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Missouri Public Service Commission

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO.: ER-2016-0285

DIRECT TESTIMONY

OF

WM. EDWARD BLUNK

ON BEHALF OF

KANSAS CITY POWER & LIGHT COMPANY

Kansas City, Missouri
July 2016

"[redacted]**" Designates "Highly Confidential" Information Has Been Removed.**
Certain Schedules Attached To This Testimony Designated "Highly Confidential" Have Been Removed Pursuant To 4 CSR 240-2.135.

KCP&L Exhibit No. 103NP
Date 2.8.17 Reporter LB
File No. ER-2016-0285

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DIRECT TESTIMONY

OF

WM. EDWARD BLUNK

Case No. ER-2016-0285

Q: Please state your name and business address.

A: My name is Wm. Edward Blunk. My business address is 1200 Main Street, Kansas City, Missouri 64105.

Q: By whom and in what capacity are you employed?

A: I am employed by Kansas City Power & Light Company ("KCP&L" or the Company) as Generation Planning Manager.

Q: On whose behalf are you testifying?

A: I am testifying on behalf of KCP&L.

Q: What are your responsibilities?

A: My primary responsibilities include facilitating the development and implementation of strategies for managing procurement and market related risks associated with fuel or energy.

Q: Please describe your education, experience and employment history.

A: In 1978, I was awarded the degree of Bachelor of Science in Agriculture cum laude by the University of Missouri at Columbia, where I was an Honors Scholar in Agricultural Economics. In 1980, I was awarded the Master of Business Administration degree by the University of Missouri at Columbia. Since then I have completed additional graduate coursework in forecasting theory and applications at the University of Missouri in Kansas

City. In addition to those academic credentials, the Global Association of Risk Professionals has certified me as an Energy Risk Professional.

Before graduating from the University of Missouri, I joined the John Deere Company from 1977 through 1981 and performed various marketing, marketing research, and dealer management tasks. In 1981, I joined KCP&L as Transportation/Special Projects Analyst. My responsibilities included fuel price forecasting, fuel planning and other analyses relevant to negotiation and/or litigation with railroads and coal companies. I was promoted to the position of Supervisor, Fuel Planning in 1984. In 2007, my position was upgraded to Manager, Fuel Planning. In 2009 my position was changed to Supply Planning Manager. In 2013, it was changed to Generation Planning Manager. While in these positions I have been responsible for developing risk management and hedging programs.

Q: Have you previously testified in a proceeding at the Missouri Public Service Commission ("MPSC" or "Commission") or before any other utility regulatory agency?

A: I have previously testified before both the MPSC and the Kansas Corporation Commission in multiple cases on multiple issues including fuel prices, forecast prices for fuel and emission allowances, strategies for managing fuel price risk, hedging, fuel-related costs, fuel inventory, and the management of emission allowances.

Q: On what subjects will you be testifying?

A: I will be testifying on fuel related issues. My testimony serves two purposes. First, I am supporting the fuel prices, emission prices, and certain fuel and emission related costs, including fuel inventory, used to develop the Company's Cost of Service ("COS") calculations. Second, I will address certain fuel and emission allowance related issues as required when a company seeks to continue a fuel adjustment clause ("FAC").

FUEL IN COST OF SERVICE

Q: What is the purpose of this portion of your testimony?

A: The purpose of this part of my testimony is to explain how prices for fuel and fuel-related commodities were forecast to project fuel expense for the COS included in the Company's Direct filing and how we plan to true-up those costs later in this proceeding.

A. Fuel Price Forecast

Q: What fuel prices did KCP&L use to develop its COS?

A: KCP&L used coal and oil prices projected for December 2016. We used SNL's spot natural gas index prices for January through March 2016 and projected prices, as described below, for April 2016 through December 2016. Please refer to the Direct Testimony of Company witnesses Ronald A. Klote and Darrin R. Ives regarding the test year and expected true-up period.

Q: Will these projected prices be replaced with actual prices in the December 2016 true-up?

A: Yes. We expect to replace the projected prices for coal, oil, and natural gas with actual prices in the December 2016 true-up.

Q: How did you forecast the coal prices?

A: The December 2016 delivered prices of Powder River Basin ("PRB") coal were forecast as the sum of the mine price and the transportation rate. Most of the coal contracts under which KCP&L expects to purchase PRB coal in 2016 specify a fixed mine price that is only subject to adjustment for quality or government imposition such as changes in laws, regulations, or taxes. Those contracts that are not fixed either specify a base price and allow for an adjustment for some form of inflation or construct their price from a market index.

Q: How did you develop projections of the freight rates for moving PRB coal?

A: We developed the freight rate projections based on the contractually defined escalation mechanisms. Where those contracts called for an index, we constructed the forecasted index from data forecast by Moody's Analytics.

Q: How did you forecast the natural gas prices used to develop the Company's COS?

A: Natural gas prices for the 12 months from January through December 2016 were used to develop the cost of natural gas in the COS. Natural gas prices for each month of January through March 2016 were based on the daily average of SNL's Panhandle Eastern Pipe Line ("PEPL") Spot Natural Gas Index. Monthly natural gas prices for April through December 2016 were based on the March 21 through March 29, 2016 average NYMEX daily settlement prices for the April through December 2016 Henry Hub natural gas futures contracts. These monthly Henry Hub prices were then adjusted using the March 21 through March 29, 2016 average of ClearPort's PEPL monthly basis contracts. These basis-adjusted values were used to develop the cost of natural gas in the COS. Again, we expect to true-up to KCP&L's actual natural gas prices during the course of this proceeding.

Q: How did you forecast the oil prices?

A: Oil prices are handled differently than natural gas because KCP&L uses oil differently. Oil is used primarily for flame stability and start-up at our Iatan, La Cygne, and Montrose coal units. The price of oil used for flame stability and start-up was based on the

December 2016 heating oil futures contract. Like natural gas, we used the March 21 through March 29, 2016 average NYMEX daily settlement prices. Consistent with past cases, KCP&L's oil-fired Northeast Power Station units were assumed to be dispatched using replacement fuel prices like those used for flame stability and start-up; however, fuel expense was adjusted to use Northeast Power Station's projected month-end inventory value for December 2016. Wolf Creek's start-up oil was also priced at the projected month-end inventory value for December 2016. We expect to true-up oil prices during the course of this proceeding.

B. Fuel Additives and Fuel Adders

Q: Are there costs related to fuel that are not included in the price of fuel?

A: Yes. Generally those costs fall into two categories: "fuel additives" and "fuel adders." Fuel additives include ammonia, lime, limestone, and powder activated carbon ("PAC") which are used to control emissions. The fuel adders include unit train lease expense, unit train maintenance, unit train property tax, unit train depreciation, coal dust mitigation, freeze protection, costs associated with transporting natural gas, and hedging costs for both natural gas as fuel and as cross-hedges for power sales. We expect to true-up these costs to actual during the course of this proceeding.

Q: Why does KCP&L need fuel additives?

A: Fuel additives, which include pollution control reagents, are commodities that are consumed in addition to the fuel either through combustion or chemical reaction. For example, ammonia is added to a stream of flue gas where it reacts with nitrogen oxide ("NO_x") as the gases pass through a catalyst chamber. Lime (or limestone) is added to the flue gas stream in a flue gas desulfurization module to "scrub" sulfur dioxide ("SO_2"). Some units also use PAC as a sorbent for controlling mercury emissions.

Q: How did you determine the cost of the fuel additives?

A: The cost was determined as the quantity times the price, where the price was the value projected for the December 2016 true-up and the quantity was based on projected usage rates. We expect to true-up these costs and usage rates during the course of this proceeding.

Q: How did you determine the cost of the fuel adders?

A: I will address each of the fuel adders in turn, but generally the cost of the various fuel adders were based on a projection of their annual expense.

Q: Please describe the unit train-related expenses.

A: Unit-train related expenses included:

- Unit train lease expense (which is separated into two components):
  - Long-term unit train lease expense;
  - Short-term unit train lease expense;
- Ad valorem private car line taxes;
- Railcar depreciation;
- Unit train maintenance expense consisting of:
  - Foreign car repair which is the cost of repairing railcars that are running in service for KCP&L but are not owned by or under a long-term lease to KCP&L;
  - Shared expenses which are costs for items like Association of American Railroads publications, Universal Machine Language Equipment Register

fees, and railcar management software fees that cannot be assigned to an individual car but are "shared" or distributed across the fleet; and

- Maintenance and repair of KCP&L's railcar fleet.

Q: Are there other coal transportation related adders?

A: Yes. Topper agents are applied to the surface of loaded railcars to mitigate the loss in transit of coal dust. Side-release agents may be applied to railcars or freeze conditioning agents may be applied to coal to minimize the amount of carry-back coal during cold weather. These agents are applied by the coal companies during the loading process at the mines. They are to improve the safety of railroad operations.

Q: How did you determine the natural gas hedging costs?

A: Hedging costs reflect the sum of the option premiums, gains and losses (both realized and unrealized) on KCP&L's portfolio for the period January through December 2016, as known or expected based on market close of March 31, 2016.

Q: What are the costs associated with transporting natural gas?

A: The costs for transporting natural gas fall into two categories. The first category is those costs which are relatively fixed. That includes reservation or demand charges, meter charges, and access charges. The second category of transportation costs is those costs which are volumetric. They include: commodity costs, commodity balancing fees, transportation charges, mileage charges, fuel and loss reimbursement, the Federal Energy Regulatory Commission annual charge adjustment, storage fees, and parking fees.

Q: How did you determine the costs associated with transporting natural gas?

A: I separated the cost of transporting natural gas into its various components. For the reservation or demand charges I used the pipeline's current rates to calculate the demand or reservation charges we expect to pay for the 12 months of January through December 2016. For the variable costs I applied the pipeline's and local distribution company's current rates to the volumes developed by Company witness Burton Crawford. Those various components were then aggregated into either commodity based charges or reservation charges. We plan to update these costs at true-up.

C. Emission Allowance Cost

Q: How did you forecast emission allowance prices?

A: Emission allowance prices used for dispatch and market prices in our models were forecast as the average price published in Argus *Air Daily* for March 21 through March 29, 2016. For expense, we used our current book value for allowances. We expect to true-up emission allowance costs.

Q: Do you expect to replace all of these fuel, fuel-related, additive, adder, and emission allowance price or cost estimates with actual prices or costs that are known at true-up?

A: Yes.

D. Fuel Inventory

Q: What is the purpose of this portion of your testimony?

A: The purpose of this portion of my testimony is to explain the process by which KCP&L determines the amount of fuel inventory to keep on hand and how the level of fuel inventory impacts KCP&L's COS.

Q: Why does KCP&L hold fuel inventory?

A: KCP&L holds fuel inventory because of the uncertainty inherent in both fuel requirements and fuel deliveries. Both fuel requirements and deliveries can be impacted by weather. Fuel requirements can also be impacted by unit availability—both the availability of the unit holding the inventory and the availability of other units in KCP&L's system. Fuel deliveries can also be impacted by breakdowns at a mine or in the transportation system. Events like the 1993 and 2011 Missouri River floods, the 2005 joint line derailments in the Southern Powder River Basin ("SPRB"), and more recently the railroad service issue that significantly reduced the delivery of coal to KCP&L's plants from March 2013 through September 2014. Fuel inventories are insurance against events that interrupt the delivery of fuel or unexpectedly increase the demand for fuel. All of these factors vary randomly. Fuel inventories act like a "shock absorber" when fuel deliveries do not exactly match fuel requirements, and enable KCP&L to continue generating electricity reliably between fuel shipments.

Q: How does KCP&L manage its fuel inventory?

A: Managing fuel inventory involves ordering fuel, receiving fuel into inventory, and burning fuel out of inventory. KCP&L controls inventory levels primarily through its fuel ordering policy. That is, KCP&L sets fuel inventory targets and then orders fuel to achieve those targets. We define inventory targets as the inventory level that we aim to maintain on average during "normal" times.

In addition to fuel ordering policy, plant dispatch policy can be used to control inventory, however KCP&L does not control the dispatch of its units. Effective March 1, 2014, the North American Electric Reliability Corporation certified Southwest Power Pool ("SPP") as the Balancing Authority ("BA") for the SPP region. As the BA and regional transmission organization operating an integrated marketplace for electric power, SPP optimizes the generation resources for its members. To do that, it uses a regional security constrained, offer-based economic algorithm to dispatch the members units. If a plant is low on fuel, SPP might reduce the operation of that plant to conserve inventory. This could require other plants under SPP's dispatch to operate more and to use more fuel than they normally would. One can view this as a transfer of fuel "by wire" to the plant with low inventory. To determine the best inventory level, KCP&L balances the cost of holding fuel against the expected cost of running out of fuel.

Q: What are the costs associated with holding fuel inventory?

A: Holding costs reflect cost of capital and operating costs. Holding inventories require an investment in working capital, which require providing investors and lenders returns that meet their expectations. It also includes the income taxes associated with providing the cost of capital. The operating costs of holding inventory include costs other than the cost of the capital tied up in the inventories. For example, we treat property tax as an operating cost.

Q: Please explain what you mean by the expected cost of running out of fuel.

A: In this context, expected cost means the probability of running out of fuel times the cost of running out of fuel. The cost of running out of fuel at a power plant is the additional cost incurred when a more expensive resource must be dispatched to serve the load that would have otherwise been served by the plant if it had the fuel to do so. If there are not enough resources available to serve load, there could be a failure to meet customer demand for electricity.

Q: How does KCP&L determine the best inventory level, *i.e.*, the level that balances the cost of holding fuel against the expected cost of running out?

A: KCP&L uses the Electric Power Research Institute's Utility Fuel Inventory Model ("UFIM") to identify those inventory levels with the lowest expected total cost. That is, we minimize the sum of inventory holding costs and the expected cost of running out of fuel.

Q: How does UFIM work?

A: UFIM uses a Markov decision model to iterate through various order policies to determine the optimal order policy. It identifies an inventory target as a concise way to express the following fuel ordering policy:

Current Month Order = (Inventory Target – Current Inventory)

+ Expected Burn this Month

+ Expected Supply Shortfall

That is, UFIM's target assumes all fuel on hand is available to meet expected burn. "Basemat" is added to the available target developed with UFIM to determine KCP&L's inventory target. Generally, and in the rest of my testimony, references to inventory targets mean the sum of fuel readily available to meet burn plus basemat.

Q: What is basemat?

A: Basemat is the quantity of coal occupying the bottom 18 inches of our coal stockpile footprint. It may or may not be useable due to contamination from water, soil, clay, or fill material on which the coal is placed. Because of this uncertainty about the quality of the coal, basemat is not considered readily available. However, because it is dynamic and it can be burned (although with difficulty), it is not written off or considered a sunk cost. To determine basemat under our compacted stockpiles, we only consider the area of a pile that is thicker than nine inches. The area of the coal pile that covers either a hopper or concrete slab is not included in the calculation of basemat. The basemat values presented here for all inventory locations are premised on work performed by MIKON Corporation, a consulting engineering firm that specializes in coal stockpile inventories and related services for utilities nationwide.

Q: How does the UFIM model work?

A: The fundamental purpose of UFIM is to develop least-cost ordering policies, *i.e.*, targets, for fuel inventory. UFIM does this by dividing time into "normal" periods and "disruption" periods where a disruption is an event of limited duration with an uncertain occurrence. It develops inventory targets for normal times and disruption management policies. The inventory target that UFIM develops is that level of inventory that balances the cost of holding inventory with the cost of running out of fuel.

Q: What are the primary inputs to UFIM?

A: The key inputs are: holding costs, fuel supply cost curves, costs of running out of fuel, fuel requirement distributions, "normal" supply uncertainty distributions, and disruption characteristics.

Q: What are the holding costs you used to develop coal inventory levels for this case?

A: KCP&L based the holding costs it used to develop fuel inventory levels for this case on the cost of capital proposed by the Company.

Q: What do you mean by "fuel supply cost curves"?

A: A fuel supply cost curve recognizes that the delivered cost of fuel may vary depending on the quantity of fuel purchased in a given month. For example, our fuel supply cost curves for PRB coal recognize that when monthly purchases exceed normal levels, we may need to lease additional train sets. Those lease costs cause the marginal cost of fuel above normal levels to be slightly higher than the normal cost of fuel.

Q: What did you use for the normal cost of fuel?

A: The normal fuel prices underlying all of the fuel supply cost curves were the December 2016 price forecasts used for the COS calculations.

Q: What did you use for the costs of running out of fuel?

A: There are several components to the cost of running out of fuel. The first cost is the opportunity cost of forgone power sales. We developed that cost by constructing a price duration curve derived from the distribution of off-system transactions that exceeded coincident load and other commitments for May 2013 through April 2016. We supplemented those points with estimates for purchasing additional energy and using oil-fired generation. The last point on the price duration curve is the socio-economic cost of failing to meet load for which we used KCP&L's assumed cost for unserved load. These price duration curves are referred to in UFIM as burn reduction cost curves. Burn reduction cost curves can vary by inventory, location, and disruption.

Q: What fuel requirement distributions did you use?

A: For all units we used distributions based on projected fuel requirements for 2016.

Q: What do you mean by "normal" supply uncertainty?

A: We normally experience random variations between fuel burned and fuel received in any given month. These supply shortfalls or overages are assumed to be independent from period to period and are not expected to significantly affect inventory policy. To determine these normal variations, we developed probability distributions of receipt uncertainty based on the difference between historical burn and receipts.

Q: What are disruptions?

A: A disruption is any change in circumstances that persists for a finite duration and significantly affects inventory policy. A supply disruption might entail a complete cut-off of fuel deliveries, a reduction in deliveries, or an increase in the variability of receipts. A demand disruption might consist of an increase in expected burn or an increase in the variability of burn. Other disruptions might involve temporary increases in the cost of fuel or the cost of replacement power. Different disruptions have different probabilities of occurring and different expected durations.

Q: What disruptions did KCP&L use in developing its inventory targets?

A: KCP&L recognized three types of disruptions in development of its inventory targets:

- Railroad or mine capacity constraints;
- Fuel yard failures; and
- Major floods.

Q: Please explain what you mean by disruptions related to railroad or mine capacity constraints.

A: Supply capacity is the ultimate quantity of coal that can be produced, loaded, and shipped out of the PRB in a given time period. Constraints to supply capacity can come from either the railroads or the mines, but regardless of which of these is the constraint source, the quantity of coal that can be delivered is restricted. A constrained supply caused by railroad capacity constraints can come from an inability of the railroad to ship a greater volume of coal from the PRB. A scenario such as this can arise from not having enough slack capacity to place more trains in-service. It can also come from an infrastructure failure such as the May 2005 derailments on the joint line in the SPRB. Beginning in the winter of 2013-2014 there was a serious decline in rail service across the U.S. rail network, in particular the upper Midwest region. That degradation in service which persisted into fall 2014 is another example of the disruptions that we refer to as a railroad or mine capacity constraint.

A variety of mine issues can constrain supply, such as there not being enough available load-outs, not enough space to stage empty trains, reaching the productive limits of equipment such as shovels, draglines, conveyors, and trucks, or the mine reaching the production limits specified in its environmental quality permits. We lump the mine and railroad capacity constraints together because they can occur simultaneously and one may mask the other.

Q: Please explain what you mean by disruptions related to fuel yard failures.

A: KCP&L and other utilities have experienced major failures in the equipment used to receive fuel. As used here, "disruption" is designed to cover the variety of circumstances that could result in a significant constraint on a plant's ability to receive fuel. For example, in 1986 KCP&L's Hawthorn station lost an unloading conveyor in a fire caused by coal dust combustion. That outage materially limited fuel deliveries for four months.

Q: Please explain what you mean by "major flood" disruptions.

A: Since 1993, the Missouri River has had two major floods. This disruption was modeled after those floods. Floods can lengthen railroad cycle times as the railroads reroute trains and curtail the deliveries of coal to generating stations.

Q: What are the coal inventory targets used in this case?

A: The coal inventory targets resulting from application of UFIM and their associated value for incorporation into rate base are shown in the attached Schedule WEB-1 **(Highly Confidential)** and are the values used to determine adjustment RB-74, "Adjust Fossil Fuel Inventories to required levels" included in Schedule RAK-2 of the Direct Testimony of KCP&L witness Ronald A. Klote. Since these coal inventory targets are a function of fuel prices, cost of capital and other factors that may be adjusted in the course of this proceeding, we would expect to adjust the coal inventory targets as necessary.

Q: The Company decided to cease burning coal in Montrose 1 effective April 15, 2016. How has that change affected your coal inventory values?

A: Montrose 2 and 3 will continue to burn coal. Retiring unit 1 reduced the projected coal requirements for the station. That reduction is reflected in the volume projections used to develop my coal inventory values.

Q: How were the inventory values for ammonia, lime, limestone, and PAC determined?

A: Inventory values for ammonia, lime, limestone, and PAC were calculated as the average month-end quantity on hand for the 13-month period from March 2015 through March 2016 multiplied by the projected December 2016 per unit value. The inventory values for ammonia, lime, limestone, and PAC are shown in Schedule WEB-1 **(Highly Confidential)**.

Q: How were the inventory values for oil determined?

A: Inventory values for oil were calculated as the average month-end quantity on hand for the 13-month period from March 2015 through March 2016 multiplied by the December

2016 per unit value. The inventory values for oil are shown in Schedule WEB-1 **(Highly Confidential)**.

Q: Will you true-up the fuel additives and oil inventory volumes and values?

A: Yes. We expect to calculate new 13-month averages representing December 2015 through December 2016 and use December 2016 prices to calculate these inventory values at true-up, assuming December 2016 is set as the true-up period.

FUEL ADJUSTMENT CLAUSE

A. Factors Considered

Q: Commission Rule 4 CSR 240-20.090(2)(C) identifies factors the Commission will consider in determining which cost components to include in a rate adjustment mechanism. Which of those factors will you address?

A: I will address those factors related to the market impact on fuel costs. Specifically, I will discuss:

1. fuel market volatility and how market volatility impacts fuel costs;
2. the market impact on fuel costs is substantial; and
3. the market impact on fuel costs is beyond the control of management.

1. Fuel Market Volatility And How Market Volatility Impacts Fuel Costs

Q: How do changes in fuel markets affect KCP&L's COS?

A: Changes in fuel markets affect KCP&L's COS in multiple ways. The first and most obvious impact is the effect of changes in fuel prices and their direct effect on fuel expense. Second, "[a]lthough many factors determine electricity prices, gas cost is the primary driver for the trend in electricity prices over time."[1]

[1] *State of the Market Report, Winter 2015, December 2014 – February 2015*, SPP Market Monitoring Unit, March 24, 2015, p. 2.

Q: **How have fuel prices changed over the past few years?**

A: Schedule WEB-2 shows how fuel prices have changed dramatically over the past several years. Schedule WEB-2 shows how from January 2010 through May 2016 the price for natural gas has ranged from $1.64/million British thermal units ("MMBtu") to $6.15. While not as dramatic as natural gas, PRB coal has also demonstrated significant price changes in that same period. It has ranged from $0.40/MMBtu to $0.86/MMBtu. (Please note, natural gas uses the scale on the left while coal uses the scale on the right.)

Q: **Have natural gas prices continued to demonstrate significant volatility since dropping from February 2014's high of $6.15/MMBtu?**

A: Yes. If we define volatility as the annualized standard deviation of the percent change in prices, we see that while the level of natural gas prices has dropped, the 46% volatility for June 2015 through May 2016 is higher than the 43% volatility for January 2010 through May 2015.

Q: **How have PRB coal prices, like natural gas, demonstrated significant volatility in just the past few years?**

A: Prompt month prices for PRB coal have experienced changes similar to natural gas. In June 2012, PRB coal prices were $0.40/MMBtu. In less than two years, the price had almost doubled to $0.76/MMBtu. Since then prices have with a few hiccups trended down to end May 2016 at $0.50/MMBtu.

Q: Why are these historical fluctuations in daily market prices for fuel the expressions of volatility that the Commission needs to consider when determining which cost components to include in a rate adjustment mechanism?

A: Historical market fluctuations should be considered because they are the prices the Company faces when it looks to buy fuel. Only after the Company makes a purchase commitment or places a hedge is that volatility mitigated. Moreover, that mitigated price may be quite different than the fuel price embedded in the cost of service calculations upon which the Company's rates are built.

Q: What do you mean by saying the Company faces daily market prices when it looks to buy fuel?

A: Let's start with natural gas. KCP&L makes purchases on the day it needs the gas. After the Company receives a dispatch instruction for one of its natural gas units, we solicit offers for natural gas to support that run. This "same day" gas is subject to intra-day volatility, in addition to the daily volatility shown by the daily settlement prices in my Schedule WEB-2.

We buy oil much like a consumer buys gas for a car. That is, when the tank is low, we refill it. Like with a car, there are times when you have some flexibility about when to refill your tank and there are times when you do not have such freedom. In either case, you do not know whether the price will go up or down after you make your purchase. Even if you did, you may not have the flexibility to wait for the price to go down. Both price and timing are a function of the movement in market prices.

Coal is somewhat like my oil example above. As a coal buyer, we face the daily volatility shown in my Schedule WEB-2. After we sign a contract that fixes the price, we mitigate that volatility for our customers. We face the volatility of the markets for all of our fuel requirements that are not already locked in to fixed price contracts.

Q: Can KCP&L manage this volatility through its hedging program?

A: To the extent that we hedge, we can fix a price which eliminates volatility for those volumes after the hedge is in place. Alternatively we can limit an adverse price movement through a call or put for those volumes, again after the hedge is in place. Hedging programs dampen the volatility of fuel prices but their protection is limited. Think of it this way. A hedge program effectively flattens the peaks and valleys of near-term price spikes and dips. But because long-term market trends may reach further than the hedge program, it only acts like a drag chute against long-term market trends.

Q: What are the main volumes that are exposed to market volatility?

A: Regarding coal, as of March 31, 2016 only about **[redacted]** of KCP&L's expected coal burn from 2017 through 2020 was under contract. That means **[redacted]** of KCP&L's expected coal burn from 2017 through 2020 was not under contract. In other words, KCP&L is exposed to volatile market prices for about **[redacted]** of its expected coal requirements for the period rates from this proceeding may be effective.

Regarding natural gas, as of March 31, 2016 about **[redacted]** of KCP&L's expected natural gas burn for the Missouri jurisdiction from 2017 through 2020 was hedged. That is, **[redacted]** of the Company's expected natural gas requirements for the Missouri jurisdiction are exposed to the market for 2017 through 2020.

Regarding oil, KCP&L does not hedge oil so all of the Company's expected oil usage is exposed to market volatility.

HIGHLY CONFIDENTIAL

Regarding the Missouri jurisdictional share of power sales in excess of the Company's coincident load and other commitments, as of March 31, 2016 **[redacted]** of those projected power sales for 2017 through 2020 are hedged.

2. Market Impact On Fuel Costs Is Substantial

Q: How might that market price volatility affect KCP&L?

A: Over the four-year period of 2017 through 2020 KCP&L is exposed to **[redacted]** million in adverse coal price risk. Besides that market risk for coal commodity, KCP&L's rail contract expires at the end of 2018. With transportation costs representing approximately half of the delivered cost of coal, that is another major exposure to prices which is beyond the Company's control. The Company is exposed to another **[redacted]** million in adverse natural gas commodity price risk for 2017 through 2020. The potential adverse price risk associated with projected non-firm off-system power sales is greater than the coal and natural gas price risk combined.

Q: How did you calculate KCP&L's **[redacted] million in adverse coal price risk?**

A: KCP&L uses a distribution of forecasts to construct a composite forecast which becomes our base forecast. From that distribution we also calculate "low" and "high" forecasts to represent the uncertainty in expectations within the portfolio of independent forecasts used to construct our base forecast. I calculated the adverse coal price risk as the difference between the "base" and the "high" in KCP&L's coal price forecast for anticipated purchases that are not yet under contract.

Q: How did you calculate the **[redacted] million in adverse natural gas price risk?**

A: The **[redacted]** million is the parametric VAR (value at risk) at the 95th percentile for the Company's expected natural gas requirement from 2017 through 2020.

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Q: What is parametric value at risk?

A: The parametric method of risk valuation uses volatility in price movements and the distribution of observed or historical prices to calculate value at risk. It assumes price changes are normally distributed. That assumption allows us to use the normal distribution as a proxy for expected price changes. The 95th percentile or the 95% confidence level of the standard normal distribution has a z-score[2] of 1.645. That is, the 95th percentile price level is 1.645 standard deviations greater than the average price. Multiplying that 1.645 z-score times the standard deviation in price change, where the standard deviation is determined by multiplying the 46% volatility times the average price for January through May 2016 of $2.01, yields a price movement of $1.53/MMBtu, which statistically speaking, will only be exceeded 5 out of 100 times. Applying that $1.53/MMBtu to the estimated **[redacted]** of natural gas equivalent for KCP&L's expected natural gas requirements for 2017 yields about **[redacted]** million of risk for 2017. We can use those same numbers and scale up for subsequent years to estimate that KCP&L's total adverse natural gas commodity price risk for 2017 through 2020 is **[redacted]** million.

Q: Why did you look at the four-year period of 2017 through 2020?

A: Section 386.266.4(3) requires a utility with a FAC to file a general rate case with the effective date of new rates to be no later than four years after the effective date of the Commission order implementing the FAC. Given that we expect the effective date of the Commission order for this case to be late May 2017, the four year horizon would run

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[2] Z-scores provide a statistical method of rescaling and standardizing data to enable easier comparison. A Z-score measures the number of standard deviations an observation is away from the mean, or average, of all observations. By assuming prices are normally distributed we can use the standard normal distribution, which has a mean of 0 and a standard deviation of 1, to infer what proportion of observations (i.e. probability) will exceed a given point.

from June 2017 into May 2021. Fuel requirements for calendar years 2017 through 2020 are reasonably representative of that period.

3. Fuel Costs Are Beyond The Control Of Management

Q: Can KCP&L control the fundamentals that drive the fuel markets?

A: No, KCP&L cannot control the market fundamentals for fuel. An easy and objective way to answer that question is to look at what portion of the market KCP&L represents. KCP&L's projected coal burn for 2017 represents about 2.5% of the projected PRB production or about 1.1% of total U.S. coal production. The Company's natural gas usage is significantly less than 0.01% of U.S. natural gas production. Both of these markets are driven by factors other than KCP&L's market share.

Q: What are the fundamental drivers for the fuel markets?

A: The fundamental drivers for the short-term markets are different than the key drivers for the long-term markets. Short-term markets reflect the convergence of changes in demand expectations and the fundamentals of readily available or stored energy. Some of the short-term fundamental drivers would include events such as storms that might disrupt immediate delivery of the energy. Temperature spikes or drops can also cause short-term imbalances between the demand and the immediately available supply. Since energy prices tend to be inelastic, these weather induced imbalances can cause significant price spikes.

Long-term markets reflect the convergence of expectations of future potential supply, including the cost to produce that supply and future potential demand. For example, the development of shale based natural gas resources has greatly increased the expected supply of natural gas. That in turn has depressed the long-term outlook for natural gas prices. Because most natural gas consumers have inelastic demands but do not have storage, the short-term fundamentals will still drive significant market uncertainty, just at a lower base level than expected before the development of shale gas.

B. 4 CSR 240-3.161(3) Requirements

Q: When an electric utility files a general rate proceeding following the general rate proceeding that established its rate adjustment mechanism ("RAM") and requests that its RAM be continued or modified, Commission rule 4 CSR 240-3.161(3) requires the electric utility file certain supporting information as part of, or in addition to, its direct testimony. Which of those requirements will you address?

A: I will address item (K) and explain the rate volatility mitigation features in KCP&L's FAC. I will also address the parts of item (S) focused on emission allowance costs or sales margins included in the FAC and allowance purchases and sales. The Direct Testimony of Company witness Burton Crawford will address the other part of item (S) regarding forecasted environmental investments.

1. Item (K): Mitigating Market Risk (Price Volatility)

Q: How does KCP&L mitigate market risk?

A: KCP&L lessens the severity of market price risk through its various hedging programs and fuel procurement strategies.

Q: Does KCP&L have a program or strategy for managing the price risk of coal?

A: Yes, it does.

Q: Please describe how KCP&L's mitigates coal price risk.

A: In the PRB coal market, the primary means of managing price risk is through a portfolio of forward contracts. Generally KCP&L has been following a modified strategy of laddering into a portfolio of forward contracts for PRB coal. Laddering is an investment technique of purchasing multiple products with different maturity dates. KCP&L's "laddered" portfolio consists of forward contracts with staggered terms so that a portion of the portfolio will roll over each year. KCP&L may modify that strategy when it anticipates market price increases. The Company may either commit for more coal before the increase, or delay committing until after the increase has waned.

Q: What does that laddered portfolio look like?

A: By the end of first quarter 2016, KCP&L had contractual commitments for essentially all of its expected requirements for 2016 and about 75% of its expected coal requirements for 2017. It also has commitments for about 45% for 2018 and about 10% for 2019, but no commitments for 2020.

Q: Does KCP&L update its fuel procurement and planning process to adjust for changes in the marketplace?

A: Yes. KCP&L routinely reviews fuel market conditions and market drivers. We monitor market data, industry publications and consultant reports in an effort to avoid high prices and to take advantage of lower prices.

Q: How has this strategy performed for KCP&L?

A: Over the last ten years (2006-2015), this strategy has helped KCP&L mitigate much of the coal market volatility impact. If we calculate volatility as the annualized standard deviation of percent change in price, the volatility of the annual average prices KCP&L paid was about 10%. That is significantly less than the 24% volatility of the annual average prices developed from the prompt calendar year strip.

Q: How does market price uncertainty for natural gas affect KCP&L?

A: Natural gas market price uncertainty primarily affects KCP&L in two ways. The first way is the direct impact on the price the Company pays for natural gas it consumes. The second impact is the effect of natural gas price on the market price for electricity.

Q: What risks is KCP&L managing through its natural gas hedge programs?

A: KCP&L uses natural gas derivatives to mitigate adverse upward price volatility in natural gas and adverse downward price volatility in power.

Q: How do those two risks compare?

A: Our exposure to adverse price risk on power is substantially more than natural gas. Using a parametric VAR calculation similar to the one I used earlier for natural gas but this time applied to 2015 prices and volumes, the adverse price uncertainty for energy sales in excess of the Company's load and other obligations was $54.7 million. That compares to an adverse price risk of only $3.2 million for natural gas. In other words, the adverse price risk for uncommitted power sales was 17 times the adverse price risk for natural gas in 2015.

Q: Does KCP&L use the same program to manage both the impact of natural gas market uncertainty on the price the Company will pay for the natural gas it consumes and the market price for electricity the Company will sell?

A: No. The adverse risk for the natural gas the Company consumes is upward price movement while the adverse risk for non-firm power the Company sells off-system is downward price movement. To manage adverse upward price risk for the natural gas we expect to consume, we use our "Natural Gas Price Hedge Plan." To manage adverse downward price risk for electricity we expect to sell off-system, we use our "Off-System Sales Margin Asset Optimization Plan."[3]

Q: **How does KCP&L determine the amount of natural gas to hedge under its two different price risk management programs?**

A: KCP&L only hedges the Missouri jurisdictional share of fuel expected to be used to serve native load, firm wholesale sales, and fuel loss reimbursement associated with that natural gas. I will refer to those volumes as our projected usage. Like the projected usage, the Company only cross-hedges the Missouri jurisdictional share of energy sales expected to be in excess of the Company's load and other obligations. I will refer to these cross-hedge volumes as power sales equivalents. To determine whether a month is hedged for projected usage or power sales equivalent, we net the two volumes. If the net volume is a projected usage, we use the "Natural Gas Price Hedge Plan" hedge programs. If the net volume for the month is power sales equivalent, we use the "Off-System Sales Margin Asset Optimization Plan."

Under the "Natural Gas Price Hedge Plan" **[redacted]**

The "Off-System Sales Margin Asset Optimization Plan" relies on management's assessment of current and forward looking factors to determine the volume to hedge. This allows for flexibility to react to markets by selling more in some months or less in others for the portfolio.

[3] The "Natural Gas Price Hedge Plan" and the "Off-System Sales Margin Asset Optimization Plan" were provided in the HIGHLY CONFIDENTIAL response to Staff Data Request 0072.

HIGHLY CONFIDENTIAL

Q: How does KCP&L determine which program to use?

A: If the projected usage for a given month is greater than the power sales equivalent, then we use our program for mitigating adverse upward price movement. If the projected power sales equivalent is greater, then we use our program for mitigating adverse downward price movement.

Q: Does KCP&L adjust its hedges for changes in projected volumes?

A: Yes. KCP&L updates its projected requirements throughout the year. If the projected requirements are determined to be significantly different than prior projections, hedge volumes may be adjusted.

Q: What is the objective of KCP&L's hedging program for mitigating adverse upward price movement in the price of natural gas it consumes?

A: The objective of KCP&L's hedging program is to reduce energy price risk inherent with floating with the market. The program is to protect the Company and its customers from large upward fluctuations in the price of natural gas while providing some opportunity to capture low prices.

Q: What is the objective of KCP&L's hedging program for natural gas it uses to cross-hedge power sales?

A: The objective of KCP&L's cross-hedging program is also to reduce energy price risk inherent with floating with the market. However, KCP&L's cross-hedging program is to protect the Company and its customers from large downward fluctuations in the price of electricity the Company might sell.

Q: Briefly describe KCP&L's hedging strategy for the natural gas it expects to consume.

A: KCP&L's natural gas hedging strategy for the gas it expects to consume is oriented toward finding a balance between the need to protect against high prices and the opportunity to purchase gas at low prices. These volumes are hedged under two hedging programs, Kase and Company, Inc.'s HedgeModel and ezHedge.

Q: How does the HedgeModel program work?

A: The approach of the HedgeModel program is to identify statistically favorable points at which to hedge. The strategy can be thought of as a three-zone strategy comprised of high price, normal price and low price zones. The high price zone identifies prices that are threatening to move upward. In this price zone, actions are taken to protect against unfavorable high price levels, mostly through the use of options-related tactics. The normal price zone identifies prices that are in a "normal" range, neither high enough to warrant protecting price, nor low enough to be considered "opportunities." No action is taken whenever prices are deemed to be in the normal price range. The low price zone identifies prices that are statistically low. In this zone, actions are taken to capture favorable forward prices as the market moves into a range where the probability of prices remaining at or below these levels is decreasing. While the main focus in the high price zone is defensive, to set a maximum or ceiling on prices, in the low price zone the focus is on capturing attractive prices.

Q: How does the ezHedge model work?

A: Kase's ezHedge generates hedging signals based on market cycles and uses a volume averaging approach, similar to dollar cost averaging. The model divides a price range into five zones based on an evaluation of percentile levels over a range of look-back periods. It selects the look-back length based on market behavior relative to the highest and lowest zones. This approach results in hedges being placed under all but the most favorable conditions, in which case volumes are left unhedged. The volume averaging aspect results in more frequent hedges when prices are in the lower priced zones and fewer hedges when prices are in the higher price zones.

Q: **What distinguishes these two hedging models?**

A: ezHedge usually results, over time, in all of the volumes placed in that program being hedged. On the other hand, if prices do not fall low enough, or if prices stay too high, there is a possibility that certain contract months could go unhedged when using HedgeModel. Combining ezHedge with HedgeModel helps ensure that a modest portion of the exposure has a high probability of being hedged.

Q: **How often does KCP&L use the HedgeModel and ezHedge?**

A: KCP&L monitors the HedgeModel and ezHedge daily. How often KCP&L places a hedge is determined by how the market moves through the price zones and the volume to be hedged.

Q: **Briefly describe KCP&L's hedging strategy for power sales.**

A: An Off-System Sales Hedging Team ("Team") monitors power and fuel markets, manages the portfolio, discusses tactical options, and makes hedging program recommendations consistent with maximizing or protecting a portion of the off-system sales margin. The Team gives consideration to market developments and changing operational considerations, and makes decisions regarding whether to proceed with any program actions. The program primarily uses natural gas futures and options to cross-hedge electricity price risk.

Q: What is cross-hedging?

A: Cross-hedging is a risk management strategy that involves offsetting a position in one commodity with an equal position in a different commodity with similar price movements. Cross-hedging is often used in markets where there is no active futures trading for the commodity of concern.

Q: Why do you use NYMEX natural gas futures contracts and options to cross-hedge electricity price risk?

A: The three most significant benefits of using NYMEX natural gas futures contracts and options to hedge electricity price risk are:

1) Liquidity: The NYMEX natural gas market is very liquid. That is, NYMEX natural gas contracts can easily be bought or sold quickly. There are large numbers of buyers and sellers ready and willing to trade at any time during market hours. Because of high trading volumes, there tend to be low spreads between asking and selling prices which result in little to no premium when entering or exiting a position.

While the Company could probably hedge a portion of its power sales risk with electricity bilateral forward contracts, it would be at a price. There is not a liquid secondary market where the Company could get out of a position should things change. Even if it could get out, it would likely be at a loss.

2) Minimal counterparty credit risk: The NYMEX uses a central counterparty clearing model. All trades are cleared through the Exchange clearinghouse which becomes the ultimate counterparty, acting as the "buyer to every seller" and the "seller to

every buyer." Counterparty credit risk is shared among clearing members, who represent some of the largest names in financial services. Consequently, the NYMEX has received and maintains an AA+ long-term counterparty credit rating from Standard & Poor's.

3) Contract size: One (1) NYMEX natural gas contract represents 10,000 MMBtus of natural gas. That is roughly equivalent to one (1) megawatt hour (MWh) of electricity. Given the liquidity of the NYMEX, there is essentially no premium for entering or exiting a position as small as one MWh. That liquidity gives KCP&L the ability to fine tune its hedge position as expectations change.

Q: Please describe how KCP&L mitigates price risk for nuclear fuel.

A: KCP&L is one of the owners of the Wolf Creek Nuclear Operating Corporation ("Wolf Creek") which purchases uranium and has it processed for use as fuel in the Wolf Creek plant's reactor. This process involves conversion of uranium concentrates to uranium hexafluoride, enrichment of uranium hexafluoride, and fabrication of nuclear fuel assemblies. The owners of Wolf Creek have on hand or under contract all of the uranium and conversion services needed to operate the plant through March 2018 and approximately 37% after that date through September 2022. The owners also have under contract all of the uranium enrichment and fabrication required to support reactor operation through March 2027 and September 2025, respectively.

2. Item (S): Emission Allowance Purchases and Sales

Q: What is the purpose of this portion of your testimony?

A: I will discuss the legal requirements for emission allowances and explain KCP&L's current strategy for meeting those requirements.

Q: What emissions are KCP&L required to offset with allowances?

A: KCP&L is required to offset SO_2 and NO_x emissions with allowances issued by the Environmental Protection Agency ("EPA").

Q: What rules or regulations established the need for emission allowances?

A: Title IV of the 1990 Clean Air Act established the allowance market system known today as the Acid Rain Program ("ARP"). Title IV set a cap on total SO_2 emissions and aimed to reduce overall emissions to 50% of 1980 levels. In 2011 the EPA finalized the Cross-State Air Pollution Rule ("CSAPR"). Title IV allowances cannot be used to comply with the CSAPR. Sources covered by the ARP must still use Title IV allowances to comply with that program.

The CSAPR is an allowance trading program and any unit specific shortages can be addressed by trading allowances within or outside KCP&L's system. We anticipate both Title IV and CSAPR allowances will be readily available because of the significant reduction in coal generation since the original rule driven by the impact of the natural gas market and unit retirements.

Q: Will emissions allowance costs or sales margins be included in the FAC?

A: Yes.

Q: What are KCP&L's forecasted allowance purchases and sales?

A: Currently KCP&L is not expecting to purchase emission allowances nor is it proposing to sell emission allowances. If the Company's needs change, allowances will be purchased as required. KCP&L may reconsider this position in light of future changes in the laws, rules, or regulations governing emission allowances.

Q: Does that conclude your testimony?

A: Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Kansas City Power & Light Company's Request for Authority to Implement A General Rate Increase for Electric Service	)))	Case No. ER-2016-0285

AFFIDAVIT OF WILLIAM EDWARD BLUNK

STATE OF MISSOURI)
) **ss**
COUNTY OF JACKSON)

William Edward Blunk, appearing before me, affirms and states:

1. My name is William Edward Blunk. I work in Kansas City, Missouri, and I am employed by Kansas City Power & Light Company as Generation Planning Manager.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Kansas City Power & Light Company consisting of thirty-four (34) pages, having been prepared in written form for introduction into evidence in the above-captioned docket.

3. I have knowledge of the matters set forth therein. I hereby affirm and state that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.

William Edward Blunk

Subscribed and affirmed before me this 1st day of July, 2016.

Nicole A. Wehry
Notary Public

My commission expires: Feb. 4 2019

NICOLE A. WEHRY
Notary Public - Notary Seal
State of Missouri
Commissioned for Jackson County
My Commission Expires: February 04, 2019
Commission Number: 14391200

SCHEDULE WEB-1

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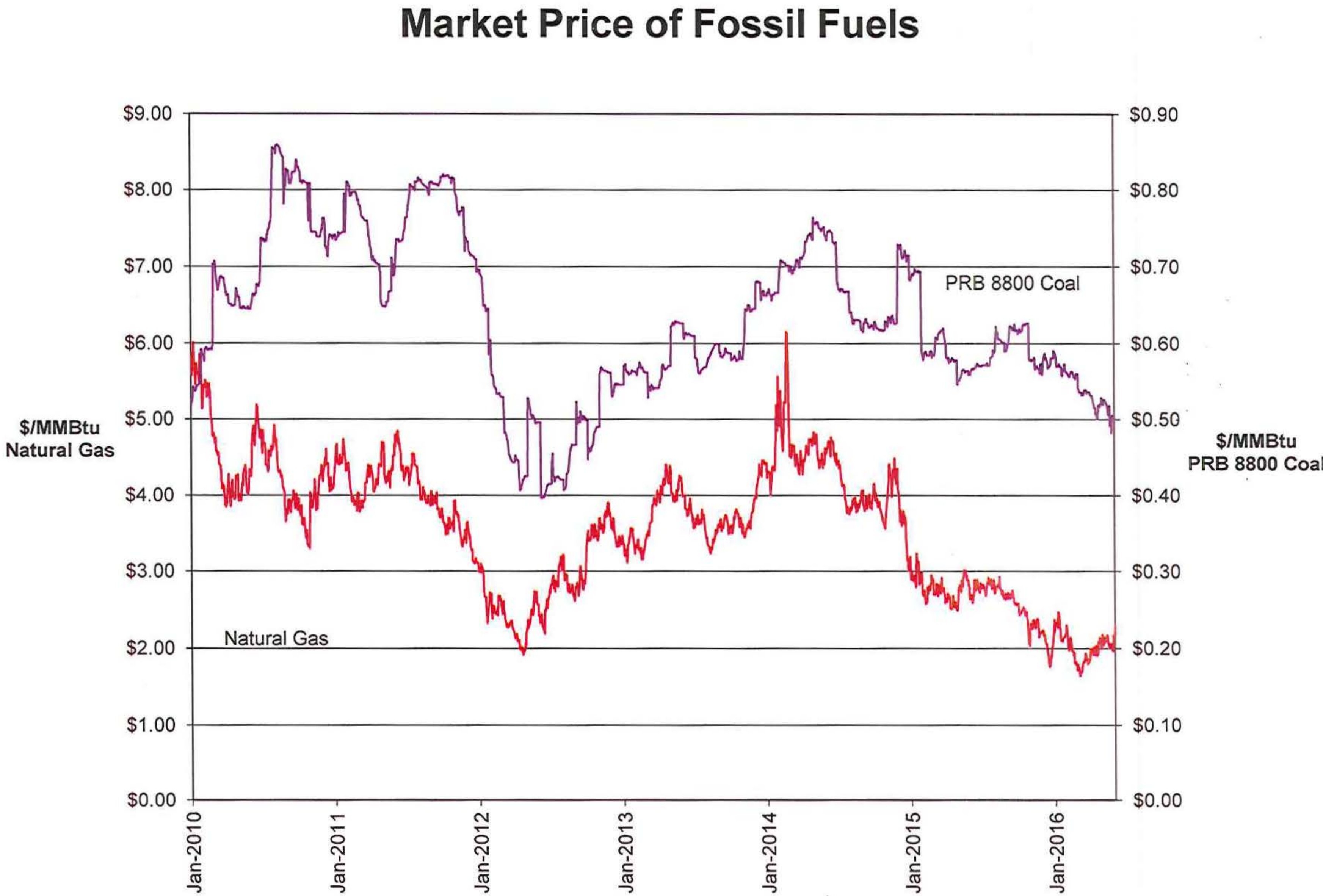

Schedule WEB-2