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Issue: Revenue Requirement
Witness: Judah Rose
Sponsoring Party: Dogwood Energy, LLC
Type of Exhibit: Surrebuttal Testimony
Case No.: ER-2009-0090

BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION

In the Matter of the Application of KCP&L GMO, Inc. d/b/a KCP&L Greater Missouri Operations Company for Approval to Make Certain Changes to its Charges for Electric Service.	)))))	Case No. ER-2009-0090

PUBLIC VERSION

SURREBUTTAL TESTIMONY – REVENUE REQUIREMENT

OF JUDAH ROSE ON BEHALF OF

DOGWOOD ENERGY, LLC

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April 9, 2009

STATE OF Virginia)
) SS.
COUNTY OF Fairfax)

BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION

In the Matter of the Application of KCP&L GMO, Inc. d/b/a KCP&L Greater Missouri Operations Company for Approval to Make Certain Changes to its Charges for Electric Service.	)))))	Case No. ER-2009-0090

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

SUBSCRIBED AND SWORN to before me, a Notary Public, this 3rd day of April, 2009.

Bonnie A Sella
Notary Public

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

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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 over 26 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 more than 3,000 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 30 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 25 years to practically every major US electric utility including companies such as Dominion Power, Delmarva Power & Light, FirstEnergy, Entergy, Florida Power & Light, 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") 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 eighteen states: Arizona, Arkansas, California, Florida, Indiana, Kentucky, Louisiana, Massachusetts, Minnesota, New Jersey, Nevada, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, 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. No.

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 Dogwood combined cycle power plant located in the service territory of KCP&L-GMO ("GMO"). The Dogwood combined cycle was formerly known as the Aries combined cycle. As indicated in the Rebuttal Testimony submitted in

this case by Robert Janssen, Dogwood Energy, LLC responded to GMO RFPs in 2007 and in 2008 by offering power supply from the Dogwood plant.

Q. WHAT DOES YOUR TESTIMONY ADDRESS?

A. My surrebuttal testimony responds to the rebuttal testimony of Burton Crawford submitted on March 13, 2009 on behalf of KCP&L Greater Missouri Operations (GMO) Company. Specifically, I respond to his claim that the Crossroads Energy Center provided the lowest 20-year Net Present Value of Revenue Requirements (NPVRR) including the cost of transmission service in the GMO 2007 Request for Proposal (RFP). My analysis indicates the opposite, namely the Dogwood offer had lower costs than the Crossroads peaking plant in 2007, and has even a greater advantage based on the March 13, 2009 testimony of Robert Janssen of Dogwood Energy in which he presents a lower price for Dogwood supply.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. 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 analysis of the economics of adding Crossroads versus Dogwood. The economic analysis has four subsections: (1) economic analysis of the electrical energy cost savings provided by Dogwood, (2) analysis of transmission costs and risks, (3) economic analysis of options accounting 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.

A. My testimony responds to the testimony of Burton Crawford of KCP&L GMO submitted on March 13, 2009 where he states on page 9 that the Crossroads Energy Center had the lowest NPVRR including the cost of transmission service among the 2007 RFP respondents. My analysis indicates the opposite, namely the cost of the Dogwood bid into the 2007 GMO RFP was lower than the bid of the Crossroads plant. My analysis was conducted using two different approaches. The first uses 2008 Southwest Power Pool (SPP) Energy Imbalance Services (EIS) historical price data, and the second uses ICF model forecasts of power prices in future years. Choosing the Dogwood plant over Crossroads would save consumers [redacted] percent on a per kW basis. The choice of Dogwood results in $[redacted] million lower GMO costs, i.e., lower revenue requirements on a Present Value[1] (PV) basis for GMO ratepayers. This equals [redacted] (at [redacted] MW) of savings. To provide perspective on the magnitude of the savings, note [redacted] is close to or in excess of the total capital cost of Crossroads of [redacted][2].

The much lower costs of the Dogwood plant are the result of Dogwood's greater electrical energy cost savings, higher off-system sales revenues, and lower transmission costs, offsetting its higher purchase price. Dogwood has much lower

[1] NPV based on 30 years and real discount rate of 3.85%
[2] Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.

per MWh operating costs than Crossroads since it is [redacted][3] percent more thermally efficient in the conversion of natural gas fuel energy to electricity. This creates large potential for energy cost savings and off-system sales profits. Competitiveness vis~a~vis the wholesale power market is especially important because of the recent establishment of the Southwest Power Pool's (SPP) Energy Imbalance Services (EIS) market, prospects for an expanded SPP day ahead and real time energy market starting in 2012, and GMO's decision to join SPP which was recently approved by the Missouri Public Service Commission (MPSC).

Dogwood also has lower transmission costs since it is located in GMO's service territory near GMO's load center. 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. This creates risks and issues not normally present in asset acquisitions and not present for Dogwood.

My conclusion that Dogwood's costs are less than Crossroads is the opposite of GMO's. Based on the information available to me, it is my opinion that the source of this difference is a flaw in GMO's modeling. GMO appears to have failed to analyze the full off-system sales potential of the proposed alternatives. GMO "turned-off" the power sales feature of the computer model used. Net revenues from off-system sales should be considered since they offset the costs of production charged to ratepayers. This inappropriate decision disproportionately

[3] Base block and duct. Dogwood base block and duct thermal efficient is [redacted] vs. [redacted] for Crossroads.

affects the Dogwood plant because it has significant potential to sell electrical energy off-system, but Crossroads does not. This decision to ignore the power market sales potential of the alternatives is especially inappropriate in light of the increasing use of market mechanisms in SPP and MISO[4].

GMO's treatment of transmission costs also appears flawed. The risks of higher transmission costs for Crossroads appears to be larger than accounted for in the GMO analysis and/or the reliability of the GMO system is being overstated. The Crossroads transmission risks derive in large part from the uniquely distant location of the plant from its load and the lack of final estimates for transmission upgrade costs. In contrast, the Dogwood plant is in the GMO service territory. In fact, even GMO admits transmission capacity may not be available in the near-term and that even after ten rounds of modeling analysis by SPP, neither the SPP nor Entergy transmission cost estimates have been finalized.

Beyond the cost savings provided by Dogwood, there are also additional qualitative considerations favoring the Dogwood bid including diversification of supply and lower emissions of CO_2.

The cost advantage of Dogwood over Crossroads increases to [redacted] percent based on the 2008 offer identified by Robert Janssen of Dogwood Energy in his March 13, 2009 testimony. This offer is lower than its 2007 bid. This offer has the virtue of having actual in-state local generation available to meet GMO's

[4] 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 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.

actual need. Under this offer, Dogwood saves GMO ratepayers [redacted] million dollars per year in real 2008 dollars, which is equal to [redacted] million per year in nominal dollars on average between 2009 and 2038 at 2.5 percent general economy wide inflation. Dogwood saves GMO ratepayers approximately [redacted] million dollars on a present value basis[5]. This is equal to [redacted]. To provide perspective, the cost savings due to Dogwood exceed the total capital cost of Crossroads of [redacted]. This savings is so large because Dogwood is so much more efficient and has lower transmission costs. This estimate of the savings is conservative because it does not include the benefits of higher reliability per kW from Dogwood due to its proximity to GMO's load, greater use of Missouri resources by GMO by choosing Dogwood, and even higher Crossroads transmission costs than I have included in my estimates, e.g., even higher transmission losses.

In light of this new information, I recommend that full consideration be given to using 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. I also recommend that information explaining why the GMO 2007 results differ from mine be provided. In the alternative, at a minimum, the costs of Crossroads in excess of the costs of Dogwood should be disallowed and rates should be accordingly decreased. I also recommend that procedures be put in place to ensure full and proper consideration

[5] NPV based on 30 years and real discount rate of 3.85%

of alternatives. Lastly, the MPSC should not approve inclusion of the Crossroads plant or its excess costs in GMO's rate base.

SECTION III. BACKGROUND

Q. PLEASE BRIEFLY DESCRIBE KCPL GMO'S APPLICATION IN THIS PROCEEDING.

A. GMO has requested that this Commission increase its retail rates for electric service in both its Missouri Public Service ("MPS") and Light and Power ("L&P") service territories in Missouri. KCP&L GMO asserts that since its rates were adjusted last, it has undertaken substantial additional investment in rate base. It indicates that these investments include adding peaking capacity at the Crossroads Energy Center.[6]

Q. WHAT IS THE BACKGROUND TO THE CROSSROADS PLANT BEING ADDED TO GMO RATE BASE?

A. GMO provided its 2007 Integrated Resource Plan (IRP) on February 5, 2007. The preferred plan was the construction of a [redacted] MW combustion turbine peaking plant in [redacted] and a [redacted] MW combined cycle in [redacted] for a total generation capacity of [redacted] MW[7]. This led to a Request for Proposals (RFP) by GMO in March 2007 for short term and long term resource needs. According to GMO witness Rooney, GMO analyzed the bid proposals by using its IRP model, and the results showed that Crossroads was both the least cost and the preferred[8] option and the self-build combustion turbine near Sedalia, Missouri was the next best. GMO made an update to the IRP in October 2007 reflecting this result. RFP

[6] See Application at Item 7.
[7] Source: GMO 2007 Integrated Resource Plan (IRP), Appendix 5-d, Annbalancesheet_HC, Preferred.
[8] Source: Filing to the Missouri Public Service Commission, Case ER-2009-0090, Highly Confidential Direct Testimony of H.D. Rooney, Page 25, line 14.

results were presented by GMO in testimony of Mr. Rooney and others on September 5, 2008 which requests a rate increase and full cost recovery for the Crossroads plant. Mr. Crawford reiterated this conclusion in his March 13, 2009 testimony.[9]

Q. WHAT DID THE STAFF CONCLUDE IN ITS COST OF SERVICE REPORT REGARDING THE CROSSROADS PLANT?

A. On page 88 and 89, the report states,

> "*Staff did not include the Crossroads power plant for two reasons: (1) affiliate transaction concerns discussed in greater detail in the next section of this report, and (2) the cost of transmission to move the Crossroads energy to GMO's territory."*

The report of the Staff also states,

> *"A utility should locate and size a generating plant to serve its native load. The Crossroads power plant was not located or sized to meet MPS's native load. Under the right circumstances, such as distress sales, acquisition of plants by others, including merchant plants such as Crossroads, could be a preferred option."*[10]

Q. WHAT DID THE STAFF PROPOSE INSTEAD?

A. On page 89, the report states,

> "*The Staff is including a "hypothetical" short-term contract to bridge the*

[9] Source: Filing to the Missouri Public Service Commission, Case ER-2009-0090, Rebuttal Testimony of Burton L. Crawford, Page 9, lines 6 – 13.
[10] Source: Filing to the Missouri Public Service Commission, Case ER-2009-0090, Staff Report Cost of Service, Pages 88 and 89.

need between the five CTs and GMO's next generation capacity addition for MPS. Therefore, the capital costs of five 105 MW CTs on a six 105 MW CT site are included in Staff's case for MPS, and the capacity costs of a generic 100 MW PPA are included in the expenses for MPS."

The report also states that,

"Even though it is Staff's position that the best resource for an electric utility is "steel-in-the-ground," i.e. utility constructed and owned generation, Staff recognizes that short-term PPAs are appropriate in circumstances where the electric utility is adding capacity in the near future."[11]

Q. WHY DID THE STAFF PROPOSE PEAKING CTS AS THE BASIS FOR THE HYPOTHETICAL PPA?

A. As stated in the Staff Cost of Service Report filed February 13, 2009,

"In September 2003, Staff testified in Case No. EF-2003-0456 to its concerns regarding Aquila's lack of planning to replace the 500 megawatts ("MW") of summer power it was then obtaining from the exempt wholesale generator ("EWG) Aries plant."[12]

Continuing, the Staff states,

"In Aquila's first general electric rate increase case in Missouri after the Aries PPA expired, Case No. ER-2005-0436, the Staff asserted that, given

[11] Source: Filing to the Missouri Public Service Commission, Case ER-2009-0090, Staff Report Cost of Service, Page 89.
[12] Source: Filing to the Missouri Public Service Commission, Case ER-2009-0090, Staff Report Cost of Service, Page 85.

the information available from the resource planning process at the time Aquila decided how it would replace the power it was obtaining through the Aries PPA, Aquila should have built five 105 MW CTs in time to meet the capacity need resulting from the expiration of the Aires PPA in May 2005….It was and still is the Staff's position that, instead of relying on short term PPAs, Aquila should have built and had available by the summer of 2005 five 105 MW CTs, to serve its customers."

I note that the Aries plant mentioned above has been renamed the Dogwood plant and Dogwood is not affiliated with Aquila, now GMO, or Calpine.

Q. WHAT IS YOUR UNDERSTANDING REGARDING THE MISSOURI PUBLIC SERVICE COMMISSION (MPSC) REVIEW OF GMO'S ADDING CROSSROADS TO ITS RATE BASE?

A. My understanding is that the MPSC has not ruled on whether this is a prudent addition to rate base or not.

Q. WHAT IS YOUR UNDERSTANDING OF FERC'S REVIEW OF GMO'S DECISION TO ADD CROSSROADS TO ITS RATE BASE?

A. My understanding is FERC approval may be required. To my knowledge this approval has not yet been obtained.

Q. DID YOU REVIEW GMO'S ANALYSIS OF THE 2007 RFP RESPONSES?

A. Yes.

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

A. I concentrated my review on two responses to the GMO RFP: (1) the existing Crossroads [redacted] MW GE 7EA peaking power plant ([redacted]MW units) located in Clarksdale, Mississippi, and (2) the [redacted] interest in the existing [redacted] MW (i.e., [redacted] MW)[13] Dogwood natural gas fueled combined cycle owned by Dogwood Energy and located in northwest Missouri in GMO's service territory.

Q. WHY THESE TWO OPTIONS?

A. These two existing options are currently available to meet the actual need for capacity of GMO, albeit assuming transmission in the case of Crossroads. The Dogwood plant provides an answer to the staff's desire for steel-in-the-ground, and capacity located and sized to meet the customer's needs. There are also no affiliate issues regarding Dogwood. Furthermore, Mr. Janssen of Dogwood Energy in his March 13, 2009 testimony reiterated Dogwood's availability under a range of arrangements and decreased the offer price.

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?

13 [redacted].

A. GMO conducted a two-stage review of alternatives. The first analysis was a screening analysis that rejected Dogwood, and the second analysis was more detailed and chose Crossroads over the remaining alternatives. GMO appears to have analyzed Dogwood with the more detailed model as a sensitivity case even though it did not pass the first stage review.

Q. HOW WAS THIS ANALYSIS CONDUCTED?

A. GMO used the MIDAS computer model of the alternatives. MIDAS is a production cost model for quantitatively assessing the impacts of power plant additions to the costs and operations of GMO's power system. The conclusion of the GMO analysis is contained in the testimony of H. Davis Rooney of GMO filed on September 05, 2008, in which he states:

> *"The top two options were both General Electric 7EA combustion turbines. One option was to construct a power plant at a site near Sedalia, Missouri. The other option was for the Missouri regulated utility to acquire Crossroads. Crossroads is both the least cost and the preferred option*[14]*."*

Q. WHAT IS YOUR OPINION OF THE GMO IRP REVIEW?

A. I have not completed a full review in part because only part of the requested information has been provided. However, I believe I have detected a flaw in the analysis that biases the results. Specifically, GMO chose to operate the MIDAS model so that it did not consider the potential for off-system sales. The model

[14] Source: ICF assumption. Based on utility financing and Missouri Public Service Commission, Case: ER-2009-0090, Rebuttal Testimony of Charles R. Hyneman, Page 10, lines 11-15

only considered the potential for new units to displace a limited amount of power purchases or displace generation of its own plants.

Q. WHY IS THE FAILURE TO ACCOUNT FOR OFF-SYSTEM SALES A FUNDAMENTAL 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 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 internal demand net of coal generation is 150 MW. Failure to give the option for off-system sales underestimates the plant's benefits in every 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 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. WHAT DID YOU DO TO CORRECT FOR THIS FUNDAMENTAL FLAW?

A. I conducted an independent analysis as discussed later.

Q. DO YOU HAVE OTHER CONCERNS ABOUT THE ECONOMIC ANALYSIS?

A. Yes. I believe the transmission analysis is also flawed. Therefore, I conducted transmission studies of Crossroads and Dogwood, also discussed later. Also, without access to the GMO model including the ability to request sensitivity analysis, I felt that conducting my own analyses was necessary.

Q. DO YOU HAVE CONCERNS ABOUT THE OVERALL EVALUATION PROCESS?

A. Yes.

Q. WHAT ARE YOUR CONCERNS?

A. It appears that the approach did not incorporate the approach of some other jurisdictions where utilities or utility affiliates bidding on RFPs have an independent third party monitor or evaluator ensure protection of ratepayer interests.

SECTION IV. ECONOMIC EVALUATION OF DOGWOOD AND CROSSROADS BID

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. The price is [redacted][15] per kilowatt.[16]

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

A. The bid price is represented by GMO as the approximate book value net of depreciation.

Q. WHAT WAS THE PURCHASE PRICE OF THE DOGWOOD COMBINED CYCLE PLANT IN THE GMO 2007 RFP?

A. The sale price of the Dogwood power plant was higher than Crossroads at [redacted][17]. This offer was for an [redacted] in the Dogwood plant. Thus, an examination of the purchase prices alone favors Crossroads because

[15] Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.

[16] For brevity, I refer to GMO's decision to rely on Crossroads as either a purchase by GMO's regulated Missouri utility from its unregulated corporate affiliate, or a transfer of interest from its unregulated corporate affiliate to the regulated utility. My understanding is that three entities are involved: (1) GMO's Missouri utility regulated by the MPSC, (2) the Clarksville Municipal utility, and (3) a GMO affiliate of the GMO utility not directly regulated by the MPSC.

[17] [redacted].

Crossroads cost is [redacted]. However, there are other factors that favor the Dogwood Bid that must be considered to determine which bid has the lowest total net costs to ratepayers. When these other factors are properly included they change the result – i.e., the Dogwood offer is preferred to the Crossroads offer.

Q. WHAT ARE THOSE FACTORS?

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

Section IV.2 Energy Cost Savings

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

A. The energy cost savings of Crossroads are very low compared to Dogwood because its heat rate is much higher than that of the Dogwood plant. The heat rate of the Crossroads peaking facility is [redacted][18]. In comparison, the heat rate of the Dogwood combined cycle is at full load (base block) [redacted][19] or [redacted] for both base block and duct firing. Therefore, failure to properly treat the energy production potential of plants (e.g., the failure to

[18] Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.
[19] Kelson Energy.

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. The lower the heat rate, the higher the efficiency. In fact, the thermal efficiency of the Dogwood unit's base block is [redacted] percent[20] versus [redacted] percent for Crossroads. Thus, Dogwood's base block is [redacted] 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] percent[21] higher than Dogwood's, it is [redacted] percent[22] higher than that of a new peaking unit. Even more importantly, the greater the gap between the performance parameters of Dogwood and Crossroads, the greater potential for evaluation errors to bias the results.

Q. WHY IS THE PLANT'S HEAT RATES IMPORTANT?

[20] [redacted].

[21] Base block

[22] Assuming 7FA combustion turbine technology

A. Plants with low heat rates (i.e., high thermal efficiency) can provide the owners of the plant 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. I have made two estimates of the cost savings and sales profits of Dogwood. The first estimate is that the Dogwood cost savings/sales profits are very large at [redacted] (see Schedule JLR-2).[23] This is based on the actual SPP EIS prices at the KCP&L node over the 12-month period of January 2008 – 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 (see Schedules JLR-4 and JLR-5). 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 was [redacted] percent. Note the same energy price hub was used for both plants. If the 2008 EIS energy

[23] Row labeled Average Net Energy Margin.

prices are assumed to be constant for the next 20 years in real terms, the resulting net present value of Dogwood electrical energy sales profits equals [redacted][24] which alone is [redacted] of the purchase price of the plant. This is important because the plant is also providing reliability or capacity value, and hence, this is available at a very low cost.

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. 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?

[24] I used the utility estimated real weighted average cost of capital as the discount rate; it is 3.85 percent. Weighted average after tax cost of capital for US electric utilities estimated by ICF and using financial assumptions from Rebuttal Testimony of Charles R. Hyneman, Missouri Public Service Commission, Case: ER-2009-0090.

A. The EIS market is a new market which started in January 2007 and is run by SPP. GMO is in the process of joining SPP[25]. 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 2007, there is a new and 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 2012. 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.

Q. WHAT IS THE SECOND ESTIMATE?

A. The second estimate is from 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

[25] KCP&L GMO (formerly GMO) is in the final stages of gaining approval to join SPP. On January 27th 2009, all parties involved in the case, including the Missouri Public Counsel and Missouri Public Service Commission Staff submitted an agreement to the state commission to conditionally approve on an interim basis KCP&L-GMO's participation in SPP, with an effective date no later than 90 days after final FERC approval. This interim period would last until September 30th 2013. The MPSC approved KCP&L-GMO's participation in SPP through 2013 with the order effective February 10, 2009. The date of FERC action remains uncertain at this time.

modeling projection, the levelized[26] energy profits are [redacted] in the historical EIS market based estimate, but still very large (see Schedule JLR-3). The net present value of energy profits for the next 20 years is [redacted] In this projection, the forecast average twenty year capacity factor for Dogwood is [redacted] percent.

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

A. No, I would expect them to be very small to de minimis in light of the plants' very high heat rate[27]. My modeling analysis corroborates this finding (see Schedule JLR-2 and 3).

Q. WHAT IS THE MAPS MODEL?

A. 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.

[26] Annuity level that provides the same present value.
[27] During system shortages, I assume both plants provide equal reliability except for losses as discussed later.

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 MAPS/IPM® MODELING ANALYSIS?

A. Key assumptions include 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 assumes that the wholesale power market is efficient and competitive. As a consequence, power plant operations, transmission flows and incremental investments are 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. 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). This assumes GMO is part of SPP[28]. In contrast, the Crossroads power plant which is located in Clarksdale, Mississippi is about 400 miles from GMO's load center. 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 assumed to become part of SPP[29]. This adds an additional transmission charge (i.e., Entergy's) which results in the transmission tariff charges of the Crossroads plant to be [redacted].[30]

Q. IN CONTRAST, WHAT ARE THE TRANSMISSION CHARGES OF THE DOGWOOD OPTION?

[28] The MPSC approved KCP&L-GMO's participation in SPP through 2013 with the order effective February 10, 2009. However, participation requires FERC action and the date of this action is uncertain.
[29] If GMO were to remain separate, three transmission tariff charges would be required for Crossroads (Entergy, SPP, and GMO Missouri) and only one for Dogwood (GMO Missouri) increasing Dogwood's cost advantage.
[30] Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.

A. Dogwood's transmission charge is estimated to be [redacted] – i.e., approximately [redacted] the Crossroads charge. This 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 and upgrade costs.

Q. WHAT ARE TRANSMISSION LOSSES?

A. Transmission losses are due to heat loss during transmission. Losses are roughly proportional to distance. The utility must make up losses by obtaining replacement power. This increases ratepayer costs.

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

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 HANDLED?

A. For each transmission transaction, a loss factor is provided. Entergy currently has a single 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, 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, my concern is that in fact ultimately, the loss factor for Dogwood could be negative albeit only slightly (i.e., its operation reduces losses) and the loss factor for Crossroads will be closer to 9 percent.

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

A. I conducted a preliminary load flow modeling analysis of the grid and estimated marginal losses for each plant.[31] I estimate the marginal losses for the movement within the SPP to be 6 percent for Crossroads and 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, marginal losses may be adopted by SPP and/or provide a rough indication of MW-mile losses.

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

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

A. The costs of the Entergy transmission upgrade cannot be finalized until the Crossroads plant is approved. The latest estimate was represented by GMO to be [redacted] million.[32] Near-term firm transmission may not be available regardless of cost. According to GMO, SPP has not finalized its cost estimate for transmission system upgrades. This is in spite of ten rounds of modeling studies.

Q. IS THIS A CONCERN?

A. Yes. This is because of the extremely long distance involved.

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

A. I have not been able to fully review their treatment. However, I have the following concerns based on the information available to me:

- They do not account for losses when considering the contribution of Crossroads to meeting reserve margin. Thus, rather than decreasing the [redacted] MW of Crossroads capacity by some incremental amount, e.g., 5 to 9 percent relative to units with much lower losses and accounting for the costs of purchasing additional capacity to make up for the losses, they ignore this issue. Even if SPP rules do not currently require such an adjustment, this is not correct; losses decrease the reliability contribution of the plant, and hence, the value of the capacity. Lower reliability is not

[32] Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.

acceptable for GMO ratepayers. Further, this cannot be expected to continue over the life of the Crossroads plant since it leads to the absurd, false, and dangerous conclusion that a plant in California is providing the same reliability benefit to GMO as one in the Kansas City area. Indeed, other RTOs have already formalized and improved the treatment of capacity and reliability. I have corrected this problem in my analysis, though the effects could be larger because I have not used the marginal loss estimate.

- I have not seen the loss factors for Crossroads or Dogwood used by GMO, if any. As noted, my own preliminary analysis is that, in fact, Dogwood's marginal loss factor is negative (i.e., it reduces losses) while the SPP marginal loss factor for Crossroads appears to be 6 percent. SPP is already closer to marginal losses than Entergy by virtue of its MW-mile system. When added to the Entergy loss factor, the total could be 9 percent. Thus, the costs could be understated by 9 percent.
- As noted, the transmission losses in the SPP system are currently being calculated based on a MW-mile loss methodology, while Entergy uses a single average loss rate. The marginal losses are the actual losses imposed on the system due to the power movement. Because the Crossroads power flow is over an extremely long distance compared to the very short distance for Dogwood, adoption by SPP of a fully marginal loss approach could have a disproportionate effect on the costs of the Crossroads option

making it even less favorable than shown in the above calculations which assume average losses. All U.S. RTO (Regional Transmission Organizations) power systems under FERC jurisdiction 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 MISO, PJM, ISO-NE, and NY-ISO. It is probable that SPP too will use marginal losses when the region moves to a Day-2 market in 2012 similar to the other RTO markets in the above regions. In situations where large amounts of power are being transmitted long distances, the use of a marginal loss calculation often widens the price spread between source and sink. For example, marginal losses were implemented in PJM on June 1, 2007. If you compare JCPL (in Eastern PJM) to APS (in the West), you see APS at a 7.5 percent average discount to JCPL in 2007 up until June 1st. Once Marginal Losses were implemented, this discount increased to about 16.5 percent for the rest of the year.[33] This distance is roughly comparable to the Crossroads to GMO distance.

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 reflect future transmission costs and demand levels. The extra

[33] PJM Historical Day Ahead Market Locational Marginal Prices, 2007.

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.

Section IV.4 Economic Analysis Of Dogwood And Crossroads

Q. IF ONE FACTORS IN ALL THE COSTS AND BENEFITS OF THE TWO OPTIONS, WHAT DO YOU CONCLUDE USING 2008 HISTORICAL DATA?

A. I conclude the Dogwood plant is preferred to the GMO Crossroads plant because it has much lower net costs to ratepayers (See Schedule JLR-2 attached hereto).

In fact, Dogwood costs appear to be [redacted]: approximately [redacted] for Dogwood versus [redacted] for Crossroads (see Schedule JLR-2).[34] This estimate is based on the SPP 2008 EIS historical market prices at KCP&L node. This [redacted] higher cost for the [redacted] MW of supply equals [redacted] million dollars per year and [redacted] million dollars on a present value basis at a real discount rate of 3.85 percent over 30 years. This higher cost would be paid by Missouri regulated ratepayers.

Q. DO YOU REACH A SIMILAR CONCLUSION USING ICF FORECASTS?

A. Yes.

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

A. Schedule JLR-3 shows the calculations using the ICF forecasts of energy sales profits for Dogwood. Using this approach, Dogwood costs appear to be [redacted] percent lower or nearly [redacted] for Dogwood versus approximately [redacted] for Crossroads. This [redacted] lower cost for the [redacted] MW of supply equals [redacted] million dollars per year and [redacted] million dollars on a present value basis at a discount rate of 3.85 percent over 30 years. This higher cost would be paid by Missouri regulated ratepayers.

Q. WHAT IS THE RANGE OF RATEPAYER SAVINGS ESTIMATED?

A. The range of savings estimated for substituting [redacted] MW of Dogwood supply in place of Crossroads supply equals on the high end [redacted] million dollars per year

[34] Net costs

and [redacted] million dollars on a present value basis at a real discount rate of 3.85 percent over 30 years. On the low end, the cost savings due to Dogwood for the [redacted] MW of supply equals [redacted] million dollars per year and [redacted] million dollars on a present value basis. This savings estimate does not include the benefits of higher reliability per kW from Dogwood due to its proximity to load, the benefits from greater use of Missouri resources, and the potential benefits for even higher transmission costs from Crossroads than I have included in my estimate.

Q. HOW DID THE DOGWOOD OFFER MR. JANSSEN MADE IN HIS TESTIMONY COMPARE TO THE 2007 DOGWOOD OFFER?

A. His offer was [redacted] (2009$) for [redacted][35] versus [redacted] (2008$) in the 2007 RFP. In real 2008 dollar terms Mr. Janssen's offer was [redacted]. Thus, it was [redacted] percent lower.

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

A. The cost advantage of Dogwood over Crossroads increases to [redacted] percent in the 2008 historical analysis, and [redacted] percent in the ICF forecast analysis (see Schedules 1 through 4). Thus, the $/kW-year advantage of Dogwood increases by about [redacted], or approximately [redacted] million dollars per year. Thus,

35 [redacted]

ratepayers' total incremental benefit from [redacted] MW of Dogwood instead of Crossroads is [redacted] million per year, and [redacted] million on a present value basis[36].

Q. WHAT IS THE TOTAL SAVINGS TO RATEPAYERS UNDER THE ROBERT JANSEN MARCH 2009 OFFER?

A. The range of savings estimated for substituting [redacted] MW of Dogwood supply in place of Crossroads supply equals on the high end approximately [redacted] million dollars per year and [redacted] million dollars on a present value basis at a real discount rate of 3.85 percent over 30 years. On the low end, cost savings from [redacted] MW of Dogwood supply equals approximately [redacted] million dollars per year and [redacted] million dollars on a present value basis. While Dogwood saves ratepayers approximately [redacted] million dollars per year in real 2008 dollars, this is equal to [redacted] million per year in nominal dollars on average between 2009 and 2038 at 2.5 percent general economy wide inflation. On a present value basis, Dogwood saves ratepayers approximately [redacted] million dollars. This savings is equal to [redacted]. To provide perspective on the size of the savings due to Dogwood per kW, the savings are more than the total capital cost of Crossroads (i.e., greater than [redacted]). This savings is so large because Dogwood is so much more efficient and has lower transmission costs. This estimate of savings does not include the benefits of higher reliability of Dogwood per kW due to the greater proximity to load, greater use of Missouri resources by GMO when choosing Dogwood, and additional potential

[36] Present value basis at a real discount rate of 3.85% percent over 30 years.

transmission costs beyond those I have included in my estimate, e.g., even higher transmission losses than I have estimated.

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 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 [redacted] tons CO_2 per MWh versus Dogwood which emits [redacted] tons per MWh.[37]

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.

[37] Tons per MWh calculated by multiplying the plant's heat rate by 117 lb/MMBtu, which is CO_2 content per Btu, then converting to tons per MWh.

SECTION V. CONCLUSIONS

Q. WHAT DO YOU RECOMMEND?

A. In light of this new information, I recommend that full consideration be given to using 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. Dogwood saves ratepayers approximately [redacted] million dollars per year in real 2008 dollars and [redacted] million per year in nominal dollars on average between 2009 and 2038. On a present value basis, Dogwood saves ratepayers approximately [redacted] million dollars. This savings is equal to [redacted]. This savings level is high; to provide perspective, the savings per kW is greater than the total capital cost of Crossroads at [redacted]. This estimate of savings does not include the benefits of higher reliability per kW due to Dogwood's proximity, the benefits of greater use of Missouri resources by GMO by choosing Dogwood rather than Crossroads, and additional potential transmission costs I have not included in my analysis such as even greater losses for Crossroads than I have estimated. This savings is so large because Dogwood is so much more efficient and has lower transmission costs. I also recommend that information explaining why the GMO 2007 results differ from mine be provided. In the alternative, at a minimum, the costs of Crossroads in excess of the costs of Dogwood should be disallowed and rates should be accordingly decreased. I also recommend that procedures be put in place to ensure full and proper consideration of alternatives. Lastly, the MPSC

should not approve inclusion of the Crossroads plant or its excess costs in GMO's rate base.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

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 more than 27 years of experience in the energy industry, with emphasis on electric power, generation and transmission. Mr. Rose directs ICF International's wholesale power Line of Business (including assistance to 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 3,000 employees, and has served on the Board of Directors of ICF International as the Management Shareholder Representative. Mr. Rose co-manages ICF's IPM© (Integrated Power Model). 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 on power issues. Mr. Rose has also served as lead negotiator, power plant appraiser, and he frequently provides expert testimony and litigation support in power-related court cases. 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.

Mr. Rose has publicly testified in scores of state and other legal proceedings, 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 on power, coal, and gas related issues, and managed large consulting projects. Mr. Rose has also appeared in TV interviews. Details are provided below.

PRESS INTERVIEWS

TV: "The Most With Allison Stewart," MSNBC, "Blackouts in NY and St. Louis & ongoing
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CNBC Wake-Up Call, August 15, 2003
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Power Markets Week

Magazine: Business Week
Power Economics
Costco Connection

Newspapers: Denver Post
Rocky Mountain News
Financial Times Energy
LA Times
Arkansas Democratic Gazette
Galveston Daily News
The Times-Picayune
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TESTIMONY

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IGCC Coal Plant, CPCN Rebuttal Testimony on behalf of Duke Energy Indiana, Cause No. 43114 before the Indiana Utility Regulatory Commission, May 2007.

Responsive Testimony, Causes No. PUD 200500516, 200600030, and 200700012 Consolidated, on behalf of Redbud Energy, before the Corporation Commission of the State of Oklahoma, May 2007.

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

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

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.

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.

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

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

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

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

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.

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.

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.

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

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

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

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.

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

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

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

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

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

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

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

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

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

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

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

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

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.

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

"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.

"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.

"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.

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

“Ohio Edison’s Sammis Power Plant BACT Remedy Case”, In the United States District Court of Ohio, Southern Division, March 8, 2004.

“Valuation of Power Contract,” January 2004, confidential arbitration.

“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.

“In the Supreme Court of British Columbia”, July 8, 2003. CONFIDENTIAL

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

“Affidavit in Support of the Debtors’ Motion”, NRG Bankruptcy, Revenues of a Fleet of Plants, May 14, 2003. CONFIDENTIAL

“IPP Power Purchase Agreement,” confidential arbitration, April 2003.

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

“Power Supply in the Pacific Northwest,” contract arbitration, December 5, 2002. CONFIDENTIAL

“Power Purchase Agreement Valuation”, Confidential Arbitration, October 2002.

“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.”

“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.”

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

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

“Analysis of an IGCC Coal Power Plant”, Minnesota state senate committees, January 22, 2002

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

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

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

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

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

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.

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

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

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

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

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

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

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

"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.

"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.

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

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

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

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

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

"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

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

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

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

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

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.

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

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

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

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

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.

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.

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

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.

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.

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

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

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.

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

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

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

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.

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

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

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

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

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

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.

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

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

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.

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.

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.

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

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.

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

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

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

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

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

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

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

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

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

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

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.

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

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

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

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.

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

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

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

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

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.

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.

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.

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.

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

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.

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.

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

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

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

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

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.

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

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.

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.

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

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.

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.

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

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

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.

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.

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

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

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.

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.

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

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.

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

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

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

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.

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.

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

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

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

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.

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

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., "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.

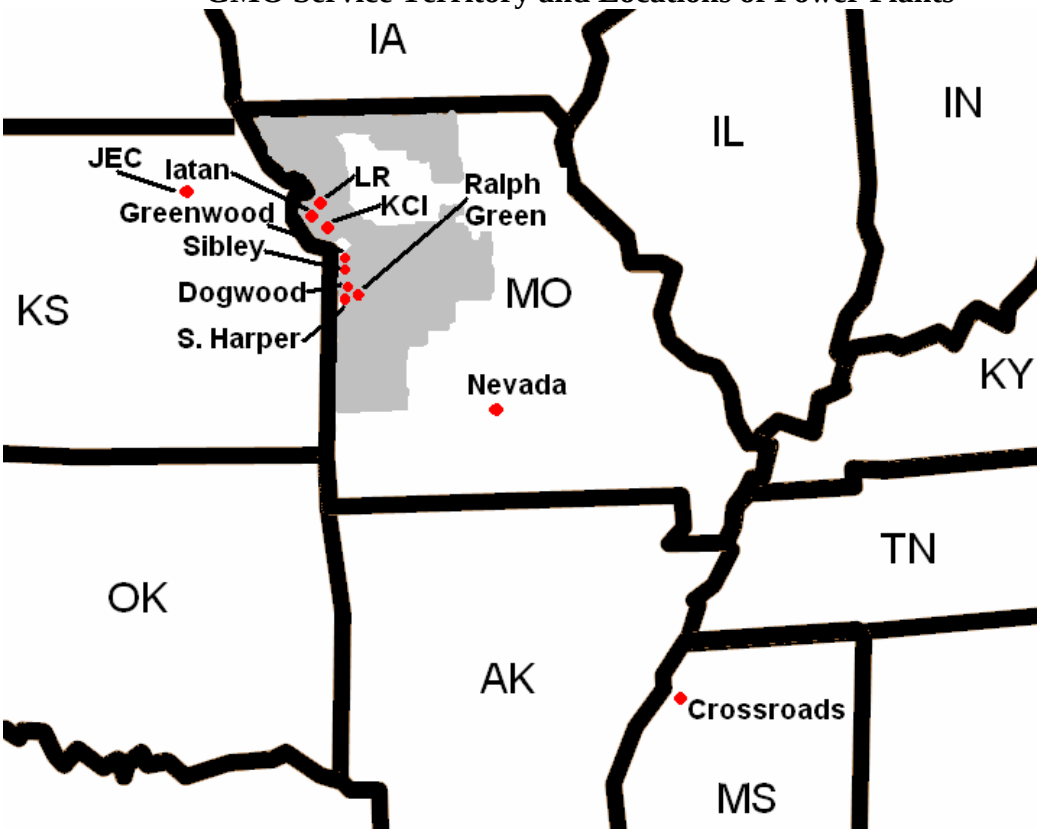
Booth, William and J.L. Rose, "FERC's Hourly System Lambda Data as Interim Bulk Power Price Information," *Public Utilities Fortnightly,* May 1, 1995.

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
JUDAH ROSE SURREBUTTAL TESTIMONY-REVENUE REQUIREMENT
DOGWOOD VERSUS CROSSROADS
EIS BASED NET ENERGY MARGIN – 2007 RFP RESPONSE
($/kW-YEAR)

	Unit	Crossroads	Dogwood[17]
Total Capacity	MW		
Bid Price	2008 $/kW		
Transmission Losses	%		
Net Capacity After Losses	MW		
Heat Rate	Btu/kWh		
Fixed O&M Charge	2008 $/kW-yr		
Transmission Charge	2008 $/kW-yr		
Variable O&M Charge	2008 $/MWh		
Capital Charge Rate	**%**		
Total Fixed Costs[11]	**2008 $/kW-yr**		
Average Delivered Gas Price[12]	2008 $/MMBtu		
Average On-Peak Energy Price[13,14]	2008$/MWh		
Average Off-Peak Energy Price[13,14]	2008$/MWh		
Average All Hours Energy Price[13,14]	2008$/MWh		
Capacity Factor[15,17]	%		
Realized Energy Price[16,17]	2008$/MWh		
Average Net Energy Margin[17,18]	**2008$/kW-yr**		
Fixed Costs - Energy Margin[19]	**2008$/kW-yr**		
Transmission Losses (Capacity) [20]	2008$/kW-yr		
Transmission Losses (Energy)[21]	2008$/kW-yr		
Net Costs[22]	**2008$/kW-yr**		

Notes:

1. Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.
2. [redacted].
3. [redacted] (Inflation rate from 4th quarter 2007 to 2008, based on BEA's implicit price deflator) Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.

4. [redacted].
5. Crossroads incurs a loss of 3% from SPP system losses and 3% from Entergy system losses, a total of 6%. Source of Entergy Loss: Entergy OASIS – http://oasis.e-terrasolutions.com/documents/EES/current_rates.htm. SPP loss is the approximate average of the Average Loss Factors in SPP's Open Access Transmission Tariff (OATT), Attachment M, Appendix 1, Issued April 2, 2007.
6. Dogwood incurs a loss of 1.92% from SPP losses. Dogwood is in SPP Zone 9: Aquila Networks – MPS, which incurs a loss of 1.92%. Source: SPP's OATT, Attachment M, Appendix 1, Issued April 2, 2007.
7. [redacted].
8. Source: Kelson Energy.
9. Dogwood plant is located in Aquila service territory. Source: SPP's OATT, issued April 2, 2007.
10. [redacted].
11. 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.
12. Source: Bloomberg. Average delivered gas price is based on daily gas price data at Mid-continent hub in 2008.
13. Source: SPP EIS. Energy prices are based on SPP EIS KCPL_LA Parent Node for 2008.
14. Peak definition is 5x16.
15. Capacity factor is based on plant's net energy margin in the EIS energy market. If the plant variable costs (heat rate*fuel cost + variable O&M) is less than energy price the plant is assumed to be running. Note the same energy price hub was used for both plants.
16. Realized energy price is the simple average of the energy price for the hours plant is running. Note the same energy price hub was used for both plants.
17. 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.
18. Average Net Energy Margin is the net of energy revenues from variable costs including fuel and variable O&M.
19. 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.
20. 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.
21. 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.
22. Net Costs is Average Net Energy Margin minus Losses.

SCHEDULE JLR-3
JUDAH ROSE SURREBUTTAL TESTIMONY-REVENUE REQUIREMENT
DOGWOOD VERSUS CROSSROADS
ICF FORECAST BASED NET ENERGY MARGIN – 2007 RFP RESPONSE
($/kW-YEAR)

	Unit	Crossroads	Dogwood[17]
Total Capacity	MW		
Bid Price	2008 $/kW		
Transmission Losses	%		
Net Capacity After Losses	MW		
Heat Rate	Btu/kWh		
Fixed O&M Charge	2008 $/kW-yr		
Transmission Charge	2008 $/kW-yr		
Variable O&M Charge	2008 $/MWh		
Capital Charge Rate	**%**		
Total Fixed Costs[11]	**2008 $/kW-yr**		
Average Delivered Gas Price[12]	2008 $/MMBtu		
Average On-Peak Energy Price[13,14]	2008$/MWh		
Average Off-Peak Energy Price[13,14]	2008$/MWh		
Average All Hours Energy Price[13,14]	2008$/MWh		
Capacity Factor[15,17]	%		
Realized Energy Price[16,17]	2008$/MWh		
CO_2 Allocation Revenue[18]	2008$/kW-yr		
Average Net Energy Margin[17,19]	**2008$/kW-yr**		
Fixed Costs - Energy Margin[20]	**2008$/kW-yr**		
Transmission Losses (Capacity) [21]	2008$/kW-yr		
Transmission Losses (Energy)[22]	2008$/kW-yr		
Net Costs[23]	**2008$/kW-yr**		

Notes:

1. Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.
2. .
3. (Inflation rate from 4th quarter 2007 to 2008, based on BEA's implicit price deflator). Source of : Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.

4. [redacted].
5. Crossroads incurs a loss of 3% from SPP system losses and 3% from Entergy system losses, a total of 6%. Source of Entergy Loss: Entergy OASIS – http://oasis.e-terrasolutions.com/documents/EES/current_rates.htm. SPP loss is the approximate average of the Average Loss Factors in SPP's Open Access Transmission Tariff (OATT), Attachment M, Appendix 1, Issued April 2, 2007.
6. Dogwood incurs a loss of 1.92% from SPP losses. Dogwood is in SPP Zone 9: Aquila Networks – MPS, which incurs a loss of 1.92%. Source: SPP's OATT, Attachment M, Appendix 1, Issued April 2, 2007.
7. [redacted].
8. Source: Kelson Energy.
9. Dogwood plant is located in Aquila service territory. Source: SPP's OATT, issued April 2, 2007.
10. [redacted].
11. 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.
12. Source: ICF. ICF ran GEMAPS model for the short-term: 2009-2011. ICF ran IPM model for the long-term: 2012-2028. IPM run years include 2013, 2018, 2023 and 2027. The years in between were calculated using geometric interpolation.
13. Source: ICF. ICF ran GEMAPS model for the short-term: 2009-2011. ICF ran IPM model for the long-term: 2012-2028. IPM run years include 2013, 2018, 2023 and 2027. The years in between were calculated using geometric interpolation.
14. Peak definition is 5x16.
15. For the purposes of this calculation, Capacity Factor is based on ICF production cost modeling forecast. Capacity factor is calculated by dividing actual annual generation by Capacity*8.76.
16. Realized energy price is the generation weighted average of the energy price for the hours plant is running. Note the same energy price hub was used for both plants.
17. 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.
18. CO_2 Allocation is the allocated tons of CO_2 times the CO_2 emissions cost. Allocated CO_2 is based on ICF internal analysis and the Bingaman-Specter Bill.
19. Average Net Energy Margin is the net of energy revenues from variable costs including fuel and variable O&M.
20. 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.
21. 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.
22. 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.
23. Net Costs is Average Net Energy Margin minus Losses.

SCHEDULE JLR-4
JUDAH ROSE SURREBUTTAL TESTIMONY-REVENUE REQUIREMENT
REVISED DOGWOOD OFFER VERSUS AQUILA CROSSROADS EIS BASED NET ENERGY MARGIN ($/kW-YEAR)

	Unit	Crossroads	Dogwood[17]
Total Capacity	MW		
Bid Price	2008 $/kW		
Transmission Losses	%		
Net Capacity After Losses	MW		
Heat Rate	Btu/kWh		
Fixed O&M Charge	2008 $/kW-yr		
Transmission Charge	2008 $/kW-yr		
Variable O&M Charge	2008 $/MWh		
Capital Charge Rate	**%**		
Total Fixed Costs[11]	**2008 $/kW-yr**		
Average Delivered Gas Price[12]	2008 $/MMBtu		
Average On-Peak Energy Price[13,14]	2008$/MWh		
Average Off-Peak Energy Price[13,14]	2008$/MWh		
Average All Hours Energy Price[13,14]	2008$/MWh		
Capacity Factor[15,17]	%		
Realized Energy Price[16,17]	2008$/MWh		
Average Net Energy Margin[17,18]	**2008$/kW-yr**		
Fixed Costs - Energy Margin[19]	**2008$/kW-yr**		
Transmission Losses (Capacity)[20]	2008$/kW-yr		
Transmission Losses (Energy)[21]	2008$/kW-yr		
Net Costs[22]	**2008$/kW-yr**		

Notes:

1. Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.
2.
3. (Inflation rate from 4th quarter 2007 to 2008, based on BEA's implicit price deflator) Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.
4.

[redacted].

5. Crossroads incurs a loss of 3% from SPP system losses and 3% from Entergy system losses, a total of 6%. Source of Entergy Loss: Entergy OASIS – http://oasis.e-terrasolutions.com/documents/EES/current_rates.htm. SPP loss is the approximate average of the Average Loss Factors in SPP's Open Access Transmission Tariff (OATT), Attachment M, Appendix 1, Issued April 2, 2007.
6. Dogwood incurs a loss of 1.92% from SPP losses. Dogwood is in SPP Zone 9: Aquila Networks – MPS, which incurs a loss of 1.92%. Source: SPP's OATT, Attachment M, Appendix 1, Issued April 2, 2007.
7. [redacted].
8. Source: Kelson Energy.
9. Dogwood plant is located in Aquila service territory. Source: SPP's OATT, issued April 2, 2007.
10. [redacted].
11. 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.
12. Source: Bloomberg. Average delivered gas price is based on daily gas price data at Mid-continent hub in 2008.
13. Source: SPP EIS. Energy prices are based on SPP EIS KCPL_LA Parent Node for 2008.
14. Peak definition is 5x16.
15. Capacity factor is based on plant's net energy margin in the EIS energy market. If the plant variable costs (heat rate*fuel cost + variable O&M) is less than energy price the plant is assumed to be running. Note the same energy price hub was used for both plants.
16. Realized energy price is the simple average of the energy price for the hours plant is running. Note the same energy price hub was used for both plants.
17. 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.
18. Average Net Energy Margin is the net of energy revenues from variable costs including fuel and variable O&M.
19. 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.
20. 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.
21. 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.
22. Net Costs is Average Net Energy Margin minus Losses.

SCHEDULE JLR-5
JUDAH ROSE DIRECT TESTIMONY-REVENUE REQUIREMENT
REVISED DOGWOOD OFFER VERSUS CROSSROADS
ICF FORECAST BASED NET ENERGY MARGIN ($/kW-YEAR)

	Unit	Crossroads	Dogwood[17]
Total Capacity	MW		
Bid Price	2008 $/kW		
Transmission Losses	%		
Net Capacity After Losses	MW		
Heat Rate	Btu/kWh		
Fixed O&M Charge	2008 $/kW-yr		
Transmission Charge	2008 $/kW-yr		
Variable O&M Charge	2008 $/MWh		
Capital Charge Rate	**%**		
Total Fixed Costs[11]	**2008 $/kW-yr**		
Average Delivered Gas Price[12]	2008 $/MMBtu		
Average On-Peak Energy Price[13,14]	2008$/MWh		
Average Off-Peak Energy Price[13,14]	2008$/MWh		
Average All Hours Energy Price[13,14]	2008$/MWh		
Capacity Factor[15,17]	%		
Realized Energy Price[16,17]	2008$/MWh		
CO_2 Allocation Revenue[18]	2008$/kW-yr		
Average Net Energy Margin[17,19]	**2008$/kW-yr**		
Fixed Costs - Energy Margin[20]	**2008$/kW-yr**		
Transmission Losses (Capacity) [21]	2008$/kW-yr		
Transmission Losses (Energy)[22]	2008$/kW-yr		
Net Costs[23]	**2008$/kW-yr**		

Notes:

1. Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.
2.
3. (Inflation rate from 4th quarter 2007 to 2008, based on BEA's implicit price deflator) Source: Missouri Public Service Commission, Case: ER-2009-0090, Data Request Set MPSC_20081022, Response to Question No: 128_1, RFP Bids Summary, Self Builds.
4.

[redacted].

5. Crossroads incurs a loss of 3% from SPP system losses and 3% from Entergy system losses, a total of 6%. Source of Entergy Loss: Entergy OASIS – http://oasis.e-terrasolutions.com/documents/EES/current_rates.htm. SPP loss is the approximate average of the Average Loss Factors in SPP's Open Access Transmission Tariff (OATT), Attachment M, Appendix 1, Issued April 2, 2007.
6. Dogwood incurs a loss of 1.92% from SPP losses. Dogwood is in SPP Zone 9: Aquila Networks – MPS, which incurs a loss of 1.92%. Source: SPP's OATT, Attachment M, Appendix 1, Issued April 2, 2007.
7. [redacted].
8. Source: Kelson Energy.
9. Dogwood plant is located in Aquila service territory. Source: SPP's OATT, issued April 2, 2007.
10. Source: Debt/Equity ratio, debt rate, equity rate and tax rate are based on Missouri Public Service Commission, Case: ER-2009-0090, Rebuttal Testimony of Charles R. Hyneman. Debt life (20 years), book life (30 years), depreciation schedule, inflation (2.5%) and other costs (1.8%) are based on ICF assumptions.
11. 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.
12. Source: ICF. ICF ran GEMAPS model for the short-term: 2009-2011. ICF ran IPM model for the long-term: 2012-2028. IPM run years include 2013, 2018, 2023 and 2027. The years in between were calculated using geometric interpolation.
13. Source: ICF. ICF ran GEMAPS model for the short-term: 2009-2011. ICF ran IPM model for the long-term: 2012-2028. IPM run years include 2013, 2018, 2023 and 2027. The years in between were calculated using geometric interpolation.
14. Peak definition is 5x16.
15. For the purposes of this calculation, Capacity Factor is based on ICF production cost modeling forecast. Capacity factor is calculated by dividing actual annual generation by Capacity*8.76.
16. Realized energy price is the generation weighted average of the energy price for the hours plant is running. Note the same energy price hub was used for both plants.
17. 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.
18. CO_2 Allocation is the allocated tons of CO_2 times the CO_2 emissions cost. Allocated CO_2 is based on ICF internal analysis and the Bingaman-Specter Bill.
19. Average Net Energy Margin is the net of energy revenues from variable costs including fuel and variable O&M.
20. 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.
21. 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.
22. 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.
23. Net Costs is Average Net Energy Margin minus Losses.