

Exhibit No.:
Issue: Cash Working Capital
Witness: Timothy S. Lyons
Type of Exhibit: Direct Testimony
Sponsoring Party: Spire Missouri, Inc.
Case No.: GR-2021-0108
Date Prepared: December 11, 2020

SPIRE MISSOURI, INC.

CASE NO. GR-2021-0108

DIRECT TESTIMONY

OF

TIMOTHY S. LYONS

DECEMBER 11, 2020

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1 **Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS**
2 **ADDRESS.**

3 A. My name is Timothy S. Lyons. I am a Partner with ScottMadden, Inc. My business
4 address is 1900 West Park Drive, Suite 250, Westborough, Massachusetts 01581.

5 **Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS TESTIMONY?**

6 A. I am submitting this testimony on behalf of Spire Missouri, Inc. (“Spire” or the
7 “Company”).

8 **Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.**

9 A. I have more than 30 years of experience in the energy industry. I started my career
10 in 1985 at Boston Gas Company (now part of National Grid), eventually becoming
11 Director of Rates and Revenue Analysis. In 1993, I moved to Providence Gas
12 Company (also now part of National Grid), eventually becoming Vice President of
13 Marketing and Regulatory Affairs. Starting in 2001, I held a number of
14 management consulting positions in the energy industry first at KEMA and then at
15 Quantec, LLC. In 2005, I became Vice President of Sales and Marketing at
16 Vermont Gas Systems, Inc. before joining Sussex Economic Advisors, LLC
17 (“Sussex”) in 2013. Sussex was acquired by ScottMadden in 2016.

18 **Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?**

19 A. I hold a bachelor’s degree from St. Anselm College, a master’s degree in Economics
20 from The Pennsylvania State University, and a master’s degree in Business
21 Administration from Babson College. A summary of my professional and
22 educational background, including a list of my testimony in prior proceedings, is
23 included in Schedule TSL-D1.

1 **PURPOSE AND OVERVIEW OF TESTIMONY**

2 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

3 A. The purpose of my testimony is to sponsor the lead-lag study. The lead-lag study
4 is used to determine the Cash Working Capital (“CWC”) requirement for the
5 Company.

6 **Q. HAVE YOU PREPARED SCHEDULES SUPPORTING YOUR**
7 **TESTIMONY?**

8 A. Yes. Schedules TSL-D2 and TSL-D3 support the lead-lag study. The Schedules
9 were prepared by me or under my direction.

10 **Q. PLEASE DEFINE THE TERM “CASH WORKING CAPITAL”.**

11 A. The term “cash working capital” refers to the net funds required by the Company
12 to finance goods and services used to provide service to customers from the time
13 those goods and services are paid for by the Company to the time that payment is
14 received from customers. Goods and services considered in this lead-lag study
15 include operations and maintenance (“O&M”) expenses, including labor and non-
16 labor expenses; federal, state, and local taxes; and employment taxes.

17 **Q. HOW WAS THE CWC REQUIREMENT DETERMINED?**

18 A. The CWC requirement was determined using the results of a lead-lag study, which
19 compares differences between the Company’s revenue lag and expense leads.

20 The revenue lag represents the number of days from the time customers receive
21 service to the time customers pay for their service, *i.e.*, when the funds are available
22 to the Company. The longer the revenue lag, the more cash the Company needs to
23 finance its day-to-day operations.

1 The expense lead represents the number of days from the time the Company
2 receives goods and services used to provide service to the time payments are made
3 for those goods and services, *i.e.*, when the funds are no longer available to the
4 Company. The longer the expense lead, the less cash the Company needs to fund
5 its day-to-day operations. Together, the revenue lag and expense leads are used to
6 measure the lead-lag days.

7 The CWC requirement was determined by applying the results of the lead-lag study
8 to the Company's adjusted test year expenses. The CWC requirement is included
9 in the Company's rate base.

10 **Q. DO THE RESULTS OF THE LEAD-LAG STUDY PROVIDE AN**
11 **ACCURATE REPRESENTATION OF THE COMPANY'S CWC NEEDS?**

12 A. Yes. The results of the lead-lag study provide an accurate representation of the
13 Company's CWC needs. Furthermore, the methodology used in this lead-lag study
14 is generally consistent with the methodology used by the Company in its most
15 recent rate case proceedings, Case Nos. GR-2017-0215 and GR-2017-0216.

16

17 **LEAD-LAG STUDY APPROACH**

18 **Q. PLEASE SUMMARIZE THE APPROACH USED TO DEVELOP THE**
19 **LEAD-LAG STUDY.**

20 A. The lead-lag study compares differences between the Company's revenue lag and
21 expense leads. The revenue lag measures the number of days from the time service
22 is provided to customers to the time payment is received from customers. The
23 expense leads measure the number of days from the time goods and services used

1 to provide service are provided to the Company to the time payments are made by
2 the Company for those goods and services. The lag and leads are measured in days
3 for individual expenses and then converted to “dollar-days” that reflect a weighting
4 by expense amounts.

5 **Q. PLEASE DESCRIBE THE FINANCIAL DATA USED IN THE LEAD-LAG**
6 **STUDY.**

7 A. The lead-lag study was based on the Company’s financial data from October 1,
8 2019 through September 30, 2020. The data included customer billing, O&M
9 expenses, and federal, state, local, and employment taxes.

10 **Q. PLEASE SUMMARIZE THE RESULTS OF THE LEAD-LAG STUDY.**

11 A. The lead-lag study is summarized in Schedule TSL-D2 and shows a CWC
12 requirement of \$12.7 million.

13

14

REVENUE LAG

15 **Q. HOW WAS THE REVENUE LAG DETERMINED?**

16 A. The revenue lag is summarized in Schedule TSL-D3, Tab A and shows the revenue
17 lag was based on the sum of three components: (1) the service lag; (2) the billing
18 lag; and (3) the collection lag.

19 **Q. WHAT IS THE SERVICE LAG?**

20 A. The service lag measures the average number of days in the service period; that is,
21 the time between the start and end of the billing month. Meters are read at the end
22 of the billing period. The service lag in this lead-lag study was based on the
23 midpoint of the service period.

1 **Q. WHAT IS THE BILLING LAG?**

2 A. The billing lag measures the number of days from the time meters are read at the
3 end of the billing period to the time bills are prepared, recorded, and sent to
4 customers. The billing lag includes time for review and validation of billed usage
5 and dollars.

6 **Q. WHAT IS THE COLLECTION LAG FOR THOSE CUSTOMERS?**

7 A. The collection lag measures the number of days from the time bills are recorded
8 and sent to customers to the time customer payments are received (i.e., funds are
9 available to the Company). The collection lag in this lead-lag study was based on
10 daily accounts receivable and monthly billed revenue data, which reflect the
11 average time to receive customer payments.

12

13

EXPENSE LEAD DAYS

14 **Q. HOW WERE LEAD DAYS FOR EXPENSES DETERMINED?**

15 A. Lead days for expenses were determined separately for the following expense
16 categories: (1) Operations and Maintenance (“O&M”) expenses; (2) Income Taxes;
17 (3) Taxes Other than Income Taxes; and (4) Interest Payments on long-term debt.

18

19

O&M EXPENSES

20 **Q. HOW WERE LEAD DAYS FOR O&M EXPENSES DETERMINED?**

21 A. Lead days for O&M expenses were determined separately for the following
22 expense categories: Purchased Gas; Regular Payroll; Vacation Pay; Annual
23 Performance Bonus; Pension; Group Insurance; Missouri Public Service

1 Commission (“PSC”) Assessment; and Other O&M Expenses. Uncollectible
2 expenses were assumed to have no impact on the Company’s CWC requirement,
3 consistent with the prior study.

4 **Q. HOW WERE LEAD DAYS FOR PURCHASED GAS DETERMINED?**

5 A. Lead days for purchased gas were based on the number of days from the midpoint
6 of the service period to the payment date. Lead days associated with purchased
7 gas, transportation and storage transactions were measured separately as the
8 number of days from the midpoint of the service period to the payment date and
9 then dollar-weighted by payments.

10 **Q. HOW WERE LEAD DAYS FOR REGULAR PAYROLL EXPENSES**
11 **DETERMINED?**

12 A. Lead days for regular payroll expenses were based on the Company’s payroll
13 process, which pays employees on a bi-weekly basis. Lead days were measured as
14 the number of days from the midpoint of the payroll period to the payroll payment
15 date.

16 **Q. DOES THE LEAD-LAG STUDY ADJUST FOR EMPLOYEES PAID BY**
17 **CHECK?**

18 A. No, employees are paid electronically via direct deposit.

19 **Q. DOES THE LEAD-LAG STUDY ADJUST FOR VACATION PAY?**

20 A. Yes, the lead-lag study adjusts for vacation pay. The adjustment reflects that
21 vacation pay is earned before it is taken. The adjustment is based on the midpoint
22 of the calendar year.

1 **Q. HOW WERE LEAD DAYS FOR THE ANNUAL PERFORMANCE BONUS**
2 **DETERMINED?**

3 A. Lead days for the Annual Performance Bonus were based on the number of days
4 from the midpoint of the performance period (i.e., October 1, 2018 through
5 September 30, 2019) to the payment date (i.e., November 29, 2019).

6 **Q. HOW WERE LEAD DAYS FOR EMPLOYEE BENEFITS DETERMINED?**

7 A. Lead days for employee benefits were measured separately for the following
8 categories: (1) Pension contributions; and (2) Group Insurance expenses, including
9 medical, dental, and vision. 401K matching payments were included in regular
10 payroll expenses since they reflect similar lead days. The lead days for each group
11 were measured separately and then dollar-weighted by annual expenses.

12 **Q. HOW WERE LEAD DAYS FOR THE MISSOURI PSC ASSESSMENT**
13 **DETERMINED?**

14 A. Lead days for the Missouri PSC Assessment were based on the number of days
15 from the midpoint of the quarterly installment periods to the quarterly payment
16 dates.

17 **Q. HOW WERE LEAD DAYS FOR OTHER O&M EXPENSES**
18 **DETERMINED?**

19 A. Lead days for Other O&M expenses were based on a stratified sample of invoices
20 paid by the Company during the test year. Lead days were measured for each
21 invoice in the sample as the number of days from the midpoint of the service period
22 to the payment date and then dollar-weighted by payment amounts. If the service
23 period was not available, then the study relied on the invoice date.

1 **INCOME TAX EXPENSE**

2 **Q. HOW WERE LEAD DAYS FOR INCOME TAXES DETERMINED?**

3 A. Lead days for Federal and State Income Taxes were measured separately as the
4 number of days from the midpoint of the taxing period to the Internal Revenue
5 Service (“IRS”) scheduled payment dates. The Company’s taxing period is the
6 fiscal year October 1, 2019 through September 30, 2020. The IRS scheduled
7 payment dates are January 15, March 15, June 15 and September 15. If the
8 scheduled payment date falls on a Saturday, Sunday, or legal holiday, the payment
9 is due on the next regular business day.

10
11 **TAXES OTHER THAN INCOME TAXES**

12 **Q. HOW WERE LEAD DAYS FOR TAXES OTHER THAN INCOME TAXES**
13 **DETERMINED?**

14 A. Lead days for Taxes other than Income Taxes were measured separately for the
15 following categories: (1) Employment Taxes related to the Federal Insurance
16 Contributions Act (“FICA”), Federal Unemployment Taxes (“FUTA”) and State
17 Unemployment Taxes (“SUTA”); and (2) Property Taxes.

18 **Q. HOW WERE LEAD DAYS FOR EMPLOYMENT TAXES DETERMINED?**

19 A. Lead days for Employment Taxes were measured separately as the number of days
20 from the midpoint of the taxing period to the payment date.

1 **Q. HOW WERE LEAD DAYS FOR PROPERTY TAXES DETERMINED?**

2 A. Lead days for Property Taxes were measured separately for each taxing authority
3 or municipality as the number of days from the midpoint of the taxing period to the
4 due date – and then dollar-weighted by payment amounts.

5

6 **INTEREST EXPENSE**

7 **Q. HOW WERE LEAD DAYS FOR INTEREST PAYMENTS DETERMINED?**

8 A. Lead days for interest payments on the Company’s debt were measured separately
9 for each payment as the number of days from the midpoint of the interest expense
10 period to the payment date and then dollar-weighted by payment amounts.

11 **Q. WERE THERE OTHER ITEMS INCLUDED IN THE STUDY?**

12 A. Yes, the study also included: (1) Sales and Use Tax; and (2) Gross Receipts Taxes.

13 **Q. HOW WERE LEAD DAYS FOR USE TAXES DETERMINED?**

14 A. Lead days for use taxes were measured as the number of days from the midpoint of
15 the taxing period to the payment date.

16 **Q. HOW WERE LEAD DAYS FOR SALES TAXES DETERMINED?**

17 A. Lead days for sales taxes were measured as the number of days from the midpoint
18 of the taxing period to the payment date, adjusted to reflect no service period
19 associated with the revenue lag or expense lead.

1 **Q. HOW WERE LEAD DAYS FOR GROSS RECEIPTS TAXES**
2 **DETERMINED?**

3 A. Lead days for gross receipts taxes were measured as the number of days from the
4 midpoint of the taxing period to the payment date, adjusted to reflect no service
5 period associated with the revenue lag or expense lead.

6

7

CONCLUSION

8 **Q. ARE THE RESULTS OF THE LEAD-LAG STUDY AN ACCURATE**
9 **REPRESENTATION OF THE COMPANY'S CWC NEEDS?**

10 A. Yes. The results of the lead-lag study provide an accurate representation of the
11 Company's CWC needs. Furthermore, the methodology used in this lead-lag study
12 is generally consistent with the methodology used by the Company in its most
13 recent rate case proceeding.

14 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

15 A. Yes, it does.

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

In the Matter of Spire Missouri Inc.'s)
Request for Authority to Implement a)
General Rate Increase for Natural Gas) File No. GR-2021-0108
Service Provided in the Company's)
Missouri Service Areas)

AFFIDAVIT

STATE OF VERMONT)
COUNTY OF CHITTENDEN) SS.
)

Timothy S. Lyons, of lawful age, being first duly sworn, deposes and states:

1. My name is Timothy S. Lyons. I am a Partner at ScottMadden, Inc. My business address is 1900 West Park Drive, Suite 250, Westborough, Massachusetts 01581.
2. Attached hereto and made a part hereof for all purposes is my direct testimony on behalf of Spire Missouri, Inc.
3. Under penalty of perjury, I declare that the foregoing is true and correct to the best of my knowledge and belief.

/s/ Timothy S. Lyons
Timothy S. Lyons

December 11, 2020
Date

Summary

Tim Lyons is a partner with ScottMadden with more than 30 years of experience in the energy industry. Tim has held senior positions at several gas utilities and energy consulting firms. His experience includes rate and regulatory support, sales and marketing, customer service and strategy development. Prior to joining ScottMadden, Tim was Vice President of Sales and Marketing for Vermont Gas. He has also served as Vice President of Marketing and Regulatory Affairs for Providence Gas Company, Director of Rates at Boston Gas Company, and Project Director at Quantec, LLC, an energy consulting firm.

Tim has sponsored testimony before 20 state regulatory commissions. Tim holds a B.A. from St. Anselm College, an M.A. in Economics from The Pennsylvania State University, and an M.B.A. from Babson College.

Areas of Specialization

- Regulation and Rates
- Retail Energy
- Utilities
- Natural Gas

Capabilities

- Regulatory Strategy and Rate Case Support
- Strategic and Business Planning
- Capital Project Planning
- Process Improvements

Articles

- “Country Strong: Vermont Gas shares its comprehensive effort to expand natural gas service into rural communities.” **American Gas Association**, June 2011 (with Don Gilbert).
- “Talking Safety With Vermont Gas.” **American Gas Association**, February 2009 (with Dave Attig).
- “Consumers Say ‘Act Now’ To Stabilize Prices.” **Power & Gas Marketing**, September/ October 2001 (with Jim DeMetro and Gerry Yurkevicz).
- “Rate Reclassification: Who Buys What and When.” **Public Utilities Fortnightly**, October 15, 1991 (with John Martin).

Sponsor	Date	Docket No.	Subject
Regulatory Commission of Alaska			
ENSTAR Natural Gas Company	06/16	Docket No. U-16-066	Adopted testimony and sponsored Lead/Lag study for a general rate case proceeding.
Arkansas Public Service Commission			
Liberty Utilities (Pine Bluff Water)	10/18	Docket No. 18-027-U	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding.
California Public Utilities Commission			
Southwest Gas Corporation (Southern California, Northern California and South Lake Tahoe jurisdictions)	8/19	Docket No. A.19-08-015	Sponsored testimony on behalf of three separate rate jurisdictions related to: revenue requirements, lead-lag/ cash working capital, and class cost of service, rate design and bill impact analysis for a general rate case proceeding.
Connecticut Public Utilities Regulatory Authority			
Yankee Gas Company	07/14	Docket No. 13-06-02	Sponsored report and testimony supporting the review and evaluation of gas expansion policies, procedures and analysis.
Illinois Commerce Commission			
Liberty Utilities (Midstates Natural Gas)	07/16	Docket No. 16-0401	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new commercial classes and a decoupling mechanism.
Iowa Utilities Board			
Liberty Utilities (Midstates Natural Gas)	07/16	Docket No. RPU-2016-0003	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new commercial classes.
Kansas Corporation Commission			
The Empire District Electric Company	12/18	Docket No. 19-EPDE-223-RTS	Sponsored testimony supporting cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding.
Maine Public Utilities Commission			
Northern Utilities, Inc. d/b/a Unutil	06/19	Docket No. 2019-00092	Sponsored testimony supporting a proposed capital investment cost recovery mechanism.
Northern Utilities, Inc. d/b/a Unutil	06/15	Docket No. 2015-00146	Sponsored testimony supporting the proposed gas expansion program, including a zone area surcharge.
Maryland Public Service Commission			
Sandpiper Energy, a Chesapeake Utilities company	12/15	Case No. 9410	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new residential and commercial classes.
Massachusetts Department of Public Utilities			
Liberty Utilities (New England Gas Company)	07/18	Docket No. DPU 18-68	Sponsored the Long-Range Forecast and Supply Plan filing for the five-year forecast period 2018/2019 through 2022/2023.
Liberty Utilities (New England Gas Company)	07/16	Docket No. DPU 16-109	Sponsored the Long-Range Forecast and Supply Plan filing for the five-year forecast period 2016/2017 through 2020/2021.

Sponsor	Date	Docket No.	Subject
Boston Gas	10/93	Docket No. DPU 92-230	Sponsored testimony describing the Company's position regarding rate treatment of vehicular natural gas investments and expenses.
Boston Gas	03/90	Docket No. DPU 90-55	Sponsored testimony supporting the weather and other cost of service adjustments, rate design and customer bill impact studies for a general rate case proceeding.
Boston Gas	03/88	Docket No. DPU 88-67-II	Sponsored testimony supporting the rate reclassification of commercial and industrial customers for a rate design proceeding.
Michigan Public Service Commission			
Lansing Board of Water & Light and Michigan State University	04/20	Docket No. U-20650	Sponsored testimony evaluating Consumer Energy's cost of service and rate design proposals.
Lansing Board of Water & Light and Michigan State University	04/19	Docket No. U-20322	Sponsored testimony evaluating Consumer Energy's cost of service and rate design proposals.
Midland Cogeneration Ventures, LLC	09/18	Docket No. U-18010	Sponsored testimony evaluating Consumer Energy's cost of service and rate design proposals.
Missouri Public Service Commission			
The Empire District Electric Company	08/19	Docket No. ER-2019-0374	Sponsored testimony supporting the cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding. The testimony also included proposals for a weather normalization mechanism.
Liberty Utilities (Midstates Natural Gas)	09/17	Docket No. GR-2018-0013	Sponsored testimony supporting the cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding. The testimony also included proposals for a revenue decoupling/ weather normalization mechanism as well as tracker accounts for certain O&M expenses and capital costs.
Missouri Gas Energy	04/17	Docket No. GR-2017-0216	Sponsored testimony supporting the cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding. The testimony included support for a decoupling mechanism.
Laclede Gas Company	04/17	Docket No. GR-2017-0215	Sponsored testimony supporting the cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding. The testimony included support for a decoupling mechanism.
New Hampshire Public Utilities Commission			
Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities	11/17	Docket No. DG 17-198	Sponsored testimony supporting a levelized cost analysis for approval of firm supply and transportation agreements.
Liberty Utilities d/b/a Granite State Electric Company	04/16	Docket No. DE 16-383	Adopted testimony and sponsored Lead/Lag study for a general rate case proceeding.
Nevada Public Utilities Commission			
Southwest Gas Corporation	02/20	Docket No. 20-02023	Sponsored testimony supporting the class cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding.

Sponsor	Date	Docket No.	Subject
<i>New Jersey Board of Public Utilities</i>			
South Jersey Gas Company	03/20	Docket No. GR20030243	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Elizabethtown Gas Company	04/19	Docket No. GR19040486	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Pivotal Utility Holdings, Inc. d/b/a Elizabethtown Gas Company	08/16	Docket No. GR16090826	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
<i>Corporation Commission of Oklahoma</i>			
The Empire District Electric Company	03/19	Cause No. PUD 201800133	Sponsored testimony supporting the cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding.
The Empire District Electric Company	04/17	Cause No. PUD 201600468	Adopted direct testimony and sponsored rebuttal testimony supporting the revenue requirements for a general rate case proceeding. The testimony included proposals for alternative ratemaking mechanisms.
<i>Rhode Island Public Utilities Commission</i>			
Providence Gas Company	08/01 09/00 08/96	Docket No. 1673	Sponsored testimony supporting the changes in cost of gas adjustment factor related to projected under-recovery of gas costs; Filed testimony and witness for pilot hedging program to mitigate price risks to customers; Filed testimony and witness for changes in cost of gas adjustment factor related to extension of rate plan.
Providence Gas Company	08/00	Docket No. 2581	Sponsored testimony supporting the extension of a rate plan that began in 1997 and included certain modifications, including a weather normalization clause.
Providence Gas Company	03/00	Docket No. 3100	Sponsored testimony supporting the de-tariff and deregulation of appliance repair service, enabling the Company to have needed pricing flexibility.
Providence Gas Company	06/97	Docket No. 2581	Sponsored testimony supporting a rate plan that fixed all billing rates for three-year period; included funding for critical infrastructure investments in accelerated replacement of mains and services, digitized records system, and economic development projects.
Providence Gas Company	04/97	Docket No. 2552	Sponsored testimony supporting the rate design, customer bill impact studies and retail access tariffs for commercial and industrial customers, including redesign of cost of gas adjustment clause, for a rate design proceeding.
Providence Gas Company	02/96	Docket No. 2374	Sponsored testimony supporting the rate design, customer bill impact studies and retail access tariffs for largest commercial and industrial customers for a rate design proceeding.
Providence Gas Company	01/96	Docket No. 2076	Sponsored testimony supporting the rate reclassification of customers into new rate classes, rate design (including introduction of

Sponsor	Date	Docket No.	Subject
			demand charges), and customer bill impact studies for a rate design proceeding.
Providence Gas Company	11/92	Docket No. 2025	Sponsored testimony supporting the Integrated Resource Plan filing, including a performance-based incentive mechanism.
Railroad Commission of Texas			
Texas Gas Service Company – Central Texas and Gulf Coast Service Areas	12/19	GUD No. 10928	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – Beaumont/ East Texas Division	11/19	GUD No. 10920	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – Borger/ Skellytown Service Area	08/18	GUD No. 10766	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – North Texas Service Area	06/18	GUD No. 10739	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – South Texas Division	11/17	GUD No. 10669	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – Rio Grande Valley Service Area	06/17	GUD No. 10656	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Atmos Pipeline – Texas	01/17	GUD No. 10580	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – Texas Gulf Division	11/16	GUD No. 10567	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Public Utility Commission of Texas			
CenterPoint Energy Houston Electric, LLC	04/19	Docket No. 49421	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Vermont Public Utilities Commission			
Vermont Gas Systems	12/12	Docket No. 7970	Sponsored testimony describing the market served by \$90 million natural gas expansion project to Addison County, VT. Also described the terms and economic benefits of a special contract with International Paper.
Vermont Gas Systems	02/11	Docket No. 7712	Sponsored testimony supporting the market evaluation and analysis for a system expansion and reliability regulatory fund.
Virginia State Corporation Commission			
American Electric Power - Appalachian Power Company	3/20	Case No. PUR-2020-00015	Sponsored testimony supporting the Lead/Lag study for the 2020 triennial review of base rates, terms and conditions.

LEAD/LAG STUDY WORKPAPERS

Schedule TSL-D2
SummarySpire Missouri Inc.
Lead-Lag Study
Cash Working Capital Requirement
Summary

Line	Description	Revenue Requirement Amount	Average Daily Amount	Revenue Lag	Ref.	Expense Lag	Ref.	Net (Lead)/Lag Days	Working Capital Requirement
<u>Operation and Maintenance Expenses</u>									
1	Purchased Gas Costs	\$ 514,331,100	1,409,126	49.15	A	(38.45)	B	10.69	15,064,071
2	Regular Payroll Expenses & Withholdings	105,135,178	288,042	49.15	A	(12.00)	C	37.15	10,699,313
3	Vacation Pay	5,244,559	14,369	49.15	A	(182.50)	C	(133.35)	(1,916,131)
4	Annual Performance Bonus	6,443,726	17,654	49.15	A	(242.50)	C	(193.35)	(3,413,497)
5	Pension	25,450,524	69,727	49.15	A	2.02	C	51.16	3,567,430
6	Benefits (Group Insurance)	16,855,575	46,180	49.15	A	(7.07)	C	42.08	1,943,212
7	Missouri PSC Assessment	4,118,152	11,283	49.15	A	35.29	C	84.44	952,674
8	Uncollectible Expense	12,571,722	34,443	49.15	A	(49.15)	C	0.00	-
9	Other O&M	90,060,968	246,742	49.15	A	(42.11)	C	7.04	1,735,887
<u>Income Taxes</u>									
11	Federal Income Taxes	\$ 12,407,679	33,994	49.15	A	(38.00)	D	11.15	378,860
12	State Income Taxes	2,203,284	6,036	49.15	A	(38.00)	D	11.15	67,276
<u>Taxes Other Than Income Taxes</u>									
14	FICA - Employer Portion	\$ 10,884,333	29,820	49.15	A	(15.27)	E	33.87	1,010,122
15	FUTA	106,848	293	49.15	A	(75.57)	E	(26.42)	(7,735)
16	SUTA	49,754	136	49.15	A	(75.54)	E	(26.39)	(3,598)
17	Property Taxes	40,000,000	109,589	49.15	A	(185.27)	F	(136.12)	(14,917,678)
18	Sales Tax	17,739,191	48,601	33.94	A	(12.22)	G	21.72	1,055,432
19	Use Tax	505,174	1,384	49.15	A	(76.50)	G	(27.35)	(37,854)
20	Gross Receipts Tax	63,508,198	173,995	33.94	A	(34.53)	G	(0.59)	(102,561)
21	Interest Payments	\$ 52,172,892	142,939	49.15	A	(72.95)	H	(23.81)	(3,402,977)
22	<u>Total</u>	<u>\$ 979,788,856</u>	<u>2,684,353</u>						<u>\$ 12,672,247</u>

LEAD/LAG STUDY WORKPAPERS

Spire Missouri Inc.
Lead-Lag Study
Revenue Collection Lag

Line	Description	Service Lag Service Period (365 days/ 12 months/ 2)	Billing Lag	Collection Lag	Average Daily A/R Balance	Total Revenue Lag	Reference
1	Revenue Lag	15.21	2.16	31.78	49.15	WP A-1, A-2	

LEAD/LAG STUDY WORKPAPERS

Spire Missouri Inc.
Lead-Lag Study
Purchased Gas

Line	Month	Amounts	(Lead)/Lag Days	Dollar Days
1	October-19	\$ 30,788,877	(38.81)	\$ (1,195,049,067)
2	November-19	48,064,574	(39.01)	(1,875,030,299)
3	December-19	51,570,523	(41.06)	(2,117,363,491)
4	January-20	50,273,724	(39.27)	(1,974,080,191)
5	February-20	40,327,537	(37.24)	(1,501,843,323)
6	March-20	30,802,591	(38.76)	(1,193,929,323)
7	April-20	24,093,681	(37.70)	(908,224,123)
8	May-20	28,757,769	(37.81)	(1,087,325,951)
9	June-20	24,597,065	(38.04)	(935,639,245)
10	July-20	25,956,173	(37.15)	(964,293,891)
11	August-20	28,120,602	(36.55)	(1,027,746,018)
12	September-20	28,461,622	(37.09)	(1,055,673,984)
13	Total	\$ 411,814,737		\$ (15,836,198,905)
14	Composite (Lead) / Lag Days			(38.45)

LEAD/LAG STUDY WORKPAPERS

Spire Missouri Inc.
Lead-Lag Study
O&M Expenses

Line	Description	(Lead)/Lag Days	Reference
1	Regular Payroll Expenses	(12.00)	C-1
2	Vacation Pay	(182.50)	365 / 2
3	Annual Performance Bonus	(242.50)	C-2
4	Pension & OPEB	2.02	C-3
5	Benefits (Group)	(7.07)	C-4
6	Missouri PSC Assessment	35.29	C-5
7	Other O&M	(42.11)	C-6

LEAD/LAG STUDY WORKPAPERS

Spire Missouri Inc.
Lead-Lag Study
Income Tax Expenses

<u>Line</u>	<u>Description</u>	<u>(Lead)/Lag Days</u>	<u>Reference</u>
1	Federal Income Taxes	(38.00)	WP-D1
2	State Income Taxes	(38.00)	WP-D2

LEAD/LAG STUDY WORKPAPERS

Spire Missouri Inc.
Lead-Lag Study
Payroll Taxes

<u>Line</u>	<u>Description</u>	<u>(Lead)/Lag Days</u>	<u>Reference</u>
1	FICA	(15.27)	WP-E1
2	FUTA	(75.57)	WP-E2
3	SUTA	(75.54)	WP-E3

LEAD/LAG STUDY WORKPAPERS

Spire Missouri Inc.
Lead-Lag Study
Property Taxes

Line	Description	Service Period Start	Service Period End	Midpoint	Due Date (1st Installment)	Due Date (2nd Installment)	Amount Paid	(Lead)/Lag Days	
								Payment (Lead)/Lag Days	Dollar Days
1	LA - Lincoln Parish	01/01/19	12/31/19	(182.50)	12/31/2019		\$ 352,039	(182.50)	\$ (64,247,074)
2	MO - City and Village	01/01/19	12/31/19	(182.50)	12/31/2019		37	(182.50)	(6,840)
3	MO - Lake St. Louis	01/01/19	12/31/19	(182.50)	12/31/2019		9,617	(182.50)	(1,755,090)
4	MO - St. Charles County	01/01/19	12/31/19	(182.50)	12/31/2019		1,458,995	(182.50)	(266,266,507)
5	MO - St. Louis City MFG L	01/01/19	12/31/19	(182.50)	12/31/2019		102,803	(182.50)	(18,761,524)
6	MO - St. Louis City PP/RE	01/01/19	12/31/19	(182.50)	12/31/2019		6,205,147	(182.50)	(1,132,439,379)
7	MO - St. Louis County	01/01/19	12/31/19	(182.50)	12/31/2019		8,871,945	(182.50)	(1,619,129,995)
8	MO - St. Louis County MF	01/01/19	12/31/19	(182.50)	12/31/2019		238,514	(182.50)	(43,528,756)
9	MO - Warren County	01/01/19	12/31/19	(182.50)	12/31/2019		3,023	(182.50)	(551,721)
10	TX - Dallas Co.	01/01/19	12/31/19	(182.50)	12/31/2019		5,101	(182.50)	(930,876)
11	MO - Jefferson County	01/01/19	12/31/19	(182.50)	12/31/2019		416,287	(182.50)	(75,972,398)
12	KS - Chautauqua County	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	8,102	(237.50)	(1,924,211)
13	KS - Leavenworth Co.	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	38,845	(237.50)	(9,225,621)
14	KS - Meade County	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	83,279	(237.50)	(19,778,862)
15	KS - Rice County	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	188,751	(237.50)	(44,828,401)
16	KS-Allen Co.	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	34,130	(237.50)	(8,105,785)
17	KS-Anderson County	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	762,297	(237.50)	(181,045,424)
18	KS-Elk County	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	172,575	(237.50)	(40,986,629)
19	KS-Jefferson County	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	52,708	(237.50)	(12,518,141)
20	KS-Montgomery County	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	428,322	(237.50)	(101,726,442)
21	KS-Woodson County	01/01/19	12/31/19	(182.50)	12/10/2019	5/10/2020	8,411	(237.50)	(1,997,603)
22	MO - Anderson City	01/01/19	12/31/19	(182.50)	12/31/2019		473	(182.50)	(86,339)
23	MO - Andrew County	01/01/19	12/31/19	(182.50)	12/31/2019		21,010	(182.50)	(3,834,413)
24	MO - Barry County	01/01/19	12/31/19	(182.50)	12/31/2019		146,190	(182.50)	(26,679,699)
25	MO - Barton County	01/01/19	12/31/19	(182.50)	12/31/2019		26,383	(182.50)	(4,814,815)
26	MO - Bates County	01/01/19	12/31/19	(182.50)	12/31/2019		1,535	(182.50)	(280,143)
27	MO - Buchanan County	01/01/19	12/31/19	(182.50)	12/31/2019		632,967	(182.50)	(115,516,390)
28	MO - Carl Junction City	01/01/19	12/31/19	(182.50)	12/31/2019		3,870	(182.50)	(706,290)
29	MO - Carroll County	01/01/19	12/31/19	(182.50)	12/31/2019		128,818	(182.50)	(23,509,323)
30	MO - Carrollton Town	01/01/19	12/31/19	(182.50)	12/31/2019		20,554	(182.50)	(3,751,185)
31	MO - Cass County	01/01/19	12/31/19	(182.50)	12/31/2019		695,556	(182.50)	(126,938,941)
32	MO - Cedar County	01/01/19	12/31/19	(182.50)	12/31/2019		34,209	(182.50)	(6,243,128)
33	MO - Christian County	01/01/19	12/31/19	(182.50)	12/31/2019		252,332	(182.50)	(46,050,595)

LEAD/LAG STUDY WORKPAPERS

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34	MO - Clay County	01/01/19	12/31/19	(182.50)	12/31/2019	3,597,703	(182.50)	(656,580,728)
35	MO - Clinton County	01/01/19	12/31/19	(182.50)	12/31/2019	60,920	(182.50)	(11,117,880)
36	MO - Concordia City	01/01/19	12/31/19	(182.50)	12/31/2019	1,243	(182.50)	(226,822)
37	MO - Cooper County	01/01/19	12/31/19	(182.50)	12/31/2019	2,811	(182.50)	(512,978)
38	MO - Crane City	01/01/19	12/31/19	(182.50)	12/31/2019	117	(182.50)	(21,307)
39	MO - Dade County	01/01/19	12/31/19	(182.50)	12/31/2019	11,908	(182.50)	(2,173,250)
40	MO - Dekalb County	01/01/19	12/31/19	(182.50)	12/31/2019	12,891	(182.50)	(2,352,642)
41	MO - Drexel City	01/01/19	12/31/19	(182.50)	12/31/2019	149	(182.50)	(27,193)
42	MO - Duenweg City	01/01/19	12/31/19	(182.50)	12/31/2019	1,278	(182.50)	(233,312)
43	MO - El Dorado Springs C	01/01/19	12/31/19	(182.50)	12/31/2019	4,252	(182.50)	(775,928)
44	MO - Emma City	01/01/19	12/31/19	(182.50)	12/31/2019	38	(182.50)	(6,844)
45	MO - Goodman City	01/01/19	12/31/19	(182.50)	12/31/2019	378	(182.50)	(69,009)
46	MO - Greene County	01/01/19	12/31/19	(182.50)	12/31/2019	102,254	(182.50)	(18,661,386)
47	MO - Henry County	01/01/19	12/31/19	(182.50)	12/31/2019	7,901	(182.50)	(1,441,860)
48	MO - Howard County	01/01/19	12/31/19	(182.50)	12/31/2019	54,966	(182.50)	(10,031,313)
49	MO - Jackson County	01/01/19	12/31/19	(182.50)	12/31/2019	6,466,657	(182.50)	(1,180,164,828)
50	MO - Jasper City	01/01/19	12/31/19	(182.50)	12/31/2019	296	(182.50)	(54,000)
51	MO - Jasper County	01/01/19	12/31/19	(182.50)	12/31/2019	1,028,626	(182.50)	(187,724,227)
52	MO - Johnson County	01/01/19	12/31/19	(182.50)	12/31/2019	237,161	(182.50)	(43,281,952)
53	MO - Lafayette County	01/01/19	12/31/19	(182.50)	12/31/2019	83,035	(182.50)	(15,153,971)
54	MO - Lanagan City	01/01/19	12/31/19	(182.50)	12/31/2019	264	(182.50)	(48,167)
55	MO - Lawrence County	01/01/19	12/31/19	(182.50)	12/31/2019	96,082	(182.50)	(17,534,896)
56	MO - McDonald County	01/01/19	12/31/19	(182.50)	12/31/2019	26,584	(182.50)	(4,851,627)
57	MO - Moniteau County	01/01/19	12/31/19	(182.50)	12/31/2019	66,067	(182.50)	(12,057,147)
58	MO - Newton County	01/01/19	12/31/19	(182.50)	12/31/2019	187,440	(182.50)	(34,207,712)
59	MO - Norborne City	01/01/19	12/31/19	(182.50)	12/31/2019	549	(182.50)	(100,172)
60	MO - Pettis County	01/01/19	12/31/19	(182.50)	12/31/2019	4,305	(182.50)	(785,670)
61	MO - Pineville City	01/01/19	12/31/19	(182.50)	12/31/2019	672	(182.50)	(122,687)
62	MO - Platte County	01/01/19	12/31/19	(182.50)	12/31/2019	839,010	(182.50)	(153,119,380)
63	MO - Ray County	01/01/19	12/31/19	(182.50)	12/31/2019	16,322	(182.50)	(2,978,699)
64	MO - Saline County	01/01/19	12/31/19	(182.50)	12/31/2019	73,604	(182.50)	(13,432,684)
65	MO - Southwest City City	01/01/19	12/31/19	(182.50)	12/31/2019	326	(182.50)	(59,493)
66	MO - Stone County	01/01/19	12/31/19	(182.50)	12/31/2019	5,951	(182.50)	(1,085,977)
67	MO - Vernon County	01/01/19	12/31/19	(182.50)	12/31/2019	2,655	(182.50)	(484,475)
68	OK - Grant County	01/01/19	12/31/19	(182.50)	12/31/2019	70,973	(182.50)	(12,952,573)
69	OK - Woods County	01/01/19	12/31/19	(182.50)	12/31/2019	2,652	(182.50)	(483,990)
70	MO - Butler County	01/01/19	12/31/19	(182.50)	12/31/2019	63,968	(182.50)	(11,674,109)
71	MO - City of Annapolis	01/01/19	12/31/19	(182.50)	12/31/2019	81	(182.50)	(14,693)
72	MO - City of Pilot Knob	01/01/19	12/31/19	(182.50)	12/31/2019	316	(182.50)	(57,736)
73	MO - Crawford County	01/01/19	12/31/19	(182.50)	12/31/2019	3,222	(182.50)	(588,073)
74	MO - Franklin County	01/01/19	12/31/19	(182.50)	12/31/2019	272,114	(182.50)	(49,660,873)
75	MO - Iron County	01/01/19	12/31/19	(182.50)	12/31/2019	6,791	(182.50)	(1,239,367)
76	MO - Jefferson County	01/01/19	12/31/19	(182.50)	12/31/2019	184,974	(182.50)	(33,757,766)
77	MO - Madison County	01/01/19	12/31/19	(182.50)	12/31/2019	18,336	(182.50)	(3,346,406)

LEAD/LAG STUDY WORKPAPERS

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78	MO - St. Francois County	01/01/19	12/31/19	(182.50)	12/31/2019	257,572	(182.50)	(47,006,903)
79	MO - Ste. Genevieve Cour	01/01/19	12/31/19	(182.50)	12/31/2019	26,275	(182.50)	(4,795,096)
80	Total Property Tax Payments					<u>\$ 35,306,511</u>	<u>(185.27)</u>	<u>\$ (6,541,196,338)</u>
81	Source: WP F-1 Property Taxes							

LEAD/LAG STUDY WORKPAPERS

Spire Missouri Inc.
Lead-Lag Study
Other Taxes

Line	Description	Amount	Reference
1	Sales Tax	(12.22)	G-1
2	Use Tax	(76.50)	G-2
3	Gross Receipts Taxes	(34.53)	G-3

LEAD/LAG STUDY WORKPAPERS

Spire Missouri Inc.
Lead-Lag Study
Interest Expense Payment

Line	Description	Service Period Begin	Service Period End	Midpoint	Payment Date	Amount	Lead-Lag Days	Dollar-Days	Composite Lead-Lag Days
1	Int Accrd - FMB 2.84% Due Nov 15 2029	5/31/2019	11/30/2019	(92.00)	11/15/2019	\$ 3,905,000	(77.00)	\$ (300,685,000)	
2	Int Accrd - FMB 6% , Due May 1, 2034	5/31/2019	11/30/2019	(92.00)	11/1/2019	\$ 3,000,000	(63.00)	\$ (189,000,000)	
3	Int Accrd - FMB 7% , Due Jun 1, 2029	6/30/2019	12/31/2019	(92.50)	12/1/2019	\$ 879,861	(62.50)	\$ (54,991,313)	
4	Int Accrd - FMB 6.15% Due Jun 1 2036	6/30/2019	12/31/2019	(92.50)	12/1/2019	\$ 1,701,896	(62.50)	\$ (106,368,500)	
5	Int Accrd - FMB 3.4%, Due August 15, 2023	8/31/2019	2/28/2020	(91.00)	2/15/2020	\$ 4,250,000	(78.00)	\$ (331,500,000)	
6	Int Accrd - FMB 4.625%, Due August 15, 2043	8/31/2019	2/28/2020	(91.00)	2/15/2020	\$ 2,311,228	(78.00)	\$ (180,275,784)	
7	Int Accrd - FMB 7 9/10% , Due Sep 15, 2030	9/30/2019	3/31/2020	(92.00)	3/15/2020	\$ 1,185,000	(76.00)	\$ (90,060,000)	
8	Interest Accrued 3.0% - FMB - Due March 15, 2020	9/30/2019	3/31/2020	(92.00)	3/15/2020	\$ 825,000	(76.00)	\$ (62,700,000)	
9	Interest Accrued 3.40% - FMB - Due March 15, 2020	9/30/2019	3/31/2020	(92.00)	3/15/2020	\$ 765,000	(76.00)	\$ (58,140,000)	
10	Int Accrd - FMB Series A 3.68% Due Sep 15 2032	9/30/2019	3/31/2020	(92.00)	3/15/2020	\$ 920,000	(76.00)	\$ (69,920,000)	
11	Int Accrd - FMB Series B 4.23% Due Sep 15 2047	9/30/2019	3/31/2020	(92.00)	3/15/2020	\$ 1,480,500	(76.00)	\$ (112,518,000)	
12	Int Accrd - FMB Series C 4.38% Due Sep 15 2057	9/30/2019	3/31/2020	(92.00)	3/15/2020	\$ 1,095,000	(76.00)	\$ (83,220,000)	
13	Int Accrd - FMB 6% , Due May 1, 2034	11/30/2019	5/31/2020	(92.00)	5/1/2020	\$ 3,016,667	(62.00)	\$ (187,033,354)	
14	Int Accrd - FMB 7% , Due Jun 1, 2029	12/31/2019	6/30/2020	(91.50)	6/1/2020	\$ 875,000	(62.50)	\$ (54,687,500)	
15	Int Accrd - FMB 6.15% Due Jun 1 2036	12/31/2019	6/30/2020	(91.50)	6/1/2020	\$ 1,691,250	(62.50)	\$ (105,703,125)	
16	Int Accrd - FMB 3.4%, Due August 15, 2023	2/29/2020	8/31/2020	(92.50)	8/15/2020	\$ 4,250,000	(76.50)	\$ (325,125,000)	
17	Int Accrd - FMB 4.625%, Due August 15, 2043	2/29/2020	8/31/2020	(92.50)	8/15/2020	\$ 2,312,500	(76.50)	\$ (176,906,250)	
18	Int Accrd - FMB 7 9/10% , Due Sep 15, 2030	3/31/2020	9/30/2020	(92.00)	9/15/2020	\$ 1,185,000	(77.00)	\$ (91,245,000)	
19	Interest Accrued 3.0% - FMB - Due March 15, 2020	3/31/2020	9/30/2020	(92.00)	9/15/2020	\$ 825,000	(77.00)	\$ (63,525,000)	
20	Interest Accrued 3.40% - FMB - Due March 15, 2020	3/31/2020	9/30/2020	(92.00)	9/15/2020	\$ 765,000	(77.00)	\$ (58,905,000)	
21	Int Accrd - FMB Series A 3.68% Due Sep 15 2032	3/31/2020	9/30/2020	(92.00)	9/15/2020	\$ 920,000	(77.00)	\$ (70,840,000)	
22	Int Accrd - FMB Series B 4.23% Due Sep 15 2047	3/31/2020	9/30/2020	(92.00)	9/15/2020	\$ 1,480,500	(77.00)	\$ (113,998,500)	
23	Int Accrd - FMB Series C 4.38% Due Sep 15 2057	3/31/2020	9/30/2020	(92.00)	9/15/2020	\$ 1,095,000	(77.00)	\$ (84,315,000)	
24	Subtotal					\$ 40,734,402		\$ (2,971,662,326)	(72.95)