

Exhibit No.:
Issue(s): *Removal of Plastic Main and
Service Line Replacements
Costs*
Witness: *Kimberly K. Bolin*
Sponsoring Party: *MoPSC Staff*
Type of Exhibit: *Direct Testimony*
Case No.: *GO-2018-0309 and
GO-2018-0310*
Date Testimony Prepared: *August 22, 2018*

MISSOURI PUBLIC SERVICE COMMISSION

COMMISSION STAFF DIVISION

AUDITING DEPARTMENT

DIRECT TESTIMONY

OF

KIMBERLY K. BOLIN

SPIRE MISSOURI, INC.

CASE NOS. GO-2018-0309 AND GO-2018-0310

*Jefferson City, Missouri
August 2018*

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OF
KIMBERLY K. BOLIN
SPIRE MISSOURI, INC.
CASE NOS. GO-2018-0309 AND GO-2018-0310**

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1 **DIRECT TESTIMONY**

2 **OF**

3 **KIMBERLY K. BOLIN**

4 **SPIRE MISSOURI, INC.**

5 **CASE NOS. GO-2018-0309 AND GO-2018-0310**

6

7 Q. Please state your name and business address.

8 A. Kimberly K. Bolin, P.O. Box 360, Suite 440, Jefferson City, MO 65102.

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

10 A. I am a Utility Regulatory Auditor for the Missouri Public Service Commission
11 (“Commission”).

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

13 A. I graduated from Central Missouri State University in Warrensburg, Missouri,
14 with a Bachelor of Science in Business Administration, major emphasis in Accounting,
15 in May 1993. Before coming to work at the Commission, I was employed by the
16 Missouri Office of the Public Counsel (“OPC”) as a Public Utility Accountant from
17 September 1994 to April 2005. I commenced employment with the Commission in
18 April 2005.

19 Q. What was the nature of your job duties when you were employed by OPC?

20 A. I was responsible for performing audits and examinations of the books and
21 records of public utilities operating within the state of Missouri.

22 Q. Have you previously filed testimony before this Commission?

23 A. Yes, numerous times. Please refer to Schedule KKB-d1, attached to this
24 Direct Testimony, for a list of the major audits in which I have assisted and filed testimony
25 with OPC and with the Commission.

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

3 A. I have received continuous training at in-house and outside seminars on
4 technical ratemaking matters both when employed by OPC and since I began my
5 employment at the Commission. I have been employed by this Commission or by OPC as
6 a Regulatory Auditor for over 20 years and have submitted testimony on ratemaking matters
7 numerous times before the Commission. I have also been responsible for the supervision of
8 other Commission employees in rate cases and other regulatory proceedings.

9 Q. Did you participate in the Commission Staff's ("Staff") review of the
10 applications filed by Spire Missouri ("Company" or "Spire") in Case Nos. GO-2018-0309
11 and GO-2018-0310?

12 A. Yes, I did, with the assistance of other members of Staff.

13 **EXECUTIVE SUMMARY**

14 Q. Please summarize your testimony in this proceeding.

15 A. In this testimony I will discuss Staff's calculation of the appropriate value
16 of the replacement cost of the plastic pipe to be removed from the Infrastructure Replacement
17 Surcharge (ISRS). Staff is using the same methodology Staff recommended in
18 direct testimony filed concurrently concerning the remand of Case Nos. GO-2016-0332 and
19 GO-2016-0333, as well as the related cases GO-2017-0201 and GO-2017-0202. Staff based
20 its recommendation to remove the cost of the replacement of plastic mains and services lines
21 upon the Western District Court of Appeals' opinion that reversed and remanded the
22 Commission Report and Order in Case Nos. GO-2016-0332 and GO-2016-0333.

1 **REPLACEMENT OF PLASTIC MAINS AND SERVICE LINES**

2 Q. Did Staff review all of the work order authorizations provided by Spire for
3 both cases (GO-2018-0309 and GO-2018-0310)?

4 A. Yes, Staff reviewed all of the work order authorizations provided by the
5 Company to determine the feet of main and service lines replaced and retired by the type of
6 pipe (plastic, cast iron, steel, etc.). The Company did not provide work orders authorizations
7 for projects totaling less than \$25,000 and open “blanket” work orders.

8 Q. For the work orders provided, was Staff able to determine the actual
9 percentage of plastic footage replaced for mains and service lines compared to the total
10 footage replaced for both mains and service lines?

11 A. No, not for all of the work orders. Some of the work orders provided by the
12 Company only had estimations of the feet of main and service lines replaced. Staff applied the
13 actual individual plastic main and services line percentages to the work order cost to
14 determine the value of the replacement of plastic pipe for the work order. Staff did not
15 remove any amounts for work orders that were associated with relocations required by a
16 governmental authority, encapsulation work orders, and meter and regulator replacement
17 work orders.

18 Q. How did Staff handle the work order authorizations that were not provided, or
19 that included estimations?

20 A. Staff calculated an average of plastic mains and service lines replaced for the
21 work order authorizations that had actual information provided and applied that percentage to
22 work order authorizations that were not provided or estimated. This methodology assumes
23 that the work orders that were not provided or estimated were comparable to the group of
24 work orders that were made available to Staff. Attached to my direct testimony are the

Direct Testimony of
Kimberly K. Bolin

1 following Schedules which show the work orders and the feet of main and service lines
2 replaced by type:

- 3 • Schedule KKB-d2– Case No. GO-2018-0309
- 4 • Schedule KKB-d3 – Case No. GO-2018-0310

5 These Schedules also show the calculation of the average of plastic mains and services lines
6 replaced that were applied to the work order authorizations that were not provided or
7 estimated.

8 Q. What percentage of ISRS additions do the work orders less than \$25,000 and
9 blanket work orders total?

10 A. The following table outlines the percentage of dollars associated with ISRS
11 additions stemming from work orders less than \$25,000 and blanket work orders:

	GO-2018-0309		GO-2018-0310	
	Amount	% of Total*	Amount	% of Total*
Work Orders with Full Recovery (Cathodic Protection, Main Leak Clamps, Relocations)	\$4,615,298	7%	\$7,433,427	11%
Work Orders with Actual Percentages	\$26,363,026	39%	\$12,440,835	17%
Work Orders using Average Percentages (Work Orders totaling less than \$25,000, blanket work orders and work orders with estimated plastic amounts)	\$36,605,090	54%	\$63,580,608	72%
Total Work Orders	\$67,583,414	100%	\$83,454,869	100%

12
13 *% of Total Work Orders included in the Company's ISRS filing

14 Q. Does this conclude your direct testimony in this proceeding?

15 A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of the Application of Spire)
Missouri Inc. to Establish an Infrastructure) Case No. GO-2018-0309
System Replacement Surcharge in its Spire)
Missouri East Service Territory)

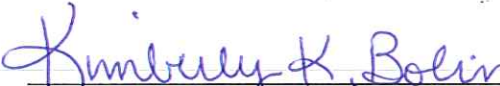
In the Matter of the Application of Spire)
Missouri Inc. to Establish an Infrastructure) Case No. GO-2018-0310
System Replacement Surcharge in its Spire)
Missouri West Service Territory)

AFFIDAVIT OF KIMBERLY K. BOLIN

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

COMES NOW KIMBERLY K. BOLIN and on her oath declares that she is of sound mind and lawful age; that she contributed to the foregoing Direct Testimony; and that the same is true and correct according to her best knowledge and belief.

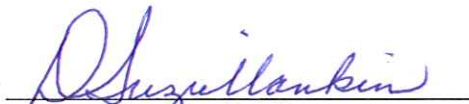
Further the Affiant sayeth not.


KIMBERLY K. BOLIN

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 22nd day of August, 2018.




Notary Public

**CASE PARTICIPATION
OF
KIMBERLY K. BOLIN**

<u>Company Name</u>	<u>Case Number</u>	<u>Testimony/Issues</u>	<u>Contested or Settled</u>
Missouri-American Water Company	WO-2017-0285	<u>Cost of Service Report</u> – Pension/OPEB Tracker, FAS 87 Pension Costs, FAS 106 OPEBs Costs, Franchise Taxes <u>Rebuttal</u> – Defined Contribution Plan, Cloud Computing, Affiliate Transaction Rule (Water Utility) <u>Surrebuttal</u> – Rate Case Expense	Settled
Missouri-American Water Company	WO-2018-0059	<u>Direct</u> – ISRS Overview, Accumulated Deferred Income Taxes, Reconciliation	Settled
Missouri Gas Energy and Laclede Gas Company	GO-2016-0332 and GO-2016-0333	<u>Rebuttal</u> – Inclusion of Plastic Main and Service Line Replacements	Contested
Empire District Electric Company/Liberty Utilities	EM-2016-0213	<u>Rebuttal</u> – Overview of Transaction, Ratemaking /Accounting Conditions, Access to Records <u>Surrebuttal</u> – OPC Recommended Conditions, SERP	Settled
Hillcrest Utility Operating Company, Inc.	WR-2016-0064	<u>Direct</u> – Partial Disposition Agreement	Contested
Empire District Electric Company	ER-2016-0023	<u>Requirement Report</u> – Riverton Conversion Project and Asbury Air Quality Control System <u>Direct</u> – Overview of Staff’s Revenue Requirement Report and Overview of Staff’s Rate Design Filing	Settled
Missouri-American Water Company	WR-2015-0301	<u>Report on Cost of Service</u> – Corporate Allocation, District Allocations <u>Rebuttal</u> – District Allocations, Business Transformation <u>Surrebuttal</u> – District Allocations, Business Transformation, Service Company Costs	Settled

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<u>Company Name</u>	<u>Case Number</u>	<u>Testimony/Issues</u>	<u>Contested or Settled</u>
Empire District Electric Company	ER-2014-0351	<u>Direct</u> – Overview of Staff’s Filing <u>Rebuttal</u> - ITC Over-Collection, Cost of Removal Deferred Tax Amortization, State Flow-Through <u>Surrebuttal</u> – Unamortized Balance of Joplin Tornado, ITC Over-Collections, Cost of Removal Deferred Tax Amortization, State Flow-Through, Transmission Revenues and Expenses	Settled
Brandco Investments/Hillcrest Utility Operating Company, Inc.	WO-2014-0340	<u>Rebuttal</u> – Rate Base and Future Rates	Settled
Lake Region Water & Sewer	WR-2013-0461	<u>Direct</u> – Overview of Staff’s Filing <u>Report on Cost of Service</u> – True-Up, Availability Fees, Sewer Operating Expense, Sewer Equipment Maintenance Expense <u>Surrebuttal</u> – Availability Fees <u>True-Up Direct</u> – Overview of True-Up Audit <u>True-Up Rebuttal</u> – Corrections to True-Up	Contested
Empire District Electric Company	ER-2012-0345	<u>Direct</u> - Overview of Staff’s Filing <u>Report on Cost of Service</u> – SWPA Hydro Reimbursement, Joplin Tornado AAO Asset, SPP Revenues, SPP Expenses, Regulatory Plan Amortization Impacts, SWPA Amortization, Tornado AAO Amortization <u>Rebuttal</u> – Unamortized Balance of Joplin Tornado AAO, Rate Case Expense, True-Up and Uncontested Issues <u>Surrebuttal</u> – Unamortized Balance of Joplin Tornado AAO, SPP Transmission Expense, True-Up, Advanced Coal Investment Tax Credit	Settled

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<u>Company Name</u>	<u>Case Number</u>	<u>Testimony/Issues</u>	<u>Contested or Settled</u>
Missouri-American Water Company	WR-2011-0337	<u>Direct</u> – Overview of Staff’s Filing <u>Report on Cost of Service</u> - True-Up Recommendation, Tank Painting Tracker, Tank Painting Expense <u>Rebuttal</u> - Tank Painting Expense, Business Transformation <u>Surrebuttal</u> – Tank Painting Tracker, Acquisition Adjustment	Settled
Missouri-American Water Company	WR-2010-0131	<u>Report on Cost of Service</u> - Pension/OPEB Tracker, Tank Painting Tracker, Deferred Income Taxes, FAS 87 Pension Costs, FAS 106 – Other Post-Employment Benefits, Incentive Compensation, Group Insurance and 401(k) Employer Costs, Tank Painting Expense, Dues and Donations, Advertising Expense, Promotional Items, Current and Deferred Income Tax Expense	Settled
Empire District Gas Company	GR-2009-0434	<u>Report on Cost of Service</u> – Prepaid Pension Asset, Pension Tracker Asset/Liability, Unamortized Accounting Authority Order Balances, Pension Expense, OPEBs, Amortization of Stock Issuance Costs, Amortization of Accounting Authority Orders <u>Direct</u> – Overview of Staff’s Filing	Settled
Laclede Gas Company	GT-2009-0056	<u>Surrebuttal Testimony</u> – Tariff	Contested
Missouri-American Water Company	WR-2008-0311 & SR-2008-0312	<u>Report on Cost of Service</u> – Tank Painting Tracker, Lobbying Costs, PSC Assessment <u>Direct</u> – Overview of Staff’s Filing <u>Rebuttal</u> – True-Up Items, Unamortized Balance of Security AAO, Tank Painting Expense, Fire Hydrant Painting Expense <u>Surrebuttal</u> – Unamortized Balance of Security AAO, Cedar Hill Waste Water Plant, Tank Painting Expense, Fire Hydrant Painting Expense	Settled

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<u>Company Name</u>	<u>Case Number</u>	<u>Testimony/Issues</u>	<u>Contested or Settled</u>
Missouri Gas Utility, Inc.	GR-2008-0060	<u>Report on Cost of Service</u> – Plant-in Service/Capitalization Policy, Plant-in Service/Purchase Price Valuation, Depreciation Reserve, Revenues, Uncollectible Expense	Settled
Laclede Gas Company	GR-2007-0208	<u>Direct</u> - Test Year and True-Up, Environmental costs, AAOs, Revenue, Miscellaneous Revenue, Gross receipts Tax, Gas Costs, Uncollectibles, EWCR, AMR, Acquisition Adjustment	Settled
Kansas City Power and Light Company	ER-2006-0314	<u>Direct</u> - Gross Receipts Tax, Revenues, Weather Normalization, Customer Growth/Loss Annualization, Large Customer Annualization, Other Revenue, Uncollectible (Bad Debt) Expense, Payroll, A&G Salaries Capitalization Ratio, Payroll Taxes, Employer 401 (k) Match, Other Employee Benefits <u>Surrebuttal</u> - Uncollectible (Bad Debt) Expense, Payroll, A&G Salaries Capitalization Ratio, Other Employee Benefits	Contested
Missouri Gas Energy	GR-2006-0204	<u>Direct</u> - Payroll, Incentive Compensation, Payroll Taxes, Employee Benefits, Lobbying, Customer & Governmental Relations Department, Collections Contract	Settled

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WHILE EMPLOYED WITH THE OFFICE OF THE PUBLIC COUNSEL

<u>Company Name</u>	<u>Case Number</u>	<u>Testimony/Issues</u>	<u>Contested or Settled</u>
Missouri Gas Energy	GU-2005-0095	<u>Rebuttal</u> - Accounting Authority Order <u>Surrebuttal</u> - Accounting Authority Order	Contested
The Empire District Electric Company	ER-2004-0570	<u>Direct</u> - Payroll	Settled
Missouri American Water Company & Cedar Hill Utility Company	SM-2004-0275	<u>Direct</u> - Acquisition Premium	Settled
Missouri Gas Energy	GR-2004-0209	<u>Direct</u> - Safety Line Replacement Program; Environmental Response Fund; Dues & Donations; Payroll; Customer & Governmental Relations Department Disallowance; Outside Lobbyist Costs <u>Rebuttal</u> - Customer Service; Incentive Compensation; Environmental Response Fund; Lobbying/Legislative Costs <u>True-Up</u> - Rate Case Expense	Contested
Osage Water Company	ST-2003-0562 / WT-2003-0563	<u>Direct</u> - Payroll <u>Rebuttal</u> - Payroll; Lease Payments to Affiliated Company; alleged Legal Requirement of a Reserve	Case Dismissed
Missouri American Water Company	WR-2003-0500	<u>Direct</u> - Acquisition Adjustment; Water Treatment Plant Excess Capacity; Retired Treatment Plan; Affiliated Transactions; Security AAO; Advertising Expense; Customer Correspondence	Settled
Empire District Electric	ER-2002-424	<u>Direct</u> - Dues & Donations; Memberships; Payroll; Security Costs <u>Rebuttal</u> - Energy Traders' Commission <u>Surrebuttal</u> - Energy Traders' Commission	Settled

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Laclede Gas Company	GR-2002-356	<u>Direct</u> - Advertising Expense; Safety Replacement Program and the Copper Service Replacement Program; Dues & Donations; Rate Case Expense <u>Rebuttal</u> - Gas Safety Replacement Program / Deferred Income Taxes for AAOs	Settled
Missouri-American Water Company	WO-2002-273	<u>Rebuttal</u> - Accounting Authority Order <u>Cross-Surrebuttal</u> - Accounting Authority Order	Contested
Environmental Utilities	WA-2002-65	<u>Direct</u> - Water Supply Agreement <u>Rebuttal</u> - Certificate of Convenience & Necessity	Contested
Warren County Water & Sewer	WC-2002-160 / SC-2002-155	<u>Direct</u> - Clean Water Act Violations; DNR Violations; Customer Service; Water Storage Tank; Financial Ability; Management Issues <u>Surrebuttal</u> - Customer Complaints; Poor Management Decisions; Commingling of Regulated & Non-Related Business	Contested
Laclede Gas Company	GR-2001-629	<u>Direct</u> - Advertising Expense; Safety Replacement Program; Dues & Donations; Customer Correspondence	Settled
Gateway Pipeline Company	GM-2001-585	<u>Rebuttal</u> - Acquisition Adjustment; Affiliated Transactions; Company's Strategic Plan	Contested
Empire District Electric	ER-2001-299	<u>Direct</u> - Payroll; Merger Expense <u>Rebuttal</u> - Payroll <u>Surrebuttal</u> - Payroll	Settled
Osage Water Company	SR-2000-556/ WR-2000-557	<u>Direct</u> - Customer Service	Contested

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St. Louis County Water Company	WR-2000-844	<u>Direct</u> - Main Incident Expense	Settled
Missouri American Water Company	WR-2000-281/ SR-2000-282	<u>Direct</u> - Water Plant Premature Retirement; Rate Case Expense <u>Rebuttal</u> - Water Plant Premature Retirement <u>Surrebuttal</u> - Water Plant Premature Retirement	Contested
Laclede Gas Company	GR-99-315	<u>Direct</u> - Advertising Expense; Dues & Donations; Miscellaneous Expense; Items to be Trued-up	Contested
St. Joseph Light & Power	HR-99-245	<u>Direct</u> - Advertising Expense; Dues & Donations; Miscellaneous Expense; Items to be Trued-up <u>Rebuttal</u> - Advertising Expense <u>Surrebuttal</u> - Advertising Expense	Settled
St. Joseph Light & Power	ER-99-247	<u>Direct</u> - Merger Expense; Rate Case Expense; Deferral of the Automatic Mapping/Facility Management Costs <u>Rebuttal</u> - Merger Expense; Rate Case Expense; Deferral of the Automatic Mapping/Facility Management Costs <u>Surrebuttal</u> - Merger Expense; Rate Case Expense; Deferral of the Automatic Mapping/Facility Management Costs	Settled
Laclede Gas Company	GR-98-374	<u>Direct</u> - Advertising Expense; Gas Safety Replacement AAO; Computer System Replacement Costs	Settled
Missouri Gas Energy	GR-98-140	<u>Direct</u> - Payroll; Advertising; Dues & Donations; Regulatory Commission Expense; Rate Case Expense	Contested

**CASE PARTICIPATION
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<u>Company Name</u>	<u>Case Number</u>	<u>Testimony/Issues</u>	<u>Contested or Settled</u>
Gascony Water Company, Inc.	WA-97-510	<u>Rebuttal</u> - Rate Base; Rate Case Expense; Cash Working Capital	Settled
Union Electric Company	GR-97-393	<u>Direct</u> - Interest Rates for Customer Deposits	Settled
St. Louis County Water Company	WR-97-382	<u>Direct</u> - Interest Rates for Customer Deposits, Main Incident Expense	Settled
Associated Natural Gas Company	GR-97-272	<u>Direct</u> - Acquisition Adjustment; Interest Rates for Customer Deposits <u>Rebuttal</u> - Acquisition Adjustment; Interest Rates for Customer Deposits <u>Surrebuttal</u> - Interest Rates for Customer Deposits	Contested
Missouri-American Water Company	WA-97-45	<u>Rebuttal</u> - Waiver of Service Connection Charges	Contested
Imperial Utility Corporation	SC-96-427	<u>Direct</u> - Revenues, CIAC <u>Surrebuttal</u> - Payroll; Uncollectible Accounts Expense; Rate Case Expense, Revenues	Settled
St. Louis Water Company	WR-96-263	<u>Direct</u> -Main Incident Repairs <u>Rebuttal</u> - Main Incident Repairs <u>Surrebuttal</u> - Main Incident Repairs	Contested
Steelville Telephone Company	TR-96-123	<u>Direct</u> - Depreciation Reserve Deficiency	Settled

**CASE PARTICIPATION
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<u>Company Name</u>	<u>Case Number</u>	<u>Testimony/Issues</u>	<u>Contested or Settled</u>
Missouri-American Water Company	WR-95-205/ SR-95-206	<u>Direct</u> - Property Held for Future Use; Premature Retirement of Sewer Plant; Depreciation Study Expense; Deferred Maintenance <u>Rebuttal</u> - Property Held for Future Use; Premature Retirement of Sewer Plant; Deferred Maintenance <u>Surrebuttal</u> - Property Held for Future Use; Premature Retirement of Sewer Plant	Contested
St. Louis County Water Company	WR-95-145	<u>Rebuttal</u> - Tank Painting Reserve Account; Main Repair Reserve Account <u>Surrebuttal</u> - Main Repair Reserve Account	Contested

Spire East
Case No. GO-2018-0309

Feet of Mains

Work Order	Steel	Cast Iron	Copper	Plastic	Total	Plastic %
900613	127	3,998		836	4,961	17%
901046	163	1,821		271	2,255	12%
901128						
901127	203	3,640		6	3,849	0%
901130	1,473	1,227		50	2,750	2%
901400		3,809		36	3,845	1%
901454	15	18,215		547	18,777	3%
901403		2,243			2,243	0%
901404	2,683	4,805			7,488	0%
901522		1,881		23	1,904	1%
901747		1,185		15	1,200	1%
901609		2,095		107	2,202	5%
901755		526		60	586	10%
901603				1	1	100%
901802						
901908	944	1,095		51	2,090	2%
901900		1,736			1,736	0%
901964		530			530	0%
902041		338			338	0%
900992	1331	4,883		649	6,863	9%
900997		2,384		494	2,878	17%
900995	10	7,952		121	8,083	1%
901046	163	1,821		271	2,255	12%
901042	18	4,838		327	5,183	6%
901095		8,280		62	8,342	1%
901043		7,792		242	8,034	3%

Feet of Service Lines

Steel	Copper	Plastic	Total	Plastic %
620	2,501	6,136	9,257	66%
302	497	333	1,132	29%
134		670	804	83%
565		1,019	1,584	64%
85	449	424	958	44%
830	620	6,456	7,906	82%
889	1,905	2,960	5,754	51%
311	982	854	2,147	40%
893	2,968	4,065	7,926	51%
199	83	3,515	3,797	93%
25	88	995	1,108	90%
239	80	267	586	46%
85	330	688	1,103	62%
27	49	464	540	86%
1,799	1,441	1,781	5,021	35%
89	503	783	1,375	57%
162	176	430	768	56%
	37	232	269	86%
	336	24	360	7%
1353	492	1246	3,091	40%
370	1150	1,873	3,393	55%
1,540	130	1474	3,144	47%
302	497	333	1,132	29%
265	862	409	1,536	27%
1,731	6695	3317	11,743	28%
1,184	544	2055	3,783	54%

Feet of Mains

Feet of Service Lines

Work Order	Steel	Cast Iron	Copper	Plastic	Total	Plastic %	Steel	Copper	Plastic	Total	Plastic %
901045	295	3,664		491	4,450	11%	257	896	2161	3,314	65%
901127	203	3,640		6	3,849	0%	565		1019	1,584	64%
901237	221	3,756		88	4,065	2%	702	4150	2748	7,600	36%
901274		9,227		490	9,717	5%	1305	1377	2763	5,445	51%
901275		4,541		42	4,583	1%	702	1066	2530	4,298	59%
901207	16,016	9,696		2,342	28,054	8%	907	492	1058	2,457	43%
901276		7,418		12	7,430	0%	924	1973	5988	8,885	67%
901281	480	6,578		977	8,035	12%	556	57	686	1,299	53%
901388		1,247		2,295	3,542	65%	502	497	6203	7,202	86%
901395							543	354	3099	3,996	78%
900943	48	280			328	0%	285		100	385	26%
901400		3,809		36	3,845	1%	830	620	6456	7,906	82%
901454											
901401		5,648			5,648	0%	464	1417	6434	8,315	77%
901439	2,120	-		57	2,177	3%	1495		699	2,194	32%
901404	2,683	4,805			7,488	0%	893	2968	4065	7,926	51%
901405		2,634		51	2,685	2%	251	1190	1544	2,985	52%
901406		5,830		48	5,878	1%	192	455	5704	6,351	90%
901432	415			1,849	2,264	82%	350	29	454	833	55%
901534	1,554	2,638		1,421	5,613	25%	380	110	263	753	35%
901457	2,157	2,441		1,415	6,013	24%			844	844	100%
901516		4,844		29	4,873	1%	1071	1792	1663	4,526	37%
901548	10	1,475		432	1,917	23%	221	1702	1302	3,225	40%
901522		1,881		23	1,904	1%	199	83	3515	3,797	93%
901606	96				96	0%					
901407	506				506	0%		1622	3264	4,886	67%
901673							294	461	4647	5,402	86%
901751		1,403			1,403	0%	89	3411	1092	4,592	24%
901596		2,912			2,912	0%	273	1200	2166	3,639	60%
901745		1,567		14	1,581	1%	385	561	1095	2,041	54%
901746		1,480		10	1,490	1%	247	1599	1450	3,296	44%

Feet of Mains

Feet of Service Lines

Work Order	Steel	Cast Iron	Copper	Plastic	Total	Plastic %	Steel	Copper	Plastic	Total	Plastic %
901748		1,422		224	1,646	14%	166	740	2762	3,668	75%
901760		1,419			1,419	0%	1108	531	2428	4,067	60%
901749		1,095		1,321	2,416	55%	1034	1646	3340	6,020	55%
901677		2,534			2,534	0%	1124	163	3093	4,380	71%
901629	382				382	0%			135	135	100%
901564		1,140			1,140	0%	428	155	1632	2,215	74%
901792		3,662		810	4,472	18%	400	1201	3887	5,488	71%
901903		827			827	0%	204	160	1367	1,731	79%
901907		1,358			1,358	0%	1221	313	2094	3,628	58%
901916		499			499	0%			2294	2,294	100%
901915		920			920	0%	366	25	1380	1,771	78%
902024		1,261			1,261	0%	381	49	552	982	56%
901967		699			699	0%	516	959	422	1,897	22%
901988		783		13	796	2%	136	206	562	904	62%
901974		535			535	0%	23	174	90	287	31%
901987		638			638	0%	322	291	1455	2,068	70%
902100		993			993	0%	81		793	874	91%
901047	356	6,405			6,761	0%	434	1478	2567	4,479	57%
901133	874	737			1,611	0%	666	453	2724	3,843	71%
901132	517	4,465		1,296	6,278	21%	579	2006	2500	5,085	49%
901239				233	233	100%	795	1847	3459	6,101	57%
901408		6,985		2,328	9,313	25%	140	3238	4016	7,394	54%
901409	140	3,338		254	3,732	7%	122	658	2092	2,872	73%
901563		2,863			2,863	0%	956	713	2166	3,835	56%
901610		4,846		135	4,981	3%	456	544	2207	3,207	69%
901804	5858			457	6,315	7%	6356	549	2008	8,913	23%
901611	207	2,593	111	189	3,100	6%	215	1142	3515	4,872	72%
902026		1,988			1,988	0%	1642	2249	2127	6,018	35%
901975		841			841	0%	101		1642	1,743	94%
902155		1,481			1,481	0%	47		44	91	48%
901901				1,704	1,704	100%	257	1350	276	1,883	15%

Feet of Mains

Feet of Service Lines

Work Order	Steel	Cast Iron	Copper	Plastic	Total	Plastic %	Steel	Copper	Plastic	Total	Plastic %
901959	156	3,354			3,510	0%	803	3334	911	5,048	18%
901962		2,852			2,852	0%	110	206	1049	1,365	77%
901972		1,132		589	1,721	34%	67	45	74	186	40%
902102	447	781		263	1,491	18%	77	80	196	353	56%
900147	455	-		860	1,315	65%					
900994	146	4,719			4,865	0%	2040		1233	3,273	38%
901094	12	8,216			8,228	0%	2334	1478	2832	6,644	43%
901049		3,094		568	3,662	16%	352	1760	2134	4,246	50%
901129	478	1,545		1,674	3,697	45%	415	1767	762	2,944	26%
901494	172	2,802		135	3,109	4%	703	991	2496	4,190	60%
901475	586	1,513		957	3,056	31%	183	487	4782	5,452	88%
901547		1,149		877	2,026	43%	450	178	3397	4,025	84%
901621	166	1,746			1,912	0%	638	1532	1945	4,115	47%
901773	549			465	1,014	46%	158		58	216	27%
901774	809	557		191	1,557	12%	144		153	297	52%
901905		1,656			1,656	0%	162	1317	3142	4,621	68%
901914	73	603		60	736	8%	546	198	1635	2,379	69%
902101		2,846			2,846	0%		164	2042	2,206	93%
901529	2888				2,888	0%	1958		116	2,074	6%
Total	49,205	275,400	111	31,900	356,616	8.9%	60,297	89,874	206,401	356,572	57.9%

**Spire West
Case No. GO-2018-0310**

Work Order	Feet of Mains					Feet of Service Lines				
	Steel	Cast Iron	Plastic	Total	Plastic %	Steel	Copper	Plastic	Total	Plastic %
800039	4459	4994		9,453	0%	98		2389	2,487	96%
800152		1,931		1,931	0%	218		1,222	1,440	85%
800045	4,273		492	4,765	10%			1,411	1,411	100%
800142	5	4,785	6	4,796	0%	927		1,215	2,142	57%
800163	5,506		147	5,653	3%	42		1,811	1,853	98%
800132	4,220		235	4,455	5%	83		1,137	1,220	93%
800073	13,794		436	14,230	3%	1		3,011	3,012	100%
800154	633	4,543	45	5,221	1%	449		2,048	2,497	82%
800143	151	3,814	13	3,978	0%	1,970		1,214	3,184	38%
800257	10,304		808	11,112	7%	34		2,488	2,522	99%
800122	11,149		979	12,128	8%	23		1,327	1,350	98%
800261	8,796		100	8,896	1%			2,130	2,130	100%
800145	1,432	3,234	496	5,162	10%	849		1,130	1,979	57%
800558	4,082		177	4,259	4%	7		170	177	96%
800146	266	4,603		4,869	0%	617		645	1,262	51%
800275	8,412		340	8,752	4%	82		1,258	1,340	94%
800340	6,026		712	6,738	11%	143		2,196	2,339	94%
800616	5,794		209	6,003	3%	69		1,067	1,136	94%
800277	11,774		821	12,595	7%	119		4,157	4,276	97%
800597	5,111		1,395	6,506	21%			905	905	100%
800284	12,038		194	12,232	2%	24		2,510	2,534	99%
800825		245	100	345	29%					
800598	7,944		333	8,277	4%			1,894	1,894	100%
800624	2,828		748	3,576	21%	123		751	874	86%
800759	6,780		180	6,960	3%	186		1,237	1,423	87%
801184	728			728	0%					
801142	20,023			20,023	0%					

Feet of Mains				
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Feet of Service Lines				
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Work Order	Steel	Cast Iron	Plastic	Total	Plastic %	Steel	Copper	Plastic	Total	Plastic %
801115		527	6	533	1%	47			47	0%
801353			3,636	3,636	100%			697	697	100%
801555			3,083	3,083	100%					
801579			464	464	100%					
800072	10,268		1,355	11,623	12%	29		3,209	3,238	99%
800153	1,484	3,959		5,443	0%	140		1,258	1,398	90%
800155	54	6,967		7,021	0%	653		3,803	4,456	85%
800157	256	5,844		6,100	0%	840		3,031	3,871	78%
800441	1,226	6,705	256	8,187	3%	397		1,662	2,059	81%
800439	377	5,361	54	5,792	1%	953		996	1,949	51%
800440	1,250	4,025		5,275	0%	901		1,449	2,350	62%
800383	1,701		3,489	5,190	67%	113		1,546	1,659	93%
800431	3,899		154	4,053	4%	75		1,440	1,515	95%
800159	125	4,891	39	5,055	1%	1,935	6	3,857	5,798	67%
800527	10,304		808	11,112	7%	34		2,488	2,522	99%
800546	197			197	0%					
800414	7,247		1,006	8,253	12%			1,680	1,680	100%
800259	12,708		698	13,406	5%	96		3,659	3,755	97%
800258	11,746		550	12,296	4%	29		2,186	2,215	99%
800100	10,845		410	11,255	4%	79		4,797	4,876	98%
800405	752			752	0%			2	2	100%
800091	1,083		416	1,499	28%			631	631	100%
800274	6403		877	7,280	12%			1,720	1,720	100%
800338	4,309		31	4,340	1%	60		1,003	1,063	94%
800341	4,471		328	4,799	7%	11		862	873	99%
800475	3,855		36	3,891	1%	70		2,648	2,718	97%
800758	278			278	0%	10		900	910	99%
800470	591			591	0%			156	156	100%
801066	1,515			1,515	0%			193	193	100%
800957	1379		370	1,749	21%	3		159	162	98%
801125	2307		363	2,670	14%	6		1,061	1,067	99%

Work Order	Feet of Mains					Feet of Service Lines				
	Steel	Cast Iron	Plastic	Total	Plastic %	Steel	Copper	Plastic	Total	Plastic %
801119	2813		71	2,884	2%	77		385	462	83%
801193	6801		342	7,143	5%			1,216	1,216	100%
800977	9649		2,372	12,021	20%	7		2,339	2,346	100%
801356	4731		97	4,828	2%			359	359	100%
801365	2051		704	2,755	26%					
801443	650		614	1,264	49%			407	407	100%
801586	1819		432	2,251	19%					
801439	10			10	0%					
801625		582	76	658	12%	191		173	364	48%
801662	1880			1,880	0%					
801789	1983			1,983	0%	9		301	310	97%
800480	6022		46	6,068	1%			967	967	100%
800760	13649		301	13,950	2%	30		3,619	3,649	99%
801376	8196		3	8,199	0%	46		1,332	1,378	97%
800158	508	4,632		5,140	0%	2,370		2,618	4,988	52%
800092	6033		92	6,125	2%	48		1,762	1,810	97%
800301	9894		452	10,346	4%	56		1,121	1,177	95%
800864	4045		88	4,133	2%			339	339	100%
801057	7206		853	8,059	11%			1,769	1,769	100%
800654	3957		628	4,585	14%	78		2,160	2,238	97%
800290	4154		688	4,842	14%	1		784	785	100%
800967	7455			7,455	0%	434		2,025	2,459	82%
801475	7893		110	8,003	1%	74		2,331	2,405	97%
Total	368557	71642	35,364	475,563	7.4%	15966	6.00	112423	128,395	87.6%