Lisa M. Ferguson

Present Position:

I am a Utility Regulatory Audit Supervisor in the Auditing Department, of the Financial and Business Analysis Division of the Missouri Public Service Commission. As a Utility Regulatory Auditor, I review all exhibits and testimony on assigned issues, develop accounting adjustments and issue positions that are supported by workpapers and written testimony. In addition, I oversee the auditing casework of junior level utility regulatory auditors.

Educational Credentials and Work Experience:

I have an Associate of Science degree from Moberly Area Community College, a Bachelor's of Science degree in Accounting from Truman State University, and a Master's degree in Accounting from Truman State University. I have been employed by the Missouri Public Service Commission since June 2008. Prior to joining the Commission, I worked in several departments, primarily Customer Service and as an accounting assistant, for Hy-Vee Food and Drug from July 1998 to May 2002. I was also employed by Kelly L. Lovekamp as a legal office assistant during 2001. From June 2002 to May 2008, I was employed as a support staff for Chariton Valley Association. My duties included support of daily living activities for people with disabilities.

Lisa M. Ferguson

Past Rate Case Proceedings:

Company Name	Case No.	Issue
Ameren Missouri (ELEC)	ER-2021-0240	Co-Case Coordinator Sioux R&D Capital/Expense, PISA rebase and amortization, Miscellaneous Revenue, Uncollectibles, RESRAM rebase, Fuel Expense, Fuel Additives, Fuel Inventories, Purchased Power, Off System Sales, Green Tariff Program, Maryland Heights Fuel, MISO Revenue and Expense, MISO Transmission Revenue & Expense, SPP Transmission Revenue & Expense, Mark Twain Transmission, Capacity & Ancillary Sales, Coal Refinement, DOE Reimbursements, Radioactive Waste, FERC ROE, Income Tax, ADIT, FIN 48 Tracker, Federal & State TCJA Tracker, Wind Generation O&M, RES AAO and Amortization, Solar Rebates, All Other Amortizations, RECs, Emission Allowances, Callaway Refueling, Callaway Unplanned Outage, Community Solar, Meramec Tracker, Neighborhood Solar Accounting Schedules/Reconciliation Filed Direct, Rebuttal, Surrebuttal (True-up Direct)
Ameren Missouri (Gas)	GR-2021-0241	Co-Case Coordinator Miscellaneous Revenue, Uncollectibles, Natural Gas Stored Underground, Income Tax, ADIT, Federal & State TCJA Tracker, All Other Amortizations Accounting Schedules/Reconciliation Filed Direct, Rebuttal, Surrebuttal (True-up Direct)

Lisa M. Ferguson

Past Rate Case Proceedings:

Company Name	Case No.	Issue
Ameren Missouri (ELEC)	ER-2019-0335	Lead Auditor Fuel Expense, Fuel Additives, Purchased Power, Off System Sales, Green Tariff Program, Maryland Heights Fuel, MISO Revenue and Expense, MISO Transmission Revenue & Expense, Mark Twain Transmission, Capacity & Ancillary Sales, Coal Refinement, DOE Reimbursements, Radioactive Waste, FERC ROE, Income Tax, ADIT, FIN 48 Tracker, TCJA Tracker Accounting Schedules/Reconciliation Filed Direct, Rebuttal, Surrebuttal (True-up Direct)
Ameren Missouri (Gas)	GR-2019-0077	Lead Auditor TCJA Income Tax AAO/Interim Rates Income Tax, Accumulated Deferred Income Tax (ADIT), Amortization of Excess ADIT, Pensions & OPEBs, Energy Efficiency, Regulatory Asset Overcollection
Missouri-American Water Co.	WO-2018-0373	ISRS - Accumulated Deferred Income Taxes (Inclusion of NOL)
Ameren Missouri (ELEC)	ER-2018-0362	2017 Federal Tax Cuts and Jobs Act ("TCJA) – Tax Reduction Filing
Ameren Missouri (ELEC)	EA-2018-0202	Terra-Gen Wind Generation CCN

Lisa M. Ferguson

Past Rate Case Proceedings:

Company Name	Case No.	Issue
Ameren Missouri (ELEC)	ER-2018-0362	2017 TCJA Tax Reform effect on current and excess deferred taxes
Liberty Gas (MNG)	GR-2018-0013	Income Tax, Accumulated Deferred Income Tax (ADIT), Property Tax, Vegetation Management, Payroll, Payroll Tax, Employee Benefits Accounting Schedules/Reconciliation Filed Direct, Rebuttal, Surrebuttal (True-up Direct)
Spire Missouri (Laclede Gas & Missouri Gas Energy)	GR-2017-0215 GR-2017-0216	Co-Lead Auditor Insulation Financing, EnergyWise Revenue/Rate Base, Gas Safety AAO Overcollection, Natural Gas/Propane Inventory, MGE Rate base Offset, Income Taxes, ADIT, Surveillance Reporting, Uniform Expense, AMR Devices Filed Direct, Rebuttal, Surrebuttal, True-Up Testified on FIN 48 as part of ADIT, Surveillance Reporting, AMR Devices, 2017 TCJA Tax Reform effect on current and excess deferred taxes
Ameren Missouri	EO-2017-0176	Cost Allocation Manual
Ameren Missouri (ELEC)	EO-2017-0127	Lead Auditor Asset Sale Case – Mercy Health

Lisa M. Ferguson

Past Rate Case Proceedings:

Company Name	Case No.	Issue
Ameren Missouri (ELEC)	ER-2016-0179	Allocations, Coal Refinement, Callaway II Write-Off, Capacity, FAC expense removal, FIN 48, Income Taxes, ADIT, Mark Twain Transmission, MISO revenues & expenses, MISO Transmission revenues & expenses, Sioux Construction Accounting Accounting Schedules/Reconciliation Filed Direct, Rebuttal, Surrebuttal
Rex Deffenderfer Enterprises	WR-2016-0267	Lead Auditor – Oversee All Issues
House Springs Sewer Co.	SM-2016-0204	Sale of Company Assets to Jefferson County Public Sewer District
Missouri-American Water Co.	WR-2015-0301 & SR-2015-0302	Amortizations, Arnold Acquisition, Belleville Labs, Capitalized O&M Depreciation, Regulatory Assets & Liabilities, Regulatory Deferrals, Hickory Hills Receivership Costs Accounting Schedules/Reconciliation
Missouri-American Water Co.	WO-2016-0054	Asset Purchased Case; Missouri American Acquisition of Jaxson Estates
House Springs Sewer Co.	Earnings Investigation	Operations & Maintenance Contract, Legal Fees, Office Rent & Electric, Plant/Reserve/CIAC, Repairs & Maintenance, Sludge Hauling, City of Byrnes Mill Expense, Garnishment

Lisa M. Ferguson

Past Rate Case Proceedings:

Company Name	Case No.	Issue
Ameren Missouri (ELEC)	ER-2014-0258	Fuel, NBEC, Fuel Additives, Fuel Inventory, Off System Sales, Purchased Power, Callaway Refueling, Coal Car Depreciation, Low Level Radioactive Waste Expense Accounting Schedules/Reconciliation Filed Direct, Rebuttal, Surrebuttal
Liberty Gas (MNG)	GR-2014-0152	Lead Auditor Board of Directors Fees, Payroll, Employee Benefits, Incentive Compensation, Environmental Expense, Fleet Fuel Expense, Property Tax, Relocation Expense
Terre Du Lac Utility Co.	WR-2014-0104 SR-2014-0105	Lead Auditor Revenues, Uncollectibles, Water Loss Adjustment
Laclede Gas Co.	GR-2013-0171	Lead Auditor Revenue, Energy Wise and Insulation Revenues and Ratebase, Gas Costs, Gross Receipts Tax, ISRS Revenue, OSS and Capacity Release, Postage Expense, Unbilled Revenues, Uncollectibles
Lincoln County Water & Sewer	SR-2013-0321	Revenues, Bank Fees, Billing Expense, DNR Fees, Office Supplies, Postage Expense, PSC Assessment, SOS Fees, Uncollectibles
Gladlo Water and Sewer Co.	SR-2013-0258 WR-2013-0259	Informal Rate Case – All Issues

Lisa M. Ferguson

Past Rate Case Proceedings:

Company Name	Case No.	Issue
Missouri-American Water Co.	SO-2013-0260	Asset Purchased Case; Missouri American Acquisition of Meramec Sewer Co; Rate Base Determination
Ameren Missouri (ELEC)	EO-2013-0044	Asset Sale Case
Meramec Sewer Co	SR-2012-0309	Rate Base, Revenues, Uncollectibles
Ameren Missouri (ELEC)	ER-2012-0166	Advertising, AMS Allocations, Capitalized O&M Depreciation, Distribution Training, Employee Benefits other than Pensions, Environmental Expense, Incentive Compensation, Legal Expense, Name Change/Branding Expense, Payroll, Payroll Taxes, Production Training Expense, Severance, Underground Training Expense, VSE/ISP Amortization EMS Accounting Schedules Filed Direct and Surrebuttal Testimony Deposed on Severance and Advertising Testified on Severance
Missouri-American Water Co.	SO-2012-0091	Asset Purchased Case; Missouri American Acquisition of Meramec Sewer Co; Rate Base Determination

Lisa M. Ferguson

Past Rate Case Proceedings:

Company Name	Case No.	Issue
House Springs Sewer Co.	SR-2011-0274	Revenues, Billing Supplies Expense, Bank Fees, Dues & Donations, Outside Services, Miscellaneous Expense, Rent Expense, Postage Expense, PSC Assessment, Rate Case Expense, Secretary of State Fees, EMS Accounting Schedules
Missouri-American Water Co.	WO-2011-0106	ISRS Filing; Extending data to Effective Date; Retirements; Deferred Taxes; Accumulated Depreciation
Ameren Missouri (ELEC)	ER-2011-0028	Capitalized O&M Depreciation, Dues & Donations, 900 Account analysis, Property Taxes, Other Rate Base Items, Corporate Franchise Taxes, CWC, Plant and Reserve, PSC Assessment, Rate Case Expense, Advertising, Interest on Customer Deposits, Outside Contractors/Services, Allocations Accounting Schedules/Reconciliation Filed Direct and Surrebuttal Testimony Deposed on Advertising Testified on Property Tax

Lisa M. Ferguson

Past Rate Case Proceedings:

Company Name	Case No.	Issue
AmerenUE (GAS)	GR-2010-0363	Capitalized O&M Depreciation, Dues & Donations, 900 Account analysis, Property Taxes, Other Rate Base Items, Corporate Franchise Taxes, CWC, Plant and Reserve, PSC Assessment, Rate Case Expense, Advertising, Interest on Customer Deposits, Outside Contractors/Services Accounting Schedules/Reconciliation Filed Direct Testimony
KMB Utility Corporation	WR-2010-0345 & SR-2010-0346	Revenues, Late Fees, Electric Bills, Lost Water Adjustment, Uncollectibles, Master meter reads Filed Staff Recommendation
Ameren UE (ELEC)	ER-2010-0036	Advertising, Capitalized O&M Depreciation, Dues & Donations, 900 Account Analysis, Property Taxes, Other Rate Base Items, Corp. Franchise Taxes, Leases, CWC, Plant, Depreciation/ Reserve, PSC Assessment, Rate Case Expense, Interest on Customer Deposits, Insurance Expenses, Accounting Runs, Injuries and Damages Accounting Schedules/Reconciliation Filed Direct and Surrebuttal Testimony
Peaceful Valley	SR-2009-0146 WR-2009-0145	Informal Small Water and Sewer Request for Rate Increase
Cannon Home Association	SR-2009-0144	Informal Small Water Request for Rate Increase

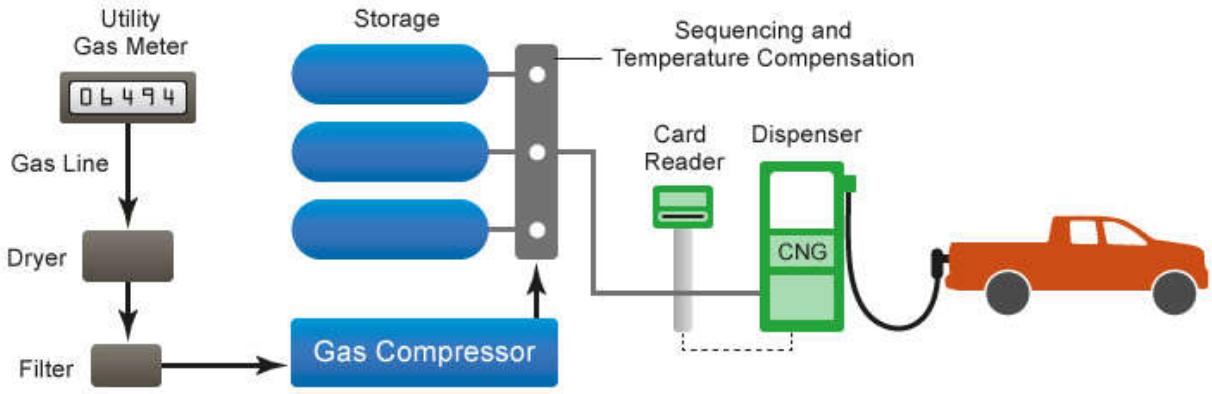
Lisa M. Ferguson

Past Rate Case Proceedings:

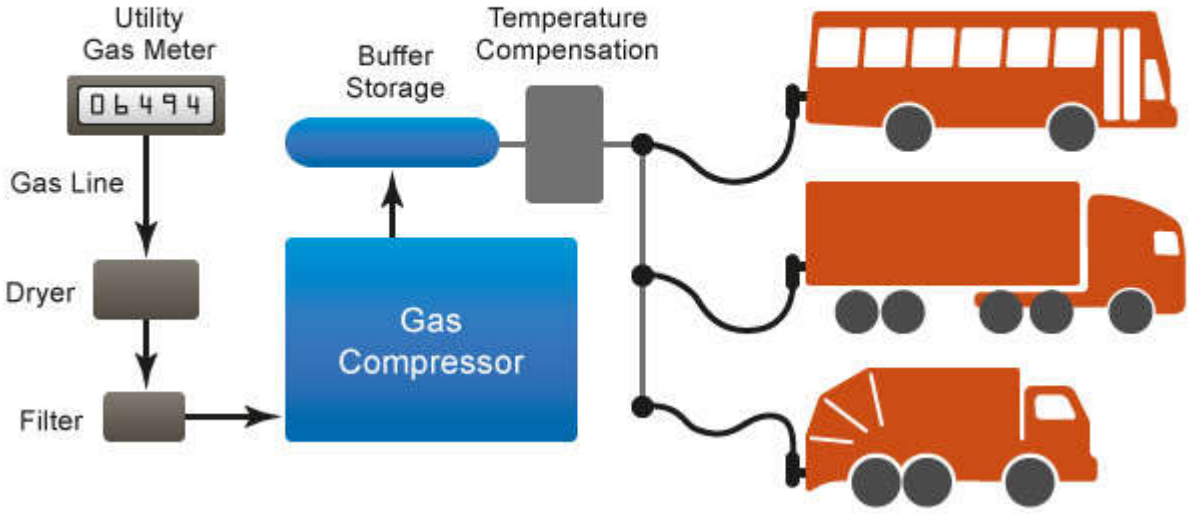
Company Name	Case No.	Issue
Atmos Energy	GO-2009-0046	Assisted on ISRS Filing; Extending data to Effective Date; Retirements; Deferred Taxes; Accumulated Depreciation; Removal of Meters
Ameren UE (GAS)	GT-2009-0038	Assisted on ISRS Filing; Extending data to Effective Date; Additions/Retirements; Deferred Taxes; Accumulated Depreciation
Laclede Gas Company	GO-2009-0029	Assisted on Abandonment Case – Recommendation Submission
Mill Creek	SR-2005-0116	Quarterly Reviews; Procedural Schedule; A/P Billing Calendar; Conference Calls; Discussion Notes; Revenues

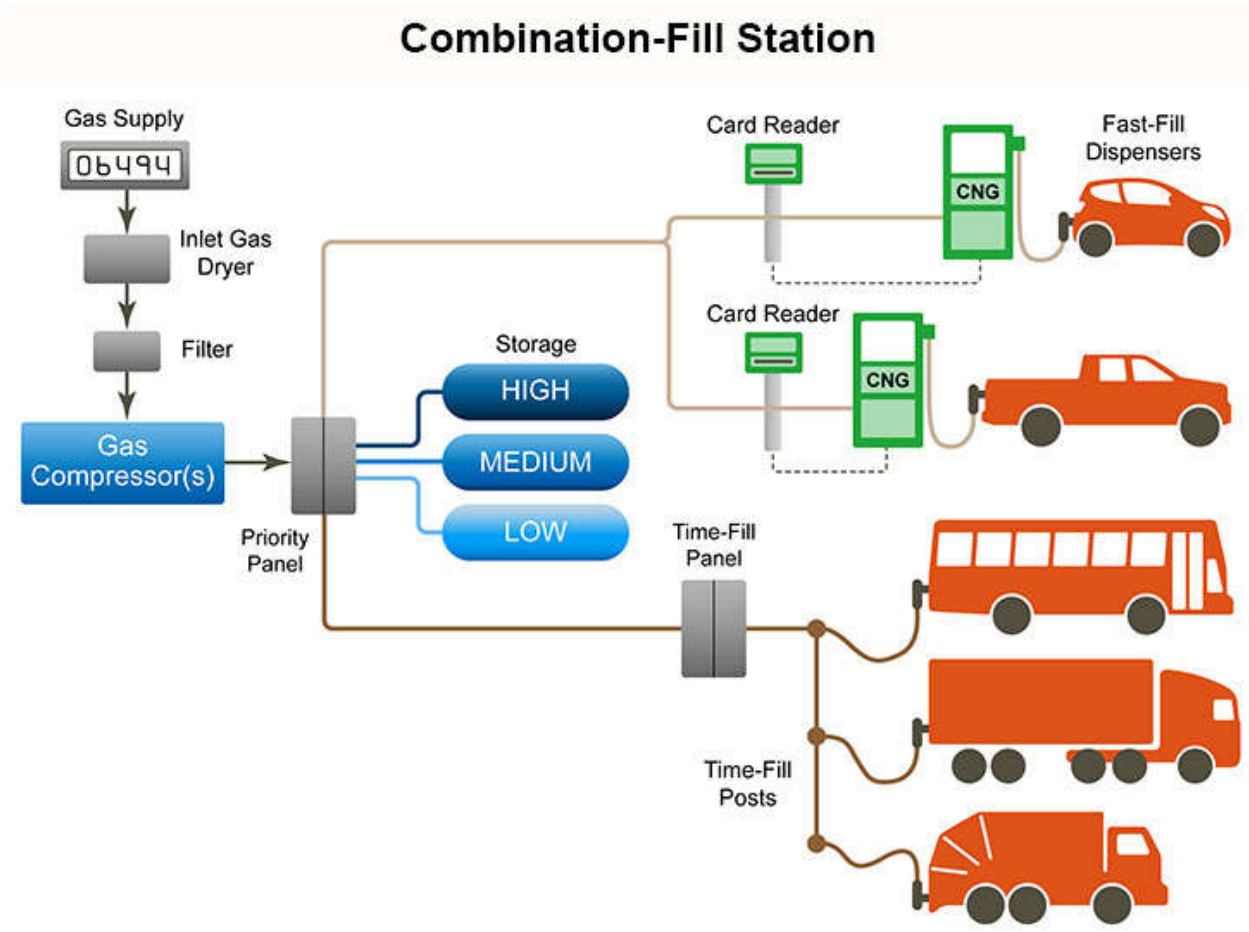
Spire Missouri General Rate Case Case No. GR-2022-0179 Staff's Direct Testimony – Staff Testimony Responsibility	
Staff Witness	**Issue Responsibility**
Paul K. Amenthor	Line Locating Expense; PSC Assessment; Injuries & Damages; Insurance Expense; Plant In Service & Depreciation Reserve; Materials & Supplies; Prepayments; Customer Deposits; Interest on Customer Deposits; Customer Advances; Rents & Leases; Capitalized O&M Depreciation; Natural Gas Inventory; Insulation Financing and EnergyWise program costs
Kimberly K. Bolin	Short-Term Debt
Amanda Coffer	Depreciation
Francisco Del Pozo	Class Cost of Service; Rate Design
Jane C. Dhority	Payroll; Payroll Taxes; Employee Benefits; Pensions and OPEBs; SERP; Rate Case Expense; External Audit Overhead Study Fees
Claire M. Eubanks, PE	Automated Metering Infrastructure; Tariff Issues
Lisa M. Ferguson	Miscellaneous Revenue; Propane investment; Propane Inventory, Propane revenue and expense; Uncollectibles; Facilities Transactions; CNG investment, revenue & expense; Energy Efficiency, Energy Affordability, Red Tag, Amortizations; Current Income Tax; Deferred Income Tax; Accumulated Deferred Income Tax; Excess Accumulated Deferred Income Taxes; MGE Ratebase Offset; CWC income tax lag
Nancy L. Harris	Retail Sales Revenue (Non-Transportation Classes)
Sarah L.K. Lange	Excess Facilities; General Service Revenue; Compliance; Meters; Class Cost of Service; Rate Design
Karen Lyons	Property Tax; Kansas Property Tax; Property Tax Tracker
Charles T. Poston, PE	Distribution System Allocation Factors
Hari K. Poudel	Weather Normalization
Michael L. Stahlman	Transportation Revenue and Tariff Changes
Seoung Joun Won, PhD	Capital Structure and Return on Equity
Matthew R. Young	Overhead Allocations and Capitalization

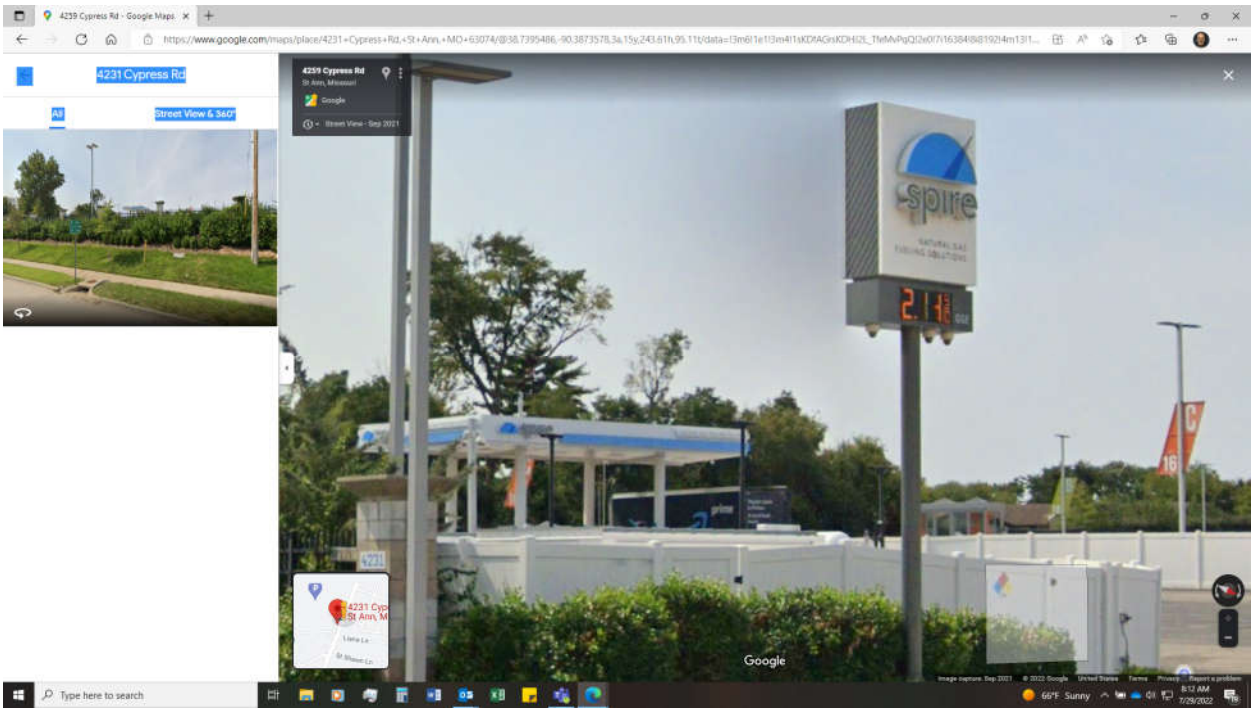
Fast-Fill Station

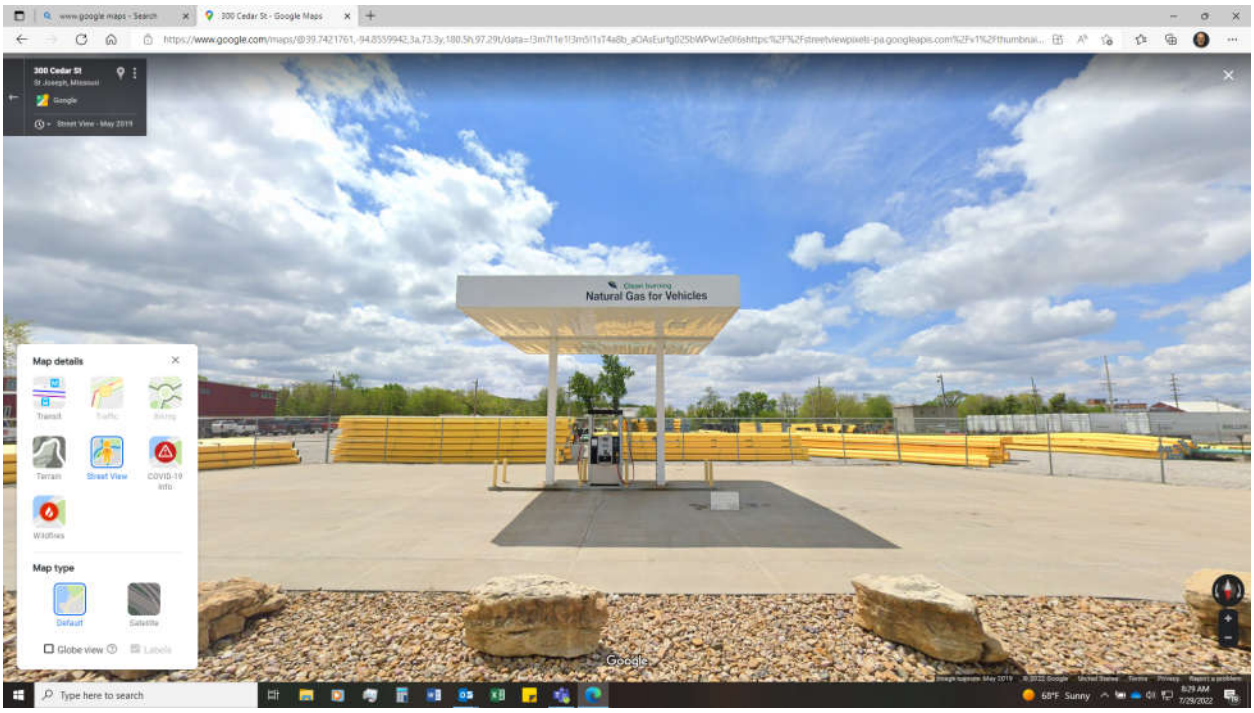


Time-Fill Station




Combination-Fill Station
Gas Supply
06494
Inlet Gas Dryer
Filter
Gas Compressor(s)
Priority Panel
Storage
HIGH
MEDIUM
LOW
Card Reader
CNG
Fast-Fill Dispensers
Card Reader
CNG
Time-Fill Panel
Time-Fill Posts


4231 Cypress Rd
All
Street View & 360°
4259 Cypress Rd
St Ann, Missouri
Google
Street View - Sep 2021
spire
Google
Type here to search
66°F Sunny
8:12 AM
7/29/2022


300 Cedar St
St Joseph, Missouri
Google
Street View - May 2019
Clean burning
Natural Gas for Vehicles
Map details
Transit
Traffic
Biking
Terrain
Street View
COVID-19 info
Wildfires
Map type
Default
Satellite
Globe view
Labels
Google
Type here to search
68°F Sunny

New metering technology coming to the communities we serve

Ultrasonic meter customer benefits

Spire’s commitment to service and safety

For more than 160 years, we’ve been finding new and better ways to serve our customers. And the advanced metering infrastructure (AMI) project provides endless opportunities for us to continue that legacy well into the future.

Diaphragm vs Ultrasonic Meter

Benefits of Ultrasonic Meters

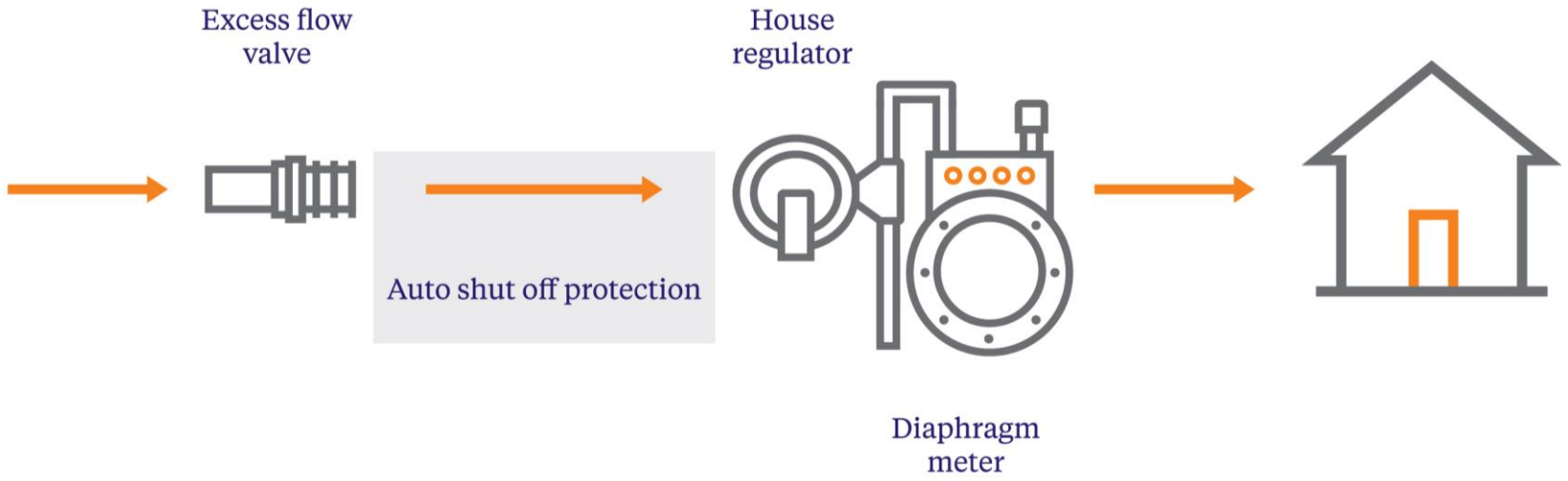
Existing diaphragm meter technology is obsolete and is difficult to sustain supply. Diaphragm meter manufacturers have notified Spire that they will stop being manufactured in the near future.

Customers will immediately realize all of these benefits when the ultrasonic meter is installed.

- Safety
- Accuracy
- Reliability
- Availability
- Size

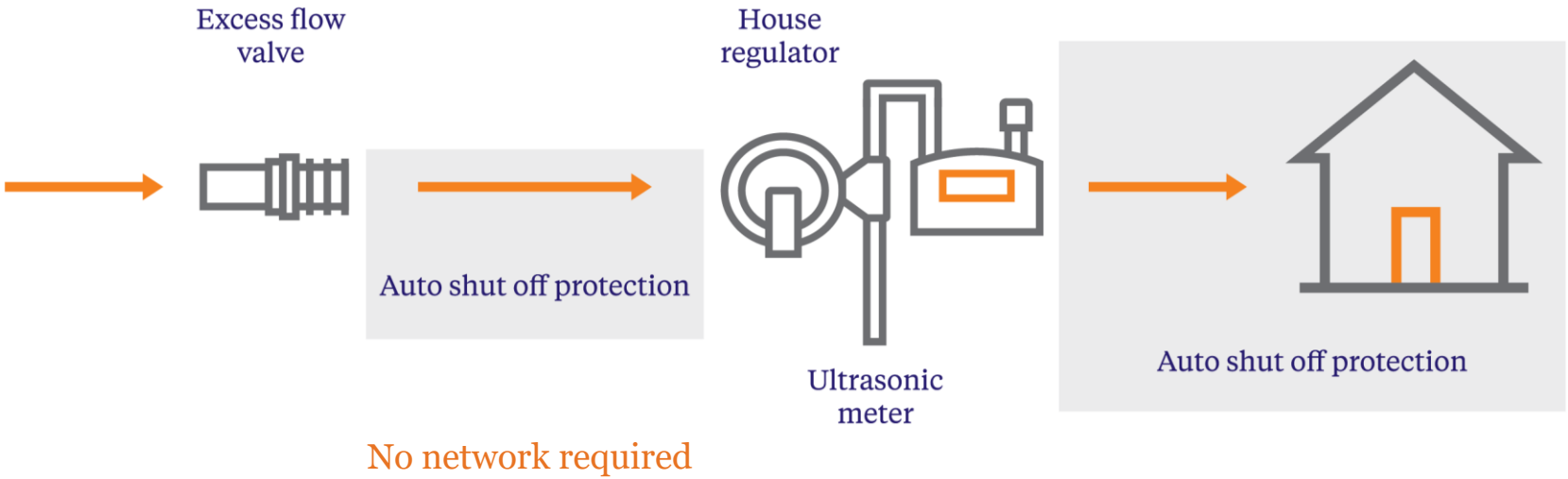
Current customer safety

Currently, the auto shut off protection provided by an excess flow valve and a diaphragm meter is limited to the piping between the excess flow valve and the house regulator.



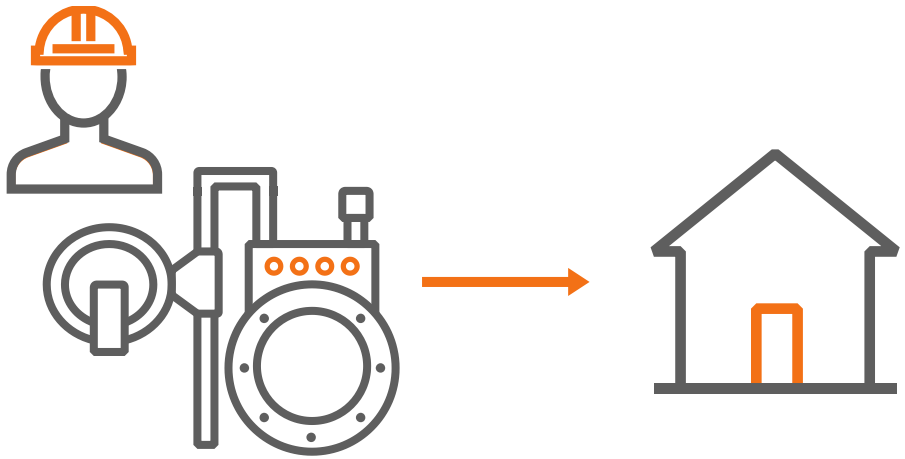
Enhanced customer safety

Beyond the initial auto shut off protection—limited to the piping between the excess flow valve and the house regulator—an ultrasonic meter uses advanced technology to activate additional auto shut off capabilities including all piping in the customer's home.



Current employee and customer safety

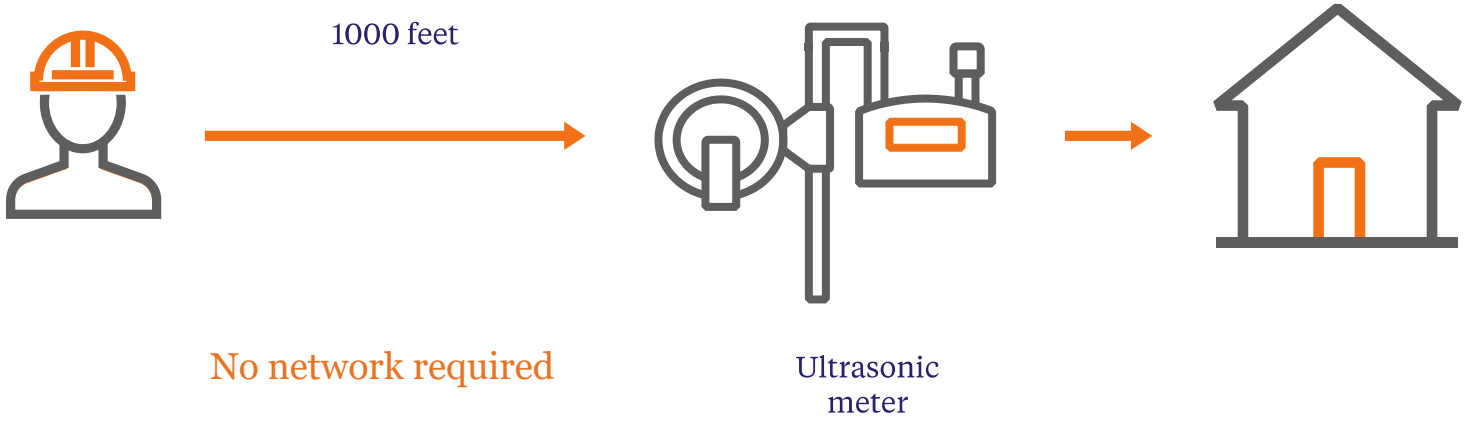
Currently, if a customer with a diaphragm meter system experiences a slower gas leak—a leak lacking the pressure to activate the auto shut off capability—a field service technician must be at the meter to manually shut off the gas.



Diaphragm meter

Enhanced employee and customer safety

Ultrasonic meters provide enhanced safety for employees and customers by allowing a field service technician to shut off a customer's gas from a distance when slower gas leaks don't activate the auto shut off capabilities.



Hazard Prevention Without a Network

- Internal shut-off valve
  - Shuts off on detection of 500 cubic foot/hour flow rate for approximately 10 seconds, providing automatic protection against explosion from open customer fuel runs
- Temperature sensor
  - Activates on detection of external temperatures of 176° F or greater
  - Decreases severity and duration of fires
- Remote shut-off from 1000 feet away
  - Reduces risk of harm to first responders
- Pressure sensor
  - On low pressure systems, prevents overpressurized gas from reaching customers on low pressure systems (can prevent Merrimack Valley incidents)

Accurate & Reliable

- Ultrasonic meter reads are 20 times more accurate than diaphragm meters (+/- 0.1% vs. +/- 2%)
- Reliability
  - Moving parts in diaphragm meter typically cause degradation of accuracy due to wear/moisture
  - Ultrasonic meters eliminate device wear, mechanical failure and billing errors

Case No. GR-2022-0179
Schedule LMF-d5, Page 10 of 14

Available & Cost-Effective Protection

- EFV installation: $1,500 cost to customer to install
  - Little incentive to switch
- New ultrasonic installation: only $25 more than comparable diaphragm
- Availability
  - Metal components in diaphragm meters are increasing in cost and decreasing in availability
  - Our primary supplier is discontinuing manufacture of residential or small commercial diaphragm meters in 2021
  - The switch to ultrasonic metering is nearing completion in Europe, and is beginning throughout the U.S.

Case No. GR-2022-0179
Schedule LMF-d5, Page 11 of 14

Ultrasonic Meter Transition

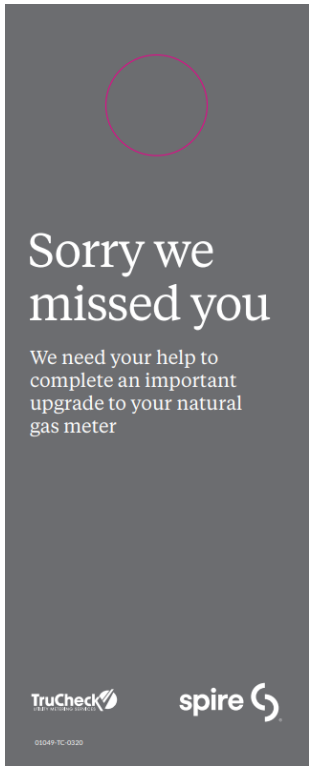
Ultrasonic meters are installed when:

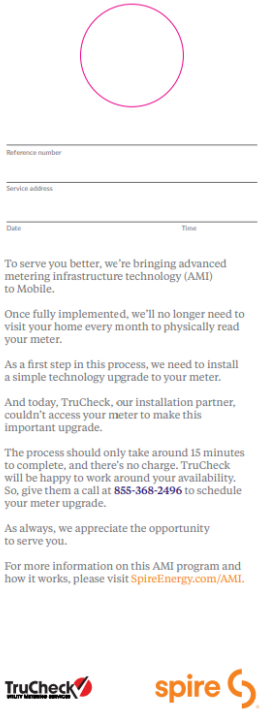
- A meter is scheduled for replacement
- The meter is sample eligible and it can be replaced when the customer service is already interrupted
- Meter is replaced as part of main or service replacement project
- New installations
- Over 60% of Missouri meters are more than 10 years old, and must be replaced per Commission rules (20 CSR 4240-10.030(19)).

Diaphragm vs. Smart Meter

Planned customer communications

Door tags





Postcards

Network Benefits

- Currently Studying Network Technology Options
- Access to Detailed Daily and Hourly Usage Information
  - Energy usage and efficiency analysis
  - Take control of usage and savings
- Company Benefits
  - Ability to deploy AI and analyze system wide usage patterns
  - Accurately model load profiles, peak day, and peak hour requirements
- Additional Safety Benefits:
  - Quicker reaction to potentially hazardous situations
  - Ability to shut meters down remotely from our office
  - Potential for automation

Case No. GR-2022-0179
Schedule LMF-d5, Page 14 of 14

Next Generation Measurement Update

June 28, 2022

spire

Context

Ultrasonic Meter – Customer Safety Features

- Internal shut-off valve
  - Shuts off on detection of 500 cubic foot/hour flow rate for approximately 10 seconds, providing automatic protection against explosion from open customer fuel runs
- Temperature sensor
  - Activates on detection of external temperatures of 176° F or greater
  - Decreases severity and duration of fires
- Remote shut-off from 1000 feet away
  - Reduces risk of harm to first responders
- Pressure sensor
  - On low pressure systems, prevents overpressurized gas from reaching customers on low pressure systems (can prevent Merrimack Valley incidents)

Current Meter Availability and Pricing

- *Received a quote in March from American meters for a diaphragm 250 meter if I ordered 2,500. American is one of the two primary diaphragm meter manufacturer's in the United States and it is by far the most common residential meter.*

- *The price was $147.50 for which we would have to add a module for an additional $48. The total cost would be $195.50 for the diaphragm equivalent to the Ultrasonic meter that we are paying $167.*

- *Spire is currently fielding multiple requests to sell our retired American meter cores to entities that would like to refurbish them. Companies around the country are unable to purchase new diaphragm meters and get them when they need them. These Companies are paying as much or more for refurbished meters because they have no other option.*

Billing Issues Context

For the last several decades Spire Missouri has relied on Diaphragm meters mechanically connected to mechanical Erts or Amrs.

- For diaphragm meters with a mechanical module, we do see reading anomalies due to mechanical failures or programming. These are very difficult to distinguish from customer behavior or utilization equipment changes when analyzing reading patterns.
- When customer complaints reach Staff, the Company has had a difficult time understanding why they are so difficult to identify. The Company has responded by building analytics that over-identify potential issues.
  - This means that we are reviewing nearly 5,000-10,000 accounts every month to find a very small number of potential problems because we know a few are occurring.
  - **In July 2022, on any given day we have as many as 40 Company personnel working to find potential meter accuracy issues for Missouri customers.**
- Despite these efforts, there are still issues that are subtle enough they are not found until a customer brings their account to our attention. Just this week we were reviewing such a case where it would have been impossible to detect through read analysis.
- Ultrasonic metering accuracy solves all of this where deployed

Review of Commission Order from 2021 Rate Case

November Amended Report & Order, GR-2021-0108:

- "The Commission finds that recovery for the cost of replacement of meters, replaced on an as-needed basis, is appropriate in instances where: the service was already disconnected; the existing meter needs replacement; and the alternative is a new diaphragm meter. The safety features and comparable costs make Spire Missouri's choice of a new ultrasonic meter (about $170 to $200) justified in instances where the options to replace an already disconnected meter are a new diaphragm meter (about $170 to $200 for a new ultrasonic meter, minus an approximate $25 difference in the cost of a new diaphragm meter equals about $145 to $175) or a refurbished diaphragm meter ($221)."
- "The Commission finds that Spire Missouri has met its burden of showing the ultrasonic meter replacements were just and reasonable as to the 74% of ultrasonic meter replacements."
- "Under Commission Rule 20 CSR 4240-10.030(19), gas utilities are required to remove, inspect and test meters every 10 years."
- "There is no evidence in the record as to whether the remaining 26% of meter replaced, which were less than 10 years old, were justified in being replaced as they were not eligible for accuracy testing under the Commission's meter testing rule."

Missouri East Meter Population By Install Date – May 2022

Missouri East Meter Population			
Installed Age	Outside	Inside	Total
Ultrasonic	39112	9127	48239
< 10 Years	117420	30951	148371
< 10 Years - Refurbished Obsolete *	49833	11803	61636
> 10 Years	265728	98800	364528
Total	472093	150681	622774

* Meters installed in the last 10 years that are refurbished and of a type and kind that are no longer of a Manufacturer and Size that should be retro-fitted to a module.

Current Replacement Practice—Mo East

In MO East approximately 5,000 to 7,000 meters are being replaced Monthly. Over the next year we hope to grow that to 8,000 – 10,000 through the following programs.

- Opportunity – Customer premise work where the meter is likely to be off is flagged with a meter replacement when the meter is eligible for meter sampling (>10 years old).
- Inside Atmospheric Corrosion inspection (ACI) – When a customer appointment is required to perform an ACI, if the meter is eligible for meter sampling (>10 years old) the meter is exchanged as well.
- Target – Meter exchange orders are created for meter older than 10 years old when additional capacity is available.
- Broken – Any diaphragm meter that is broken, not registering, or with reading anomalies suspected to be from equipment failure are scheduled for replacement regardless of age.

The current strategy is being executed by leveraging current employee capacity and trying to find ways to increase that capacity.

Case No. GR-2022-0179
Schedule LMF-d6, Page 8 of 25

Current Sampling Practice

Replacement of meters based on Meter Testing program (Installed > 10 Years)

- Meters are grouped by year installed, manufacturer, and size.
- A minimum military sample of each group are replaced. This is primarily done by opportunities when already at a customer premise. Targeted replacements are used when a group is not being met by opportunity.
- Any group that tests collectively below 90% is replaced in whole (Failed)

This means every group by age from oldest to those 10 years old is replaced in part each year. The failed groups are targeted to eliminate.

Meter Sampling Program Illustration

Sampling Group	Total Population	Total Sample Required	Tested	Pass % - Targeted	Pass % - All	2019 Status
1995_175-N	234	32	46	64.3%	60.9%	Failed
1995_175-S	1851	125	116	93.1%	92.2%	
1995_200-R	146	20	27	91.3%	92.6%	
1995_250-A	807	80	80	93.2%	93.8%	
1995_250-S	184	32	38	94.7%	94.7%	
1995_275-R	13052	315	400	94.4%	91.3%	
1995_425-A	83	13	14	92.3%	92.9%	
1996_175-N	184	32	29	75.0%	72.4%	Failed
1996_175-R	470	50	55	82.6%	78.2%	Failed
1996_175-S	326	50	55	90.4%	89.1%	
1996_250-A	656	80	71	94.2%	94.4%	
1996_250-S	68	13	14	100.0%	92.9%	
1996_275-R	16184	315	372	95.7%	95.2%	
1997_175-A	669	80	94	84.1%	83.0%	Failed
1997_175-N	318	50	54	95.6%	96.3%	
1997_175-S	214	32	35	93.8%	88.6%	
1997_200-R	142	20	22	80.0%	81.8%	Failed
1997_250-A	13556	315	440	97.0%	97.0%	
1997_250-S	127	20	20	100.0%	100.0%	
1997_275-R	636	80	83	89.5%	89.2%	
1997_425-A	200	32	30	93.3%	93.3%	
1998_175-A	448	50	53	91.1%	88.7%	
1998_175-N	197	32	27	92.0%	92.6%	
1998_175-R	636	80	86	87.3%	87.2%	Failed
1998_175-S	142	20	29	96.0%	96.6%	
1998_200-R	165	32	37	87.5%	83.8%	Failed

Ultrasonic Deployment – Current Replacement Guidelines

Current Missouri East Replacement Guidelines

Since the company's replacement strategy is tentative the following replacement guidelines are being followed. These guidelines will be updated to maximize the benefit to the customer when a better understanding of the availability of resources to change meters and the impact to stranded assets have been established.

Missouri East Replacement Guidelines

Meter Type	Age	Amount @ 5/1/22	Guideline
Inside	>10 yrs	94	High priority targeted meter change
	<10 yrs	48	Do not change meter for now pending strategy finalization
Obsolete	>10 yrs	158	Targeted change on any meter not refurbished in the last 10 years*
Outside	>10 yrs	158	Opportunistic meter change
Outside	<10 yrs	117	Do not change meter for now pending strategy finalization
Total Active Diaphragm		**575**	

** Obsolete meters are over 10 year old. Due to diaphragm meter shortages, some were refurbished less than 10 years ago.*

Meter Replacement Pace—Forward Factors (Mo East)

1. Expiration of the Landis and Gyr System

The Landis and Gyr (L+G) contract expires April 2025 and there is a low probability of obtaining an extension. The L+G system will be over 20 years old in 2025 and they no longer want to support it. Ameren is moving off this system.

2. Development of Network Technology

Uniform 500G endpoints requires fewer communication devices that need to be installed throughout the network territory. This saves both capital expenditures and on-going operational expenses. Itron is also working on cellular technology which may greatly eliminate the need to use a fixed network which would even further reduce capital and operating expenses. Spire is going to beta test some of components of this new technology for Itron this summer.

3. Financial Benefits to Customers and Shareholders (next slide)

Directional analysis shows that the more customers that can be converted with ultrasonic meters the better financial impact to both the customers and the shareholders. This was especially pronounced for customers with meters inside their houses.

Case No. GR-2022-0179
Schedule LMF-d6, Page 12 of 25

Ultrasonic Deployment – Financial Impact Scenarios

Missouri East Ultrasonic Meter Deployment - Overall Comparison

	Conservative	Aggressive	SuperAggressive
Ultrasonic Meters Installed	304.5	422.5	478.5
Advanced Devices Installed	322.5	200.5	-
Inside Meters Replaced	44.0	150.0	150.0
Hours Required	250.4	392.0	434.0
Capital Costs Increases	114.8	105.1	85.8
OM Reductions & Benefits	(72.4)	(97.3)	(103.1)
Customer Bill - Inc / (Dec)	5.2	(8.2)	(10.8)

Case No. GR-2022-0179
Schedule LMF-d6, Page 13 of 25

Ultrasonic Deployment Proposed Strategy (Mo East)

The company's tentative strategy to replace diaphragm meters with ultrasonic meters for the next three years, pending regulatory support:

Meter Type	Age	Amount @ 5/1/22	Current Guideline	Proposed Guideline
Inside	>10 yrs	94	High Priority targeted meter change	High Priority targeted meter change
	<10 yrs	48	Do not change meter pending strategy finalization	Change when ACI inspection is required or when in customer premise for requested work.
Obsolete	>10 yrs	158	Targeted change on any meter not refurbished in the last 10 years*	Targeted change.
Outside	>10 yrs	158	Opportunistic meter change	Opportunistic meter change
Outside	<10 yrs	117	Do not change meter pending strategy finalization	Do not change meter.
Total Active Diaphragm		575		

* Obsolete meters are over 10 years old. Due to diaphragm meter supply shortages, some were refurbished less than 10 years ago.

Case No. GR-2022-0179
Schedule LMF-d6, Page 14 of 25

Proposed Strategy Implementation (Mo East)

The proposed strategy has two singular priorities for current capacity:

1. Replace all inside meters. This provides the most customer impact while minimizing the inconvenience and expense of converting these meters. It also allows the highest customer facing work to be performed by Spire employees.
2. Replace all obsolete meter types. This focuses on replacing meters that are older, less accurate, less reliable, and are not easily retrofitted to modules.

This strategy does not substantially change the age of meters being replaced, except for the ~38,000 inside meters that were installed new in the last 10 years.

The remaining meter populations will be two standard meter types which will allow for a systematic, consistent module deployment and maintenance program where they are required.

Case No. GR-2022-0179
Schedule LMF-d6, Page 15 of 25

Missouri West Meter Population – May 2022

Missouri West Meter Population

Group	By Install Date (Test Age)	By Purchase Date (Asset Age)	Shift
Ultrasonic	89,220	89,220	
< 10 Years	166177	121691	-44486
10 to 20 years	121938	128156	6218
20 to 30 years	99009	107598	8589
30 to 40 years	47820	55695	7875
> 40 years	14391	36195	21804
Total	538,555	538,555	0

Missouri West has stored discreet purchase dates.

Install date tracks the last time the meter was tested and sets it in the sample test program.

Purchase date is the actual asset age.

The 44,486 refurbished meters installed less than 10 years ago are generally 20 to 40+ years old.

Missouri West Meter Strategy – May 2022

The Age of the Meter Population in Missouri West

In trying to evaluate the best course forward for our customers within the constraints in GR-2021-0108, an analysis was completed in October 2021 to see how many diaphragm meters could be replaced in Missouri West without replacing any meters under 10 years old.

We can install 65K ultrasonic meters per year without replacing diaphragm meters under 10 years old. In fact, we would have over 120K diaphragm meters over 10 years old remaining.

Not meant to be a final strategy but more to show that we could continue to aggressively replace meters while only targeting meters that are more than 10 years old.

Case No. GR-2022-0179
Schedule LMF-d6, Page 17 of 25

Missouri West Meter Strategy – May 2022

Strategy since GR-2021-0108

Since Missouri West is not on the Landis and Gyr system, there is not the same urgency to replace communication devices. Also, almost all the meters in Missouri West are located on the outside of our customer's house.

Since meters under 10 years old were disallowed in GR-2021-0108,, the company will focus on replacing meters that are more than 10 years old. Further analysis has shown that obsolete meters refurbished and installed in the last 10 years are at the end of their useful life. Including them in the opportunistic program creates additional opportunities that minimizing effort related to replacement.

Just like in Missouri East, the company will continue to evaluate the benefits to our customers of installing ultrasonic meters on the outside of the house and may change strategies. As we develop network technology and the associated strategy, the location and population of 100G erts will need to be addressed to facilitate being able to deploy a modern meter reading network.

Mo West Ultrasonic Deployment Proposed Strategy

Missouri West Replacement Guidelines

Meter Type	Age	Amount @ 5/1/22	Current Guideline	Proposed Guideline
Outside	>10 yrs	283	Opportunistic - Targeted meter change	Opportunistic - Targeted meter change
Obsolete	<10 yrs	44	Do not change meter pending strategy finalization	Opportunistic - Targeted meter change
Outside	<10 yrs	122	Do not change meter pending strategy finalization	Do not change meter.
Total Active Diaphragm		449		

* Obsolete meters are over 10 years old. Due to diaphragm meter supply shortages, some were refurbished less than 10 years ago.

Current Practice—MO West

The current strategy is being executed by leveraging current employee capacity and trying to find ways to increase that capacity.

In MO West approximately 4,000 to 6,000 meters are being replaced monthly.

- Opportunity – Customer premise work where the meter is likely to be off is flagged with a meter replacement when the meter is eligible for meter sampling (>10 years old).
- Target – Meter exchange orders are created for meter older than 10 years old when additional capacity is available.
- Broken – Any diaphragm meter with reading anomalies suspected to be from a broken meter or module are scheduled for replacement regardless of age.

Case No. GR-2022-0179
Schedule LMF-d6, Page 20 of 25

Comparing Total Cost – 5 yr. old Inside Meter Example

Year(s)	Meter Age		Opportunistic Meter Change	Module Installation
2023	6	Meter Cost	170	
2023		Opportunistic Install Cost	27	
2025	8	Module Cost		60
2025		Installation Cost		30
2024-32		Reduced Wasted Trips	(90)	
		Reduced Uncollectibles	(90)	
		Reduced Meter Investigation	(45)	
2032	15	Meter Cost		170
2032		Installation Cost		108
		Total Cost over 10 years	(28)	368

Case No. GR-2022-0179
Schedule LMF-d6, Page 21 of 25

Questions?

Appendix

The Inside Meter Population in Missouri East

There about 150K diaphragm meters that are located inside a customer's house with about 100K of them older than 10 years old. These meters should be prioritized due to the increased safety risk, possibilities for customer inconvenience, higher chances for inaccurate reads, and the difficulty of accessing these meters. There is a strong case to replace these meters even if they are not 10 years old. The company is required to enter every customer's house every three years for an atmospheric corrosion inspection. This requires scheduling with a customer to get access to their meter inside the house. This can be a major inconvenience for our customers and logistically difficult for our operations. During the next 3 years (before the L+G contract expires), it makes sense to replace all meters (even those under 10 years old) while we are in the house. This will be better than putting a module on the existing diaphragm meter only to need to replace the meter later and interrupt our customer a second time to abandon the module before the end of its useful life. The preliminary annual operational expense reduction is estimated to range from $20 to $40 for every ultrasonic meter installed inside a customer's house [(5)]. These savings would be without a network. So even replacing a one-year-old diaphragm meter on the inside saves our customers money as well as bringing the added safety, convenience, and billing accuracy benefits mentioned earlier. The best action for our customers is replacing all inside diaphragm meters no matter what age.

In conjunction with our cast iron replacement program. The company has plans to move a high percentage of the inside meters that are on the low-pressure cast-iron system, about 50K, to the outside over the next six years. There is currently no plan developed to move the remaining meters that are not on the low-pressure cast-iron system, about 100K, to the outside.

Appendix

The Outside Meter Population in Missouri East

Installing ultrasonic meters outside the customers premise brings the same benefits as on the inside just not to the same magnitude. The safety, customer convenience, and billing accuracy benefits apply to outside meters. The operational expenses reduced by outside ultrasonic meters still need to be evaluated. Since these meters are easier to access and there are over 400K outside meters older than 10 years old, the company will focus on them first. As the program develops, we might also look at replacing outside meters that are less than 10 years old.

The Obsolete Meter Population in Missouri East

There are diaphragm meters that are obsolete and require specialized non-standard modules to be installed. All these meters are more than 10 years old, but some were refurbished within the last 10 years. This was before the company started using ultrasonic meters and was necessary because of the difficulty in buying enough new diaphragm meters to meet our customer's needs. These meters are still functional but are responsible for generating the highest percentage of the earlier mentioned accuracy and timeliness issues for our customers. These obsolete meters would require the purchase of customized communication devices and special installation instructions for proper operations. The company plans on replacing all these meters with ultrasonic meters, even those that have been refurbished in the last 10 years.

Appendix

The biggest constraint to installing ultrasonic meters in Missouri East is having the resources to do the work. Installing an ultrasonic meter takes more time than just installing a module on a diaphragm meter. Many times, a customer's gas must be disconnected and that could lead to complications when the gas is reconnected. This not only takes more resources but a higher skilled workforce to ensure safe and efficient customer service. Since this work is only for a limited amount of time, this also requires a peak in resource needs that won't be required once the work is over. This coupled with an aging workforce has made setting a final strategy more difficult.

Module installation also has constraints. The goal is to eliminate modules and the associated reliability from Spire metering. Module installation requires new hardware, software, and training for each Mo East technician that installs them. The cost per employee is approximately $3,000. Since this will only be for the next several years, this expense precludes equipping employees to install modules on an opportunity basis. Targeted replacement will require a separate trip and in the case of customers with inside meters a separate appointment. This expense makes module installation even less financially beneficial.

Case No. GR-2022-0179
Schedule LMF-d6, Page 25 of 25

Spire Missouri
GR-2022-0179

Response to Data Request 0296

Question:

Description: Please reference the Spire Missouri PowerPoint Presentation, "Next Generation Measurement Update, June 28, 2022, that was provided at the July 15, 2022 meter planning meeting with Staff and OPC. Specifically slide 6. Please provide all documentation, copies of all internal policies, and a full list and description of all methods utilized by Spire Missouri to comply with the Commission's order in Case no. GR-2021-0108 regarding the installment and cost recovery of ultrasonic meters. This information should include, separately for Spire East and Spire West, the number of meters and amount of all costs associated with the meter replacement by month for the period of June 1, 2021 through September 30, 2022, as information becomes available. Please separate the number of meters and the costs requested into two buckets, those meter replacements that meet the Commission order by each type of scenario listed by the Commission in the Report and Order and the remainder of meter replacements that did not meet they scenarios listed. Requested by: Lisa Ferguson (lisa.ferguson@psc.mo.gov)

Response:

The Company implemented several changes to manage the labor reporting around this work. These changes were applied to all labor reported beginning May 1, 2022.

On field activities where the meter is replaced, technicians report the incremental time that was added to a job to perform a meter exchange when the technician was onsite to perform other work (Opportunity replacements). All time related to the original field activity followed the accounting of that field activity type.

For the incremental time to perform the meter exchange or for time reported to specifically replace a meter, the time was charged based on the following simple rule.

- If the meter was installed for less than 10 years the time was charged to O&M.
- If the meter was installed for more than 10 years the time was charged to the Capital replacement of the ultrasonic meter.

This time charging was reviewed by Finance and adjusted wherever necessary to follow this rule starting May 1, 2022. This same methodology was applied to labor related to meter replacement work completed from June 1, 2021 to April 30, 2022 and the accounting will be updated as part of this case.

The field work management system was in the final stages of a project to deploy that technology for Spire Affiliates outside Missouri in September 2021. Changes specific to this rule could not be made in the field management system until Spring of 2022 which

made it difficult to ensure field employees strictly followed this rule in the work they were performing. However, great effort was made to strictly monitor the time charging to follow this order while improvements could be made.

It is Spire's desire to prioritize and maximize the meters that get replaced with the capacity that is available. The matrix that was provided with our strategy is what is driving where employees are asked to perform replacements. Now every night, orders scheduled for the following day are marked that a meter replacement is required on order types where the gas is likely to be off and the meter has been installed for more than 10 years. If the order is identified as replacement required, the incremental time for the meter exchange is directed to Capital and the remaining time follows the accounting of the original order type. There are a variety of reasons beyond the replacement strategy that drive the replacement or removal of meters. For example, the customer has increased load or changed delivery pressure, the meter is determined to be undersized, there is a question of accuracy, but the meter is not obviously broken, the module needs to be replaced on an obsolete meter type for which we do not have a replacement module, or the meter is suspected to be leaking. When these replacements happen and the meter is less than 10 years old, the time will be charged to O&M. Time charging is still being reviewed and adjusted if any discrepancies are found.

A summary of the ultrasonic installations and corresponding replacements for each region is shown below.

Ultrasonic Meters Installed Spire Missouri East						
Month	Total Ultrasonics Installed	New Installs	Meters replaced GT 10 Yrs	Broken Lt 10 Years	Obsolete Meters Lt 10 Years	Meters Lt 10 Yrs
	Labor Charged	Capital	Capital	O&M	O&M	O&M
2021-06	799					
2021-07	6,423	131	3455	100	871	1866
2021-08	7,554	127	4515	135	902	1875
2021-09	6,167	204	3527	103	712	1621
2021-10	4,533	306	2499	103	487	1138
2021-11	3,735	444	1938	138	371	844
2021-12	2,923	285	1578	99	275	686
2022-01	3,683	327	2081	86	356	833
2022-02	4,219	202	2658	77	411	871
2022-03	6,711	201	4508	105	586	1311
2022-04	5,405	181	3718	80	408	1018
2022-05	5,575	70	4287	121	319	778

Ultrasonic Meters Installed Spire Missouri West						
Month	Total Ultrasonics Installed	New Installs	Meters replaced GT 10 Yrs	Broken Lt 10 Years	Obsolete Meters Lt 10 Years	Meters Lt 10 Yrs
	Labor Charged	Capital	Capital	O&M	O&M	O&M
2021-06	5,789	310	4423	31	156	869
2021-07	5,206	391	3829	26	113	847
2021-08	3,846	494	2715	34	96	507
2021-09	5,199	514	3939	36	121	589
2021-10	5,264	811	3243	49	212	949
2021-11	5,119	1,008	2909	66	218	918
2021-12	4,200	689	2739	48	142	582
2022-01	3,443	624	2049	53	170	547
2022-02	2,835	444	1878	45	96	372
2022-03	6,333	469	5061	32	228	543
2022-04	5,950	423	4469	39	204	815
2022-05	4,947	356	3774	34	158	625

Signed by: Jim Rieske

Spire Missouri – Excess ADIT Tracker and Rate Case Adjustment

Memo prepared by Tim Krick and Chuck Kuper

January 26, 2022

Background and overview

The TCJA that was signed into law on December 22, 2017 happened near the end of Spire Missouri's last general rate case and outside of the test year period. Due to the magnitude of the impact of TCJA on customer rates, the Commission considered this an extraordinary event and in January 2018 ordered the Company and its Staff to provide estimates of the impact on prospective rates, even though it was not a known and measurable amount at the end of the test period.

In the Amended Order and Report for GR-2017-0215 and GR-2017-0216 dated March 7, 2018, the Commission ordered that the estimated effects of the tax law change be included in the revenue requirement for both the reduction in federal tax rates and an estimate of the return of Excess ADIT. Due to the short period between the new law and rates going into effect the Commission made it clear throughout the order that the revenue adjustment was an estimate, and ordered that a tracker be established to allow for the estimated return of excess ADIT be trued-up to the actual calculations in the next general rate case. The order specifically noted the normalization rules around returning protected balances to specify that the protected ADIT will be trued up to the actual calculation. As such, there is no normalization concern as the amounts computed in the true up are considered the actual amounts that were returned to ratepayers for the protected excess ADIT since 2018.

The balance of the excess ADIT from the 2017 case was estimated at $112M. In preparing the true up calculation, the Company updated the balances based on the 9/30/17 tax return data as that is the data that was used to compute the ARAM methodology for amounts and amortization period. The original estimate used a provisional amount as the tax return had not been prepared at that point. The true up also updated the split between protected and unprotected ADIT as well as the amortization period for the protected excess ADIT. Also, there were adjustments to unprotected balances such as pension and energy efficiency.

Included in the analysis was a true up of the tracker amounts compared to the actual amortization calculated subsequent to that case. This true up was agreed amongst the parties and accepted by the Commission to be amortized into rates over a three-year period, which is representative of a normal rate proceeding cycle.

Below is a summary of the balance calculated and approved in 2018 ($112.0), the true-up that was approved in the order ($118.1) based on the tracker, and an additional calculation ($116.7) that corrects an error identified by the Company in the pension category that we will pursue getting corrected in the next general rate case (explained in next paragraph). Also included in the true-up is an adjustment to amortization between cases of $0.6-$0.7M to agree with the final unprotected balance.

in millions	**2017 Case**	**True-up (as ordered)**	**True-up (corrected)**
Property Related	$ 270.5	$ 281.4	$ 281.4
Property - EIP/AIP write-off	(6.4)	(6.4)	(6.4)
Pension - Gross	67.3	64.2	67.3
Pension - write-off recovered	(3.4)	-	-
Pension - write-off lost	(7.6)	-	(7.6)
Energy Efficiency	11.3	11.0	11.0
Other	0.6	-	0.6
Total-DTL Rate Base Offset	$ 332.3	$ 350.2	$ 346.3
Excess ADIT Due customers (excl gross up)	**$ 112.0**	**$ 118.1**	**$ 116.7**
ADIT True-up adjustment		6.1	4.7
Amortization timing true-up		(0.7)	(0.6)
Net impact		**$ 5.4**	**$ 4.1**

Explanation of corrected true-up calculation

The amount of ADIT related to pension/opeb used for the true-up did not properly include an adjustment for the write-off of a prepaid pension asset in the prior case, nor the reversal of a portion of that last year due to a Missouri Supreme Court ruling. This error was identified as part of a final reconciliation of the order after it was issued, and therefore can't be corrected until the next case. This was an obvious error and therefore the Company is recording the liability to reflect the corrected calculation. The $1.3M variance will be presented to the Staff in the next rate case.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

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

SPIRE QUARTERLY REPORT – METER REPLACEMENT

COMES NOW Spire Missouri Inc., d/b/a Spire ("Spire" or "Company"), by and through counsel, and pursuant to the Missouri Public Service Commission's ("Commission") November 12, 2021 Amended Report and Order ("Order") submits this quarterly report on Spire's meter replacement strategy. For its report the Company states as follows:

The Commission's Order directed Spire "to file quarterly reports that describe any changes to the meter replacement strategy for each Missouri service territory as well as justification for any changes to the replacement strategy. The justification should include, but not be limited to, cost benefit analyses for the change in replacement strategy, alternative approaches considered, and potential customer impacts of the changes."[1]

Spire has not changed its current meter replacement strategy for either service territory, however, the Company is currently assessing its meter replacement strategy for Spire East. Spire East has contracted with Landis and Gyr ("L&G") since 2005 to utilize their automated meter reading ("AMR") system to collect read data for all of the Company's AMR devices in its Missouri East service territory. At the time Spire joined the L&G system, Ameren Missouri ("Ameren") was also utilizing the same system to collect read data for their AMR meters. Ameren has since transitioned to a more updated system, and Spire is now the only Company still utilizing the L&G

[1] Case No. GR-2021-0108, Amended Report and Order pgs. 46, 48. (November 12, 2021)

system. The contract with L&G expires in April of 2025, and L&G has indicated that it does not intend to maintain this system after the contract expires. Because the AMR system will no longer be available as of 2025, Spire is assessing next steps, which will likely include a change to Spire East's meter replacement strategy. Any additional information, if known, will be shared with Staff and OPC and included in the Company's next quarterly report.

WHEREFORE, Spire respectfully requests the Commission accepts this filing as its Quarterly Report on Meter Replacement.

Respectfully Submitted,

Goldie T. Bockstruck

Matthew Aplington MoBar #58565
General Counsel
Spire Missouri Inc.
700 Market Street, 6th Floor
St. Louis, MO 63101
(314) 342-0785 (Office)
Email: matt.aplington@spireenergy.com

Goldie T. Bockstruck MoBar #58759
Director, Associate General Counsel
Spire Missouri Inc.
700 Market Street, 6th Floor
St. Louis, MO 63101
314-342-0533 Office
314-421-1979 Fax
Email: Goldie.Bockstruck@spireenergy.com

Rachel L. Niemeier, MoBar #56073
Regulatory Counsel
Spire Missouri Inc.
700 Market Street, 6th Floor
St. Louis, MO 63101
314-390-2623 Office
Email: rachel.niemeier@spireenergy.com

ATTORNEYS FOR SPIRE MISSOURI INC.

CERTIFICATE OF SERVICE

The undersigned certifies that a true and correct copy of the foregoing notice was served on all parties to this case on 21st day of April 2022 by electronic mail.

Goldie T. Bockstruck