BEFORE THE CORPORATION COMMISSION

OF THE STATE OF KANSAS

IN THE MATTER OF THE PETITION	]	
OF KANSAS CITY POWER AND LIGHT	]	
COMPANY FOR DERMINATION OF THE	]	
RATEMAKING PRINCIPLES AND	]	KCC Docket No. 11-KCPE-581-PRE
TREATMENT THAT WILL APPLY TO THE	]	
RECOVERY IN RATES OF THE COST TO	]	
BE INCURRED BY KCP&L FOR CERTAIN	]	
ELECTRIC GENERATION FACILITIES	]	
UNDER K.S.A. 66-1239	]	

DIRECT TESTIMONY OF

KARL RICHARD PAVLOVIC

ON BEHALF OF

THE CITIZENS' UTILITY RATEPAYER BOARD

PUBLIC VERSION

June 3, 2011

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I. INTRODUCTION

Q. Please state your name and summarize your position and qualifications.

A. My name is Karl Richard Pavlovic. I am a Senior Consultant with Snavely King Majoros & O'Connor, Inc. ("Snavely King"), an economic consulting firm with offices at 8100 Professional Place, Suite 306, Landover, Maryland 06877. Appendix A to my testimony is a brief description of my qualifications and experience. Appendix B contains a list of the regulatory projects and proceedings in which I have participated and/or made an appearance. I am submitting this testimony on behalf of the Citizens' Utility Ratepayer Board ("CURB").

II. SUBJECT OF TESTIMONY

Q. What is the subject of your testimony?

A. My testimony addresses (1) the results of my review of the Resource Planning Analysis Kansas City Power & Light ("KCP&L") has submitted in support of its predetermination petition in this docket and (2) my recommendation about whether the investment in the La Cygne station for which KCP&L seeks predetermination has been shown to be prudent.

III. QUALIFICATIONS

Q. Please summarize your qualifications?

A. I received undergraduate and graduate degrees in Philosophy from Yale College and Purdue University. By education and professional experience I have expertise in formal and mathematical logic, statistics, economics, financial analysis, econometrics, and computer

modeling. I have gained knowledge in the areas of commercial and industrial operations in the energy, transportation, and telecommunications industries and familiar with a wide range of experimental and investigative methods in science and engineering. For over 25 years I have served as a consultant on the economics of regulated industries to clients in the public and private sectors. In that capacity I have been responsible for the design and execution of statistical, economic and financial analyses of discrete commercial operations, individual firms, and industry sectors for use by management and counsel in formulating and implementing commercial and litigation strategy. In a number of cases, these analyses have been the basis for testimony by me or others in regulatory and court proceedings. My consulting assignments in the energy field have included analyses of crude oil and petroleum product markets, the operations and costs of petroleum pipelines, investigations of the operating and plant investment costs and least cost planning of electric and natural gas systems, and all aspects of the restructuring of electric markets.

Q. Have you previously testified in regulatory proceedings?

A. Yes. I have submitted testimony to the Federal Communications Commission, the Federal Energy Regulatory Commission, and the Public Service Commission of the District of Columbia.

IV. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. On February 23, 2011 Kansas City Power & Light Company (KCP&L") applied to the Kansas Corporation Commission ("KCC") for predetermination of the ratemaking principles and treatment that would apply to recovery in rates of $1.23 billion of environmental retrofit expenditures at its La Cygne power plant. In its petition KCP&L specifically requests that KCC issue an order finding, *inter alia*:

- "that KCP&L's decision to construct and install the La Cygne Environmental Project, i.e., wet scrubber, baghouses, and a common chimney for both La Cygne Units 1 and 2, and an SCR, low-NOx burners and an OFA system for Unit 2, is reasonable, reliable, efficient and prudent" and
- "that 1.23 billion (total project, excluding AFUDC and property taxes) is a reasonable and prudent cost to construct and install the La Cygne Environmental Project."[1]

With regard to the questions of reasonableness, reliability, efficiency and prudence, KCP&L witness Giles asserts that the results of the Resource Planning Analysis described and presented in the Direct Testimony of KCP&L witness Crawford show that the La Cygne Environmental Project is the most cost-effective alternative to continue to meet KCP&L's customer's needs.[2] CURB retained Snavely King to evaluate the Resource Planning Analysis

1. Petition at 7.
2. Giles at 13.

and, if possible, verify that the analysis in fact demonstrates that the La Cygne Environmental Project is reasonable, reliable, efficient and prudent.

V. SUMMARY OF CONCLUSIONS

Q. What are your conclusions and recommendations?

A. I conclude that KCP&L's Resource Planning Analysis is not reasonable and fails to conclusively demonstrate that the proposed La Cygne Environmental Project is prudent. My recommendation is that the Commission find the La Cygne Environmental Project as presented in KCP&L's petition has not, at this time, been shown to be reasonable and prudent and that the Commission deny KCP&L's petition. Specifically, I find that:

- The analysis does not demonstrate conclusively that the La Cygne Environmental Project is the least cost method of meeting customer demand.
- The analysis does not consider the full range of possible dispositions of La Cygne Units 1 and 2 and is therefore incomplete.
- The analysis contains forecasts with an assumed fuel cost differential that is unreasonable and biased in favor of coal-fired generation and the La Cygne Environmental Project.
- The analysis uses an erroneous procedure to estimate scenario probabilities which, exacerbates the fuel cost differential bias.
- The analysis uses a discount rate that fails to take account of its customers cost of money.

- There is no statistically significant difference between the NPVRR's for the resource plans presented by KCP&L in support of its petition. Therefore, KCP&L is unable to conclusively demonstrate, and the Commission is unable to conclusively determine that the La Cygne Environmental Project is the least cost method of meeting customer demand.

VI. Resource Planning

Q. What is the purpose of a resource planning analysis?

A. Generically, utilities routinely conduct resource planning analyses in order to select an overall plan of operation for the utility for a future period that usually spans several decades. The analysis tries to take into account all aspects of the utility's operation and the future conditions that will impact that operation. The primary focus of the analysis is to determine the mix of generation resources that will meet the demand for electricity at the lowest cost to its customers.

Q. How does a resource planning analysis do this?

A. Conceptually, there are four steps or phases to a resource planning analysis: (1) development of forecasts of future demand and costs, (2) selection of the resource plans to be analyzed, (3) calculation of the costs of the resource plans selected, and (4) evaluation and selection of a resource plan. The engine of a resource planning analysis is a mathematical model that simulates the operation of the utility's generation, transmission and distribution facilities. Such models are referred to generically as "production cost" models. Forecasts of future

customer demand, facility unit operation and unit construction costs, financial parameters, and a schedule of generation sources, i.e., a resource plan, are input to the model. The model then optimizes the dispatch of the generation resources to meet the forecasted demand and calculates total costs as an overall revenue requirement for each of the future years covered in the analysis.

Q. Does KCP&L's Resource Planning Analysis follow the steps you outlined?

A. Yes. KCP&L witness Crawford characterizes the KCP&L analysis as consisting of two steps,[3] but the process he describes is consistent with the process I just described and the workpaper discovery I examined confirmed this fact.

Q. Are there guidelines or standards for conducting a resource planning analysis?

A. Some jurisdictions incorporate by statute or regulation guidelines or standards for the conduct of a resource planning analysis. Kansas does not.

Q. Did KCP&L follow any guidelines or standards in its analysis?

A. Yes. KCP&L witness Crawford states that KCP&L's analysis was conducted in conformance with Missouri ERP rules set forth in Missouri Rule CSR 240 Chapter 22.[4] My examination of workpaper discovery found that KCP&L's analysis was in fact conducted in conformance with the Missouri ERP rules.

Q. What production cost model did KCP&L use in its analysis?

A. KCP&L used a production cost model called MIDAS™ ("model").[5]

3. Crawford at 4-5.
4. Crawford at 4.
5. Crawford at 5.

Q. How did you conduct your evaluation of KCP&L's Resource Planning Analysis?

A. I submitted data requests requesting, *inter alia*, all workpapers showing the development of the forecast inputs to the model including the resource plans analyzed, the documentation for the model, and all input and output reports generated by the model. I also asked a number of specific questions regarding KCP&L's interpretation and evaluation of the model results. KCP&L was forthcoming in their responses to all of these data requests. I used this information and my expertise to assess each of the four steps of the analysis for reasonableness and bias.

A. Input and Procedural Flaws in KCPL's Resource Planning Analysis

Q. In your evaluation did you find any flaws in KCP&L's resource planning analysis?

A. Yes. I found several flaws in the inputs and procedures used by KCP&L.

Q. What did you determine with regard to KCP&L's development of the forecast inputs in its analysis?

A. There are six forecast inputs used in KCP&L's analysis: (1) technology costs, (2) price forecasts for coal, natural gas, CO_2, (3) energy efficiency and demand side management ("EE/DSM") forecasts, (4) construction cost forecasts, (5) demand/load forecasts, and (6) interest/finance forecasts. Because the procedure KCP&L uses to evaluate the model results for the resource plans requires a range of forecasts, KCP&L developed base, high and low forecasts for coal, natural gas, CO_2, construction costs, and load, and base and high forecasts for interest and finance. I found these forecast inputs in and of themselves to be reasonable.

However, as I discuss below, the price forecasts for natural gas and coal, when taken together, create bias in the analysis that favors the proposed retrofit of La Cygne.

Q. What did you determine with regard to KCP&L's development of the resource plans used in its analysis?

A. KCP&L developed and analyzed fourteen resource plans, which reflect various permutations of environmental retrofit of its coal-fired generation versus replacement with gas-fired combustion turbines or combined cycle units. In four of the resource plans, both La Cygne Units 1 and 2 are retired and replaced with gas-fired generation. In two of the resource plans, both La Cygne Units 1 and 2 are retired and replaced with coal-fired generation. In five of the resource plans, both La Cygne Units 1 and 2 are environmentally retrofitted. In two of the resource plans, La Cygne Unit 1 is retrofitted and Unit 2 is replaced with gas-fired generation. In two of the plans, La Cygne Unit 2 is retrofitted and Unit 1 is replaced with gas-fired generation.

Q. Did KCP&L leave out any important resource plans from the perspective of its petition for predetermination?

A. None of the fifteen resource plans considers either (1) retirement of La Cygne Units 1 and 2 and replacement with purchased power or (2) delayed implementation of the environmental retrofit of La Cygne Units 1 and 2. The issue posed by KCP&L's petition is not the disposition of its facilities taken as a whole, but rather the disposition of La Cygne Units 1 and 2 and which potential disposition is the reasonable, reliable, efficient and prudent

disposition. A reasonable and to-the-point analysis would have analyzed the full range of potential dispositions.

Q. Have you determined what the result of adding resource plans reflecting retirement and purchased power replacement and delayed implementation of the environmental retrofit would be?

A. No. I do not have access to the model and only by running those resource plans through the model can their impact be determined.

Q. What did you determine with regard to calculation of the annual revenue requirements associated with the selected resource plans?

A. I do not have access to the model and I have not been able to either examine or test the algorithms in the model. My examination of the model documentation and the model reports provided by KCP&L gives me no reason to doubt that the model is correctly calculating the annual revenue requirements of the resource plans analyzed. It does appear, however, that the model does not generate a report showing the inputs for a given resource plan. This is a serious deficiency, since it means that there is no means of confirming the inputs have been correctly entered into the model.

Q. How does the model evaluate the annual revenue requirements of the resource plans considered in the analysis?

A. The model evaluates the model results, i.e., the annual revenue requirement calculations, using a second separate module within the MIDAS model that is referred to in the MIDAS documentation as the "Decision Framework." The Decision Framework evaluates each of

the resource plans under a set of scenarios, referred to as the "Risk Tree." The Risk Tree represents a measure of the uncertainty of the forecasts for critical inputs – in KCP&L's analysis the critical inputs are the forecasts for coal prices, natural gas prices, CO_2 prices, construction costs, demand, and interest/finance parameters.[6] The Risk Tree used in KCP&L's Resource Planning Analysis is shown graphically in Confidential Schedule BLC2011-10 and consists of 64 scenarios. Each scenario represents a unique combination of the base, high and low forecasts for the forecast inputs with a probability assigned to each base, high and low input and a scenario probability calculated from the assigned input probabilities. In KCP&L's analysis, the model calculates the annual revenue requirement stream under each scenario for each resource plan. The 64 scenario driven revenue requirement streams are then each discounted to calculate a single net present value of the revenue requirement ("NPVRR") for each scenario. A single probability-weighted NPVRR for each resource plan is then calculated by applying the 64 scenario probabilities to the resource plan's 64 scenario NPVRRs. Finally, the resource plan that has the lowest probability-weighted NPVRR is selected as, in KCP&L witness Crawford's words, "[t]he plan that … shows the greatest potential of cost effectiveness over a wide range of future risks."[7]

Q. How does determining the plan with greatest potential for cost effectiveness over a wide range of future risks demonstrate that the La Cygne Environmental Project is the most cost effective alternative for La Cygne?

6. Crawford at 6.

A. In KCP&L's analysis, the resource plan with the lowest weighted NPVRR, KP05B "Retire Montrose – CC Replace," includes the Retrofits of La Cygne Units 1 and 2.[8] The resource plans that include the alternative dispositions of La Cygne (i.e., retrofit of one unit and replacement with a gas-fired units and replacement of both units with either natural gas or coal-fired units) all have higher NPVRRs.[9] On the assumption that all possible dispositions of La Cygne are represented in the resource plans considered in the analysis, the La Cygne retrofit's presence in the lowest NPVRR would demonstrate that the La Cygne Environmental Project is the most cost effective alternative to meet KCP&L's customer demand.

Q. Does KCP&L's Resource Planning Analysis in fact demonstrate that 1) resource plan KP05B shows the greatest potential of cost effectiveness, and 2) demonstrate that the La Cygne Environmental Project is the most cost effective alternative to meet KCP&L's customer demand?

A. No. Because the evaluation and selection process does not produce a reasonable and unbiased estimate of the total cost of the alternative resource plans considered in the analysis and because the analysis does not produce results that are distinguishable from each other, KCP&L's analysis does not demonstrate either of those two propositions.

Q. Why does the evaluation and selection process used by KCPL not produce reasonable and unbiased estimates of the total cost of the resource plans?

7. Crawford at 7.
8. See Exhibit 1 - KCP&L response to CURB 84.
9. Crawford, Schedule BLC2011-12.

A. The scenario probability weightings and the discount rate used by KCP&L are both unreasonable and biased.

Q. Explain why the probability weightings used by KCP&L are unreasonable and biased?

A. The goal of the probability weighting process is to produce an estimate of the most likely total cost of the resource plan by weighting the individual scenario NPVRRs by the probability of each scenario's occurrence. If the scenario probabilities reflect reasonable estimates of the probability of each scenario's occurrence, then the weighted NPVRR will represent a reasonable estimate of the likely total cost of resource plan. The probabilities assigned to the scenarios by KCP&L, however, are not reasonable.

Q. How did KCP&L select and assign probabilities to the scenarios?

A. KCP&L explained the process of assignment and selection in response to data requests from CURB and Staff.[10] KCP&L takes the six input forecasts I discussed earlier for which KCP&L developed base, high and low forecasts to be "critical uncertainties:" coal prices, natural gas prices, CO_2 prices, construction costs, demand, and interest/finance parameters. For the five uncertain inputs for which base, high and low forecasts were developed (i.e., coal prices, natural gas prices, CO_2 prices, construction costs, and load growth), KCP&L assigned independent probabilities of 50% to the base forecast and 25% to each of the high and low forecasts. For the uncertain input interest/finance, for which only base and high forecasts were developed, KCP&L assigned independent probabilities of 67% to the base forecast and 33% to the high forecast. KCP&L then compiled 486 possible scenarios

representing all possible permutations of the base, high and low forecast for the uncertain inputs and calculated the independent probability of each scenario by calculating the product of the probabilities, e.g., Coal high 25% times gas low 25 % times CO_2 base 50% times load growth base 50% times construction cost high 25% times interest/finance base 67% = 0.3906%. Next, KCP&L eliminated all possible scenarios with a calculated probability of less than 0.5%, but retained the two extreme scenarios (all high forecasts and all low and base interest/finance) which have probabilities of less than 0.5%. This produced a total of 64 scenarios. Finally, the probabilities of the 64 scenarios were normalized to produce a set of what KCP&L incorrectly refers to as 'conditional' probabilities summing to 100%.[11] (See Confidential Schedule BLC2011-10)

Q. Is this a reasonable procedure for developing and assigning probabilities to the 64 scenarios?

A. No. The principle error is the assumption that the probabilities of the individual critical factors in each scenario are independent. Only on that false assumption is it reasonable to calculate the product of the individual factor probabilities (base, high and low) as an estimate of the probability of the scenario that comprises those probabilities. The six critical uncertainties used by KCP&L are all economic factors or variables and, being linked via the regional and global economies, economic variables are rarely if ever truly independent of each other. KCP&L's procedure assumes, contrary to fact, complete independence.

10 See Exhibit 2 - KCP&L responses to CURB 68 and 73 and KCC 14.

11. KCP&L provided in response to CURB 68 a spreadsheet showing the development of these 'conditional' probabilities, "Q68 - CURB_20110331-68-Att-CURB_DR68_DecisionTree.xls."

Q. Please give an example.

A. Natural gas and coal prices are an excellent and thoroughly apposite example. It is true that, as KCP&L witness Blunk notes in his testimony, the short term fundamentals of natural gas are different from those of coal, resulting in natural gas prices being much more volatile than coal prices. There is over the medium to long-term, however, a market relationship between the demand and supply of both coal and natural gas. The mechanism of this relationship is fairly straightforward. The major portion of the demand for boiler coal and a large portion of the demand for natural gas come from the electric utility sector. Long-term demand for the two fuels is determined by individual utility decisions whether to construct coal-fired generators or gas-fired generators. Short-term to medium-term demand is determined by individual utility decisions to dispatch gas- or coal-fired generation. Both sets of decisions are made largely on the basis of the price differential between natural gas and coal. I say largely because, in those parts of the country that face air-quality challenges, the dispatch decision is also made on that basis, with coal generation at times cut-back and gas generation increased so as not to exceed governing air-quality standards. The common link between the price and demand for coal and the price and demand for natural gas in the utility sector acts as a check on the price differential between coal and natural gas. The Energy Information Administration ("EIA") of the Department of Energy forecasts delivered gas and coal prices using the National Energy Modeling System ("NEMS"), which models, inter alia, the demand links I just discussed. As can be seen in Exhibit 3 of my testimony, EIA's 2011 Reference Case forecasts of the delivered prices for natural gas and coal show that for 2011

the price for natural gas is 1.9 times the price for coal on an mMbtu basis. For 2020 the EIA forecast is for natural gas to be 2.2 times the price of coal, for 2030 2.7 times the price of coal, and for 2034 2.8 times the price of coal.

Q. How do the natural gas and coal forecasts KCP&L used in its Resource Planning Analysis compare with EIA's forecast?

A. As can be seen in Exhibit 3 of my testimony, KCP&L's base forecast for natural gas and coal assume natural gas prices that, compared to EIA's 1.9, 2.2, 2.7, and 2.9, are 2.3, 3.3, 4.3 and 4.7 times that of coal. KCP&L's high forecast for natural gas versus its base, high and low coal forecasts assume even higher differentials: approximately 4 times coal in 2020, approximately 6.5 times in 2030 and approximately 8 times in 2034.

Q. Why is there such a great discrepancy between KCP&L's base forecast and EIA's Reference Case forecast?

A. To develop its base case forecasts, KCP&L takes the simple average of forecasts from a number of sources. For natural gas, KCP&L uses forecasts from CERA, EVA, EIA, Global Insight and PIRA; for coal KCP&L uses forecasts from EVA, EIA, JD Energy and Wood McKenzie.[12] For natural gas only two out of five forecast sources overlap with the coal forecast sources and for coal only two out of four overlap with the natural gas forecast sources. Had the CERA, PIRA and Global Insight forecasts of coal and Wood McKenzie and JD Energy forecasts for natural gas been included in the development of the base

12. Blunk at 5.

forecasts for natural gas and coal the discrepancy between the KCP&L forecasts and the EIA forecasts would likely have been less.

Q. Why is this important?

A. It is important for two reasons. First, KCP&L's Resource Planning Analysis analyzes 14 resource plans that differ only with regard to the mix of coal fired and gas-fired generation. The simple test of comparing KCP&L's base forecast differentials to EIA's Reference Case forecast differentials indicates that KCP&L's forecasts are biased on a fuel cost basis in favor of coal-fired generation. Second, the way in which KCP&L developed the 64 scenarios further exacerbates this bias

Q. How does the way KCP&L developed the 64 scenarios further exacerbate the bias?

A. The market mechanism I discussed earlier acts to hold down the price differential between natural gas and coal. This means that the probability of price combinations that produce a low price differential should be higher than the probability of price combinations that produce high differentials – the probability distribution should be left skewed. However, KCP&L's procedure gives equal probability to the various combinations of natural gas and coal prices. For example, in Exhibit 4 to my testimony it can be seen that KCP&L gives equal probability, 0.6% , to both a high price differential (i.e., the case of high gas price and low coal price) and a low price differential (i.e., the case of a low gas price and high coal price). Because the high differential advantages coal and is less likely than a low differential, giving the high differential a weight equal to that of a low differential further advantages coal.

Q. Is the method of discounting revenues and expenses in KCP&L's NPVRR analysis also unreasonable and biased?

A. Yes. KCP&L's analysis is biased in two ways. The first way is inherent in the discounting procedure. Discounting is a standard way of reducing a stream of future expenses or revenues to a single number that can be used for purposes of comparison to a similarly discounted but different stream of future expenses or revenues in order to choose between the two alternative courses of action that produce the two streams. It is also commonly understood that discounting places a greater weight on near-term expenses and revenues over the more distant ones – that the procedure is biased against up-front expenses and biased towards up-front revenues. In the context of utility least-cost resource planning, this bias has traditionally been an issue in the comparison between construction of gas-fired plants and coal-fired plants. It has manifested itself in a bias in favor of gas-fired plants which have lower up-front costs than coal-fired plants. In this case, however, where new gas-fired construction is being compared to retrofit of existing coal-fired plants, the bias is in favor of coal-fired plants because the up-front costs of coal-retrofit are less than the up-front costs of new gas-fired construction.

Q. What is the second way in which KCP&L's methodology for discounting revenues and expenses in its analysis biased?

A. The actual discount rate used in the analysis determines the magnitude of the inherent bias in discounting that I just discussed. A lower discount rate results in a lower the bias towards present dollars because future dollars are discounted less and therefore represent a higher

proportion of the total dollars. A higher discount rate results in a higher bias towards present dollars because the future dollars are discounted more and therefore represent a smaller proportion of the total. In this case, KCPL uses a low discount rate which magnifies the fuel cost bias which is greatest in the later years of the forecast period.

Q. What discount rate did KCP&L use in its analysis?

A. KCP&L used a discount rate of ***Begin CONFIDENTIAL [redacted] End CONFIDENTIAL***. This is a low discount rate of an order of magnitude appropriate for the cost of money of a large corporate enterprise like KCP&L. In its analysis, KCP&L made the following cost of capital assumptions in its base interest/finance forecast: preferred stock dividend yield – ***Begin CONFIDENTIAL [redacted] End CONFIDENTIAL***, short-term debt interest rate – ***Begin CONFIDENTIAL [redacted] End CONFIDENTIAL***, and long-term debt interest rate – ***Begin CONFIDENTIAL [redacted] End CONFIDENTIAL***. In its high interest/finance forecast it assumed short term debt at ***Begin CONFIDENTIAL [redacted] End CONFIDENTIAL*** and long-term debt at ***Begin CONFIDENTIAL [redacted] End CONFIDENTIAL***.[13]

Q. Should KCP&L have used a higher discount rate?

A. Yes. The discount rate bias is in fact a virtue when the discount rate accurately estimates the cost of money of the decision maker. From an economic standpoint, future dollars are worth less and should be discounted using the cost of money of the person on whose behalf the comparison and decision is being made. As Mr. Majoros explains in his testimony, the cost

of money for most of KCP&L's customers is much higher than the cost of money for KCP&L as a corporate entity. Because the cost of the La Cygne Environmental Project will be borne by KCP&L's customers, in its discounting of the scenario NPVRRs, KCP&L should have used a discount rate reflecting its customers' higher cost of money.

Q. What would be the impact of using a higher discount rate reflecting KCP&L's customers' higher cost of money?

A. The NPVRR differential between the resource plans that include retrofit of La Cygne and the resource plans that include gas replacement of one or both of La Cygne Units 1 and 2 would decrease. In effect, using a higher customer based discount rate would counteract some of the price-differential, probability-weighting and discounting bias inherent in the KCP&L methodology, as I discussed above. The differentials could even reverse.

Q. Did you evaluate whether using a higher discount rate does in fact reverse the NRVRR differential between certain resource plans?

A. Yes. In Exhibit 6 to my testimony, I applied a discount rate of 25% to all the scenarios of all the resource plans in KCP&L's analysis and found that it did reverse the NPVRR differential between resource plan KP05B and resource plans KP03A – "Retire L2 – CT Replace" and KP03B – "Retire L2 – CC Replace," which became the lowest and second lowest NPVRR plans. Without the natural gas/coal price differential bias, the reversal would occur at a significantly lower discount rate.

13. See Exhibit 5 – KCP&L response to CURB 80.

Q. What is your conclusion regarding KCP&L's Resource Planning Analysis?

A. Based on the input and procedural flaws described above I conclude that KCP&L's Resource Planning Analysis is not reasonable and fails to conclusively demonstrate that the proposed La Cygne Environmental Project is prudent.

B. Output Flaws in KCPL's Resource Planning Analysis

Q. Does KPC&L's Resource Planning Analysis produce plans that are quantitatively indistinguishable from each other?

A. Yes. If you examine KCP&L's summary of the analysis results,[14] which I have sorted on rank and included as Exhibit 7 to my testimony, you can see that the range of the results for the 15 resource plans is quite narrow - 1,100 compared to a mean of 25,120 – 4%. If resource plan KP06C – "Retire All – Coal Replace" is eliminated the range drops to 592 compared to a mean of 25,058 – 2%. If the plans considered are further restricted to the 11 resource plans that include only the cases that involve retrofit and/or gas-fired replacement of either one or both La Cygne units, the range drops further to 216 compared to a mean of 24,984 – less than 1%. The last set of results for just those cases that consider alternative dispositions of La Cygne Units 1 and 2 are intuitively indistinguishable. The underlying distributions of the 64 scenario NPVRRs are also intuitively indistinguishable from each other. The graph in Exhibit 8 to my testimony allows a visual comparison of the weighted NPVRRs and scenario NPVRR distributions for the 15 resource plans.

Q. Did you statistically test whether there is a significant difference between the NPVRR's of the resource plans presented by KCP&L in support of its petition?

A. For the 15 resource plans I performed a simple standard statistical test of significance. The results of the test, shown in Exhibit 9, indicate that there is no statistically significant difference between the NPVRRs for the 11 resource plans that cover the alternative dispositions of La Cygne Units 1 and 2 – retrofit versus gas-fired replacement of one or both units.

Q. Why is this fact important?

A. It means that with the input and procedural flaws and analysis biases I previously discussed and outputs that are statistically indistinguishable, KCP&L is simply unable to demonstrate, contrary to KCP&L witness Crawford's assertions, that when compared to gas-fired replacement, retrofitting the coal units is the least cost option for La Cygne.

Q. What is your conclusion regarding the output of KCP&L's Resource Planning Analysis?

A. KCP&L is unable to conclusively demonstrate, and the Commission is unable to conclusively determine that the La Cygne Environmental Project is the least cost method of meeting customer demand.

Q. Is it possible to revise the analysis to avoid this indeterminate result?

A. It is possible that the natural gas and coal price forecasts combined into a set of scenarios with correctly computed conditional probabilities and an appropriate discount rate would

14. Crawford, Schedule BLC2011-12

produce results capable of distinguishing among the alternative dispositions for La Cygne Units 1 and 2. I think it unlikely, but only correcting the analysis would definitively answer the question.

VII. Prudence

Q. In addressing the issue of prudence are you rendering a legal opinion?

A. No. Rendering a legal opinion is outside my competence and expertise. The governing statute on the issue of prudence is K.S.A. 66-128g. Subsection (a), which I reproduce below in its entirety, lays out 12 factors to be considered by the Commission in determining prudence. My testimony will address the subset of those factors that I am competent to address.

> **66-128g:**
> (a) The factors which shall be considered by the commission in making the determination of "prudence" or lack thereof in determining the reasonable value of electric generating property, as contemplated by this act shall include without limitation the following:
> (1) A comparison of the existing rates of the utility with rates that would result if the entire cost of the facility were included in the rate base for that facility;
> (2) a comparison of the rates of any other utility in the state which has no ownership interest in the facility under consideration with the rates that would result if the entire cost of the facility were included in the rate base;
> (3) a comparison of the final cost of the facility under consideration to the final cost of other facilities constructed within a reasonable time before or after construction of the facility under consideration;
> (4) a comparison of the original cost estimates made by the owners of the facility under consideration with the final cost of such facility;
> (5) the ability of the owners of the facility under consideration to sell on the competitive wholesale or other market electrical power generated

by such facility if the rates for such power were determined by inclusion of the entire cost of the facility in the rate base;

(6) a comparison of any overruns in the construction cost of the facility under consideration with any cost overruns of any other electric generating facility constructed within a reasonable time before or after construction of the facility under consideration;

(7) whether the utility having an ownership interest in the facility being considered has provided a method to ensure that the cost of any decommissioning, any waste disposal or any cost of clean up of any incident in construction or operation of such facility is to be paid by the utility;

(8) inappropriate or poor management decisions in construction or operation of the facility being considered;

(9) whether inclusion of all or any part of the cost of construction of the facility under consideration, and the resulting rates of the utility therefrom, would have an adverse economic impact upon the people of Kansas;

(10) whether the utility acted in the general public interest in management decisions in the acquisition, construction or operation of the facility;

(11) whether the utility accepted risks in the construction of the facility which were inappropriate to the general public interest to Kansas;

(12) any other fact, factor or relationship which may indicate prudence or lack thereof as that term is commonly used.

Q. Which of these 12 factors will you address?

A. As I read the list, all of the factors are post facto and assume explicitly or implicitly that construction of the facilities under consideration is complete, the final costs are known and the complete record of construction and placing into service of the facilities can be scrutinized by the Commission and interested parties. That is not the case here. I believe that factors 8, 9, 10, and 11 can be generalized to this case by applying them to the Resource Planning Analysis that KCP&L offers in support of its petition for predetermination. My testimony addresses those factors in the context of the Resource Planning Analysis.

Q. What do you conclude under your generalization of Factors 8, 9, 10 and 11?

A. As I explained above, the analysis (1) does not consider the full range of possible dispositions of La Cygne Units 1 and 2, (2) contains an assumed fuel cost differential that KCP&L did not test for reasonableness and bias, (3) uses an erroneous procedure to estimate scenario probabilities that exacerbates the fuel cost differential bias , (4) uses a discount rate that fails to take account of its customers cost of money and (5) does not in the final analysis conclusively demonstrate that the La Cygne Environmental Project is the least cost method of meeting customer demand. In my opinion, these facts are indicative of inappropriate and poor management decisions and a failure to consider the public interest, and general imprudence with regard to the La Cygne Environmental Project for which KCP&L is seeking predetermination.

Q. Does this conclude your testimony?

A. Yes.

VERIFICATION

STATE OF MARYLAND)

COUNTY OF PRINCE GEORGES) ss:

Karl Richard Pavlovic, being duly sworn upon his oath, deposes and states that he is a consultant for the Citizens' Utility Ratepayer Board, that he has read the above and foregoing document, and, upon information and belief, states that the matters therein appearing are true and correct.

Karl Richard Pavlovic.

SUBSCRIBED AND SWORN to before me this 3rd day of June, 2011.

Notary Public

My Commission expires:

DONNA ANN JEFFRIES
NOTARY PUBLIC DISTRICT OF COLUMBIA
My Commission Expires July 14, 2015

APPENDIX A

Work Experience

Karl Richard Pavlovic

Experience

Snavely King Majoros O'Connor & Bedell, Inc.

Senior Consultant (2010-Present)

Dr. Pavlovic provides clients with economic and policy analyses of commercial operations and expert testimony in support of litigation, negotiation and strategic planning. His analyses and testimony are distinguished by systematic articulation and testing of assumptions, thorough evaluation of data, innovative application of statistical tools and economic principles, and clarity and precision of presentation.

Dr. Pavlovic has provided expert testimony on the operations, costs and revenues of gas and electric utilities, the impacts of restructuring wholesale and retail electric markets, the operation and competitiveness of petroleum and electric markets, the market valuation of crude oil, and electric and gas reliability.

Major projects directed by Dr. Pavlovic have included: analytical assistance to counsel and testimony on all aspects of the restructuring of wholesale and retail electric markets in the Eastern Interconnection; analysis of petroleum markets, expert testimony, and coordination of technical testimony in the Trans Alaska Pipeline quality bank litigation; Independent Technical Review of the economic models used by the US Army Corps of Engineers for the Ohio River System Investment Plan; assistance to a major independent telephone company in the formulation and implementation of corporate strategic plans, applications for long-distance authority, and settlement negotiations with major domestic and foreign carriers.

By education and professional experience Dr. Pavlovic has expertise in formal and mathematical logic, statistics, economics, financial analysis, econometrics, and computer modeling. With over 25 years experience as a consultant and expert witness, Dr. Pavlovic has in-depth knowledge of commercial and industrial operations in the energy, transportation, and telecommunications industries and is familiar with a wide range of experimental and investigative methods in science and engineering.

FTI Consulting, Inc., *Director (2008-2010)*

Responsible for consulting engagements in the energy industry.

DOXA, Inc., *President (1994-2008)*

Management and Direction of small consulting firm; responsible for the design and execution of statistical, economic and financial analyses of discrete commercial operations, individual firms, and industry sectors for use by management and counsel in formulating and implementing commercial and litigation strategy.

Snavely, King & Associates, Inc.

Vice President (1988-1994), Consultant (1983-1987)

Responsible for economic analysis in civil court and regulatory proceedings, and consulting assignments in corporate strategic planning including investigations of rate structures, cost of service studies, market identification, and economic projections.

University of Florida, Gainesville FL

Associate Director, Center for Applied Philosopy (1982-1983)

Responsible for implementation and management of daily operations of the Center. Major projects included reorganization of finances of the Humanities and Agriculture Project, assembly and direction of a multi-disciplinary team in design of the Caribbean Inter-Sector Forecasting Project, and conception and direction of the Applied Philosophy Feasibility and Implementation Project.

Research Associate, Civil Engineering (1980-1983)

Responsibile for direction of the Caribbean Agricultural Transportation Study, design of the planning component of the Honduran Water Port Project, and redesign and completion of the Florida Domestic and Export Agricultural Transportation Projects.

Associate Professor, Philosophy (1978-1983)

Responsible for undergraduate and graduate courses in scientific methodology, epistemology, hermeneutics and ethics and professionalism as well as research on the social context and impact of scientific and technological growth.

Education

Purdue University – Ph.D and MA in Philosophy
Karl-Ruprecht Universität, Heidelberg, Germany
Yale University – BA in Philosophy

Dr. Pavlovic was an active member of the Board of Trustees of the Legal Aid Society of the District of Columbia from 1994 to 2008 and served as Treasurer from 1999 to 2008.

APPENDIX B

Projects and Appearances

Karl Richard Pavlovic

PROJECTS AND APPEARANCES

Impact Evaluation Study of the District of Columbia Department of the Environment's Two-Year Pilot Reliable Energy Trust Fund Programs (2007 - 2008)
D.C. Public Service Commission Formal Case No. 945

In the Matter of the Application of the Potomac Electric Power Company for Authority to Increase Existing Retail Rates and Charges for Electric Distribution Service (2007 - 2008)
D.C. Public Service Commission Formal Case No. 1053

In the Matter of the Investigation of Interconnection Standards in the District of Columbia (2006 -)
D.C. Public Service Commission Formal Case No. 1050

In the Matter of the Investigation into the Omnibus Utility Emergency Amendment Act of 2005, Specifically Regarding the Establishment of the Natural Gas Trust Fund Programs (2006 -)
D.C. Public Service Commission Formal Case No. 1037

Emergency Application of the Potomac Electric Power Company For A Certificate of Public Convenience and Necessity To Construct Two 69kV Overhead Transmission Lines and Notice of The Proposed Construction of Two Underground 230kV Transmission Lines (2005 - 2006)
D.C. Public Service Commission Formal Case No. 1044

Investigation Into Potomac Electric Power Company's Distribution Service Rates (2003 - 2005)
D.C. Public Service Commission Formal Case No. 1032

Investigation of the Feasibility of Removing Pre-Existing Aboveground Utility Lines and Cables and Relocating Them Underground in the District of Columbia (2003 -)
D.C. Public Service Commission Formal Case No. 1026

Guadalupe L. Garcia v. Ann Veneman, Secretary, US Department of Agriculture (2003 -)
U.S. District Court for the District of Columbia

Mirant Corporation, et al., Debtors (2003 - 2005)
U.S. District Court for the Northern District of Texas

Complaint: Office of the People's Counsel of the District of Columbia v. Mirant Americas Energy Marketing, L.P. (2003)
Federal Energy Regulatory Commission

Investigation into the Effect of the Bankruptcy of Mirant Corporation on Retail Electric Service in the District of Columbia (2003 - 2005)
D.C. Public Service Commission Formal Case No. 1023

Development and Designation of Standard Offer Service in the District of Columbia (2003 - 2007)
D.C. Public Service Commission Formal Case No. 1017

Independent Review Panel, Project Management Plan, Ohio River Main Stem Study (2003 - 2005)
U.S. Army Corps of Engineers

Investigation into Affiliated Activities, Promotional Practices, and Codes of Conduct of Regulated Gas and Electric Companies (2002 - 2004)
D.C. Public Service Commission Formal Case No. 1009

Independent Review Panel, Ohio River Main Stem Study, System Investment Plan (2001)

Karl Richard Pavlovic

U.S. Army Corps of Engineers

Joint Application of PEPCO and New RC, Inc. for Authorization and Approval of Merger Transaction (2001 - 2002)
D.C. Public Service Commission Formal Case No. 1002

Investigation into Explosions Occurring in Underground Distribution Systems of PEPCO (2001 - 2006)
D.C. Public Service Commission Formal Case No. 991

Trans Alaska Pipeline System 1996 Quality Bank Complaint Remand (2000 -)
Federal Energy Regulatory Commission

Ohio River Main Stem Study, Independent Technical Review (1999)
U.S. Army Corps of Engineers

Investigation of January 1999 Electric Service Interruption (1999 - 2004)
D.C. Public Service Commission Formal Case No. 982

Trans Alaska Pipeline System 1996 Quality Bank Complaint Appeal (1998 -2000)
U.S. Court of Appeals for the District of Columbia

Electric Retail Competition Investigation (1997 -)
D.C. Public Service Commission Formal Case No. 945

Trans Alaska Pipeline System 1996 Quality Bank Complaint (1996 - 1998)
Federal Energy Regulatory Commission

Trans Alaska Pipeline System 1989 Quality Bank Complaint Remand (1995 - 1998)
Federal Energy Regulatory Commission

Prudhoe Bay Unit Operating Agreement Hearings (1995)
Alaska Oil and Gas Conservation Commission

Prudhoe Bay Unit Natural Gas Liquids Hearings (1995)
Alaska Department of Natural Resources/Department of Revenue (1995)

Potomac Electric Power Co. 3rd Integrated Least-Cost Plan (1995)
D.C. Public Service Commission Formal Case No. 917, Phase II

All American Pipeline Quality Bank Complaint (1994-1995)
Federal Energy Regulatory Commission

Trans Alaska Pipeline System 1989 Quality Bank Complaint Appeal (1994-1995)
U.S. Court of Appeals for the District of Columbia

Investigation of the January 1994 Energy Crisis (1994)
D.C. Public Service Commission Formal Case No. 936

Washington Gas Light Co. Gas Rate Case (1994)
D.C. Public Service Commission Formal Case No. 934

Washington Gas Light Co. 3rd Integrated Least-Cost Plan (1994)
D.C. Public Service Commission Formal Case No. 921

Potomac Electric Power Co. Electric Rate Case (1993)
D.C. Public Service Commission Formal Case No. 929

Karl Richard Pavlovic

Washington Gas Light Co. Gas Rate Case (1993)
D.C. Public Service Commission Formal Case No. 922

Trans Alaska Pipeline System Pumpability Complaint (1992)
Federal Energy Regulatory Commission

Potomac Electric Power Co. 2nd Integrated Least-Cost Plan (1992)
D.C. Public Service Commission Formal Case No. 917

Potomac Electric Power Co. Electric Rate Case (1992)
D.C. Public Service Commission Formal Case No. 912

Potomac Electric Power Co. Fuel Clause Audit and Productivity Improvement Plan (1991- 2008)
D.C. Public Service Commission Formal Case No. 766

Potomac Electric Power Co. Electric Rate Case (1991)
D.C. Public Service Commission Formal Case No. 905

Anchorage Telephone Utility (1991-1995)
Federal Communications Commission

Trans Alaska Pipeline System 1989 Quality Bank Complaint (1990-1993)
Federal Energy Regulatory Commission

Telefonica Larga Distancia de Puerto Rico International Service Tariffs (1990-1992)
Federal Communications Commission

Southern Bell Intrastate Depreciation Study (1989-1990)
Florida Public Service Commission

Lake Erie Iron Ore Antitrust Litigation: Erie-Western Pennsylvania Port Authority v. Penn Central et al. (1988-1989)
U.S. District Court for the Eastern District of Pennsylvania

Unimar International Chapter 11 Reorganization (1988)
U.S. Bankruptcy Court for the Western District of Washington at Seattle

National Forest Road Cost Analysis System (1986)
U.S. Department of Agriculture, Forest Service

Puerto Rico Telephone Company Long Distance Facilities and Service Applications (1985-1990)
Federal Communications Commission

All American Cable and Radio/ AT&T de Puerto Rico International Rate Complaint (1985-1990)
Federal Communications Commission

Caribbean Telecommunications Facilities Planning Docket (1984-1990)
Federal Communications Commission

APPENDIX C

****Confidential Not Provided in Public Version****

Referenced Data Requests
and
Supporting Schedules

Exhibit 1
CURB-84 Confidential

Exhibit 2
CURB-68 Confidential
CURB-73 Confidential
KCC-14 Confidential

Exhibit 3

Exhibit 4

Exhibit 5
CURB-80 Confidential

Exhibit 6

Exhibit 7

Exhibit 8

Exhibit 9

CERTIFICATE OF SERVICE

11-KCPE-581-PRE

I, the undersigned, hereby certify that a true and correct copy of the above and foregoing document was placed in the United States mail, postage prepaid, electronic service, or hand-delivered this 3rd day of June, 2011, to the following:

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