

**Exhibit No.:**  
**Issue(s)**  
**Witness/Type of Exhibit:**  
**Sponsoring Party:**  
**Case No.:**

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FAC  
Robinett/Direct  
Public Counsel  
EO-2017-0065

**DIRECT TESTIMONY**  
  
**OF**  
  
**JOHN A. ROBINETT**

Submitted on Behalf of the Office of the Public Counsel

**EMPIRE DISTRICT ELECTRIC COMPANY**

CASE NO. EO-2017-0065

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**Denotes Highly Confidential Information  
that has been Redacted**

May 19, 2017

**NP**

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


In the Matter of the Sixth Prudence	)	
Review of Costs Subject to the	)	
Commission-Approved Fuel Adjustment	)	Case No. EO-2017-0065
Clause of The Empire District Electric	)	
Company	)	

**AFFIDAVIT OF JOHN A. ROBINETT**

**STATE OF MISSOURI**    )  
  )   ss  
**COUNTY OF COLE**     )

John A. Robinett, of lawful age and being first duly sworn, deposes and states:


1. My name is John A. Robinett. I am a Utility Engineering Specialist for the Office of the Public Counsel.
2. Attached hereto and made a part hereof for all purposes is my direct testimony.
3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

  
\_\_\_\_\_  
John A. Robinett  
Utility Engineering Specialist

Subscribed and sworn to me this 16<sup>th</sup> day of May 2017.



JERENE A. BUCKMAN  
My Commission Expires  
August 23, 2017  
Cole County  
Commission #13754037

  
\_\_\_\_\_  
Jerene A. Buckman  
Notary Public

My Commission expires August 23, 2017.

**REBUTTAL TESTIMONY  
OF  
JOHN A. ROBINETT  
Empire District Electric  
CASE NO. EO-2017-0065**

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

2 A. John A. Robinett, PO Box 2230, Jefferson City, Missouri 65102.

3 **Q. By whom are you employed and in what capacity?**

4 A. I am employed by the Missouri Office of the Public Counsel (“OPC”) as a Utility  
5 Engineering Specialist.

6 **Q. Please describe your work and educational background.**

7 A. A copy of my work and educational experience is attached to this testimony as Schedule  
8 JAR-d-1.

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

10 A. The purpose of this testimony is to provide a historical review of heat rate performance  
11 tests for Empire District Electric (“Empire”) generating units to analyze the prudence of  
12 maintenance and operation of the generating units.

13 **Q. Do you have a recommendation for the Commission?**

14 A. Yes. OPC recommends the Commission require its Staff in its FAC prudence audits,  
15 conduct a review of each generating unit heat rates. The review should include heat rates  
16 from the previous and current prudence audit periods and the heat rate test results  
17 supplied as FAC minimum filing requirements in rate cases. Staff’s prudence review  
18 report should include a section that documents Staff’s review and the findings from its  
19 review.

1 **Q. What is a heat rate?**

2 A. Heat rate is a measure of generating station thermal efficiency, generally expressed in  
3 British thermal units (“Btu”) per net kilowatt-hour (“kWh”). In its simplest form, it is  
4 computed by dividing the total Btu content of fuel burned for electric generation by the  
5 resulting net kilowatt-hour generation. Net generation is the amount of electricity generated  
6 by a power plant minus the power used for plant operation that is available to be transmitted  
7 and distributed for consumer use. The lower the heat rate, the more efficient the generation  
8 unit.

9 **Q. What is the importance and reason for reviewing heat rates in a fuel adjustment clause**  
10 **prudence review?**

11 A. Much of the incentive to the electric utility to maintain or upgrade the efficiency of a  
12 generation plant is removed when a utility is granted a fuel adjustment clause (“FAC”).  
13 Any fuel cost savings from increases in efficiencies goes back to the customers. Any  
14 increase in cost due to decreases in efficiencies is recovered from the customers. The utility  
15 is made whole regardless of the efficiency of its generation plants. By reviewing heat rates,  
16 an expert could point to data in conjunction with construction and or maintenance records  
17 and provide where and how the unit’s efficiency changes are directly related to plant  
18 additions or major maintenance activities. A review of heat rates is also a tool for  
19 determining if the utility has decided to save money by reducing maintenance costs. While  
20 a review of heat rates will not necessarily reveal imprudence with regard to power plant  
21 maintenance, a dramatic change in the heat rates could indicate a change in maintenance  
22 practices.

Staff discussed the importance of minimum equipment performance standards in the FAC rulemaking case, File No. EX-2006-0472.<sup>1</sup>

*Concern: Some stakeholders believe that minimum equipment performance standards are needed in these rules.*

*Staff Response: Staff agrees that equipment performance standards should be a part of these rules and has included in the proposed rules requirements to develop generating unit efficiency testing and monitoring procedures. Staff will, as a result of receiving this data, have the ability to monitor each electric utilities' power plants in terms of their capability to efficiently convert fuel to electricity. Any observed reductions over time may be an indication of the utility's need to implement programs to improve efficiency. Staff views this as a very important and necessary detail since the efficiency of each electric utility's power plants directly relates to each electric utility's fuel and purchased power costs.*

The setting of base line heat rates and subsequent monthly reporting allows the monitoring of the efficiency performance of the plants over time and may identify changes that may exceed normal wear and tear. Root causes and means to address the underlying issues of these changes should be researched and explained in FAC prudence audits.

**Q. Have baseline heat rates been established for Empire District Electric Company?**

A. Yes. In File No. ER-2011-0004 on page 101 of the Staff Report Cost of Service, Staff witness Leon Bender states at lines 27 through 29 *"There are now base line heat rate testing results for all of Empire's generating plants to which future heat rate test results can be compared as a measure of the change of efficiency of the plant."*

**Q. What is the importance of establishing base line heat rate testing results for generating units?**

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<sup>1</sup> Staff Testimony in Support of and Suggested Changes to 4 CSR 240-3.161 and 4 CSR 240-20.090, EFIS item no. 15, Filed 9/7/2006, Attachment A-9 through A-10

1 A. The Commission in its Report and Order from Case No. ER-2008-0318 cites the importance  
2 of heat rate/ efficiency testing plans.

3 *“Fourth, as required by the Commission’s rules, AmerenUE’s fuel adjustment clause*  
4 *includes a detailed heat rate/efficiency testing plan that will allow the Commission to guard*  
5 *against imprudent operation and maintenance of the company’s generating units, thus*  
6 *controlling net fuel costs.”*<sup>2</sup>

7 Heat rate testing was one of the five reasons or factors the Commission used for  
8 supporting the 95 percent pass through provision in AmerenUE’s (now Ameren Missouri)  
9 fuel adjustment clause.

10 **Q. Did OPC perform any historical review of heat rate information provided by Empire**  
11 **District Electric Company?**

12 A. Yes. OPC plotted the entirety of the historical monthly heat rate data that has been provided  
13 previously by Empire. OPC used data from Staff Data requests in this prudence audit case  
14 and all of the previous FAC prudence audit cases.<sup>3</sup> In addition to the monthly heat rate data  
15 from the FAC prudence audit cases, OPC plotted the heat rate test results for each unit  
16 provided by Empire in rate Case Nos. ER-2012-0345, ER-2014-0351, and ER-2016-0023.  
17 The plots for each generating unit are attached as Schedule JAR-d-2 HC.

18 **Q. What did OPC’s analysis reveal?**

19 A. OPC observed many outliers where units operated more and less efficiently in the historical  
20 monthly heat rate data provided by Empire District Electric Company.

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<sup>2</sup> Case No. ER-2008-0318 Report and Order p. 74

<sup>3</sup> Staff Data Request No. 0023 from File No. EO-2010-0084, Staff Data Request No. 0022 from File No. EO-2011-0285, Staff Data Request No. 0023 from File No. EO-2013-0114, Staff Data Request No. 0022 from File No. EO-2014-0057, Staff Data Request No. 0022 from File No. EO-2015-0214, and Staff Data Request No. 0022 from File No. EO-2017-0065

1 **Q. Are these outliers indications of imprudence?**

2 A. Not necessarily. Empire explained in its response to OPC Data Request Nos. 8501 and  
3 8502 that there are circumstances that can cause changes in the efficiencies of generating  
4 units in a given month.

5 *“Typical monthly dispatch for the unit’s are not at steady state operations nor at top load*  
6 *for the unit. Empire’s generating units will follow the SPP dispatch signal, which is*  
7 *constantly changing. The lower the dispatch level, the lower the unit’s operating efficiency*  
8 *will be. Additionally, if the unit performs a shut down or start up during the month, it will*  
9 *operate at the lowest efficiency point on the heat rate curve during the shut down or start up*  
10 *period, which contributes to a higher average heat rate for the month. Unit outages and*  
11 *derates will also contribute to a higher average heat rate for the month.”<sup>4</sup>*

12 **Q. Did OPC investigate any outliers?**

13 A. Yes. OPC issued Data Request Nos. 8500, 8501, 8502, 8502.1, 8202.2 and 8502.3 further  
14 seeking information about causes of the monthly heat rate data outliers.

15 **Q. Would you summarize what Empire’s responses to these data requests revealed?**

16 A. Empire in its response to OPC Data Request No. 8501 indicated drivers for increases in  
17 monthly heat rates (less efficient) can be caused by start-ups, shut downs, low operation  
18 hours, low unit loading, derates, and outages planned or unplanned. For a portion of the  
19 months where units operated more efficiently than average, Empire’s response to OPC Data  
20 Request No. 8502 as to why these outliers occurred was that they were due to calculation  
21 errors. OPC has not received corrected heat rates where calculations errors were identified  
22 by Empire. Additionally, Empire listed coal inventory adjustments as a cause for a unit’s  
23 heat rates being more efficient than average.

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<sup>4</sup> Paragraph from Empire’s Response to OPC Data Request Nos. 8501 and 8502

1 **Q. Did Staff perform any analysis of the monthly heat rate data in its prudence audit?**

2 A. Yes. Staff indicated in response to OPC's Data Request No. 0062.1 that Staff plotted the  
3 monthly heat rate data for the 18 month review period and observed no clear upward trends.

4 **Q. How is OPC's analysis different from the analysis conducted by Staff in this prudence**  
5 **audit?**

6 A. Staff only reviewed the monthly data for this prudence audit period. It did not include in its  
7 analysis the heat rates from detailed heat rate testing procedures provided in Empire's past  
8 rate cases or the monthly heat rates provided in previous prudence audits.

9 **Q. Is review of the 18 months of the Fuel Adjustment Clause prudence review periods of**  
10 **monthly heat rate data sufficient to determine prudence of maintenance of the**  
11 **generating units?**

12 A. No. As observed from Empire's response to Staff Data Request No. 0022 several units ran  
13 fewer than six months during the 18 month review period. As further described by Staff in  
14 response to Data Request No. 0062.1, one of the units was run only three months of the  
15 review period.

16 *"Given that there are only three monthly data points for heat rates from Riverton 10, and*  
17 *two of those monthly data points include unscheduled outages and minimal in-service*  
18 *hours<sup>5</sup>, the data provided cannot be used to determine any trend in heat rates for this unit."*

19 **Q. Did Staff performed any analysis of the monthly heat rate data from Data Request No.**  
20 **0022 in File No. EO-2017-0065?**

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<sup>5</sup> OPC understands "*in-service hours*" to be synonymous with hours ran or hours operated. Riverton 10 has been commercially operable or "in-service" since 1988



1 A. Yes. While Staff's prudence report did not mention any analysis of heat rates, Staff's  
2 response to OPC data request 0062.1 states Staff did review Empire's response to Staff DR  
3 0022. According to its response to OPC's data request Staff plotted the data from Staff DR  
4 0022 for each unit and observed that there were no clear upward trends in monthly heat rates  
5 for the units. From its observation of the plot of the data, Staff determined that there is not  
6 an indication from the monthly heat rates that the unit efficiencies are declining.

7 **Q. Has Staff performed any analysis of the monthly heat rate data and how it relates to**  
8 **historical performance since Empire received a Fuel Adjustment Clause?**

9 A. No. As Staff indicated in response to Data Request No. 0062.1: "*Staff did not rely on any*  
10 *heat rate data outside of the prudence review period.*"

11 **Q. Why should the Commission be concerned about the historical analysis of monthly**  
12 **heat rate data?**

13 A. As indicated in Staff's response to Data Request 0062.1:  
14 "*Given that there are only three monthly data points for heat rates from Riverton 10, and*  
15 *two of those monthly data points include unscheduled outages and minimal in-service hours,*  
16 *the data provided cannot be used to determine any trend in heat rates for this unit.*"

17 This is only one unit; however, based on review of heat rate information provided by  
18 Empire in Data Request 0022, Riverton 10, Riverton 11, and Energy Center 1 operated less  
19 than one-third of the prudence review period.

20 **Q. Why is this a concern?**

21 A. To truly know how a unit is performing, the more historical data one has the better one can  
22 track how the unit is declining or increasing in efficiency. As Staff indicated for Riverton

1 10, during this 18 month review period the unit only had three months of operation and in  
2 two of these months the plant experienced unscheduled outages or minimal run hours. The  
3 data for Riverton 10 from this prudence audit period cannot be used to determine any trend  
4 in heat rate data.

5 **Q. Did OPC find any imprudence in the historical monthly heat rate data?**

6 A. Not at this time. However, OPC has sent supplemental data requests to Empire regarding  
7 outliers in efficiency for both instances of more and less efficient occurrences for the  
8 monthly heat rate data provided in all six prudence cases. At the time of this testimony OPC  
9 is still waiting for responses to supplemental data requests asking for corrected monthly heat  
10 rate data for specific units and months where Empire identified outlier efficiencies as  
11 calculation errors.

12 **Q. Why then is OPC recommending the Commission require Staff to review heat rates**  
13 **in future prudence reviews?**

14 A. As I previously stated, a review of heat rates is a tool for determining if the utility has  
15 decided to save money by reducing maintenance costs. While a review of heat rates will not  
16 necessarily reveal imprudence with regard to power plant maintenance, and at this point in  
17 my analysis it has not, a future dramatic change in the heat rates could indicate a change in  
18 maintenance practices. Therefore, OPC recommends the Commission direct its Staff in its  
19 FAC prudence audits to conduct a review of each generating unit's heat rates. The review  
20 should include heat rates from the previous and current prudence audit periods. Staff's  
21 prudence review report should include a section that documents Staff's review and the  
22 findings from its review.

1     **Q.     Does this conclude your direct testimony?**

2     A.     Yes, it does.

## John A. Robinett

I am employed as a Utility Engineering Specialist for The Missouri Office of the Public Counsel (OPC). I began employment with OPC in August of 2016. In May of 2008, I graduated from the University of Missouri-Rolla (now Missouri University of Science and Technology) with a Bachelor of Science degree in Mechanical Engineering.

During my time as an undergraduate, I was employed as an engineering intern for the Missouri Department of Transportation (MoDOT) in their Central Laboratory located in Jefferson City, Missouri for three consecutive summers. During my time with MoDOT, I performed various qualification tests on materials for the Soil, Aggregate, and General Materials sections. A list of duties and tests performed are below:

- Compressive strength testing of 4" and 6" concrete cylinders and fracture analysis
- Graduations of soil, aggregate, and reflective glass beads
- Sample preparations of soil, aggregate, concrete, and steel
- Flat and elongated testing of aggregate
- Micro-deval and LA testing of aggregate
- Bend testing of welded wire and rebar
- Tensile testing of welded, braided cable, and rebar
- Hardness testing of fasteners (plain black and galvanized washers, nuts, and bolts)
- Proof loading and tensile testing of bolts
- Sample collection from active road constructions sites
- Set up and performed the initial testing on a new piece of equipment called a Linear Traverse / Image Analysis
- Wrote operators manual for the Linear Traverse / Image Analysis Machine
- Trained a fulltime employee on how to operate the machine prior to my return to school
- Assisted in batching concrete mixes for testing, mixing the concrete, slump cone testing, percent air testing, and specimen molding of cylinders and beams

Upon graduation, I accepted a position as an Engineer I in the Product Evaluation Group for Hughes Christensen Company, a division of Baker Hughes, Inc. (Baker), an oil field service company. During my employment with Baker, I performed failure analysis on oil field drill bits as well as composed findings reports which were forwarded to the field engineers in order for them to report to the company the conclusions of the failure causes.

I previously was employed as a Utility Engineering Specialist I, II, III for the Missouri Public Service Commission (Commission). My employment with the Commission spanned from April of 2010 to August of 2016. My duties involved analyzing depreciation rates and studies for utility companies and presenting expert testimony in rate cases before the Commission.

# JOHN A. ROBINETT

## SUMMARY OF CASE PARTICIPATION

Listed below are the cases in which I have supplied depreciation rates accompanied by a signed affidavit.

Company	Case Number	Issue	Party
Ameren Missouri	ER-2016-0179	Direct, Rebuttal, Testimony Heat Rate Testing & Depreciation	Office of Public Counsel (OPC)
Kansas City Power & Light Company	ER-2016-0156	Direct, Rebuttal, Surrebuttal, and Live Testimony Heat Rate Testing & Depreciation	OPC
Empire District Electric Company Merger with Liberty	EM-2016-0213	Rebuttal Testimony	Missouri Public Service Commission (MOPSC)
Empire District Electric Company	ER-2016-0023	Depreciation Study, Direct, Rebuttal, and Surrebuttal Testimony	MOPSC
Hillcrest Utility Operating Company, Inc.	SR-2016-0065	Depreciation Review	MOPSC
Hillcrest Utility Operating Company, Inc.	WR-2016-0064	Depreciation Review	MOPSC
Missouri American Water Company	WR-2015-0301	Depreciation Study, Direct, Rebuttal, and Surrebuttal Testimony	MOPSC
Bilyeu Ridge Water Company, LLC Midland Water Company, Inc. Moore Bend Water Utility, LLC Riverfork Water Company Taney County Water, LLC Valley Woods Utility, LLC(Water) Valley Woods Utility, LLC(Sewer) Consolidated into Ozark International, Inc.	WR-2015-0192 WR-2015-0193 WR-2015-0194 WR-2015-0195 WR-2015-0196 WR-2015-0197 SR-2015-0198 Consolidated into WR-2015-0192	Depreciation Review  *filed depreciation rates not accompanied by signed affidavit	MOPSC
I. H. Utilities, Inc. sale to Indian Hills Utility Operating Company, Inc.	WO-2016-0045	Depreciation Rate Adoption CCN	MOPSC
Missouri American Water Company CCN City of Arnold	SA-2015-0150	Depreciation Rate Adoption CCN	MOPSC

**JOHN A. ROBINETT**  
**SUMMARY OF CASE PARTICIPATION**

<b>Company</b>	<b>Case Number</b>	<b>Issue</b>	<b>Party</b>
Empire District Electric Company	ER-2014-0351	Direct, Rebuttal, and Surrebuttal Testimony	MOPSC
West 16th Street Sewer Company, W.P.C. Sewer Company, Village Water and Sewer Company, Inc. and Raccoon Creek Utility Operating Company, Inc.	SM-2015-0014	Depreciation Rate Adoption	MOPSC
Brandco Investments LLC and Hillcrest Utility Operating Company, Inc.	WO-2014-0340	Depreciation Rate Adoption, Rebuttal Testimony	MOPSC
Liberty Utilities (Midstates Natural Gas) Corp. d/b/a Liberty Utilities	GR-2014-0152	Direct, Rebuttal, Surrebuttal and Live Testimony	MOPSC
Summit Natural Gas of Missouri, Inc	GR-2014-0086	Depreciation Study, Direct and Rebuttal Testimony	MOPSC
P.C.B., Inc.	SR-2014-0068	Depreciation Review	MOPSC
M.P.B., Inc.	SR-2014-0067	Depreciation Review	MOPSC
Roy-L Utilities	WR-2013-0543	Depreciation Review	MOPSC
Roy-L Utilities	SR-2013-0544	Depreciation Review	MOPSC
Missouri Gas Energy Division of Laclede Gas Company	GR-2014-0007	Depreciation Study, Direct and Rebuttal Testimony	MOPSC
Central Rivers Wastewater Utility, Inc	SA-2014-00005	Depreciation Rate Adoption	MOPSC
Empire District Electric Company	ER-2012-0345	Depreciation Study, Direct, Rebuttal, and Surrebuttal Testimony	MOPSC
Empire District Electric Company	WR-2012-0300	Depreciation Review	MOPSC
Laclede Gas Company	GO-2012-0363	Depreciation Authority Order Rebuttal, Surrebuttal and Live Testimony	MOPSC
Moore Bend Water Company, Inc. sale to Moore Bend Water Utility, LLC (Water)	WM-2012-0335	Depreciation Rate Adoption	MOPSC
Oakbrier Water Company, Inc.	WR-2012-0267	Depreciation Review	MOPSC
Lakeland Heights Water Co., Inc.	WR-2012-0266	Depreciation Review	MOPSC
R.D. Sewer Co., L.L.C.	SR-2012-0263	Depreciation Review	MOPSC
Canyon Treatment Facility, LLC	SA-2010-0219	Depreciation Rate Adoption- CCN	MOPSC

**JOHN A. ROBINETT**  
**SUMMARY OF CASE PARTICIPATION**

<b>Company</b>	<b>Case Number</b>	<b>Issue</b>	<b>Party</b>
Taney County Water, LLC	WR-2012-0163	Depreciation Review	MOPSC
Sale of Saddlebrooke Water and Sewer Infrastructure, LLC to Missouri American Water Company (Sewer)	SA-2012-0067	Rebuttal Testimony	MOPSC
Sale of Saddlebrooke Water and Sewer Infrastructure, LLC to Missouri American Water Company (Water)	WA-2012-0066	Rebuttal Testimony	MOPSC
Midland Water Company, Inc.	WR-2012-0031	Depreciation Review	MOPSC
Sale of KMB Utility Corporation to Algonquin Water Resources of Missouri, LLC, d/b/a Liberty Water (Sewer)	SO-2011-0351	Depreciation Rate Adoption	MOPSC
Sale of KMB Utility Corporation to Algonquin Water Resources of Missouri, LLC, d/b/a Liberty Water (Water)	WO-2011-0350	Depreciation Rate Adoption	MOPSC
Sale of Noel Water Company, Inc. to Algonquin Water Resources of Missouri, LLC, d/b/a Liberty Water (Water)	WO-2011-0328	Depreciation Rate Adoption	MOPSC
Sale of Taney County Utilities Corporation to Taney County Water, LLC (Water)	WM-2011-0143	Depreciation Rate Adoption	MOPSC
Empire District Electric Company	ER-2011-0004	Depreciation Study, Direct, Rebuttal, and Surrebuttal Testimony	MOPSC
Rex Deffenderfer Enterprises, Inc.	WR-2011-0056	Depreciation Review	MOPSC
Tri-States Utility, Inc	WR-2011-0037	Depreciation Review	MOPSC
Southern Missouri Gas Company, L.P.	GE-2011-0096	Depreciation Study Waiver	MOPSC
Southern Missouri Gas Company, L.P.	GR-2010-0347	Depreciation Review	MOPSC
KMB Utility Corporation (Sewer)	SR-2010-0346	Depreciation Review	MOPSC
KMB Utility Corporation (Water)	WR-2010-0345	Depreciation Review	MOPSC
Middlefork Water Company	WR-2010-0309	Depreciation Review	MOPSC

EO-2017-0065

Empire District Electric

Schedule JAR-D-2

has been deemed

“Highly Confidential”

in its Entirety