

*Exhibit No.:*  
*Issue(s):* *Ultrasonic Meters*  
*Witness:* *Claire M. Eubanks*  
*Sponsoring Party:* *MoPSC Staff*  
*Type of Exhibit:* *Direct Testimony*  
*Case No.:* *GR-2022-0179*  
*Date Testimony Prepared:* *August 31, 2022*

**MISSOURI PUBLIC SERVICE COMMISSION**

**INDUSTRY ANALYSIS DIVISION**

**ENGINEERING ANALYSIS DEPARTMENT**

**DIRECT TESTIMONY  
Revenue Requirement**

**OF**

**CLAIRE M. EUBANKS, P.E.**

**SPIRE MISSOURI, INC., d/b/a Spire**

**CASE NO. GR-2022-0179**

*Jefferson City, Missouri*  
*August 2022*

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**DIRECT TESTIMONY OF**  
**CLAIRE M. EUBANKS, P.E.**  
**SPIRE MISSOURI, INC., d/b/a Spire**  
**CASE NO. GR-2022-0179**

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**DIRECT TESTIMONY**  
**OF**  
**CLAIRE M. EUBANKS, P.E.**  
**SPIRE MISSOURI, INC., d/b/a Spire**  
**CASE NO. GR-2022-0179**

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5  
6 Q. Please state your name and business address.

7 A. My name is Claire M. Eubanks and my business address is Missouri Public  
8 Service Commission, P.O. Box 360, Jefferson City, Missouri, 65102.

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

10 A. I am employed by the Missouri Public Service Commission (“Commission”) as  
11 the Manager of the Engineering Analysis Department of the Industry Analysis Division.

12 Q. Please describe your educational background and work experience.

13 A. I received my Bachelor of Science degree in Environmental Engineering from  
14 the University of Missouri – Rolla, now referred to as Missouri University of Science and  
15 Technology, in May 2006. I am a licensed professional engineer in the states of Missouri and  
16 Arkansas. I began my career as a Project Engineer with Aquaterra Environmental Solutions,  
17 Inc., now SCS Aquaterra, an engineering consulting firm with locations across the Midwest.  
18 As a Project Engineer, I worked on a variety of engineering and environmental projects  
19 including landfill design, environmental sampling, construction oversight, and construction  
20 quality assurance. Over the course of my six years with Aquaterra I was promoted several times,  
21 eventually to Project Manager. As a Project Manager, I managed a variety of engineering  
22 projects primarily related to the design and environmental compliance of solid waste landfills,  
23 including performing as the Certifying Engineer for projects related to landfill design,  
24 construction plans and specifications, and construction quality assurance.

1           In November 2012, I began my employment with the Commission as a Utility  
2 Regulatory Engineer I. My primary job duties were primarily related to the Renewable Energy  
3 Standard, reviewing applications for Certificates of Convenience and Necessity, construction  
4 audits, and the development and evaluation of in-service criteria. In January 2017, I was  
5 promoted to Utility Regulatory Engineer II and in April of 2020, I was promoted to my  
6 current position.

7           Q.     Have you previously filed testimony before the Commission?

8           A.     Yes, numerous times. Please refer to Schedule CME-d1, attached to this  
9 direct testimony, for a list of cases in which I have filed testimony or recommendations.

10          Q.     What knowledge, skills, experience, training and education do you have in the  
11 areas of which you are testifying as an expert witness?

12          A.     I have received continuous training at in-house and outside seminars on  
13 technical matters since I began my employment at the Commission. I have been employed by  
14 this Commission as an Engineer for over 9 years, and have submitted testimony numerous times  
15 before the Commission. I have also been responsible for the supervision of other Commission  
16 employees in rate cases and other regulatory proceedings.

17           **EXECUTIVE SUMMARY**

18          Q.     What is the purpose of your direct testimony?

19          A.     The purpose of my direct testimony is to support Staff's recommended  
20 disallowance related to the premature retirement of metering infrastructure. Staff witness  
21 Lisa M. Ferguson discusses issues with the meter replacement project and has posted the  
22 adjustment described further in this testimony to the cost of service.

1 **METERING INFRASTRUCTURE**

2 Q. What is Staff's recommendation to the Commission regarding the premature  
3 retirement of diaphragm meters?

4 A. Staff recommends that the Commission disallow the recovery of 7.5% of the  
5 smart meter account and 8.9% of the associated smart meter installation costs that occurred  
6 from June 1, 2021 to May 31, 2022. This represents the percentage of meter installations  
7 that resulted in a diaphragm meter less than 10 years old and meters where Spire  
8 Missouri provided no documented age being replaced with an ultrasonic meter. Staff witness  
9 Lisa M. Ferguson has included the specific adjustment to FERC account 381.1 – Smart Meters  
10 and 381.2 – Smart Meter Installations in the cost of service accounting schedules.

11 Q. Has the Commission recently ordered a disallowance related to premature  
12 retirement of meters?

13 A. Yes. In the last Spire Missouri rate case, GR-2021-0108, the Commission could  
14 not conclude that replacement of meters that were less than 10 years old was just and reasonable  
15 in all instances and therefore disallowed recovery of 26% of the meter replacements. The  
16 Commission found instances where certain meter replacements were appropriate, for example,  
17 when an existing meter needs replacement.<sup>1</sup>

18 Q. What is the significance of the 10-year threshold?

19 A. Commission rule 20 CSR 4240-10.030(19) requires gas utilities to remove,  
20 inspect and test meters at least once every 120 months (i.e. 10 years). Spire Missouri received  
21 a waiver to this rule and performs statistical sampling rather than testing every meter.<sup>2</sup>

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<sup>1</sup> Amended Report and Order GR-2021-0108, page 46-48.

<sup>2</sup> GO-95-320, Report and Order, issued May 13, 1997 (Laclede Gas Company); GO-91-353; Order Granting Variance from Compliance, issued October 8, 1991 (Missouri Gas Energy f/k/a The Kansas Power and Light Company).

1 Q. How does Spire Missouri’s statistical sampling program work?

2 A. The statistical sampling program identifies groups of meters with common  
3 characteristics and applies a statistical sampling technique to each group. In other words, only  
4 a sampling of meters are removed for testing annually.

5 Q. Please describe the existing metering infrastructure of Spire Missouri.

6 A. The existing metering infrastructure consists of diaphragm meters paired with  
7 Automated Meter Reading (“AMR”) devices. Spire Missouri West began installing ultrasonic  
8 meters in May 2020 and Spire Missouri East began installing ultrasonic meters in June 2021.<sup>3</sup>

9 Q. What is a diaphragm meter?

10 A. A diaphragm meter measures the volume of gas that passes through it. A known  
11 volume of gas is displaced with each stroke of the diaphragm. The strokes are registered with  
12 an index (or counter).

13 Q. What is an AMR device?

14 A. AMR devices allow for one-way communication from the meter to the utility.  
15 An AMR device<sup>4</sup> is a network module attached to the meter index. These devices are  
16 programmed to convert the index revolutions to usage and transmit the usage reading to the  
17 utility when interrogated (i.e. read by van meter readers).

18 Q. What is an ultrasonic meter?

19 A. An ultrasonic gas meter measures the velocity of the gas flow using ultrasonic  
20 signals. The ultrasonic meters selected by Spire Missouri include safety features such as an  
21 integrated safety shut-off valve, high flow alarms, air detection alarms, and high temperature

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<sup>3</sup> Response to OPC data request 8517 and 8518.

<sup>4</sup> Itron refers to these devices as Encoder Receiver Transmitters (ERTs)

1 alarms. Additionally, the ultrasonic meters can detect reverse flows indicating a potential need  
2 to investigate tampering. In contrast to the existing metering infrastructure, the ultrasonic  
3 meters have integrated network devices that could allow for two-way communication  
4 between the device and utility when a network is in place. This two-way communication would  
5 allow Spire Missouri to remotely shut-off meters. However, a field technician would need to be  
6 on-site for service reconnection.

7 Q. Will additional capital costs be needed to enable two-way communications after  
8 installation of the ultrasonic meters?

9 A. Yes. However, the ultrasonic meters can function without a network in place in  
10 an AMR mode. The AMR mode allows the meters to be read with the existing van meter  
11 readers.

12 Q. Previously you mentioned the meter testing requirement of once every ten years.  
13 How does that compare to the average life of meters and AMR devices?

14 A. Based on the company's most recent depreciation study, which supported the  
15 ordered depreciation rates for the meter account in the last rate case, diaphragm meters have an  
16 average life of 35 years.<sup>5</sup> Company witnesses in GR-2021-0108 indicated that diaphragm  
17 meters, in their experience, have a life of roughly 18.8-22.1 years.<sup>6</sup> AMR devices have an  
18 average life of 8-15 years.<sup>7</sup> In comparison, the ultrasonic meters selected by Spire Missouri  
19 have a battery life of 20 years.<sup>8</sup>

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<sup>5</sup> GR-2021-0108, Spanos rebuttal, Schedule JJS-R2, p. 51 of 396. Staff Accounting Schedules – Commission Amended Report and Order November 12, 2021, Accounting Schedule 5, Page 1 of 2.

<sup>6</sup> GR-2021-0108, Tr. Vol. 11, pp. 230, 232-233 and 253-255.

<sup>7</sup> Staff Accounting Schedules per Commission Amended Report and Order November 12, 2021, Accounting Schedule 5, Page 1 of 2.

<sup>8</sup> Staff Accounting Schedules per Commission Amended Report and Order November 12, 2021, Accounting Schedule 5, Page 1 of 2.

1 Q. Did Spire Missouri document the reasons for meter exchanges that occurred  
2 since the last rate case?

3 A. Yes. Spire Missouri has exchanged meters for a variety of reasons. The primary  
4 reasons being:

- 5 • Systematic Meter Exchange
- 6 • Size upgrade or downgrade
- 7 • Special requests
- 8 • Relocation of meter
- 9 • Issues with the AMR device

10 The table below provides the number of replacements<sup>9</sup> from June 1, 2021 to  
11 May 31, 2022:

Meter Changed Reason	Count	Rank
DUE TO SYSTEMATIC METER EXCHANGE	76,406	1
SIZE UPGRADE OR DOWNGRADE	9,959	2
SPECIAL REQUEST	3,222	3
RELOCATE	2,939	4
AMR ISSUES	1,418	5
METER EXCEPTION CASE	410	6
DRM METER	402	7
DAMAGE	370	8
NOISE	125	9
LEAK	111	10
STUCK	103	11
FAILED SAMPLING	83	12
NOT RETRIEVED AMR	56	13
DIVERSION	20	14
NOT RETRIEVED	12	15
INACTIVE 18+ MONTHS	2	16
<b>Grand Total</b>	<b>95,638</b>	

13  
14 Q. Did Spire Missouri systematically replace meters that were less than  
15 10 years old?

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<sup>9</sup> Limited to ultrasonic meter installations.

1           A.     Yes. In the systematic meter exchange category, Spire Missouri exchanged  
2 11,677 meters less than 10 years old and 1,342 meters with an unknown age with a new  
3 ultrasonic meter. This accounts for 7.5% of the smart meter account and 8.9% of the smart  
4 meter installation account from June 1, 2021 through May 31, 2022.

5           Q.     Why has Staff included meters with an unknown age in its recommended  
6 disallowance?

7           A.     Staff cannot recommend recovery of the costs related to these meters due to the  
8 lack of documentation from Spire Missouri.

9           Q.     Did Staff ask Spire Missouri for documentation about meters with an  
10 unknown age?

11          A.     Yes. Staff requested additional explanation from Spire Missouri in Staff Data  
12 Request 0289.1. Staff expects a response from Spire Missouri on August 25, 2022; however  
13 Staff did not have the response at the time of writing this testimony to meet internal deadlines.

14          Q.     Has Spire Missouri provided direct testimony supporting the inclusion of its  
15 systematic meter exchanges?

16          A.     No.

17          Q.     Is it just and reasonable to retire meters prior to the end of their useful life?

18          A.     Not without justification. The replacement of meters is not beneficial to  
19 ratepayers when there is no cost justification or need to retire the replaced plant. Ratepayers are  
20 harmed by the premature replacement of meters in that the ratepayers would be paying more  
21 than the cost of one meter. This can occur because of the delay between adding one meter and  
22 retiring another on the utility's books or simply that the item was retired before the end of its  
23 useful life and in turn reserve is removed from rate base prematurely. This causes the ratebase

1 to falsely increase. Additionally, the unusual retirements will skew depreciation rates if not  
2 properly accounted for when completing future depreciation studies. Further, Staff Witness  
3 Sarah L. K. Lange identifies a discrepancy in the number of meters identified in the  
4 continuing property record and the number of Spire Missouri customers. Additional  
5 information and cooperation with Spire Missouri will be necessary to correct the records and  
6 accounts going forward.

7 Q. Has Spire Missouri filed quarterly reports required by the Commission's Order  
8 in GR-2021-0108 to describe any changes to Spire Missouri's meter replacement strategy for  
9 each of its service territories, as well as justification for any changes, including but not limited  
10 to, cost benefit analyses for the change in replacement strategy, alternative approaches  
11 considered, and potential customer impacts?

12 A. Spire Missouri filed one quarterly report regarding its meter replacement  
13 strategy on April 21, 2022 indicating it has not changed its current meter replacement strategy  
14 for either service territory but is assessing a change for Spire East. Spire Missouri noted the  
15 expiration of a contract with Landis & Gyr in 2025 is driving the assessment to alter its meter  
16 replacement strategy. Landis & Gyr is currently supporting the AMR system used to collect  
17 and read data from the Company's AMR devices in its Missouri East service territory.<sup>10</sup>

18 Q. Does this conclude your direct testimony?

19 A. Yes it does.

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<sup>10</sup> Spire Quarterly Report – Meter Replacement, April 21, 2022 filed in GR-2021-0108.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Spire Missouri, Inc. d/b/a )  
Spire's Request for Authority to Implement ) Case No. GR-2022-0179  
a General Rate Increase for Natural Gas )  
Service Provided in the Company's )  
Missouri Service Areas )

**AFFIDAVIT OF CLAIRE M. EUBANKS, PE**

STATE OF MISSOURI )  
 ) ss.  
COUNTY OF COLE )

COMES NOW CLAIRE M. EUBANKS, PE and on her oath declares that she is of sound mind and lawful age; that she contributed to the foregoing *Direct Testimony of Claire M. Eubanks, PE*; and that the same is true and correct according to her best knowledge and belief.

Further the Affiant sayeth not.

*Claire M Eubanks*  
CLAIRE M. EUBANKS, PE

**JURAT**

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 29<sup>th</sup> day of August 2022.

D. SUZIE MANKIN  
Notary Public - Notary Seal  
State of Missouri  
Commissioned for Cole County  
My Commission Expires: April 04, 2025  
Commission Number: 12412070

*D Suzie Mankin*  
Notary Public

**CLAIRE M. EUBANKS, PE**

**PRESENT POSITION:**

I am the Manager of the Engineering Analysis Department, Industry Analysis Division of the Missouri Public Service Commission.

**EDUCATIONAL BACKGROUND AND WORK EXPERIENCE:**

I received my Bachelor of Science degree in Environmental Engineering from the University of Missouri – Rolla, now Missouri University of Science and Technology, in May 2006. I am a licensed professional engineer in the states of Missouri and Arkansas. Immediately after graduating from UMR, I began my career with Aquaterra Environmental Solutions, Inc., now SCS Aquaterra, an engineering consulting firm based in Overland Park, Kansas. During my time with Aquaterra, I worked on various engineering projects related to the design, construction oversight, and environmental compliance of solid waste landfills. I began my employment with the Commission in November 2012 and was promoted to my current position in April 2020.

**CASE HISTORY:**

<b>Case Number</b>	<b>Utility</b>	<b>Type</b>	<b>Issue</b>
EA-2012-0281	Ameren	Rebuttal	Certificate of Convenience and Necessity
EC-2013-0379 EC-2013-0380	KCP&L KCP&L GMO	Rebuttal	RES Compliance
EO-2013-0458	Empire	Memorandum	RES Compliance Plan & Report
EO-2013-0462	Ameren	Memorandum	RES Compliance Report
EO-2013-0503	Ameren	Memorandum	RES Compliance Plan
EO-2013-0504	KCPL	Memorandum	RES Compliance Plan & Report
EO-2013-0505	GMO	Memorandum	RES Compliance Plan & Report
ET-2014-0059	KCP&L GMO	Rebuttal	RES Retail Rate Impact
ET-2014-0071	KCP&L	Rebuttal	RES Retail Rate Impact
ET-2014-0085	Ameren	Rebuttal	RES Retail Rate Impact
ER-2014-0258	Ameren	Cost of Service Report, Surrebuttal	RES, In-Service

<b>Case Number</b>	<b>Utility</b>	<b>Type</b>	<b>Issue</b>
EO-2014-0151	KCP&L GMO	Memorandum	RESRAM
EO-2014-0357	Electric	Memorandum	Solar Rebates Payments
EO-2014-0287	KCPL	Memorandum	RES Compliance Plan
EO-2014-0288	GMO	Memorandum	RES Compliance Plan
EO-2014-0289	KCPL	Memorandum	RES Compliance Report
EO-2014-0290	GMO	Memorandum	RES Compliance Plan
ER-2014-0370	KCP&L	Cost of Service Report	RES
EX-2014-0352	N/A	Live Comments	RES rulemaking
EC-2015-0155	GMO	Memorandum	Solar Rebate Complaint
EO-2015-0260	Empire	Memorandum	RES Compliance Plan & Report
EO-2015-0263	KCPL	Memorandum	RES Compliance Report
EO-2015-0264	GMO	Memorandum	RES Compliance Report
EO-2015-0265	KCPL	Memorandum	RES Compliance Plan
EO-2015-0266	GMO	Memorandum	RES Compliance Plan
EO-2015-0267	Ameren	Memorandum	RES Compliance Plan & Report
EO-2015-0252	GMO	Staff Report	Integrated Resource Plan – Renewable Energy Standard
EO-2015-0254	KCPL	Staff Report	Integrated Resource Plan – Renewable Energy Standard
EA-2015-0256	KCP&L GMO	Live Testimony	Greenwood Solar CCN
EO-2015-0279	Empire	Memorandum	RES Compliance Plan & Report
ET-2016-0185	KCP&L	Memorandum	Solar Rebate Tariff Suspension
EO-2016-0280	KCPL	Memorandum	RES Compliance Report
EO-2016-0281	GMO	Memorandum	RES Compliance Report
EO-2016-0282	KCPL	Memorandum	RES Compliance Plan
EO-2016-0283	GMO	Memorandum	RES Compliance Plan
EO-2016-0284	Ameren	Memorandum	RES Compliance Plan & Report
ER-2016-0023	Empire	Report	RES
ER-2016-0156	KCP&L GMO	Rebuttal	RESRAM Prudence Review

<b>Case Number</b>	<b>Utility</b>	<b>Type</b>	<b>Issue</b>
EA-2016-0208	Ameren	Rebuttal	Certificate of Convenience and Necessity
ER-2016-0285	KCPL	Cost of Service Report	In-Service, Greenwood Solar
ER-2016-0179	Ameren	Rebuttal	In-Service, Labadie Landfill
EW-2017-0245	Electric	Report	Working Case on Emerging Issues in Utility Regulation
EO-2017-0268	Ameren	Memorandum	RES Compliance Plan & Report
EO-2017-0269	KCPL	Memorandum	RES Compliance Report
EO-2017-0271	KCPL	Memorandum	RES Compliance Plan
GR-2017-0215 & GR-2017-0216	Spire	Rebuttal & Surrebuttal	CHP for Critical Infrastructure
GR-2018-0013	Liberty Utilities (Midstates Natural Gas)	Rebuttal	CHP Outreach Initiative for Critical Infrastructure Resiliency
EO-2018-0287	Ameren	Memorandum	RES Compliance Plan & Report
EO-2018-0288	KCPL	Memorandum	RES Compliance Report
EO-2018-0290	KCPL	Memorandum	RES Compliance Plan
EA-2016-0207	Ameren	Memorandum	Certificate of Convenience and Necessity
ER-2018-0146	GMO	Cost of Service Report	RESRAM Prudence Review
ER-2018-0145 ER-2018-0146	KCPL GMO	Class Cost of Service Report, Rebuttal	Solar Subscription Pilot Rider, Standby Service Rider
EA-2018-0202	Ameren	Staff Report	Certificate of Convenience and Necessity
EE-2019-0076	Ameren	Memorandum	Variance Request – Reliability Reporting
EA-2019-0021	Ameren	Staff Report	Certificate of Convenience and Necessity
EA-2019-0010	Empire	Staff Report	Certificate of Convenience and Necessity
EX-2019-0050	N/A	Live Comments	Renewable Energy Standard

<b>Case Number</b>	<b>Utility</b>	<b>Type</b>	<b>Issue</b>
EO-2019-0315	KCPL	Memorandum in Response to Commission Questions	Renewable Energy Standard
EO-2019-0316	GMO	Memorandum	Renewable Energy Standard
EO-2019-0317	KCPL	Memorandum in Response to Commission Questions	Renewable Energy Standard
EO-2019-0318	GMO	Memorandum	Renewable Energy Standard
ER-2019-0335	Ameren	Cost of Service Report	Renewable Energy Standard, In-Service Criteria
EA-2019-0371	Ameren	Staff Report	Certificate of Convenience and Necessity
EO-2020-0329	Evergy Missouri Metro	Memorandum	Renewable Energy Standard
EO-2020-0330	Evergy Missouri West	Memorandum	Renewable Energy Standard
EE-2021-0237	Evergy Missouri Metro	Memorandum	Cogeneration Tariff
EE-2021-0238	Evergy Missouri West	Memorandum	Cogeneration Tariff
EE-2021-0180	Ameren Missouri	Memorandum	Electric Meter Variance
ET-2021-0151 and 0269	Evergy	Memorandum, Rebuttal Report	Transportation Electrification
AO-2021-0264	Various	Staff Report	February 2021 Cold Weather Event
EW-2021-0104	n/a	Staff Report	RTO Membership
EW-2021-0077	n/a	Staff Report	FERC Order 2222
EO-2021-0339	Evergy Missouri West	Memorandum	Territorial Agreement
GR-2021-0108	Spire	Rebuttal	Automated Meter Reading Opt-out Tariff
EA-2021-0087	ATXI	Rebuttal Report	Certificate of Convenience and Necessity
ER-2021-0240	Ameren Missouri	Cost of Service Report Rebuttal	In-Service Bat Mitigation

<b>Case Number</b>	<b>Utility</b>	<b>Type</b>	<b>Issue</b>
ER-2021-0312	Empire	Cost of Service Report	Construction Audit – Engineering Review, In-service
EO-2022-0061	Evergy Missouri West	Surrebuttal	Special Rate/ Renewable Energy Standard
EA-2022-0099	ATXI	Rebuttal	Certificate of Convenience and Necessity
ER-2022-0129	Evergy Missouri West	Direct Rebuttal	Advanced Metering Infrastructure, Reliability, Transmission & Distribution Investment, PISA reporting, Misc. Tariff issues
ER-2022-0130	Evergy Missouri Metro	Direct Rebuttal	Advanced Metering Infrastructure, Reliability, Transmission & Distribution Investment, PISA reporting, Misc. Tariff issues
EE-2022-0329	Ameren Missouri	Memorandum	Variance Request