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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO.: ER-2018-0146

DIRECT TESTIMONY

OF

THOMAS J. SULLIVAN, JR.

ON BEHALF OF

KCP&L GREATER MISSOURI OPERATIONS COMPANY

**Kansas City, Missouri
January 2018**

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CASE NO. ER-2018-0146

INTRODUCTION

1

2 **Q. Please state your name and business address.**

3 A. Thomas J. Sullivan, Jr. 15898 Millville Road, Richmond, Missouri, 64085.

4 **Q. By whom are you employed?**

5 A. I am President and owner of Navillus Utility Consulting LLC.

6 **Q. How long have you been with Navillus Utility Consulting?**

7 A. I started the company in June 2011.

8 **Q. What is your educational background?**

9 A. I received a Bachelor of Science Degree in Civil Engineering Summa Cum Laude from
10 the University of Missouri - Rolla in 1980 and a Master of Business Administration
11 Degree in Business Administration from the University of Missouri - Kansas City in
12 1985.

13 **Q. Are you a registered professional engineer?**

14 A. Yes, I am a Registered Professional Engineer in the State of Missouri.

15 **Q. To what professional organizations do you belong?**

16 A. I am a member of the American Society of Civil Engineers.

1 **Q. What is your professional experience?**

2 A. Prior to forming Navillus Utility Consulting LLC, I worked for Black & Veatch
3 Corporation. I worked for Black & Veatch for over 31 years as an engineer, project
4 engineer, project manager, vice president, and director. I have been responsible for the
5 preparation and presentation of numerous studies for gas, electric, water, and wastewater
6 utilities. My clients served include investor-owned utilities, publicly-owned utilities, and
7 their customers. The professional studies that I have prepared involve valuation and
8 depreciation, cost of service, cost allocation, rate design, cost of capital, supply analysis,
9 load forecasting, economic and financial feasibility, cost recovery mechanisms, and other
10 engineering and economic matters.

11 **Q. Have you previously appeared as an expert witness?**

12 A. Yes, I have. In Schedule TJS-1, I list cases where I have filed expert witness testimony
13 and appeared as an expert witness. As noted on that schedule, I have appeared before the
14 Missouri Public Service Commission (“Commission”) as an expert witness on
15 depreciation rates for Missouri Gas Energy in Case Nos. GR-2001-292, GR-2004-0209,
16 GR-2006-0422, and GR-2009-0355; The Empire District Gas Company in Case Nos.
17 GR-2009-0434 and GR-2016-0023; and, The Empire District Electric Company in Case
18 Nos. ER-2011-0004 and ER-2012-0345. I also served as an expert witness for Aquila,
19 Inc. (natural gas operations) on class cost of service, rate design, and weather
20 normalization in Case No. GR-2004-0072.

21 **Q. For whom are you testifying in this matter?**

22 A. I am testifying on behalf of the KCP&L – Greater Missouri Operations Company
23 (“GMO” or “Company”). I would also like to point out that I am filing testimony on

1 behalf of the Company in its Kansas City Power & Light Company (“KCP&L”) rate case
2 coincident with this filing.

3 **Q. What is the purpose of your direct testimony?**

4 A. I am sponsoring GMO’s proposed production cost allocation methodology used in its
5 class cost of service (“CCOS”) study. My testimony specifically focuses on the
6 classification and allocation of production related costs. Company witness Ms. Marisol
7 Miller is sponsoring the Company’s CCOS and her Direct Testimony includes the
8 discussion of the Company’s model and actual analyses. In his Direct Testimony,
9 Company witness Mr. Bradley Lutz discusses the recent history of the Company’s
10 production cost allocation and their decision regarding the methodology to use in this
11 case.

12 **Q. Do you sponsor any schedules with your testimony?**

13 A. Yes. I sponsor the following schedules:

14 Schedule TJS-1 – Expert Witness Testimony of Thomas J. Sullivan

15 Schedule TJS-2 – GMO’s Generating Facilities

16 Schedule TJS-3 – Comparison of Fuel and Capacity Unit Costs

17 Schedule TJS-4 – Comparison of Capacity Factors and Capacity Unit Costs

18 Schedule TJS-5 – Class Coincident Peak Load Factors

19 Schedule TJS-6 – Operating Characteristics of GMO’s Generating Assets

20 (Capacity Factors & Load Factors)

21 Schedule TJS-7 – Unit Costs of GMO’s Generating Assets

22 Schedule TJS-8 – Unit Costs of GMO’s Generating Asset Reflecting System-wide

23 Fuel Cost

1 Schedule TJS-9 – Comparison of Production Cost Allocations – NARUC

2 Schedule TJS-10 – Comparison of Production Cost Allocations – GMO

3 The sources of data used to prepare Schedules TJS-2, TJS-3, TJS-4, TJS-6, TJS-7, and
4 TJS-8 are the Company’s Federal Energy Regulatory Commission Form No. 1 (“FERC
5 Form 1”) for the years 2014 through 2016. Schedule TJS-9 relies upon data in the 1992
6 National Association of Regulatory Utility Commissioners Electric Utility Cost
7 Allocation Manual (“NARUC Manual”). Schedules TJS-5, TJS-7, TJS-8 and TJS-10
8 utilize data and analyses from the Company’s CCOS Study filed in this case

9 **Q. Do you support the company’s recommended use of the classification and allocation
10 of production related costs using the average and excess demand methodology?**

11 A. Yes, I do.

12 **Q. What are the primary reasons you are recommending the use of this methodology?**

13 A. In my opinion the Average and Excess Demand (“A&E”) methodology best meets the
14 primary goal of a CCOS Study which is to align cost allocation with cost causation for
15 the following reasons:

- 16 1. Lower load factor customers have directly resulted in the Company needing to
17 construct and operate facilities that have higher unit costs.
- 18 2. The cost of the facilities built to serve these lower load factor loads are
19 significantly more expensive than the facilities that would be built if the
20 system operated at a much higher load factor.
- 21 3. Fuel costs are currently recovered on an energy basis even though the lower
22 load factor generating facilities have much higher fuel costs. Thus the

1 recovery of fuel related costs on an energy basis results in a benefit to lower
2 load factor customers.

3 4. The use of allocation methods that approach an energy based allocation does
4 not give adequate differentiation between the cost associated with higher and
5 lower load factor facilities and higher and lower load factor customers.

6 5. The A&E or 100 percent demand based allocations produce results that
7 provide a reasonable balance between the energy and capacity function of
8 generating facilities.

9 **Q. Please outline your direct testimony.**

10 A. My direct testimony is broken down in the following sections:

- 11 1. Discussion of CCOS principles and definition of terms.
- 12 2. Discussion of Production Cost Allocation.
- 13 3. Discussion of GMO's generating assets and load profile.
- 14 4. History of methodologies used in Missouri and Kansas.
- 15 5. Discussion of the production cost allocation methodologies.

16 **CLASS COST OF SERVICE PRINCIPLES AND TERMINOLOGY**

17 **Q. What is the purpose of a CCOS study?**

18 A. A CCOS study is intended to determine the cost of providing service to the various
19 classes of service provided by the utility. The classes of service are defined as relatively
20 homogeneous groups of customers whose usage characteristics and service requirements
21 are similar. The classes generally align with the various rates the utility charges for
22 service. The costs allocated to the customer classes consist of the various components of
23 rate base and revenue requirements. The primary component of rate base is the net plant

1 investment in the facilities of the utility system. Revenue requirements primarily consist
2 of operation and maintenance expenses, depreciation expenses, return on rate base, and
3 taxes.

4 The CCOS study is used as a tool or as one of the principle considerations in the
5 design of the rates charged by the utility. While a CCOS study does provide the overall
6 cost of service or overall revenue requirement for each customer class, the real value of
7 the CCOS study is providing detail regarding the cost of the various functions or services
8 that the utility provides. Further, rates generally consist of fixed and variable
9 components that target specific fixed and variable costs. Fixed costs are costs that do not
10 vary with the amount of the product produced or used. Variable costs are costs that do
11 vary directly with the amount of product produced or used. To the extent practical, rates
12 should be designed to reflect the fixed and variable nature of the underlying costs.

13 **Q. Please discuss further the various functions and services provided by an electric**
14 **utility like GMO.**

15 A. The functions provided by an electric utility like GMO consist of the following:

16 Generation or Production – producing electricity.

17 Transmission – moving electricity from generating resources to general areas of
18 demand.

19 Distribution – delivery of electricity to the individual customers.

20 Customer related – providing customer specific services and services related to
21 billing customers and collecting revenues.

22 For utilities like GMO that use the FERC Uniform System of Accounts, investment and
23 operating costs are tracked at a level of detail that follows these functions.

1 Electric utilities provide service that is available 24 hours a day and 365 days a
2 year whenever the customers demand that service. The electric utility's facilities must be
3 designed to be able to respond to demands of customer over which the utility has no
4 direct control. Therefore, in the CCOS study, functional costs are further classified as
5 demand, commodity, or customer related. Demand related costs are the costs associated
6 with providing the capacity in the system needed to meet both the highest demand of
7 individual customers but also the aggregate requirements of all of its customers with an
8 adequate level of reserves to meet contingencies. Commodity (or energy) related costs
9 are the costs of providing the variable needs of the customers. Customer related costs are
10 those costs incurred to connect and serve a customer independent of the customer's actual
11 demand or usage.

12 **Q. What specific component of the CCOS study is addressed in your direct testimony?**

13 A. My direct testimony will specifically address appropriate allocation of the production or
14 generation function to customer classes.

15 **Q. Please discuss what facilities and costs constitute the production function?**

16 A. The production function for GMO consist of the power plants owned by GMO and the
17 various components associated with these generating assets up to the point where the
18 electricity is delivered to the electric transmission or distribution systems. A listing of
19 these facilities is shown in Schedule TJS-2.

20 The production net plant includes the Company's investment less the accumulated
21 depreciation associated with these facilities. Based on the FERC Uniform System of
22 Accounts, these costs are tracked in FERC Accounts 310 through 347. This breakdown
23 provides the detail on plant in service, accumulated depreciation, and depreciation

1 expenses associated with these assets. The direct costs associated with operating and
2 maintaining these facilities are tracked in FERC Accounts 500 through 557.

3 In addition to these direct costs, the revenue requirement for production also
4 includes the return and income taxes associated with the rate base associated with these
5 facilities as well as allocations of taxes other than income taxes and an allocation of
6 general and administrative costs.

7 **Q. How are electric production related costs classified?**

8 A. Generally, the non-fuel production (function) related costs are classified as demand
9 (capacity) and commodity (energy). Fuel (used in the generating facilities) is usually
10 unbundled from the CCOS study and collected through a separate fuel charge component
11 of the rate or in some manner that directly accounts for fuel. There are several different
12 methodologies that are used to determine what portion of non-fuel production related
13 costs are classified as demand or capacity and commodity or energy. Later in my
14 testimony, I will discuss not only the A&E methodology I am recommending but other
15 methodologies that have been used or considered for use for GMO in the recent past.

16 **Q. Once non-fuel production related cost are classified, how are these costs allocated to
17 customer classes?**

18 A. The Production Demand related costs are typically allocated to customer classes based on
19 some measure of the customer class's share of the peak demand of the system. The
20 Production Commodity related costs are allocated to customer classes based on the
21 customer class' share of the annual energy requirements (or total energy production) of
22 the system.

1 **Q. Please define what you mean by commodity or energy requirements.**

2 A. A customer class's commodity or energy requirements are the class's aggregate sales plus
3 energy losses usually measured in kilowatt-hours ("kWh"). In the context of the CCOS
4 study the sales can be annual, monthly, or seasonal. The losses for each customer class
5 represent the amount of energy in excess of what the customer consumes that needs to be
6 inputted into the system in order to account for the energy losses that occur through all of
7 the facilities required to deliver that energy to the customer. For example, each time the
8 energy flows through a transformer, a certain amount of energy is lost (as heat) in the
9 process of increasing or decreasing the voltage. So, all other things being equal, the
10 losses associated with each customer class are generally correlated with the voltage level
11 at which the customers in that class are served.

12 **Q. Please define what you mean by Capacity or Peak requirements.**

13 A. The customer class's capacity or peak requirements are the class's aggregate rate of
14 energy usage plus losses usually measured in kilowatts ("kW"). There are several
15 different ways to measure this peak requirement. The rate of energy use can be viewed
16 as the amount of energy used in one hour (or sometimes shorter time periods such as 15
17 minutes). The peak demands discussed in my testimony will be one hour demands.
18 Class coincident peak ("CP") is the aggregate demand of that class at the time of
19 (coincident with) the system peak. Class non-coincident peak is the maximum aggregate
20 demand of that class that occurs any time during the time period defined. The non-
21 coincident peaks ("NCP") of each of the customer classes do not necessarily occur at the
22 time of the system peak and they do not necessarily occur at the same time as each other
23 (i.e. one class's NCP may not occur at the same time as another class's NCP). CP's and

1 NCP's can be defined both annually, monthly, seasonally or ranked (the highest 4 CP's
2 for example). For purposes of production cost allocation, the class demands are
3 aggregated for the class. The class demands are the sum of the demands for all of the
4 customers in that class at a given point in time; in other words, for the class, the demands
5 of the individual customers are coincident with each other (i.e. occur at the same time).

6 **Q. Are there some other terms you would like to discuss prior to discussing specific**
7 **production cost allocation methodologies?**

8 A. Yes. There are four terms I would like to define and discuss because they are particularly
9 important to the discussion of the production cost allocation – Capacity Factor, Load
10 Factor, Coincident Peak, and Non-Coincident Peak.

11 **Q. Please define what you mean by capacity factor.**

12 A. Capacity factor as it relates to an electric utility is defined as the ratio of the average
13 output (kilowatts) of a generating unit over a specified period of time to the rated
14 capacity (kilowatts) of a generating unit over that same time period. Capacity factor is a
15 measure of how efficiently the unit is operated or dispatched. For example, if a
16 generating unit with a rated capacity of 200,000 kilowatts generates 1,314,000,000
17 kilowatt-hours of electricity over a year for an average output of 150,000 kilowatts
18 (1,314,000,000 kilowatt-hours divided by 8760 hours in a year), that unit had a capacity
19 factor of 75 percent. In other words, the unit produced 75 percent of the energy it could
20 have theoretically produced if it operated 100 percent of the time at its rated capacity.

21 **Q. What factors impact the capacity factor of a generating unit.**

22 A. There are several factors that impact a unit's capacity factor. One factor is the variable
23 operating cost of the unit. The variable operating costs include both the fuel cost of the

1 unit as well as the variable operation and maintenance expenses associated with the unit.
2 When an electric utility's generating units are dispatched, it generally makes the most
3 economic sense to dispatch the available units with the lowest variable cost first. This
4 will generally result in the lowest overall variable cost of operating the facilities. With
5 this in mind, there are factors other than economic dispatch that might impact which units
6 are dispatched at any specific point in time. The second factor is the availability of the
7 unit. The availability of the unit is a function of several factors including the age of the
8 unit, the cycle of regularly scheduled maintenance, and other unplanned outages or
9 unscheduled maintenance and repairs. Further, how the unit is used (i.e. the frequency of
10 restarts) impacts the availability of the unit. Most generating units operate most
11 efficiently if they are operating at or near their rated capacity with minimal fluctuations in
12 output or restarts. Fluctuations in output and restarts are generally caused by variations
13 in system demand. Fluctuations in output and restarts cause stress on equipment that
14 increases operation and maintenances costs and reduces the life of components.

15 **Q. Please define what you mean by load factor.**

16 A. Load factor for an electric utility is defined as average demand divided by peak demand.
17 Load factor is a measure of how efficiently a customer uses the facilities required for
18 service. For example, if a customer uses 8,760 kilowatt-hours over the course of a year,
19 that customer's average demand is 1 kilowatt. However, if the customer used 5 kilowatts
20 during the hour of its maximum demand, the customer's load factor would be 20 percent
21 (1 divided by 5). If this customer's demand also occurred at the same time as the system
22 peak, this 20 percent could further be stated at the customer's coincident peak load factor.
23 If, on the other hand, this demand occurred at a time other than the system peak, this 20

1 percent would be stated as the customer's non-coincident peak load factor. A customer
2 with a 20 percent load factor, on average used 20 percent of the capacity available to
3 serve their demand; or stated differently, 80 percent of the available capacity was not
4 fully used.

5 While capacity factor is typically used to measure the output of a generating unit,
6 load factor can be used as either a measure of a customer's load profile or as a measure of
7 how the generating asset is used over a finite period of time. Also, there is a subtle
8 difference between a generating unit's capacity factor and its load factor. Load factor for
9 a generating unit would be based on the unit's peak output whereas capacity factor is
10 based on the unit's rated capacity.

11 **Q. When you use the terms peak or average demand in your testimony, do the figures**
12 **include allowance for losses?**

13 A. Yes. In my testimony, when I am referring or referencing specific numbers, the class
14 average demands are based on the annual customer class demands including allowance
15 for losses and the class peak demands also include allowance for losses. Therefore, all
16 the figures are assumed to be at the system input level, rather than what is ultimately
17 measured at the meter. So, for example, if a customer uses 1,000 kilowatt-hours in a
18 month, the amount of energy that actually has to be generated is higher than that figure
19 due to the fact that some energy is lost or consumed through the delivery of that energy
20 through the system.

21 **Q. Please define coincident peak.**

22 A. In the context of my testimony, I will use the term Coincident Peak to mean the class
23 peak coincident (occurring at the same time) with the system peak. The coincident peak

1 associated with the single highest system demand is referred to as the 1 CP. I refer to
2 coincident peaks based on the average of multiple months as the number with CP. For
3 example, 3 CP would mean the average of the three highest class coincident peaks in
4 three different months.

5 **Q. Please define Non-coincident peak.**

6 A. In the context of my testimony, I will use the term Non-coincident Peak to mean the
7 highest demand for the class occurring at any time (may or may not be coincident with
8 the system peak). The non-coincident peak associated with a class' highest demand is
9 referred to as the 1 NCP. I refer to non-coincident peaks based on the average of multiple
10 months as the number with NCP. For example, 3 NCP would mean the average of the
11 three highest class peaks in three different months.

12 **Q. Within a customer class, how is the CP or NCP determined.**

13 A. When I use the term CP or NCP, I am assuming that within a class the peak demands of
14 the individual customers are coincident with each other and the CP and NCP are the
15 aggregated demand of the whole class. There may be demand factors used (on
16 distribution facilities for example) where the term NCP may mean the sum of the
17 individual customer demands that may not be coincident with each other, but in the
18 context of my testimony, I will only be referring to class demands where the demands of
19 the individual customers within the class are coincident with each other.

1 **PRODUCTION COST ALLOCATION**

2 **Q. What is the overall goal of cost allocation in general and production cost allocation**
3 **in particular as it relates to a CCOS study?**

4 A. The goal of a CCOS study is to align the cost with causation to the maximum extent
5 practical. In other words, the cost should be aligned as closely as practical to the
6 customers who result in the cost being incurred. Different types of generating assets are
7 more efficient at serving different types of loads. The utility's decisions regarding what
8 generating assets are to be built are based on analysis of these loads and the relative cost
9 of different types of generating assets that could serve these loads, the goal being to
10 construct facilities that result in the lowest overall cost. The relative unit costs of these
11 different types of generating assets can generally be summarized as follows:

- 12 1. Higher capital (fixed) cost facilities generally have lower operating
13 (variable) costs.
- 14 2. Lower capital cost facilities generally have higher operating costs.

15 As such, the lowest overall cost usually results from building the higher fixed cost
16 facilities to operate at high capacity (or load) factors and the lower fixed cost facilities to
17 operate at lower capacity (or load) factors.

18 As system load factor declines with the corresponding decline in the capacity
19 factors of the generating assets – base load units become less economical and the
20 generation mix turns to intermediate and peaking type units that have lower capital costs
21 but higher operating costs. Overall such units have higher unit costs because their costs
22 correspond with less generation (lower capacity factors). Also, as system load factor
23 declines, the diversity between customer classes generally increases and you start to see

1 the stratification between customer classes. This stratification will manifest itself in
2 increasing differences between average demand and peak demand allocation factors as
3 the spread between class load factors increase.

4 The allocation of generation costs should then primarily focus on properly
5 allocating costs to the classes that produce the lower load factor and the higher unit cost
6 associated with intermediate and peaking generation.

7 **Q. Have you confirmed these relationships as they relate to the Company's generating**
8 **assets?**

9 A. Yes. In Schedule TJS-3 I provide a graph that shows the fixed cost of GMO's principle
10 generating resources in terms of the original cost of the facilities divided by their rated
11 capacity (\$/kW) and their average fuel cost (\$/kWh) for 2016. As shown in this graph,
12 the variable fuel cost is generally inversely correlated to the fixed capacity cost of the
13 facilities.

14 In Schedule TJS-4, I show the relationship between capital cost and capacity
15 factor over the 2014-2016 period. The graph shows that the higher capital cost units have
16 higher capacity factors (they are dispatched more). It should be noted that as discussed
17 previously, a unit's capacity factor is also impacted by issues other than cost.

18 **Q. Is there one specific cost allocation methodology that is Generally better at aligning**
19 **costs to the customer classes causing the cost?**

20 A. No. The methodology used should take into consideration the following:

- 21 1. The load characteristics of the customers served by the utility.
- 22 2. The generating assets constructed to meet customer requirements.
- 23 3. How fuel costs are recovered.

1 4. Methodologies generally used by similarly situated utilities.

2 As a secondary consideration, the methodology historically used by the utility should also
3 be taken into consideration primarily from the perspective of the impact the CCOS study
4 may have on the design of rates. In my opinion, the methodology used should not be
5 driven by what has been used in the past. The methodology used should be the
6 methodology that best recognizes the four considerations listed above. However, I do
7 recognize that a change in methodology and full application of this methodology in the
8 design of rates could be disruptive and the reflection of a methodological change in rate
9 design may need to be phased in over time to mitigate disruption.

10 **Q. Is there one specific cost allocation methodology that is recommended by the**
11 **NARUC Manual?**

12 A. No. The intent of the manual (published in 1992) was to provide a comparison of
13 methodologies in use at the time the manual was published. The manual specifically
14 discusses the following methodologies for production cost allocation:

15 Peak Demand Methods

- 16 1. Single Coincident Peak (“1 CP”)
- 17 2. Summer and Winter Coincident Peak (“6 CP”)
- 18 3. Monthly Coincident Peak (“12 CP”)
- 19 4. Other Multiple Coincident Peaks (“4 CP” would be an example)
- 20 5. All Peak Hours (“On-peak Energy”)

21 Energy Weighting Methods

- 22 6. Average and Excess
- 23 7. Equivalent Peaker

- 1 8. Base and Peak
- 2 9. Judgmental Energy Weighting (includes Average and Peak)

3 Time Differentiated Methods

- 4 10. Production Stacking
- 5 11. Base-Intermediate-Peak
- 6 12. Loss of Load Probability (“LOLP”)
- 7 13. Probability of Dispatch (“POD”)

8 Within these methods there are also hybrids. For example, the energy weighting methods
9 might include either coincident peaks or non-coincident peaks and differing number of
10 peaks (3, 4, 6, or 12, for example).

11 **Q. Is there a common point of comparison between these various methods?**

12 A. Yes. All of these methods use different approaches to determining the relative weighting
13 of capacity (peak) and energy requirements in the allocation of production related costs.
14 Generally speaking, the relative weightings will range from a Single Non-Coincident
15 Peak Method which allocates all the costs on the basis of non-coincident peak demand to
16 methodologies that approach a pure energy allocation. Generally, the higher number of
17 peaks included in the calculation combined with a higher percentage weighting of energy
18 in the allocation will generally produce allocations that near a pure energy allocation.

19 **Q. Are all of the methodologies identified in the NARUC Manual commonly used?**

20 A. No. Based on my review of GMO’s recent rate cases and recent rate cases filed in
21 Missouri and Kansas, the following methods have generally been used or proposed (with
22 various numbers and types of peaks - CP versus NCP):

- 23 1. Average and Excess

1 2. Average and Peak

2 3. Base-Intermediate-Peak

3 In the remainder of my testimony, I will primarily focus on these methodologies. I will
4 also use the 1 NCP and 1 CP method and pure energy allocation method for comparative
5 purposes. Please refer to the direct testimony of company witness Mr. Bradley Lutz for a
6 more detailed history of the use of the methods above as they pertain to GMO.

7 **Q. Of the methodologies on which you will focus in the remainder of your testimony,**
8 **please generally discuss the relative weighting of peak demand and energy**
9 **requirements in those allocation bases.**

10 A. If the three methodologies are considered along a continuum with a 1 NCP or 1 CP
11 method having a zero weighting of energy requirements and a pure energy allocation
12 having a 100 percent weighting of energy requirements, the three methodologies listed
13 above can generally be ranked as follows as they relate to a 1 NCP methodology:

14 1. 1 NCP

15 2. 1 CP

16 3. Average and Excess

17 4. Peak and Average

18 5. Base-Intermediate-Peak

19 6. Energy Only

20 Later in my testimony, I will provide examples of the allocation bases produced by these
21 methods as discussed in the NARUC Manual and also as they relate to test year analyses
22 in this case.

1 **GMO'S LOAD PROFILE AND GENERATING ASSETS**

2 **Q. What are the primary considerations in determining the appropriate cost allocation**
3 **methodology for GMO?**

4 A. As stated above, the primary considerations are the Company's load profile and the
5 generating assets constructed to serve that load profile. If a system operated at a very
6 high load factor (say 80 percent or higher), the differences between the load profiles of
7 the customer classes would be small and thus the differences between allocation
8 methodologies would be relatively small. Further, the utility would generally build base
9 load generating facilities that are intended to operate at very high capacity or load factors.
10 There would be a great deal of homogeneity between the generating resources. As
11 system load factor declines, the relative differences between class load profiles and
12 allocation methods increases and the utility relies upon ever increasing investments in
13 peaking units (the homogeneity between generating resources decreases) which have
14 lower capital costs but higher operating and fuel costs. Also, as system load factor
15 declines, the overall utilization rates (capacity factors and load factors) of all of the
16 generating units decline. Base load units are cycled more and peaking units are cycled
17 even more. The core issue in any production cost allocation is who should pay for the
18 higher unit costs that result from the lower utilization of generating units and the greater
19 reliance upon peaking units. In other words, who should pay for the unused or under-
20 utilized capacity? The simple answer is the customers who contribute to the unused or
21 underutilized capacity or, broadly speaking, the customer classes whose usage
22 characteristics contribute to the lower system load factor.

1 **Q. Please explain how load profile should determine the appropriate cost allocation**
2 **methodology.**

3 A. For systems with very high load factors, the differences in load profile between the
4 classes are relatively small with all of the classes necessarily having very high load
5 factors. In other words, there is a great deal of homogeneity between the load profiles of
6 the various customer classes and also a great deal of homogeneity between the generating
7 assets. As such, it would be difficult to argue that particular classes are contributing to
8 unused capacity since the capacity is being highly utilized. As such, it would be
9 reasonable to utilize methodologies that are more energy based. Also, as a practical
10 matter, there would be little difference in the results produced by different
11 methodologies.

12 As system load factor declines and differences between class load factors
13 increases (i.e. there is not homogeneity between the customer classes and less
14 homogeneity between generating assets), the differences between a pure peak and a pure
15 energy allocation increase. Most importantly, allocation bases that give higher
16 recognition to energy requirements become less and less appropriate because they fail to
17 adequately recognize which classes are contributing to the lower system load factor and
18 higher cost.

19 **Q. Based on the Test Year Ended June 30, 2017, what are the class load factors for the**
20 **Customer classes used in GMO's CCOS study?**

21 A. Schedule TJS-5 summarizes the derivation of class load factors based on test year
22 coincident peak demand (1 CP) and test year energy requirements. As shown in
23 Schedule TJS-5, the system load factor is 54 percent and the class load factors range from

1 41 percent for the Residential class to 80 percent for the Large Power Service class. The
2 Small and Large General Service classes have load factors that are close to the system
3 load factor, 63 percent and 57 percent, respectively. Based on this analysis, there are
4 significant differences between the class load factors with the Residential class being the
5 primary contributor to the system's relatively low load factor.

6 **Q. Is there a significant diversity in GMO's generating resources and how these**
7 **resources are operated?**

8 A. Yes. As shown in Schedule TJS-6, there is diversity in types of units, fuels used, and in
9 how the units are used. There is a very clear delineation between plants that have high
10 rates of utilization and plants that have low rates of utilization. As shown in Schedule
11 TJS-7, the plants with the highest utilization rates also have the lowest fuel cost and
12 generally the lowest overall unit cost.

13 **Q. What Is the correlation between how GMO's Generating resources are operated**
14 **and customer demands?**

15 A. The high utilization rate and low cost units generally meet the highest load factor
16 demands. In other words, the high consistent customer use is met by these highly utilized
17 and lowest unit cost plants. Conversely, the low utilization rate and higher cost units are
18 used sparingly to meet the lowest load factor demands. These lowest load factor
19 demands are the infrequent higher demands caused by lower load factor customers.

20 **Q. Please discuss Fuel Costs and how they are related to the CCOS study.**

21 A. Fuel costs are recovered through a combination of fuel in the base rates plus a separate
22 FAC rider that tracks the difference between the base amount of fuel and the incremental
23 change in fuel costs. As such fuel costs are tracked separately from the non-fuel portion

1 of base rates. As such the CCOS study generally focuses on the non-fuel related
2 production costs. Generally, fuel costs are recovered from customers on an aggregated
3 basis (system-wide unit cost) with no specific recognition given to the differences in fuel
4 costs between generating units and how the usage characteristics of different customer
5 classes contribute to how generating units with different fuel costs are utilized to meet the
6 different customer class requirements. The primary reason for this is to simplify the
7 application and administration of the fuel cost rider. As shown in Schedule TJS-7, there
8 are significant differences in the fuel costs between the generating units and as shown in
9 Schedule TJS-6, there are significant differences in how the units are utilized. Further, as
10 discussed above, how the units are utilized is directly related to the differing customer
11 requirements.

12 **Q. Is the cost recovery of fuel Costs relevant to the allocation and cost recovery of non-**
13 **fuel costs?**

14 A. Yes. As indicated above, the unit fuel cost does not reflect the significant differences in
15 fuel cost between generating units and the significant difference in customer
16 requirements that cause these different fuel costs to be incurred. As such, it is important
17 to recognize that this difference exists when considering how the non-fuel production
18 related costs should be allocated to customer classes. While there are a variety of reasons
19 that it makes sense to use a system-wide average fuel cost, that does not mean that
20 differences in fuel costs should be ignored in developing the overall cost to serve
21 customer classes and ultimately in the overall rate design. The CCOS study can and
22 should take into consideration the overall cost of the generating assets.

1 **Q. How can the costs of the generating units reflect the actual treatment of fuel costs?**

2 A. In Schedule TJS-7, I show the actual unit fuel costs for each of the Company's generating
3 units for the 2014-2016 period, as well as the overall unit fuel cost (on Line 15). The
4 total unit costs for each unit shown on Lines 21-40 reflect each generating unit's specific
5 fuel cost. In Schedule TJS-8, I show the unit cost of each unit excluding their fuel costs
6 on Lines 2 through 14 and including the system-wide average fuel cost (in lieu of the
7 unit's specific fuel costs) on Lines 17 through 29. As shown on Lines 15 and 30, the total
8 overall non-fuel cost does not change, only the units' costs of the individual units.

9 **Q. How can the analysis shown in Schedule TJS-8 be used to determine how non-fuel
10 production costs should be allocated to customer classes?**

11 A. On Line 32 of Schedule TJS-8, I show the average unit cost of the four most highly
12 utilized generating units for each year, and on Line 34, I show the average unit cost of the
13 remaining generating units. These unit costs reflect the use of a system-wide unit cost for
14 fuel. A comparison between Lines 32 and 34 shows that the unit cost of the highly
15 utilized generating units is significantly lower than the unit cost of the remaining (lower
16 utilized) generating units. In 2016, this cost difference was approximately \$0.055 per
17 kWh. The differences were higher in 2015 and about the same in 2014.

18 The allocation methodology used to allocate production related costs should
19 recognize both this difference in cost and how the customer classes contribute to this
20 difference in cost. The use of an energy based allocation basis, allocation bases that
21 heavily weight energy, or allocation bases that approximate the result produced by an
22 energy allocation will not adequately reflect these differences in cost and the customer
23 classes whose usage characteristics contribute to these differences.

1 **METHODOLOGIES USED BY OTHER UTILITIES IN MISSOURI AND KANSAS**

2 **Q. Would you please discuss production cost allocations recently used in Missouri and**
3 **Kansas?**

4 A. As I indicated earlier, the production cost allocations used or proposed in recent Missouri
5 and Kansas rate cases include the following:

- 6 1. Average and Excess
- 7 2. Average and Peak
- 8 3. Base-Intermediate-Peak

9 Mr. Lutz discusses the history of the methodologies used in the Company’s recent rate
10 case. I would like to focus on the methodologies used by the other two large electric
11 utilities in Missouri and Kansas, Ameren and Westar, respectively.

12 **Q. What methodologies were proposed in the most recent Ameren rate case?**

13 A. In its most recent case in Missouri Public Service Commission Docket No. ER-2016-
14 0179, Ameren’s witness proposed the use of the A&E Demand methodology using the
15 maximum four monthly non-coincident peaks for the class peak demands. The Missouri
16 Public Service Commission Staff proposed the use of the BIP methodology. The witness
17 for the Missouri Industrial Energy Consumers (“MIEC”) proposed the use of the A&E
18 methodology using the two highest summer non-coincident peaks for the class peak
19 demands.

20 **Q. What methodologies were proposed in the most recent Westar rate case?**

21 A. In its most recent rate case in Kansas Corporation Commission (“KCC”) Docket No. 15-
22 WSEE-115-RTS, Westar’s witness proposed the use of the A&E methodology using the
23 four monthly highest coincident peaks for the class peak demands. The KCC Staff

1 proposed a method that would best be described as average and peak where costs
2 classified as average and peak using the same classification as the A&E methodology but
3 the peak portion is allocated based on the class' four monthly highest coincident peak
4 demands.

5 **Q. Why does it matter what methodologies are used for Ameren and Westar?**

6 A. The primary reason it matters deals with competition and specifically competition for
7 industrial customers. As discussed earlier in my testimony, GMO's industrial customers
8 generally have a very high load factor, much higher than the system average and much
9 higher than the other customer classes. As will be discussed in the next section of my
10 testimony, of the three methodologies predominantly recommended in Missouri and
11 Kansas, the A&E methodology is the only method that gives a significant recognition to
12 the relative load factors of the customer classes. Further, when a system is not operating
13 at a very high load factor, the A&E methodology is the only method that reasonably
14 assigns the higher cost of unused capacity.

15 If the CCOS study is used as a principle tool in assigning the utility revenue
16 requirement to customer classes and thus rate design, industrial cost responsibility and
17 thus industrial rates for utilities using the A&E methodology will be lower than using
18 either of the other two methodologies, all other things being equal. Thus, if the rates for
19 the two major utilities with which GMO competes are using the A&E methodology and
20 GMO is not, GMO will be at a competitive disadvantage in attracting and retaining
21 industrial load.

1 **Q. Why is it important to attract and retain industrial load?**

2 A. There are numerous reasons why this is important. First, industrial customers have
3 higher load factors that increase the overall efficiency of the electric system, particularly
4 generation and transmission facilities. The loads are stable throughout the day, allowing
5 the utility to invest in lower cost base load generating facilities. Second, industrial
6 customers usually provide a large amount of direct and indirect jobs. The direct jobs are
7 associated with the industrial facility itself. The indirect jobs include the supporting
8 companies that provide materials to the facility and the residential and commercial
9 development supported by the employees of the industrial company.

10 **DISCUSSION OF PRODUCTION COST ALLOCATION METHODOLOGIES**

11 **Q. Up to this point you have discussed several production cost allocation**
12 **methodologies. can you please define these methodologies, starting with the average**
13 **and Excess Demand methodology?**

14 A. The A&E method is a hybrid method combining average demand and peak demand
15 components. The rationale of hybrid methods is that generating assets serve the function
16 to meet requirements 8,760 hours a year and, also to meet peak hour requirements. The
17 hybrid methods seek to balance these two functions in the allocation.

18 I generally prefer to view the A&E method as two steps even though the
19 mathematics can be combined into one overall allocation factor. The first step in the
20 application of the A&E method is to determine how much non-fuel cost is classified to
21 the Energy function and how much is assigned to the Capacity (or Demand) function. In
22 the A&E method, the amount classified to the Energy function is equal to the system load

1 factor (based on the annual system peak). One minus the system load factor is then
2 classified as Capacity related.

3 In the second step, the amount classified to the Energy function is then allocated
4 to customer classes based on the class annual energy requirements or average demand.
5 The amount classified to the Capacity function is allocated to customer classes based on
6 the class peak demand in excess of their average demand (in other words, peak demand
7 minus average demand).

8 **Q. Please define the A&P demand methodology.**

9 A. While there may be different iterations of the A&P method, the following is how it will
10 be used in my testimony. This method is similar to the A&E method in that the
11 classification of costs between Energy and Capacity is done the same way. The
12 allocation of the cost classified as Energy is also allocated in the same fashion. The
13 difference is that the Capacity component is allocated to customer classes based on the
14 total class peak demand.

15 **Q. Please define the BIP methodology.**

16 A. The BIP method is based upon assigning generating resources to base, intermediate and
17 peaking components based the type of load the unit primarily serves usually based on the
18 relative operating costs of the units. For example, a base load unit (a unit operating at a
19 high capacity or load factor) runs most of the time and thus serves load during base,
20 intermediate and peaking periods. A peaking unit that has a very low capacity or load
21 factor would generally only operate during peak (or emergency) periods and thus only
22 serves load during peak periods. Once the non-fuel costs are classified as base,
23 intermediate and peaking, there may be a variety of methods used to allocate costs to

1 customer classes. Costs classified as peaking would be allocated based on some measure
2 of demand during peak period, cost classified as intermediate based on some measure of
3 intermediate or shoulder period demand, and base costs allocated on average demand.

4 **Q. Please define the non-Coincident Peak Demand (1 NCP) methodology.**

5 A. While the three methods previously discussed would be considered hybrid methods, the
6 next three methods I discuss would be considered either pure demand or energy methods
7 in that costs are allocated based on either 100 percent peak demand or 100 percent energy
8 (or average demand).

9 The 1 NCP method assigns 100 percent of the non-fuel costs to the Capacity
10 function and then allocates costs to customer classes based on the class NCP as a
11 percentage of the sum of all the classes NCP. While this method would not typically be
12 used to allocate production related costs, I have included it in my testimony for
13 comparative purposes with the other methods.

14 **Q. Please define the Coincident Peak Demand (1 CP) methodology.**

15 A. The 1 CP method assigns 100 percent of non-fuel costs to the Capacity function and then
16 allocates costs to customer classes based on the class CP contribution to the overall
17 system CP.

18 **Q. Please describe an allocation based on 100 percent energy requirements.**

19 A. As the name implies, this method assigns 100 percent of the non-fuel costs to the Energy
20 function and then allocates costs to customer classes based on annual requirement (or
21 average demand). Like the 1 NCP method, this method is not commonly used to allocate
22 capacity related costs but is include for comparative purposes. However, as previously

1 discussed, the fuel portion of production costs are essentially allocated to customer
2 classes using this allocation.

3 **Q. Please generally contrast each of these methodologies?**

4 A. In Schedule TJS-9, I show an example of the resulting composite allocation (combining
5 the energy and capacity components into one allocation factor) using each of these
6 methods. I have used the example utility used in the NARUC Manual to demonstrate
7 each of the methods. Generally speaking, the results produced by these methods can be
8 segregated into two groups. The single peak and A&E methods tend to produce similar
9 results. Likewise, the pure energy and BIP tend to produce similar results, with the A&P
10 being somewhat towards the midpoint of all the methods.

11 The single peak and A&E methods tend to allocate more cost to lower load factor
12 customer classes and less to higher load factor customer classes. The BIP method differs
13 very little from a pure energy allocation.

14 **Q. Please discuss the impact of including multiple peaks in the demand allocation
15 factors.**

16 A. Generally, the use of multiple peaks will tend to dilute the impact that peak demand has
17 on the allocation bases and will tend to move the allocation towards a pure energy
18 allocation. This makes some intuitive sense for a couple of reasons. First, as more hours
19 are included in the demand analysis, you by necessity are moving towards an energy
20 allocation basis. Second, as more hours are included, the impact is to reduce the gross
21 demand of lower load factor customer classes since these classes have more variability in
22 their hourly demands than do higher load factor customer classes where demands do not
23 vary significantly from hour-to-hour.

1 **Q. Have you done a comparative analysis of methodologies based on GMO?**

2 A. Yes. In, Schedule TJS-10 I compare the resulting allocation factor using a 1 NCP, 1 CP,
3 A&E – 4 NCP, A&E – 4 CP, A&P – 4 NCP, and pure energy allocations. The results are
4 very similar to the analysis in Schedule TJS-9 from the NARUC Manual.

5 Like the single peak methods, the A&E method results in an allocation that
6 specifically differentiates between customer classes with high load factors and low load
7 factors. Further, there is not a great deal of variation between methods for customer
8 classes with load factor near the system average.

9 **Q. What methodology do you believe best achieves the goals you identified earlier in**
10 **your testimony regarding production cost allocation?**

11 A. The Average and Excess Demand methodology.

12 **Q. Please explain why.**

13 A. As I stated earlier in my testimony, the goal of a CCOS study is to align the cost with
14 causation; cost should be aligned as closely as practical to the customers who result in the
15 cost being incurred. Different types of generating assets are more efficient at serving
16 different types of loads. The utility's decisions regarding what generating assets are to be
17 built are based on analysis of these loads and the relative cost of different types of
18 generating assets that could serve these loads, the goal being to construct facilities that
19 result in the lowest overall cost.

20 In my opinion the A&E methodology best meets this goal for the following
21 reasons:

22 1. Lower load factor customers have directly resulted in the Company
23 needing to construct and operate facilities that have higher unit costs.

- 1 2. The cost of the facilities built to serve these lower load factor loads are
2 significantly more expensive than the facilities that would be built if the
3 system operated at a much higher load factor.
- 4 3. Fuel costs are currently recovered on an energy basis even though the
5 lower load factor generating facilities have much higher fuel costs. Thus,
6 the recovery of fuel related costs on an energy basis results in a benefit to
7 lower load factor customers.
- 8 4. To use allocation methods that approach an energy based allocation does
9 not give adequate differentiation between the cost associated with higher
10 and lower load factor facilities and higher and lower load factor
11 customers.
- 12 5. The A&E or 100 percent demand based allocations produce results that
13 provide a reasonable balance between the energy and capacity function of
14 generating facilities.

15 Further, as discussed earlier in my testimony, the production cost allocation
16 methodologies used by utilities in the region are an important consideration primarily due
17 to how the cost allocation ultimately impacts rate design, particularly for higher load
18 factor, large industrial customers. Since the other large utilities in Missouri and Kansas
19 use the A&E methodology, designing rates for GMO using either the A&P or BIP
20 methodologies puts GMO at a competitive disadvantage relative to these other utilities.
21 Therefore, using the A&E methodology for cost allocation for GMO and using the
22 resultant cost allocation as the basis for rate design is more reasonable than using the

1 methods used in the past for GMO since using the A&E methodology results in a better
2 alignment of the basis for GMO's rates with these other utilities.

3 **Q. Does this complete your direct testimony?**

4 A. Yes, it does.

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

In the Matter of KCP&L Greater Missouri)
Operations Company’s Request for Authority to) Case No. ER-2018-0146
Implement A General Rate Increase for Electric)
Service)

AFFIDAVIT OF THOMAS J. SULLIVAN, JR.

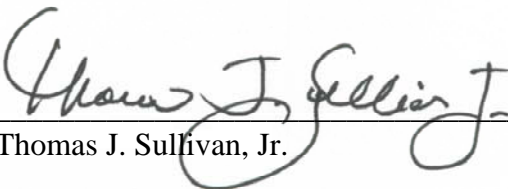
STATE OF MISSOURI)
) ss
COUNTY OF JACKSON)

Thomas J. Sullivan, Jr., being first duly sworn on his oath, states:

1. My name is Thomas J. Sullivan, Jr. and my business address is Navillus Utility Consulting LLC, 15898 Millville Road, Richmond, Missouri, 64085. I have been retained to serve as an expert witness to provide testimony on behalf of KCP&L Greater Missouri Operations Company.

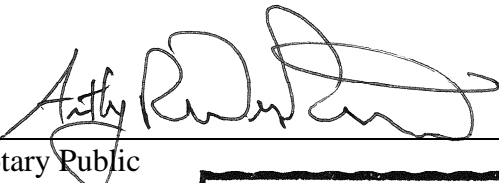
2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of KCP&L Greater Missouri Operations Company consisting of thirty-two (32) pages, having been prepared in written form for introduction into evidence in the above-captioned docket.

3. I have knowledge of the matters set forth therein. I hereby swear and affirm 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.



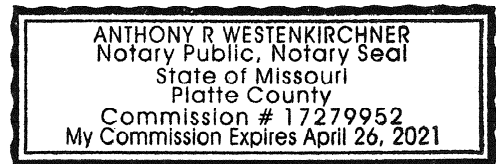
Thomas J. Sullivan, Jr.

Subscribed and sworn before me this 29th day of January, 2018.



Notary Public

My commission expires: 4/26/2021



Expert Witness Testimony of Thomas J. Sullivan, Jr.

- Peoples Natural Gas Company of South Carolina, South Carolina Public Service Commission Docket No. 88-52-G (1988). Natural gas utility revenue requirements and rate design.
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- Kinder Morgan, Inc., LLC, Wyoming Public Service Commission Docket No. 30022-GR-6-73 (2006). Natural gas utility weather normalization adjustment, development of load factors, billing cycle adjustment, determination of test year billing units and revenue, and depreciation rates.
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- Aquila Networks, Nebraska Public Service Commission Docket No. NG-0041 (2006). Natural gas utility jurisdictional and class cost of service study, rate design, and revenue synchronization adjustment.
- Zia Natural Gas Company, New Mexico Public Regulation Commission Case No. 08-00036-UT (2008). Natural gas utility billing determinants and revenues, weather normalization adjustment, customer growth adjustment, peak day analysis, revenue requirement, class cost of service study, and rate design.
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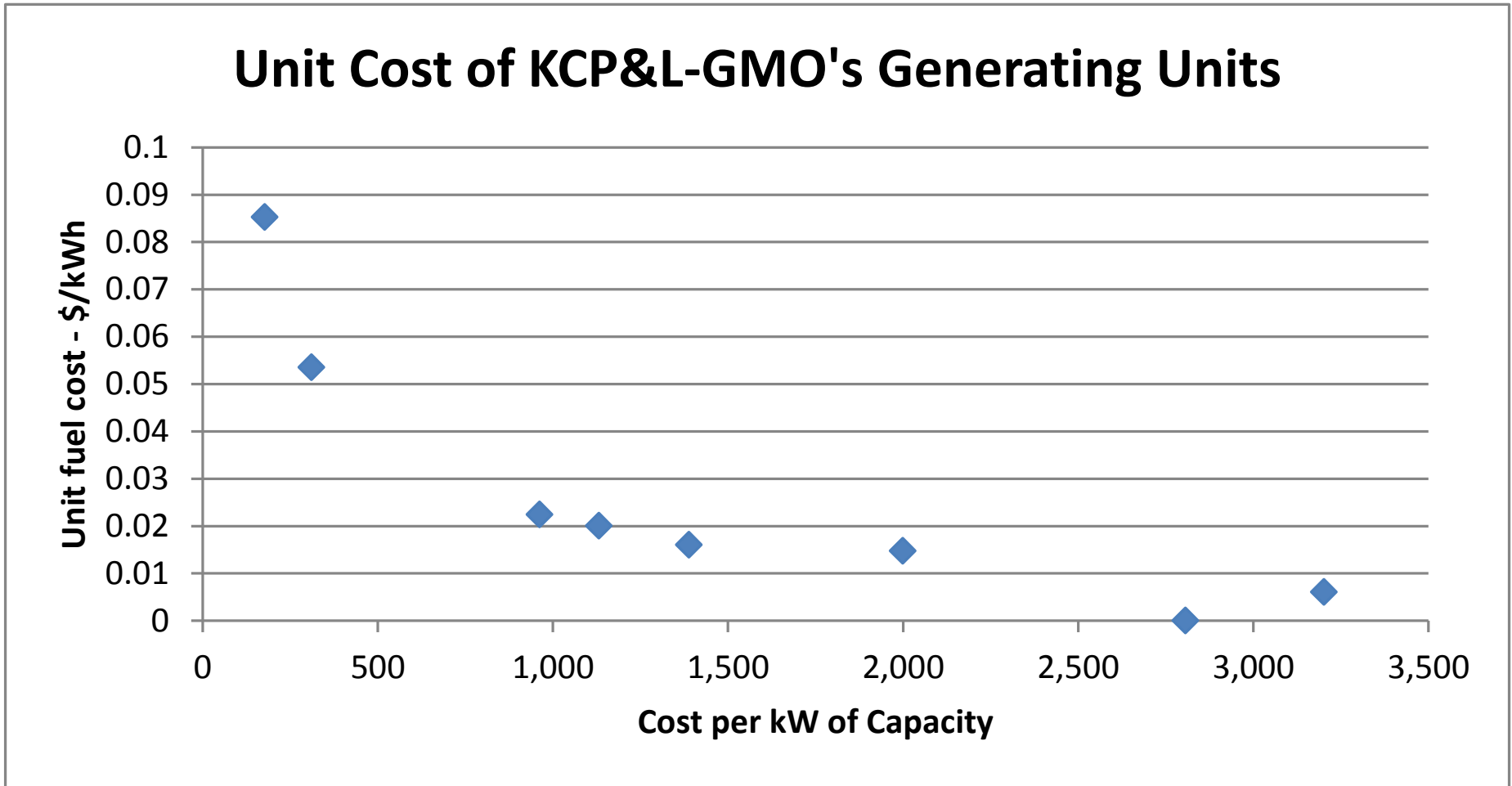
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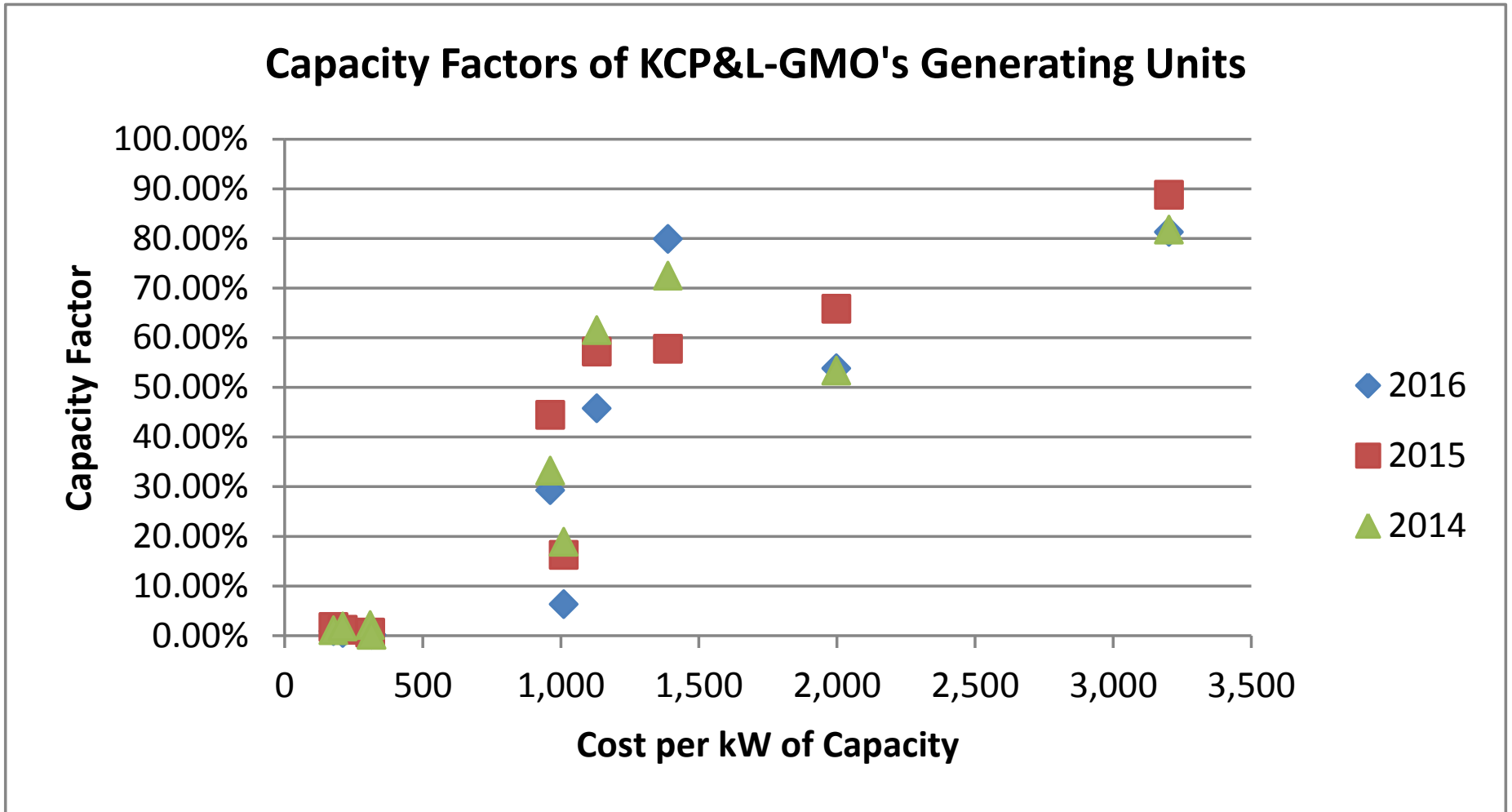
Kansas City Power & Light Company - Greater Missouri Operations
 Generating Facilities

[A] [B] [C] [D] [E]

Line No.	Description	KCPL Ownership	Fuel	Plant Type	Generating Capacity (1) MW
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1	Sibley	100.00%	Coal/Other	Steam	523.50
2	Ralph Green	100.00%	Gas	Gas Turbine	88.90
3	Jeffrey	8.00%	Coal/Oil	Steam	172.80
4	Crossroads	100.00%	Gas	Gas Turbine	387.60
5	Greenwood	100.00%	Gas	Gas Turbine	284.80
6	Nevada	100.00%	Oil	Combustion Turbine	21.60
7	South Harper	100.00%	Gas	Gas Turbine	387.60
8	Lake Road	100.00%	Coal/Other	Steam	150.50
9	Lake Road	100.00%	Gas/Oil	Gas Turbine	127.60
10	Iatan 1	18.00%	Coal/Oil	Steam	130.70
11	Iatan 2	18.00%	Coal/Oil	Steam	179.80
12	St. Joe Landfill	100.00%	Gas	Internal Combustion	1.60
13	Greenwood Solar	100.00%	Solar	Solar	3.00
14	(1) KCPL- GMO's share				





Kansas City Power & Light Company - GMO
Class Coincident Peak Load Factors

[A]

[B]

Line No.	Customer Class	Load Factor
1	Residential	41.47%
2	Small General Service	63.48%
4	Large General Service	57.49%
5	Large Power Service	80.48%
6	Other	100.00%
7	Total System	53.53%

Kansas City Power & Light Company - Greater Missouri Operations
 Operating Characteristics of KCP&L-GMO's Generating Assets
 2014-2016

	[A]	[B]	[C]	[D]	[E]	[F]
Line No.	Description	Fuel	Type	2016	2015	2014
1 Capacity Factors						
2	Sibley	Coal/Other	Steam	29.26%	44.42%	33.20%
3	Ralph Green	Gas	Gas Turbine	0.89%	1.71%	1.04%
4	Jeffrey (8%)	Coal/Oil	Steam	45.76%	57.22%	61.45%
5	Crossroads	Gas	Gas Turbine	0.69%	0.59%	2.08%
6	Greenwood	Gas	Gas Turbine	0.51%	1.16%	1.75%
7	Nevada	Oil	Combustion Turbine	-0.05%	-0.07%	-0.04%
8	South Harper	Gas	Gas Turbine	0.14%	-0.02%	0.09%
9	Lake Road	Coal/Other	Steam	6.31%	16.19%	18.85%
10	Lake Road	Gas/Oil	Gas Turbine	-0.15%	-0.11%	-0.09%
11	Iatan 1 (18%)	Coal/Oil	Steam	79.88%	57.76%	72.45%
12	Iatan 2 (18%)	Coal/Oil	Steam	53.77%	65.81%	53.32%
13	St. Joe Landfill	Gas	Internal Combustion	81.29%	88.81%	81.76%
14	Greenwood Solar	Solar	Solar	11.29%		
15 Load Factors						
16	Sibley	Coal/Other	Steam	37.27%	54.08%	40.23%
17	Ralph Green	Gas	Gas Turbine	1.18%	2.08%	1.31%
18	Jeffrey (8%)	Coal/Oil	Steam	45.70%	57.15%	61.73%
19	Crossroads	Gas	Gas Turbine	0.92%	0.86%	2.80%
20	Greenwood	Gas	Gas Turbine	0.75%	1.83%	3.26%
21	Nevada	Oil	Combustion Turbine	-0.06%	-0.08%	-0.05%
22	South Harper	Gas	Gas Turbine	0.17%	-0.03%	0.13%
23	Lake Road	Coal/Other	Steam	9.78%	27.38%	28.95%
24	Lake Road	Gas/Oil	Gas Turbine	-0.36%	-0.22%	-0.22%
25	Iatan 1 (18%)	Coal/Oil	Steam	82.21%	59.44%	73.40%
26	Iatan 2 (18%)	Coal/Oil	Steam	62.38%	65.73%	58.11%
27	St. Joe Landfill	Gas	Internal Combustion	65.03%	71.04%	43.61%
28	Greenwood Solar	Solar	Solar	6.77%		
29 Four Highest Load Factors (1)						
30	Sibley				59.86%	
31	Jeffrey				57.15%	61.73%
32	Iatan 1			82.21%	59.44%	73.40%
33	Iatan 2			62.38%	65.73%	58.11%
34	(1) Higher than System Load Factor					

Kansas City Power & Light Company - GMO
Unit Costs of KCP&L-GMO's Generating Assets
2014-2016

[A] [B] [C] [D]

Line No.	Description	2016	2015	2014
1 Fuel Cost per kWh				
2	Sibley	0.0224	0.0213	0.0256
3	Ralph Green	0.0852	0.0594	0.1037
4	Jeffrey (8%)	0.0200	0.0198	0.0201
5	Crossroads	0.0535	0.0554	0.0768
6	Greenwood	0.3889	0.2159	0.1160
7	Nevada	-0.0396	-0.1200	-0.4018
8	South Harper	0.7168	-3.8751	1.2535
9	Lake Road	0.2394	0.1194	0.1310
10	Lake Road	-0.1619	-0.2632	-0.3003
11	latan 1 (18%)	0.0160	0.0173	0.0187
12	latan 2 (18%)	0.0147	0.0152	0.0172
13	St. Joe Landfill	0.0061	0.0058	0.0056
14	Greenwood Solar	0.0000		
15	Total	0.0257	0.0255	0.0301
16 Four Lowest Fuel Costs				
17	latan 2 (18%)	0.0147	0.0152	0.0172
18	latan 1 (18%)	0.0160	0.0173	0.0187
19	Jeffrey (8%)	0.0200	0.0198	0.0201
20	Sibley	0.0224	0.0213	0.0256
21 Total Unit Cost - \$/kWh				
22	Sibley	0.0747	0.0531	0.0657
23	Ralph Green	0.3471	0.2080	0.3442
24	Jeffrey (8%)	0.0546	0.0455	0.0429
25	Crossroads	0.5669	0.6527	0.2468
26	Greenwood	0.9805	0.4718	0.2846
27	Nevada	-5.7890	-3.8939	-8.0639
28	South Harper	3.8658	-23.0251	5.9827
29	Lake Road	0.4684	0.2174	0.1961
30	Lake Road	-2.2720	-2.7283	-2.7919
31	latan 1 (18%)	0.0392	0.0501	0.0421
32	latan 2 (18%)	0.0624	0.0520	0.0636
33	St. Joe Landfill	0.0506	0.0510	-0.0116
34	Greenwood Solar	0.2716		
35	Total	0.0806	0.0680	0.0736
36 Four Lowest Total Unit Costs per kWh				
37	latan 1 (18%)	0.0392	0.0501	0.0421
38	Jeffrey (8%)	0.0546	0.0455	0.0429
39	latan 2 (18%)	0.0624	0.0520	0.0636
40	Sibley	0.0747	0.0531	0.0657

Kansas City Power & Light Company - GMO
Unit Costs of KCP&L-GMO's Generating Assets
Reflecting System-wide Fuel Cost
2014-2016

[A] [B] [C] [D]

Line No.	Description	2016	2015	2014
1	<u>Total Unit Cost Less Fuel per kWh</u>			
2	Sibley	0.0523	0.0318	0.0400
3	Ralph Green	0.2618	0.1486	0.2405
4	Jeffrey (8%)	0.0345	0.0256	0.0228
5	Crossroads	0.5133	0.5973	0.1700
6	Greenwood	0.5916	0.2560	0.1686
7	Nevada	-5.7494	-3.7739	-7.6621
8	South Harper	3.1490	-19.1500	4.7292
9	Lake Road	0.2290	0.0981	0.0651
10	Lake Road	-2.1101	-2.4651	-2.4915
11	Iatan 1 (18%)	0.0232	0.0329	0.0234
12	Iatan 2 (18%)	0.0477	0.0369	0.0465
13	St. Joe Landfill	0.0445	0.0452	-0.0172
14	Greenwood Solar	0.2716	0.0000	0.0000
15	Total	0.0549	0.0425	0.0434
16	<u>Total Unit Cost Less Average Fuel per kWh</u>			
17	Sibley	0.0489	0.0273	0.0399
18	Ralph Green	0.3213	0.1823	0.3184
19	Jeffrey (8%)	0.0288	0.0197	0.0171
20	Crossroads	0.5411	0.6270	0.2211
21	Greenwood	0.9547	0.4461	0.2589
22	Nevada	-5.8148	-3.9196	-8.0897
23	South Harper	3.8401	-23.0509	5.9569
24	Lake Road	0.4427	0.1917	0.1703
25	Lake Road	-2.2977	-2.7541	-2.8176
26	Iatan 1 (18%)	0.0135	0.0244	0.0164
27	Iatan 2 (18%)	0.0367	0.0263	0.0379
28	St. Joe Landfill	0.0248	0.0252	-0.0373
29	Greenwood Solar	0.2458	-0.0257	-0.0257
30	Total	0.0549	0.0422	0.0478
31	Four Highest Load Factor Units			
32	Unit Cost - \$/kWh	0.0246	0.0255	0.0192
33	All Other Units			
34	Unit Cost - \$/kWh	0.0794	0.3159	0.0764

Comparison of Selected Production Cost Allocations
 NARUC Electric Utility Cost Allocation Manual

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
Line No.	Class or Classification	CP Load Factor	Allocation Methods						
			1 NCP	1 CP	AE-1NCP	AP-1CP	AP-1NCP	BIP	Energy
1	Average				57.98%	57.98%	57.98%		
2	Demand				42.02%	42.02%	42.02%		
3	Domestic	51.53%	36.94%	34.84%	36.46%	32.59%	33.48%	31.55%	30.96%
4	Lighting, Small & Medium Power	52.73%	34.91%	37.25%	34.82%	35.28%	34.30%	34.04%	33.86%
5	Large Power	73.47%	23.34%	24.63%	23.97%	28.44%	27.90%	30.58%	31.21%
6	Agriculture & Pumping	56.82%	3.94%	3.29%	3.88%	3.25%	3.52%	3.12%	3.22%
7	Street Lighting	100.00%	0.87%	0.00%	0.86%	0.43%	0.80%	0.71%	0.74%
8	Total	57.98%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

