BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

The Staff of the Missouri Public Service Commission,	)	
Complainant,	)	**File No. GC-2020-0127**
v.	)	
Spire Missouri, Inc. d/b/a Spire,	)	
Respondent	)	

NOTICE OF COMPLAINT AND ORDER ESTABLISHING TIME TO RESPOND

Issue Date: November 6, 2019 Effective: Date November 6, 2019

On November 6, 2019, the Staff of the Commission filed a complaint with the Missouri Public Service Commission against Spire Missouri, Inc. d/b/a Spire. Pursuant to Commission Rule 20 CSR 4240-2.070, Spire has 30 days from the date of this notice to file an answer.

As required by Section 536.067(2)(f), RSMo, the Commission informs the parties that the Commission's provisions governing procedures before the Commission, including provisions relating to discovery, are found at Commission Rule 20 CSR 4240-2.090.

THE COMMISSION ORDERS THAT:

1. The Commission's Data Center shall send, by certified mail, a copy of this notice and order and a copy of the complaint to the respondent at:

Spire Legal Department
700 Market Street, 6th Floor
St. Louis MO 63101

2. Spire Missouri, Inc. shall file its answer to this complaint no later than December 6, 2019.

3. This order is effective when issued.

BY THE COMMISSION

Morris L. Woodruff
Secretary

John T. Clark, Senior Regulatory Law Judge,
by delegation of authority pursuant to
Section 386.240, RSMo 2016.

Dated at Jefferson City, Missouri,
on this 6th day of November, 2019.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

The Staff of the Missouri Public Service Commission,	)	
Complainant,	)	
vs.	)	**File No. GC-2020-XXXX**
Spire Missouri West (formerly doing Business as Missouri Gas Energy),	)	
Respondent.	)	

COMPLAINT

COMES NOW the Staff of the Missouri Public Service Commission ("Staff"), by and through Staff Counsel's Office, pursuant to Section 386.390 RSMo. 2016, 20 CSR 4240-40.020, 030, and .080 and in response to the Missouri Public Service Commission's ("Commission") October 30, 2019, Order in File No. GS-2019-0015 Directing Staff To File A Complaint, and for its Complaint states as follows:

Introduction

1. The Respondent is the present operator of Spire Missouri Inc., d/b/a Spire Missouri West ("Spire" or "Spire Missouri") the regulated provider of retail natural gas service to the Kansas City area including 1106 The Paseo. Staff contends that Spire violated certain of the sections of the Commission's Gas Pipeline Safety Rule, 20 CSR 4240-40.030, and Drug and Alcohol Testing Rule, 20 CSR 4240-40.080[1], with respect to the events of July 16, 2018, regarding the conduct of Spire and the work of a

[1] At the time Staff filed its Gas Incident Report on the July 16, 2018 event, the Commission was under the Department of Economic Development and all rule references in the Report cite to 4 CSR 240. Effective August 31, 2019, the Commission was moved to the Department of Commerce and Insurance and all Commission rules were moved to 20 CSR 4240.

Spire contractor to abandon the existing service line to 1106 The Paseo. The natural gas system in the immediate vicinity of 1100-1116 The Paseo was undergoing abandonments, replacements, and upgrades of service lines. The individuals performing the work were employed by a Spire contractor, ** _____ **, hereafter referred to as "Contractor", working pursuant to a ** _____ ** between Spire Missouri Inc.[2] and ** _____ . **

Complainant

2. Complainant is the Staff acting through the Chief Staff Counsel as authorized by Missouri Public Service Commission ("Commission") Rule 20 CSR 4240-2.070(1).

Respondent

3. Natural gas service was provided in Kansas City, Missouri for a period of time, by Missouri Gas Energy ("MGE"). MGE was acquired by Laclede Gas Company ("Laclede") in 2013 and for a few years continued to operate under the MGE name as a division of Laclede, which was incorporated on March 2, 1857, as Laclede Gas Light Company. In 2016, Laclede Group changed its name to Spire, Inc. Respondent Spire Missouri, Inc. is a Missouri general business corporation in good standing, its principal place of business is located at 700 Market Street, St. Louis, Missouri 63101 and its registered agent is Ellen Theroff, 700 Market Street, St. Louis, Missouri 63101. Spire Missouri, Inc. is a wholly owned subsidiary of Spire, Inc. It is a public utility engaged in distributing and transporting natural gas to retail customers in both western and eastern portions of Missouri. Spire Missouri serves retail customers in the City of Kansas City

[2] Spire Response to Staff Data Request 0059. Spire Missouri Inc. is identified as a Missouri Corporation with a mailing address of 7500 E. 35th Terrace, Kansas City, Missouri 64129.

and thirty (30) counties in Western Missouri through its Spire Missouri West operating unit and serves retail customers in the City of St. Louis and ten (10) counties in Eastern Missouri through its Spire Missouri East operating unit. Many of the procedures currently in use by Spire Missouri West were formerly MGE procedures, and still have the MGE name on them.

Jurisdiction

4. By virtue of the activities described in the above paragraphs, Respondent Spire is now, and at all times pertinent to the events described above was a "gas corporation" within the intendments of § 386.020(18), and a "public utility" within the intendments of § 386.020(43), and thus subject to the jurisdiction of this Commission and to the provisions of the Public Service Commission Law at Chapters 386 and 393, RSMo.

Powers of the Commission

5. Pursuant to Sections 386.250(1) and 393.140(1), this Commission is charged with the supervision and regulation of public utilities engaged in the supply of natural gas at retail and is authorized by Sections 386.250(6), 386.310.1, and 393.140 to promulgate safety rules applicable to the transportation and distribution of natural gas. Pursuant to this authority, the Commission has duly promulgated its Rule 20 CSR 4240-40.030, Safety Standards-Transportation of Gas by Pipeline ("Gas Pipeline Safety Rule") and its Rule 20 CSR 4240-40.080, Drug and Alcohol Testing. Monetary penalties are authorized by Sections 386.570, 386.572 and 386.590 for the violation of the Commission's rules.

6. This Commission has authority to hear and determine complaints against public utilities pursuant to Section 386.390.1, which provides that "[c]omplaint may be made . . . in writing, setting forth any act or thing done or omitted to be done by any corporation . . . in violation, or claimed to be in violation, of any provision of law, or of any rule or order or decision of the commission . . . ."

7. This Commission is authorized by Section 386.310.1, after a hearing upon a complaint, to require a public utility to maintain and operate its line, plant, system, and equipment in such manner as to promote and safeguard the health and safety of its employees, customers, and the public, and to this end to require the performance of any other act which the health or safety of its employees, customers or the public may demand.

8. This Commission is authorized by Section 393.140(2) to investigate the methods employed in distributing gas and "[has] power to order such reasonable improvements as will best promote the public interest, preserve the public health and protect those using such gas . . . and those employed in the manufacture and distribution thereof. . ." The Commission is authorized by Section 393.140(5) if it shall be of the opinion after a hearing had upon complaint that the property, equipment, or appliances of any such person or corporation under its supervision is unsafe, insufficient or inadequate, the Commission shall determine and prescribe the safe, efficient and adequate property, equipment and appliances thereafter to be used for the security and accommodation of the public and in compliance with the provisions of law and franchises and charters.

Facts Common To All Counts

9. At approximately 10:23 a.m. Central Daylight Time ("CDT") on July 16, 2018, a natural gas fire occurred in and around an excavation near 1106 The Paseo in Kansas City, Missouri resulting in injuries to two individuals performing work on the natural gas pipeline. The natural gas system in the immediate vicinity of 1106 The Paseo was undergoing abandonments, replacements, and upgrades during the time immediately before and after this incident. The work being performed in the immediate vicinity of 1106 The Paseo was part of a larger project that included the replacement of the cast iron ("CI") main with a new two-inch diameter polyethylene ("PE") main, and upgrading the existing three-inch PE main's operating pressure. The two-inch diameter steel service line at 1106 The Paseo was to be abandoned and replaced by a new one-inch diameter PE service line. The incident occurred while a three-person contractor work crew was in the process of abandoning the existing service line to 1106 The Paseo.

10. The individuals performing the work were employed by the Contractor, ** _____ *, working for Spire in Kansas City, Missouri. One of the Contractor work crew members cut the plastic portion of the existing service line with a ratchet pipe-cutting tool without first stopping the flow of natural gas. Cutting the service line without first stopping the flow of natural gas resulted in natural gas escaping from the open line into the atmosphere. When this Contractor employee was unable to insert a fitting into the open line to stop the flow of natural gas, he used an electric reciprocating saw to cut the steel portion of the service line. Within a few seconds, an ignition occurred. Based on Staff's investigation, the electric reciprocating saw was the probable source of ignition in

this incident. As a result of the ignition, two of the Contractor employees were injured by the fire. One was treated and released, the other required inpatient hospitalization.

11. Staff hereby incorporates herein by reference Appendices A through G, of the attached Staff's Gas Incident Report filed on July 31, 2019 in File No. GS-2019-0015.

COUNT I

The use of an electric reciprocating saw in the conditions present at the time of the incident was a violation of 20 CSR 4240-40.030(13)(X)1.[3], 20 CSR 4240-40.030(13)(X)2.[4] and Spire Missouri West (formerly MGE) Standard 2540D[5], a procedure that was in place to meet the requirements of 20 CSR 4240-40.030(13)(X)[6] as required by 20 CSR 4240-40.030(12)(C)2.A.[7, 8]

12. The Staff's Gas Incident Report filed on July 31, 2019, in File No. GS-2019-0015 at pages 10-12 and 14 in Section III.B. Prevention of Accidental Ignition covers the substance of this Count and is attached. (See Attachment A.)

13. Once the Contractor employee cut the plastic portion of the existing service line with a ratchet pipe-cutting tool, natural gas was escaping from the open line into the atmosphere. When this occurred, ignition sources should have been removed from the

[3] 20 CSR 4240-40.030(13)(X)1. requires that when a hazardous amount of gas is being vented into open air, each potential source of ignition must be removed from the area and a fire extinguisher must be provided.

[4] 20 CSR 4240-40.030(13)(X)2. states that gas or electric welding or cutting may not be performed on pipe or on pipe components that contain a combustible mixture of gas in the area of work.

[5] Construction Standard 2540D addresses prevention of accidental ignition.

[6] 20 CSR 4240-40.030(13)(X) prevention of accidental ignition requirements are in Construction Standard 2540D.

[7] 20 CSR 4240-40.030(12)(C)2.A. requires that the manual required by paragraph 20 CSR 4240-40.030(12)(C)1. must include procedures for safety during normal operating, maintaining and repairing the pipeline in accordance with each of the requirements of sections (12), (13) and (14).

[8] Since 20 CSR 4240-40.030(12)(C)2.A. requires that a procedure must be included, if applicable, in the manual required by paragraph 20 CSR 4240-40.030(12)(C)1. to provide safety during maintenance and normal operations, failing to follow that procedure is also a violation of 20 CSR 4240-40.030(12)(C)1., which requires that each operator follow its manual of written procedures. Additionally, 20 CSR 4240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 20 CSR 4240-40.030), therefore failing to follow this procedure is a violation of 20 CSR 4240-40.030(1)(G)3.

area and no electric cutting should have been performed. The use of an electric reciprocating saw in this environment was a violation of 20 CSR 4240-40.030(13)(X)1., which requires that each potential source of ignition be removed from the area when a hazardous amount of gas is being vented into open air, and 20 CSR 4240-40.030(13)(X)2., which prohibits electric cutting on any pipe or pipe components that contain a combustible mixture of gas and air in the area of work.

WHEREFORE, Staff prays that the Commission, after due notice and hearing, will determine that Spire violated the Commission's Gas Pipeline Safety Rule 20 CSR 4240-40.030 as stated herein and, pursuant to § 386.600, authorize its General Counsel to seek penalties under §§ 386.570, 386.572 and 386.590; and grant such other and further relief as is just in the premises.

COUNT II

Failure to have a working fire extinguisher available at the job site was a violation of 20 CSR 4240-40.030(13)(X)1.,[9] and Spire Missouri West (formerly MGE) Standard 2540D,[10] a procedure that was in place to meet the requirements of 20 CSR 4240-40.030(13)(X)[11] as required by 20 CSR 4240-40.030(12)(C)2.A. [12]

[9] 20 CSR 4240-40.030(13)(X)1. requires that when a hazardous amount of gas is being vented into open air, each potential source of ignition must be removed from the area and a fire extinguisher must be provided.

[10] Construction Standard 2540D addresses prevention of accidental ignition.

[11] 20 CSR 4240-40.030(13)(X) prevention of accidental ignition requirements are in Construction Standard 2540D.

[12] Since 20 CSR 4240-40.030(12)(C)2.A. requires that a procedure must be included, if applicable, in the manual required by paragraph 20 CSR 4240-40.030(12)(C)1. to provide safety during maintenance and normal operations, failing to follow that procedure is also a violation of 20 CSR 4240-40.030(12)(C)1., which requires that each operator follow its manual of written procedures. Additionally, 20 CSR 4240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 20 CSR 4240-40.030), therefore failing to follow this procedure is a violation of 20 CSR 4240-40.030(1)(G)3.

14. The Staff's Gas Incident Report filed on July 31, 2019, in File No. GS-2019-0015 at pages 10-14, in Section III.B. Prevention of Accidental Ignition covers the substance of this Count and the Incident Report is attached.

15. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs I through 13 above.

16. At the time of the incident, a fire extinguisher was at the jobsite in the vicinity of the excavation. The fire extinguisher was not used or attempted to be used to extinguish the fire. However, during the Contractor's investigation of the failure to have a working fire extinguisher at the job site, it was determined that the fire extinguisher was not properly charged at the time of the fire.

WHEREFORE, Staff prays that the Commission, after due notice and hearing, will determine that Spire violated the Commission's Gas Pipeline Safety Rule 20 CSR 4240-40.030 as stated herein and, pursuant to § 386.600, authorize its General Counsel to seek penalties under §§ 386.570, 386.572 and 386.590; and grant such other and further relief as is just in the premises.

COUNT III

Instances of failure to follow Spire Missouri West (formerly MGE) Standard 3545D[13], a procedure necessary to meet the requirements of 20 CSR 4240-40.030(12)(C)2.J.[14] to protect workers in a hazardous atmosphere, were violations of 20 CSR 4240-40.030(12)(C)1.[15, 16]

More specifically:

a. Failure to have a working fire extinguisher in an emergency was a failure to follow Spire Missouri West (formerly MGE) Standard 3545D, a procedure necessary to meet the requirements of 20 CSR 4240-0.030(12)(C)2.J. to protect workers in a hazardous atmosphere, which was a violation of 20 CSR 4240-40.030(12)(C)1.
b. Failure to test the excavation with a combustible gas indicator ("CGI") when there was reason to suspect the presence of a flammable gas was a failure to follow Spire Missouri West (formerly MGE) Standard 3545D, a procedure necessary to meet the requirements of 20 CSR 4240-40.030(12)(C)2.J. to protect workers in a hazardous atmosphere, which was a violation of 20 CSR 4240-40.030(12)(C)1.
c. Failure to assign an additional person to observe work in a hazardous environment was a failure to follow Spire Missouri West (formerly MGE) Standard 3545D, a procedure necessary to meet the requirements of 20 CSR 4240-40.030(12)(C)2.J. to protect workers in a hazardous atmosphere, which was a violation of 20 CSR 4240-40.030(12)(C)1.

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[13] O&M Standard 3545D addresses hazardous atmospheres and was provided to Staff in response to Staff Data Request 0010.

[14] 20 CSR 4240-40.030(12)(C)2.J. requires that the manual of written procedures required by 20 CSR 4240-40.030(12)(C)1. must include procedures to take adequate precautions in excavated trenches to protect personnel from the hazards of unsafe accumulations of vapor or gas, and making available, when needed at the excavation, emergency rescue equipment including a breathing apparatus and a rescue harness and line.

[15] 20 CSR 4240-40.030(12)(C)1. requires that each operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response. O&M Standard 3545D is one of these written procedures.

[16] Additionally, 20 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 20 CSR 4240-40.030), therefore failing to follow this procedure is a violation of 20 CSR 4240-40.030(1)(G)3.

d. Although a fire-resistant suit, fire-resistant hood, and a supplied air respirator were available at the construction site at the time of the incident, the Contractor work crew did not utilize this equipment.[17] The Contractor work crew did not have a safety retrieval harness and life lines available at the site.[18] Failure to use required personal protective equipment or respiratory protection or have available rescue equipment was a failure to follow Spire Missouri West (formerly MGE) Standard 3545D, a procedure necessary to meet the requirements of 20 CSR 4240-40.030(12)(C)2.J. to protect workers in a hazardous atmosphere, which was a violation of 20 CSR 4240-40.030(12)(C)1.

17. The Staff's Gas Incident Report filed on July 31, 2019, in File No. GS-2019-0015 at pages 15 through 20, in Section III.C. Protection of Personnel covers the substance of this Count and is attached.

18. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs I through 16 above.

19. Spire Missouri West (formerly MGE) O&M Standard 3545D, Hazardous Atmospheres (Spire's procedure to comply with the requirements of 20 CSR 4240-40.030(12)(C)2.J., which addresses taking adequate precautions in excavated trenches to protect personnel from the hazards of unsafe accumulations of vapor or gas) includes among other things testing atmospheres where a hazardous atmosphere exists or could reasonably be expected to exist (Section 3.0); testing the atmospheric environment in and around the excavation with a combustible gas indicator ("CGI") before personnel are allowed access in all excavations where there is reason to suspect the presence of a

[17] Spire Response to Staff Data Request 0025.

[18] Spire Response to Staff Data Request 0010.3.

flammable gas (e.g., leak repair) (Section 5.2); when workers are required to be within the hazardous environment there must be an additional person assigned to observe the workers' activities and warn about changes in conditions or initiate rescue activities if necessary (Section 5.4); in atmospheres in excavated trenches identified as hazardous additional Personal Protective Equipment ("PPE") shall include, but may not be limited to, fire retardant suit and hood, respiratory protection and rescue equipment in addition to the PPE items normally required (Section 6.0); and a working fire extinguisher shall be placed upwind of excavated trenches and staffed by an employee trained in the operation of a fire extinguisher (Section 7.2). According to Spire, "Based on the [Spire] incident investigation, proper procedures were not followed at [1106 The Paseo]; therefore hazardous atmosphere testing was not conducted but [Contractor employees] were trained on these procedures".[19] Although a fire extinguisher was provided, Spire stated it was not properly charged at the time of the fire, and a Contractor employee was aware it was not ready for use.[20] Spire indicated that a Contractor employee failed to assign an additional person to observe the worker's activities and warn about changes in conditions.[21] Although a fire-resistant suit, fire-resistant hood, and an Allegro Model 1-300 supplied air respirator were available at the construction site at the time of the incident, the Contractor work crew did not utilize this equipment.[22] The Contractor work crews did not have a safety retrieval harness and life lines available at the site.[23] Failure to follow Spire Missouri West (formerly MGE) O&M Standard 3545D, which was

[19] Spire Response to Staff Data Request 0010.2 Follow Up.
[20] Spire Response to Staff Data Request 0037.
[21] Spire Response to Staff Data Request 0025.
[22] Spire Response to Staff Data Request 0010.3.
[23] Spire Response to Staff Data Request 0010.2.

part of Spire's emergency response procedure under 20 CSR 4240-40.030(12)(C)2.J., was a violation of 20 CSR 4240-40.030(12)(C)1.

WHEREFORE, Staff prays that the Commission, after due notice and hearing, will determine that Spire violated the Commission's Gas Pipeline Safety Rule 20 CSR 4240-40.030 as stated herein and, pursuant to § 386.600, authorize its General Counsel to seek penalties under §§ 386.570, 386.572 and 386.590; and grant such other and further relief as is just in the premises.

COUNT IV

Failure to follow Spire Missouri West (formerly MGE) Standard 2240E for mechanical joining was a violation of 20 CSR 4240-40.030(6)(B)2., a requirement that each joint must be made in accordance with written procedures that have been proved by test or experience to produce a strong gastight joint (because the flow of gas was not terminated as required in Spire's written procedure).[24]

20. The Staff's Gas Incident Report filed on July 31, 2019 in File No. GS-2019-0015 at pages 21-22, in Section III.D. Mechanical Joining covers the substance of this Count and is attached.

21. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs I through 19 above.

22. At the time of the incident, the Contractor employee completing the abandonment of the existing service line to 1106 The Paseo was attempting to install a Permasert™ coupling as a cap for the 2-inch diameter plastic stub remaining on the main from the existing service line. Spire's procedure (Spire Missouri West (formerly MGE) Construction Standard 2240E) requires that when using a Permasert™ coupling to join

[24] Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow this procedure is a violation of 4 CSR 240-40.030(1)(G)3.

pipe of this size, the flow of gas must be terminated. The method employed by the Contractor work crew to install the Permasert™ coupling did not include terminating the flow of natural gas. Failure to follow Spire Missouri West (formerly MGE) Standard 2240E was a violation of 20 CSR 4240-40.030(6)(B)2.

WHEREFORE, Staff prays that the Commission, after due notice and hearing, will determine that Spire violated the Commission's Gas Pipeline Safety Rule 20 CSR 4240-40.030 as stated herein and, pursuant to § 386.600, authorize its General Counsel to seek penalties under §§ 386.570, 386.572 and 386.590; and grant such other and further relief as is just in the premises.

COUNT V

** _____ _____ ** was a violation of 49 CFR 199.105(b)1.[25] as adopted by the Commission by promulgation of 20 CSR 4240-40.080.

23. The Staff's Gas Incident Report filed on July 31, 2019 in File No. GS-2019-0015 at pages 31-37, in Section III.G. Drug and Alcohol Testing covers the substance of this Count and is attached.

24. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs I through 22 above.

25. Spire identified three Contractor employees who comprised the Contractor work crew for 1106 The Paseo and whose performance either contributed to the incident or could not be completely discounted as a contributing factor to the incident.

[25] 49 CFR 199.105(b)1. Requires post-accident testing as soon as possible but no later than 32 hours after an accident, an operator must drug test each surviving covered employee whose performance of a covered function either contributed to the accident or cannot be completely discounted as a contributing factor to the accident. An operator may decide not to test under this paragraph but such a decision must be based on specific information that the covered employee's performance had no role in the cause(s) or severity of the accident.

26. Each of these three Contractor employees should have been tested for drugs (49 CFR 199.105(b) as adopted by 20 CSR 4240-40.080). Out of the three Contractor employees for whom tests for drugs were required, ** ___ ** were performed.

27. ** _____

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28. ** _____

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_____ . **

WHEREFORE, Staff prays that the Commission, after due notice and hearing, will determine that Spire violated the Commission's Drug and Alcohol Testing Rule 20 CSR 4240-40.080 as stated herein and, pursuant to § 386.600, authorize its General Counsel to seek penalties under §§ 386.570, 386.572 and 386.590; and grant such other and further relief as is just in the premises.

COUNT VI

** _____

_____ ** was a violation of 49 CFR 199.225(a)1.[26] as adopted by the Commission by promulgation of 20 CSR 4240-40.080.

[26] 49 CFR 199.225(a)1. Requires that as soon as practicable following an accident, each operator must test each surviving covered employee for alcohol if that employee's performance of a covered function either contributed to the accident or cannot be completely discounted as a contributing factor to the accident. The decision not to administer a test under this section must be based on specific information that the covered employee's performance had no role in the cause(s) or severity of the accident.

29. The Staff's Gas Incident Report filed on July 31, 2019 in File No. GS-2019-0015 at pages 31-37, in Section III.G. Drug and Alcohol Testing covers the substance of this Count and is attached.

30. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs I through 28 above.

31. Spire identified three Contractor employees who comprised the Contractor work crew for 1106 The Paseo and whose performance either contributed to the incident or could not be completely discounted as a contributing factor to the incident.

32. Each of these three Contractor employees should have been tested for alcohol (49 CFR 199.225(a)1 as adopted by 20 CSR 4240-40.080). Out of the three Contractor employees for whom tests for alcohol were required, ** ___ ** were performed.

33. ** _____

_____ _____

_____ . **[27]

34. ** _____

_____

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_____ . **

WHEREFORE, Staff prays that the Commission, after due notice and hearing, will determine that Spire violated the Commission's Drug and Alcohol Testing Rule 20 CSR 4240-40.080 as stated herein and, pursuant to § 386.600, authorize its

[27] Spire Confidential Response to Staff Data Requests 0030 and 0067.2.

General Counsel to seek penalties under §§ 386.570, 386.572 and 386.590; and grant such other and further relief as is just in the premises.

COUNT VII

Failure to ensure that all work completed on its pipelines by its contractor complies with 20 CSR 4240-40.030 was a violation of 20 CSR 4240-40.030(12)(B)3.

35. The Staff's Gas Incident Report filed on July 31, 2019, in File No. GS-2019-0015 at pages 37-40, in Section III.H. Spire Oversight of Contractor covers the substance of this Count and is attached.

36. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs I through 34 above.

37. Failure to ensure that the work completed by Spire's Contractor complied with 20 CSR 4240-40.030 was a violation of 20 CSR 4240-40.030(12)(B)3. Violations of Sections III.B. Prevention of Accidental Ignition, III.C. Protection of Personnel, and III.D. Mechanical Joining describe how work by Spire's Contractor did not comply with 20 CSR 4240-40.030(13)(X) and did not follow several Spire procedures as required by 20 CSR 4240-40.030(1)(G)3., (6)(B)2., and (12)(C)1.

WHEREFORE, Staff prays that the Commission, after due notice and hearing, will determine that Spire violated the Commission's Gas Pipeline Safety Rule 20 CSR 4240-40.030 as stated herein and, pursuant to § 386.600, authorize its General Counsel to seek penalties under §§ 386.570, 386.572 and 386.590; and grant such other and further relief as is just in the premises.

COUNT VIII

Failure to include procedures for the contractor oversight requirements of 20 CSR 4240-40.030(12)(B)3. in Spire's procedural manual as required by 20 CSR 4240-40.030(12)(C)1. [28] was a violation of 20 CSR 4240-40.030(12)(C)2.A.[29, 30]

38. The Staff's Gas Incident Report filed on July 31, 2019 in File No. GS-2019-0015 at pages 37-40, in Section III.H. Spire Oversight of Contractor covers the substance of this Count and is attached.

39. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs I through 37 above.

40. There is no Spire-approved written policy or procedure for oversight and inspection of contractors work to ensure that work complies with 20 CSR 4240-40.030, however, Spire is in the process of standardizing policies and procedures across operational areas and will review whether to implement a new construction contractor inspection policy or procedure(s). Spire must add procedures for the requirements of 20 CSR 4240-40.030(12)(B)3. to its procedural manual in order to meet the requirements of 20 CSR 4240-40.030(12)(C)2.A. and not be in violation of 20 CSR 4240-40.030(12)(C)1.

WHEREFORE, Staff prays that the Commission, after due notice and hearing, will determine that Spire violated the Commission's Gas Pipeline Safety Rule 20 CSR 4240-

[28] 20 CSR 4240-40.030(12)(C)1. requires that each operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response.
[29] 20 CSR 4240-40.030(12)(C)2.A. requires that the manual required by paragraph 20 CSR 4240-40.030(12)(C)1. must include procedures for operating, maintaining and repairing the pipeline in accordance with each of the requirements of sections 20 CSR 4240-40.030(12), (13) and (14).
[30] Additionally, 20 CSR 4240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 20 CSR 4240-40.030), therefore failing to have this procedure is a violation of 20 CSR 4240-40.030(1)(G)3.

40.030 as stated herein and, pursuant to § 386.600, authorize its General Counsel to seek penalties under §§ 386.570, 386.572 and 386.590; and grant such other and further relief as is just in the premises.

RECOMMENDATIONS

In addition to identifying violations of Commission Rules, Staff set out in its Gas Incident Report at pages 44-47 recommendations respecting areas related to the violations with the intended effect of the recommendations being a prevention of a recurrence of the violations. When Staff filed its Gas Incident Report on July 31, 2019, it also filed a cover pleading entitiled "Staff's Gas Incident Report" in which it stated it would file a Complaint against Spire which would contain Staff's Recommendations in addition to addressing the violations of the Commission's Pipeline Safety Rule, 20 CSR 4240-40.030, and Drug and Alcohol Testing, 20 CSR 4240-40.080. Pursuant to its authority under § 386.310.1 to require Spire to operate its system in such manner as promotes and safeguards the health and safety of its employees, customers, and the public, its authority under § 393.140(2) to order such reasonable improvements in Spire's methods of operation as will best promote the public interest, preserve the public health and protect both those using gas and those employed in the distribution of gas, and its authority under other statutory sections noted herein, the Commission may order Spire to implement these Recommendations.

Staff recommended in its Gas Incident Report and recommends through its Complaint that the Commission direct that Spire file an action plan to effectuate each recommendation:

1. Develop and include, in its procedural manual required by 20 CSR 4240-40.030(12)(C)1., procedures for the contractor oversight requirements of 20 CSR 4240-40.030(12)(B)3.[31] Staff further recommends Spire follow these procedures.

2. Develop a list of tasks that require Spire oversight when the tasks are to be performed by a contractor, including any task that involves planned work in a hazardous gas atmosphere.

3. Take a more proactive role in ensuring that its contractors are in compliance not only with the pipeline safety rules that Staff identifies as having been violated in this incident, but in general with all applicable pipeline safety rules. Actions to be taken by Spire to ensure contractor compliance with applicable rules should include but not necessarily be limited to:

    a. Conducting a review of training materials to ensure that the requirements of applicable pipeline safety rules and Spire procedures to implement these rules are covered in sufficient detail during training,

    b. Conducting random and/or routine field evaluations of contractor employees' knowledge, skills and ability to perform assigned tasks,

    c. Conducting random and/or routine inspections to ensure that equipment necessary to perform the assigned tasks and respond to abnormal operating conditions (e.g., fire extinguisher, PPE) are available and are in working order at jobsites, and

    d. Conducting field verification of contractor employees' qualifications to perform covered tasks. Staff recommends Spire utilize form "PHMSA (OQ) Field Inspection Form 15 (Rev. 3) March 2, 2007" (See Appendix F) or similar information/data form to complete these verifications.

[31] 4 CSR 240-40.030(12)(B)3. that states each operator is responsible for ensuring that all work completed on its pipelines by its consultants and contractors complies with 4 CSR 240-40.030.

4. Take a more proactive role in ensuring that post-incident drug and alcohol tests are performed by its contractors as required by 20 CSR 4240-40.080 Drug And Alcohol Testing. In future incidents that involve contractors performing covered functions on Spire's pipelines, Staff recommends that Spire take steps as soon as possible after an incident to notify the administrator of the contractor's anti-drug and alcohol misuse program that the requirements of 49 CFR 199.105(b) and 49 CFR 199.225(a), as adopted by 20 CSR 4240-40.080, must be implemented.

5. Spire consider contractor work as a sub-threat of Incorrect Operation in its Distribution Integrity Management Program ("DIMP") Plan so that any trends in the frequency (increasing or decreasing) of incorrect operations by contractors may be evaluated.

6. Modify Spire Missouri West O&M Standard 3545D, *Hazardous Atmospheres* to require that an appropriate level of Spire management review and approve planned work that involves the intentional creation of a hazardous atmosphere.

7. Conduct a comprehensive review of its operator qualification program. As part of this review, Staff recommends Spire complete the following:

    a. Review the program's covered task list to ensure that all covered tasks that are performed on Spire's gas pipelines are included in the covered task list.

    b. Ensure that the evaluations listed for each covered task are those currently required by Spire to be considered qualified to perform each covered task.

c. For each Spire approved provider of operator qualification evaluations (for example MEA, EWN, etc.), create a list of evaluations required to be considered qualified for each specific covered task listed in Spire's operator qualification program.

d. Provide the lists from 7.c. above to Spire Contract Inspectors so they can better ensure that contractor employees working for Spire are qualified to perform the covered tasks required by their work.

8. Conduct an annual, comprehensive review of the operator qualification program for each of its contractors to ensure that the training and evaluation methods used by each contractor meet the requirements of the operator qualification programs Spire uses for its own employees.

Staff recommended in its Gas Incident Report and recommends in its Complaint that the Commission order Spire to file an action plan, by December 31, 2019, which addresses the recommendations (numbered 1-8 above). Staff further recommended and recommends that the Commission order Spire to include in its action plan filing when it will effectuate that action plan. Finally, Staff recommended and recommends:

1. The Commission require that the action plan include Spire's proposed resolution for addressing each recommendation and the timeframe for implementing the resolution.
2. The Commission require Spire to file updates every six months as to how the plan has been effectuated.

If for any recommendation Spire believes no action is necessary, Staff recommends the Commission order Spire to explain, and provide supporting documentation as available, the reason(s) Spire believes no action is required.

WHEREFORE Staff files its Complaint with respect to the events of July 16, 2018, at 1106 The Paseo, Kansas City, Missouri and in response to the Commission's October 30, 2019, Order in File No. GS-2019-0015 Directing Staff To File A Complaint.

Respectfully submitted,

/s/ Steven Dottheim
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Jefferson City, MO 65102

Attorney for the Staff of the
Missouri Public Service Commission

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing have been mailed, hand-delivered, transmitted by facsimile or electronically mailed to all counsel of record this 6th day of November, 2019.

/s/ Steven Dottheim

MISSOURI PUBLIC SERVICE COMMISSION

STAFF's GAS INCIDENT REPORT

1106 The Paseo
Kansas City, Missouri
July 16, 2018 Natural Gas Incident

Spire Missouri Inc. d/b/a Spire Missouri West

Case No. GS-2019-0015

Commission Staff Division
Safety Engineering Department
July 31, 2019 - Jefferson City, Missouri

** Denotes Confidential Information **

Attachment A

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STAFF's GAS INCIDENT REPORT
SPIRE MISSOURI WEST
CASE NO. GS-2019-0015

STAFF's GAS INCIDENT REPORT

SPIRE MISSOURI WEST

CASE NO. GS-2019-0015

I. EXECUTIVE SUMMARY

At approximately 10:23 a.m. Central Daylight Time ("CDT") on July 16, 2018, a natural gas fire occurred in and around an excavation near 1106 The Paseo in Kansas City, Missouri[1] resulting in injuries to two individuals performing work on the natural gas pipeline.[2] The natural gas system in the immediate vicinity of 1106 The Paseo was undergoing abandonments[3], replacements[4], and upgrades[5] during the time immediately before and after this incident. The work being performed in the immediate vicinity of 1106 The Paseo was part of a larger project that included the replacement of the cast iron ("CI") main with a new two-inch diameter polyethylene ("PE") main, and upgrading the existing three-inch PE main's operating pressure. The two-inch diameter steel service line[6] at 1106 The Paseo was to be abandoned and replaced by a new one-inch diameter PE service line.[7] The incident occurred while a three-person work crew was abandoning the existing service line to 1106 The Paseo.[8]

The individuals performing the work were employed by a contractor, ** _____ **, hereafter referred to as "Contractor", working for Spire Missouri West ("Spire" or

[1] Spire response to Staff Data Requests 0051 and 0067.2.

[2] Spire response to Staff Data Request 0013.2.

[3] "Abandoned" means permanently removed from service (4 CSR 240-40.030(1)(B)1.).

[4] The term "replacement" is used in the context of: "a new fixed asset or portion of an asset that takes the place of a discarded one" (Webster's Third New International Dictionary, Unabridged, Copyright 1976 by G. & C. Merriam Co., definition 2.b.). Additionally, there are regulatory requirements regarding replacement of certain pipe materials. General requirements for required replacement programs are addressed in 4 CSR 240-40.030(15).

[5] "Upgrade" is a term used by Spire for a verification procedure used to increase operating pressure in instances where an increase of Maximum Allowable Operating Pressure as defined in 4 CSR 240-40.030(1)(B) is not required. The term "upgrading" is not synonymous with "uprating" as detailed in 4 CSR 240-40.030(11). Spire provided a copy of its verification procedure for this project in response to Staff Data Request 0006.

[6] Service to 1106 The Paseo was provided by a two-inch diameter PE tee from the 3-inch PE main, which utilized a transition fitting to transition to a two-inch diameter steel service. This two-inch diameter steel service ran approximately forty-one (41) feet to the meter located on the northeast corner of 1106 The Paseo.

[7] Spire response to Staff Data Request 0001.

[8] Spire response to Staff Data Request 0001.

"The Company"), formerly known as Missouri Gas Energy ("MGE"), the natural gas service provider in Kansas City, Missouri.[9]

** An _____ ** employed by Spire, observed the fire and called for emergency responders and then called the Spire security center to report the incident.[10] Around the same time, a Kansas City fire battalion chief noticed the incident while driving by and stopped to assist.[11] An ambulance from The University of Kansas Hospital arrived on site at approximately 10:28 a.m. CDT and transported the injured individuals to the hospital.[12] At approximately 10:30 a.m. CDT, a Contractor employee stopped the flow of gas by squeezing-off a 3-inch plastic main[13] at an excavation located near the intersection of East 11th Street and The Paseo. Spire's security center was notified of the incident at approximately 10:30 a.m. CDT and was informed that Kansas City police and fire were already notified. The Spire Construction Supervisor left for the incident site, and arrived at approximately 10:50 a.m. CDT. Two Contractor Managers arrived at the scene at approximately 10:55 and 11:00 a.m. CDT.[14] The Kansas City Fire Department was on site at 11:00 a.m. CDT.[15] A second Contractor crew was later called to the incident site to complete work on the 1100 block of The Paseo.[16]

The Safety Engineering Department Staff ("Staff") was notified of the incident at approximately 1:00 p.m. CDT on July 16, 2018, and started its investigation at that time. On July 19, 2018, Staff filed a motion recommending that the Commission establish a case for purposes of receiving a report resulting from Staff's investigation of the incident, which was granted on July 25, 2018.

During its investigation, Staff learned that one of the Contractor work crew members cut the plastic portion of the existing service line with a ratchet pipe-cutting tool without first

[9] Natural gas service in Kansas City, Missouri is provided by Spire Missouri West ("Spire"), formerly known as Missouri Gas Energy ("MGE").

[10] Spire response to Staff Data Request 0002.

[11] Spire response to Staff Data Request 0013.

[12] Spire response to Staff Data Requests 0002 and 0012.1.

[13] Spire response to Staff Data Request 0004.

[14] Spire response to Staff Data Request 0002.

[15] Spire response to Staff Data Request 0002.

[16] Spire response to Staff Data Request 0002.

stopping the flow of natural gas. Cutting the service line without first stopping the flow of natural gas resulted in natural gas escaping from the open line into the atmosphere.[17] When this Contractor work crew member was unable to insert a fitting into the open line to stop the flow of natural gas, he used an electric reciprocating saw[18] to cut the steel portion of the service line. Within a few seconds, an ignition occurred.[19] Based on Staff's investigation, the electric reciprocating saw was the probable source of ignition in this incident. As a result of the ignition, two of the Contractor work crew members were injured by the fire; one was treated and released, the other required inpatient hospitalization.[20]

In Spire's Pipeline and Hazardous Material Safety Administration ("PHMSA") 7100.1 incident report[21] submitted in compliance with 4 CSR 240-40.020(5), Spire identified the apparent cause of the incident as: "Incorrect Operation", specifically "Failure to follow proper procedure when performing a service line replacement."[22] Based on Staff's investigation, Staff agrees that "Incorrect Operation", specifically failure to follow proper procedures, was the probable cause of this incident.

For more detailed information of the incident, see Appendix A. (Note: Before Staff's Incident Report was finalized, Appendices A to D, "Detailed Discussion Of Facts And Staff's Investigation", "Figures", "Photographs", and "Lessons Learned", were provided to Spire for Spire's review and submission of corrections by Spire to Staff regarding the factual content and the identification of confidential information in Appendices A to D. Spire reviewed Staff's transmittal of Appendices A to D and provided a response identifying suggested corrections to certain Staff factual statements. Staff considered all of Spire's suggestions before finalizing its Appendices A to D.)

I. Executive Summary Staff Experts: Clinton L. Foster and Kathleen A. McNelis, PE

[17] Attachment to Spire response to Staff Data Request 0025.

[18] In Spire responses and Spire Attachments to responses Staff Data Requests, this device is sometimes referred to as a "Sawzall." See Appendix C, Photographs 1 and 2.

[19] Based on Attachment to Spire response to Staff Data Request 0025.

[20] Spire response to Staff Data Request 0013.2.

[21] Incident reports are required by 4 CSR 240-40.020(6) for federally reportable incidents.

[22] Attachment provided with Spire response to Staff Data Request 0067.2.

A. Violation of Commission Pipeline Safety Rules

As a result of its investigation, Staff found that sufficient facts/information exist to assert the following violations:

1. The use of an electric reciprocating saw in the conditions present at the time of the incident was a violation of 4 CSR 240-40.030(13)(X)1.[23], 4 CSR 240-40.030(13)(X)2.[24] and Spire Missouri West (formerly MGE) Standard 2540D[25], a procedure that was in place to meet the requirements of 4 CSR 240-40.030(13)(X) as required by 4 CSR 240-40.030(12)(C)2.A.[26, 27]

   (See: III.B. *Prevention of Accidental Ignition*: Staff Experts Brian J. Buchanan and Kathleen A. McNelis, PE)

2. Failure to have a working fire extinguisher available at the job site was a violation of 4 CSR 240-40.030(13)(X)1.,[28] and Spire Missouri West (formerly MGE) Standard 2540D, a procedure that was in place to meet the requirements of 4 CSR 240-40.030(13)(X) as required by 4 CSR 240-40.030(12)(C)2.A.[29]

   (See: III.B. *Prevention of Accidental Ignition*: Staff Experts Brian J. Buchanan and Kathleen A. McNelis, PE)

[23] 4 CSR 240-40.030(13)(X)1. requires that when a hazardous amount of gas is being vented into open air, each potential source of ignition must be removed from the area and a fire extinguisher must be provided.

[24] 4 CSR 240-40.030(13)(X)2. states that gas or electric welding or cutting may not be performed on pipe or on pipe components that contain a combustible mixture of gas in the area of work.

[25] Construction Standard 2540D addresses prevention of accidental ignition and was provided to Staff in response to Staff Data Request 0009.

[26] 4 CSR 240-40.030(12)(C)2.A. requires that the manual required by paragraph 4 CSR 240-40.030(12)(C)1. must include procedures for safety during normal operating, maintaining and repairing the pipeline in accordance with each of the requirements of sections (12), (13) and (14).

[27] Since 4 CSR 240-40.030(12)(C)2.A. requires that a procedure must be included, if applicable, in the manual required by paragraph 4 CSR 240-40.030(12)(C)1. to provide safety during maintenance and normal operations, failing to follow that procedure is also a violation of 4 CSR 240-40.030(12)(C)1., which requires that each operator follow its manual of written procedures. Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow this procedure is a violation of 4 CSR 240-40.030(1)(G)3.

[28] 4 CSR 240-40.030(13)(X)1. requires that when a hazardous amount of gas is being vented into open air, each potential source of ignition must be removed from the area and a fire extinguisher must be provided.

[29] Since 4 CSR 240-40.030(12)(C)2.A. requires that a procedure must be included, if applicable, in the manual required by paragraph 4 CSR 240-40.030(12)(C)1. to provide safety during maintenance and normal operations, failing to follow that procedure is also a violation of 4 CSR 240-40.030(12)(C)1., which requires that each operator follow its manual of written procedures. Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow this procedure is a violation of 4 CSR 240-40.030(1)(G)3.

3. Instances of failure to follow Spire Missouri West (formerly MGE) Standard 3545D[30], a procedure necessary to meet the requirements of 4 CSR 240-40.030(12)(C)2.J.[31] to protect workers in a hazardous atmosphere, were violations of 4 CSR 240-40.030(12)(C)1.[32, 33]

(See: III.C. *Protection of Personnel*: Staff Experts Brian J. Buchanan and John D. Kottwitz)

More specifically:

a. Failure to have a working fire extinguisher in an emergency was a failure to follow Spire Missouri West (formerly MGE) Standard 3545D, a procedure necessary to meet the requirements of 4 CSR 240-0.030(12)(C)2.J. to protect workers in a hazardous atmosphere, which was a violation of 4 CSR 240-40.030(12)(C)1.

(See: III.C. *Protection of Personnel*: Staff Experts Brian J. Buchanan and John D Kottwitz)

b. Failure to test the excavation with a combustible gas indicator ("CGI") when there was reason to suspect the presence of a flammable gas was a failure to follow Spire Missouri West (formerly MGE) Standard 3545D, a procedure necessary to meet the requirements of 4 CSR 240-40.030(12)(C)2.J. to protect workers in a hazardous atmosphere, which was a violation of 4 CSR 240-40.030(12)(C)1.

(See: III.C. *Protection of Personnel*: Staff Experts Brian J. Buchanan and John D. Kottwitz.)

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[30] O&M Standard 3545 D addresses hazardous atmospheres and was provided to Staff in response to Staff Data Request 0010.

[31] 4 CSR 240-40.030(12)(C)2.J. requires that the manual of written procedures required by 4 CSR 240-40.030(12)(C)1. must include procedures to take adequate precautions in excavated trenches to protect personnel from the hazards of unsafe accumulations of vapor or gas, and making available, when needed at the excavation, emergency rescue equipment including a breathing apparatus and a rescue harness and line.

[32] 4 CSR 240-40.030(12)(C)1. requires that each operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response. O&M Standard 3545 D is one of these written procedures.

[33] Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow this procedure is a violation of 4 CSR 240-40.030(1)(G)3.

c. Failure to assign an additional person to observe work in a hazardous environment was a failure to follow Spire Missouri West (formerly MGE) Standard 3545D, a procedure necessary to meet the requirements of 4 CSR 240-40.030(12)(C)2.J. to protect workers in a hazardous atmosphere, which was a violation of 4 CSR 240-40.030(12)(C)1.

(See: III.C. *Protection of Personnel*: Staff Experts Brian J. Buchanan and John D. Kottwitz.)

d. Although a fire-resistant suit, fire-resistant hood, and a supplied air respirator were available at the construction site at the time of the incident, the Contractor work crew did not utilize this equipment.[34] The Contractor work crew did not have a safety retrieval harness and life lines available at the site.[35] Failure to use required personal protective equipment or respiratory protection or have available rescue equipment was a failure to follow Spire Missouri West (formerly MGE) Standard 3545D, a procedure necessary to meet the requirements of 4 CSR 240-40.030(12)(C)2.J. to protect workers in a hazardous atmosphere, which was a violation of 4 CSR 240-40.030(12)(C)1.

(See: III.C. *Protection of Personnel*: Staff Experts Brian J. Buchanan and John D. Kottwitz.)

4. Failure to follow Spire Missouri West (formerly MGE) Standard 2240E for mechanical joining was a violation of 4 CSR 240-40.030(6)(B)2., a requirement that each joint must be made in accordance with written procedures that have been proved by test or experience to produce a strong gastight joint (because the flow of gas was not terminated as required in Spire's written procedure).[36]

(See: III.D. *Mechanical Joining*: Staff Experts Clinton L. Foster and Kathleen A. McNelis, PE)

[34] Spire response to Staff Data Request 0025.

[35] Spire response to Staff Data Request 0010.3.

[36] Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow this procedure is a violation of 4 CSR 240-40.030(1)(G)3.

5. ** _____.
_____ ** was a violation of 49 CFR 199.105(b)1.[37] as adopted by the Commission by promulgation of 4 CSR 240-40.080.
(See: III.G. *Drug and Alcohol Testing*: Staff Expert Kathleen A. McNelis, PE)
6. ** _____
_____ ** was a violation of 49 CFR 199.225(a)1.[38] as adopted by the Commission by promulgation of 4 CSR 240-40.080.
(See: III.G. *Drug and Alcohol Testing*: Staff Expert Kathleen A. McNelis, PE)
7. Failure to ensure that all work completed on its pipelines by its contractor complies with 4 CSR 240-40.030 was a violation of 4 CSR 240-40.030(12)(B)3.
(See: III.H. *Spire Oversight of Contractor*: Staff Expert John D. Kottwitz)
8. Failure to include procedures for the contractor oversight requirements of 4 CSR 240-40.030(12)(B)3. in Spire's procedural manual as required by 4 CSR 240-40.030(12)(C)1.[39] was a violation of 4 CSR 240-40.030(12)(C)2.A.[40, 41]
(See: III.H. *Spire Oversight of Contractor*: Staff Expert John D. Kottwitz)

Staff will pursue the appropriate actions related to its assertions that rules were violated.

[37] 49 CFR 199.105(b)1. Requires post-accident testing as soon as possible but no later than 32 hours after an accident, an operator must drug test each surviving covered employee whose performance of a covered function either contributed to the accident or cannot be completely discounted as a contributing factor to the accident. An operator may decide not to test under this paragraph but such a decision must be based on specific information that the covered employee's performance had no role in the cause(s) or severity of the accident.

[38] 49 CFR 199.225(a)1. Requires that as soon as practicable following an accident, each operator must test each surviving covered employee for alcohol if that employee's performance of a covered function either contributed to the accident or cannot be completely discounted as a contributing factor to the accident. The decision not to administer a test under this section must be based on specific information that the covered employee's performance had no role in the cause(s) or severity of the accident.

[39] 4 CSR 240-40.030(12)(C)1. requires that each operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response.

[40] 4 CSR 240-40.030(12)(C)2.A. requires that the manual required by paragraph 4 CSR 240-40.030(12)(C)1. must include procedures for operating, maintaining and repairing the pipeline in accordance with each of the requirements of sections 4 CSR 240-40.030(12), (13) and (14).

[41] Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to have this procedure is a violation of 4 CSR 240-40.030(1)(G)3.

B. Staff Recommendations for Areas Needing Improvement

Staff also asserts that sufficient facts/information exist to recommend various areas of improvement for Spire in an effort to minimize the possibility of recurrence of the events that caused or contributed to this incident. In Section IV of this Report, Staff delineates its various recommendations, and recommends the Commission require Spire to file an action plan to address Staff's recommendations.

Staff Experts: Kathleen A. McNelis, PE, John D. Kottwitz, Clinton L. Foster and Brian J. Buchanan

II. PURPOSE AND SCOPE OF STAFF'S INVESTIGATION

The purpose and scope of Staff's investigation was to:

- Identify the probable cause(s) of the incident,
- Investigate, analyze and determine if there have been violations of Commission Rules related to:
  - Incident Reporting Requirements in 4 CSR 240-40.020;
  - Missouri Pipeline Safety Standards in 4 CSR 240-40.030, including but not limited to the operator's[42] emergency response and failure investigation, and
  - Drug and Alcohol Testing requirements in 4 CSR 240-40.080; and
- Make recommendations, as applicable to Spire with an objective of minimizing the possibility of recurrence.

II. Purpose and Scope of Staff's Investigation Staff Expert: Kathleen A. McNelis, PE

[42] "Operator" is defined in 4 CSR 240-40.030(1)(B)26 as "a person who engages in the transportation of gas." "Person" is defined in 4 CSR 240-40.030(1)(B)27 as "any individual, firm, joint venture, partnership, corporation, association, county, state, municipality, political subdivision, cooperative association, or joint stock association, and including any trustee, receiver, assignee, or personal representative of them." Transportation of gas" is defined in 4 CSR 240-40.030(1)(B)27 as "the gathering, transmission, or distribution of gas by pipeline or the storage of gas in Missouri."

III. STAFF'S INVESTIGATION - ANALYSIS OF INCIDENT AND CONCLUSIONS

A. Natural Gas Escape and Ignition

Analysis:

At approximately 10:23 a.m. CDT on July 16, 2018, a natural gas fire occurred in and around an excavation near 1106 The Paseo in Kansas City, Missouri.[43] The approximate location is shown in Appendix B, Figure 1. At the time of the incident, a three-person Contractor work crew was assigned to tie-in[44] three new service lines to the natural gas main running parallel to The Paseo, and to abandon the existing services lines to 1100, 1106 and 1116 The Paseo.[45] The incident occurred while the Contractor work crew was abandoning the existing service line to 1106 The Paseo.[46]

An approximately 3-foot by 5-foot working space was excavated to a depth of about 3 feet to provide access to the service line and main[47] (See Appendix B, Figure 2 and Appendix C, Photograph 1). When the incident occurred, a member of the Contractor work crew ** _____ **, ("Contractor Employee A") was in the excavation working to abandon the service line, a contractor ** _____ **, ("Contractor Employee B") was standing nearby, and a contractor ** _____ **, ("Contractor Employee C") was in his company truck.[48] Two additional Contractor personnel were also working in the vicinity of 1106 The Paseo at the time of the incident: ** _____ ** ("Contractor Employee D") and ** _____ ** ("Contractor Employee E"). Contractor Employee D was walking back to 1106 The Paseo from his truck at the time of the incident.[49] Prior to the incident, Contractor Employee D was working on the meter set for 1106 The Paseo.[50]

[43] Spire response to Staff Data Requests 0051 and 0067.2.

[44] "Tie-in" means to attach a new service line to the main and allowing natural gas to flow through the new service line, thereby "tying-in" the service line to natural gas service.

[45] Spire response to Staff Data Request 0025.

[46] Spire response to Staff Data Request 0001.

[47] Spire response to Staff Data Request 0010.1 and Spire Attachment to response to Staff Data Request 0002.

[48] Spire response to Staff Data Requests 0003, 0003.1 and 0013.1.

[49] Spire response to Staff Data Request 0003.

[50] Spire response to Staff Data Request 0003.1.

Contractor Employee A cut the plastic portion of the existing service line with a ratchet pipe-cutting tool without stopping the flow of natural gas to the main or service line, which resulted in natural gas escaping from the open line into the atmosphere.[51] When Contractor Employee A was unable to insert a fitting into the open line to stop the flow of natural gas, he used an electric reciprocating saw[52] (See Appendix C, Photographs 1 and 2) to cut the steel portion of the service line. Within a few seconds (at around 10:23 a.m. CDT), an ignition occurred and the natural gas fire began resulting in serious burns to both Contractor Employee A and Contractor Employee B.[53]

Conclusion:

Natural gas escaped because the service line was cut without first stopping the flow of natural gas. The fire and resulting injuries occurred during the use of the electric reciprocating saw in a combustible atmosphere.

III. A. Natural Gas Escape and Ignition Staff Expert: Clinton L. Foster

B. Prevention of Accidental Ignition

Analysis:

4 CSR 240-40.030(13)(X) requires that each operator shall take steps to minimize the danger of accidental ignition of gas in any structure or area where the presence of gas constitutes a hazard of fire or explosion, including the following:

> 1. When a hazardous amount of gas is being vented into open air, each potential source of ignition must be removed from the area and a fire extinguisher must be provided;
>
> 2. Gas or electric welding or cutting may not be performed on any pipe or pipe components that contain a combustible mixture of gas and air in the area of work; and
>
> 3. Warning signs shall be posted, where appropriate.

[51] Spire Attachment to response to Staff Data Request 0025.

[52] In Spire responses and Attachments to Spire responses to Staff Data Requests, this tool is sometimes referred to as a "Sawzall."

[53] Based on Attachment to Spire response to Staff Data Request 0025.

Additionally, 4 CSR 240-40.030(12)(C)1. requires each operator to prepare and follow a manual of written procedures for conducting operations and maintenance activities[54] and for emergency response, and 4 CSR 240-40.030(1)(G)3. requires each operator to maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under 4 CSR 240-40.030. 4 CSR 240-40.030(12)(C)2.A. requires, among other things, that the procedural manual required by 4 CSR 240-40.030(12)(C)1. must include procedures for each applicable requirement in 4 CSR 240-40.030(13) to provide safety during maintenance and normal operations. This would include the requirements of 4 CSR 240-40.030(13)(X). Failure to follow a procedure that was written to comply with the requirements of 4 CSR 240-40.030(12)(C) is therefore a violation of 4 CSR 240-40.030(12)(C)1. and 4 CSR 240-40.030(1)(G)3.

Spire's procedures addressing the requirements of 4 CSR 240-40.030(13)(X) are in Spire Missouri West (formerly MGE) Construction Standard 2540D, Prevention of Accidental Ignition.[55]

Spire Missouri West (formerly MGE) Construction Standard 2540D requires, among other things that:

- Whenever it is necessary to perform any work in an area which might contain a gas-air mixture, certain precautionary steps shall be taken, including securing the immediate area from the general public (Standard 2540D, paragraph 2.7.1.1), and the use of signs and barricades at the job site (Standard 2540D, paragraph 2.7.1.2).
- Whenever it is necessary to perform any work in an area which might contain a gas-air mixture, a fire extinguisher shall be placed upwind and in close proximity to the job site so as to readily accessible in an emergency. In some cases, it may be prudent to request the fire department stand by at the location (Standard 2540D, paragraph 2.7.1.3).

[54] This manual is frequently referred to as an Operations and Maintenance ("O&M") Manual.

[55] A copy was provided by Spire in response to Staff Data Request 0009.

- When gas is being vented into the open air, potential sources of ignition shall be removed from the area (Standard 2540D, Section 2.3).

At the time of the incident, a fire extinguisher was at the jobsite in the vicinity of the excavation. The fire extinguisher was not used or attempted to be used to extinguish the fire.[56] However, during the Contractor's investigation of the failure, it was determined that the fire extinguisher was not properly charged at the time of the fire.[57] Spire stated in response to Staff Data Request 0037.1: "One day before the incident, [Contractor Employee C] told the [Contractor] general foreman that he needed to go to the yard to get a replacement fire extinguisher, but he failed to do so."[58]

Staff reviewed Spire Missouri West (formerly MGE) Construction Standard 2540D and found that it met the minimum requirements with respect to 4 CSR 240-40.030(12)(C)2.A. and 4 CSR 240-40.030(13)(X).

Staff investigated the actions taken during this incident. In Staff's opinion[59], the following actions were not in compliance with the requirements of 4 CSR 240-40.030(13)(X), or with Spire Missouri West (formerly MGE) Construction Standard 2540D procedures to ensure compliance with regulatory requirements.

1. Use of Electric Saw in a Hazardous Atmosphere

Once Contractor Employee A cut the plastic portion of the existing service line with a ratchet pipe-cutting tool, natural gas was escaping from the open line into the atmosphere. When this occurred, ignition sources should have been removed from the area and no electric cutting should have been performed. The use of an electric reciprocating saw in this environment was a violation of 4 CSR 240-40.030(13)(X)1., which requires that each potential source of ignition be removed from the area when a hazardous amount of gas is being vented into open air, and 4 CSR 240-40.030(13)(X)2., which prohibits electric cutting on any pipe or pipe components that contain a combustible mixture of gas and air in the area of work.

[56] Spire response to Staff Data Request 0033.

[57] Spire response to Staff Data Request 0037.

[58] Spire response to Staff Data Request 0037.1.

[59] As supported by Spire's responses to Staff Data Requests 0031, 0037.2, 0038, 0040.1, 0049, and 0055, and the Exhibit Spire provided in response to Staff Data Request 0067.2.

2. Failure to Provide a Working Fire Extinguisher

4 CSR 240-40.030(13)(X)1. requires that a fire extinguisher must be provided when a hazardous amount of gas is being vented into open air. Paragraph 2.7.1.3 of Spire Missouri West (formerly MGE) Construction Standard 2540D requires that whenever it is necessary to perform any work in an area which might contain a gas-air mixture, a fire extinguisher shall be placed upwind and in close proximity to the job site so as to be readily accessible in an emergency. Staff's position is that to comply with these requirements, the fire extinguisher must be properly charged, and available for use. Failure to provide a working fire extinguisher was a violation of 4 CSR 240-40.030(13)(X)1.

Staff also investigated if Spire had furnished its procedures to the Contractor, and whether Contractor employees had been provided with training and the equipment necessary to implement the procedures.

Spire stated that it provided the Contractor with the entire O&M manual[60], including the Emergency Plan on December 15, 2016, and has provided the Contractor with updated Standards, as changes are made, since that time.[61]

At the time of the incident, Spire required the Contractor's employees to follow both the Spire Missouri West Operator Qualification ("OQ") Program and the Contractor's own Operator Qualification Program.[62] According to Spire, the Contractor is responsible for providing training on Spire procedures to its employees.[63] The Spire individuals who conducted the initial review of the Contractor's OQ program are no longer with Spire, and therefore the scope of those individuals' study is not known.[64]

According to information provided by Spire, each member of the Contractor work crew was trained on the operation of a fire extinguisher and was trained to verify full charge.[65]

[60] 4 CSR 240-40.030(12)(C)1. requires each operator to prepare and follow a manual of written procedures for conducting operations and maintenance activities. This manual is frequently referred to as an operations and maintenance ("O&M") manual.

[61] Spire responses to Staff Data Requests 0022 and 0023.

[62] Spire response to Staff Data Request 0039.1.

[63] Spire response to Staff Data Request 0022.

[64] Spire response to Staff Data Request 0040.

[65] Spire response to Staff Data Request 0010.2.

According to the Contractor, the fire extinguisher was not retained following the incident,[66] therefore no testing of the fire extinguisher could be performed after the incident.

Conclusion:

1. The electric reciprocating saw was the probable source of ignition in this incident.
2. The use of an electric reciprocating saw in the conditions present at the time of the incident was a violation of 4 CSR 240-40.030(13)(X)1.,[67] 4 CSR 240-40.030(13)(X)2.[68] and Spire Missouri West (formerly MGE) Standard 2540D, a procedure that is in place to meet the requirements of 4 CSR 240-40.030(13)(X) as required by 4 CSR 240-40.030(12)(C)2.A.[69]
3. Failure to have a working fire extinguisher available at the job site was a violation of 4 CSR 240-40.030(13)(X)1.,[70] and Spire Missouri West (formerly MGE) Standard 2540D, a procedure that is in place to meet the requirements of 4 CSR 240-40.030(13)(X) as required by 4 CSR 240-40.030(12)(C)2.A.[71]

III. B. Prevention of Accidental Ignition Staff Experts: Brian J. Buchanan and Kathleen A. McNelis, PE

[66] Spire response to Staff Data Request 0010.2.

[67] 4 CSR 240-40.030(13)(X)1. requires that when a hazardous amount of gas is being vented into open air, each potential source of ignition must be removed from the area and a fire extinguisher must be provided.

[68] 4 CSR 240-40.030(12)(X)2. states that gas or electric welding or cutting may not be performed on pipe or on pipe components that contain a combustible mixture of gas in are in the area of work.

[69] Since 4 CSR 240-40.030(12)(C)2.A. requires that a procedure must be included, if applicable, in the manual required by paragraph 4 CSR 240-40.030(12)(C)1. to provide safety during maintenance and normal operations, failing to follow that procedure is also a violation of 4 CSR 240-40.030(12)(C)1., which requires that each operator follow its manual of written procedures. Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow this procedure is a violation of 4 CSR 240-40.030(1)(G)3.

[70] 4 CSR 240-40.030(13)(X)1. requires that when a hazardous amount of gas is being vented into open air, each potential source of ignition must be removed from the area and a fire extinguisher must be provided.

[71] Since 4 CSR 240-40.030(12)(C)2.A. requires that a procedure must be included, if applicable, in the manual required by paragraph 4 CSR 240-40.030(12)(C)1. to provide safety during maintenance and normal operations, failing to follow that procedure is also a violation of 4 CSR 240-40.030(12)(C)1., which requires that each operator follow its manual of written procedures. Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow this procedure is a violation of 4 CSR 240-40.030(1)(G)3.

C. Protection of Personnel

Analysis:

- 4 CSR 240-40.030(12)(C)1. requires each operator to prepare and follow a manual of written procedures for conducting operations and maintenance activities and for emergency response.
- 4 CSR 240-40.030(1)(G)3. requires each operator to maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under 4 CSR 240-40.030.
- One of the required procedures (4 CSR 240-40.030(12)(C)2.J.) is for taking adequate precautions in excavated trenches to protect personnel from the hazards of unsafe accumulations of vapor or gas, and making available, when needed at the excavation, emergency rescue equipment including a breathing apparatus and a rescue harness and line.

Spire's procedures addressing the requirements of 4 CSR 240-40.030(12)(C)2.J. are in Spire Missouri West (formerly MGE) O&M Standard 3545D, Hazardous Atmospheres.[72]

These procedures require among other things:

- Atmospheres where a hazardous atmosphere exist or could reasonably be expected to exist, such as in or around excavations and confined spaces, shall be tested before employees enter (Standard 3545D, Section 3.0);
- In all excavations where there is reason to suspect the presence of a flammable gas (e.g., leak repair), the atmospheric environment in and around the excavation shall be tested with a combustible gas indicator ("CGI") before personnel are allowed access (Standard 3545D, Section 5.2);
- When workers are required to be within the hazardous environment there must be an additional person assigned to observe the workers' activities and warn about changes in conditions or initiate rescue activities if necessary (Standard 3545D, Section 5.4);

[72] A copy was provided in response to Staff Data Request 0010.

- In atmospheres that have been identified as hazardous additional Personal Protective Equipment ("PPE") shall include, but may not be limited to, fire retardant suit and hood, respiratory protection and rescue equipment in addition to the Personal Protective Equipment items normally required for the tasks being performed (Standard 3545D, Section 6.0); and
- A fire extinguisher shall be placed at a location upwind of the excavation and shall be staffed by an employee trained in the operation of a fire extinguisher (Standard 3545D, Section 7.2).

In response to a Staff data request asking for an explanation of how the hazardous atmosphere testing was conducted for the excavation at 1106 The Paseo, Spire responded: "Based on the [Spire] incident investigation, proper procedures were not followed at this location; therefore, hazardous atmosphere testing was not conducted but ** _____ _____ ** were trained on these procedures."[73]

Although a fire extinguisher was provided, Spire stated that it was not properly charged at the time of the fire, and that Contractor Employee C was aware that it was not ready for use.[74]

Spire's response to Staff Data Request 0010.3 indicated that Contractor Employee C failed to assign an additional person to observe the worker's activities and warn about changes in conditions.

Although a fire-resistant suit, fire-resistant hood, and an Allergo Model A-300 supplied air respirator were available at the construction site at the time of the incident, the Contractor work crew did not utilize this equipment.[75] The Contractor work crew did not have a safety retrieval harness and life lines available at the site.[76]

According to information provided by Spire, all members of the Contractor work crew were trained in the operation of a fire extinguisher and were trained to verify full charge and proper visual inspection on a daily basis and a monthly documented inspection.[77] Annual fire

[73] Spire response to Staff Data Request 0010.2.
[74] Spire response to Staff Data Request 0037.
[75] Spire response to Staff Data Request 0025.
[76] Spire response to Staff Data Request 0010.3.
[77] Spire response to Staff Data Request 0010.2.

extinguisher inspections by a third-party are maintained on the inspection tag for each fire extinguisher. The monthly inspections are also documented on the inspection tag.[78]

Since the acquisition of Missouri Gas Energy by Spire, Spire has reviewed Spire Missouri West (formerly MGE) policies and procedures with all contractors through training and has provided them with an electronic copy of all applicable procedures.[79]

Staff reviewed Spire Missouri West (formerly MGE) O&M Standard 3545D and found that it met the minimum requirements with respect to 4 CSR 240-40.030(12)(C)2.J.

In Staff's opinion, the following actions or failures to act were not in compliance with Spire's procedures in Spire Missouri West (formerly MGE) O&M Standard 3545D that are required to be followed by 4 CSR 240-40.030(12)(C)1.:

1. *Failure to Test the Atmosphere for Combustible Mixture of Gas*

Section 5.2 of Spire Missouri West (formerly MGE) O&M Standard 3545D, Hazardous Atmospheres (Spire's procedure to comply with the requirements of 4 CSR 240-40.030(12)(C)2.J.) requires that in all excavations where there is reason to suspect the presence of a flammable gas (e.g., leak repair), the atmospheric environment in and around the excavation shall be tested with a CGI before personnel are allowed access.

Since natural gas was escaping from the open line into the atmosphere of the excavation, there was reason to suspect the presence of a flammable gas. In response to a Staff data request asking for an explanation of how the hazardous atmosphere testing was conducted for the excavation at 1106 The Paseo, Spire responded: "Based on the incident investigation, proper procedures were not followed at this location; therefore, hazardous atmosphere testing was not conducted."[80]

The atmosphere in the excavation was hazardous as demonstrated by the ignition and fire. Based on Staff's investigation, the hazardous atmosphere was not tested with a CGI as required by Spire's procedure. Failure to follow this procedure is a violation of 4 CSR 240-40.030(12)(C)1.

[78] Spire response to Staff Data Request 0036.3.
[79] Spire response to Staff Data Request 0040.
[80] Spire response to Staff Data Request 0010.2.

2. Failure to Provide a Working Fire Extinguisher

Section 7.2 of Spire Missouri West (formerly MGE) O&M Standard 3545D, Hazardous Atmospheres (Spire's procedure to comply with the requirements of 4 CSR 240-40.030(12)(C)2.J.) requires that a fire extinguisher shall be placed at a location upwind of the excavation and shall be staffed by an employee trained in the operation of a fire extinguisher.

Since gas was escaping from the open line into the atmosphere of the excavation, it would be reasonable to expect that a hazardous atmosphere could exist. Although a fire extinguisher was provided, Spire stated that it was not properly charged at the time of the fire, and that Contractor Employee C was aware that it was not ready for use.[81] Thus it appears that a working fire extinguisher was not provided at the excavation as required by Spire's procedure. Failure to follow this procedure is a violation of 4 CSR 240-40.030(12)(C)1.

3. Failure to Assign Additional Person to Observe Work in Hazardous Environment.

Section 5.4 of Spire Missouri West (formerly MGE) O&M Standard 3545D, Hazardous Atmospheres (Spire's procedure to comply with the requirements of 4 CSR 240-40.030(12)(C)2.J.) requires that when workers are required to be within a hazardous environment there must be an additional person assigned to observe the workers' activities and warn about changes in conditions or initiate rescue activities if necessary.

Since gas was escaping from the open line into the atmosphere of the excavation, it would be reasonable to expect that a hazardous environment could exist. Based on Staff's investigation, no additional person was assigned to observe the worker's activities and warn about changes in conditions as required by Spire's procedure. Failure to follow this procedure is a violation of 4 CSR 240-40.030(12)(C)1.

4. Failure to Use Required Personal Protective Equipment

Section 6.0 of Spire Missouri West (formerly MGE) O&M Standard 3545D, Hazardous Atmospheres (Spire's procedure to comply with the requirements of 4 CSR 240-40.030(12)(C)2.J.) requires that in atmospheres that have been identified as hazardous, additional Personal Protective Equipment ("PPE") shall include, but may not be limited to, fire

[81] Spire response to Staff Data Request 0037.

retardant suit and hood, respiratory protection and rescue equipment in addition to the PPE items normally required for the tasks being performed.

Although the Contractor work crew did not conduct the appropriate testing to identify the atmosphere as hazardous (See above III.B. *Prevention of Accidental Ignition*), the presence of blowing natural gas in an excavation could reasonably be assumed to be a hazardous atmosphere in the absence of testing. The ignition that resulted in this incident confirmed that a hazardous atmosphere was present. A fire-resistant suit, fire-resistant hood, and an Allergo Model A-300 supplied air respirator were available at the construction site at the time of the incident,[82] but the Contractor work crew did not use this equipment[83] as required by Spire's procedure. The Contractor work crew did not have a safety retrieval harness and life lines available at the site[84] as required by Spire's procedure. Failure to follow this procedure is a violation of 4 CSR 240-40.030(12)(C)1.

Staff also investigated if Spire had furnished its procedures to the Contractor, and whether Contractor employees had been provided with training and the equipment necessary to implement the procedures. According to information provided by Spire, Spire provided the Contractor with the entire O&M manual, including the Emergency Plan on December 15, 2016, and has provided the Contractor with updated Standards, as changes are made, since that time.[85]

According to information provided by Spire, each member of the Contractor work crew was trained on:

a. Procedures to test for hazardous atmospheres.[86]
b. Use of PPE.[87]
c. The operation of a fire extinguisher and to verify full charge and proper visual inspection on a daily basis with a monthly documented inspection and annual third-party inspection.[88]

[82] Spire response to Staff Data Request 0010.3.
[83] Spire response to Staff Data Request 0025.
[84] Spire response to Staff Data Request 0010.3.
[85] Spire responses to Staff Data Requests 0022 and 0023.
[86] Spire responses to Staff Data Requests 0010, 0010.1 and 0010.2.
[87] Spire response to Staff Data Request 0010.3, 0010.4 and 0031.2.
[88] Spire response to Staff Data Request 0010.2.

According to information provided by Spire, at the time of the incident, the Contractor work crew was provided with the following equipment:

a. A Bascom-Turner, Gas Sentry CGI-201[89] for testing hazardous atmospheres.
b. A fire-resistant suit, a fire-resistant hood, and an Allergo Model A-300 supplied air respirator available to them at the construction site at the time of the incident.[90]
c. A fire extinguisher.

However, it was determined during the investigation that the fire extinguisher was not properly charged at the time of the fire.[91] Further, according to information provided by Spire, the Contractor work crew did not have a safety retrieval harness and life lines available at the site at the time of the incident.[92]

Conclusion:

1. Failure to follow Spire Missouri West (formerly MGE) O&M Standard 3545D, that was written for compliance with the requirements of 4 CSR 240-40.030(12)(C)2.J., was a likely contributing factor to the incident. If the required procedures had been followed to protect personnel working in trenches from the hazards of unsafe accumulations of natural gas, injuries from the fire could have been avoided or been less severe.
2. Failure to follow Spire Missouri West (formerly MGE) O&M Standard 3545D that was written for compliance with the requirements of 4 CSR 240-40.030(12)(C)2.J. was a violation of 4 CSR 240-40.030(12)(C)1.[93]

III. C. Protection of Personnel Staff Experts: Brian J. Buchanan and John D. Kottwitz

[89] Spire response to Staff Data Request 0010.3.

[90] Spire response to Staff Data Request 0010.3.

[91] Spire response to Staff Data Request 0037.

[92] Spire response to Staff Data Request 0010.3.

[93] Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow the procedure is additionally a violation of 4 CSR 240-40.030(1)(G)3.

D. Mechanical Joining

Analysis:

4 CSR 240-40.030(6)(B)2. requires that each joint must be made in accordance with written procedures that have been proved by test or experience to produce strong gastight joints. Specific requirements for joining plastic pipe are provided in 4 CSR 240-40.030(6)(F). Specific requirements related to joining plastic pipe with mechanical joints are provided in 4 CSR 240-40.030(6)(F)4. Additionally, the general requirements for connections to main piping are provided in 4 CSR 240-40.030(8)(J).

4 CSR 240-40.030(1)(G)3. requires that each operator shall maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule. Spire's procedure to comply with the requirements of 4 CSR 240-40.030(6)(B) General, (6)(F) Plastic Pipe, and (8)(J) Service Lines is provided in Spire Missouri West (formerly MGE) Construction Standard 2240E. Paragraph 7.3.1[94] of Spire Missouri West (formerly MGE) Construction Standard 2240E, Mechanical Joining, requires that the flow of gas be terminated when PE pipe size ½-inch CTS[95] ("Copper Tube Size") through 2-inch IPS[96] ("Iron Pipe Size") are to be joined using a Permasert™ coupling[97].

Based on the response to Staff Data Request 0025, at the time of the incident, the Contractor employee completing the abandonment of the existing service line to 1106 The Paseo was attempting to install a Permasert™ coupling as a cap for the 2-inch diameter plastic stub remaining on the main from the existing service line.

Spire's procedure (Spire Missouri West (formerly MGE) Construction Standard 2240E) requires that when using a Permasert™ coupling to join pipe of this size, the flow of gas must be terminated. The method employed by the Contractor work crew to install the Permasert™

[94] In response to Staff Data Request 0063, Spire indicated that the sections of Spire Missouri West (formerly MGE) Construction Standard 2240E that were applicable to the work being completed at 1106 The Paseo were Section 2.0-General and Section 7.0-Mechanical Joints for Plastic.

[95] CTS means Copper Tube Size. CTS polyethylene pipe is sized like copper pipe and is also manufactured with the Outside Diameter (OD) as the controlling dimension. Copper Tube Size or CTS pipe is commonly referred to as tubing.

[96] IPS means Iron Pipe Size. Polyethylene pipe sizes identified by IPS diameters designate the nominal inside diameter for 12-inch and smaller IPS pipe, and outside diameter for 14-inch and larger IPS pipe.

[97] Permasert™ is a registered trademark for a type of mechanical coupling manufactured by Elster Perfection.

coupling did not include terminating the flow of natural gas and was therefore inconsistent with Spire's procedure established to comply with the requirements of 4 CSR 240-40.030(6)(B)2.

Conclusion:

At the time the incident occurred, the Contractor was attempting to install a mechanical joint in a manner that violated Spire Missouri West (formerly MGE) Construction Standard 2240E, a procedure in place to comply with the requirements of 4 CSR 240-40.030(6)(B)2.,[98] which requires that each joint must be made in accordance with written procedures that have been proved by test or experience to produce strong gastight joints.

III. D. Mechanical Joining Staff Experts: Clinton L. Foster and Kathleen A. McNelis, PE

E. Operator Qualifications ("OQ")

Analysis:

4 CSR 240-40.030(12)(D) Qualification of Pipeline Personnel prescribes the minimum requirements for operator qualification of individuals performing covered tasks on a pipeline facility including contractors acting on behalf of the operator.[99] A summary of the relevant requirements and definitions in 4 CSR 240-40.030(12)(D) can be found in Appendix E of this Report. Spire provided copies of ** _____ _____ ** and ** _____ ____ ** in response to Staff Data Request 0039. These documents are the standards used by Spire and ** _____ ** to comply with the requirements of 4 CSR 240-40.030(12)(D).

Contractor employees were required to follow ** _____ _____ ** and were expected to follow ** _____ **.[100] ** _____

[98] Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to follow the procedure is additionally a violation of 4 CSR 240-40.030(1)(G)3.

[99] 4 CSR 240-40.030(12)(D)1.A.states, "This subsection applies to all individuals who perform covered tasks, regardless of whether they are employed by the operator, a contractor, a subcontractor, or any other entity performing covered tasks on behalf of the operator."

[100] Spire response to Staff Data Request 0039.1.

_____
_____[101] _____
_____[102] _____
_____ **[103]

Spire indicated that a review of the Contractor's operator qualification program, ** _____ **, was completed by Spire at some point prior to the Contractor performing any work on Spire's pipeline facilities, but the individuals who conducted the initial review are no longer with Spire, and the scope of these individuals' examination is unknown.[104] Spire has not conducted a subsequent review of the Contractor's operator qualification program.[105]

Spire stated that in order to ensure through evaluation that Contractor employees are qualified and have the necessary knowledge and skills to perform tasks in a manner that ensures the safe operation of pipeline facilities; Spire has reviewed Spire policies and procedures with all contractors through training and has provided them with an electronic copy of all applicable Spire procedures.

4 CSR 240-40.030(12)(D)8.A.(II) requires that qualification records shall include identification of the covered tasks the individual is qualified to perform. Staff requested from Spire the identification of the covered tasks each Contractor employee working at the project at the 1100 block of The Paseo was qualified to perform.[106] In response, Spire provided qualification records of the individuals performing the covered tasks at the project at the 1100 block of The Paseo.[107] The records indicated that Contractor Employee A completed qualification evaluations through ENERGY WorldNet, Inc. ("EWN"), and Contractor

[101] 4 CSR 240-40.030(12)(D)1.B. defines covered task as an activity, identified by the operator, that: (I) Is performed on a pipeline facility; (II) Is an operations, maintenance or emergency-response task; (III) Is performed as a requirement of 4 CSR 240-40.030; and (IV) Affects the operation or integrity of the pipeline.

[102] The Attachment to the Spire response to Staff Data Request 0039 indicates that any reference to Missouri Gas Energy in the Attachment now refers to Spire Missouri West.

[103] Attachment to Spire response to Staff Data Request 0039.

[104] Spire response to Staff Data Request 0040.

[105] Spire response to Staff Data Request 0040.1.

[106] Spire response to Staff Data Request 0026.5.

[107] Spire response to Staff Data Requests 0026, 0026.1, 0026.2, 0026.3, 0026.4.

Employee C completed qualification evaluations through MEA Energy Association ("MEA")[108]. The records indicated that Contractor Employee E completed qualification evaluations through EWN and MEA. Spire stated that Contractor Employee B and Contractor Employee D had not yet been qualified to perform any covered tasks.[109]

A detailed description of the operator qualification records for each Contractor employee as well as that of the Spire Contract Inspector assigned to the project can be found in Appendix A, Section K Operator Qualification [4 CSR 240-40.030(12)(D)] of this Report.

In response to Staff Data Request 0041, Spire stated that it expected the covered tasks of squeeze-off of main pipe,[110] service abandonment, service installation, and an increase in operating pressure of existing plastic main to be performed during the project at the 1100 block of The Paseo. Spire expected these covered tasks to be performed based on a verbal discussion between the Spire Contract Inspector and the Contractor, however Spire also stated that the Contractor may deviate from the discussed plan at its discretion provided proper Spire procedures are followed.[111] Spire indicated that no documentation of Spire's expectations of which covered tasks the Contractor will perform was provided to the Contractor.[112] Spire also stated that the covered tasks of service abandonment, live gas work, squeeze off of main pipe, and service installation were actually performed during the project at the 1100 block of The Paseo.[113]

Spire indicated that an investigation was conducted to determine if the performance of any covered task(s) caused or contributed to this incident.[114] Spire stated, "The Company's and Contractor's investigation determined that the cause of the incident was that proper procedures were not followed in that the covered task was performed using a Sawzall. The individuals

[108] EWN and MEA are third party providers of operator qualification evaluations, each with differing training methods and evaluations. The difference in the two means that, although an individual can be qualified to perform the same covered task under each provider, the evaluations required will be different for that same covered task.

[109] Spire response to Staff Data Requests 0026.2 and 0026.4.

[110] A squeeze-off of pipe utilizes a clamping tool to constrict the pipe so that natural gas can no longer freely flow past the tool.

[111] Spire response to Staff Data Request 0058.

[112] Spire response to Staff Data Request 0058.

[113] Spire response to Staff Data Request 0041.

[114] Spire response to Staff Data Request 0043.

involved were either terminated or suspended from further work until requalification was completed under the OQ program requirements."[115] Spire also stated with respect to Contractor Employee A, "The training and qualification of this individual were sufficient at the time he was trained and qualified. It is the Company's [Spire's] policy to revoke the qualifications of any individual who is found to have not followed Company [Spire] procedures in the field. Such employees must be re-trained and re-qualified prior to returning to the performance or supervision of field work."[116]

4 CSR 240-40.030(12)(D)4.B. requires that personnel to whom 4 CSR 240-40.030(12)(D) applies must possess the knowledge and skills necessary to carry out the procedures in the procedural manual for operations, maintenance and emergencies established under 4 CSR 240-40.030(12)(C)[117] that relate to the covered tasks they perform.

In order to ensure that the Contractor employees working at 1106 The Paseo possessed the knowledge and skills necessary to carry out the procedures in the procedural manual for operations, maintenance and emergencies, Spire stated, "The Company inspector[118] verifies OQ records[119] for all individuals assigned to a project prior to commencement of work. As part of operator qualification, contractor personnel were evaluated on the knowledge and skills necessary to carry out the procedures in the procedural manual for operations, maintenance and emergencies established by the Company that relate to the covered tasks they perform."[120] In addition to the responsibility of verifying OQ records concerning the individuals assigned to a project, the Spire Contract Inspector is responsible for ensuring that qualified individuals possess the knowledge and skills necessary to recognize and react to abnormal operating conditions, to recognize potential ignition sources, to recognize conditions that would likely cause emergencies, including equipment or facility malfunctions or failure and gas leaks, in order to predict the potential consequence of these conditions and take appropriate corrective

[115] Spire response to Staff Data Request 0043.

[116] Spire response to Staff Data Requests 0025 and 0038.4.

[117] 4 CSR 240-40.030(12)(C) requires that, among other things, an operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response.

[118] "Company inspector" is the same Spire Contract Inspector mentioned above.

[119] Spire response to Staff Data Request 0026.

[120] Spire response to Staff Data Request 0044.

action, and to take steps necessary to control any accidental release of gas and to minimize the potential for fire or explosion.[121]

Spire indicated that the Contractor work crew had been trained to utilize instruments and equipment that relate to the covered tasks they perform in accordance with manufacturer's instructions.[122] Spire further stated that, in order to ensure that the Contractor individuals working at 1106 The Paseo possessed the knowledge and skills necessary to know the proper use of firefighting procedures and equipment, fire suits, and breathing apparatus, ** _____ ** new hire safety orientation discusses the general principles of fire extinguisher operation, and the natural gas presentation in the orientation discusses controlling ignition sources in an emergency situation.[123]

Spire provided documentation pertaining to the new hire safety orientation of the three individuals working on the Contractor work crew at 1106 The Paseo in response to Staff Data Request 0048.2.

** _____
_____
_____
_____
_____
_____
_____
_____
_____ **[124]

Staff reviewed the ** _____ _____ ** and determined that it complied with the program requirements of 4 CSR 240-40.030(12)(D)3. The ** _____

[121] As stated in Spire responses to Staff Data Requests 0015, 0042, 0045, 0046, and 0047.

[122] Spire response to Staff Data Request 0010.3. Instruments and equipment included in this response are a Bascom-Turner, Gas Sentry CGI-201 (Combustible Gas Indicator), fire-resistant suit and hood, and an Allegro Model A-300 supplied air respirator.

[123] Stated in Spire response to Staff Data Request 0048.

[124] Attachment to Spire response to Staff Data Request 0039.

____ ** provided to Staff does not adequately meet all the program requirements of 4 CSR 240-40.030(12)(D)3.; however, in response to Staff Data Request 0039.1, Spire stated that ** _____ ** employees were required to follow the ** _____ _____ ** and were expected to follow ** _____ **. Since Contractor Employees A, B, C, D, and E were required to follow Spire Missouri West (formerly MGE) Administrative Standard 4150E, in Staff's opinion, the requirements of 4 CSR 240-40.030(12)(D)3 were met.

Staff also reviewed the following documents provided by Spire:

- A list of the covered tasks Spire expected to be performed by the Contractor work crew at the project at the 1100 block of The Paseo,
- A list of the covered tasks that were actually performed by the Contractor work crew at the project at the 1100 block of The Paseo,
- Spire required evaluations for an individual to be considered qualified for each of the covered tasks expected to be performed and those actually performed, and
- The documented training and evaluations completed by Contractor Employees A, B, C, D and E and Spire's Contractor Inspector.

Based on Staff's review of the provided records, at the time of the incident, Contractor Employee A was qualified to perform the covered tasks of squeeze-off of main pipe for plastic pipe, service abandonment, increase in operating pressure of existing plastic main, and live gas work. Contractor Employee A was not qualified to perform the covered task of service installation based on the records provided by Spire, but Spire stated that Contractor Employee A did not perform the covered task of service installation during the project at the 1100 block of The Paseo.

Contractor Employee C was qualified to perform the covered tasks of squeeze-off of main pipe for plastic pipe, service abandonment, service installation, increase in operating pressure of existing plastic main, and live gas work.

Contractor Employee E came to the aid of Contractor Employee A to perform the covered task of squeeze-off of main pipe on a plastic pipe; however, Contractor Employee E

was not qualified to perform the covered task of squeeze-off of main pipe on a plastic pipe based on records provided by Spire.

4 CSR 240-40.030(12)(D)3.C. says that each operator's operator qualification program shall include provisions to allow individuals that are not qualified to perform a covered task to do so, if directed and observed by a qualified individual. Staff concludes that although Contractor Employee E was not qualified to perform the covered task of squeeze-off of main pipe on a plastic pipe, Contractor Employee A was qualified to perform this task, was nearby to Contractor Employee E while he was performing this covered task, and could direct and observe him.

Spire indicated that Contractor Employees B and D had not completed qualification evaluations and were working under the span of control[125] of qualified individuals. Staff found no evidence to the contrary.

Staff did not find any violations of training and evaluation requirements of 4 CSR 240-40.030(12)(D)4. with respect to the individuals performing the covered tasks to which they were assigned.

Spire also provided operator qualification requirements for an individual to be considered qualified to perform the work required of Spire Contract Inspectors. Spire also provided the qualification records for the Spire Contract Inspector assigned to the project at the 1100 block of The Paseo. Staff found that, at the time of the incident, the Spire Contract Inspector assigned to the project at the 1100 block of The Paseo was qualified to perform the work required of Spire Contract Inspectors.

Staff was provided qualification records related to the covered tasks.[126] Staff did not find violations of the record keeping requirements of 4 CSR 240-40.030(12)(D)8.; however, it was not abundantly clear in the records provided to Staff as to the identification of the covered

[125] Span of control is a term used to indicate that someone was being directed and observed by another individual. 4 CSR 240-40.030(12)(D)3.D. is relevant in that it requires that each operator's written qualification program include provisions to allow individuals that are not qualified pursuant to 4 CSR 240-40.030(12)(D) to perform a covered task if directed and observed by an individual that is qualified.

[126] As required by 4 CSR 240-40.030(12)(D)8.

tasks the individuals involved were qualified to perform.[127] Staff was able to ascertain this information through analysis of these records and through follow-up data requests to Spire.

Staff attempted to compare a list of the minimum required training and qualifications that individuals were expected to have in order to perform the covered tasks to the actual training and qualifications of the individuals who performed or were expected by Spire to perform these tasks. Staff discovered:

1. The covered task list in Section 9.0 of ** _____ _____ _____ _____ _____ **
2. For the individuals involved in this incident, training and evaluations were performed by two different recognized training providers: EWN and MEA.
3. ** _____ _____ _____ _____ **

Conclusion:

During its investigation, Staff reviewed the Company's lists of required training and qualifications as set forth in ** _____ _____ ** for the covered tasks that Spire expected to be performed, or were actually performed by the Contractor work crew at the project at the 1100 block of The Paseo.

Staff did not find any violation with respect to Spire's actions to comply with the requirements of 4 CSR 240-40.030(12)(D), or its procedures in ** _____ _____ **. However, since the Spire Contract Inspectors are tasked with determining the qualifications of

[127] As required by 4 CSR 240-40.030(12)(D)8.A.(II).

contractor field crews, it would be beneficial to have a straightforward method for the Contract Inspectors to determine what specific written and performance evaluations are required for each applicable recognized training provider to qualify individuals to perform covered tasks. Staff has recommendations that are aimed at clarification of the covered task list (See Section IV STAFF RECOMMENDATIONS).

III. E. Operator Qualifications ("OQ") Staff Expert: Clinton L. Foster

F. Emergency Plans and Actions Required

Analysis:

4 CSR 240-40.030(12)(J)1. requires each operator to establish written procedures to minimize the hazard resulting from a gas pipeline emergency. The procedures must provide for the following:

A. Receiving, identifying, and classifying notices of events which require immediate response by the operator;

B. Establishing and maintaining adequate means of communication with appropriate fire, police, and other public officials;

C. Responding promptly and effectively to a notice of each type of emergency, including the following:

(I) Gas detected inside or near a building;

(II) Fire located near or directly involving a pipeline facility;

(III) Explosion occurring near or directly involving a pipeline facility; and

(IV) Natural disaster;

D. Making available personnel, equipment, tools, and materials, as needed at the scene of an emergency;

E. Taking actions directed toward protecting people first and then property;

F. Causing an emergency shutdown and pressure reduction in any section of the operator's pipeline system necessary to minimize hazards to life or property;

G. Making safe any actual or potential hazard to life or property;

H. Notifying appropriate fire, police, and other public officials of gas pipeline emergencies and coordinating with them both planned responses and actual responses during an emergency;

I. Safely restoring any service outage;

J. Beginning action under subsection (12)(L) [Investigation of Failures] (192.617), if applicable, as soon after the end of the emergency as possible; and

K. Actions required to be taken by a controller during an emergency in accordance with subsection (12)(T) [Control Room Management].

Spire stated that it provided the Contractor with the entire O&M manual, including the Emergency Plan on December 15, 2016, and has provided the Contractor with updated Standards since that time as changes are made.[128]

The Contractor was required to follow the Spire Missouri West (formerly MGE) O&M Standard 3110V.[129] Spire currently effective Emergency Plan, Spire Missouri West (formerly MGE) O&M Standard 3110V effective date 3-24-2017, was provided as an attachment to Spire's response to Staff Data Request 0022. Staff reviewed Spire Missouri West (formerly MGE) O&M Standard 3110V and found that it meets the minimum requirements of 4 CSR 240-40.030(12)(J)1. Based on Staff's investigation, Spire's actions in response to this incident (See Appendix A, Section I) were consistent with the requirements of 4 CSR 240-40.030(12)(J)1.

Conclusion:

Staff found that Spire's procedures and actions were consistent with the requirements of 4 CSR 240-40.030(12)(J) with respect to its emergency response procedures and actions.

III. F. Emergency Plans and Actions Required Staff Expert: Brian J. Buchanan

G. Drug and Alcohol Testing

Analysis:

Missouri pipeline safety rules adopt the Federal Drug and Alcohol Testing regulations[130] by reference.[131] At the time the incident occurred, the then currently effective Commission

[128] Spire responses to Staff Data Requests 0022 and 0023.

[129] Based on Spire response to Staff Data Request 0022.1.

[130] 49 Code of Federal Regulations ("CFR") parts 40 and 199, effective October 1, 2015, incorporated by reference by the Commission at the time of the incident, July 16, 2018.

[131] Commission Rule 4 CSR 240-40.080(1).

Rules had adopted the Code of Federal Regulations ("CFR") dated October 1, 2015, 49 CFR parts 40 and 199.[132]

49 CFR 199.101 requires each operator to maintain and follow a written anti-drug plan that conforms to Part 199 and the Department of Transportation ("DOT") Procedures.[133] 49 CFR 199.202 requires each operator to maintain and follow a written alcohol misuse plan that conforms to Part 199 and the DOT Procedures.

4 CSR 240-40.080(4)(B) states that the references to "accident" in Section 199.105 and 199.225 should refer to a "federal incident reportable under 4 CSR 240-40.020".

49 CFR 199.3 defines "employee" and "covered employee" to include contractors engaged by operators:

> Covered employee, employee, or individual to be tested means a person who performs a covered function, including persons employed by operators, contractors engaged by operators, and persons employed by such contractors.

49 CFR 199.3 defines "covered function" as follows:

> Covered function means an operations, maintenance, or emergency-response function regulated by part 192, 193, or 195 of this chapter that is performed on a pipeline or on an LNG facility.

With respect to contractor employees, 49 CFR 199.115 and 199.245 provide that an operator may provide by contract that the drug and alcohol testing, education and training required by 49 CFR 199 be carried out by the contractor, provided that the operator remains responsible for ensuring compliance with the requirements of Parts 199 and 40.

Drug tests are required for covered employees: pre-employment, post-accident and at any time during employment as part of a pool of covered employees subject to random selection for testing:

- Pre-employment: 49 CFR 199.105(a) requires that: "No operator may hire or contract for the use of any person as an employee unless that person

[132] Subsequent to the incident, Commission adopted more recent Federal amendments in File No. GX-2018-0279, effective January 30, 2019.

[133] 49 CFR 199.3 defines DOT procedures to mean the Procedures for Transportation Workplace Drug and Alcohol Testing Programs published by the Office of the Secretary of Transportation in part 40 of Title 49.

passes a drug test or is covered by an anti-drug program that conforms to the requirements of this part."

- Randomly during employment: 49 CFR 199.105(c) provides that "except as provided in paragraphs (c)(2) through (4) of this section, the minimum annual percentage rate for random drug testing shall be 50 percent of covered employees."
- Post-Accident: 49 CFR 199.105(b) provides the post-accident[134] drug testing requirements: "As soon as possible but no later than 32 hours after an accident, an operator shall drug test each employee whose performance either contributed to the accident or cannot be completely discounted as a contributing factor to the accident. An operator may decide not to test under this paragraph but such a decision must be based on the best information available immediately after the accident that the employee's performance could not have contributed to the accident or that, because of the time between that performance and the accident, it is not likely that a drug test would reveal whether the performance was affected by drug use."

Additionally, for each large operator having more than 50 covered employees, drug and alcohol test results must be reported annually to PHMSA, in a Management Information System ("MIS") report, no later than March 15 of each year for the previous calendar year.[135] Spire provided copies of the 2018 MIS reports for Spire and ** _____ ** in response to Staff Data Request 0067.

The requirements for post-accident alcohol testing are provided in 49 CFR 199.225(a):

> (a) Post-accident.
>
> (1) As soon as practicable following an accident, each operator shall test each surviving covered employee for alcohol if that employee's performance of a covered function either contributed to the accident or cannot be completely discounted as a contributing factor to the accident. The decision not to administer a test under this section shall be based on

[134] Commission Rule 4 CSR 240-40.080(4)(B) states that the references to "accident" in Sections 199.3, 199.100, 199.105, 199.200, 199.221, 199.225, 199.227 and 199.234 should refer to a "federal incident reportable under 4 CSR 240-40.020" instead.

[135] Required by 49 CFR 199.119 for drug testing, 49 CFR 199.229 for alcohol testing.

> the operator's determination, using the best available information at the time of the determination that the covered employee's performance could not have contributed to the accident.
>
> (2)(i) If a test required by this section is not administered within 2 hours following the accident, the operator shall prepare and maintain on file a record stating the reasons the test was not promptly administered. If a test required by this paragraph is not administered within 8 hours following the accident, the operator shall cease attempts to administer an alcohol test and shall state in the record the reasons for not administering the test. (ii) Reserved

For the employees (including Contractor's employees) performing covered functions at the time of the incident, each would have been required to have passed a pre-employment drug test, and been part of a pool of covered employees to be selected for random drug tests. For employees whose performance either contributed to the incident or could not be completely discounted as a contributing factor to the incident, each should have been tested for drugs within 32 hours after the incident and for alcohol within 2 hours of the incident.

Spire provided copies of the ** _____ _____ _____ ** in response to Staff Data Request 0030.

In response to Staff Data Request 0066, Spire provided documentation that the ** _____ ** employees involved in this incident were drug and alcohol tested pre-employment.

In response to Staff Data Request 0067, Spire provided documentation that ** _____ ** employees were randomly tested at a rate of at least 50% of covered employees.

A Contractor work crew from ** _____ _____ [136] ___ _____ **[137] were assigned to this project. Additionally, ** _____ _____ ** were involved in the emergency response.

[136] Spire confidential response to Staff Data Request 0003.

[137] Spire confidential response to Staff Data Request 0002.

Spire stated in response to Staff Data Request 0066 that ** _____ _____ _____ _____. **

Question 2 in Part F of the PHMSA 7100.1 Incident Report Form[138] asks: "As a result of this Incident, were any Operator contractor employees tested under the post-accident incident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?". ** _____ _____ **[139]

In response to Staff Data Request 0030, Spire stated that "** _____ _____ _____ _____ **"

Based on Spire's response in the PHMSA 7100.1 Incident Report Form[140] and to Staff's Data Request 0030, it appeared initially as though two Contractor employees were tested post-incident as required by 49 CFR 199.225(a) as adopted by 4 CSR 240-40.080. However, the Management Information System ("MIS") reports[141] submitted by ** _____ _____. **[142]

In response to Staff Data Request 0067.1, asking why the Drug and Alcohol Testing MIS Data Collection Form for ** _____ _____ **, Spire responded: ** _____ _____

[138] 4 CSR 240-40.020(6)(A) requires that each operator must submit a federal incident report on Form PHMSA F 7100.1 as soon as practicable but not more than thirty (30) days after detection of an incident required to be reported under 4 CSR 240-40.020(3). Spire's initial incident report was provided in response to Staff Data Request 0051 and its supplemental incident report was provided in response to Staff Data Request 0067.2.

[139] Confidential attachment to Spire's response to Staff Data Request 0051.

[140] Confidential attachment to Spire's response to Staff Data Request 0051.

[141] For each large operator having more than 50 covered employees, drug and alcohol test results must be reported annually to the Pipeline and Hazardous Materials Safety Administration ("PHMSA") in the Office of Pipeline Safety of the U.S. Department of Transportation no later than March 15 of each year for the previous calendar year in a Management Information System ("MIS") report.

[142] A copy was provided by Spire in response to Staff Data Request 0067.

_____- _____
_____
_____ **

In response to Staff's Data Request 0067.2 questioning the discrepancy between the number of post-incident drug and alcohol tests reported in the MIS report provided in response to Staff's Data Request 0067.1 ** ____ ** and number of post incident drug and alcohol tests reported in Spires's PHMSA 7100.1 Incident Report Form ** ____ **, Spire responded:

> The Company was originally informed by ** _____ ** that two contract employees had been drug and alcohol tested as a result of the incident… Subsequent discussion with ** _____ ** has revealed that, while drug testing was requested by ** _____ ** from the hospital, ** _____
> _____
> _____ **
> Therefore, the information provided in Part F of the Form PHMSA F7100.1 needs to be updated.

Spire submitted a supplemental Form PHMSA F7100.1 for this incident amending the number of employees tested to ** ___ ** and provided a copy as an attachment to Staff Data Request 0067.2.

Staff inquired through Data Requests why ** _____
_____ **. Spire's response indicated that ** _____
_____
_____ **

Conclusion:

Spire identified three employees whose performance either contributed to the incident or could not be completely discounted as a contributing factor to the incident. Based on the Spire's descriptions of the role each individual played in the incident and subsequent response, Staff agrees with the Spire's identification of these three individuals.

Each of these three individuals should have been tested for drugs (49 CFR 199.105(b) as adopted by 4 CSR 240-40.080) and alcohol (49 CFR 199.225(a) as adopted by 4 CSR 240-40.080). Out of six tests (3 for drugs, 3 for alcohol) required, ** ____ ** were performed.

** _____
_____
_____ **[143] Therefore, based on Staff's analysis:

** _____
_____
_____
_____
_____
_____
_____ **

III. G. Drug and Alcohol Testing Staff Expert: Kathleen A. McNelis, PE

H. Spire Oversight of Contractor

Analysis:

Section (12) of Commission Rule 4 CSR 240-40.030 prescribes the minimum requirements for the operation of pipeline facilities.[144]

- At the time of the incident, paragraph (12)(B)3. stated:

  3. Each operator shall be responsible for ensuring that all work completed by its consultants and contractors complies with this rule.[145]

- 4 CSR 240-40.030(12)(C)1. requires each operator to prepare and follow a manual of written procedures for conducting operations and maintenance activities and for emergency response.

[143] Spire confidential response to Staff Data Requests 0030 and DR 0067.2.
[144] The scope of Section (12) is contained in 4 CSR 240-40.030(12)(A).
[145] Rule means 4 CSR 240-40.030 Safety Standards – Transportation of Gas by Pipeline.

- 4 CSR 240-40.030(12)(C)2.A. requires that the manual required by paragraph (12)(C)1. must include procedures for operating, maintaining, and repairing the pipeline in accordance with each of the applicable requirements of 4 CSR 240-40.030(12), (13), and (14).

There is no Spire-approved written policy or procedure for oversight and inspection of contractors working for Spire; however, Spire is in the process of standardizing policies and procedures across operational areas and will review whether to implement a new construction contractor inspection policy or procedure(s).[146]

Spire has employees who are Contract Inspectors that inspect work performed by contractors. Work at the incident location was part of a large work project to upgrade the distribution system in the area.[147] For the work project at the incident location, Spire explained as follows:

> On the morning of the day of the incident, the Spire contract inspector verbally confirmed the work schedule for that day with the contract crew foreman via phone.[148]

> On the morning of the day of the incident, the Company contract inspector drove by to visit the construction crew near the work location but did not stop or inspect anything at the work site since work had not begun and the supervisor was not present with the crew.[149]

After driving by the Contractor work crew at the incident location, the Spire Contract Inspector proceeded to another work project about four miles to the south. The Spire Contract Inspector continued at that work project and then returned to the Spire office, where he learned the incident had recently occurred. Other than driving by before work started for the day, the Spire Contract Inspector was not present at the incident location on July 16, 2018, prior to the incident occurring.[150]

[146] Spire response to Staff Data Request 0049.
[147] Spire response to Staff Data Request 0005.
[148] Spire response to Staff Data Request 0054.1.
[149] Spire response to Staff Data Request 0054.1.
[150] Spire response to Staff Data Requests 0011 and 0053.

The Contractor work crew also had a Contractor superintendent, Contractor general foreman, and Spire supervisor assigned to it.[151] None of these assigned persons were at the incident location during work by the Contractor work crew on July 16, 2018, prior to the incident and were not present at the time of the incident.[152]

Staff requested a list of contractor work tasks that require a Spire Contract Inspector to be present during the work task, and specifically if a Spire Contract Inspector is required to be present when a Contractor project involves working with escaping gas and/or cutting a pipeline containing gas. Spire answered as follows:

> There are no work tasks that the Company requires a Company contract inspector to be present during. The Company only hires contractors that are qualified to perform all tasks required for a particular project.[153]

> The Company does not require a contractor [sic] inspector to be present when a contractor project involves working with escaping gas and/or cutting a pipeline containing gas.[154]

Conclusion:

4 CSR 240-40.030(12)(B)3. requires that Spire shall be responsible for ensuring that all work completed by its contractors complies with 4 CSR 240-40.030. Report Sections III.B. *Prevention of Accidental Ignition*, III.C. *Protection of Personnel*, and III.D. *Mechanical Joining* describe how work by Spire's Contractor did not comply with 4 CSR 240-40.030(13)(X) and did not follow several Spire procedures as required by 4 CSR 240-40.030(1)(G)3., (6)(B)2., and (12)(C)1.

4 CSR 240-40.030(12)(C)2.A. requires that Spire's procedural manual, which is required by 4 CSR 240-40.030(12)(C)1., must include procedures for operating, maintaining, and repairing its pipelines in accordance with each applicable requirement of 4 CSR 240-40.030(12), (13), and (14).

[151] Spire response to Staff Data Requests 0053f and 0054d.
[152] Spire response to Staff Data Requests 0054.2.
[153] Spire response to Staff Data Request 0055.
[154] Spire response to Staff Data Request 0055.

More specifically,

1. Violations of 4 CSR 240-40.030 by Spire's Contractor found in the Conclusions of Report Sections III. B., C., and D. demonstrate that Spire did not ensure its Contractor complied with 4 CSR 240-40.030 while working on Spire pipelines at the incident location. As further discussed in the Report Sections III. B., C., and D., many of these non-compliances by Spire's Contractor contributed to the incident.
2. Failure to ensure that the work completed by Spire's Contractor complied with 4 CSR 240-40.030 was a violation of 4 CSR 240-40.030(12)(B)3.
3. Failure to include procedures for the contractor oversight requirements of 4 CSR 240-40.030(12)(B)3. in Spire's procedural manual, which is required by 4 CSR 240-40.030(12)(C)1., was a violation of 4 CSR 240-40.030(12)(C)2.A.[155] Spire must add procedures for the requirements of 4 CSR 240-40.030(12)(B)3. to its procedural manual since Spire does not have policies or procedures for oversight and inspection of contractors working for Spire.

III. H. Spire Oversight of Contractor Staff Expert: John D. Kottwitz

I. Investigation of Failures

Analysis:

4 CSR 240-40.030(12)(L) Investigation of Failures requires that each operator shall establish procedures for analyzing accidents and failures for the purposes of determining the causes of the failure and minimizing the possibility of a recurrence.

Spire's failure analysis procedure for reportable incidents is in Spire Missouri West (formerly MGE) O&M Standard 3150. This procedure requires among other things, an investigation and attempt to determine the incident cause (Section 2.3), and recommendations, if any, on corrective action needed to prevent a recurrence (Section 5.2.6).

[155] Additionally, 4 CSR 240-40.030(1)(G)3. requires that each operator maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to establish under this rule ("rule" here meaning 4 CSR 240-40.030), therefore failing to have the procedure is additionally a violation of 4 CSR 240-40.030(1)(G)3.

According to Spire, the results of its failure analysis[156] were as follows:

> The results of the Company's failure analysis were that the Company's training and operator qualifications programs were sufficient with respect to the construction conditions and that the incident resulted from the contract employee's decision to not follow established procedures. In an effort to minimize the possibility of a recurrence, the Company will circulate a 'lessons learned' notification to all internal Field Operations employees concerning the events surrounding this incident by October 31, 2018. ** _____ ** has already circulated a 'lessons learned' notification to all contract crews concerning the events surrounding this incident and has disciplined the responsible employees. Furthermore, the Company will continue to address Company employees or contractor employees according to Company policies who do not follow Company procedures.

Copies of Spire's and Contractor's "lessons learned" notifications are included as Appendix D.

Conclusion:

Staff did not find any violations with respect to Spire's actions to comply with the requirements of 4 CSR 240-40.030(12)(L) or its procedures in Spire Missouri West (formerly MGE) O&M Standard 3150. Staff found that Spire's failure analysis procedure complies with the requirements of 4 CSR 240-40.030(12)(L). Staff found that Spire conducted an investigation of this incident in compliance with its procedures and the requirements of 4 CSR 240-40.030(12)(L).

However, Staff has made additional recommendations based on its investigation that are aimed at minimizing the possibility of a recurrence of such an incident and failure (See Section IV. STAFF RECOMMENDATIONS).

III. I. Investigation of Failures Staff Expert: Kathleen A. McNelis, PE

[156] Spire response to Staff Data Request 0038.

J. Distribution Integrity Management Program ("DIMP")

Analysis:

Regulations for Gas Distribution Integrity Management Program ("DIMP")[157] require that each gas distribution operator develop and implement an integrity management program no later than August 2, 2011. Program elements must include a demonstrated knowledge of the system, identification of threats, evaluation and ranking of risk, identification and implementation of measures to address risks, measurement of performance, monitoring of results and evaluation of effectiveness. Sources of data to be considered in DIMP include incident and leak history. In implementation of DIMP, a baseline is established for threats to monitor the effectiveness of the program.

At a minimum[158], operators must consider the following categories of threats to each gas distribution pipeline:

- Corrosion,
- Natural Forces,
- Excavation Damage,
- Other Outside Force Damage,
- Material or Welds,
- Equipment Failure,
- Incorrect Operation, and
- Other concerns that could threaten the integrity of its pipeline.

In 2011 when the requirements of 4 CSR 240-40.030(17), DIMP, became effective, the company now known as Spire had three DIMP Plans – one for Missouri Gas Energy (at that time, a separate company from Laclede Gas), one for Missouri Natural (a former operating district of Laclede Gas) and one for Laclede Gas (at that time, a separate company from MGE).

[157] 4 CSR 240-40.030(17).

[158] 4 CSR 240-40.030(17)(D)2. states that these listed threat categories must be considered.

Currently, Spire has one combined DIMP Plan for its Missouri operations, and is in compliance with the requirements of 4 CSR 240-40.030(17).[159]

In its incident report provided to PHMSA,[160] Spire lists the apparent cause of the incident as "Incorrect Operation". "Incorrect Operation" is one of the threat categories that must be considered in an operator's DIMP. In the DIMP Plan that was effective for Spire Missouri West at the time of the incident, incorrect operation is identified as a potential threat to both mains and service lines. In response to a Staff Data Request[161] asking about the status of incorrect operation in Spire's currently effective DIMP Plan, Spire stated:

> The Company already ranks the threat of Incorrect Operations relative to other potential threats to its system. Currently, Incorrect Operations is not identified as a top threat and therefore does not require accelerated action to be taken. In the future, if Incorrect Operations is identified as a top threat the Company will review the drivers of elevated risk and create an accelerated action plan to address them.

In response to a Staff Data Request[162] asking if Spire's currently effective DIMP Plan addressed the possibility/risk of contractors working for Spire with respect to the threat of "incorrect operation", Spire stated:

> The Company's DIMP plan does not specifically address contractor work as a sub-threat of Incorrect Operations.

Conclusion:

In Staff's opinion[163], this incident was a result of incorrect operations by a contractor working for Spire. Spire potentially has less control over the content of contractor training, qualifications and work practices than it does over its own employees. While Spire includes

[159] Staff conducts routine inspections of the DIMP Plans and DIMP implementation by the natural gas operators jurisdictional to the Commission. An inspection of Spire's DIMP was conducted in August of 2018.

[160] 4 CSR 240-40.020(6)(A) requires that each operator must submit a federal incident report on Form PHMSA F 7100.1 as soon as practicable but not more than thirty (30) days after detection of an incident required to be reported under 4 CSR 240-40.020(3). Spire's initial incident report was provided in response to Staff Data Request 0051 and its supplemental incident report was provided in response to Staff Data Request 0067.2.

[161] Spire response to Staff Data Request 0050d.

[162] Spire response to Staff Data Request 0050e.

[163] As supported by Spire's responses to Staff Data Requests 0031, 0037.2, 0038, 0040.1, 0049, and 0055, and the Exhibit Spire provided in response to Staff Data Request 0067.2.

consideration of incorrect operation in its DIMP, it does not differentiate between incorrect operation due to contractor or Spire employees.

Although Staff found no violations with respect to 4 CSR 240-40.030(17), Staff is making a recommendation that going forward, Spire consider contractor work as a sub-threat of Incorrect Operation in its DIMP Plan so that any trends in the frequency (increasing or decreasing) of incorrect operations by contractors may be evaluated.

III. J. Distribution Integrity Management Program ("DIMP")
Staff Expert: Kathleen A. McNelis, PE

IV. STAFF RECOMMENDATIONS

In summary, throughout this Report, Staff has identified several areas that either require improvement or are violations of Commission rules. The specific Commission rule violations are identified in Section I.A. above. Staff will proceed as appropriate related to these violations and recommendations.

In addition, Staff recommends that Spire:

1. Develop and include, in its procedural manual required by 4 CSR 240-40.030(12)(C)1., procedures for the contractor oversight requirements of 4 CSR 240-40.030(12)(B)3. Staff further recommends Spire follow these procedures.

   (See: III.H. *Spire Oversight of Contractor*: Staff Expert John D. Kottwitz)

2. Develop a list of tasks that require Spire oversight when the tasks are to be performed by a contractor, including any task that involves planned work in a hazardous gas atmosphere.

   (See: III.H. *Spire Oversight of Contractor*: Staff Expert John D. Kottwitz)

3. Take a more proactive role in ensuring that its contractors are in compliance not only with the pipeline safety rules that Staff identifies as having been violated in this incident, but in general with all applicable pipeline safety rules.

   Actions to be taken by Spire to ensure contractor compliance with applicable rules should include but not necessarily be limited to:

a. Conducting a review of training materials to ensure that the requirements of applicable pipeline safety rules and Spire procedures to implement these rules are covered in sufficient detail during training,

b. Conducting random and/or routine field evaluations of contractor employees' knowledge, skills and ability to perform assigned tasks,

c. Conducting random and/or routine inspections to ensure that equipment necessary to perform the assigned tasks and respond to abnormal operating conditions (e.g., fire extinguisher, PPE) are available and are in working order at jobsites, and

d. Conducting field verification of contractor employees' qualifications to perform covered tasks. Staff recommends Spire utilize form "PHMSA (OQ) Field Inspection Form 15 (Rev. 3) March 2, 2007" (See Appendix F) or similar information/data form to complete these verifications.

(See: III.B. *Prevention of Accidental Ignition*: Staff Experts Brian J. Buchanan, and Kathleen A. McNelis, PE; III.C. *Protection of Personnel*: Staff Experts Brian J. Buchanan and John D. Kottwitz; III.D. *Mechanical Joining:* Staff Experts Clinton L. Foster and Kathleen A. McNelis, PE; III.E. *Operator Qualifications ("OQ")*: Staff Expert Clinton L. Foster; and III.H. *Spire Oversight of Contractor*: Staff Expert John D. Kottwitz)

4. Take a more proactive role in ensuring that post-incident drug and alcohol tests are performed by its contractors as required by 4 CSR 240-40.080 Drug And Alcohol Testing. In future incidents that involve contractors performing covered functions on Spire's pipelines, Staff recommends that Spire take steps as soon as possible after an incident to notify the administrator of the contractor's anti-drug and alcohol misuse program that the requirements of 49 CFR 199.105(b) and 49 CFR 199.225(a), as adopted by 4 CSR 240-40.080, must be implemented.

(See: III.G. *Drug And Alcohol Testing:* Staff Expert Kathleen A. McNelis, PE)

5. Consider contractor work as a sub-threat of Incorrect Operation in its DIMP Plan so that any trends in the frequency (increasing or decreasing) of incorrect operations by contractors may be evaluated.

(See: III.J. *Distribution Integrity Management Program ("DIMP")*: Staff Expert Kathleen A. McNelis, PE)

6. Modify Spire Missouri West O&M Standard 3545D, *Hazardous Atmospheres* to require that an appropriate level of Spire management review and approve planned work that involves the intentional creation of a hazardous atmosphere.

(See: III.C. *Protection of Personnel:* Staff Experts Brian J. Buchanan, John D. Kottwitz and III.H. *Spire Oversight of Contractor*: Staff Expert John D. Kottwitz)

7. Conduct a comprehensive review of its operator qualification program. As part of this review, Staff recommends Spire complete the following:
   a. Review the program's covered task list to ensure that all covered tasks that are performed on Spire's gas pipelines are included in the covered task list.
   b. Ensure that the evaluations listed for each covered task are those currently required by Spire to be considered qualified to perform each covered task.
   c. For each Spire approved provider of operator qualification evaluations (for example MEA, EWN, etc.), create a list of evaluations required to be considered qualified for each specific covered task listed in Spire's operator qualification program.
   d. Provide the lists from 7c. above to Spire Contract Inspectors so they can better ensure that contractor employees working for Spire are qualified to perform the covered tasks required by their work.

   (See: III.E. *Operator Qualifications ("OQ")*: Staff Expert Clinton L. Foster)

8. Conduct an annual, comprehensive review of the operator qualification program for each of its contractors to ensure that the training and evaluation methods used by each contractor meet the requirements of the operator qualification programs Spire uses for its own employees.

(See: III.E. *Operator Qualifications ("OQ")*: Staff Expert Clinton L. Foster)

Staff recommends that the Commission order Spire to file an action plan, by December 31, 2019, which addresses the recommendations (numbered 1-8 above). Staff further recommends that the Commission order Spire to include in its action plan filing when it will effectuate that action plan. Finally, Staff recommends:

1. The Commission require that the action plan include Spire's proposed resolution for addressing each recommendation and the timeframe for implementing the resolution.
2. The Commission require Spire to file updates every six months as to how the plan has been effectuated.

If for any recommendation Spire believes no action is necessary, Staff recommends the Commission order Spire to explain, and provide supporting documentation as available, the reason(s) Spire believes no action is required.

V. Appendices

Appendix A:	Detailed Discussion of Facts and Staff's Investigation - Confidential
Appendix B:	Figure Images - Location of Incident
Appendix C:	Photographs
Appendix D:	Spire - Lessons Learned Safety Bulletin
Appendix E:	Summary of 4 CSR 240-40.030(12)(D) Operator Qualification Requirements and Definitions
Appendix F:	PHMSA (OQ) Field Inspection Form 15 (Rev. 3) March 2, 2007
Appendix G:	Staff's Credentials and Case Participation

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Spire Missouri Inc. d/b/a Spire Missouri West Concerning a Natural Gas Incident at 1106 Paseo Boulevard in Kansas City, Missouri	))))	**Case No. GS-2019-0015**

AFFIDAVIT OF BRIAN J. BUCHANAN

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

COMES NOW Brian J. Buchanan and on his oath states that he is of sound mind and lawful age; that he contributed to the foregoing *Staff's Gas Incident Report*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

Brian J. Buchanan

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 31st day of July, 2019.

Notary Public

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Spire Missouri Inc. d/b/a Spire Missouri West Concerning a Natural Gas Incident at 1106 Paseo Boulevard in Kansas City, Missouri	))))	**Case No. GS-2019-0015**

AFFIDAVIT OF CLINTON L. FOSTER

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

COMES NOW Clinton L. Foster and on his oath states that he is of sound mind and lawful age; that he contributed to the foregoing *Staff's Gas Incident Report*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

Clinton L. Foster

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 25th day of July, 2019.

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Notary Public

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Spire Missouri Inc. d/b/a Spire Missouri West Concerning a Natural Gas Incident at 1106 Paseo Boulevard in Kansas City, Missouri	))))	**Case No. GS-2019-0015**

AFFIDAVIT OF JOHN D. KOTTWITZ

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

COMES NOW John D. Kottwitz and on his oath states that he is of sound mind and lawful age; that he contributed to the foregoing *Staff's Gas Incident Report*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

John D. Kottwitz

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 31st day of July, 2019.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Spire Missouri Inc. d/b/a Spire Missouri West Concerning a Natural Gas Incident at 1106 Paseo Boulevard in Kansas City, Missouri	))))	**Case No. GS-2019-0015**

AFFIDAVIT OF KATHLEEN A. MCNELIS, PE

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

COMES NOW Kathleen A. McNelis, PE and on her oath states that she is of sound mind and lawful age; that she contributed to the foregoing *Staff's Gas Incident Report*; and that the same is true and correct according to her best knowledge and belief.

Further the Affiant sayeth not.

Kathleen A. McNelis, PE

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 31st day of July, 2019.

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

Notary Public

MISSOURI PUBLIC SERVICE COMMISSION

STAFF's GAS INCIDENT REPORT

Appendix A

Spire Missouri Inc. d/b/a Spire Missouri West

Case No. GS-2019-0015

Commission Staff Division
Safety Engineering Department
July 31, 2019 - Jefferson City, Missouri

** Denotes Confidential Information **

TABLE OF CONTENTS OF

STAFF's GAS INCIDENT REPORT

Appendix A

Spire Missouri Inc. d/b/a Spire Missouri West

Case No. GS-2019-0015

APPENDIX A:

DETAILED DISCUSSION OF FACTS AND STAFF'S INVESTIGATION

Note: The detailed information presented in Appendix A was obtained through Staff's on-site investigation, interviews, Spire Missouri West ("Spire") records, information provided by Spire to Staff in responses to Staff Data Requests, and reports of other entities[1]. The information provided in the sections below summarizes Staff's investigation and the facts gathered during its investigation. To the extent that these facts were found to be necessary or helpful to address the incident cause and/or outcome, the facts are discussed in the body of Staff's Gas Incident Report; some of the facts that appear below may not be mentioned in the body of Staff's Gas Incident Report.

A. The Incident

At approximately 10:23 a.m. CDT on July 16, 2018, a natural gas fire occurred in and around an excavation near 1106 The Paseo in Kansas City, Missouri.[2] The approximate location is shown in Appendix B, Figure 1. At the time of the incident, a three-person crew was assigned to tie-in three new service lines to the gas main running parallel to The Paseo, and to abandon the existing services lines to 1100, 1106 and 1116 The Paseo.[3] The crew members performing the work were employed by a contractor working for Spire on Spire's natural gas facilities: ** _____ **, hereafter referred

[1] Including the Midwestern Regional Climate Center, wunderground.com, and Pipeline Data Mart [accessed through the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration ("PHMSA") Portal].

[2] Spire responses to Staff Data Requests 0051 and 0067.2.

[3] Spire response to Staff Data Request 0025.

to as "Contractor". The incident occurred while this crew was abandoning the existing service line to 1106 The Paseo.[4]

An approximately 3-foot by 5-foot working space was excavated to a depth of about 3-feet to provide access to the service line and main[5] (*See* Appendix B, Figure 2 and Appendix C, Photograph 1). When the incident occurred, a contractor ** ____ _____ **, ("Contractor Employee A") was in the excavation working to abandon the service line, a contractor ** _____ **, ("Contractor Employee B") was standing nearby, and a contractor ** _____ **, ("Contractor Employee C") was in his company truck.[6] The following additional Contractor personnel were also working in the vicinity of 1106 The Paseo at the time of the incident: ** _____ ** ("Contractor Employee D") and ** ____ _____ ** ("Contractor Employee E"). Contractor Employee D was walking back to 1106 The Paseo from his truck at the time of the incident.[7] Prior to the incident, Contractor Employee D was working on the meter set for 1106 The Paseo.[8]

Without stopping the flow of gas to the main or service line, Contractor Employee A cut the plastic portion of the existing service line with a ratchet pipe-cutting tool. This resulted in gas escaping from the open line into the atmosphere.[9] When Contractor Employee A was unable to insert a fitting into the open line to stop the flow of

[4] Spire response to Staff Data Request 0001.

[5] Spire response to Staff Data Request 0010.1 and Spire Attachment to Staff Data Request 0002.

[6] Spire responses to Staff Data Requests 0003, 0003.1 and 0013.1.

[7] Spire response to Staff Data Request 0003.

[8] Spire response to Staff Data Request 0003.1.

[9] Spire attachment to response to Staff Data Request 0025.

gas, he used an electric reciprocating saw[10] (*See* Appendix C, Photograph 2) to cut the steel portion of the service line. Within a few seconds (at around 10:23 a.m. CDT), an ignition occurred and the gas fire began resulting in serious burns to both Contractor Employee A and Contractor Employee B.[11]

The Incident Staff Expert: Clinton L. Foster

B. Personal Injuries

Both Contractor Employee B (standing above the excavation) and Contractor Employee A (in the excavation) were injured during the incident and transported to the hospital. Contractor Employee B required inpatient hospitalization, and Contractor Employee A was taken to the hospital and was released after receiving treatment.[12]

Personal Injuries Staff Expert: Clinton L. Foster

C. Property Damage

Spire reported damages to Spire facilities. There were no reported public or non-operator (Spire) damages. Damages to Spire facilities and cost of repair were estimated by Spire to be $2,566, an estimated $3 of gas was lost and the estimated cost of Spire's emergency response was $500, for a total estimated cost to Spire of $3,069.[13]

Property Damage Staff Expert: Kathleen A. McNelis, PE

[10] In Spire responses and attachments to Staff Data Requests, this tool is sometimes referred to as a Sawzall.

[11] Based on attachment to Spire response to Staff Data Request 0025.

[12] Spire response to Staff Data Request 0013.2.

[13] Based on attachment to Spire response to Staff Data Request 0067.2.

D. Site Description

The incident occurred in and around an excavation in front of 1106 The Paseo in Kansas City, Missouri (*See* Appendix B, Figure 1). 1106 The Paseo is located on the 1100 block of The Paseo between East 11th Street and East 12th Street. The Paseo is a split boulevard that runs north to south, East 11th Street runs east to west and East 12th Street runs east to west. 1106 The Paseo lies between 1100 The Paseo and 1116 The Paseo (*See* Appendix B, Figure 2). The property at 1106 The Paseo includes a gated fence along the building side of the sidewalk running alongside The Paseo, and a grass curb strip[14] between the sidewalk and The Paseo (*See* Appendix C, Photograph 3). The excavation was located in the grass curb strip and sidewalk in front of the property (*See* Appendix B, Figure 2).

Site Description Staff Expert: Clinton L. Foster

E. Meteorological Data

On Monday, July 16th, the sky was partly cloudy or clear throughout the day. No precipitation was recorded by any nearby weather stations. Charles B. Wheeler Downtown Airport reported temperatures at the time of the incident to be 77-78 degrees Fahrenheit, with three (3) miles-per-hour winds out of the northwest.[15]

Meteorological Data Staff Expert: Clinton L. Foster

[14] The narrow strip of grass between the sidewalk and the street.

[15] Meteorological data was obtained from the Midwestern Regional Climate Center for Charles B. Wheeler Downtown Airport, Kansas City, MO and wunderground.com.

F. Natural Gas System

Natural gas service in Kansas City, Missouri is provided by Spire. Prior to this incident, the natural gas distribution mains supplying the 1100 block of The Paseo were four-inch diameter cast iron ("CI") pipe, and three-inch diameter polyethylene ("PE") pipe running north to south along the west side of The Paseo.[16] The mains were operating at a pressure of approximately thirty (30) inches water column[17] at the time of the incident.[18] The Maximum Allowable Operating Pressure ("MAOP")[19] established by Spire for these mains was 2.2 psig.[20] Service to 1106 The Paseo was provided by a two-inch diameter PE tee from the 3-inch PE main, which utilized a transition fitting to transition to a two-inch diameter steel service. This two-inch diameter steel service ran approximately forty-one (41) feet to the meter located on the northeast corner of 1106 The Paseo.[21]

Natural Gas System Staff Experts: Clinton L. Foster and John D. Kottwitz

[16] Spire responses to Staff Data Requests 0001, 0005, and 0007.

[17] Inches water column is a unit of pressure. 30 inches water column is approximately equal to 1.08 pounds per square inch.

[18] Spire response to Staff Data Request 0015.1.

[19] Maximum Allowable Operating Pressure ("MAOP") is defined in 4 CSR 240.030(1)(B) as the maximum pressure at which a pipeline or segment of a pipeline may be operated under this rule.

[20] Spire response to Staff Data Request 0015.2.

[21] Spire response to Staff Data Request 0008.

G. Project Details

The natural gas system in the immediate vicinity near 1106 The Paseo was undergoing abandonments[22], replacements[23], and upgrades[24] during the time immediately before and after this incident. The work being done in the immediate vicinity near 1106 The Paseo was part of a larger project to replace older pipe and ultimately raise the MAOP in the area from 2.2 pounds per square inch (psi)[25] to 58 pounds per square inch (psi).[26] The project included the replacement of the CI main with a new two-inch diameter PE main, and upgrading the existing three-inch PE main's operating pressure.[27] The two-inch diameter steel service line at 1106 The Paseo was to be abandoned and replaced by a new one-inch diameter PE service line.[28]

Project Details Staff Experts: Clinton L. Foster and John D. Kottwitz

H. Utilization of Contractors

Spire was using a contractor for the replacement and upgrade project described in the section immediately above (Section G. Project Details). In addition to the three-person Contractor crew at the incident location, Spire was using and has been using

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[22] Abandoned means permanently removed from service (4 CSR 240-40.030(1)(B)1.).

[23] The term replacement is used in the context of: "a new fixed asset or portion of an asset that takes the place of a discarded one" (Webster's Third New International Dictionary, Unabridged, Copyright 1976 by G. & C. Merriam Co., definition 2.b.)). Additionally, there are regulatory requirements regarding replacement of certain pipe materials. General requirements for required replacement programs are addressed in 4 CSR 240-40.030(15).

[24] "Upgrade" is a term used by Spire for a verification procedure to increase operating pressure in instances where an increase of MAOP as defined in 4 CSR 240-40.030(1)(B) is not required. The term "upgrading" is not synonymous with "uprating" as detailed in 4 CSR 240-40.030(11). Spire provided a copy of its verification procedure for this project in response to Staff Data Request 0006.

[25] Spire response to Staff Data Request 0015.2.

[26] Spire response to Staff Data Request 0001.1.

[27] Spire response to Staff Data Request 0005.

[28] Spire response to Staff Data Request 0001.

contractor crews elsewhere in the Kansas City metropolitan area[29]. On July 16, 2018, Spire was using 29 contractor crews from ** _____ ** and 10 contractor crews from ** _____ . **[30]

Spire has employees who are Contract Inspectors that inspect work performed by contractors. On July 16, 2018, 21 of the 26 Contract Inspectors in the Kansas City metropolitan area were working (5 were off on leave) plus one "step-up"[31] Contract Inspector.[32] Further, an inspection contractor was used to inspect the work of two contractor crews on July 16, 2018.[33]

The Spire Contract Inspector assigned to the three-person contractor crew working at the incident site was assigned to a total of five contractor crews for July 16, 2018.[34]

For the project at the incident location, the Company further responded as follows in response to Staff Data Request 0049:

> Routine oversight and inspection of the work of ** _____ ** at the project included routine jobsite visits throughout the day, advising on installation designs, managing tie-in processes, and reviewing project progress. There was no non-routine oversight of this project.

Spire also explained as follows:

> On the morning of the day of the incident, the Company contract inspector drove by to visit the construction crew near the work location

[29] Spire also uses Spire crews for construction work in the Kansas City metropolitan area.

[30] Spire response to Staff Data Request 0053.

[31] "Step-up" Contract Inspector refers to a Spire Maintenance Crew Person who was assigned to be a Spire Contract Inspector on July 16, 2018, as indicated in the Spire response to Staff Data Request 0053.

[32] Spire response to Staff Data Request 0056.1.

[33] Spire response to Staff Data Request 0053.

[34] Spire response to Staff Data Request 0053.

> but did not stop or inspect anything at the work site since work had not begun and the supervisor was not present with the crew.[35]
>
> On the morning of the day of the incident, the Spire contract inspector verbally confirmed the work schedule for that day with the contract crew foreman via phone.[36]

After driving by the Contractor crew at the incident location, the Spire Contract Inspector proceeded to another project location about four miles to the south where three of his assigned Contractor crews were working. The Spire Contract Inspector continued at that project and then returned to the Spire office, where he learned the incident had recently occurred. Other than driving by before work started for the day, the Spire Contract Inspector was not present at the incident location on July 16, 2018, prior to the incident occurring.[37]

Spire explained the intended procedure further:

> The Company's expectation is that all contractor construction crews have an ** _____ ** superintendent, Company contract inspector, and Company supervisor assigned to them. That expectation was fulfilled on the date of the incident and throughout the duration of the project.[38]

In addition to a Contractor superintendent, the Contractor also had a Contractor general foreman assigned to supervise the Contractor crew.[39]

Other than the Spire Contract Inspector's drive-by before work started, none of these assigned persons were at the incident location during work by the Contractor crew on July 16 prior to the incident and were not present at the time of the incident.

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[35] Spire response to Staff Data Request 0054.1.

[36] Spire response to Staff Data Request 0054.1.

[37] Spire responses to Staff Data Requests 0011, 0053, 0054 and 0054.1.

[38] Spire response to Staff Data Request 0053.

[39] Spire response to Staff Data Request 0054.

Staff requested a list of contractor work tasks that require a Spire Contract Inspector to be present during the work task, and specifically if a Spire Contract Inspector is required to be present when a Contractor project involves working with escaping gas and/or cutting a pipeline containing gas. Spire answered as follows:

> There are no work tasks that the Company requires a Company contract inspector to be present during. The Company only hires contractors that are qualified to perform all tasks required for a particular project.[40]
>
> The Company does not require a contractor [sic] inspector to be present when a contractor project involves working with escaping gas and/or cutting a pipeline containing gas.[41]

Staff also asked Spire for their contractor oversight procedures. Spire responded that there is no Spire-approved written policy or procedure for oversight and inspection of contractors working for Spire; however, Spire is in the process of standardizing policies and procedures across operational areas and will review whether to implement a new construction contractor inspection policy or procedures.[42]

Utilization of Contractors Staff Expert: John D. Kottwitz

I. Emergency Response [4 CSR 240-40.030(12)(J)]

The incident occurred at approximately 10:23 a.m. CDT ** _____ _____ ** employed by Spire, observed the fire and called for emergency responders and then called the Spire security center to report the incident.[43] Around the same time, a Kansas City Fire Battalion Chief noticed the incident

[40] Spire response to Staff Data Request 0055.

[41] Spire response to Staff Data Request 0055.

[42] Spire response to Staff Data Request 0049.

[43] Spire response to Staff Data Request 0002.

while driving by and stopped to assist.[44] An ambulance from The University of Kansas Hospital arrived on site at approximately 10:28 a.m. CDT and transported the injured individuals to the hospital.[45] At approximately 10:30 a.m. CDT, Contractor Employee E stopped the flow of gas by squeezing-off a 3-inch plastic main[46] at an excavation located near the intersection of East 11th Street and The Paseo (*See* Appendix B, Figure 2 for squeeze-off location). Spire's security center received a call from the off duty police officer at approximately 10:30 a.m. CDT and was informed that Kansas City Police and Fire were already notified. Spire's security center subsequently notified ** _____ ** a Spire Construction Supervisor at approximately 10:32 a.m. CDT.[47] The Construction Supervisor left for the incident site, and arrived at approximately 10:50 a.m. CDT. Two Contractor Managers arrived at the scene at approximately 10:55 and 11:00 a.m. CDT.[48] The Kansas City Fire Department was on site at 11:00 a.m. CDT.[49] A second Contractor crew was later called to the incident site to complete work on the 1100 block of The Paseo.[50] A Spire Contract Inspector was called to the scene, and directed the removal of a burnt portion of the three-inch diameter PE main. He remained on-site until the second Contractor crew completed work.[51]

Emergency Response Staff Expert: Brian J. Buchanan

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[44] Spire response to Staff Data Request 0013.

[45] Spire responses to Staff Data Requests 0002 and 0012.1.

[46] Spire response to Staff Data Request 0004.

[47] Spire response to Staff Data Request 0002.

[48] Spire response to Staff Data Request 0002.

[49] Spire response to Staff Data Request 0002.

[50] Spire response to Staff Data Request 0002.

[51] Spire response to Staff Data Request 0002.

J. Spire Plans/Procedures

Spire's currently effective Emergency Plan: "Spire Missouri West O&M Standard 3110V", effective date 3-24-2017, was provided as an attachment to Spire's response to Staff Data Request 0022. The Contractor was required to follow the Spire Missouri West Standard 3110V.[52]

Spire stated that it provided the Contractor with the entire Operations and Maintenance ("O&M") manual, including the Emergency Plan on December 15, 2016, and has provided the Contractor with updated Standards since that time, as changes are made.[53]

At the time of the incident, Spire required the Contractor's employees to follow both the Spire Missouri West Operator Qualification Program and the Contractor's own Operator Qualification Program.[54] According to Spire, the Contractor is responsible for providing training on Spire procedures to its employees.[55] The Spire individuals who conducted the initial review of the Contractor's operator qualification program prior to the Contractor performing any work on Spire's pipeline facilities are no longer with Spire, and therefore the scope of their study is not known[56].

According to information provided by Spire, each member of the Contractor crew was trained on:

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[52] Based on Spire response to Staff Data Request 0022.1.

[53] Spire responses to Staff Data Requests 0022 and 0023.

[54] Spire response to Staff Data Request 0039.1.

[55] Spire response to Staff Data Request 0022.

[56] Spire response to Staff Data Request 0040.

a. Procedures to test for hazardous atmospheres.[57]

b. Use of Personal Protective Equipment ("PPE").[58]

c. The operation of a fire extinguisher and to verify full charge and proper visual inspection on a daily basis with a monthly documented inspection and annual third-party inspection.[59]

According to information provided by Spire, the Contractor crew had or did not have the following items available to the Contractor crew at the incident location at the time of the incident:

a. Contractor crew had gas detection equipment consisting of a Bascom-Turner, Gas Sentry CGI-201[60] for testing hazardous atmospheres.[61]

b. Contractor crew had a fire-resistant suit, a fire-resistant hood, and an Allergo Model A-300 supplied air respirator.[62]

c. Contractor crew did not have a safety retrieval harness and life lines.[63]

d. Contractor crew had a fire extinguisher at the jobsite in the vicinity of the excavation. The fire extinguisher was not used or attempted to be used to extinguish the fire.[64] However, during Contractor's investigation, it was determined that the fire extinguisher was not properly charged at the time of

[57] Spire responses to Staff Data Requests 0010, 0010.1 and 0010.2.

[58] Spire responses to Staff Data Requests 0010.3, 0010.4 and 0031.2.

[59] Spire response to Staff Data Request 0010.2.

[60] A Bascom-Turner, Gas Sentry CGI-201 is a type of Combustible Gas Indicator manufactured by Bascom-Turner.

[61] Spire response to Staff Data Request 0010.3.

[62] Spire response to Staff Data Request 0010.3.

[63] Spire response to Staff Data Request 0010.3.

[64] Spire response to Staff Data Request 0033.

the fire.[65] It was also determined during Contractor's investigation that Contractor Employee C was aware that the fire extinguisher was not ready for use and failed to take action to remedy the problem.[66] Spire stated in response to Staff Data Request 0037.1: "One day before the incident, the foreman told the general foreman that he needed to go to the yard to get a replacement fire extinguisher, but he failed to do so."[67]

According to information provided by Spire, all members of the Contractor crew were trained in the operation of a fire extinguisher and were trained to verify full charge and proper visual inspection on a daily basis and a monthly documented inspection.[68] Annual fire extinguisher inspections by a third-party are maintained on the inspection tag for each fire extinguisher. The monthly inspections are also documented on the inspection tag.[69] According to Spire, the daily visual pre-use inspections required by the procedure were not necessary as the Contractor does not utilize cartridge-type fire extinguishers.[70] According to the Contractor, the extinguisher and the annual inspection tag for this extinguisher were not retained following the incident.[71]

Spire procedures require the removal of sources of ignition from the excavation when gas is being vented into the open air, this would include a ratchet pipe cutting tool

[65] Spire response to Staff Data Request 0037.

[66] Spire response to Staff Data Request 0037.

[67] Spire response to Staff Data Request 0037.1

[68] Spire response to Staff Data Request 0010.2.

[69] Spire response to Staff Data Request 0036.3.

[70] Spire response to Staff Data Request 0010.2.

[71] Spire response to Staff Data Request 0036.3.

and a Sawzall.[72] Spire Missouri West (formerly Missouri Gas Energy "MGE") Standard 2540D, Paragraph 2.3 requires removing the sources of ignition from the excavation.[73]

Since the acquisition of Missouri Gas Energy by Spire, Spire has reviewed Spire Missouri West, formerly MGE, policies and procedures with all contractors through training and has provided them with an electronic copy of all applicable procedures.[74] Additionally, ENERGY WorldNet, Inc. ("EWN")[75] was present at a meeting in December 2016 to facilitate the discussion of how Spire would be performing the reviews of contractors based on Spire Standards.[76] Spire utilizes EWN for Spire's operator qualification training and evaluations.[77] For an employee of the Contractor to be considered qualified to perform the covered task "squeeze -off of main pipe," Spire requires computer-based training modules and performance evaluations.[78] For a Spire employee to be considered qualified to perform the covered task, Spire requires computer-based training modules (which include written exams) and performance evaluations.[79] Spire's Contract Inspector verifies Operation Qualification ("OQ") records for all individuals assigned to a project prior to commencement of work.

The results of Spire's failure analysis (*See* Section P) were that Spire's training and emergency procedure programs were sufficient with respect to the construction

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[72] Spire response to Staff Data Request 0031.1.

[73] Spire response to Staff Data Request 0031.1.

[74] Spire response to Staff Data Request 0040.

[75] ENERGY WorldNet, Inc. is a third party provider of operator qualification training, testing and record maintenance.

[76] Spire response to Staff Data Request 0040.

[77] Spire responses to Staff Data Requests 0056.2 and 0056.3.

[78] Spire responses to Staff Data Request 0041.2 and 0041.7.

[79] Spire responses to Staff Data Request 0041.2 and 0041.7.

conditions and that the incident resulted from the Contractor employee's decision to not follow established procedures. Spire's investigation determined that the cause of the incident was that proper procedures were not followed in that the covered task was performed using a Sawzall.[80] Spire stated that it expected the "main pipe" to be squeezed off in the excavation at the service tee for 1100 The Paseo.[81] Spire's Contract Inspector stated that his expectation was verbally communicated to the Contractor construction crew on the Friday before the incident.[82] Spire stated that it only hires contractors that are qualified to perform all tasks required for a particular project.[83]

The contractor was required to follow Spire Missouri West's Prevention of Accidental Ignition Standard, 2540D,[84] and O&M Standard 3545C, Hazardous Atmospheres.[85]

Spire Plans/Procedures

Staff Experts: Brian J. Buchanan, Clinton L. Foster,
John D. Kottwitz and Kathleen A. McNelis, PE

1. *Prevention of Accidental Ignition [4 CSR 240-40.030(13)(X)]*

Spire's procedures addressing the requirements of 4 CSR 240-40.030(13)(X) are in Spire Missouri West Construction Standard 2540D, Prevention of Accidental Ignition.[86] This procedure requires, among other things that when gas is being vented into

[80] Spire response to Staff Data Request 0043.

[81] Spire response to Staff Data Request 0041.1.

[82] Spire response to Staff Data Request 0011.

[83] Spire response to Staff Data Request 0055.

[84] Spire responses to Staff Data Requests 0009 and 0009.1.

[85] Spire responses to Staff Data Request 0010 and 0010.2.

[86] A copy was provided in response to Staff Data Request 0009.

the open air, potential sources of ignition shall be removed from the area (Standard 2540D, Section 2.3).

An approximately 3-foot by 5-foot working space was excavated to a depth of about 3-feet to provide access to the service line and main (*See* Appendix B, Figure 2).[87] When the incident occurred, Contractor Employee A was in the excavation working to abandon the service line, Contractor Employee B was not in the excavation but was standing nearby, and Contractor Employee C was in his truck.[88] Signs and barricades were in place around the excavation.[89]

Without stopping the flow of gas to the main or service line, Contractor Employee A cut the plastic portion of the existing service line with a ratchet pipe-cutting tool, resulting in gas escaping from the open line into the atmosphere.[90] When Contractor Employee A was unable to insert a fitting into the open line to stop the flow of gas, he used an electric reciprocating saw to cut the steel portion of the service line. Within a few seconds (at around 10:23 a.m. CDT), an ignition occurred and the gas fire began resulting in serious burns to both Contractor Employee A and Contractor Employee B.[91]

Prevention of Accidental Ignition

Staff Experts: Brian J. Buchanan and Kathleen A. McNelis, PE

[87] Spire response to Staff Data Request 0010.1 and Spire attachment to Staff Data Request 0002.

[88] Spire responses to Staff Data Requests 0003 and 0003.1

[89] Spire response to Staff Data Request 0035.

[90] Attachment to Spire response to Staff Data Request 0025.

[91] Based on attachment to Spire response to Staff Data Request 0025.

2. Precautions to Protect Personnel [4 CSR 240-40.030(12)(C)2.J.]

Spire's procedures addressing the requirements of 4 CSR 240-40.030(12)(C)2.J. are in Spire Missouri West O&M Standard 3545D, Hazardous Atmospheres.[92]

This procedure requires, among other things:

- Atmospheres where a hazardous atmosphere exist or could reasonably be expected to exist, such as in or around excavations and confined spaces, shall be tested before employees enter (Standard 3545D, Section 3.0);
- In all excavations where there is reason to suspect the presence of a flammable gas (e.g., leak repair), the atmospheric environment in and around the excavation shall be tested with a combustible gas indicator ("CGI") before personnel are allowed access (Standard 3545D, Section 5.2);
- When workers are required to be within the hazardous environment there must be an additional person assigned to observe the workers' activities and warn about changes in conditions or initiate rescue activities if necessary (Standard 3545D, Section 5.4);
- In atmospheres that have been identified as hazardous additional Personal Protective Equipment ("PPE") shall include, but may not be limited to, fire retardant suit and hood, respiratory protection and rescue equipment in addition to the Personal Protective Equipment items normally required for the tasks being performed (Standard 3545D, Section 6.0); and

[92] A copy was provided in response to Staff Data Request 0010.

- A fire extinguisher shall be placed at a location upwind of the excavation and shall be staffed by an employee trained in the operation of a fire extinguisher (Standard 3545D, Section 7.2).

In response to a Staff Data Request asking for an explanation of how the hazardous atmosphere testing was conducted for the excavation at 1106 The Paseo, Spire responded: "Based on the [Spire] incident investigation, proper procedures were not followed at this location; therefore, hazardous atmosphere testing was not conducted but ** _____ ** were trained on these procedures."[93]

Although a fire extinguisher was provided, Spire stated that it was not properly charged at the time of the fire, and that Contractor Employee C was aware that it was not ready for use.[94]

Spire's response to Staff Data Request 0010.3 indicated that Contractor Employee C failed to assign an additional person to observe the worker's activities and warn about changes in conditions.

Although a fire-resistant suit, fire-resistant hood, and an Allergo Model A-300 supplied air respirator were available at the construction site at the time of the incident,[95] the Contractor work crew did not utilize this equipment.[96]

Precautions to Protect Personnel Staff Experts: Brian J. Buchanan and John D. Kottwitz

[93] Spire response to Staff Data Request 0010.2.

[94] Spire response to Staff Data Request 0037.

[95] Spire response to Staff Data Request 0010.3.

[96] Spire response to Staff Data Request 0025.

3. Mechanical Joining [4 CSR 240-40.030(6)(B)]

Spire's procedure to comply with the requirements of 4 CSR 240-40.030(6)(B) General, (6)(F) Plastic Pipe, and (8)(J) Service Lines are provided in Spire Missouri West Construction Standard 2240E. In response to Staff Data Request 0063, Spire indicated that the sections of Spire Missouri West Construction Standard 2240E that were applicable to the work being completed at 1106 The Paseo were Section 2.0-General and Section 7.0-Mechanical Joints for Plastic.

Paragraph 7.3.1 of Spire Missouri West Construction Standard 2240E, Mechanical Joining, requires that the flow of gas be terminated when PE pipe size ½-inch CTS[97] through 2-inch IPS[98] are to be joined using a Permasert™ coupling.[99]

Based on the response to Staff Data Request 0025, at the time of the incident, the individual completing the abandonment of the existing service line to 1106 The Paseo was attempting to install a Permasert ™ coupling as a cap for the 2-inch diameter plastic stub remaining on the main from the existing service line.

Mechanical Joining Staff Experts: Clinton L. Foster and Kathleen A. McNelis, PE

K. Operator Qualification [4 CSR 240-40.030(12)(D)]

Spire provided copies of ** _____ _____ ** and ** _____

[97] CTS means Copper Tube Size. Copper Tube size polyethylene pipe is sized like copper pipe and is also manufactured with the Outside Diameter (OD) as the controlling dimension. Copper Tube Size or CTS pipe is commonly referred to as tubing.

[98] IPS means Iron Pipe Size. Polyethylene pipe sizes identified by IPS diameters designate the nominal inside diameter for 12-inch and smaller IPS pipe, and outside diameter for 14-inch and larger IPS pipe.

[99] Permasert™ is a registered trademark for a type of mechanical coupling manufactured by Elster Perfection.

____ ** in response to Staff Data Request 0039. Contractor employees were required to follow ** _____ _____ ** and were expected to follow ** _____ _____ .[100] _____ _____ ____ ____[101] _____ _____ **[102] Spire indicated that a review of the Contractor's operator qualification program, ** _____ ____ **, was completed by Spire at some point prior to the Contractor performing any work on Spire's pipeline facilities, but the individuals who conducted the initial review are no longer with Spire, and the scope of their examination is unknown.[103] Spire has not conducted a subsequent review of the Contractor's operator qualification program.[104] Spire stated that, in order to ensure through evaluation that contractor employees are qualified and have the necessary knowledge and skills to perform tasks in a manner that ensures the safe operation of pipeline facilities, Spire has reviewed Spire policies and procedures with all contractors through training and has provided them with an electronic copy of all applicable Spire procedures. Additionally, EWN was present at

[100] Spire response to Staff Data Request 0039.1.

[101] The attachment to Spire response to Staff Data Request 0039 indicates that any reference to Missouri Gas Energy in the attachment now refers to Spire Missouri West.

[102] Attachment to Spire response to Staff Data Request 0039.

[103] Spire response to Staff Data Request 0040.

[104] Spire response to Staff Data Request 0040.1.

a meeting with Spire in December 2016 to facilitate the discussion of how Spire would be preforming the reviews of contractors based on Spire standards.[105]

In response to Staff Data Request 0041, Spire stated that it expected the covered tasks of squeeze-off of main pipe, service abandonment, service installation, and an increase in operating pressure of existing plastic main to be performed during the project at the 1100 block of The Paseo. Spire expected these covered tasks to be performed based on a verbal discussion between the Spire Contract Inspector and the Contractor, however Spire also stated that the Contractor may deviate from the discussed plan at its discretion provided proper Spire procedures are followed.[106] Spire indicated that no documentation of Spire's expectations of which covered tasks the Contractor will perform is provided to the Contractor.[107] Spire also stated that the covered tasks of service abandonment, live gas work, squeeze off of main pipe, and service installation were actually performed during the project at the 1100 block of The Paseo.[108]

4 CSR 240-40.030(12)(D)8.A.(II) requires that qualification records shall include identification of the covered tasks the individual is qualified to perform. Staff requested from Spire the identification of the covered tasks each Contractor employee working at the project at the 1100 block of The Paseo was qualified to perform from Spire. Spire indicated this information could be found in Exhibit 26, an attachment to Spire's response to Staff Data Request 0026.[109]

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[105] Spire response to Staff Data Request 0040.

[106] Spire response to Staff Data Request 0058.

[107] Spire response to Staff Data Request 0058.

[108] Spire response to Staff Data Request 0041.

[109] Spire response to Staff Data Request 0026.5.

Spire provided qualification records of the individuals performing these covered tasks, at the project at the 1100 block of The Paseo in response to Staff Data Request 0026. The records indicated that Contractor Employee A completed qualification evaluations through EWN, and Contractor Employee C completed qualification evaluations through MEA Energy Association ("MEA")[110]. The records indicated that Contractor Employee E completed qualification evaluations through EWN and MEA. Spire stated that Contractor Employee B, and Contractor Employee D had not yet been qualified to perform any covered tasks.[111]

In order to connect the qualification records with the covered task list included in ** _____ ____ **, Staff requested and Spire provided lists of evaluations through EWN necessary for Spire to consider an individual qualified to perform each of the covered tasks expected to be performed and each of those tasks actually performed at the 1100 block of The Paseo.[112]

For the covered task of squeeze-off of main pipe, Spire requires the following EWN evaluations to be successfully completed in order for an individual to be considered qualified to perform the covered task:

[110] EWN and MEA are third party providers of operator qualification evaluations, each with differing training methods and evaluations. The difference in the two means that, although an individual can be qualified to perform the same covered task under each provider, the evaluations required will be different for that same covered task.

[111] Spire responses to Staff Data Requests 0026.2 and 0026.4.

[112] Spire in responses to Staff Data Requests 0041.7, 0041.8, 0041.9, 0041.10, 0041.11, 0041.12 and 0041.13.

Computer Evaluations[113]:

- EWN- CBT-AOC Failure to Follow Procedures
- EWN-CBT-AOC Flammable Gas Atmosphere
- EWN-CBT-Squeeze Off Plastic Pipe
- EWN-CBT-AOC Inoperability of a Pipeline Component
- EWN-CBT-Squeeze Off Steel Pipe

Performance Evaluations[114]:

- EWN-PE-Squeeze Off Plastic Pipe
- EWN-PE-Squeeze Off Steel Pipe[115]

For the covered task of service abandonment, Spire requires the following EWN evaluations to be successfully completed in order for an individual to be considered qualified to perform the covered task:

Computer Evaluations:

- EWN-CBT-AOC Inoperability of a Pipeline Component
- EWN-CBT-AOC Flammable Gas Atmosphere
- EWN-CBT-Temporary Isolation of Service Lines and Service Discontinuance

Performance Evaluations:

- EWN-PE-Temporary Isolation of Service Lines and Service Discontinuance[116]

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[113] These computer evaluations can consist of computerized training modules, and computerized written examinations.

[114] Performance evaluations can consist of field evaluation of an employee performing a covered task under the direction and observation of a qualified individual, or performing a simulation of the covered task.

[115] Spire response to Staff Data Request 0041.7.

[116] Spire response to Staff Data Request 0041.8

For the covered task of service installation, Spire requires the following EWN evaluations to be successfully completed in order for an individual to be considered qualified to perform the covered task:

Computer Evaluations:

- EWN-CBT-AOC Inoperability of a Pipeline Component
- EWN-CBT-Pressure Test: Nonliquid Medium-MAOP Less Than 100 psi
- EWN-CBT-Pressure Test: Nonliquid Medium-MAOP Greater Than or Equal to 100 psi
- EWN-CBT Leak Test at Operating Pressure
- EWN-CBT-AOC Flammable Gas Atmosphere
- EWN-CBT-Visually Inspect Pipe and Pipe Components Prior to Installation
- EWN-CBT-AOC Failure to Follow Procedures
- EWN-CBT-Joining of Plastic Pipe-Stab Fittings
- EWN-CBT-Joining of Pipe: Compression Couplings
- EWN-CBT-Joining of Pipe-Threaded Joints
- EWN-CBT-Joining of Pipe-Flange Assembly
- EWN-CBT-Installation of Steel Pipe in a Ditch
- EWN-CBT-Joining of Plastic Pipe-Butt Heat Fusion: Manual
- EWN-CBT-Joining of Plastic Pipe-Sidewall Heat Fusion
- EWN-CBT-Joining of Plastic Pipe-Electrofusion
- EWN-CBT-Joining of Plastic Pipe-Socket Heat Fusion
- EWN-CBT-Abnormal Operating Conditions-Buckled or Dented Pipe
- EWN-CBT Installation of Plastic Pipe in a Ditch
- EWN-CBT-Install Tracer Wire

Performance Evaluations:

- EWN-PE-Pressure Test-Nonliquid Medium MAOP Less Than 100 psi
- EWN-PE-Pressure Test: Nonliquid Medium-MAOP Greater Than or Equal to 100 psi
- EWN-PE-Leak Test at Operating Pressure
- EWN-PE-Visually Inspect Pipe and Pipe Components Prior to Installation
- EWN-PE-Joining of Plastic Pipe-Stab Fittings
- EWN-PE-Joining of Pipe: Compression Couplings
- EWN-PE-Joining of Pipe-Threaded Joints
- EWN-PE-Joining of Pipe-Flange Assembly
- EWN-PE-Joining of Plastic Pipe-Butt Heat Fusion
- EWN-PE-Joining of Plastic Pipe-Sidewall Saddle Heat Fusion
- EWN-PE-Joining of Plastic Pipe-Electrofusion
- EWN-PE-Joining of Plastic Pipe-Socket Heat Fusion
- EWN-PE-Installation of Plastic Pipe in a Ditch
- EWN-PE-Install Tracer Wire

Evaluations Required by Spire if Performing Specialized Installations:

- EWN-CBT Installation of Plastic Pipe in a Bore
- EWN-PE-Installation of Plastic Pipe in a Bore
- EWN-CBT Installation of Plastic Pipe Plowing/Pull-In
- EWN-PE-Installation of Plastic Pipe Plowing/Pull-In
- EWN-CBT-Installation of Plastic Pipe by Plowing/Planting
- EWN-PE-Installation of Plastic Pipe by Plowing/Planting[117]

[117] Spire response to Staff Data Request 0041.9.

For the covered task of an increase in operating pressure of existing plastic main, Spire requires the following EWN evaluations to be successfully completed in order for an individual to be considered qualified to perform the covered task:

Computer Evaluations:

- EWN-CBT-AOC Inoperability of a Pipeline Component
- EWN-CBT-Pressure Test: Nonliquid Medium-MAOP Less Than 100 psi
- EWN-CBT-Pressure Test: Nonliquid Medium-MAOP Greater Than or Equal to 100 psi
- EWN-CBT-AOC Report of Gas Odor/Liquid Release
- EWN-CBT Leak Test at Operating Pressure
- EWN-CBT-AOC Flammable Gas Atmosphere
- EWN-CBT-Visually Inspect Pipe and Pipe Components Prior to Installation

Performance Evaluations:

- EWN-PE-Pressure Test-Nonliquid Medium MAOP Less Than 100 psi
- EWN-PE-Pressure Test: Nonliquid Medium-MAOP Greater Than or Equal to 100 psi
- EWN-PE-Visually Inspect Pipe and Pipe Components Prior to Installation[118]

For the covered task of live gas work, Spire stated that the evaluations for the covered task of live gas work are completed by being qualified under other covered tasks in particular being performed.[119]

With regards to the covered task of squeeze-off of main pipe, Contractor Employee A successfully completed all the Spire required evaluations within the

[118] Spire response to Staff Data Request 0041.10.

[119] Spire response to Staff Data Request 0041.12.

39 months prior to the incident except: EWN-CBT-Squeeze of Steel Pipe and EWN-PE-Squeeze Off Steel Pipe. Spire stated that an employee can be qualified to perform the task of squeeze-off of main pipe on specifically plastic pipe if the employee successfully completes the evaluations regarding squeeze-offs on plastic pipe; that employee is not required to complete the evaluations regarding squeeze-offs on steel pipe, but through this process the employee would not be qualified to perform squeeze-offs on steel pipe.[120] With regards to the covered task of service abandonment, Contractor Employee A successfully completed all Spire required evaluations within the 39 months prior to the incident. With regards to the covered task of service installation, Contractor Employee A successfully completed all the Spire required evaluations within the 39 months prior to the incident except: EWN-CBT-Joining of Plastic Pipe-Socket Heat Fusion, EWN-CBT-Install Tracer Wire, and EWN-PE-Joining of Plastic Pipe-Socket Heat Fusion. Spire stated that Contractor Employee A did not perform the covered task of service installation at the project at the 1100 block of The Paseo.[121] With regards to the covered task of increase in operating pressure of an existing plastic main, Contractor Employee A successfully completed all Spire required evaluations within the 39 months prior to the incident.[122]

In order to connect the qualification records with the covered task list included in ** _____ **, Spire provided a list of evaluations through MEA necessary for Spire to consider an

[120] Spire response to Staff Data Request 0041.14.

[121] Spire response to Staff Data Request 0041.15.

[122] Contractor Employee A's qualification records were provided in Spire's response to Staff Data Request 0026.

individual qualified to perform the covered tasks expected to be performed and each of those tasks actually performed at the 1100 block of The Paseo in response to Staff Data Requests 0060.2. For the covered task of squeeze-off of main pipe, Spire requires the following MEA evaluations to be successfully completed in order for an individual to be considered qualified to perform the covered task:

- 192-1414 Pipeline Shutdown, Startup or Pressure Change (MEA1167)
- 192-1418 Purging (MEA1170)
- 192-0101 Characteristics and Hazards of Natural Gas (MEA1459)
- 192-2011 Prevention of Accidental Ignition (MEA1185)
- 192-Abnormal Operating Conditions (MEA1291)[123]

For the covered task of service abandonment, Spire requires the following MEA evaluations to be successfully completed in order for an individual to be considered qualified to perform the covered task:

- 192-2014 Service Lines Not In Use and Service Discontinuance (MEA1186)
- 192-1418 Purging (MEA1170)
- 192-1401 Abandonment or Inactivation of Facilities (MEA1157)
- 192-0101 Characteristics and Hazards of Natural Gas (MEA1459)
- 192-2011 Prevention of Accidental Ignition (MEA1185)
- 192-Abnormal Operating Conditions (MEA1291)[124]

[123] Spire response to Staff Data Request 0060.2.

[124] Spire response to Staff Data Request 0060.2.

For the covered task of service installation, Spire requires the following MEA evaluations to be successfully completed in order for an individual to be considered qualified to perform the covered task:

- 192-1301 Leak and Strength Test-Service Lines, Mains, and Transmission Lines (MEA1156)
- 192-0803 Inspection for Damage (MEA1145)
- 192-1005 Mechanical Joints (MEA1151)
- 192-1003 Plastic Pipe-Butt Heat Fusion (MEA1149)
- 192-1004 Plastic Pipe-Sidewall Heat Fusion (MEA1150)
- 192-1002 Plastic Pipe-Electrofusion (MEA1148)
- 192-Abnormal Operating Conditions (MEA1291)
- 192-1408 Installation of Plastic Pipe (MEA1162)
- 192-0101 Characteristics and Hazards of Natural Gas (MEA1459)
- 192-2011 Prevention of Accidental Ignition (MEA1185)[125]

For the covered task of increase in pressure of existing plastic main, Spire requires the following MEA evaluations to be successfully completed in order for an individual to be considered qualified to perform the covered task:

- 192-0803 Inspection for Damage (MEA1145)
- 192-1301 Leak and Strength Test-Service Lines, Main and Transmission Lines (MEA1156)
- 192-0101 Characteristics and Hazards of Natural Gas (MEA1459)
- 192-2011 Prevention of Accidental Ignition (MEA1185)
- 192-Abnormal Operating Conditions (MEA1291)[126]

[125] Spire response to Staff Data Request 0060.2.

[126] Spire response to Staff Data Request 0060.2.

For the covered task of live gas work, Spire stated that the evaluations for the covered task of live gas work are completed by being qualified under other covered tasks in particular being performed.[127]

With regards to all of the covered tasks expected to be completed and those actually completed during the project at the 1100 block of The Paseo, Contractor Employee C had successfully completed all Spire required MEA evaluations within the 39 months prior to the incident.[128]

Contractor Employee E came to the aid of Contractor Employee A and performed a squeeze-off of plastic main pipe as part of the emergency response to the incident.[129] Based on the records provided in response to Staff Data Request 0026, Contractor Employee E was missing the Spire required EWN-CBT-Squeeze Off Plastic Pipe and EWN-PE-Squeeze Off Plastic Pipe evaluations through EWN to be qualified to perform the covered task of squeeze-off of plastic main pipe. Based on the records provided in response to Staff Data Request 0026, Contractor Employee E was missing the Spire required 192-1418 Purging (MEA1170)[130], 192-0101 Characteristics and Hazards of Natural Gas (MEA1459), 192-2011 Prevention of Accidental Ignition (MEA1185), 192-Abnormal Operating Conditions (MEA1291) evaluations through MEA to be qualified to perform the covered task of squeeze-off of plastic main pipe. Contractor

[127] Spire response to Staff Data Request 0041.12.

[128] Spire response to Staff Data Request 0026.

[129] Spire responses to Staff Data Requests 0025 and 0041.14.

[130] Staff understands that although Contractor Employee E did not complete 192-1418 Purging (MEA1170), the equivalent EWN module (EWN 1651 Purge-Flammable or Inert Gas) can be used in place of this module. Records provided by Spire show Contractor Employee E had successfully completed EWN 1651 Purge-Flammable or Inert Gas.

Employee A was nearby to Contractor Employee E when Contractor Employee E performed the covered task of squeeze-off of main pipe.[131]

Spire also indicated that the Spire Contract Inspector position requires OQ training and evaluations.[132] Spire provided the following list of training and evaluations necessary to be considered qualified to perform the work required of Spire Contract Inspectors:

- 1000 – Monitoring Cathodic Protection
- 1010 - Corrosion Prevention
- 1030 – Measure Corrosion
- 1080 – Testing & Inspection of Pipeline Facilities
- 1090 – Joining of Pipe
- 1100 – Plastic Pipe Fusion
- 1120 – Cast Iron Installation & Maintenance
- 1130 – Steel Pipe Installation & Maintenance
- 1140 – Plastic Pipe Installation & Maintenance
- 1150 – Above Ground Pipe Installation
- 1160 – Backfilling
- 1170 – Pipeline Coatings
- 1180 – Tapping and Stopping
- 1200 – Odorizes and Odorants
- 1210 – Gas Leak Investigation & Classification

[131] Spire response to Staff Data Request 0025.

[132] Spire response to Staff Data Request 0056.

- 1220 – Gas Leak Survey
- 1230 – Locating Underground Facilities
- 1240 – Pipeline Markers and Rights-of-Way
- 1250 – Damage Prevention
- 1260 – Pipeline Support
- 2040 - Fire School
- 2050 – Environmental Awareness
- 2060 – Fitting Recognition
- 2120 – Emergency Plan
- 2150 – NIMS/ICS Incident Response, Contract Inspection, and Personal Protective Equipment[133]

Spire provided the qualification records for its Contract Inspector assigned to oversee the work done by the Contractor, and the Spire Contract Inspector had successfully completed all the training and evaluations within the 39 months prior to the incident required to be considered qualified to perform the work required by Spire of its Contract Inspectors.[134]

Spire indicated that an investigation was conducted to determine if the performance of any covered task(s) caused or contributed to this incident.[135] Spire stated, "The Company's and Contractor's investigation determined that the cause of the incident was that proper procedures were not followed in that the covered task was performed

[133] Spire response to Staff Data Request 0056.2.

[134] Spire response to Staff Data Request 0056.3.

[135] Spire response to Staff Data Request 0043.

using a Sawzall. The individuals involved were either terminated or suspended from further work until requalification was completed under the OQ program requirements.[136]" Spire also stated with respect to Contractor Employee A, "The training and qualification of this individual were sufficient at the time he was trained and qualified. It is the Company's [Spire's] policy to revoke the qualifications of any individual who is found to have not followed Company [Spire] procedures in the field. Such employees must be re-trained and re-qualified prior to returning to the performance or supervision of field work.[137]"

4 CSR 240-40.030(12)(D)4.B. requires that personnel to whom this subsection[138] applies must possess the knowledge and skills necessary to carry out the procedures in the procedural manual for operations, maintenance and emergencies established under 4 CSR 240-40.030(12)(C)[139] that relate to the covered tasks they perform. Spire stated:

> Operations Training provided ** _____ ** with the entire O&M manual on December 15, 2016 and has provided them with updated Standards since that time as changes are made. ** _____ ** management is instructed to ensure employees are aware of these procedures and where to access them. Additionally, Spire procedures, and how to access them, is discussed during annual plastic fusion qualification classes.[140]

** _____

_____

[136] Spire response to Staff Data Request 0043.

[137] Spire responses to Staff Data Requests 0025 and 0038.4.

[138] Subsection refers to 4 CSR 240-40.030(12)(D) Qualification of Pipeline Personnel.

[139] 4 CSR 240-40.030(12)(C) requires that, among other things, an operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response.

[140] Spire response to Staff Data Request 0023.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____ **[141]

In order to ensure that the Contractor crew individuals working at 1106 The Paseo possessed the knowledge and skills necessary to carry out the procedures in the procedural manual for operations, maintenance and emergencies, Spire stated, "The Company inspector[142] verifies OQ records[143] for all individuals assigned to a project prior to commencement of work. As part of operator qualification, contractor personnel were evaluated on the knowledge and skills necessary to carry out the procedures in the procedural manual for operations, maintenance and emergencies established by the Company that relate to the covered tasks they perform."[144] The Spire Contract Inspector is also responsible for ensuring that qualified individuals possess the knowledge and skills necessary to recognize and react to abnormal operating conditions, to recognize potential ignition sources, to recognize conditions that would likely cause emergencies, including equipment or facility malfunctions or failure and gas leaks, in order to predict the potential consequence of these conditions and take appropriate

[141] Attachment to Spire response to Staff Data Request 0039.

[142] "Company inspector" is the same Spire Contract Inspector mentioned above.

[143] Spire response to Staff Data Request 0026.

[144] Spire response to Staff Data Request 0044.

corrective action, and to take steps necessary to control any accidental release of gas and to minimize the potential for fire or explosion.[145]

Spire stated that, in order to ensure that the Contractor individuals working at 1106 The Paseo possessed the knowledge and skills necessary to know the proper use of firefighting procedures and equipment, fire suits, and breathing apparatus, ** _____ ** new hire safety orientation discusses the general principles of fire extinguisher operation, and the natural gas presentation in the orientation discusses controlling ignition sources in an emergency situation.[146] Spire provided documentation pertaining to the new hire safety orientation of the three individuals working on the Contractor work crew at 1106 The Paseo in response to Staff Data Request 0048.2.

Spire indicated that the Contractor work crew had been trained to utilize instruments and equipment that relate to the covered tasks they perform in accordance with manufacturer's instructions.[147]

Operator Qualification Staff Expert: Clinton L. Foster

L. Distribution Integrity Management Program ("DIMP") [4 CSR 240-40.030(17)]

In 2011 when the requirements of 4 CSR 240-40.030(17), DIMP, became effective, the company now known as Spire had three DIMP Plans – one for Missouri Gas Energy (at that time, a separate company from Laclede Gas), one for Missouri Natural (a former operating district of Laclede Gas) and one for Laclede Gas (at that

[145] As stated in Spire responses to Staff Data Requests 0015, 0042, 0045, 0046, 0047.

[146] Stated in Spire response to Staff Data Request 0048.

[147] Spire response to Staff Data Request 0010.3. Instruments and equipment included in this response are a Bascom-Turner, Gas Sentry CGI-201 (Combustible Gas Indicator), fire resistant suit and hood, and an Allegro Model A-300 supplied air respirator.

time, a separate Company from MGE). Currently, Spire has one combined DIMP Plan for its Missouri operations, and is in compliance with the requirements of 4 CSR 240-40.030(17).[148]

In its incident report provided to PHMSA,[149] Spire lists the apparent cause of the incident as "Incorrect Operation". "Incorrect Operation" is one of the threat categories that must be considered in an operator's DIMP. In the DIMP Plan that was effective for Spire Missouri West at the time of the incident, incorrect operation is identified as a potential threat to both mains and service lines. In response to a Staff Data Request[150] asking about the status of incorrect operation in Spire's currently effective DIMP Plan, Spire stated:

> The Company already ranks the threat of Incorrect Operations relative to other potential threats to its system. Currently, Incorrect Operations is not identified as a top threat and therefore does not require accelerated action to be taken. In the future, if Incorrect Operations is identified as a top threat the Company will review the drivers of elevated risk and create an accelerated action plan to address them.

In response to a Staff Data Request[151] asking if Spire's currently effective DIMP Plan addressed the possibility/risk of contractors working for Spire with respect to the threat of "incorrect operation", Spire stated:

> The Company's DIMP plan does not specifically address contractor work as a sub-threat of Incorrect Operations.

Distribution Integrity Management Program ("DIMP")
Staff Expert: Kathleen A. McNelis, PE

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[148] Staff conducts routine inspections of the DIMP Plans and DIMP implementation by the natural gas operators jurisdictional to the Commission. An inspection of Spire's DIMP was conducted in August of 2018.

[149] Commission Rule 4 CSR 240-40.020(6)(A) requires that each operator must submit a federal incident report on Form PHMSA F 7100.1 as soon as practicable but not more than thirty (30) days after detection of an incident required to be reported under 4 CSR 240-40.020(3). Spire's initial incident report was provided in response to Staff Data Request 0051 and its supplemental incident report was provided in response to Staff Data Request 0067.2.

[150] Spire response to Staff Data Request 0050d.

[151] Spire response to Staff Data Request 0050e.

M. Leakage Surveys and Leaks [4 CSR 240-40.030(13)(M) and 4 CSR 240-40.030(14)]

4 CSR 240-40.030(13)(M)1. requires that each operator of a distribution line or system shall conduct periodic[152] instrument leakage surveys. Prior to the incident, leakage surveys had most recently been conducted by Spire in the area July 5 through 9, 2018. No leaks were identified during this leakage survey and there were no known active leaks within a two block radius around 1106 The Paseo at the time of the incident.[153]

Leakage Surveys and Leaks Staff Expert: Clinton L. Foster

N. Odorization Records [4 CSR 240-40.030(12)(P)]

4 CSR 240-40.030(12)(P)1. requires that combustible gas in a transmission line or distribution line must contain natural odorant, or be odorized so that at a concentration in air of one-fifth of the lower explosive limit[154] the gas is readily detectible by a person with a normal sense of smell.

4 CSR 240-40.030(12)(P)6. requires that, to assure the proper concentration of odorant in accordance with this subsection,[155] each operator must conduct, at least monthly, odor intensity tests with an instrument capable of determining the percentage of gas in air at which the odor becomes readily detectible. The records of odor intensity tests performed by Spire in the distribution system serving the incident location demonstrated that the natural gas was readily detectable at gas-in-air concentrations of

[152] For the pipeline in the area within a two block radius around 1106 The Paseo, 4 CSR 240-40.030(13)(M)2.B. requires, at minimum, these instrument leakage surveys be conducted as frequently as necessary, but at intervals not exceeding thirty-nine (39) months, but at least once each third calendar year.

[153] Spire response to Staff Data Request 0019.

[154] Based upon a lower explosive limit ("LEL") at 4.5 percent gas-in-air, 4 CSR 240-40.030(12)(P)1. requires the odorant in natural gas to be readily detectable at a concentration of less than 0.90 percent gas-in-air.

[155] Subsection refers to 4 CSR 240-40.030(12)(P).

approximately 0.25 percent gas in air during the month prior to the incident.[156] In the six months prior to the incident, records of odor intensity tests performed by Spire in the distribution system serving the incident location demonstrated that the natural gas was readily detectable at gas in air concentrations varying between 0.15 and 0.30 percent.[157] Spire did not receive any notifications of a gas odor on July 16, 2018, within a one-block radius around the incident site.[158]

Odorization Records Staff Expert: Clinton L. Foster

O. <u>Missouri Public Service Commission Reporting Requirements [4 CSR 240-40.020)]</u>

Spire confirmed discovery of an incident meeting the reporting requirements of Commission Rule 4 CSR 240-40.020(2)(C) at approximately 1:00 p.m. CDT on July 16, 2018.[159] The incident reporting requirements in 4 CSR 240-40.020(3), (4), and (5) were completed as follows:

1. Spire made the initial telephone notification of a natural gas incident to a Staff member at approximately 1:00 p.m., CDT on July 16, 2018.[160]
2. Spire notified the United States Department of Transportation-Pipeline and Hazardous Materials Safety Administration (DOT-PHMSA) of a natural gas incident at approximately 1:06 p.m., CDT on July 16, 2018 (NRC Report Number 1218524).[161]

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[156] Spire response to Staff Data Request 0017.

[157] Spire response to Staff Data Request 0017.

[158] Spire response to Staff Data Request 0021.

[159] Spire response to Staff Data Request 0062.

[160] 4 CSR 240-40.020(4)(A) requires the operator to notify designated Commission personnel by telephone within two hours following discovery, unless emergency efforts to protect life and property would be hindered and then as soon thereafter as practicable, for each event which meets the natural gas incident reporting requirements.

[161] Spire response to Staff Data Request 0064.

3. DOT-PHMSA form PHMSA F 7100.1 titled "Incident Report – Gas Distribution System" was completed by Spire and initially submitted to Staff on August 15, 2018.[162] Spire also submitted the form to DOT-PHMSA electronically. A supplemental Incident Report was submitted to DOT-PHMSA on May 16, 2019,[163] with a copy provided to Staff in response to Staff Data Request 0067.2.

Missouri Public Service Commission Reporting Requirements
Staff Experts: Clinton L. Foster and Kathleen A. McNelis, PE

P. <u>Spire Investigation of Failure [4 CSR 240-40.030(12)(L)]</u>

Spire's failure analysis procedure for reportable incidents is in ** _____ _____ . ** This procedure requires among other things, an investigation and attempt to determine the incident cause (Section 2.3), and recommendations, if any, on corrective action needed to prevent a recurrence (Section 5.2.6). According to Spire, the results of its failure analysis[164] were as follows[165]:

> The results of the Company's failure analysis were that the Company's training and operator qualifications programs were sufficient with respect to the construction conditions and that the incident resulted from the contract employee's decision to not follow established procedures. In an effort to minimize the possibility of a recurrence, the Company will circulate a 'lessons learned' notification to all internal Field Operations employees concerning the events surrounding this incident by October 31, 2018. ** _____ ** has already circulated a 'lessons learned' notification to all contract crews concerning the events surrounding this incident and has disciplined the responsible employees. Furthermore, the Company will continue to address Company employees or contractor

[162] Initially a copy of the PHMSA F7100.1 report was provided to Staff via email on August 15, 2018. An additional copy was provided in response to Staff Data Request 0051.

[163] Information obtained by Staff through the PHMSA Portal.

[164] Spire response to Staff Data Request 0038.

[165] Spire response to Staff Data Request 0038.

employees according to Company policies who do not follow Company procedures.

Copies of Spire's and Contractor's "lessons learned" notifications are provided as Appendix D.

Spire Investigation of Failure Staff Expert: Kathleen A. McNelis, PE

Q. <u>Compliance with Drug and Alcohol Testing Requirements [4 CSR 240-40.080)]</u>

Spire provided copies of both the ** _____ _____ ** Spire Missouri West Alcohol Testing Policy Pipeline & Transportation, ** _____ ** in response to Staff Data Request 0030. While the ** _____ ** policy does not specifically state that ** _____ ** will conform to the requirements of 49 CFR Parts 40 and 199, ** _____ _____ _____ . **[166]

<u>Pre-employment testing:</u>

In response to Staff Data Request 0066, Spire provided documentation that the ** _____ ** employees involved in this incident were drug and alcohol tested pre-employment.

<u>Random Testing:</u>

In response to Staff Data Request 0067, Spire provided documentation that ** _____ ** employees were randomly tested at a rate of at least 50%. Further, Spire stated that in response to Staff Data Request 0066 that ** _____

[166] Spire's confidential attachment to response to Staff Data Request 0059.

_____

_____

_____

_____ **

Post-Incident Testing:

A Contractor work crew from ** _____

_____[167]

_____ **[168] were assigned to this project. The covered function being performed immediately prior to the incident was ** _____

_____ . **[169] Additionally, ** _____

_____ ** were involved in the emergency response.

In its August 15, 2018 Incident Report, Spire stated the cause of the incident as: ** _____

_____

_____

____[170] _____

_____

_____

[167] Spire confidential response to Staff Data Request 0003.

[168] Spire confidential response to Staff Data Request 0002.

[169] Spire confidential response to Staff Data Request 0001.

[170] Spire confidential response to Staff Data Request 0031.

_____

_____ [171] **

In response to Staff Data Request 0030, Spire stated that "** _____

_____

_____

_____

_____ **"

Based on Spire's response in the PHMSA 7100.1 Incident Report Form[172] and to Staff's Data Request 0030, it appeared initially as though two Contractor employees were tested post-incident as required by 49 CFR 199.225(a) as adopted by 4 CSR 240-40.080. However, the Management Information System ("MIS") reports[173] submitted by ** _____ ** for calendar year 2018 showed no post-incident drug or alcohol tests were performed.[174]

In response to Staff Data Request 0067.1, asking why the Drug and Alcohol Testing MIS Data Collection Form for ** _____

_____ **, Spire responded: ** _____

_____

_____

[171] Confidential attachment to Spire's response to Staff Data Request 0051.

[172] Confidential attachment to Spire's response to Staff Data Request 0051.

[173] For each large operator having more than 50 covered employees, drug and alcohol test results must be reported annually to the Pipeline and Hazardous Materials Safety Administration ("PHMSA") in the Office of Pipeline Safety of the U.S. Department of Transportation no later than March 15 of each year for the previous calendar year in a Management Information System ("MIS") report.

[174] A copy was provided by Spire in response to Staff Data Request 0067.

_____

_____ **

In response to Staff's Data Request 0067.2 questioning the discrepancy between the number of post-incident drug and alcohol tests reported in the MIS report provided in response to Staff's Data Request 0067.1 ** ____ ** and number of post incident drug and alcohol tests reported in Spires's PHMSA 7100.1 Incident Report Form ** ____ **, Spire responded:

> The Company was originally informed by ** _____ ** that two contract employees had been drug and alcohol tested as a result of the incident… Subsequent discussion with ** _____ ** has revealed that, while drug testing was requested by ** _____ ** from the hospital, ** _____
> _____
> _____ ** Therefore, the information provided in Part F of the Form PHMSA F7100.1 needs to be updated.

Spire submitted a supplemental Form PHMSA F7100.1 for this incident amending the number of employees tested to ** ___ ** and provided a copy as an attachment to Staff Data Request 0067.2.

Staff inquired in Data Requests why ** _____

_____ **. Spire's response indicated that ** _____

_____

_____ **

** _____

_____

_____

_____

_____

_____ [175] _____

_____ **[176]

None of the individuals assigned to the covered function or emergency response were tested for drugs or alcohol following the incident. In response to Staff Data Request 0065, Spire stated that ** " _____

_____ ." **

** _____

_____

_____ **[177]

Compliance with Drug and Alcohol Testing Requirements
Staff Expert: Kathleen A. McNelis, PE

R. Missouri Public Service Commission Staff Investigation

At the direction of the Pipeline Safety Program Manager, three (3) Safety Engineering Department Staff members and one Staff Counsel Attorney interviewed Spire and Contractor employees involved in the incident in Kansas City on July 25, 2018. Staff members also visited the incident site and viewed the physical information/material collected. Additional discovery has included submitting Data Requests to Spire and reviewing responses.

Missouri Public Service Commission Staff Investigation Staff Expert: Clinton L. Foster

[175] Spire confidential response to Staff Data Request 0013.2.

[176] Spire response to Staff Data Request 0068.

[177] Spire confidential response to Staff Data Request 0030.

APPENDIX B: Figures

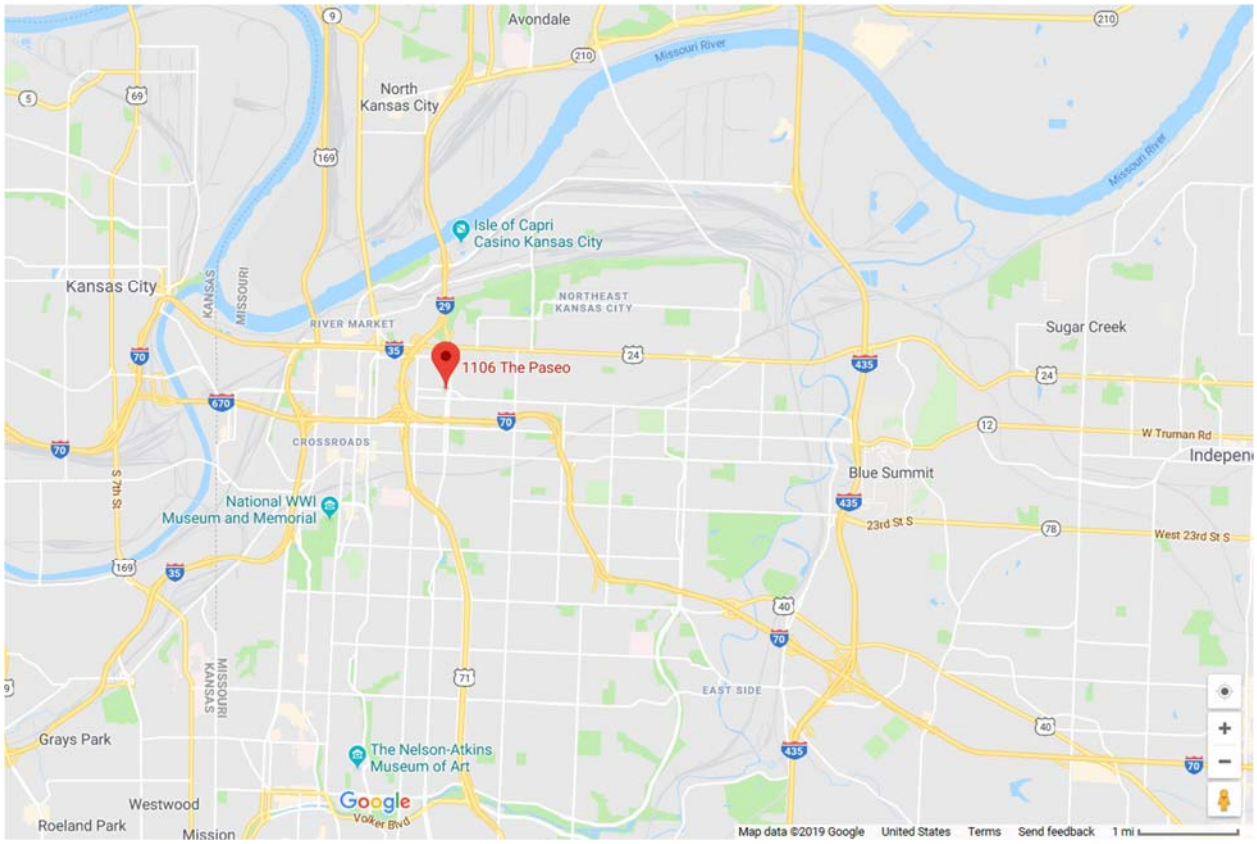

Figure 1: Approximate Location of Incident (Source: Google)

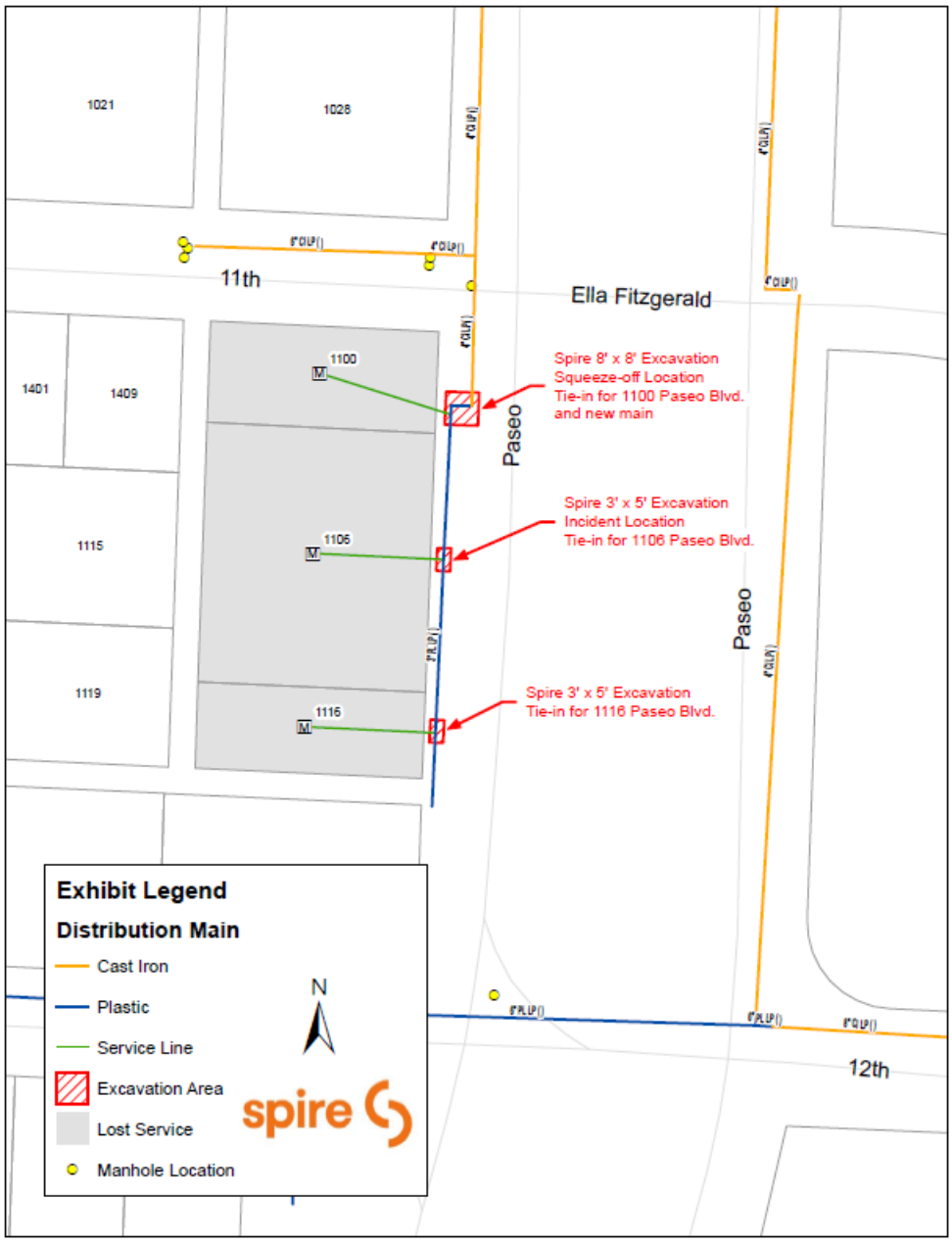

Figure 2: Schematic Representation of Spire Mains and Service Lines in the Incident Vicinity. A Note indicates a 3-foot by 5-foot Excavation at the Tie-In Location for the Service Line to 1106 to the Main along Paseo (Source: Spire)

APPENDIX C: Photographs

Photograph 1: Photograph looking down into the excavation following the incident. (Source of Photograph: Spire in Response to Staff Data Request 0032). The red arrow (added by Staff) points to electric reciprocating saw shown in Photograph 2. Note: In response to Staff Data Request 0061, Spire answered that the electric reciprocating saw in Photograph 2 is the same electric reciprocating saw at the bottom center of Photograph 1.

Photograph 2: Photograph of electric reciprocating saw following the incident (Source: Spire, confirmed in Spire response to Staff Data Request 0061).

Photograph 3: Photograph was taken on 07-24-2018 looking South along The Paseo. The excavation has been backfilled and its location is marked with a safety cone. (Source: Staff)

APPENDIX D: Lessons Learned

spire

LESSONS LEARNED SAFETY BULLETIN

Job Classification:	Contractor working for Spire Missouri (West)
Incident date/time:	7-16-18 10:23 am
Location:	Missouri West – 1106 Paseo
Job/task performed at time of injury:	Tie-in – Abandoning the existing steel service line
Nature of injury:	Gas Ignition resulting in 2 people burned

What happened?

A contractor for Spire was renewing a service line. The new service line was in place and the contractor crew was abandoning the existing steel service line. The existing service line was plastic to steel. Instead of safely stopping the flow of gas to the gas main or service line, the contractor cut the plastic portion of the existing service line with a ratchet pipe cutting tool resulting in gas escaping from the cut line for several minutes. While trying to insert a Permasert coupling in the open line, the contractor crew did not have a chamfering tool available, so they used a pocket knife instead. The contractor was unable to get the Permasert coupling installed and gas continued to escape. The contractor foreman instructed his employee to use an electric sawzall to cut the steel portion of the existing service line to allow more space to install the coupling. The contractor employee in the excavation expressed concern about using the sawzall, but proceeded with using the sawzall anyway. Within a few seconds an ignition occurred, resulting in serious burns to the contractor employee in the excavation, and also to a contract laborer who had just walked up near the excavation.

The cause

The electric Sawzall is believed to be the ignition source. The contractor's foreman failed to safely lead his crew. Required procedure for service line abandonment was not followed. There was failure to exercise stop work authority to prevent this incident. Work was being conducted in a gaseous environment without wearing a firesuit and fresh air breathing system. There was no fire watch in place.

Recommendations

Understand and follow proper work procedures for the work you are conducting. Ignition sources must always be kept away from gas. Wear all the required Fire protection including a fire suit, Kevlar hood, fire gloves and supplied air respirator when working in gaseous atmosphere. Exercise your "Stop Work Authority" when situations are not safe to proceed.

Source – Company Response to Staff Data Request 0038.1

** _____ ** ** _____ **

Injury Type/Body Part: Gas Release Fire with Employees Burned **Incident Date:** 7/16/2018

Location: Midwest Region – Kansas City, MO

Description (What Happened?):
Two employees were installing a two-inch PE tie-over and abandoning the existing service line. An electric Sawzall was used to cut the existing service line. A flash occurred, and two employees were taken to the KU burn center hospital. One employee was treated and released, and the other employee was released two days late when gas was released. An electric Sawzall was being used to cut the existing service. A flash occurred and the fire burned both employees. EMS was called both employees were taken to the hospital. **One employee received burns to more than 25% of his body.**

Questions to ask your crews:

- Is the work you are performing in conformance with customer and client requirements?
- Do I know the concentration of flammable gas in the area where I am working?
- Are you using the correct tools for the work?
- Do I have the correct PPE?

What we need to do?

- **Do Not** use Sawzalls or any power tool in a potential gaseous atmosphere.
- In all excavations where there is reason to suspect the presence of a flammable gas (e.g.; leak repair), the atmospheric environment in and around the excavation shall be tested with a CGI before personnel are allowed access.
- When a hazardous atmosphere exists, access to the excavation shall be limited to authorized personnel equipped with appropriate Personal Protective Equipment.
- When workers are required to be within the hazardous environment there must be an additional person assigned to observe the workers' activities and warn about changes in conditions or initiate rescue activities if necessary.
- Should a sudden, uncontrolled release of gas occur during excavation activities, operation of mechanized equipment shall cease immediately.
- A fire extinguisher shall be placed at a location upwind of the excavation and shall be staffed by an employee trained in the operation of a fire extinguisher.

Source – Company Response to Staff Data Request 0038.2

APPENDIX E: Summary of 4 CSR 240-40.030(12)(D) Operator Qualification Requirements and Definitions

Pipeline facility means "new and existing pipelines, rights-of-way, and any equipment, facility, or building used in the transportation of gas or in the treatment of gas during the course of transportation."[1]

4 CSR 240-40.030(12)(D)1.B. defines "covered task" as:

"an activity, identified by the operator, that –

(I) Is performed on a pipeline facility;

(II) Is an operations, maintenance or emergency-response task;

(III) Is performed as a requirement of this rule[2]; and

(IV) Affects the operation or integrity of the pipeline."

4 CSR 240-40.030(12)(D)2.C. defines "qualified" as:

"Qualified means that an individual has been evaluated and can:

(I) Perform assigned covered tasks; and

(II) Recognize and react to abnormal operating conditions."[3]

Therefore in order for an individual to be considered qualified to perform covered tasks, an individual must be evaluated.

4 CSR 240-40.030(12)(D)2.B. defines "evaluation (or evaluate)" as:

"Evaluation (or evaluate) means a process consisting of training and examination, established and documented by the operator, to determine an individual's ability to perform a covered task and to demonstrate that an individual possesses the knowledge and skills under paragraph (12)(D)4. After initial evaluation for paragraph (12)(D)4., subsequent evaluations for

[1] 4 CSR 240-40.030(1)(B)(33) – Definitions.

[2] Rule means 4 CSR 240-40.030 Safety Standards – Transportation of Gas by Pipeline.

[3] 4 CSR 240-40.030(12)(D)2.A. defines abnormal operating condition as a condition identified by the operator that may indicate a malfunction of a component or deviation from normal operations that may: (I) Indicate a condition exceeding design limits; (II) Result in a hazard(s) to persons, property, or the environment; or (III) Require an emergency response.

paragraph (12)(D)4. can consist of examination only. The examination portion of this process shall be conducted by one or more of the following:

(I) Written examination;

(II) Oral examination; or

(III) Hands-on examination, which could involve observation supplemented by appropriate queries. Observations can be made during:

(a) Performance on the job,

(b) On the job training, or

(c) Simulations."

4 CSR 240-40.030(12)(D)4. requires that personnel to whom this subsection applies must possess the knowledge and skills necessary to:

"A. Follow the requirements of this rule that relate to the covered tasks they perform;

B. Carry out the procedures in the procedural manual for operations, maintenance and emergencies established under (12)(C)[4] ([49 CFR] 192.605) that relate to the covered tasks they perform;

C. Utilize instruments and equipment that relate to the covered tasks they perform in accordance with manufacturer's instructions;

D. Know the characteristics and hazards of the gas transported, including flammability range, odorant characteristics and corrosive properties;

E. Recognize potential ignition sources;

F. Recognize conditions that are likely to cause emergencies, including equipment or facility malfunctions or failure and gas leaks, predict potential consequences of these conditions and take appropriate corrective action;

G. Take steps necessary to control any accidental release of gas and to minimize the potential for fire or explosion; and

[4] 4 CSR 240-40.030(12)(C) requires that, among other things, an operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response.

H. Know the proper use of firefighting procedures and equipment, fire suits and breathing apparatus by utilizing, where feasible, a simulated pipeline emergency condition."

Program Requirements:

4 CSR 240-40.030(12)(D)3. requires that each operator have and follow a written qualification program that includes provisions to:

"A. Identify covered tasks;

B. Ensure through evaluation that individuals performing covered tasks are qualified and have the necessary knowledge and skills to perform the tasks in a manner that ensures the safe operation of pipeline facilities;

C. Allow individuals that are not qualified pursuant to this subsection to perform a covered task if directed and observed by an individual that is qualified;

D. Evaluate an individual if the operator has reason to believe that the individual's performance of a covered task contributed to an incident meeting the Missouri reporting requirements in 4 CSR 240-40.020(4)(A);

E. Evaluate an individual if the operator has reason to believe that the individual is no longer qualified to perform a covered task;

F. Communicate changes, including changes to rules and procedures, that affect covered tasks to individuals performing those covered tasks and their supervisors, and incorporate those changes in subsequent evaluations;

G. Identify the interval for each covered task at which evaluation of the individual's qualifications is needed, with a maximum interval of thirty-nine (39) months;

H. Evaluate an individual's possession of the knowledge and skills under paragraph (12)(D)4. at intervals not to exceed thirty-nine (39) months;

I. Ensure that covered tasks are:

(I) Performed by qualified individuals, or

(II) Directed and Observed by qualified individuals"

Record Keeping:

4 CSR 240-40.030(12)(D)8. requires that each operator maintain records that demonstrate compliance with this subsection.

"A. Qualification records shall include:

(I) Identification of the qualified individual(s);

(II) Identification of the covered tasks the individual is qualified to perform;

(III) Date(s) of current qualification; and

(IV) Qualification Methods[5]

B. Records supporting an individual's current qualification shall be maintained while the individual is performing the covered task. Records of prior qualification and records of individuals no longer performing covered tasks shall be retained for a period of five (5) years."[6]

[5] 4 CSR 240-40.030(12)(D)8.A.

[6] 4 CSR 240-40.030(12)(D)8.B.

OPERATOR QUALIFICATION
FIELD INSPECTION PROTOCOL FORM

Inspection Date(s):	
Name of Operator and OPID:	
Inspection Location(s):	
Supervisor(s) Contacted:	
# Qualified Employees Observed:	
# Qualified Contractors Observed:	

Individual Observed	Title/Organization	Phone Number	Email Address

To add rows, press TAB with cursor in last cell.

PHMSA/State Representative	Region/State	Email Address

To add rows, press TAB with cursor in last cell.

Remarks:
A table for recording specific tasks performed and the individuals who performed the tasks is on the last page of this form. This form is to be uploaded on to the OQBD for the appropriate operator, then imported into the file.

9.01 Covered Task Performance

Verify the qualified individuals performed the observed covered tasks in accordance with the operator's procedures or operator approved contractor procedures.

9.01 Inspection Results (type an X in exactly one cell below)		**Inspection Notes**
	No Issue Identified	
	Potential Issue Identified (explain)	
	N/A (explain)	
	Not Inspected	

Guidance: The employee or contractor individual(s) should be observed performing two separate covered tasks, with only one of the covered tasks being performed as a shop simulation. Obtain a copy of the procedure(s) used to perform the task(s). The individuals should be able to describe key items to be considered for correct performance of the task, and demonstrate strict compliance with procedure requirements. If a crew performing a job is observed (such as installing a service line, tapping a main and supplying gas to a meter set), the individual covered tasks should be identified and documented and the crew member performing the task(s) should be questioned as above.

Additional considerations for covered task observations:

1. Determine if procedures prepared by the operator to conduct the task(s) are present in the field and are being used as necessary to perform the task(s).
2. Confirm that the procedures being used in the field are the same (content, revision number, and/or date issued) as the latest approved procedures in the operator's O&M manual.
3. Confirm that the procedures employed by contractor individuals performing covered tasks are those approved by the operator for the tasks being performed.
4. Ensure that procedure adherence is accomplished and that "work-arounds"[1] are not employed that would invalidate the evaluation and qualification that was performed for the individual in performance of the task.
5. Determine if all of the tools and special equipment identified in procedures are present at the job site and are properly employed in the performance of the task, and if techniques and special processes specified are used as described. In certain circumstances, a contractor may operate the pipeline for an owner/operator. In that case, review which procedures have been used to qualify the individuals performing covered tasks and review records accordingly. Also ensure the "operating contractor" performs correct supervisory tasks such as reasonable cause determination.

[1] A "work-around" is a situation where the individual is using a procedure that wouldn't work the way it was written (due to an inadequate procedure or an equipment change that made the procedure steps invalid), or the individual has found a "better" way to get the job done faster instead of using the tool the way it was designed (e.g., not making depth measurements on a tapping tool because you had never drilled through the bottom of the pipe), or not taking the time to follow the manufacturer's instructions (not marking the stab depth when using a Continental coupling to join two sections of plastic pipe) because he never experienced a problem.

9.02 Qualification Status

Verify the individuals performing the observed covered tasks are currently qualified to perform the covered tasks.

9.02 Inspection Results (type an X in exactly one cell below)		**Inspection Notes**
	No Issue Identified	
	Potential Issue Identified (explain)	
	N/A (explain)	
	Not Inspected	

Guidance: The name of each individual observed should be noted and a subsequent review of their qualification records performed to ensure that: 1) the individual was qualified to perform the task observed; and 2) the individual's qualifications are current. A review of the evaluation requirements contained in the operator's or contractor's OQ written program should be performed to ensure that all requirements were met for the current qualification. In addition, a review of the evaluation instruments (written tests, performance evaluation checklists, etc.) may be performed to determine if any of these contain deficiencies (e.g., too few questions to ensure task knowledge, failure to address critical task requirements). Reviews of qualification records and/or evaluation instruments should ensure that AOC evaluation has been performed.

9.03 Abnormal Operating Condition Recognition and Reaction

Verify the individuals performing covered tasks are cognizant of the AOCs that are applicable to the tasks observed.

9.03 Inspection Results (type an X in exactly one cell below)		**Inspection Notes**
	No Issue Identified	
	Potential Issue Identified (explain)	
	N/A (explain)	
	Not Inspected	

Guidance: This inspection should focus on an individual's knowledge of the AOCs applicable to the covered task being performed and the ability to recognize and react to those AOCs. The information gained during the inspection should be compared to the requirements for qualification applied by the operator or contractor during the evaluation process for the subject covered task (e.g., knowledge of task-specific AOCs in addition to generic AOCs). If contractor individuals are observed, confirm whether the AOCs identified in the operator's written program are the ones used for qualification of the contractor individual.

9.04 Verification of Qualification

Verify the qualification records are current, and ensure the personal identification of all individuals performing covered tasks are checked, prior to task performance.

9.04 Inspection Results (type an X in exactly one cell below)		**Inspection Notes**
	No Issue Identified	
	Potential Issue Identified (explain)	
	N/A (explain)	
	Not Inspected	

Guidance: Supervisors, crew foremen or other persons in charge of field work must be able to verify that the qualifications of individuals performing covered tasks. This typically applies to individuals employed by the operator that are from another district or field office, where the qualification status may be unknown or uncertain, or to contractor individuals. Employee records should be made available through company databases or other means of verification, while contractors should be required to provide documentation of qualification prior to beginning work, and also provide a form of identification that is satisfactory to correlate the qualification documentation with the individual performing the task.

9.05 Program Inspection Deficiencies

Have potential issues identified by the headquarters inspection process been corrected at the operational level?

9.05 Inspection Results (type an X in exactly one cell below)		**Inspection Notes**
	No Issue Identified	
	Potential Issue Identified (explain)	
	N/A (explain)	
	Not Inspected	

Guidance: If the field inspection is performed subsequent to the headquarters inspection (six months or more), the OQ database or inspection records should be checked to determine if any potential issues that were identified as having implications for incorrect task performance (e.g., no skills evaluation for tasks requiring knowledge and skills; hands-on evaluations were performed as a group as opposed to individually; span of control was not specified on a task-specific basis; evaluation and qualification on changed tasks or changed procedures not performed; inadequate provisions for, or inadequate implementation of requirements for, suspension of qualification following involvement in an incident or for reasonable cause) have been corrected.

Field Inspection Notes

The following table is provided for recording the covered tasks observed and the individuals performing those tasks.

No	Task Name	Name/ID of Individual Observed			Comments
		Correct Performance (Y/N)	Correct Performance (Y/N)	Correct Performance (Y/N)	
1					
2					
3					
4					
5					
6					
7					
8					

.

MISSOURI PUBLIC SERVICE COMMISSION

STAFF's GAS INCIDENT REPORT

Appendix G

Credentials and Case Participation

Spire Missouri Inc. d/b/a Spire Missouri West

Case No. GS-2019-0015

Commission Staff Division
Safety Engineering Department
July 31, 2019 - Jefferson City, Missouri

TABLE OF CONTENTS OF
STAFF's GAS INCIDENT REPORT
CREDENTIALS AND CASE PARTICIPATION

SPIRE MISSOURI WEST
CASE NO. GS-2019-0015

Educational and Employment Background and Credentials
of
Brian J. Buchanan

I earned an Associates of Science degree in Civil Engineering and Construction Management from State Tech (Formerly Linn State Tech) in Missouri. I am a member of the Professional Fire and Fraud Investigators Association (PFFIA).

I am currently employed as a Technical Specialist II in the Safety Engineering Department in the Commission Staff Division of the Missouri Public Service Commission ("Commission"). The Safety Engineering Department performs inspections of natural gas pipeline operators jurisdictional to Missouri for enforcement of Missouri pipeline safety regulations, and performs investigations of pipeline related incidents. Training of Staff in the Safety Engineering Department to perform inspections and investigations is provided by the Pipeline and Hazardous Materials Administration (PHMSA)'s Inspector Training and Qualifications Division (TQ). The following is a listing of the PHMSAA TQ training requirements that I have completed:

Course Title from PHMSA TQ Learner Transcript
PHMSA-PL1245 Safety Evaluation of Distribution Integrity Management Programs (DIMP) Course
PHMSA-PL1250 Safety Evaluation of Gas Pipeline Systems Course
PHMSA-PL1255 Gas Pressure Regulation and Overpressure Protection Course
PHMSA-PL1310 Plastic and Composite Materials Course
PHMSA-PL1GLAW Introduction to Gas Laws
PHMSA-PL1HCA High Consequence Areas
PHMSA-PL1IPROC Integrity Management Processes
PHMSA-PL1ODOR Natural Gas Odorization
PHMSA-PL1P192 - Introduction to Part 192
PHMSA-PL1PRESS Fundamentals of Gas Pressure Regulators
PHMSA-PL1RA Introduction to Risk Assessment Methods
PHMSA-PL3242 Welding and Welding Inspection of Pipeline Materials Course
PHMSA-PL3256 Pipeline Failure Investigation Techniques Course
PHMSA-PL3257 Pipeline Safety Regulation Application and Compliance Procedures Course
PHMSA-PL3267 Fundamentals of Integrity Management Course

Course Title from PHMSA TQ Learner Transcript
PHMSA-PL3292 Safety Evaluation of Inline Inspection (ILI)/Pigging Programs Course
PHMSA-PL3293 Corrosion Control of Pipeline Systems Course
PHMSA-PL3322 Evaluation of Operator Qualification (OQ) Programs Course
PHMSA-PL3CP Fundamentals of Pipeline Corrosion and Cathodic Protection
PHMSA-PL3ECDA External Corrosion Direct Assessment
PHMSA-PL3ELEC Fundamentals of Basic DC Electricity
PHMSA-PL3PIG Fundamentals of Launching and Receiving Maintenance Pigs
PHMSA-PL3PP Fundamentals of Plastic Pipe
PHMSA-PL3REG Regulatory Overview
PHMSA-PL3WELD Introduction to Pipeline Welding

The following is a listing of cases before the Commission in which I have previously provided testimony or analysis through affidavits:

Company	Case Number	Filing Description	EFIS file date
Spire Missouri	GC-2018-0159	Staff Report	5/17/2018
Laclede Gas Company	GS-2016-0160	Staff Gas Incident Report	10/21/2016
City of New Florence	GS-2017-0324	Progress Report	06/29/2018, 03/29/19, 6/28/2019

Educational and Employment Background and Credentials
of
Clinton L. Foster

I earned a Bachelor of Science in Civil Engineering degree from the University of Missouri – Columbia. I am registered as an Engineer Intern in Missouri.

I am currently employed as a Utility Engineering Specialist II in the Safety Engineering Department in the Commission Staff Division of the Missouri Public Service Commission ("Commission"). The Safety Engineering Department performs inspections of natural gas pipeline operators jurisdictional to Missouri for enforcement of Missouri pipeline safety regulations, and performs investigations of pipeline related incidents. Training of Staff in the Safety Engineering Department to perform inspections and investigations is provided by the Pipeline and Hazardous Materials Administration (PHMSA)'s Inspector Training and Qualifications Division (TQ). The following is a listing of the PHMSA TQ training requirements that I have completed:

Course Title from PHMSA TQ Learner Transcript
PHMSA-PL1245 Safety Evaluation of Distribution Integrity Management Programs (DIMP) Course
PHMSA-PL1250 Safety Evaluation of Gas Pipeline Systems Course
PHMSA-PL1255 Gas Pressure Regulation and Overpressure Protection Course
PHMSA-PL1310 Plastic and Composite Materials Course
PHMSA-PL1DIMP Introduction of Distribution Integrity Management Program
PHMSA-PL1GLAW Introduction to Gas Laws
PHMSA-PL1HCA High Consequence Areas
PHMSA-PL1IPROC Integrity Management Processes
PHMSA-PL1P192 - Introduction to Part 192
PHMSA-PL1PRESS Fundamentals of Gas Pressure Regulators
PHMSA-PL1RA Introduction to Risk Assessment Methods
PHMSA-PL3242 Welding and Welding Inspection of Pipeline Materials Course
PHMSA-PL3256 Pipeline Failure Investigation Techniques Course
PHMSA-PL3257 Pipeline Safety Regulation Application and Compliance Procedures Course
PHMSA-PL3267 Fundamentals of Integrity Management Course
PHMSA-PL3291 Fundamentals of (SCADA) System Technology and Operations Course
PHMSA-PL3292 Safety Evaluation of Inline Inspection (ILI)/Pigging Program Course

Course Title from PHMSA TQ Learner Transcript
PHMSA-PL3293 Corrosion Control of Pipeline Systems Course
PHMSA-PL3322 Evaluation of Operator Qualification (OQ) Course
PHMSA-PL3355 Safety Evaluation of Control Room Management Programs
PHMSA-PL3600 Root Cause/Incident Investigation Course
PHMSA-PL3CP Fundamentals of Pipeline Corrosion and Cathodic Protection
PHMSA-PL3DA Drug and Alcohol Testing for the Pipeline Industry
PHMSA-PL3ECDA External Corrosion Direct Assessment
PHMSA-PL3ELEC Fundamentals of Basic DC Electricity
PHMSA-PL3HIP The History of Intelligent Pigging
PHMSA-PL3IC Investigating and Managing Internal Corrosion of Pipelines
PHMSA-PL3OQ Operator Qualification
PHMSA-PL3PAP Public Awareness Programs for Pipeline Operators
PHMSA-PL3PIG Fundamentals of Launching and Receiving Maintenance Pigs
PHMSA-PL3PP Fundamentals of Plastic Pipe
PHMSA-PL3REG Regulatory Overview
PHMSA-PL3SCADA Fundamentals of SCADA Systems
PHMSA-PL3WELD Introduction to Pipeline Welding

The following is a listing of cases before the Commission in which I have previously provided testimony or analysis through affidavits:

Company	Case Number	Filing Description	EFIS file date
Spire Missouri, Inc.	GC-2018-0159	Staff Report	5/17/18
City of New Florence	GS-2017-0324	Progress Report	12/29/2017, 6/29/2018, 12/28/2018, 3/29/2019, 6/28/2019
Laclede Gas Company	GS-2014-0226	Staff Gas Incident Report	12/18/2014

Educational and Employment Background and Credentials
of
John D. Kottwitz

I earned a Bachelor of Science in Civil Engineering degree from the University of Missouri – Rolla (now the Missouri University of Science and Technology). I have an Engineer-in-Training certificate in Missouri. I am a member of the Gas Piping Technology Committee (GPTC).

I am currently employed as a Utility Engineering Specialist III in the Safety Engineering Department in the Commission Staff Division of the Missouri Public Service Commission ("Commission"). The Safety Engineering Department performs inspections of natural gas pipeline operators jurisdictional to Missouri for enforcement of Missouri pipeline safety regulations, and performs investigations of pipeline related incidents. Training of Staff in the Safety Engineering Department to perform inspections and investigations is provided by the Inspector Training and Qualifications Division (TQ) of the Pipeline and Hazardous Materials Administration (PHMSA). The following is a listing of the PHMSA TQ training requirements that I have completed:

Course Title from PHMSA TQ Learner Transcript
PHMSA-PL1245 Safety Evaluation of Distribution Integrity Management Programs (DIMP) Course
PHMSA-PL1250 Safety Evaluation of Gas Pipeline Systems Course
PHMSA-PL1255 Gas Pressure Regulation and Overpressure Protection Course
PHMSA-PL1297 Gas Integrity Management (IM) Protocol Course
PHMSA-PL1310 Plastic and Composite Materials Course
PHMSA-PL1DIMP Introduction of Distribution Integrity Management Program
PHMSA-PL1HCA High Consequence Areas
PHMSA-PL1ICDA Internal Corrosion Direct Assessment
PHMSA-PL1IPROC Integrity Management Processes
PHMSA-PL1RA Introduction to Risk Assessment Methods
PHMSA-PL3242 Welding and Welding Inspection of Pipeline Materials Course
PHMSA-PL3251 Safety Evaluation of Pipeline Corrosion Control Systems Course I
PHMSA-PL3252 Safety Evaluation of Pipeline Corrosion Control Systems Course II
PHMSA-PL3254 Joining of Pipeline Materials Course
PHMSA-PL3256 Pipeline Failure Investigation Techniques Course
PHMSA-PL3257 Pipeline Safety Regulation Application and Compliance Procedures Course

Course Title from PHMSA TQ Learner Transcript
PHMSA-PL3267 Fundamentals of Integrity Management Course
PHMSA-PL3291 Fundamentals of (SCADA) System Technology and Operation Course
PHMSA-PL3292 Safety Evaluation of Inline Inspection (ILI)/Pigging Programs Course
PHMSA-PL3293 Corrosion Control of Pipeline Systems Course
PHMSA-PL3296 Pipeline Reliability Assessment Seminar
PHMSA-PL3306 External Corrosion Direct Assessment (ECDA) Field Course
PHMSA-PL3322 Evaluation of Operator Qualification (OQ) Programs Course
PHMSA-PL3355 Safety Evaluation of Control Room Management Programs
PHMSA-PL3365 Public Awareness Program Effectiveness Evaluation (PAPEE) Seminar
PHMSA-PL3600 Root Cause/Incident Investigation Course
PHMSA-PL3DA Drug and Alcohol Testing for the Pipeline Industry
PHMSA-PL3ECDA External Corrosion Direct Assessment
PHMSA-PL3IC Investigating and Managing Internal Corrosion of Pipelines
PHMSA-PL3OQ Operator Qualification
PHMSA-PL3PIG Fundamentals of Launching and Receiving Maintenance Pigs
PHMSA-PL3PAP Public Awareness Programs for Pipeline Operators
PHMSA-PL3SCADA Fundamentals of SCADA Systems
PHMSA-PL3SCCDA Stress Corrosion Cracking Direct Assessment

The following is a listing of cases before the Commission in which I have previously provided testimony or analysis:

Company	Case Number	Filing Description	File Date
Missouri Pipeline Company	GA-89-126	Direct Testimony	5/10/1989
Summit Natural Gas of Missouri	GC-2014-0202	Staff Report	2/10/2014
Laclede Gas Company	GE-2002-372	Staff Recommendation	2/28/2002
Atmos Energy Corporation	GE-2003-0007	Staff Recommendation Staff Recommendation	8/12/2002 11/5/2002
Missouri Association of Natural Gas Operators	GE-2003-0137	Staff Recommendation	1/9/2003
City of Kennett, Missouri	GE-2003-0503	Staff Recommendation	6/6/2003

Company	Case Number	Filing Description	File Date
Ameren Missouri	GE-2017-0164	Staff Recommendation	3/22/2017
Laclede Gas Company	GO-90-140	Staff Recommendation Staff Recommendation Staff Recommendation	2/22/1990 6/4/1990 3/14/1991
Associated Natural Gas Company	GO-90-167	Staff Recommendation	4/9/1990
Laclede Gas Company	GO-91-275	Staff Recommendation	7/13/1993
Kansas Power & Light Company	GO-91-277	Staff Recommendation	3/10/1992
Laclede Gas Company	GO-91-387	Staff Recommendation	7/15/1991
City of Perryville, Missouri	GO-92-73	Staff Recommendation	11/8/1991
Western Resources	GO-94-130	Staff Recommendation	11/16/1993
Missouri Public Service	GO-96-186	Staff Recommendation	12/13/1995
Missouri Gas Energy	GO-96-336	Staff Recommendation	5/7/1996
Associated Natural Gas Company	GO-97-180	Staff Recommendation	12/10/1996
Union Electric Company	GO-98-25	Staff Recommendation	10/16/1997
Missouri Public Service	GO-98-508	Staff Recommendation	6/11/1999
Associated Natural Gas Company	GO-98-567	Staff Recommendation	7/7/1998
Missouri Gas Energy	GO-99-302	Staff Recommendation	2/257/1999
Missouri Gas Energy	GO-2002-50	Staff Recommendation	9/6/2001
Laclede Gas Company	GO-2003-0506	Staff Recommendation Multiple Status Reports	6/13/2003 Annually
Atmos Energy Corporation	GO-2006-0253	Staff Recommendation	12/16/2005
Kansas Power & Light Company	GR-90-50	Direct Testimony	3/22/1990
Missouri Public Service	GR-90-198	Direct Testimony	9/11/1990
Missouri Gas Energy	GS-2003-0468	Staff Recommendation	9/2/2004

Company	Case Number	Filing Description	File Date
AmerenUE	GS-2006-0199	Staff Gas Incident Report	3/10/2006
Laclede Gas Company	GS-2007-0130	Staff Gas Incident Report	2/2/2007
Laclede Gas Company	GS-2011-0245	Staff Gas Incident Report	12/22/2011
Laclede Gas Company	GS-2014-0226	Staff Gas Incident Report	12/18/2014
Ameren Missouri	GS-2016-0159	Staff Gas Incident Report	5/31/2017
Laclede Gas Company	GS-2016-0160	Staff Gas Incident Report	10/21/2016

Educational and Employment Background and Credentials
of
Kathleen A. McNelis, PE

I earned a Bachelor of Chemical Engineering degree from the Georgia Institute of Technology and a Master's of Science in Metallurgical Engineering from the University of Missouri in Rolla (now the Missouri University of Science and Technology). I am a registered Professional Engineer (PE) in Missouri. I am a member of the National Association of Pipeline Safety Representatives (NAPSR) and the National Association of Corrosion Engineers (NACE).

I am currently employed as the Utility Regulatory Engineering Manager of the Safety Engineering Department in the Commission Staff Division of the Missouri Public Service Commission ("Commission"). The Safety Engineering Department performs inspections of natural gas pipeline operators jurisdictional to Missouri for enforcement of Missouri pipeline safety regulations, and performs investigations of pipeline related incidents. Training of Staff in the Safety Engineering Department to perform inspections and investigations is provided by the Pipeline and Hazardous Materials Administration (PHMSA)'s Inspector Training and Qualifications Division (TQ). The following is a listing of the PHMSA TQ training requirements that I have completed:

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PHMSA-PL1255 Gas Pressure Regulation and Overpressure Protection Course
PHMSA-PL1297 Gas Integrity Management (IM) Protocol Course
PHMSA-PL1310 Plastic and Composite Materials Course
PHMSA-PL1DIMP Introduction of Distribution Integrity Management Program
PHMSA-PL1GLAW Introduction to Gas Laws
PHMSA-PL1HCA High Consequence Areas
PHMSA-PL1ICDA Internal Corrosion Direct Assessment
PHMSA-PL1IPROC Integrity Management Processes
PHMSA-PL1ODOR Natural Gas Odorization
PHMSA-PL1P192 - Introduction to Part 192

Course Title from PHMSA TQ Learner Transcript
PHMSA-PL1PRESS Fundamentals of Gas Pressure Regulators
PHMSA-PL1RA Introduction to Risk Assessment Methods
PHMSA-PL3242 Welding and Welding Inspection of Pipeline Materials Course
PHMSA-PL3254 Joining of Pipeline Materials Course
PHMSA-PL3256 Pipeline Failure Investigation Techniques Course
PHMSA-PL3257 Pipeline Safety Regulation Application and Compliance Procedures Course
PHMSA-PL3267 Fundamentals of Integrity Management Course
PHMSA-PL3291 Fundamentals of (SCADA) System Technology and Operation Course
PHMSA-PL3292 Safety Evaluation of Inline Inspection (ILI)/Pigging Programs Course
PHMSA-PL3293 Corrosion Control of Pipeline Systems Course
PHMSA-PL3306 External Corrosion Direct Assessment (ECDA) Field Course
PHMSA-PL3322 Evaluation of Operator Qualification (OQ) Programs Course
PHMSA-PL3355 Safety Evaluation of Control Room Management Programs
PHMSA-PL3365 Public Awareness Program Effectiveness Evaluation (PAPEE) Seminar
PHMSA-PL3600 Root Cause/Incident Investigation Course
PHMSA-PL3CP Fundamentals of Pipeline Corrosion and Cathodic Protection
PHMSA-PL3DA Drug and Alcohol Testing for the Pipeline Industry
PHMSA-PL3ECDA External Corrosion Direct Assessment
PHMSA-PL3ELEC Fundamentals of Basic DC Electricity
PHMSA-PL3IC - Investigating and Managing Internal Corrosion of Pipelines
PHMSA-PL3OQ Operator Qualification
PHMSA-PL3PAP Public Awareness Programs for Pipeline Operators
PHMSA-PL3PIG Fundamentals of Launching and Receiving Maintenance Pigs
PHMSA-PL3PP Fundamentals of Plastic Pipe
PHMSA-PL3REG Regulatory Overview
PHMSA-PL3SCADA Fundamentals of SCADA Systems
PHMSA-PL3SCCDA Stress Corrosion Cracking Direct Assessment
PHMSA-PL3WELD Introduction to Pipeline Welding
PHMSA-PL4LNG Fundamentals of Liquefied Natural Gas (LNG)

The following is a listing of cases before the Commission in which I have previously provided testimony or analysis through affidavits:

Company	Case Number	Filing Description	EFIS file date
Grain Belt Express	EA-2016-0358	Staff Rebuttal Report	1/24/2017
Roeslein Alternative Energy Services, LLC-Investor(Gas)	GA-2016-0271	Staff Recommendation	6/28/2016
Spire Missouri	GC-2018-0159	Staff Report	5/17/2018
Summit Natural Gas of Missouri	GO-2018-0195	Staff Preliminary Report	3/21/2018
Liberty Utilities	GO-2019-0091	Staff Recommendation	1/9/2019
Ameren Missouri	GR-2014-0061	Staff Recommendation	12/18/2014
Summit Natural Gas of Missouri	GR-2014-0096	Staff Recommendation	10/10/2014
Summit Natural Gas of Missouri	GR-2014-0097	Staff Recommendation	10/10/2014
Empire District Gas	GR-2014-0108	Staff Recommendation	12/18/2014
Laclede Gas Company	GR-2014-0121	Staff Recommendation	12/19/2014
Laclede Gas Company	GR-2014-0231	Staff Recommendation	12/18/2015
Ameren Missouri	GR-2014-0238	Staff Recommendation	6/16/2015
Summit Natural Gas	GR-2015-0101	Staff Recommendation	12/14/2015
Empire District Gas	GR-2015-0109	Staff Recommendation	12/16/2015
Laclede Gas Company	GR-2017-0215 and GR-2017-0216	Staff Report - Class Cost of Service Report	9/22/2017
Liberty Utilities	GR-2018-0013	Staff Report – Class Cost of Service	3/16/2018
City Utilities of Springfield	GS-2004-0257	Status Reports	04/5/2016, 01/6/2017
Laclede Gas Company	GS-2009-0270	Staff Gas Incident Report	7/15/2009
Missouri Gas Energy	GS-2011-0248	Staff Gas Incident Report	12/9/2011
Ameren Missouri	GS-2016-0159	Staff Gas Incident Report	5/31/2017
Laclede Gas Company	GS-2016-0160	Staff Gas Incident Report	10/21/2016
City of New Florence	GS-2017-0324	Progress Report	12/29/2017, 06/29/2018, 6/28/2019

STATE OF MISSOURI

OFFICE OF THE PUBLIC SERVICE COMMISSION

I have compared the preceding copy with the original on file in this office and I do hereby certify the same to be a true copy therefrom and the whole thereof.

WITNESS my hand and seal of the Public Service Commission, at Jefferson City, Missouri, this 6th day of November 2019.

Morris L. Woodruff
Secretary

MOPSC Digitally signed by MOPSC Date: 2019.11.06 15:46:53 -06'00'

MISSOURI PUBLIC SERVICE COMMISSION

November 6, 2019

File/Case No. GC-2020-0127

Missouri Public Service Commission
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opcservice@opc.mo.gov

Spire
Legal Department
700 Market Street, 6th Floor
St. Louis, MO 63101

Enclosed find a certified copy of an Order or Notice issued in the above-referenced matter(s).

Sincerely,

Morris L. Woodruff
Secretary

Recipients listed above with a valid e-mail address will receive electronic service. Recipients without a valid e-mail address will receive paper service.