to U.S. Bankruptcy Court.

13. "Power Prices." Testimony in confidential contract arbitration, July 1998.

12. "Horizontal Market Power in Generation." Testimony to New Jersey Board of Public Utilities, May 22, 1998.

11. "Basic Generation Services and Determining Market Prices." Testimony to the New Jersey Board of Public Utilities, May 12, 1998.

10. "Generation Reliability." Testimony to New Jersey Board of Public Utilities, May 4, 1998.

9. "Future Rate Paths and Financial Feasibility of Project Financing." Cajun Bankruptcy, Testimony to U.S. Bankruptcy Court, April 1998.

8. "Stranded Costs of PSE&G." Market Valuation of a Fleet of Coal, Nuclear, Gas, and Oil-Fired Power Plants, Testimony to New Jersey Board of Public Utilities, February 1998.

7. "Application of PECO Energy Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code." Market Value of Fleet of Nuclear, Coal, Gas, and Oil Power Plants, Rebuttal Testimony filed July 1997.

6. "Future Wholesale Electricity Prices, Fuel Markets, Coal Transportation and the Cajun Bankruptcy." Testimony to Louisiana Public Service Commission, December 1996.

5. "Curtailment of the Saguaro QF, Power Contracting and Southwest Power Markets." Testimony on a contract arbitration, Las Vegas, Nevada, June 1996.

4. "Future Rate Paths and the Cajun Bankruptcy." Testimony to the U.S. Bankruptcy Court, June 1997.

3. "Fuel Prices and Coal Transportation." Testimony to the U.S. Bankruptcy Court, June 1997.

2. "Demand for Gas Pipeline Capacity in Florida from Electric Utilities." Testimony to Florida Public Service Commission, May 1993.

1. "The Case for Fuel Flexibility in the Florida Electric Generation Industry." Testimony to the Florida Department of Environmental Regulation (DER), Hearings on Fuel Diversity and Environmental Protection, December 1992.

SELECTED SPEAKING ENGAGEMENTS

98. Rose, J.L., Fundamentals of Electricity Transmission, EUCI, Crystal City, Arlington, VA, June 29-30, 2010.

97. Rose, J.L., Economics of PC Refurbishment, Improving the Efficiency of Coal-Fired Power Generation in the U.S., DOE-NETL, February 24, 2010.

96. Rose, J.L., Fundamentals of Electricity Transmission, EUCI, Orlando, FL, January 25-26, 2010.

95. Rose, J.L., CO_2 Control, "Cap & Trade", & Selected Energy Issues, Multi-Housing Laundry Association, October 26, 2009.

94. Rose, J.L., Financing for the Future – Can We Afford It?, 2009 Bonbright Conference, October 9, 2009.

93. Rose, J.L., EEI's Transmission and Market Design School, Washington, D.C., June 2009.

92. Rose, J.L., ICF's New York City Energy Forum - Market Recovery in Merchant Generation Assets, June 10, 2008.

91. Rose, J.L., Southeastern Electric Exchange – Integrated Resource Planning Task Force Meeting, Carbon Tax Outlook Discussion, February 21-22, 2008.

90. Rose, J.L., AESP, NEEC Conference, Rising Prices and Failing Infrastructure: A Bleak or Optimistic Future, Marlborough, MA, October 23, 2006.

89. Rose, J.L., Infocast Gas Storage Conference, "Estimating the Growth Potential for Gas-Fired Electric Generation," Houston, TX, March 22, 2006.

88. Rose, J.L., "Power Market Trends Impacting the Value of Power Assets," Infocast Conference, Powering Up for a New Era of Power Generation M&A, February 23, 2006.

87. Rose, J.L., "The Challenge Posed by Rising Fuel and Power Costs", Lehman Brothers, November 2, 2005.

86. Rose, J.L., "Modeling the Vulnerability of the Power Sector", EUCI – Securing the Nation's Energy Infrastructure, September 19, 2005

85. Rose, J.L., "Fuel Diversity in the Northeast, Energy Bar Association, Northeast Chapter Meeting, New York, NY, June 9, 2005.

84. Rose, J.L., "2005 Macquarie Utility Sector Conference", Macquarie Utility Sector Conference, Vail, CO, February 28, 2005.

83. Rose, J.L., "The Outlook for North American Natural Gas and Power Markets", The Institute for Energy Law, Program on Oil and Gas Law, Houston, TX, February 18, 2005.

82. Rose, J.L. "Assessing the Salability of Merchant Assets – What's on the Horizon?" Infocast – The Market for Power Assets, Phoenix, AZ, February 10, 2005.

81. Rose, J.L. "Market Based Approaches to Transmission – Longer-Term Role", National Group of Municipal Bond Investors, New York, NY, December 10, 2004.

80. Rose, J.L. "Supply & Demand Fundamentals – What is Short-Term Outlook and the Long-Term Demand? Platt's Power Marketing Conference, Houston, TX, October 11, 2004.

79. Rose, J.L. "Assessing the Salability of Merchant Assets – When Will We Hit Bottom?, Infocast's Buying, Selling, and Investing in Energy Assets Conference, Houston, TX, June 24, 2004.

78. Rose, J. L. "After the Blackout – Questions That Every Regulator Should be Asking," NARUC Webinar Conference, Fairfax, VA, November 6, 2003.

77. Rose, J. L., "Supply and Demand in U.S. Wholesale Power Markets," Lehman Brothers Global Credit Conference, New York, NY, November 5, 2003.

76. Rose, J.L., "Assessing the Salability of Merchant Assets – When Will We Hit Bottom?", Infocast's Opportunities in Energy Asset Acquisition, San Francisco, CA, October 9, 2003.

75. Rose, J.L., "Asset Valuation in Today's Market", Infocast's Project Finance Tutorial, New York, NY, October 8, 2003.

74. Rose, J.L., "Forensic Evaluation of Problem Projects", Infocast's Project Finance Workouts: Dealing With Distressed Energy Projects, September 17, 2003.

73. Rose, J.L., National Management Emergency Association, Seattle, WA, September 8, 2003.

72. Rose, J.L., "Assessing the Salability of Merchant Assets – When Will We Hit Bottom?", Infocast's Buying, Selling & Investing in Energy Assets, Chicago, IL, July 24, 2003.

71. Rose, J.L., CSFB Leveraged Finance Independent Power Producers and Utilities Conference, New York, NY, "Spark Spread Outlook", July 17, 2003.

70. Rose, J.L., Multi-Housing Laundry Association, Washington, D. C., "Trends in U.S. Energy and Economy", June 24, 2003.

69. Rose, J.L., "Power Markets: Prices, SMD, Transmission Access, and Trading", Bechtel Management Seminar, Frederick, MD, June 10, 2003.

68. Rose, J.L., Platt's Global Power Market Conference, New Orleans, LA, "The Outlook for Recovery," March 31, 2003.

67. Rose, J.L., "Electricity Transmission and Grid Security", Energy Security Conference, Crystal City, VA, March 25, 2003.

66. Rose, J.L., "Assessing the Salability of Merchant Assets – When Will We Hit Bottom?, Infocast's Buying, Selling & Investing in Energy Assets, New York City, February 27, 2003.

65. Rose, J.L., Panel Discussion, "Forensic Evaluation of Problem Projects", Infocast Conference, NY, February 24, 2003.

64. Rose, J.L., PSEG Off-Site Meeting Panel Discussion, February 6, 2003 (April 13, 2003).

63. Rose, J.L., "The Merchant Power Market—Where Do We Go From Here?" Center for Business Intelligence's Financing U.S. Power Projects, November 18-19, 2002.

62. Rose, J.L., "Assessing U.S. Regional And The Potential for Additional Coal-Fired Generation in Each Region," Infocast's Building New Coal-Fired Generation Conference, October 8, 2002.

61. Rose, J.L., "Predicting the Price of Power for Asset Valuation in the Merchant Power Financings, "Infocast's Product Structuring in the Real World Conference, September 25, 2002.

60. Rose, J.L., "PJM Price Outlook," Platt's Annual PJM Regional Conference, September 24, 2002.

59. Rose, J.L., "Why Investors Are Zeroing in on Upgrading Our Antiquated Power Grid Rather Than Exotic & Complicated Technologies," New York Venture Group's Investing in the Power Industry—Targeting The Newest Trends Conference, July 31, 2002.

58. Rose, J.L., Panel Participant in the Salomon Smith Barney Power and Energy Merchant Conference 2002, May 15, 2002.

57. Rose, J.L., "Locational Market Price (LMP) Forecasting in Plant Financing Decisions," Structured Finance Institute, April 8-9, 2002.

56. Rose, J.L., "PJM Transmission and Generation Forecast", Financial Times Energy Conference, November 6, 2001.

55. Rose, J.L., "U.S. Power Sector Trends", Credit Suisse First Boston's Power Generation Supply Chain Conference, Web Presented Conference, September 12, 2002.

54. Rose, J.L., "Dealing with Inter-Regional Power Transmission Issues", Infocast's Ohio Power Game Conference, September 6, 2001

53. Rose, J.L., "Where's the Next California", Credit Suisse First Boston's Global Project Finance Capital Markets Conference, New York NY, June 27 2001

52. Rose, J.L, "U.S. Energy Issues: What MLA Members Need to Know," Multi-housing Laundry Association, Boca Raton Florida, June 25, 2001

51. Rose, J.L., "How the California Meltdown Affects Power Development", Infocast's Power Development and Finance Conference 2001, Washington D.C., June 12, 2001

50. Rose, J.L., "Forecasting 2001 Electricity Prices" presentation and workshop, What to Expect in western Power Markets this Summer 2001 Conference, Denver, Colorado, May 2, 2001

49. Rose, J.L., "Power Crisis in the West" Generation Panel Presentation, San Diego, California, February 12, 2001

48. Rose, J.L., "An Analysis of the Causes leading to the Summer Price Spikes of 1999 & 2000" Conference Chair, Infocast Managing Summer Price Volatility, Houston, Texas, January 30, 2001.

47. Rose, J. L., "An Analysis of the Power Markets, summer 2000" Generation Panel Presentation, Financial Times Power Mart 2000 conference, Houston, Texas, October 18, 2000

46. Rose, J.L., "An Analysis of the Merchant Power Market, Summer 2000" presentation, Conference Chair, Merchant Power Finance Conference, Atlanta, Georgia, September 11 to 15, 2000

45. Rose, J.L., "Understanding Capacity Value and Pricing Firmness" presentation, Conference Chair, Merchant Plant Development and Finance Conference, Houston, Texas, March 30, 2000.

44. Rose, J.L., "Implementing NYPP's Congestion Pricing and Transmission Congestion Contract (TCC)", Infocast Congestion Pricing and Forecasting Conference, Washington D.C., November 19, 1999.

43. Rose, J.L., "Understanding Generation" Pre-Conference Workshop, PowerMart, Houston, Texas, October 26-28, 1999.

42. Rose, J.L., "Understanding Capacity Value and Pricing Firmness" presentation, Conference Chair Merchant Plant Development and Finance Conference, Houston, Texas, September 29, 1999.

41. Rose, J.L., "Comparative Market Outlook for Merchant Assets" presentation, Merchant Power Conference, New York, New York, September 24, 1999.

40. Rose, J.L., "Transmission, Congestion, and Capacity Pricing" presentation, Transmission The Future of Electric Transmission Conference, Washington, DC, September 13, 1999.

39. Rose, J.L., "Effects of Market Power on Power Prices in Competitive Energy Markets" Keynote Address, The Impact of Market Power in Competitive Energy Markets Conference, Washington, DC, July 14, 1999.

38. Rose, J.L., "Peak Price Volatility in ECAR and the Midwest, Futures Contracts: Liquidity, Arbitrage Opportunity" presentation at ECAR Power Markets Conference, Columbus, Ohio, June 9, 1999.

37. Rose, J.L., "Transmission Solutions to Market Power" presentation, Do Companies in the Energy Industry Have Too Much Market Power? Conference, Washington, DC, May 24, 1999.

36. Rose, J.L., "Repowering Existing Power Plants and Its Impact on Market Prices" presentation, Exploiting the Full Energy Value-Chain Conference, Chicago, Illinois, May 17, 1999.

35. Rose, J.L., "Transmission and Retail Issues in the Electric Industry" Session Speaker, Gas Mart/Power 99 Conference, Dallas, Texas, May 10, 1999.

34. Rose, J.L., "Peak Price Volatility in the Rockies and Southwest" presentation at Repowering the Rockies and the Southwest Conference, Denver, Colorado, May 5, 1999.

33. Rose, J.L., "Understanding Generation" presentation and Program Chairman at Buying & Selling Power Assets: The Great Generation Sell-Off Conference, Houston, Texas, April 20, 1999.

32. Rose, J.L., "Buying Generation Assets in PJM" presentation at Mid-Atlantic Power Summit, Philadelphia, Pennsylvania, April 12, 1999.

31. Rose, J.L., "Evaluating Your Generation Options in Situations With Insufficient Transmission," presentation at Congestion Management conference, Washington, D.C., March 25, 1999.

30. Rose, J.L., "Will Capacity Prices Drive Future Power Prices?" presentation at Merchant Plant Development conference, Chicago, Illinois, March 23, 1999.

29. Rose, J.L., "Capacity Value – Pricing Firmness," presentation at Market Price Forecasting conference, Atlanta, Georgia, February 25, 1999

28. Rose, J.L., "Developing Reasonable Expectations About Financing New Merchant Plants That Have Less Competitive Advantage Than Current Projects," presentation at Project Finance International's Financing Power Projects in the USA conference, New York, New York, February 11, 1999.

27. Rose, J.L., "Transmission and Capacity Pricing and Constraints," presentation at Power Fair 99, Houston, Texas, February 4, 1999.

26. Rose, J.L., "Peak Price Volatility: Comparing ERCOT With Other Regions," presentation at Megawatt Daily's Trading Power in ERCOT conference, Houston, Texas, January 13, 1999.

25. Rose, J.L., "The Outlook for Midwest Power Markets," presentation to The Institute for Regulatory Policy Studies at Illinois State University, Springfield, Illinois, November 19, 1998.

24. Rose, J.L., "Developing Pricing Strategies for Generation Assets," presentation at Wholesale Power in the West conference, Las Vegas, Nevada, November 12, 1998.

23. Rose, J.L., "Understanding Electricity Generation and Deregulated Wholesale Power Prices," a full-day pre-conference workshop at Power Mart 98, Houston, Texas, October 26, 1998.

22. Rose, J.L., "The Impact of Power Generation Upgrades, Merchant Plant Developments, New Transmission Projects and Upgrades on Power Prices,"

presentation at Profiting in the New York Power Market conference, New York, NY, October 22, 1998.

21. Rose, J.L., "Capacity Value – Pricing Firmness," presentation to Edison Electric Institute Economics Committee, Charlotte, NC, October 8, 1998.

20. Rose, J.L., "Locational Marginal Pricing and Futures Trading," presentation at Megawatt Daily's Electricity Regulation conference, Washington, D.C., October 7, 1998.

19. Rose, J.L., Chairman's opening speech and "The Move Toward a Decentralized Approach: How Will Nodal Pricing Impact Power Markets?" at Congestion Pricing and Tariffs conference, Washington, D.C., September 25, 1998.

18. Rose, J.L., "The Generation Market in MAPP/MAIN: An Overview," presentation at Megawatt Daily's MAIN/MAPP – The New Dynamics conference, Minneapolis, Minnesota, September 16, 1998.

17. Rose, J.L., "Capacity Value – Pricing Firmness," presentation at Market Price Forecasting conference, Baltimore, Maryland, August 24, 1998.

16. Rose, J.L., "ICF Kaiser's Wholesale Power Market Model," presentation at Market Price Forecasting conference, New York, New York, August 6, 1998.

15. Rose, J.L., Campbell, R., Kathan, David, "Valuing Assets and Companies in M&A Transactions," full-day workshop at Utility Mergers & Acquisitions conference, Washington, D.C., July 15, 1998.

14. Rose, J.L., "Must-Run Nuclear Generation's Impact on Price Forecasting and Operations," presentation at The Energy Institute's conference entitled "Buying and Selling Electricity in the Wholesale Power Market," Las Vegas, Nevada, June 25, 1998.

13. Rose, J.L., "The Generation Market in PJM," presentation at Megawatt Daily's PJM Power Markets conference, Philadelphia, Pennsylvania, June 17, 1998.

12. Rose, J.L., "Market Evaluation of Electric Generating Assets in the Northeast," presentation at McGraw-Hill's conference: Electric Asset Sales in the Northeast, Boston, Massachusetts, June 15, 1998.

11. Rose, J.L., "Overview of SERC Power," opening speech presented at Megawatt Daily's SERC Power Markets conference, Atlanta, Georgia, May 20, 1998.

10. Rose, J.L., "Future Price Forecasting," presentation at The Southeast Energy Buyers Summit, Atlanta, Georgia, May 7, 1998.

9. Rose, J.L., "Practical Risk Management in the Power Industry," presentation at Power Fair, Toronto, Canada, April 16, 1998.

8. Rose, J.L., "The Wholesale Power Market in ERCOT: Transmission Issues," presentation at Megawatt Daily's ERCOT Power Markets conference, Houston, Texas, April 1, 1998.

7. Rose, J.L., "New Generation Projects and Merchant Capacity Coming On-Line," presentation at Northeast Wholesale Power Market conference, New York, New York, March 18, 1998.

6. Rose, J.L., "Projecting Market Prices in a Deregulated Electricity Market," presentation at conference: Market Price Forecasting, San Francisco, California, March 9, 1998.

5. Rose, J.L., "Handling of Transmission Rights," presentation at conference: Congestion Pricing & Tariffs, Washington, D.C., January 23, 1998.

4. Rose, J.L., "Understanding Wholesale Markets and Power Marketing," presentation at The Power Marketing Association Annual Meeting, Washington, D.C., November 11, 1997.

1. Rose, J.L., "Determining the Electricity Forward Curve," presentation at seminar: Pricing, Hedging, Trading, and Risk Management of Electricity Derivatives, New York, New York, October 23, 1997.

2. Rose, J.L., "Market Price Forecasting In A Deregulated Market," presentation at conference: Market Price Forecasting, Washington, D.C., October 23, 1997,

1. Rose, J.L., "Credit Risk Versus Commodity Risk," presentation at conference: Developing & Financing Merchant Power Plants in the New U.S. Market, New York, New York, September 16, 1997.

SELECTED PUBLICATIONS

Rose, J.L. and Surana, S. "Oil Price Increases, Yield Curve Inversion may be Indicators of Economic Recession." Oil and Gas Financial Journal, Volume 7, Issue 6, June 2010

Rose, J.L. and Surana, S. "Forecasting Recessions and Investment Strategies." World-Generation, June/July 2010, V.22, #3.

Rose, J.L., "Should Environmental Restrictions be Eased to Allow for the Construction of More Power Plants? The Costco Connection, April 2001.

Rose, J.L., "Deregulation in the US Generation Sector: A Mid-Course Appraisal", Power Economics, October 2000.

Rose, J. L., "Price Spike Reality: Debunking the Myth of Failed Markets", *Public Utilities Fortnightly,* November 1, 2000.

Rose, J.L., "Missed Opportunity: What's Right and Wrong in the FERC Staff Report on the Midwest Price Spikes," *Public Utilities Fortnightly,* November 15, 1998.

Rose, J.L., "Why the June Price Spike Was Not a Fluke," *The Electricity Journal,* November 1998.

Rose, J.L., S. Muthiah, and J. Spencer, "Will Wall Street Rescue the Competitive Wholesale Power Market?" *Project Finance International,* May 1998.

Rose, J.L., "Last Summer's "Pure" Capacity Prices – A Harbinger of Things to Come," *Public Utilities Fortnightly,* December 1, 1997.

Rose, J.L., D. Kathan, and J. Spencer "Electricity Deregulation in the New England States," *Energy Buyer,* Volume 1, Issue 10, June-July 1997.

Rose, J.L., S. Muthiah, and M. Fusco, "Financial Engineering in the Power Sector," *The Electricity Journal,* Jan/Feb 1997.

Rose, J.L, S. Muthiah, and M. Fusco, "Is Competition Lacking in Generation? (And Why it Should Not Matter)," *Public Utilities Fortnightly,* January 1, 1997.

Mann, C. and J.L. Rose, "Price Risk Management: Electric Power vs. Natural Gas," *Public Utilities Fortnightly,* February 1996.

Rose, J.L. and C. Mann, "Unbundling the Electric Capacity Price in a Deregulated Commodity Market," *Public Utilities Fortnightly,* December 1995.

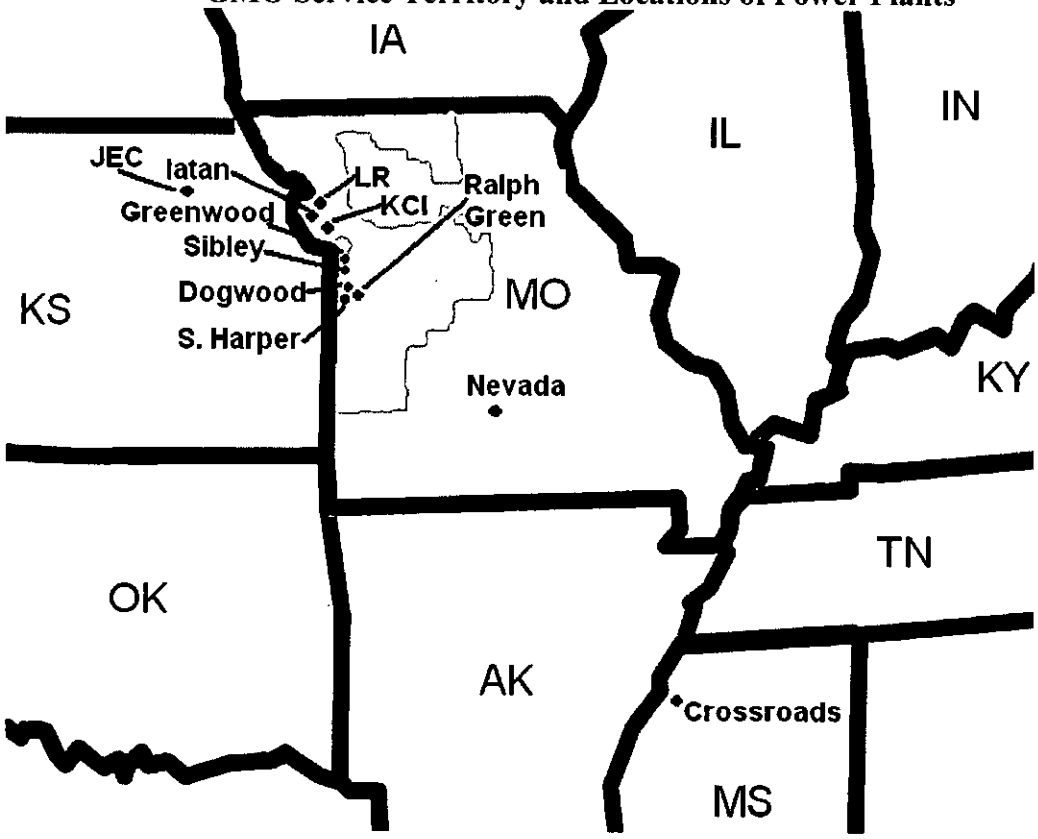
Booth, William and J.L. Rose, "FERC's Hourly System Lambda Data as Interim Bulk Power Price Information," *Public Utilities Fortnightly,* May 1, 1995.

Rose, J.L. and M. Frevert, "Natural Gas: The Power Generation Fuel for the 1990s." Published by Enron.

EMPLOYMENT HISTORY

ICF Resources Incorporated	Managing Director	1999-Present
	Vice President	1996-1999
	Project Manager	1993-1996
	Senior Associate	1986-1993
	Associate	1982-1986

SCHEDULE JLR-1
GMO Service Territory and Locations of Power Plants



SCHEDULE JLR-2 (PUBLIC)
JUDAH ROSE SURREBUTTAL TESTIMONY-REVENUE REQUIREMENT
DOGWOOD VERSUS CROSSROADS
SPP EIS BASED NET ENERGY MARGIN ($/kW-YEAR)

	Unit	Crossroads	Dogwood
Total Capacity	MW	300	300
Bid Price[1]	2010 $/kW	** [redacted] **	** [redacted] **
Transmission Losses[2]	%	9%	1.92%
Net Capacity After Losses	MW	273	294
Heat Rate[3]	Btu/kWh	** [redacted] **	** [redacted] **
Fixed O&M Charge[4]	2010 $/kW-yr	** [redacted] **	** [redacted] **
Transmission Charge[5]	2010 $/kW-yr	50.0	20.0
Variable O&M Charge[4]	2010 $/MWh	** [redacted] **	** [redacted] **
Capital Charge Rate[6]	%	10.25%	10.15%
Total Fixed Costs[7]	2010 $/kW-yr	** [redacted] **	** [redacted] **
Average Delivered Gas Price[8]	2010 $/MMBtu	4.33	4.15
Average On-Peak Energy Price[9,10]	2010$/MWh	36.3	37.2
Average Off-Peak Energy Price[9,10]	2010$/MWh	24.0	26.8
Average All Hours Energy Price[9,10]	2010$/MWh	29.9	31.8
Capacity Factor[11,13]	%	** [redacted] **	** [redacted] **
Realized Energy Price[12,13]	2010$/MWh	** [redacted] **	** [redacted] **
Average Net Energy Margin[13,14]	2010$/kW-yr	** [redacted] **	** [redacted] **
Fixed Costs - Energy Margin[15]	2010$/kW-yr	** [redacted] **	** [redacted] **
Transmission Losses (Capacity)[16]	2010$/kW-yr	4.46	1.80
Transmission Losses (Energy)[17]	2010$/kW-yr	2.16	3.11
Net Costs[18]	2010$/kW-yr	** [redacted] **	** [redacted] **

[1]Burton L. Crawford rebuttal testimony on behalf of KCP&L Greater Missouri Operations Company, Case No. ER-2010-0356 dated December 2010. Pages 38 and 43, Tables 15 and 21. Assumed inflation is 2.5% per year.

[2]Source: Confidential ICF load flow study.

[3]Dogwood Energy and Burton L. Crawford rebuttal testimony on behalf of KCP&L Greater Missouri Operations Company, Case No. ER-2010-0356 dated December 2010. Page 41, Table 18.

[4]Burton L. Crawford rebuttal testimony on behalf of KCP&L Greater Missouri Operations Company, Case No. ER-2010-0356 dated December 2010. Pages 38 and 41, Tables 15 and 18. Assumed inflation is 2.5% per year.

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[5]ICF

[6]ICF Assumptions

[7]Total fixed costs are total of capital recovery, fixed O&M and transmission costs. Annual capital recovery payments are calculated by multiplying capital charge rate with the bid price.

[8]Source: Bloomberg. Average delivered gas price is based on daily gas price data at NGPL Mid-Continent hub in 2010 for Dogwood and Texas Gas Zone 1 for Crossroads.

[9]Source: SPP EIS. Energy prices are based on 2010 SPP EIS MPSPHILLUNDOGWOOD for Dogwood and MPS-LA Parent Node for Crossroads.

[10]Peak definition is 5x16.

[11]For the purposes of this calculation, Capacity Factor is calculated by dividing actual annual generation by capacity*8.76. Plant will dispatch if LIP prices is greater than (heat rate * gas price +VOM).

[12]Realized energy price is the generation weighted average of the energy price for the hours plant is running.

[13]Capacity Factor, Realized Energy Price, and Average Net Energy Margin for Dogwood are weighted averages of both the base and duct-fired portions of the power plant.

[14]Average Net Energy Margin is the net of energy revenues from variable costs including fuel and variable O&M.

[15]Fixed Costs – Energy Margin is an indicator of the required capacity price for a unit to recoup its fixed costs. This approach is used in calculation of net Cost of New Entry (CONE) in PJM capacity markets. If the difference is positive the unit can recoup all of its fixed costs from energy market. It is calculated by subtracting Total Fixed Cost from Average Net Energy Margin.

[16]The Transmission Losses from capacity are calculated by first finding the portion of the capital cost that would be lost through capacity transmission and converting it to $/kW-yr using the capital charge rate. Transmission losses from the Fixed O&M component are then added on.

[17]The Transmission Losses from energy are calculated by simply finding the difference between the plants Average Net Energy Margin with derated energy prices and the Average Net Energy Margin without derating.

[18]Net Costs is Average Net Energy Margin minus Losses.