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Witness:	Michael W. Harding
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File No.:	ET-2018-0132
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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. ET-2018-0132

DIRECT TESTIMONY

OF

MICHAEL W. HARDING

ON

BEHALF OF

UNION ELECTRIC COMPANY

d/b/a Ameren Missouri

St. Louis, Missouri
February, 2018

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DIRECT TESTIMONY

OF

MICHAEL W. HARDING

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Michael W. Harding. My business address is One Ameren Plaza, 1901 Chouteau Avenue, St. Louis, Missouri 63103.

Q. What is your position with Ameren Missouri?

A. I am employed by Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri" or "Company") as Supervisor Rates & Analysis.

Q. Please describe your educational background and employment experience.

A. I received a Bachelor of Science in Business Finance from the University of Kansas in 2007. In 2006, I completed a power marketing internship at Westar Energy in Topeka, Kansas, and was hired to work part-time through my final year of school scheduling physical power contracts and performing analysis in support of the trade floor. Upon completion of my degree, I accepted a full-time position as a Real-Time Scheduler with Westar Energy. At the end of 2007, I accepted a Real-Time Trading Position with Union Electric Company, where my responsibilities included optimizing the company's real-time position and expanding the scope of the companies trading opportunities. In May 2008, I was promoted to Term Trader where my primary duties included managing and optimizing the long-term power and transmission assets of the company in the forward markets. At the beginning of 2014, I joined Ameren Services Company as a General Executive of Renewable Energy. My primary responsibilities during this time included ensuring compliance with the Missouri Renewable Energy Standard, modeling support of proposed renewable generation, and project management of various renewable initiatives. I was promoted to my current position in April 2017, where I am responsible for the Company's class cost of service, rate design, tariff administration, and various regulatory projects.

Q. What is the purpose of your direct testimony in this proceeding?

A. The purpose of my direct testimony is to support the updates made to the Company's General Rules and Regulations, Section II., Characteristics of Service Supplied, and Section III., Distribution System Extensions, and to provide the results of a study conducted to estimate the impact to revenue requirement from shifting from the Company's current line extension approach to the marginal cost method. The primary updates to the line extension tariffs have been made in order to bring Ameren Missouri's line extension tariffs in line with recent changes made by its peer utilities in the state, and in line with what the Missouri Public Service Commission ("Commission") recently ordered with regard to Kansas City Power & Light Company's ("KCPL") line extension policy in File No. ER-2016-0285. Ultimately, these updates will give more consideration to the incremental costs and benefits of adding an additional customer to the system.

Also included in the Distribution System Extensions changes filed in this docket is a discount afforded to certain customers who are able to connect to nearby infrastructure in the Company's service territory that has capacity to serve them, which we are referring to as the "Non-Residential Existing Infrastructure Incentive" ("NEII"). My testimony also addresses the NEII.

II. TARIFF UPDATES – OTHER THAN THE NEII

Q. Briefly summarize the changes made to the tariffs.

A. The bulk of the changes and added definitions with regard to marginal cost have been added to the General Rules and Regulations, Section III, Distribution System Extensions. Smaller changes have been made to Section II and various riders primarily to update language that refers back to the newer Section III line extension methodology. During this process, division engineers also reviewed Sections II and III of the General Rules and Regulations and suggested changes in order to bring the language up to date. We have also included those changes in the tariff.

Q. Do the changes to the line extension calculations impact residential customers or residential subdivisions?

A. No, they do not.

Q. Please describe the Company's current line extension tariff requirements for non-residential customers.

A. The current tariff provisions, as they apply to non-residential customers, require the customer to cover the entire cost of the line extension with revenues from one year of operations. Line extension costs that are not covered by revenues during the first year are paid by the line extension customer as a contribution in aid of construction, either collected up front and retained or collected through minimum monthly payments over 12 months. This method does not account for the benefit of ongoing revenues beyond year one, or the marginal cost to serve the customer on an ongoing basis.

Q. What are the primary line extension updates that will impact non-residential customers?

A. Ameren Missouri is proposing to adopt a marginal cost method for calculating whether a non-residential customer is required to contribute toward a line extension or upgrade. For a non-residential customer seeking a distribution extension to its premises, this means the Company will provide the requested extension at no cost to the customer, provided the Extension Allowance exceeds the Extension Cost. Any amount of Extension Cost that exceeds the Extension Allowance would have to be contributed by the customer prior to construction. This contribution will be referred to in the tariff as the "Extension Charge," and it will be calculated as follows:

$$\text{Extension Charge} = \text{Extension Cost} - \text{Extension Allowance}$$

The Extension Cost is the estimated installed cost of the line extension, modification, or enlargement required to connect the customer to the Company's distribution system. The Extension Allowance is the amount calculated based upon the customer's estimated Marginal Revenues, divided by the Company's Cost of Service Factor ("COSF").

$$\text{Extension Allowance} = \frac{\text{Marginal Revenue}}{\text{Cost of Service Factor}}$$

<u>Marginal Revenue</u>: Total estimated continuing annual revenues less incremental energy, capacity, and marginal network and infrastructure support cost.

<u>Cost of Service Factor</u>: Comprised of the Company's cost of capital, cost of depreciation, property tax, state and federal income tax and insurance. The factor is applied to the Marginal Revenue to determine Ameren Missouri's Extension

Allowance, and is determined from Ameren Missouri's most recent rate case proceeding and/or through a periodic annual review.

Q. Are these changes in line with what other utilities in Missouri are using for calculating non-residential line extensions?

A. Yes, both KCP&L[1] and KCP&L – Greater Missouri Operations Company ("KCPL-GMO") have (or will have) line extension policies that use marginal cost estimates for calculating the contribution that the utility and customer should make toward the extension.

Q. Are these changes in line with how utilities across the country approach line extension policy for non-residential customers?

A. Yes, the marginal cost method is widely used across the United States, taking various forms. Given that most utilities' capital structures vary little from year to year, many simply opt to simplify their line extension allowance as a multiplier against estimated revenues in their tariffs, with periodic adjustment of the multiplier should the underlying cost of capital vary greatly. In accordance with what the Commission has already approved for KCPL-GMO, Ameren Missouri has opted for a more defined calculation for determining the Extension Allowance in the tariff.

Q. Did you consult with any other utilities prior to this filing with regard to incorporating the marginal cost method into Ameren Missouri's line extension tariff?

A. Yes, we reached out to KCPL-GMO inquiring about its marginal cost model in order to align our design with what the Commission had already approved.

[1] In File No. ER-2016-0285, the Commission ordered KCP&L to adopt such policies in its next rate case, which it has now filed.

Q. Aside from the marginal cost methodology that has been defined in this testimony and applied to Ameren Missouri's tariff sheets where applicable, are there any other updates to the tariffs that would significantly impact the manner in which a customer interacts with the Company with regard to procedures, billing impact or otherwise?

A. No, as part of the Company's full review of Sections II and III of the General Rules and Regulations, the various changes outside of the core line extension methodology have been made merely to update the structure of the tariff, correct grammar, and to simplify outdated or nuanced language. Most of the changes reside in Section III and pertain to the calculation of non-residential line extensions.

III. COMPARITIVE IMPACT ANALYSIS – MARGINAL COST APPROACH

Q. Please describe the purpose of this analysis.

A. The study sought to determine the impact to the Company's revenue requirement, over a 12-month period, of using a marginal cost approach to line extension, similar to what KCPL-GMO has adopted, versus Ameren Missouri's current approach, which does not consider marginal cost.

Q. Why was this analysis performed?

A. As part of the Unanimous Stipulation and Agreement resulting from File No. ER-2016-0179, the parties agreed that "a study of the Company's line extension policy shall be conducted as outlined in the rate design rebuttal testimony of Company witness Bill Davis." The rebuttal testimony of Mr. Davis in File No. ER-2016-0179 recommended that the Company "explore revised line extension policies that resemble those included in Kansas City Power & Light—Greater Missouri Operations' ('KCP&L-GMO') tariffs."

Additionally, in the above mentioned testimony, Ameren Missouri agreed to "conduct a twelve-month historical study comparing the revenue requirement impact of its existing line extension policy to a line extension policy modeled after that in effect for KCP&L-GMO" and, upon concluding the study, provide a recommendation based in part on the analysis performed.

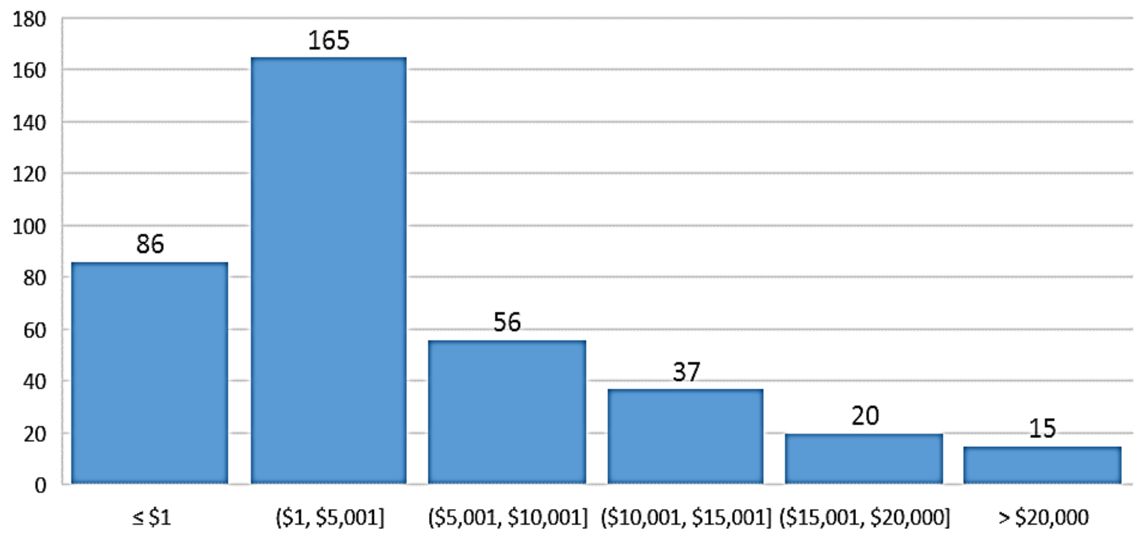
Q. Based on this study, what would the estimated impact to customers seeking a line extension have been with the marginal cost approach over the 12-month study period?

A. In the study, we examined 379 non-residential customers who requested a line extension over a 12-month period between June 1, 2015 and May 30, 2016. The study determined that 293 of the 379 non-residential customers, or approximately 77%, would have benefited from the marginal cost approach versus the existing line extension method. The remaining 23% would not have seen an impact from the change, as they did not pay for the line extension even under the Company's current tariff (due to having a high level of annual revenue versus the line extension cost). The other 293 customers would have contributed approximately $2.3 million less had they been under the marginal cost approach versus the current line extension approach. The histogram in Figure 1 below shows the customer savings that would have been realized under the marginal cost approach. Eighty-six customers would have seen no impact to their contribution, 251 customers or ~66% of the sample, would have seen less than a $5000 difference in the contribution that would have been required from them, and ~34% would have seen a contribution difference of greater than $5000.

Figure 1

Current Approach v. Marginal Approach

# of Customers & Difference in Charge Required from Customer



Q. How many customers would have been required to provide a contribution under the marginal cost approach to line extension?

A. Under the marginal cost approach, 141 customers would still have been required to pay an Extension Charge compared to the 296 customers required to contribute under Ameren Missouri's current tariff.

Q. Why do some customers receive a savings benefit while others are still required to contribute?

A. The study looked at the annual marginal revenue the customer is expected to provide to the system compared to the annual cost the Company is expected to incur while serving the customer. If a customer requires a costly line extension to connect to the system and will provide little or no additional revenue to the system in doing so, that customer will likely require a larger Extension Charge to reduce the impact on continuous annual cost to a level that doesn't harm other customers. A customer who is required to pay an Extension Charge after calculating the Extension Allowance under the marginal cost approach is, in effect, doing so to pay down the Extension Cost to a level that will be revenue neutral to other customers. If a customer didn't contribute this Extension Charge, the annual cost to serve the customer would be greater than the annual revenues received, ultimately putting upward pressure on rates for all customers. Customers added to the system who have no required Extension Charge or who have paid their required extension charge will have a downward or neutral effect on customer rates.

Q. Do all non-residential customers that request a line extension receive some benefit with the marginal cost approach versus the existing approach?

A. No, a benefit is only realized if the customer is contributing additional revenue as a result of the line extension. For example, of the 141 customers that were still required to contribute under the marginal cost approach, 24 received less than a 10% decrease from the charge that was required under the current approach, with three of those seeing no change to the amount required, as no additional revenue was expected to be received as a result of those line extensions. These three customers would pay the full cost of the line extension under either scenario. 103 customers, or 73% of those required to provide an Extension Charge under the marginal cost approach, saw less than a 50% decrease from what would have been paid by the customer under the current approach. Figures 2 and 3 below show the impacts to the 141 customers still required to pay a contribution under the marginal cost approach.

Figure 2
Marginal Cost Approach – Customers with Extension Charge
# of Customers & % Reduction in Charge from Current Approach

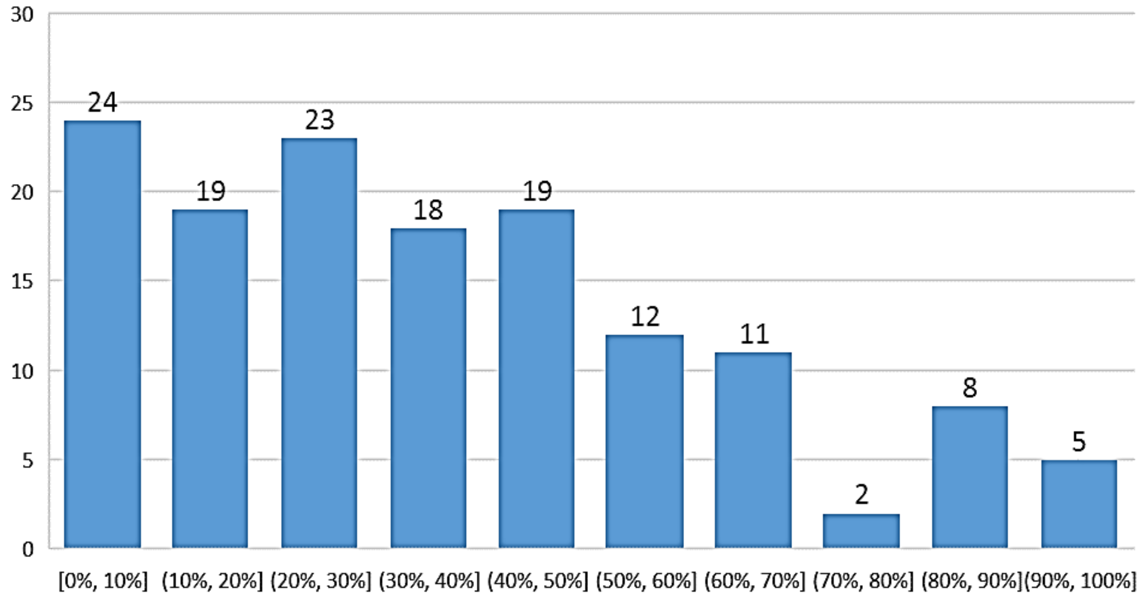
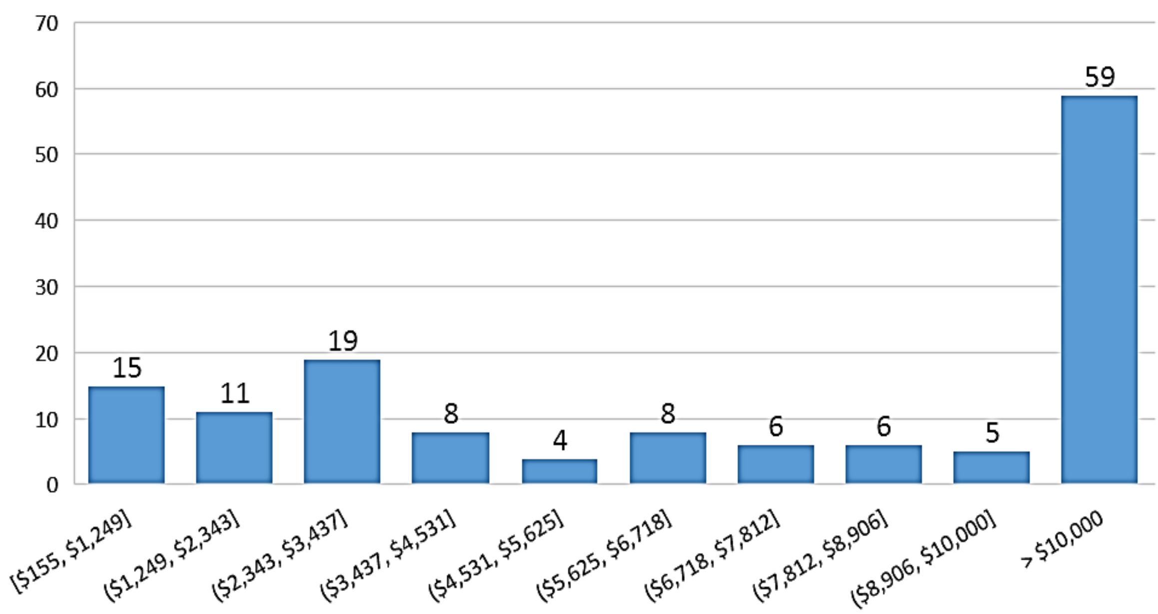


Figure 3
Marginal Cost Approach – Customers with Extension Charge
# of Customers & Amount Required from Customer



Q. What is the estimated impact to the Company's revenue requirement with the marginal cost approach versus the current approach over the 12-month period analyzed?

A. The reduction in line extension costs would result in an increase to rate base of around $2.3 million, resulting in a revenue requirement increase of approximately $325,350.

Q. What is the estimated rate impact to customers from the change?

A. If the increase in the revenue requirement from this policy change is applied only to the non-residential classes' kilowatt-hour ("kWh") usage from the last rate review, excluding lighting, it would result in a $.0000172/kWh rate increase to these classes, or a monthly bill increase of 17 cents, presuming it is divided equally among all of the non-residential rate customers. My study did not consider the potential rate benefits resulting from a line extension policy that would generally make it more attractive for businesses to connect with the system or the resulting change in behavior from such a policy, but those are both possible benefits.

Q. How were the estimated marginal revenues calculated in the study for analyzing the marginal cost approach?

A. For each account, the avoided energy, avoided capacity, and infrastructure support costs were subtracted from the 12 months of actual revenue to arrive at the 12-month total marginal revenue. The avoided energy costs were calculated based on actual energy usage for all accounts with a replacement cost of 2.45 cents/kWh and a line loss multiplier of 1.0549. Avoided capacity was calculated based on the actual demands for 3(M) customers, with 2(M) customers demand estimated by using a load factor of .518

applied to their usage. A line loss multiplier of 1.0549 and capacity reserves multiplier of 1.078 was applied to these demands before they were multiplied by a 2.52 cents/kW-Day rate, and by 365 to arrive at the 12-month avoided capacity rate. (The 2.52 cent rate is a smoothed rate based on the previous three years of capacity prices.)

Last, the infrastructure support charge was calculated by multiplying the expected 12-month revenues by the percentage of cost allocated to upkeep of the distribution system for the respective rate class that it was being applied to, which was derived from Ameren Missouri's most recent class cost of service model. For the Rate Schedule 2(M) customer, this was 10.8049% and for the Rate Schedule 3(M) customer it was 16.0792%.

Q. Can you provide an example of how an individual Extension Charge would be calculated under the marginal cost approach?

A. Table 1 below assumes a customer applying for a line extension costing $33,493 does not have the necessary marginal revenues in order to receive the extension at no cost, and is required to pay a $9,922 Extension Charge prior to the Company proceeding with construction. For comparison, assuming this customer's year one revenues were $7000, the customer would be required to pay $26,493 toward the cost of the line extension under the current tariff.

Table 1

Date:	01/01/2025		
Project Name:	ABC Company		
Extension Cost:	$33,493		
Assumptions			Estimated Annual
Total Estimated Annual Sales (kWh)			57,600
Estimated 12 Month Peak Demand (kW)			140
Customer Class			LGS 3(M)
Annual Revenue:			
Customer Charge			$1,140.84
Energy		+	$4,700
Demand		+	$1,200
Total Revenue		=	$7,041
Power Supply Costs:			
Energy Cost	$/kWh		0.0258
Total Annual Sales (kWh)		×	57,600
Total Energy Cost			$1,489
Capacity Cost	$/kW		0.0288
Demand (kW)		×	140
Total Capacity Cost			$1,470
Total Supply Cost		=	$2,958
Annual Totals:			
Total Revenue			$7,041
Total Supply Cost		-	$2,958
Network & Infrastructure Support Cost		-	$761
Annual Marginal Revenue			$3,322
Cost of Service Factor		÷	14.09%
Extension Allowance		=	$23,571
Extension Cost			$33,493
Extension Charge			$9,922
			Charge Required

Q. How did you derive the COSF that was used in determining the Extension Allowance for the marginal cost study?

A. The COSF used in the study is 14.09% and was calculated based on the cost of capital assumptions at our last rate review. This number was composed of the Before-

Tax Cost of Money Rate of 9.73%[2], Ad Valorem Tax Rate of 1.8%, and a Depreciation Rate of 3.33%, equal to a year-one COSF of 14.86%. In order to better capture the true carrying cost associated with owning a depreciable asset, the 30-year depreciation rate was applied to remaining plant for 5 years to calculate an estimated year-one COSF. The average of the first 5 years was then used to arrive at the 14.09% used in the study's COSF contained in Table 2 below.

Table 2

Cost of Service Factor			
Year	Remaining Plant	Annual COSF	Average Annual COSF
1	100.00%	14.86%	14.86%
2	96.67%	14.48%	14.67%
3	93.34%	14.09%	14.48%
4	90.01%	13.71%	14.28%
5	86.68%	13.32%	14.09%

Q. Did this study lead Ameren Missouri to a particular conclusion?

A. Yes, after reviewing the results of the study, including the impact on all non-residential customers on its system, the Company recommends updating the line extension policies to the marginal cost method for non-residential customers. We have filed our proposed tariff sheet updates concurrently with this testimony.

IV. THE NEII DISCOUNT

Q. What is the purpose of the Non-Residential Existing Infrastructure Incentive that is included in the proposed non-residential line extension section?

A. The purpose of this incentive is to encourage high usage non-residential customers to look for lower cost opportunities to connect with nearby existing

[2] This study was performed prior to the 2018 federal income tax change. An assumed federal tax rate change to 21% would change the 14.09% Average Annual Cost of Carry to 12.79%

infrastructure. Connecting to the Ameren Missouri system in a location with existing infrastructure keeps the cost of the line extension down, which ultimately provides greater downward pressure on rates for all customers. Customers who qualify will receive a monthly credit equal to 15% off their monthly base usage charges, which includes customer, energy, and demand related charges.

Q. Who qualifies for the Non-Residential Existing Infrastructure Incentive?

A. The customer must be receiving service under classification 3(M), 4(M), 11(M) or if under a different classification, have a minimum monthly billing demand of 5,000 kilowatts. The customer must also have an Extension Cost that is less than 25% of their Extension Allowance in order to qualify for the incentive.

$$\frac{\text{Extension Cost}}{\text{Extension Allowance}} < 25\% = \begin{array}{c}\text{Qualifying}\\ \text{Ratio}\end{array}$$

Q. Why are customers with a ratio at or below 25% the only ones eligible for the incentive?

A. Generally all customers who connect with the system should be providing some downward pressure on rates, or at least contributing to the line extension cost in a way that holds other customers harmless. However, customers with a ratio of 25% or less are providing such a disproportionally large benefit that it makes sense to reward them and encourage this behavior in others. If businesses are able to site at locations with existing infrastructure to keep cost down for themselves and the Company, all customers will ultimately benefit, and the Company wants to reward the customers providing this benefit and encourage others to do the same.

Q. Are customers who receive the Non-residential Existing Infrastructure Incentive getting back all of the benefit they would have provided to lowering rates?

A. No, in fact, for a customer with a 25% ratio, the application of a 15% monthly bill discount reducing their marginal revenues would still result in the customer using less than half of the available Extension Allowance even after subtracting the incentive from the marginal revenues. This means the customer's annual marginal revenue is still greatly exceeding the annual cost which provides downward pressure on rates for all customers. A customer with an Extension Cost that is equal to 25% of the Extension Allowance, and receiving the 15% incentive, would still be providing annual revenues that exceed approximately 3 times what is required to cover the annual line extension cost.

Q. Does this conclude your direct testimony?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Approval of Efficient Electrification Program.	))))	File No. ET-2018-0132

AFFIDAVIT OF MICHAEL W. HARDING

STATE OF MISSOURI)
) ss
CITY OF ST. LOUIS)

Michael W. Harding, being first duly sworn on his oath, states:

1. My name is Michael W. Harding. I work in the City of St. Louis, Missouri, and I am employed by Union Electric Company d/b/a Ameren Missouri as the Supervisor of Rates & Analysis.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Union Electric Company d/b/a Ameren Missouri consisting of 16 pages and Schedule(s) N/A, all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

MICHAEL W. HARDING

Subscribed and sworn to before me this 21st day of February, 2018.

Cathleen A. Dehne
Notary Public

My commission expires:

March 7, 2021

CATHLEEN A DEHNE
Notary Public – Notary Seal
St. Louis City – State of Missouri
Commission Number 17119727
My Commission Expires Mar 7, 2021