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Lake Road Allocations*
Witness: *Charles T. Poston, PE*
Sponsoring Party: *MoPSC Staff*
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Case Nos.: *ER-2022-0129 and
ER-2022-0130*
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MISSOURI PUBLIC SERVICE COMMISSION

INDUSTRY ANALYSIS DIVISION

ENGINEERING ANALYSIS DEPARTMENT

DIRECT TESTIMONY

OF

CHARLES T. POSTON, P.E.

**Evergy Metro, Inc. d/b/a Evergy Missouri Metro
Case No. ER-2022-0129**

**Evergy Missouri West, Inc. d/b/a Evergy Missouri West
Case No. ER-2022-0130**

*Jefferson City, Missouri
June 2022*

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1 **EXECUTIVE SUMMARY**

2 Q. What is the purpose of your testimony?

3 A. My testimony addresses two issues: Staff's calculation of variable fuel and
4 purchased power expense, and Staff's recommendation concerning cost allocation factors at the
5 Lake Road Plant.

6 Q. Is your testimony applicable to the general rate case filed by Evergy
7 Missouri West ("EMW"), ER-2022-0130, or the general rate case filed by Evergy
8 Missouri Metro ("EMM") in ER-2022-0129?

9 A. My direct testimony is only applicable to the EMW revenue requirement,
10 ER-2022-0130. Staff witness Shawn Lange is concurrently providing direct testimony
11 regarding the variable fuel and purchased power expense for developing the EMM revenue
12 requirement in ER-2022-0129. There is no comparable Lake Road Plant allocation factor
13 testimony for EMM as the Lake Road Plant is owned by EMW.

14 Q. In this testimony, do you provide any recommendations for expense levels to be
15 reflected in the revenue requirement ordered in this case?

16 A. Yes. It is my recommendation that the revenue requirement determined by the
17 Commission in this case should reflect Staff's calculation of variable fuel and purchased power
18 expense, equal to \$218,459,431.

19 Q. In this testimony, do you provide any recommendations that should be
20 specifically reflected in the Commission's Report and Order in this case?

21 A. Yes. It is my recommendation that Commission order the adoption of the
22 Lake Road Plant allocation factors and allocation method put forth by EMW in the direct
23 testimony of witness Linda J. Nunn.

1 Q. In this testimony, do you describe the development of a workproduct, which you
2 provided to another Staff witness for the development of an issue?

3 A. Yes. I provided the production cost model results to Staff witness
4 Amanda Conner for use in determining the appropriate percentage of transmission expense for
5 EMW to recover, and to develop the Staff's recommended Fuel Adjustment Clause Base
6 Factor. I provided the production cost model results to Staff witness Matthew Young to include
7 in the calculation of Staff's revenue requirement. Additionally, I provided my recommendation
8 to adopt EMW's allocation factors for the Lake Road Plant to Staff witness Keith Majors so
9 that he could use them in developing Staff's revenue requirement.

10 **VARIABLE FUEL AND PURCHASED POWER EXPENSE**

11 Q. What is the purpose of your direct testimony regarding variable fuel and
12 purchased power expense?

13 A. The purpose of this section of my direct testimony is to describe how Staff
14 calculated its recommended variable fuel and purchased power expense for EMW through the
15 use of a production cost model. Staff recommends that the revenue requirement chosen by the
16 Commission include a variable fuel and purchased power expense of \$218,459,431.

17 Q. What does Staff recommend concerning the variable fuel and purchased power
18 expense for EMW?

19 A. Staff recommends that the revenue requirement chosen by the Commission
20 include the variable fuel and purchased power expense calculated by Staff. Staff's variable fuel
21 and purchased power expense is consistent with Staff's level of load and rate revenues.

22 Q. What is the purpose of a production cost model?

1 A. Staff uses a production cost model to perform a simulation of a utility's energy
2 generation, energy sales, and energy purchases. The simulation results are used to calculate the
3 indicated revenues and expenses.

4 The revenues and expenses calculated from the results of Staff's production cost
5 modeling are:

- 6 • The purchase of the fuel necessary to support the generation of electricity at
7 power plants;
- 8 • The costs and revenues from the purchases and sales of energy within
9 integrated marketplace; and
- 10 • The purchases of energy through purchased power agreements.

11 Fixed expenses such as those related to the recovery of capital are not included in the results of
12 Staff's production cost model.

13 Q. What production cost modeling software does Staff use?

14 A. Staff uses the PLEXOS® software for production cost modeling.

15 Q. What inputs are necessary for Staff's production cost model?

16 A. Staff's production cost model includes input data developed by multiple Staff
17 witnesses. These include: market prices from Staff witness Saeid Dindarloo, fuel prices from
18 Staff witness Matthew Young, and system load from Staff witness Hari Poudel. I developed the
19 remaining inputs: generation from wind farms, planned and forced outages, and power plant
20 characteristics.

21 Q. How did you adapt the output from wind farms for use in Staff's production
22 cost model?

1 A. Historic hourly generation data for each of the wind farms that EMW purchases
2 energy from was used to create representative average output profiles unique to each site. The
3 prices paid for the energy from the wind farm purchased power agreements (“PPAs”) were
4 taken from the contracts that EMW entered into with the wind farm owners.

5 Q. How were planned and forced outages accounted for in Staff’s production
6 cost model?

7 A. Planned and forced outages are infrequent in occurrence and variable in
8 duration. In order to capture that variability, the outages experienced at each power plant were
9 normalized by averaging seven years of historic data.

10 Q. How were power plant characteristics for Staff’s production cost model derived?

11 A. Staff relied on EMW for responses to data requests and data supplied to comply
12 with 20 CSR 4240-3.190 for inputs relating to each generating unit such as:

- 13 • Unit capacity;
- 14 • Unit heat rate curve;
- 15 • Primary and startup fuels;
- 16 • Ramp rates;
- 17 • Startup costs; and,
- 18 • Variable operating and maintenance expense.

19 Definitions of the bulleted terms above are included in Schedule CTP-d2.

20 Q. Has there been a change in the structure of Staff’s production cost model since
21 EMW’s last general rate case?

1 A. Yes. Staff has modified its production cost model to incorporate the use
2 of multiple sets of market prices in order to better mimic the behavior of EMW¹ in the
3 integrated marketplace. Staff implemented this production cost modeling philosophy in the
4 two most recent rate cases filed by the Empire District Electric Company (ER-2019-0374 and
5 ER-2021-0312).² In Staff's production cost model for EMW, all load requirements are met
6 through market purchases of energy at its market defined load node. Staff Witness
7 Saeid Dindarloo provided the sets of market prices relied upon for Staff's production cost
8 model. The production cost model simulates the dispatch of each coal or natural gas-fired power
9 plant based upon the market prices associated with that generator's node. In each hour of the
10 simulation, the total generation from all sources is then summed and compared against the
11 purchased energy required to satisfy load. If total generation exceeds purchased energy, then
12 net purchases are recorded for that hour. Conversely, if total generation is less than purchased
13 energy, net purchases are recorded. In that way, net sales and purchases within the market are
14 determined for each hour of the simulation.

15 Q. What are the industry best practices related to the calculation of variable fuel
16 and purchased power expenses?

17 A. Production cost modeling software is widely used throughout the electric
18 power industry in the United States and throughout the world for the calculation of variable fuel
19 and purchased power expenses. Similar software is used by electric utilities, regional
20 transmission operators, regulatory agencies, universities, and research laboratories for
21 evaluating the costs related to the generation, transmission, and consumption of electricity. The

¹ The production cost model created by Staff witness Shawn Lange for EMM in ER-2022-0129 is of the same style as the production cost model used here for EWM.

² The multi-nodal design of the production cost models used by Staff for EWM, EMM, and the Empire District Electric Company has not yet been implemented for Ameren Missouri.

1 use of modeling software allows for the calculation of the lowest cost method by which
2 customer needs can be satisfied while considering a given utility's generating resources, load
3 requirements, and other constraints.

4 Q. What was the Commission's decision regarding variable fuel and purchased
5 power in EMW's previous general rate case, ER-2018-0146?

6 A. The Commission made no specific decision regarding variable fuel and
7 purchased power in EWM's previous general rate case. The concurrent general rate cases for
8 EMM and EMW, ER-2018-0145 and ER-2018-0146, were settled through a series of
9 non-unanimous stipulations and agreements that were approved by the Commission. In those
10 cases, Staff's billing determinants and revenues were used for the purpose of establishing rates.

11 Q. What is the recommended variable fuel and purchased power expense that
12 resulted from Staff's production cost modeling?

13 A. Staff calculated that the variable fuel and purchased power expense for EMW
14 for test year as updated, the 12 month period, ending December 31, 2021, to be \$218,459,431.
15 The revenue requirement determined by the Commission should reflect Staff's calculation of
16 variable fuel and purchased power expense.

17 **LAKE ROAD ALLOCATIONS**

18 Q. What is the purpose of your direct testimony regarding the allocation of costs at
19 the Lake Road Plant?

20 A. The purpose of this section of my direct testimony is to describe the need for
21 new cost allocation factors at the Lake Road Plant and to explain Staff's recommendation to
22 adopt the new allocation method proposed by EWM.

23 Q. Why are allocation factors necessary at the Lake Road Plant?

1 A. The Lake Road Plant serves the needs of both electric and steam customers
2 served pursuant to the Steam Heating tariffs of EMW. The allocation factors serve to allocate
3 the revenue requirement associated with the plant between the EMW electric revenue
4 requirement, and the EMW steam revenue requirement.

5 Q. Did Staff consider any other changes related to the allocation of costs at the
6 Lake Road Plant?

7 A. Yes. Staff witness Amanda Conner is recommending a change to the fuel
8 adjustment clause (“FAC”) what would identify and remove the costs related to auxiliary power
9 used at the Lake Road Plant solely for the benefit of steam customers. This proposed change
10 would reduce fuel costs for electric customers.

11 Q. What method of allocating the Lake Road Plant does Staff rely on in this case?

12 A. Staff relied on the allocation method put forward by EWM in the direct
13 testimony of Linda J. Nunn,³ and recommends it be approved by the Commission. The
14 allocation of expenses at the Lake Road Plant between electric and steam customers has been
15 an issue that has not been fully resolved since changes became necessary in 2016. Since then,
16 EWM has gone through two general electric rate cases without parties being able to agree on a
17 new method for calculating the necessary allocation factors. The updated allocation method
18 requested by EWM in this case is reasonable, and Staff recommends use of the updated
19 allocation method for the Lake Road Plant at this time.

20 Q. Why is a change in the historic allocation method for the Lake Road Plant
21 appropriate?

³ Case No. ER-2022-0130, Direct Testimony of Linda J. Nunn, pages 3-9 and Schedule LNJ-1.

1 A. In the summer of 2016, EWM (then “GMO”), chose to convert Unit 4/6 at the
2 Lake Road Plant to use natural gas as its primary fuel source. Previously, Unit 4/6 used coal as
3 its primary fuel. At that time, the allocation method in use at the Lake Road Plant included a
4 “coal burned factor” that was an important part of the calculation for assigning costs between
5 electric and steam customers. The cessation of coal burning at Unit 4/6 caused the existing
6 allocation method to no longer return results as originally intended. As a result, EWM proposed
7 a new allocation method and allocation factors in Case No. ER-2016-0156.

8 Q. How has Staff previously responded to EWM’s proposals for new allocation
9 factors at the Lake Road Plant?

10 A. Staff filed testimony about EWM’s proposed allocation methods for the
11 Lake Road Plant in Case Nos. ER-2016-0156⁴ and ER-2018-0146.⁵ At those times,
12 Staff raised a number of concerns about the proposed changes and opposed the new
13 allocation methods that EWM wanted to implement. The objections that Staff had during those
14 cases included:

- 15 • the proposed method for calculation of the 900 lb. steam demand
- 16 factor; and,
- 17 • the presence of a number of errors in the drafting of the proposed
- 18 allocation procedures.

19 Q. Have the changes to the allocations methods proposed by EWM in this case
20 addressed those concerns?

⁴ Case No. ER-2016-0156, Rebuttal and Surrebuttal Testimony of Charles T. Poston.

⁵ Case No. ER-2018-0145, Rebuttal and Surrebuttal/True-up Direct Testimony and Charles T. Poston.

1 A. Yes. The calculation for the 900 lb. steam demand factor has been updated by
2 EWM and is proposed to be based on the heat input capacity of the boilers on the 900 lb. steam
3 system rather than the theoretical capacity needed to support the average peak steam sales plus
4 the capacity needed to support maximum electrical generation at the same time. The draft
5 allocation procedure has been revised and has incorporated a number of Staff's comments, both
6 substantive and minor, made in previous rate cases and during discussions between rate cases.

7 Q. What steps has Staff taken to resolve the Lake Road allocation factor issue
8 between EWM's rate cases?

9 A. As ordered by the Commission in ER-2018-0146,⁶ EWM reached out to
10 interested parties prior to the filing of this case in order to discuss the development of a new
11 steam allocation procedure. During a series of meetings, EWM responded to a number of
12 Staff's requests for additional information and made itself available for discussions over the
13 phone as well.

14 Q. What are the best practices related to the allocation of costs at a combined heat
15 and power facility such as the Lake Road Plant?

16 A. The expenses incurred by EWM at the Lake Road Plant fall into three
17 broad categories:

- 18 • expenses that only benefit electric customers;
- 19 • expenses that only benefit steam customers; and,
- 20 • expenses that benefit both electric and steam customers.

⁶ In Case No. ER-2018-0145, the non-unanimous partial stipulation and agreement dated September 19, 2018 included a section titled, "GMO Steam Allocations." As a part of that stipulation, GMO (now EWM), agreed to work with parties prior to its next electric general rate case to develop new steam allocation procedures. A series of meetings did take place during the second half of 2021.

1 The expenses that only benefit electric customers should be allocated 100% to those same
2 electric customers. Likewise, the expenses that only benefit steam customers should be
3 allocated 100% to the steam customers. More complicated methods of allocation are required
4 to address expenses that benefit both electric and steam customers. Additionally, the sum of
5 the allocated expenses recovered from electric and steam customers should be equal to the sum
6 of the total expenses actually incurred.

7 Q. What has the Commission ordered regarding the Lake Road Plant allocation
8 factors in the two previous EWM rate cases?

9 A. In both ER-2016-0156 and ER-2018-0146, the Lake Road Plant allocation factor
10 issue was resolved through stipulations without any agreement between parties on new
11 allocation methods. In each case, a set of allocation factors based on those existing at the time
12 ER-2016-0156 was filed were agreed to by parties.

13 Q. What other conditions contributed to Staff changing its recommendation
14 regarding the use of a new method for calculating allocation factors at the Lake Road Plant?

15 A. Based purely on its annual net generation of electricity, Lake Road is not
16 nearly the benefit to electric customers that it was ten year ago. However, there have also
17 been large changes to the marketplace in which it operates. During the last decade, the
18 introduction of the Southwest Power Pool's integrated marketplace, the large increase in
19 available wind generation, and the conversion of Unit 4/6 to run on natural gas have all
20 resulted in the Lake Road Plant being dispatched less for electrical generation. At the same
21 time, the steam business at Lake Road continues to serve a number of important employers in
22 St. Joseph, MO. While Lake Road is not an exceptionally large power plant, every megawatt
23 of dispatchable generating capacity is increasingly important for EWM following the retirement
24 of the Sibley 3 coal power plant.

Direct Testimony of
Charles T. Poston, P.E.

1 Q. What is Staff's recommendation for resolving the long-standing issue of new
2 allocation factors at the Lake Road Plant?

3 A. Staff recommends that the Commission order the adoption of the allocation
4 factors and allocation method put forth by EWM in its direct testimony.

5 Q. Does this conclude your direct testimony?

6 A. Yes.

Charles T. Poston, P.E. Case History

Case Number	Utility	Testimony	Issue
GS-2014-0226	Laclede Gas Company	Staff Report	Staff investigation following natural gas explosion
EO-2015-0320	Union Electric Company d/b/a Ameren Missouri	Staff Recommendation	SO ₂ and NO _x emission allowance trading and reporting
ER-2016-0023	Empire District Electric Company	Staff Report	Heat Rate Testing
EC-2016-0230	KCP&L Greater Missouri Operations Company	Staff Report	Consumer Complaint in reference to “Smart Meter” installation
		Staff Investigation	
ER-2016-0156	KCP&L Greater Missouri Operations Company	Staff Report	Variable Fuel Costs, Lake Road Allocations, Heat Rate Testing
		Rebuttal	Lake Road Allocations
		Surrebuttal	Lake Road Allocations
ER-2016-0285	Kansas City Power & Light Company	Staff Report	Variable Fuel Costs
		Rebuttal	
		True-Up Direct	
		True-Up Rebuttal	
ER-2018-0146	KCP&L Greater Missouri Operations Company	Staff Report	Variable Fuel Cost Lake Road Allocations
		Rebuttal	Lake Road Allocations
		Surrebuttal	Greenwood Solar Allocation, Lake Road Allocations, Variable Fuel Costs
		True-Up Direct	
GO-2019-0115 GO-2019-0116	Spire Missouri, Inc.	Staff Recommendation	Avoided Cost Studies
Staff Direct Report			
GO-2019-0356 GO-2019-0357	Spire Missouri, Inc.	Staff Recommendation	Engineering Review

Charles T. Poston, P.E. Case History (continued):

Case Number	Utility	Testimony	Issue
AO-2021-0264 ¹ EO-2021-0359 EO-2021-0360	Evergy Missouri West, Inc., Evergy Missouri Metro, Inc.	Staff Report(s)	February 2021 Cold Weather Event
GR-2021-0108	Spire Missouri, Inc.	Class Cost of Service Report	Allocation of Distribution Costs
		Rebuttal	Meters/Services/Mains Allocators and Therms vs. CCF Billing
ER-2021-0240	Union Electric Company d/b/a Ameren Missouri	Cost of Service Report	Callaway Energy Center Forced Outages
GR-2021-0241	Union Electric Company d/b/a Ameren Missouri	Class Cost of Service Report	CCOS Sponsorship Testimony
			Allocation of Service Lines, Meters, and Regulators
ER-2021-0320	Empire District Electric Company	Cost of Service Report	Variable Fuel Cost
			Wind Farm Construction Audit Report
		Rebuttal	Natural Gas Price Wind Farm In-Service Criteria
GT-2022-0118	Liberty Utilities (Midstates Natural Gas) Corp.	Staff Recommendation	Eligibility of Costs Related to PVC Pipe Replacements
GO-2022-0171	Spire Missouri, Inc.	Staff Recommendation	Engineering Analysis Review

¹ This case contained a Staff report concerning the response of numerous Missouri utilities to the cold weather event of February 2021. I was a contributor only to the sections concerning Evergy Missouri West and Evergy Missouri Metro.

Definitions

Unit capacity:

The maximum capacity of a power plant is equal to its maximum level of energy output in megawatts (MW).

Unit heat rate curve:

The heat rate of a power plant, typically measured in BTU/kWh, is a measure of efficiency. It shows how much energy from the fuel consumed by the power plant is required to generate one kWh of electricity. The larger the magnitude of the heat rate, the less efficient a power plant is.

Primary and startup fuels:

A power plant's primary fuel is the main source of energy that it uses to generate electricity. For example, a coal-fired power plant will have coal as its primary fuel. This is distinct from startup fuel which may be used sparingly during limited periods of time while the power plant is being started. Fuel oil might be used as a startup fuel while a coal plant is being started. Once a certain power level is achieved, the startup fuel will stop being used, and the power plant will operate solely on its primary fuel.

Ramp rates:

Ramp rates describe how quickly a power plant can change its output power level and are typically given in units of megawatts per hour or megawatts per minute. Large coal or nuclear power plants have lower ramp rates than smaller natural gas-fired combustion turbines.

Startup costs:

Startup costs are the operations and maintenance costs associated with the startup of a power plant. The magnitude of startup costs can influence how a power plant is dispatched within a market. All other factors being equal, high startup costs would tend to make a power plant less likely to be dispatched in a given situation.

Variable operating and maintenance expense:

Variable operations and maintenance expenses (“VOM”) are a part of the incremental cost of running a power plant. They represent the costs related to the equipment replacement and servicing that are necessarily incurred by the wear and tear that occurs when a power plant operates. These costs are measured in dollars per megawatt-hour (\$/MWh) and will affect the price at which energy from a power plant is offered into the market. All other factors being equal, high VOM costs would tend to make a power plant less likely to be dispatched in a given situation.