BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

The Staff of the Missouri Public Service Commission, Complainant, vs. Spire Missouri West (formerly doing business as Missouri Gas Energy), Respondent	)))))))))))	**Case No. GC-2022-XXXX**

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., and 20 CSR 4240-40.030, as follow-up to its investigation in Case No. GS-2021-0019, 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. Staff contends that Spire violated certain sections of the Commission's Gas Pipeline Safety Rule, 20 CSR 4240-40.030, with respect to the incident that occurred on July 1, 2020, regarding the conduct of Spire and the work of a Spire contractor to locate and mark the location of a Spire natural gas main in an area of planned excavation. The individuals performing the work to locate and mark the natural gas main were employed by a Spire contractor, ** [redacted] **, hereafter referred to as "Contract Locator".

Complainant

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

Respondent

3. Respondent Spire Missouri, Inc. (Spire Missouri) 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. 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 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. Some of the procedures in use by Spire Missouri West at the time the incident occurred were formerly Missouri Gas Energy ("MGE") procedures, and still have the MGE name on them. 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 Group. The Laclede Group, was formed in 2000 and changed its name to Spire, Inc. in 2016. Spire Missouri, Inc. is a wholly owned subsidiary of Spire, Inc.

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 definition of Section 386.020(18) RSMo., and a "public utility" within the definition of Section 386.020(43) RSMo., 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) RSMo., 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 RSMo., 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").

6. Section 386.570.1. RSMo. provides for a penalty between $100 to $2,000, per offense, for "[a]ny corporation, person or public utility which violates or fails to comply with any provision of the constitution of this state or any other law, or which fails, omits or neglects to obey observe or comply with any order, decision, decree, rule, direction, demand or requirement, or any part or provision thereof, of the commission…."

7. Section 386.572.2. RSMo. states the "maximum penalty for each violation shall [be] twenty thousand dollars" while the "maximum penalty for a continuing violation or a multiple series of violations of the same standard or rule provision shall [be] two hundred thousand dollars".

8. Pursuant to Section 386.590. RSMo. "[a]ll penalties….shall be cumulative of each other, and the suit for the recovery of one penalty shall not be a bar to or affect the recovery of any other penalty or forfeiture".

9. This Commission has authority to hear and determine complaints against public utilities pursuant to Section 386.390.1. RSMo. 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 . . . ."

10. This Commission is authorized by Section 386.310.1. RSMo. 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.

11. This Commission is authorized by Section 393.140(2) RSMo., 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) RSMo., 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

12. On May 28, 2020 an employee of ** [redacted] ** ("the Excavator"), an excavating company, notified the Missouri One Call System ("MOCS") that it planned to excavate in an area that included the grass median and west shoulder of the northbound lanes of U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri, on June 3, 2020.

13. On June 1, 2020 an employee of ** [redacted] **, (Contract Locator), a utility locating company working for Spire responded by stating "Clear/No Conflict," indicating that Spire had no pipeline facilities in the area to be excavated.

14. At approximately 3:32 p.m. CDT on July 1, 2020, the Excavator, using auger equipment to install a new guard rail, damaged a 12-inch diameter gas distribution main that is part of Spire's system. This pipeline runs east to west under U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri. The auger penetrated through the edge of a protective casing and into the pipeline, resulting in an unplanned release of natural gas.

15. Spire was notified of the release of natural gas shortly after it occurred, and worked through July 1, 2020 and into July 2, 2020 to shut down the pipeline and repair the damaged segment. Spire returned the pipeline to service by 5:40 p.m. on July 2, 2020.

16. Staff incorporates by reference the attached Staff's Gas Incident Report with appendices filed on June 30, 2021 in Case No. GS-2021-0019.

17. Spire filed its response to Staff's Gas Incident Report on September 13, 2021 in Case No. GS-2021-0019. Spire stated in its response that it had reviewed

Staff's Gas Incident Report and the recommendations contained therein and found that Staff's assessments of the facts surrounding the incident were correct. However, in order for the Commission to consider any resolution Staff and Spire may enter into to resolve the alleged violations, Staff must file a complaint.[1]

COUNT I

Failure to have adequate procedures within Spire's ** [redacted] ** to comply with 20 C.S.R. 4240-40.030(12)(I)3.G. was a violation of 20 C.S.R. 4240-40.030(12)(I)1.

18. The Staff's Gas Incident Report filed on June 30, 2021, in Case No. GS-2021-0019 at pages 16-20 and 22 in Section III.C. Damage Prevention Program covers the substance of this Count and is attached.

19. Spire's written program in effect at the time of the locate request required temporary marking of Spire's facilities as required by 20 C.S.R. 4240-40.030(12)(I)3.G., but it did not include specific procedures for requiring locators to perform a visual scan of the work area and to confirm the location of Spire's facilities through conductive methods. Performing a visual scan of the work area and confirmation of the pipe location by conductive method would have been necessary to provide for temporary marking of Spire's buried pipeline. Failing to have adequate procedures to comply with the requirements of 20 C.S.R. 4240-40.030(12)(I)3.G. was a violation of 20 C.S.R. 4240-40.030(12)(I)1., requiring Spire to have and carry out a written program to prevent damage to its pipelines by excavation activities.

[1] See Order Directing Staff to File a Complaint in Case No. GS-2019-0015.

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 Section 386.600 RSMo., authorize its General Counsel to seek penalties under Sections 386.570, 386.572 and 386.590 RSMo.; and grant such other and further relief as is just in the circumstances.

COUNT II

Failure to provide a copy of the applicable sections of the Missouri Underground Facility Safety and Damage Prevention Act, Chapter 319, Revised Statutes of Missouri (RSMo), in Spire's annual mailings to excavators was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written damage prevention program ** [redacted] **, a procedure necessary to meet the requirements of 20 C.S.R. 4240-40.030(12)(I)3.B.

20. The Staff's Gas Incident Report filed on June 30, 2021, in Case No. GS-2021-0019 at pages 17-18 and 22, in Section III.C. Damage Prevention Program covers the substance of this Count and the Incident Report is attached.

21. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs 1 through 19 above.

22. Spire's written damage prevention procedure ** [redacted] ** requiring Spire to provide educational mailings to excavators was consistent with the Commission's Gas Pipeline Safety Rule 20 CSR 4240-40.030(12)(I)3.B. However, Spire failed to carry out the requirement in its procedure. Specifically, Spire's failure to provide a copy of the applicable sections of the Missouri Underground Facility Safety and Damage Prevention Act, Chapter 319, Revised Statutes of Missouri (RSMo) in Spire's annual mailings to excavators as required by Spire's procedure was a violation of 20 C.S.R. 4240-40.030(12)(I)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 Section 386.600 RSMo., authorize its General Counsel to seek penalties under Sections 386.570, 386.572 and 386.590 RSMo.; and grant such other and further relief as is just in the circumstances.

COUNT III

Failure to provide temporary marking of Spire's buried pipeline in the area of excavation activity before, as far as practical, the activity begins was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written damage prevention program ** [redacted] **, a procedure necessary to meet the requirements of 20 C.S.R. 4240-40.030(12)(I)3.G.

23. The Staff's Gas Incident Report filed on June 30, 2021, in Case No. GS-2021-0019 at pages 13 through 14, 18-20 and 22 in Section III.C. Damage Prevention Program 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 1 through 22 above.

25. Spire's written procedure ** [redacted] ** requiring the use of yellow flags or spray paint to provide for temporary marking of its buried pipelines in areas of excavation activity was consistent with the Commission's Gas Pipeline Safety Rule 20 CSR 4240-40.030(12)(I)3.G. However, Spire failed to carry out this part of its procedure. Spire's failure to provide for temporary markings of its buried pipeline in the area of planned excavation activity as required by Spire's procedures was a violation of 20 C.S.R. 4240-40.030(12)(I)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 Section 386.600 RSMo., authorize its General Counsel to seek penalties under Sections 386.570, 386.572 and 386.590 RSMo.; and grant such other and further relief as is just in the circumstances.

COUNT IV

Failure to evaluate the notification of a planned excavation activity to determine the need for and extent of inspections, was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program ** [redacted] **, a procedure necessary to meet the requirements of 20 C.S.R. 4240-40.030(12)(I)4.

26. The Staff's Gas Incident Report filed on June 30, 2021 in Case No. GS-2021-0019 at pages 14-16, and 20-22 in Section III.C. Damage Prevention Program covers the substance of this Count and is attached.

27. Staff hereby realleges and incorporates herein by reference all of the allegations set out in Paragraphs 1 through 25 above.

28. At the time of the incident, the requirement in Spire's written damage prevention procedure ** [redacted] ** to identify types of locations where inspections of planned excavation activities were necessary was consistent with the requirements of 20 CSR 4240-40.030(12)(I)4. The incident occurred as a result of damage to a 12-inch steel pipeline operating at 128 psig. According to Spire's written damage prevention criteria, this meant that Spire should have considered the need for and frequency of on-site visits to the excavation site to confirm the location of the pipeline and excavation activity. However, because the area was incorrectly identified as "Clear/No Conflict" by Spire's Contract Locator, Spire did not implement its procedure. Spire therefore failed to evaluate the need to make an on-site visit to confirm the location of the pipeline and excavation activity.

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 Section 386.600 RSMo., authorize its General Counsel to seek penalties under Sections 386.570, 386.572 and 386.590 RSMo.; and grant such other and further relief as is just in the circumstances.

COUNT V

Failure to have and follow written procedures for the oversight and inspection of a contract locator in its procedural manual for operations, maintenance and emergencies required by 20 C.S.R. 4240-40.030(12)(C)1., was a violation of 20 C.S.R. 4240-40.030(12)(C)2.A.

29. The Staff's Gas Incident Report filed on June30, 2021, in Case No. GS-2021-0019 at pages 32-34, in Section III.F. Spire Oversight of Contractor 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 1 through 28 above.

31. At the time of this incident, Spire did not have written procedures in its procedural manual for operations, maintenance and emergencies required by 20 C.S.R. 4240-40.030(12)(C)1. for the oversight and inspection of a contract locator to ensure that its work is compliant with 20 C.S.R. 4240-40.030.

32. Paragraph 20 CSR 4240-40.030(12)(B)3. states that each operator is responsible for ensuring that all work completed on its pipelines by its consultants and contractors complies with this rule. Paragraph 20 CSR 4240-40.030(12)(C)1. requires that each operator prepare and follow a manual of written procedures for conducting operations and maintenance activities and for emergency response. Failing to have procedures for the oversight and inspection of a contract locator to ensure that its work is

compliant with 20 C.S.R. 4240-40.030 in Spire's procedural manual for operations, maintenance and emergencies required by 20 C.S.R. 4240-40.030(12)(C)1. was a violation of 20 C.S.R. 4240-40.030(12)(C)2.A.

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 Section 386.600 RSMo., authorize its General Counsel to seek penalties under Sections 386.570, 386.572 and 386.590 RSMo.; and grant such other and further relief as is just in the circumstances.

Count VI:

Staff Recommendations

33. In addition to identifying violations of Commission Rules, Staff set out in its Gas Incident Report at pages 44-48 recommendations respecting areas related to the violations with the intended effect of the recommendations being a prevention of a recurrence of the violations and minimize the possibility of recurrence of the incident. When Staff filed its Gas Incident Report on June 30, 2021, it also filed a cover pleading entitled *Staff's Gas Incident Report* that stated it would file a Complaint against Spire which would contain Staff's recommendations in addition to identifying and addressing the violations of the Commission's pipeline safety rules. Pursuant to its authority under Section 386.310.1. RSMo., 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 Section 393.140(2) RSMo., 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. Spire shall review, evaluate and update, as necessary, and follow its reporting procedures to ensure that such procedures require revision or confirmation of its initial telephonic notice to the NRC within 48 hours after the confirmed discovery of an incident as required by 20 C.S.R. 4240-40.020(3)(C).

2. Subsequent to the incident, Spire has taken action to update its damage prevention program from ** [redacted] ** to ** [redacted] **. In order to ensure compliance with the requirements of 20 C.S.R. 4240-40.030(12)(I)3.G. to provide for temporary markings of buried pipelines in the area of excavation going forward, Staff recommends that Spire:

a. Review the Common Ground Alliance Best Practice Marking Standards and determine which practices and procedures Spire intends to incorporate by reference within a Standard Operating Procedure ("SOP") and then identify which are considered as best practices and which are procedures.

b. Reference a specific version of the Common Ground Alliance Best Practice Marking Standards as opposed to referencing "the current version".

c. Establish a schedule for review of revisions to Common Ground Alliance Best Practice Marking Standards. Staff further recommends that Spire follow this schedule.

d. Review revisions to Common Ground Alliance Best Practice Marking Standards to determine when and how to adopt into Spire's procedures and training requirements.

Staff further recommends that Spire follow these procedures.

3. Spire shall, in future annual mailers to excavators, include a copy of the applicable sections of Chapter 319, RSMo. concerning underground facility safety and damage prevention pertaining to excavators. Subsequent to the incident, Spire has taken action to update its damage prevention program from ** [redacted] ** to ** [redacted]. ** In order to ensure that Spire's written program complies with the requirements of 20 C.S.R.4240-40.030(12)(I)3.B., Staff recommends that Spire amend ** [redacted] ** to include a requirement that the annual mailers include a copy of the applicable sections of Chapter 319, RSMo. concerning underground facility safety and damage prevention pertaining to excavators.

4. Spire shall amend ** [redacted] ** of its ** [redacted] ** to include all of the factors listed in 20 C.S.R.4240-40.030(12)(I)4. as considerations for determining the need for, and extent of, inspections. Staff further recommends that Spire follow this procedure.

5. Spire shall consider adding the following criteria as considerations for determining the need for, and extent of, inspections to ** [redacted] [redacted] [redacted] [redacted] [redacted] [redacted]. **

6. Spire shall develop and include in its damage prevention program a description of Spire's ** [redacted], ** and procedures for its implementation. Staff further recommends Spire follow these procedures.

7. In order to ensure compliance with the requirements of 20 C.S.R. 4240-40.030(12)(B)3., Spire should:

a. Create or modify existing O&M procedures to define the process of how Spire personnel will conduct oversight and inspection of contractors performing the task of locating Spire's facilities to ensure compliance with 20 C.S.R. 4240-40.030(12)(B)3. Such procedure must include but not be limited to oversight and inspection of instances when a contractor completes a locate request as a "Clear/No Conflict". Staff further recommends that Spire follow these new or modified procedures.

b. Develop and implement a written procedure for conducting random field quality audits of "Clear/No Conflict" locates and include consideration of all factors that contributed to this incident. Staff further recommends that Spire follow these new or modified procedures.

8. Spire shall create or modify existing O&M procedures to require Spire personnel and its contractors to report mapping errors of Spire's natural gas system when identified through O&M activities, including but not limited to, patrols and leakage surveys. Staff further recommends that Spire follow these new or modified procedures.

9. Spire shall create or modify existing O&M procedures to investigate each field reported mapping error, and make timely corrections of identified errors in the mapping system. Staff further recommends that Spire follow these new or modified procedures.

10. Spire shall create or adopt a standardized, rigorous root cause analysis procedure. This procedure should be used when conducting investigations of failures. The procedure should address how to determine the predominant reason(s) that the event occurred, and to identify where a change in behavior would reasonably be expected to lead to a change in the outcome, i.e. avoidance of the event. Staff further recommends that Spire follow this procedure.

11. Spire shall update Part G3 of its PHMSA F 7100.1 Incident Report for this incident to reflect that Spire received an initial notification from the One-Call Center to request marking of underground utilities.

12. Spire shall begin including considerations of all causes contributing to incidents in its DIMP risk evaluation going forward.

13. The Commission should order:

a. Spire to file an action plan, by December 31, 2021, which addresses the recommendations (numbered 1-12 above).

b. Spire to include in its action plan filing a date certain when it will effectuate that action plan.

c. Require that the action plan include Spire's proposed resolution for addressing each recommendation and the timeframe for implementing the resolution.

d. Require Spire to file updates every six months as to how the plan has been effectuated.

14. 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 1, 2021, at US Route 169 and Northwest Barry Road, Kansas City, Missouri.

Respectfully submitted,

/s/ Jamie S. Myers
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Attorney for Staff of the
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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 28th day of September, 2021.

/s/Jamie S. Myers

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 Pipeline	)	**File No. GS-2021-0019**
Incident Along Highway 169 in Kansas City, Missouri	)	

STAFF'S GAS INCIDENT REPORT

COMES NOW the Staff of the Missouri Public Service Commission, through counsel, and for its report states:

1. The Commission's rules set safety standards for operators of natural gas pipelines. For example, operators are required to have and carry out a written damage prevention program in order to prevent damage to buried pipelines by excavation activity.[1] This program must include an educational component,[2] as well as criteria to determine when a visual inspection should be performed[3] and provide for temporary marking of buried pipelines before excavation begins.[4] Operators are required to consider threats to the pipeline in their Distribution Integrity Management Plan.[5] Natural gas operators are also required to have a manual describing procedures for operating, maintaining, and repairing the pipeline.[6] These procedures apply to work not only performed by the operator but also to its contractors.[7] When a federal incident has occurred, natural gas operators are required to telephone notices to the National Response Center[8] and to

[1] 20 CSR 4240-40.030(12)(I)1.
[2] 20 CSR 4240-40.030(12)(I)3.B.
[3] 20 CSR 4240-40.030(12)(I)4.
[4] 20 CSR 4240-40.030(12)(I)3.G.
[5] 20 CSR 4240-40.030(17)(D)2.
[6] 20 CSR 4240-40.030(12)(C)1.
[7] 20 CSR 4240-40.030(12)(B)3.
[8] 20 CSR 4240-40.020(3)(C).

submit reports to the U.S. Department of Transportation.[9] They are required to analyze accidents in order to determine causes and minimize possibility of recurrences.[10]

2. People and entities planning excavation are required to place a locate request with the Missouri One Call System ("MOCS") at least two, but not more than ten, working days prior to the excavation.[11] Spire uses a contract locator to respond to requests to locate, identify, and mark Spire's underground natural gas facilities before construction commences.

3. On May 28, 2020 an excavator notified the MOCS that it planned to excavate on June 3, 2020 in an area including the grass median and west shoulder of the northbound lanes of U.S. Route 169, south of Northwest Barry Road in Kansas City. Spire's contract locator responded to this notice of planned excavation on June 1, 2020 with a status of "Clear/No Conflict," indicating that Spire has no facilities in the area to be excavated.

4. The excavator did not begin its work in this area until July 1, 2020. On that day, as the excavator was using auger equipment to install a new guard rail in the area which it was told is clear of Spire facilities, the excavator damaged a 12-inch diameter gas distribution main which is part of Spire's system. The auger equipment penetrated the edge of a protective casing and into the pipeline, resulting in an unplanned release of natural gas.

5. Spire worked on July 1, 2020 and July 2, 2020 to shut down the pipeline and repair the damaged segment. The pipeline was returned to service late in the

[9] 20 CSR 4240-40.020(6)(A).
[10] 20 CSR 4240-40.030(12)(L).
[11] §319.026.1., RSMo.

afternoon of July 2, 2020. No one was injured or killed as a result of this incident. Spire estimates property damage to be $65,283, which does not include the cost of lost natural gas.

6. On July 21, 2020 Staff filed a motion requesting that the Commission open a case to investigate this incident. The Commission granted Staff's motion on July 29, 2020 and ordered Staff to file a report regarding the incident, or a status report, by January 25, 2021. Staff filed status reports on January 25, 2021 and May 27, 2021 stating that its investigation was ongoing. On May 27, 2021 the Commission ordered Staff to file its report, or a status report, by June 28, 2021.

7. Commission Rule 20 CSR 4240-40.030(12)(I)1. requires natural gas operators to have "a written program to prevent damage to that pipeline by excavation activities." ** [redacted] . **[12] Spire's damage prevention program did not include procedures requiring locators to perform a visual scan of the work area or to confirm Spire facilities through conductive methods. Staff finds that Spire violated 20 CSR 4240-40.030(12)(I)1. because the procedures in its damage prevention program were inadequate. Since the July 1, 2020 incident, Spire updated its damage prevention program to include a reference to following Common Ground Alliance ("CGA") Best Practice Marking Standards. The current CGA Best Practice Marking Standards requires that areas be visually scanned and the use of conductive methods to locate buried facilities prior to excavation activities occurring. Staff recommends that Spire

[12] DR 14.2.

review the CGA Best Practice Marking Standards and determine which practices and procedures it intends to incorporate in its procedures and training. For further information about this finding, Staff directs the Commission to section III.C of its report.

8. Commission Rule 20 CSR 4240-40.030(12)(I)3.B. requires damage prevention programs to have an educational component, which includes natural gas operators annually sending to excavators either a copy of the relevant sections of Chapter 319, RSMo,[13] or a Commission-approved summary of the relevant sections of Chapter 319, RSMo. Spire's damage prevention program complies with 20 CSR 4240-40.030(12)(I)3.B., because Spire's written damage prevention plan in effect at the time of the incident required Spire to provide a copy of Chapter 319, RSMo in its annual mailings to excavators. However, Staff finds that Spire violated 20 CSR 4240-40.030(12)(I)1., because it failed to send copies of applicable sections of Chapter 319, RSMo to excavators. Staff recommends that Spire include the relevant sections of Chapter 319, RSMo in annual mailings to excavators. Since the July 1, 2020 incident, Spire updated its damage prevention program, but this current program does not require sending a copy of Chapter 319, RSMo or a summary to excavators. In light of this, Staff further recommends that Spire amend its current damage prevention program to meet this requirement. For further information about this finding, Staff directs the Commission to section III.C of its report.

[13] Sections 319.010 through 319.050 of Chapter 319, RSMo are titled the "Underground Facility Safety and Damage Prevention Act" and deal with underground safety and damage prevention pertaining to excavators.

9. Commission Rule 20 CSR 4240-40.030(12)(I)3.G. states that damage prevention programs must provide for temporary marking of buried pipelines in the excavation area before the activity begins. Spire's written damage prevention program addresses this requirement. However, Staff finds that Spire violated 20 CSR 4240-40.030(12)(I)1., because it failed to carry out the requirements of its written program to provide temporary markings identifying the locations of its buried pipelines before excavation activity. Spire's contract locator responded to the notice of planned excavation with a status of "Clear/No Conflict" indicating that it had no facilities in the area to be excavated. ** [redacted] ** [14]

Staff recommends that Spire create or modify existing procedures to require its personnel and contractors to report mapping errors of Spire's natural gas system, to develop procedures for investigating mapping errors, and to make timely corrections of identified errors in the mapping system. For further information about this finding, Staff directs the Commission to section III.C of its report.

10. Commission Rule 20 CSR 4240-40.030(12)(I)4. states that notifications of planned excavation activities should be evaluated to determine the need for and extent of a visual inspection. Spire did not evaluate the planned excavation on U.S. Route 169 to determine the need for and extent of an inspection. The language of the rule is not mandatory, however, according to the procedures in Spire's damage prevention program,

[14] DR 5.2.
[15] DR 5.3.

before excavation occurs, Spire is to evaluate notifications to determine whether a visual inspection is needed. Staff finds that Spire violated 20 CSR 4240-40.030(12)(I)1, because it did not carry out the provisions of its damage prevention program. Staff recommends that Spire's damage prevention program be amended to include all criteria in 20 CSR 4240-40.030(12)(I)4., and Staff has additional criteria that it recommends Spire consider in determining the need for, and extent of, inspections. For further information about this finding, Staff directs the Commission to section III.C of its report.

11. Commission Rule 20 CSR 4240-40.030(12)(C)1. requires natural gas operators to prepare and follow a manual of written procedures for conducting operations and maintenance activities and for emergency response. Commission Rule 20 CSR 4240-40.030(12)(C)2.A. requires that the manual required by 20 CSR 4240-40.030(12)(C)1. include procedures for operating, maintaining, and repairing the pipeline in accordance with sections 12, 13, and 14 of the Commission's gas transportation safety standards. At the time of the incident, Spire had a procedures manual, however Staff found that Spire violated 20 CSR 4240-40.030(12)(C)2.A., because this manual does not include oversight procedures with respect to work performed by Spire's contract locators. Commission rule 20 CSR 4240-40.030(12)(B)3. states that natural gas operators are responsible for ensuring that all work completed on its pipelines by contractors complies with this rule. Staff recommends that Spire create or modify existing procedures to define the process of how Spire oversees and inspects the work of its contract locators as well as develop and implement procedures for conducting random field quality audits of locates. For further information about this finding, Staff directs the Commission to Section III.F of its report.

12. Commission Rule 20 CSR 4240-40.020(3)(C) requires natural gas operators to revise or confirm their initial telephonic notice to the National Response Center[16] within 48 hours (or to the extent practical) after discovery of a federal incident. This incident qualified as a federal incident. Spire confirmed its initial telephonic notice approximately 99 hours after discovery of the incident. Staff did not find a violation, but it recommends that Spire review, evaluate, and update, as necessary, its reporting procedures to ensure that in the future, it confirms initial telephone noice within 48 hours as required by 20 CSR 4240-40.020(3)(C). For further information about this finding, Staff directs the Commission to section III.B of its report.

13. Commission Rule 20 CSR 4240-40.030(12)(L) requires natural gas operators to establish procedures for analyzing accidents in order to determine causes and minimize possibility of recurrences. Spire has established procedures – which Staff did not find to be in violation – but Staff recommends that Spire create or adopt a standardized, rigorous root cause analysis procedure to use when investigating failures to determine the primary reason(s) an incident occurred and to identify behavioral changes that would reasonably be expected to avoid the same outcome in the future. For further information about this finding, Staff directs the Commission to section III.G of its report.

14. Commission Rule 20 CSR 4240-40.020(6)(A) requires natural gas operators to submit a U.S. Department of Transportation Form PHMSA F7100.1 as soon as practicable (but not more than 30 days) after detection of a reportable incident on a

[16] The National Response Center is a federal emergency call center that fields initial reports of gas, oil, chemical, radiological, and biological discharges into the environment and forwards information to the appropriate state and federal agencies for response.

distribution pipeline system. Commission Rule 20 CSR 4240-40.020(6)(B) requires natural gas operators to file supplemental reports, as deemed necessary. Spire submitted the report required by 20 CSR 4240-40.020(6)(A), but Staff found an error that requires Spire to file a supplemental report, pursuant to 20 CSR 4240-40.020(6)(B). Staff recommends that Spire update Part G3 of Form PHMSA F7100.1, Incident Report, stating that Spire received an initial notification through the MOCS requesting the marking of underground utilities. For further information about this finding, Staff directs the Commission to section III.G of its report.

15. Commission Rule 20 CSR 4240-40.030(17)(D)2. Requires operators of natural gas distribution systems to consider threats to the pipeline in its Distribution Integrity Management Program ("DIMP"), including the threat of excavation damage. ** [redacted] ** [17] Staff is concerned that by attributing the incident cause solely to the excavator's actions, Spire will not address the risks associated with the contributing factors of incorrect mapping or insufficient procedures going forward. Staff recommends that Spire consider all factors contributing to incidents in its DIMP. For further information about this finding, Staff directs the Commission to section III.H of its report.

[17] DR 56.

16. Staff identified violations of the Commission's pipeline safety standards, as promulgated in 20 CSR 4240-40.030, that are set out in the attached Gas Incident Report which warrant the Staff Counsel's Office filing a Complaint against Spire. Staff also set out in the Gas Incident Report recommendations related to the incident and the violations of the Commission's pipeline safety standards and drug and alcohol testing, as promulgated in 20 CSR 4240-40.030, which require improvement by Spire. The intended effect of Staff's recommendations is to prevent a recurrence of the incident and the violations. Although Staff recommends that the Commission order Spire to file an action plan by December 31, 2021, which addresses Staff's recommendations, Staff will address this item and its other recommendations in its Complaint to follow the filing of Staff's Gas Incident Report.

WHEREFORE, for the above-stated reasons, Staff requests that the Commission order Spire to respond to Staff's report, and to order Spire to file an action plan by December 31, 2021 to implement Staff's recommendations. Staff intends to follow-up this filing with filing a Complaint against Spire which will contain Staff's recommendations in addition to identifying and addressing violations of Commission pipeline safety rules.

Respectfully submitted,

/s/ Karen E. Bretz
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CERTIFICATE OF SERVICE

I certify that a copy of the foregoing was served via e-mail on counsel for the parties of record to this case on this 30th day of June, 2021.

/s/ Karen Bretz

MISSOURI PUBLIC SERVICE COMMISSION

STAFF's GAS INCIDENT REPORT

US Route 169 and Northwest Barry Road
Kansas City, Missouri
July 1, 2020 Gas Incident

Spire Missouri Inc., d/b/a Spire Missouri West
(Formerly known as "Missouri Gas Energy" or "MGE")

Case No. GS-2021-0019

Industry Analysis Division
Safety Engineering
Department
June 30 2021 - Jefferson City, Missouri

** Denotes Confidential Information **

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STAFF's GAS INCIDENT REPORT

SPIRE MISSOURI WEST

CASE NO. GS-2021-0019

I. EXECUTIVE SUMMARY

Commission rules require operators of natural gas pipelines in Missouri to take measures to protect buried pipelines from excavation damage. These measures include, but are not limited to, carrying out a written excavation damage prevention program, participating in the Missouri One Call System, providing educational material to excavators working in areas where pipelines are located, and providing temporary marking of buried pipelines in areas of excavation activity.

Spire Missouri Inc. d/b/a Spire Missouri West (Formerly known as "Missouri Gas Energy" or "MGE") uses ** [redacted] ** ("Contract Locator"), to respond to requests received through the Missouri One Call System, Inc. ("MOCS")[1] to locate Spire's natural gas facilities.[2] ** [redacted] **, a Kansas City, Missouri contract locate company, is currently the only contractor Spire uses to perform these services in Missouri.

Prior to the incident, on May 28, 2020 an employee of ** [redacted] ** ("the Excavator"), an excavating company, notified MOCS that it planned to excavate in an area that included the grass median and west shoulder of the northbound lanes of U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri, on June 3, 2020.[3]

On June 1, 2020 the Contract Locator responded by stating "Clear/No Conflict," indicating that Spire had no facilities in the area to be excavated.[4]

At approximately 3:32 p.m. CDT[5] on July 1, 2020, the Excavator, using auger equipment to install a new guard rail, damaged[6] a 12-inch diameter gas distribution main which

[1] Missouri One Call System, Inc. is the qualified one-call system for Missouri. It is a nonprofit corporation providing a single point of contact to be used by participating utilities to receive locate requests for planned excavations.
[2] Spire Response to Staff Data Request 0003, 0019, 0020.
[3] Spire Response to Staff Data Request 0003, 0003.1.
[4] Spire Response to Staff Data Request 0003, 0023.1, part 1.
[5] All subsequent time references in this report are in Central Daylight Time ("CDT").
[6] *See* Appendix C, Photographs 5 and 6.

is part of Spire's system.[7] This pipeline runs east to west under U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri.[8] The auger penetrated the edge of a protective casing and into the pipeline, resulting in an unplanned release of natural gas.[9]

Spire was notified of the release shortly after it occurred and worked through July 1, 2020 and into July 2, 2020 to shut down the pipeline and repair the damaged segment. Spire returned the pipeline to service by 5:40 p.m. on July 2, 2020.

Spire notified the Safety Engineering Department Staff ("Staff") of the incident at approximately 6:08 p.m. on July 1, 2020, and Staff started its investigation at that time.[10] On July 21, 2020, 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. The Commission granted the motion on July 29, 2020.

Spire initially notified the National Response Center ("NRC") of a natural gas incident at approximately 7:00 p.m. on July 1, 2020. Spire provided its 48-hour confirmation of the incident to the NRC at approximately 10:00 p.m. on July 5, 2020.[11] Staff has a recommendation related to timely reporting for Spire's 48-hour confirmation of the incident.

In Spire's Pipeline and Hazardous Material Safety Administration ("PHMSA") F 7100.1 incident report,[12] Spire identified the apparent cause of the incident as: "Excavation Damage," specifically "One-Call Notification Practices Not Sufficient."[13] Spire identified the root cause as "Expired Locate," with the contributing factors of "Failed to Mark" and "Inaccurate Records."[14] Staff has a recommendation related to Spire's root cause analysis processes.[15]

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[7] Spire Response to Staff Data Request 0034.1.
[8] Spire Response to Staff Data Request 0002; *See* App. C, Photograph 1.
[9] Spire Response to Staff Data Request 0002.
[10] Staff Gas Incident Notification record.
[11] 20 C.S.R. 4240-40.020(3) (requiring immediate notice of federal incidents and revision or confirmation within 48 hours of confirmed discovery, to the extent practicable).
[12] 20 C.S.R. 4240-40.020(6) (requiring incident reports to be to be submitted for federally reportable incidents occurring on natural gas distribution systems); 20 C.S.R. 4240-40.020(5) (Requirements for report submission).
[13] *See generally*, Spire Response to Staff Data Request 0034.1.
[14] *See infra* Section V.9; *See supra* Section III.G., Investigation of Failures: Staff Expert Clinton L. Foster. *See* App. A (more detailed information about the incident) (Before Staff's Incident Report was finalized, App. A-C, "Detailed Discussion Of Facts And Staff's Investigation," "Figures," and "Photographs," 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 C. Spire reviewed Staff's transmittal of Appendices A to C 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 C.).
[15] *See infra* Section V.9.

A Staff inspector was dispatched to the incident site on July 2, 2020. The inspector arrived on-site at 9:00 a.m., observed Spire's work to stop the flow of gas to the damaged portion of the pipeline, and the beginning of Spire's work to repair the damaged portion of the pipeline. Three Staff inspectors were assigned to the incident investigation, including the inspector dispatched to the site of the incident, to conduct additional discovery. This additional discovery included submitting Data Requests to Spire and reviewing responses, and collecting information from additional sources.

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

1. Failure to have adequate procedures within Spire's ** [redacted] ** to comply with 20 C.S.R. 4240-40.030(12)(I)3.G. was a violation of 20 C.S.R. 4240-40.030(12)(I)1.
2. Failure to provide a copy of the applicable sections of the Missouri Underground Facility Safety and Damage Prevention Act, Chapter 319, Revised Statutes of Missouri (RSMo), in Spire's annual mailings to excavators was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program ** [redacted] **, a procedure necessary to meet the requirements of 20 C.S.R. 4240-40.030(12)(I)3.B.
3. Failure to provide temporary marking of Spire's buried pipeline in the area of excavation activity before, as far as practical, the activity begins was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program ** [redacted] **, a procedure necessary to meet the requirements of 20 C.S.R. 4240-40.030(12)(I)3.G.
4. Failure to evaluate the notification of a planned excavation activity to determine the need for and extent of inspections, was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program ** [redacted] **, a procedure necessary to meet the requirements of 20 C.S.R. 4240-40.030(12)(I)4.
5. Failure to have and follow written procedures for the oversight and inspection of a contract locator in its procedural manual for operations, maintenance and emergencies required by 20 C.S.R. 4240-40.030(12)(C)1., was a violation of 20 C.S.R. 4240-40.030(12)(C)2.A.

Staff's recommendations regarding these violations, are addressed in the applicable discussions in Section III (Staff Analysis of the Incident) and listed in Section V (Staff Recommendations) of this report, and it recommends the Commission require Spire to file an action plan to address Staff's recommendations.

Staff Experts: Kathleen A. McNelis PE, Greg A. Williams and Clinton L. Foster

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 20 C.S.R. 4240-40.020;
  - Missouri Pipeline Safety Standards in 20 C.S.R. 4240-40.030, including but not limited to the operator's[16] emergency response and failure investigation; and
  - Drug and Alcohol Testing Requirements in 20 C.S.R. 4240-40.080; and
- Make recommendations, as applicable to Spire with an objective of minimizing the possibility of recurrence.

Staff Expert: Kathleen A. McNelis PE

III. STAFF ANALYSIS OF INCIDENT

A. Incident Description and Emergency Response

On May 28, 2020, an employee of the Excavator called MOCS to notify MOCS that it planned to excavate in an area that included the grass median and west shoulder of the northbound lanes of U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri on June 3, 2020.[17]

[16] 20 C.S.R. 4240-40.030(1)(B)26 (defining "operator" as "a person who engages in the transportation of gas."); 20 C.S.R. 4240-40.030(1)(B)27 (defining "person" 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."); 20 C.S.R. 4240-40.030(1)(B)41 (defining "Transportation of Gas" as "the gathering, transmission, or distribution of gas by pipeline or the storage of gas in Missouri.").

[17] Spire Response to Staff Data Request 0003, 0003.1.

On June 1, 2020 Spire's Contract Locator responded with "Clear/No Conflict," indicating that Spire had no facilities in the area to be excavated.[18] ** [redacted] ** ("Contract Locator Employee A"), and ** [redacted] ** ("Contract Locator Employee B") are employees of the Contract Locator assigned to respond to the notice of planned excavation.[19]

At approximately 3:32 p.m. on July 1, 2020, the Excavator using auger equipment to install a new guard rail damaged[20] a 12-inch diameter main,[21] which is part of Spire's natural gas distribution system.[22] This main runs east to west under U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri.[23] The auger penetrated the edge of a protective casing and into the pipeline, resulting in an unplanned release of natural gas.[24]

The main was operating at a pressure of approximately 128 pounds per square inch gauge (psig) at the time of the incident.[25] The maximum allowable operating pressure established by Spire for this main is 150 psig.[26]

The Excavator notified a Spire Civic Improvement Inspector soon after the damage occurred.[27] The Spire Civic Improvement Inspector notified an operations supervisor, who dispatched a serviceperson and a maintenance crew to the site at approximately 3:37 p.m.[28] The Spire serviceperson arrived on-site at 3:40 p.m., and the Spire maintenance crew arrived at 3:45 p.m. [29] The Kansas City Fire Department closed the remainder[30] of U.S. Route 169 in the area of the incident at approximately 3:45 p.m.[31] At approximately 4:00 p.m. the auger equipment was removed and began excavating to further expose the damaged segment of

[18] Spire Response to Staff Data Request 0003, 0023.1, Part 1.
[19] Spire Response to Staff Data Request 0021 (indicating that once a locate request has been sent by Missouri One Call to the Contract Locator and Company, the locate request is assigned to a Contract Locator employee by the contract supervisor. However, Spire clarified in Response to Staff Data Request 0039.1 that the contract supervisor was assigned to locate request 201494113 and was assigned to covered task 1291- Locate Underground Pipelines.).
[20] *See* App. C, Photographs 5 and 6.
[21] Main means a distribution line that serves as a common source of supply for more than one service line.
[22] Spire Response to Staff Data Request0034.
[23] Spire Response to Staff Data Request 0002; *See* App. C, Photograph 1.
[24] Spire Response to Staff Data Request 0002.
[25] Spire Response to Staff Data Request 0002.
[26] Spire Response to Staff Data Request 0034.
[27] Spire Response to Staff Data Request 0002.
[28] Spire Response to Staff Data Request 0002.
[29] Spire Response to Staff Data Request 0002.
[30] One lane in the northbound direction was closed prior to the incident due to the work being completed by the Excavator.
[31] Spire Response to Staff Data Request 0002.

pipeline.[32] At 5:00 p.m. Spire attempted to stop the flow of gas to the damaged main by closing the valve on the west side of U.S. Route 169, however the valve did not fully close and allowed natural gas to continue to flow.[33]

Spire decided to stop the flow of natural gas to the leaking segment by installing temporary control fittings on the main upstream and downstream of the damage. Spire began excavating to expose the main on the west and east sides of the highway at 7:00 p.m. and 7:30 p.m., respectively, to install control fittings. By 7:40 p.m. the pipeline pressure decreased to 80 psig. At 8:00 p.m. the leaking pipeline was further exposed and a repair clamp[34] was installed in an attempt to stop the leak, however the repair clamp did not fully stop the leaking natural gas.

Additionally, on July 1, 2020 Spire conducted a leakage survey of the area surrounding the incident site to check for the migration of natural gas and any additional leaks. Spire did not identify migration of natural gas or additional leaks.[35]

On the next day, July 2, 2020, the excavations located on either side of U.S. Route 169 were used to hot tap and line stop[36] the pipeline. The hot tapping and line stopping was completed on the west and east sides of U.S. Route 169 at 8:51 a.m. and 11:07 a.m., respectively, stopping the flow of natural gas to the leaking segment.[37]

At 11:25 a.m. the band clamp was removed from the damaged section of main, and at approximately 3:30 p.m. an encapsulation sleeve[38] was installed on the damaged section of main. By 5:40 p.m., the line stops were both removed and the main was returned to service.

Spire estimated property damage from the incident to be $65,283, not including the estimated cost of natural gas loss, [39] so the unplanned release of natural gas met the criteria for

[32] Spire Response to Staff Data Request 0002.
[33] Spire Response to Staff Data Request 0002.
[34].*See* Appendix C, Photographs 3, 4 (A repair clamp is a type of repair equipment which fits around the pipeline and is tightened to "clamp" onto the pipeline.).
[35] Spire Response to Staff Data Request 0002.
[36] *See* App. C, Photograph 2 (Hot tapping and line stopping a pipeline is a method to isolate a segment of a pipeline through the use of a specialized fitting(s) which can tap an active pipeline and insert a plug into the pipeline which stops the flow of product).
[37] Spire Response to Staff Data Request 0002.
[38] An encapsulation sleeve or weld-over sleeve is a type of repair equipment which is welded onto and around the pipeline.
[39] Spire Response to Staff Data Request 0034.1.

a federal incident.[40] There were no deaths or injuries as a result of this incident, and gas volume lost was estimated to be less than 3 million cubic feet.

Staff did not find any violations of Commission rules with respect to Spire's emergency response to the incident.

Staff Expert: Clinton L. Foster

B. Incident Reporting Requirements

1. Regulatory Requirements:

20 C.S.R. 4240-40.020(3)(A) requires that at the earliest practicable moment following discovery, but no later than one (1) hour after confirmed discovery,[41] each operator shall give notice, in accordance with subsection (3)(B), of each federal incident as defined in section (2).

20 C.S.R. 4240-40.020(3)(B) requires that each notice required by subsection (3)(A) must be made to the NRC.

20 C.S.R. 4240-40.020(3)(C) requires that within forty-eight (48) hours after the confirmed discovery of an incident, to the extent practicable, an operator must revise or confirm its initial telephonic notice required in subsection (3)(B) with an estimate of the amount of gas released, an estimate of the number of fatalities and injuries, and all other significant facts that are known by the operator that are relevant to the cause of the incident or extent of the damages. If there are no changes or revisions to the initial report, the operator must confirm the estimates in its initial report.

20 C.S.R. 4240-40.020(4)(A) requires operators to notify designated Commission personnel by telephone within two hours following discovery of a Missouri reportable

[40] 20 C.S.R. 4240-40.020 (2)(D) (defining a federal incident to be any of the following events: 1. An event that involves a release of gas from a pipeline and that results in one or more of the following consequences: A. A death or personal injury necessitating in-patient hospitalization; or B. Estimated property damage of fifty thousand dollars ($50,000) or more, including loss to the operator and others, or both, but excluding the cost of gas lost; or C. Unintentional estimated gas loss of three (3) million cubic feet or more; or 2. An event that is significant, in the judgement of the operator, even though it did not meet the criteria of paragraph (2)(D)1.)

[41] 20 C.S.R. 4240-40.020(2)(C) (defining "confirmed discovery" to mean when it can be reasonably determined, based on information available to the operator at the time a reportable event has occurred, even if only based on a preliminary evaluation.).

incident[42] by the operator, or as soon thereafter as practicable if emergency efforts to protect life and property would be hindered.

20 C.S.R. 4240-40.020(6) requires that operators of distribution pipeline systems must submit U.S. Department of Transportation Form PHMSA F 7100.1 as soon as practicable but not more than 30 days after detection of an incident required to be reported under section (3).

2. Spire Actions to Comply with 20 C.S.R. 4240-40.020(2)(C), (3), (4), and (6)

Spire confirmed discovery of an incident meeting the reporting requirements of 20 C.S.R. 4240-40.020(2)(C) and (4)(A) at approximately 5:24 p.m. on July 1, 2020.[43] The incident reporting requirements in 20 C.S.R. 4240-40.020(3), (4), and (6) were completed as follows:

a. Spire made the initial telephone notification of a natural gas incident to a designated Commission personnel at approximately 6:08 p.m. on July 1, 2020.[44]

b. Spire notified the NRC of a natural gas incident at approximately 7:00 p.m. on July 1, 2020 (NRC Report Number 1280866).[45]

c. Spire provided 48-hour confirmation of the incident to the NRC at approximately 10:00 p.m. on July 5, 2020 (NRC Report Number 1281146).

d. Spire completed and submitted USDOT-PHMSA form PHMSA F 7100.1, titled "Incident Report – Gas Distribution System," to Staff and PHMSA on July 31, 2020.[46]

[42] 20 C.S.R. 4240-40.020(4)(A) (requiring reporting of the following events within areas served by the operator: 1. An event that involves a release of gas involving the operator's actions or pipeline system, or where there is a suspicion by the operator that the event may involve a release of gas involving the operator's actions or pipeline system, and results in one (1) or more of the following consequences: A. A death; B. A personal injury involving medical care administered in an emergency room or health care facility, whether inpatient or outpatient, beyond initial treatment and prompt release after evaluation by a health care professional; or C. Estimated property damage of ten thousand dollars ($10,000) or more, including loss to the gas operator or others, or both, and including the cost of gas lost; or 2. An event that is significant, in the judgment of the operator, even though it did not meet the criteria of paragraph (4)(A)1.).
[43] Spire Response to Staff Data Request 0048.
[44] 20 C.S.R. 4240-40.020(4)(A) (requiring 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.).
[45] Spire Response to Staff Data Request 0034.1.
[46] Information provided by Spire's July 31, 2020 e-mail to Commission Staff; and Spire Response to Staff Data Request 0034.

3. Staff Analysis:

Spire complied with the reporting requirements of 20 C.S.R. 4240-40.020(4)(A) by telephone notification of a natural gas incident to designated Commission personnel at approximately 6:08 p.m. on July 1, 2020.

Spire complied with the reporting requirements of 20 C.S.R. 4240-40.020(3)(A) and 20 C.S.R. 4240-40.030(3)(B), by notification to the NRC of a natural gas incident at approximately 7:00 p.m. on July 1, 2020.

Spire did not submit its confirmation or revision of its initial incident notification to the NRC within 48 hours of confirmed discovery of the incident. Spire submitted the notification at approximately 10:00 p.m. on July 5, 2020, which is approximately 99 hours following confirmed discovery of the incident. Spire did not provide notification to the NRC within 48 hours, however Staff notes that 20 C.S.R. 4240-40.020(3)(C) provides "… to the extent practicable". Staff recognizes that when an event is classified as an incident due to cost and/or gas release volume estimates, it may take some time to gather the information and either confirm or revise to the NRC. Staff has included a recommendation below related to timely reporting to the NRC.

Spire complied with the requirements of 20 C.S.R. 4240-40.020(6), by submitting its USDOT-PHMSA form PHMSA F 7100.1 titled "Incident Report – Gas Distribution System" to Staff and PHMSA on July 31, 2020. Spire's submission time was not more than 30 days after detection of an incident, as required by 20 C.S.R. 4240-40.020(6)(A).

4. Violations:

Staff found that Spire's procedures and actions were consistent with the requirements of 20 C.S.R. 4240-40.020(3), (4), and (6), however Staff included one recommendation below as a result of its investigation related to more timely reporting to the NRC.

5. Staff Recommendations:

Staff recommends that Spire review, evaluate and update, as necessary, its reporting procedures to ensure that such procedures require revision or confirmation of its initial telephonic notice to the NRC within 48 hours after the confirmed discovery of an incident as required by 20 C.S.R. 4240-40.020(3)(C).

Staff Expert: Greg A. Williams

C. Damage Prevention Program

In its PHMSA F 7100.1 incident report, Spire indicated that a third-party excavator damaged Spire's facilities, causing this incident. Spire's narrative description of the incident[47] includes the following statements:

> The contractor was not working under a valid locate at the time of the damage. A locate was requested by the contractor on May 28th for the area being worked. The locator did not complete a proper locate at that time, and the original locate had expired before the work began and was not renewed.[48]

1. Regulatory Requirements:

Commission Rule 20 C.S.R. 4240-40.030(12)(I)1. requires operators of buried pipelines to have and carry out a written program to prevent pipeline damage by excavation activities in accordance with subsection 20 C.S.R. 4240-40.030(12)(I).

- 20 C.S.R. 4240-40.030(12)(I)3.B. requires the written program to provide for annual mailings to excavators. The mailings must either include a copy of the applicable sections of Chapter 319, RSMo concerning underground facility safety and damage prevention pertaining to excavators, or a summary of the provisions of Chapter 319, RSMo approved by designated Commission personnel. Chapter 319, RSMo § 319.010 to § 319.050, includes provisions for both excavators and underground facility owners.
- 20 C.S.R. 4240-40.030(12)(I)3.G. requires that the written program provide for temporary marking of buried pipelines in the area of excavation activity before, as far as practical, the activity begins.
- Commission Rule 20 C.S.R. 4240-40.030(12)(I)4. requires that each notification identified in subparagraph (12)(I)3.D. should be evaluated to determine the need

[47] Spire Response to Staff Data Request 0034.
[48] Spire Response to Staff Data Request 0034

for and the extent of inspections. The following factors should be considered in determining the need for and extent of those inspections:

- The type and duration of the excavation activity involved;
- The proximity to the operator's facilities;
- The type of excavating equipment involved;
- The importance of the operator's facilities;
- The type of area in which the excavation activity is being performed;
- The potential for serious incident should damage occur;
- The prior history of the excavator with the operator; and
- The potential for damage occurring which may not be easily recognized by the excavator.

Staff notes that Spire appears to base its narrative description that the Excavator was not working under a valid locate at the time of the damage on an interpretation of certain provisions of Chapter 319, RSMo. Specifically, the requirement to provide notice of intent to excavate to the notification center at least two working days but not more than ten working days before commencing the excavation activity in § 319.026.1, which states:

> An excavator shall serve notice of intent to excavate to the notification center by toll-free telephone number operated on a twenty-four hour per-day, seven day per-week basis or by facsimile or by completing notice via the internet at least two working days, **but not more than ten working days, before the expected date of commencing the excavation activity**. The notification center receiving such notice shall inform the excavator of all notification center participants to whom such notice will be transmitted and shall promptly transmit all details of such notice provided under subsection 2 of this section to every notification center participant in the area of excavation.[49]

Additionally, § 319.026.6 requires that if an excavator is unable to begin the excavation within ten working days, the excavator shall make a relocate request before beginning the excavation:

[49] RSMo § 319.026.1 [Emphasis added.].

> 6. When markings have been provided in response to a notice of intent to excavate, excavators may commence or continue to work within the area described in the notice for so long as the markings are visible. **If an excavator is unable to begin the excavation within ten working days as described in the request, the excavator shall make a relocate request before beginning the excavation…**[50]

Further, Chapter 319, RSMo § 319.030.1 requires that:

> Every person owning or operating an underground facility to whom notice of intent to excavate is required to be given shall, upon receipt of such notice as provided in this section from a person intending to commence an excavation, inform the excavator as promptly as practical, but not in excess of two working days, unless the excavator agrees to extend the start date and time provided in the locate request through methods established by the notification center, of the approximate location of underground facilities in or near the area of the excavation so as to enable the person engaged in the excavation work to locate the facilities in advance of and during the excavation work, provided that no excavation shall begin earlier than the scheduled excavation date provided on the locate request unless the excavator has confirmed that all underground facilities have been located. The utility owner or operator shall provide the approximate location of its underground facilities by the use of markings as designated in Section 319.015.[51]

2. Spire Actions to Comply with 20 C.S.R. 4240-40.030(12)(I)

In regards to compliance with the requirement of 20 C.S.R. 4240-40.030(12)(I)1., Spire identified ** [redacted] [52] ** as the written program to prevent damage by excavation activities for Spire West facilities that was in effect on the dates of May 28, 2020, and June 1, 2020.[53] Spire stated that it provided a copy of the ** [redacted] **, to the Contract Locator on May 25, 2020.[54] ** [redacted] **

[50] RSMo § 319.026.6 [Emphasis added.].
[51] RSMo § 319.030.1.
[52] *See* Spire Response to Staff Data Request 0018.1.
[53] Spire Response to Staff Data Request 0001, part b ** [redacted] **
[54] Spire Response to Staff Data Request 0042.2, part iv.

However, this standard does not include procedures for conducting a "visual scan of the area" or to "confirm the location of the facility using conductive methods."[55]

On July 1, 2020 Spire adopted a new written program to prevent damage by excavation activities for Spire West facilities titled ** [redacted] **[56] ** [redacted] [redacted] **[57]

Regarding compliance with the requirement of 20 C.S.R. 4240-40.030(12)(I)3.B. to provide excavator education, Spire provided Staff with a copy of the annual mailer sent to excavators in 2019 and 2020.[58] The mailer[59] provided information about Spire's natural gas system, instructions on how to make a request to locate underground utilities, and what to do in the event of a damaged natural gas pipeline. Additionally, Spire provided copies of its 2019 and 2020 mailer distribution lists, and both lists included the Excavator.[60] A copy of the mailer is included as Exhibit 1 of Appendix D of this report.

Commission Rule 20 C.S.R. 4240-40.030(12)(I)3.B requires that annual mailings to excavators include a copy of the applicable sections of Chapter 319, RSMo, or a summary of the provisions of Chapter 319, RSMo approved by designated Commission personnel to excavators annually. Spire stated that it did not provide a copy of Chapter 319, RSMo to excavators and instead chose to provide a summary of the provisions.[61] Spire stated that it has been utilizing the same summary for at least the last 15 years, but that it was unable to locate a copy of the approval of the summary by designated Commission personnel.[62]

Regarding compliance with the requirement of 20 C.S.R. 4240-40.030(12)(I)3.G. to provide for temporary marking of its buried pipelines in the area of excavation activity, Spire

[55] Spire Response to Staff Data Request 0014.3; 0024.2.
[56] Spire Response to Staff Data Request 0014, 0018.
[57] Spire Response to Staff Data Request 0053.1.
[58] Spire Response to Staff Data Request 0018.7, 0009.2.
[59] Spire Response to Staff Data Request 0009.2.
[60] Spire Response to Staff Data Request 0018.2, 0018.9.
[61] Spire Response to Staff Data Request 0018.9.
[62] Spire Response to Staff Data Request 0018.9, as expanded upon in Spire's May 26, 2021 review comments on App. A facts.

did not mark its pipeline as required by ** [redacted] **

Spire received a notification of a planned excavation in the area on May 28, 2020 from the Missouri One Call System.[63] Spire responded to the notice of planned excavation on June 1, 2020 with a status of "Clear/No Conflict"[64] indicating Spire had no facilities in the area to be excavated.[65] In response to Staff Data Request 0014.2, requesting Spire to explain specifically what the Contract Locating Company did, or failed to do that contributed to this incident, Spire stated that "The contract locator did not perform a visual scan of the area or confirm the location of the facility using conductive methods."[66]

Regarding compliance with the requirement of 20 C.S.R. 4240-40.030(12)(I)4. to evaluate each notification to determine the need for and extent of inspections, Spire established ** [redacted] **[67] Subsection 8.2 of the standard states:

** [redacted]

A. [redacted]
B. [redacted]
C. [redacted]
D. [redacted]
E. [redacted]

[63] Spire Response to Staff Data Request 0003, 0003.1.
[64] Spire Response to Staff Data Request 0003.
[65] Spire Response to Staff Data Request 0023.1, part 1, (indicating a "Clear/No Conflict" response only applies when there are no Company facilities within the dig area).
[66] Spire Response to Staff Data Request 0014.2.
[67] Spire Response to Staff Data Request 0064.

F. [redacted]

G. [redacted]

[redacted]

H. [redacted]

I. [redacted]

J. [redacted]

K. [redacted]

[redacted]**[68]

The location of the incident included a 12-inch steel pipeline operating at 128 psig, and a serious incident occurred due to damage to the pipeline.[69]

In response to Staff Data Request 0033.1, Spire described the process used to identify locations where inspections of planned excavations is necessary:[70]

** [redacted]

[redacted]

[redacted]

[redacted]**[71]

Additionally, Spire stated that ** [redacted]

[redacted]**[72] Rather, the Company's process for checking accuracy of locates applies to all tickets regardless of response types or location.[73]

[68] Spire Response to Staff Data Request 0018.1.
[69] *See generally* Spire Response to Staff Data Request 0034.1.
[70] Spire Response to Staff Data Request 0033.1 (Spire refers to the locations where inspections of planned excavations were necessary per 20 C.S.R. 4240-40.030(12)(I)4. as "high profile" locations.).
[71] Spire Response to Staff Data Request 0033.1.
[72] Spire Response to Staff Data Request 0033.1.
[73] Spire Response to Staff Data Request 0033.1.

Spire provided the ** [redacted] ** in response to Staff Data Request 0033. In the report, Spire stated:

> ** [redacted] **[74]

Since the time of the incident, Spire has updated this process. The new system is an automated notification system which alerts Spire in the event a notification of planned excavation is received within an identified "high profile" area.[75] In response to Staff Data Request 0033.1, Spire stated:

> ** [redacted] **[76]

In response to Staff Data Request 0064, part 3, Spire provided its effectiveness evaluation of procedures utilized with respect to compliance with the requirements of 20 C.S.R. 4240-40.030(12)(I)4. following the July 1, 2020 incident.[77]

Spire's response stated that:

> Prior to the incident, the Company had begun assessing what constitutes a high profile locate ticket as part of its Ticket Management System rollout. The Company continues this process and has not made any revisions at this time.[78]

3. <u>Staff Analysis:</u>

In regards to 20 C.S.R. 4240-40.030(12)(I)1., Spire's written program in effect at the time of the locate request (** [redacted] **)

[74] Spire Response to Staff Data Request 0033.
[75] *See* Spire Response to Staff Data Request 0033.1.
[76] Spire Response to Staff Data Request 0033.1.
[77] *See* Spire Response to Staff Data Request 0064.
[78] Spire Response to Staff Data Request 0064, Part 3.

required temporary marking of Spire's facilities,[79] but it did not include specific procedures for requiring locators to perform a visual scan of the work area and to confirm the location of Spire's facilities through conductive methods. According to the information provided by Spire, performing a visual scan of the work area and confirmation of the locations by conductive methods would have been necessary to provide for temporary marking of Spire's buried pipelines.[80]

Spire's currently effective ** [redacted] ** which supersedes ** [redacted] ** includes a reference to the Common Ground Alliance Best Practice Marking Standards.[81] The current Common Ground Alliance Best Practice Marking Standards require a visual scan and the use of electromagnetic locating when possible.[82] Staff has recommendations related to Spire's adoption and implementation of the Common Ground Alliance Best Practice Marking Standards.[83]

In regards to 20 C.S.R. 4240-40.030(12)(I)3.B., Spire's written program in effect at the time of the incident provided for an annual excavator educational mailing to excavators, and specified that a copy of Chapter 319, RSMo shall be included.[84] However, the mailer that was sent to excavators did not include a copy of Chapter 319, RSMo, and was silent with respect to renewal of locates marked "Clear/No Conflict."[85] Although Spire indicated that the root cause of the incident was the Excavator's failure to renew the locate request, it does not appear that Spire has provided educational material to excavators regarding this requirement in the event Spire provides a "Clear/No Conflict" response to an earlier request. Staff is concerned that Spire may not have revised and updated the summary to address additions and revisions to the statute if Spire has been providing the same summary of its interpretation of the requirements of Chapter 319, RSMo to excavators for 15 years. Staff has a recommendation related to Spire providing a copy of applicable sections of Chapter 319, RSMo with its educational materials to excavators going forward.[86] Additionally, Staff notes that the currently effective Spire damage

[79] Spire Response to Staff Data Request 0018.1.
[80] Spire Response to Staff Data Request 0014.2.
[81] *See* Spire Response to Staff Data Request 0018.
[82] Common Ground All. Best Prac. 17 §§ 4.07, 4.12.
[83] *See Infra* Section III.C.5.A., Section V.2.
[84] Spire Response to Staff Data Request 0018.1.
[85] Spire Response to Staff Data Request 0009.2.
[86] *See infra* Section V.3.

prevention program, ** [redacted] ** does not require that a copy of Chapter 319, RSMo be included in the annual mailer sent to excavators. Staff has a recommended procedural change related to this below.[87]

Regarding the requirement in 20 C.S.R. 4240-40.030(12)(I)3.G., Spire's written program required Spire to provide for temporary markings of buried pipelines, however Spire did not do so. Spire's failure to comply with the requirement to provide temporary markings of its pipeline caused or contributed to this incident. To evaluate if this was an isolated occurrence of failure to mark facilities, Staff reviewed annual and incident report[88] data for Spire Missouri West.

Table 1 displays the number of excavation damages on Spire Missouri West distribution facilities for calendar year 2015-2019.[89] During this 5-year time period, Spire Missouri West has reported a total of 1,874 damages to its pipeline caused by locating practices not sufficient.

Table 1 - Excavation damages in Spire Missouri West distribution system operating area by apparent root cause 2015-2019

Year	Excavation Damage Apparent Root Cause				Total
	One-Call Notification Practices Not Sufficient	Locating Practices Not Sufficient	Excavation Practices Not Sufficient	Other	
2015	125	418	377	0	920
2016	152	349	311	9	821
2017	130	449	301	9	889
2018	159	297	364	50	870
2019	151	361	392	27	931
Totals (2015-2019)	**717**	**1,874**	**1,745**	**95**	**4,431**

Table 2 displays data from federal incidents attributed to Excavation Damage cause with root cause or contributing factor of locating practices not sufficient from Jan 1, 2015 through 9/22/2020 in Spire Missouri West operating Area.

[87] *See* Spire Response to Staff Data Request 0014, 0018.
[88] 20 C.S.R. 4240-40.020(7)(A) (providing annual reporting requirements); 20 C.S.R. 4240-40.020(6) (providing federal incident reporting requirements); 20 C.S.R. 4240-40.020(4) (providing Missouri incident reporting requirements).
[89] Information obtained from Spire's Response to Staff Data Request 0046.

Table 2 - Federal Incidents attributed to Excavation Damage cause with root cause or contributing factor of locating practices not sufficient from Jan 1, 2015 through date of Staff Data Request 0046 (9/22/2020) in Spire Missouri West operating area

Date	Address	Property Damage	Property Damage Including Gas Loss	Gas Released (MCF[90])
3/13/2015	Rangeline & Newman Rd., Joplin, MO	$13,152.00	$41,708.00	5,436.00
6/09/2017	6512 E 155th St, Grandview, MO	$155,284.00	$157,082.00	309.85
7/01/2020	MO 169 Highway and Barry Road, Kansas City, MO	$65,283.00	$65,697.00	100.59
	Total between 1/1/2015 and 9/22/2020	$233,719.00	$264,487.00	5,846.44

Table 3 displays data from Missouri state reportable incidents attributed to the general cause of excavation damage with a root cause or contributing factor of locating practices not sufficient from Jan 1, 2015 through date of Staff Data Request 0046 (9/22/2020) in Spire Missouri West operating Area.

Table 3 - Missouri state reportable incidents attributed to excavation damage cause with root cause or contributing factor of locating practices not sufficient from Jan 1, 2015 through date of Staff Data Request 0046 (9/22/2020) in Spire Missouri West operating area

Date	Address	Property Damage	Property Damage Including Gas Loss	Gas Released (MCF)
3/30/2016	E. Gregory Blvd. & Oak St., Kansas City, MO	$19,537.00	$23,499.00	923.21
4/4/2016	100 N Broadway, Oak Grove, MO	$16,928.00	$19,766.00	661.36
7/29/2019	2015 W Foxwood Dr, Raymore, MO	$24,564.00	$25,628.00	215.42
7/6/2020	3250 N Progress Ave, Joplin, MO	$15,517.00	$19,434.00	950.74
	Total between 1/1/2015 and 9/22/2020	$76,546.00	$88,327.00	2,750.73

The data shown in Table 1-Annual Report indicates that excavation damage by apparent root cause-locating practices not sufficient have occurred regularly over the five years preceding the incident. The data shown in Tables 2-Federal and 3-State indicate that the incidents caused or contributed to by the factor of insufficient locating practices not sufficient can be costly and result in the release of a large volume of natural gas. Because the current incident does not

[90] MCF is the unit equal to 1,000 cubic feet.

appear to be an isolated event, Staff believes that procedural changes would be beneficial to reduce the number of damages attributable to locating practices not sufficient going forward. Staff has recommendations related to Spire's adoption and implementation of the Common Ground Alliance Best Practice Marking Standards to provide for temporary markings of Spire's buried pipelines.[91]

Spire's written procedures were consistent with the requirements of 20 C.S.R. 4240-40.030(12)(I)4. to identify types of locations where inspections of planned excavations were necessary. However, Spire did not implement its procedure because the main had not been marked. The incident occurred on a 12-inch steel pipeline operating at 128 psig, and a serious incident occurred due to damage to the pipeline[92], which according to Spire's established procedures meant that Spire should have considered making on-site field visits to the excavation site. Spire stated:

** [redacted] **[93]

This indicates to Staff if Spire had implemented its procedure, ** [redacted] **, and the incident may have been avoided. Spire did not adequately implement its procedure to evaluate the notification of intent to excavate to determine the need for and extent of inspections.

Subsequent to the incident, Spire implemented a new damage prevention standard, ** [redacted] ** states the following:

** [redacted]

[91] *See Infra* Section III.C.5.A., Section V.2.
[92] *See* Spire Response to Staff Data Request 0034.1 at 4, 11.
[93] Spire Response to Staff Data Request 0033.

[redacted]
[redacted]**[94]

** [redacted] ** does not include the following criteria from the superseded standard:

A. ** [redacted]
B. [redacted]
C. [redacted]
D. [redacted]
E. [redacted]
F. [redacted]
G. [redacted]
[redacted] **

** [redacted] ** does not include the following factors[95] listed in 20 C.S.R. 4240-40.030(12)(I)4.:

- Type of excavating equipment involved;
- The potential for serious incident should damage occur;
- Prior history of the excavator with the operator; and
- The potential for damage occurring which may not be easily recognized by the excavator.[96]

** [redacted] ** does not include all the requirements of 20 C.S.R. 4240-40.030(12)(I)4. Staff is concerned that the omission of some of the elements of 20 C.S.R. 4240-40.030(12)(I)4. from ** [redacted] ** may lead to these criteria not being considered when evaluating each notification. Staff has a recommendation pertaining to this.

Since the time of the incident, Spire has implemented a new ** [redacted] ** which includes an automated process to determine if a notification received per 20 C.S.R. 4240-40.030(12)(I)3.D. is in a "high profile" location and requires Spire personnel to be on-site. Spire's currently effective damage prevention program does not address the

[94] Spire Response to Staff Data Request 0014, 0018.
[95] *See* Spire Response to Staff Data Request 0014, 0018.
[96] 20 C.S.R § 4240-40.030(12)(I)4.C,F-H.

implementation of this new automated process. Without the inclusion of procedures relating to the use of the new automated evaluation process in Spire's damage prevention program, Staff is concerned that the process will not be implemented as intended if Spire does not define personnel roles and responsibilities.

4. Violations

Failure to have adequate procedures within Spire's ** [redacted] ** to comply with 20 C.S.R. 4240-40.030(12)(I)3.G. was a violation of 20 C.S.R. 4240-40.030(12)(I)1.

Failure to provide a copy of the applicable sections of Chapter 319, RSMo, in Spire's annual mailings to excavators was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program to comply with the provisions of 20 C.S.R. 4240-40.030(12)(I)3.B.

Failure to provide temporary marking of Spire's buried pipeline in the area of excavation activity, as is practical, before the activity begins was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program to comply with the provisions of 20 C.S.R. 4240-40.030(12)(I)3.G.

Failure to evaluate the notification of a planned excavation activity to determine the need for and extent of inspections, was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program ** [redacted] **, a procedure necessary to meet the requirements of 20 C.S.R. 4240-40.030(12)(I)4.

5. Staff Recommendations:

In order to minimize possibility of a recurrence of incident, Staff has the following recommendations in regards to Spire's damage prevention program:

A. Subsequent to the incident, Spire has taken action to update its damage prevention program from ** [redacted] ** to ** [redacted] **. In order to ensure compliance with the requirements of 20 C.S.R. 4240-40.030(12)(I)3.G. to provide for temporary markings of buried pipelines in the area of excavation going forward, Staff recommends that Spire:

1. Review the Common Ground Alliance Best Practice Marking Standards and determine which practices and procedures Spire intends to incorporate by

reference within a Standard Operating Procedure (SOP) and then identify which are considered as best practices and which are procedures.

2. Reference a specific version of the Common Ground Alliance Best Practice Marking Standards as opposed to referencing "the current version".
3. Establish a schedule for review of revisions to Common Ground Appliance Best Practice Marking Standards. Staff further recommends that Spire follow this schedule.
4. Reviews revisions to Common Ground Appliance Best Practice Marking Standards to determine when and how to adopt into Spire's procedures and training requirements.[97]

B. In future annual mailers to excavators, Staff recommends that Spire include a copy of the applicable sections of Chapter 319, RSMo concerning underground facility safety and damage prevention pertaining to excavators. Subsequent to the incident, Spire has taken action to update its damage prevention program from ** [redacted] ** to ** [redacted] ** In order to ensure that Spire's written program complies with the requirements of 20 C.S.R. 4240-40.030(12)(I)3.B., Staff recommends that Spire amend ** [redacted] ** to include a requirement that the annual mailers include a copy of the applicable sections of Chapter 319, RSMo concerning underground facility safety and damage prevention pertaining to excavators.

C. Regarding Spire's ** [redacted] ** Staff recommends that ** [redacted] ** be amended to include all of the factors listed in 20 C.S.R. 4240-40.030(12)(I)4. as considerations for determining the need for, and extent of, inspections. Staff further recommends that Spire follow this procedure.

D. Additionally, Staff recommends that Spire consider adding the following criteria as considerations for determining the need for, and extent of, inspections to** [redacted]

i. [redacted]
ii. [redacted]
iii. [redacted] **

[97] *See supra* Section III.C., Damage Prevention: Staff Experts Greg A. Williams and Clinton L. Foster.

E. Staff recommends Spire develop and include in its damage prevention program a description of Spire's ** [redacted] ** and procedures for its implementation. Staff further recommends Spire follow these procedures.

Staff Experts Greg A. Williams and Clinton L. Foster

D. Operator Qualification

In its PHMSA F 7100.1 incident report, Spire stated that Spire's Contract Locator did not complete a proper locate for the request made on May 28, 2020. Staff therefore evaluated Spire's qualification program with respect to training and qualification of contract locators, as well as the qualifications of individuals assigned to complete the May 28, 2020 locate request.

1. Regulatory Requirements:

20 C.S.R. 4240-40.030(12)(D)., Qualification of Pipeline Personnel, prescribes the required qualifications of individuals performing covered tasks on a pipeline facility,[98] including any other entity or individual performing covered tasks on behalf of the operator.[99] A "covered task" is defined by 20 C.S.R. 4240-40.030(12)(D)1.B. 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; and

(IV) Affects the operation or integrity of the pipeline."[100]

20 C.S.R. 4240-40.030(12)(D)2.C. defines "qualified" to mean "that an individual has been evaluated and can:

(I) Perform assigned covered tasks; and

(II) Recognize and react to abnormal operating conditions."[101]

[98] 20 C.S.R. 4240-40.030(1)(B)33 (defining a "pipeline facility" as "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.").
[99] 20 C.S.R. 4240-40.030(12)(D)1.A. ("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] 20 C.S.R. § 4240-40.030(12)(D)1.B.
[101] 20 C.S.R. 4240-40.030(12)(D)2.A. (defining "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:(a) indicate

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

Program Requirements:

20 C.S.R. 4240-40.030(12)(D)3., among other things, 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 20 C.S.R. 4240-40.020(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

a condition exceeding design limits; (b) result in a hazard(s) to persons, property, or the environment; or (c) require an emergency response.").

(II) Directed and observed by qualified individuals."[102]

2. Spire Actions to Comply with 20 C.S.R. 4240-40.030(12)(D)

Spire provided copies of its ** [redacted] **, Contract Locator's ** [redacted] ** and Spire's covered task list that was in effect at the time of the July 1, 2020 incident. Spire stated that contract locators performing work on Spire facilities are required to qualify under Spire's Operator Qualification (OQ) plan.[103]

Spire stated; "The covered task of 1291 – Locate Underground Pipelines is the only covered task that applies to contract locators that perform or manage locating of the Company's natural gas facilities."[104]

The Contract Locator provides its own operator qualification performance evaluations and training for its employees[105] in accordance with Spire's OQ plan. A copy of ** [redacted] ** was provided to the Contract Locator on May 25, 2020.[106]

Spire stated that the operator qualification evaluation methods used by the Contract Locator to evaluate covered task 1291 – Locate Underground Pipelines for Contract Locator employees included methods such as written exam, oral exam, Gas Locating Work Observation Checklist, performance on the job, and on the job training.[107]

In response to Staff Data Request 0042, Spire provided qualification records for both Contract Locator Employees A and B.[108] The qualification records from Spire's response included ** [redacted] **[109] ** [redacted] ** for both Contract Locator Employees A and B included documentation that the required evaluations had been completed.

[102] 20 C.S.R. 4240-40.030(12)(D)3.A-I.
[103] Spire Response to Staff Data Request 0040, 0040.2, 0041.1.
[104] Spire Response to Staff Data Request 0041, part 1.
[105] Spire Response to Staff Data Request 0041, part 2.
[106] Spire Response to Staff Data Request 0042.2.
[107] *See* Spire Response to Staff Data Request 0043.1, part c, subpart i.
[108] *See generally*, Spire Response to Staff Data Request 0042.
[109] *See* Spire Response to Staff Data Request 0042.

3. Staff Analysis:

Staff reviewed Spire's OQ Plan, the Contract Locator's ** [redacted] ** and Spire's covered task list that was in effect at the time of the July 1, 2020 incident and found that both the plan and covered task lists met the requirements of 20 C.S.R. 4240-40.030(12)(D)3. for a written qualification program.

Staff reviewed the qualification records for Contract Locator Employees A and B, and found both had completed training and qualification in accordance with Spire's OQ Plan.

For the covered task of 1291 – Locate Underground Pipelines, Spire's OQ program is a combination of both ** [redacted] ** and qualification training, which includes performance evaluations performed by the Contract Locator. Since Contract Locator Employee A responded incorrectly to locate ticket 201494113 as a "Clear/No Conflict" on June 1, 2020 and did not locate Spire's gas pipeline, Staff agrees that covered task locate underground pipeline was not performed correctly and required an evaluation in accordance with 20 C.S.R. 4240-40.030(12)(D)3.E. to determine if re-qualification was necessary.

As a result of the July 1, 2020 incident, Spire determined that ** [redacted] **.[110] ** [redacted] **.[111]

4. Violations

Staff did not find any violation with respect to Spire's actions to comply with the requirements of 20 C.S.R. 4240-40.030(12)(D), or Spire's procedures in its ** [redacted] **

5. Staff Recommendations:

Staff had no recommendations relating to Spire's Operator Qualification Plan based on Staff's analysis of this incident.

Staff Expert: Greg A. Williams

[110] Spire Response to Staff Data Request 0043, part 1.
[111] Spire Response to Staff Data Request 0043, part 2.

E. Drug and Alcohol Testing

The actions of the Contract Locator caused or contributed to this incident, therefore Staff investigated the Contract Locator's conformance with Commission Drug and Alcohol Testing requirements.

1. Regulatory Requirements:

Missouri pipeline safety rules adopt the Federal Drug and Alcohol Testing regulations[112] by reference.[113] At the time the incident occurred, the Commission Rules adopted the Code of Federal Regulations dated October 1, 2017, 49 C.F.R. parts 40 and 199 by reference.[114] The descriptions and quotations of applicable requirements below are based on the October 1, 2017, 49 C.F.R. parts 40 and 199.

49 C.F.R. 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.[115] 49 C.F.R. 199.202 requires each operator to maintain and follow a written alcohol misuse plan that conforms to Part 199 and the DOT Procedures.

20 C.S.R. 4240-40.080(4)(B) states that the references to "accident" in 49 CFR 199.105 and 199.225 should refer to a "federal incident reportable under 20 C.S.R. 4240-40.020."

49 C.F.R. § 199.3 defines "employee" and "covered employee" as:

> a person who performs a covered function, including persons employed by operators, contractors engaged by operators, and persons employed by such contractors.[116]

49 C.F.R. § 199.3 defines "covered function" as:

> 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.[117]

[112] 49 C.F.R. §§ 40 and 199, effective October 1, 2017, incorporated by reference by the Commission at the time of the incident, July 1, 2020.
[113] 20 C.S.R. 4240-40.080(1).
[114] Subsequent to the incident, Commission adopted more recent Federal amendments in File No. GX-2020-0112 effective July 30, 2020.
[115] 49 C.F.R. § 199.3 (defining DOT procedures as 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).
[116] 49 C.F.R. § 199.3.
[117] *Id.*

49 C.F.R.199.3 defines "prohibited drug" as follows:

> Prohibited drug means any of the following substances specified in Schedule I or Schedule II of the Controlled Substances Act (21 U.S.C. 812): marijuana, cocaine, opiates, amphetamines, and phencyclidine (PCP).[118]

With respect to contractor employees, 49 C.F.R. §§ 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 C.F.R.§ 199 be carried out by the contractor, provided that the operator remains responsible for ensuring compliance with the requirements of 49 CFR 199 and 40.

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

- Pre-employment: 49 C.F.R. §199.105(a) requires that: "No operator may hire or contract for the use of any person as an employee unless that person passes a drug test or is covered by an anti-drug program that conforms to the requirements of this part."[119]
- Randomly during employment: 49 C.F.R. § 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."[120]
- Post-Accident: 49 C.F.R. § 199.105(b) provides the post-accident[121] 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

[118] *Id.*
[119] 49 C.F.R. § 199.105(a).
[120] 49 C.F.R § 199.105(c)(1).
[121] 20 C.S.R. 4240-40.080(4)(B)(stating that the references to "accident" in §§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 20 C.S.R. 4240-40.020" instead.).

decision must be based on the specific information that the covered employee's performance had no role in the cause(s) or severity of the accident."[122]

Alcohol tests are required for covered employees post-accident:

- Post-Accident: 49 C.F.R. 199.225(a) provides the post-accident[123] alcohol testing requirements: "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. If a test required by this section is not administered within eight (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."[124]

2. <u>Spire Actions to Comply with 20 C.S.R. 4240-40.080</u>

Spire provided copies of the ** [redacted] ** in response to Staff Data Request 0035.

Spire also provided documentation that the two Contract Locator employees involved in this incident were drug tested consistently with pre-employment requirements. Spire also provided documentation that ** [redacted] ** Additionally, Spire provided documentation that ** [redacted]

[122] 49 C.F.R. § 199.105(b)(1).
[123] 20 C.S.R. 4240-40.080(4)(B) (stating that the references to "accident" in §§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 20 C.S.R. 4240-40.020" instead.).
[124] 49 C.F.R. 199.225(1)-(2).

[redacted]." **[125]

For the quarter completed directly prior to the incident, Spire provided[126] the number of covered employees working for Spire and the number of covered employees working for the Contract Locator, as well as the number of random drug tests conducted. During the quarter in which the incident occurred, Spire provided the number of covered employees working for Spire and the number of covered employees working for the Contract Locator, as well as the number of random drug tests conducted.

Spire provided documentation of drug and alcohol testing for the 2020 calendar year for both Spire and the Contract Locator. Spire had 436 covered employees during the 2020 calendar year and conducted 219 random drug tests. The Contract Locator had 8,810 covered employees during the 2020 calendar year and conducted 5,254 random drug tests.

3. Staff Analysis:

Spire identified two Contract Locator employees, Contract Locator Employees A and B, whose performance either contributed to the incident or could not be completely discounted as a contributing factor to the incident that occurred on July 1, 2020.[127]

Contract Locator Employees A and B, were both initially assigned to Missouri One-Call locate ticket number 201494113 on May 28, 2020 for the area along Highway 169 and south of Northwest Barry Road in Kansas City, Missouri[128]. Spire stated that once a locate request has been sent by the Missouri One Call to the Contract Locator and Company, the locate request is assigned to a Contract Locator employee by the contract supervisor.[129] ** [redacted] **[130] Contract Locator Employee A provided the response of "Clear/No Conflict" for this locate ticket on June 1, 2020.[131]

[125] Spire Response to Staff Data Request 0037.
[126] Spire Response to Staff Data Request 0038.
[127] Spire Response to Staff Data Request 0001, 0039.
[128] Spire Response to Staff Data Request 0002, 0020.
[129] Spire Response to Staff Data Request 0021.
[130] Spire Response to Staff Data Request 0039.1.
[131] Spire Response to Staff Data Request 0003, 0039.1.

Contract Locator Employee A was tested for drugs, and for alcohol on July 2, 2020 following the incident.[132] Contract Locator Employee B was tested for drugs on July 6, 2020.[133]

Thirty days had elapsed between the response of "Clear/No Conflict" on June 1, 2020, and the incident on July 1, 2020. Due to the time that had elapsed, Staff concludes post-accident alcohol tests cannot be used to determine if alcohol affected the individuals' performance of any covered functions on June 1, 2020. Staff does not find that Spire violated the provisions of 20 C.S.R. 4240-40.080 in this matter.

Spire provided documentation demonstrating the anti-drug program met the requirements for pre-employment testing because the two identified individuals were drug tested pre-employment.

Spire provided data showing that the number of random covered employee drug tests Spire and the Contractor Locator performed met the requirement of an annual random testing rate of 50 percent of covered employees distributed throughout the calendar year of 2020.

4. Violations

Staff found that Spire's procedures and actions were consistent with the requirements of 20 C.S.R. 4240-40.080.

5. Staff Recommendations:

Staff has no recommendations relating to drug and alcohol testing based on Staff's analysis of this incident.

Staff Expert: Clinton L. Foster

F. Spire's Oversight of Contractors

1. Regulatory Requirements:

20 C.S.R. 4240-40.030(12)(B)3. states that each operator is responsible for ensuring that all work completed on its pipelines by its consultants and contractors complies with this rule.[134]

[132] Spire Response to Staff Data Request 0020, 0037, 0039.
[133] Spire Response to Staff Data Request 0020, 0037.2, 0039; Response to Staff Data Request 0037 ** [redacted] **
[134] 20 C.S.R. 4240-40.030(12)(B)3.

20 C.S.R. 4240-40.030(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.[135]

20 C.S.R. 4240-40.030(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 20 C.S.R. 4240-40.030(12), (13), and (14).[136]

2. Spire's Actions to Comply with 20 C.S.R. 4240-40.030(12)(B)3. And (12)(C)2.

Staff requested copies of all Spire policies and procedures related to the oversight and inspection contract locators locating Spire's natural gas facilities.[137] Spire responded that ** "[redacted]. **[138] As part of Spire's ** [redacted] **, Spire ** [redacted] **

Spire's description of its quality control/audit process used to evaluate a locate request completed as a "Clear/No Conflict" is as follows:

> During an audit of a "Clear/No Conflict" locate, the Company verifies the response provided by the contract locator using Company installation records and other information provided by contract locator. The Company does not have a written procedure detailing this process.[139]

3. Staff Analysis:

At the time of this incident, Spire did not have written procedures in its procedural manual for operations, maintenance and emergencies required by 20 C.S.R. 4240-40.030(12)(C)1. for the oversight and inspection of a contract locator to ensure that its work is compliant with 20 C.S.R. 4240-40.030.

[135] 20 C.S.R. 4240-40.030(12)(C)1.
[136] 20 C.S.R. 4240-40.030(12)(C)2.A.
[137] Spire Response to Staff Data Request 0023.
[138] Spire Response to Staff Data Request 0023.
[139] Spire Response to Staff Data Request 0028.

4. Violations

Failure to have and follow written procedures for the oversight and inspection of a contract locator[140] in its procedural manual for operations, maintenance and emergencies required by 20 C.S.R. 4240-40.030(12)(C)1., was a violation of 20 C.S.R. 4240-40.030(12)(C)2.A.[141] Staff has two recommendations pertaining to this violation.

5. Staff Recommendations:

In order to ensure compliance with the requirements of 20 C.S.R. 4240-40.030(12)(B)3., Staff recommends that Spire:

A. Create or modify existing O&M procedures to define the process of how Spire personnel will conduct oversight and inspection of contractors performing the task of locating Spire's facilities to ensure compliance with 20 C.S.R. 4240-40.030(12)(B)3. Such procedure must include but not be limited to oversight and inspection of instances when a contractor completes a locate request as a "Clear/No Conflict". Staff further recommends that Spire follow these new or modified procedures.

B. Develop and implement a written procedure for conducting random field quality audits of "Clear/No Conflict" locates and include consideration of all factors that contributed to this incident. Staff further recommends that Spire follow these new or modified procedures.

Staff Expert: Greg A. Williams

G. Investigation of Failures

1. Regulatory Requirements:

20 C.S.R. 4240-40.030(12)(L), Investigation of Failures, states 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.[142]

[140] 20 C.S.R. 4240-40.030(12)(B)3. states that each operator is responsible for ensuring that all work completed on its pipelines by its consultants and contractors complies with this rule.
[141] 20 C.S.R. 4240-40.030(1)(G)3. (requiring each operator maintain, modify as appropriate, and follow the plans, procedures, and programs that it is required to establish under this rule, therefore, failing to have the procedure is additionally a violation of 20 C.S.R. 4240- 40.030(1)(G)3.).
[142] 20 C.S.R. 4240-40.030(12)(L).

2. Spire Actions to Comply with 20 C.S.R. 4240-40.030(12)(L)

Spire estimated property damage from the incident to be $65,283, not including the estimated cost of natural gas loss, [143] so the unplanned release of natural gas met the criteria for a federal incident.[144]

In response to Staff Data Request 0061.3, Spire stated that ** [redacted] ** was the procedure Spire established in effect at the time of the incident for investigating reportable incidents on Spire facilities.[145] This procedure requires, among other things, an investigation and attempt to determine the incident cause, and recommendations, if any, on corrective action needed to prevent a recurrence.

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

** [redacted] **[146]

Spire stated that the map of the pipeline crossing was inaccurate, showing it 200 feet south of the actual crossing in Spire's mapping records.[147]

[143] Spire Response to Staff Data Request 0034.1.
[144] 20 C.S.R. 4240-40.020(2)(D) (defining a federal incident to be any of the following events: 1. An event that involves a release of gas from a pipeline and that results in one or more of the following consequences: A. A death or personal injury necessitating in-patient hospitalization; or B. Estimated property damage of fifty thousand dollars ($50,000) or more, including loss to the operator and others, or both, but excluding the cost of gas lost; or C. Unintentional estimated gas loss of three (3) million cubic feet or more; or 2. An event that is significant, in the judgement of the operator, even though it did not meet the criteria of paragraph (2)(D)1.
[145] Spire Response to Staff Data Request 0061.3.
[146] Spire Response to Staff Data Request 0033.
[147] Spire Response to Staff Data Request 0005.2.

Further, Spire stated that "[t]he Company has determined that the mapping error was a contributing factor to the mis-locate but not the cause of the incident."[148]

Staff requested Spire's explanation of the Contract Locator's error that contributed to this incident. Spire stated; "the contract locator did not perform a visual scan of the area or confirm the location of the facility using conductive methods." [149]

Subsequent to the incident, Spire established the procedure ** [redacted] ** to investigate reportable incidents on Spire facilities, which replaces ** [redacted]. ** Both procedures include a requirement to perform an investigation and attempt to determine the incident cause, and recommendations, if any, on corrective action needed to prevent a recurrence.

Spire stated:

> As a result of this incident, the Company has identified that verifying highway crossing locations would be beneficial additional information to obtain on its system. The Company already has a process in place to report inaccurately mapped facilities and plans to further enhance this process during its upcoming Mobile Workforce System Implementation in Fall of 2020. After implementation, the system will show the field personnel their approximate location in relation to the mapped facilities. If the physical location of the facility is not accurate they will be able to submit a map correction condition to have the location updated.[150]

3. Staff Analysis:

Staff determined that Spire's procedures for investigation of failures meets the minimum requirements of 20 C.S.R. 4240-40.030(12)(L). Staff further determined that Spire conducted its investigation to analyze the incident—for the purpose of determining the cause(s) of the failure and minimizing the possibility of a recurrence—per its established procedure. Staff notes that neither the procedure that existed at the time of the incident, nor the procedure

[148] Spire Response to Staff Data Request 0005.3.
[149] Spire Response to Staff Data Request 0014.2.
[150] Spire Response to Staff Data Request 0006.

that has subsequently replaced it includes a standardized root cause analysis[151] procedure. Staff is therefore unable to follow the logic Spire used to determine the root cause of the incident. Staff is concerned about inconsistency in investigations of separate incidents, or multiple investigations of the same without a standardized root cause analysis process.

Spire's analysis concluded that the root cause[152] of this incident was "Expired Locate".[153] Staff does not follow the Company's logic used to determine that this was the root cause of the incident. Spire responded to the May 28, 2020 initial request to mark underground facilities with a status of "Clear/No Conflict" indicating that there were no Spire facilities in the area of the excavation instead of marking its facilities in the area of excavation. Staff concludes that Spire responded to the initial request with a status of "Clear/No Conflict" due to a combination of inadequate procedures and inaccurate mapping.

By attributing the incident cause solely to the Excavator, Staff is concerned that Spire is overlooking the role of its errors in the cause of this incident. Staff knows that Spire's initial response of "Clear/No Conflict" was incorrect, but we do not know what subsequent events might have occurred if Spire had properly located its facilities in response to the Excavator's May 28, 2020 request. Staff does not know what might have occurred in the following circumstances:

a. If Spire had initially informed the Excavator that a gas pipeline was present in the area of excavation by marking it (as opposed to providing a response of "Clear/No Conflict"), it is possible the Excavator would have renewed its request to locate that gas pipeline prior to July 1, 2020.

b. If Spire had properly marked its facilities in response to the Excavator's May 28, 2020 request, those markings might still have been visible to the Excavator on July 1, 2020.

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[151] *See Pipeline Glossary*, PIPELINE & HAZARDOUS MATERIALS SAFETY ADMIN., https://primis.phmsa.dot.gov/comm/glossary/#RootCauseAnalysis (last visited June 9, 2021) (defining "Root Cause Analysis" as "a problem solving process that focuses on the task of finding the root cause and determining the best prevention solutions to a problem.").

[152] Common Ground All. Best Prac. 17 App. A (defining "root cause" as "the primary reason an event occurred.").

[153] *See supra* Section III.C. (Information about the regulatory role of Chapter 319, RSMo).

c. If the Excavator had requested that Spire renew its response, Spire might or might not have recognized and corrected its previous errors by marking the facilities.

Because Spire made the initial error, and it cannot be demonstrated that a request to renew the facility markings by the Excavator following that error would have prevented the incident, Staff's opinion is that Spire's failure to locate its facilities in response to the Excavator's May 28, 2020 request contributed at least as much to causing this incident, as the Excavator's failure to request that Spire renew the markings.

Additionally, Spire's PHMSA F 7100.1 Incident Report form[154] stated that the Excavator did not request the marking of underground facilities by notification to the One-Call System. As described in Section III.C. of this Report, Spire first received a notification of a planned excavation in the area on May 28, 2020 via Missouri One-Call System.[155] Although the request to mark underground utilities was made more than 10 days prior to excavation[156], Staff disagrees with Spire's assessment that no notification was made to the One-Call Center to request marking of underground utilities.[157]

Spire indicated that ** [redacted] ** was a contributing factor to the incident. Staff expresses concern that, although Spire has implemented an updated system to allow field personnel to report mapping errors, currently, there appears to be no requirements in Spire's O&M procedures requiring field personnel to report errors identified during O&M activities.

4. <u>Violations</u>

Staff did not find that Spire's procedures and actions were inconsistent with the requirements of 20 C.S.R. 4240-40.030(12)(L). However, Spire's procedures do not provide a written processes that focuses on the tasks of identification of the root cause(s), or for

[154] *See generally*, Spire Response to Staff Data Request 0034.1.
[155] Spire Response to Staff Data Request 0003, 0003.1.
[156] RSMo § 319.026 states that an excavator shall serve notice of intent to excavate to the notification center by toll-free telephone number operated on a twenty-four hour per-day, seven day per-week basis or by facsimile or by completing notice via the internet at least two working days, but not more than ten working days, before the expected date of commencing the excavation activity.
[157] *See* discussion *supra* Section III.C. (detailing inadequate procedures relating to responding to requests to mark underground utilities).

determining the best prevention solutions to prevent recurrence of failures. As a result of this investigation, Staff makes the following four recommendations.

5. Staff Recommendations:

A. Staff recommends that Spire create or modify existing O&M procedures to require Spire personnel and its contractors to report mapping errors of Spire's natural gas system when identified through O&M activities, including but not limited to patrols and leakage surveys. Staff further recommends that Spire follow these new or modified procedures.

B. Staff recommends that Spire create or modify existing O&M procedures to investigate each field reported mapping error, and make timely correction of identified errors in the mapping system. Staff further recommends that Spire follow these new or modified procedures.

C. Staff recommends that Spire create or adopt a standardized, rigorous root cause analysis procedure. This procedure should be used when conducting investigations of failures. The procedure should address how to determine the predominant reason(s) that the event occurred, and to identify where a change in behavior would reasonably be expected to lead to a change in the outcome, i.e. avoidance of the event. Staff further recommends that Spire follow this procedure.

D. Staff recommends that Spire update Part G3 of its PHMSA F 7100.1 Incident Report for this incident to reflect that Spire received an initial notification from the One-Call Center to request marking of underground utilities.

Staff Expert: Clinton L. Foster

H. Distribution Integrity Management Program ("DIMP")

2. Regulatory Requirements:

Commission Rules for Gas Distribution Integrity Management Program ("DIMP") require that each gas distribution operator develop and implement an integrity management program no later than August 2, 2011. Program elements must include a demonstration of 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. Data to be considered in DIMP should include, but is not limited to, incident history.

At a minimum, 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.

3. Spire Actions to Comply with 20 C.S.R. 4240-40.030(17)

Currently, Spire has one combined DIMP Plan for its Missouri operations, and is in compliance with the requirements of 4 C.S.R. 240-40.030(17).[158]

In its incident report provided to PHMSA,[159] Spire lists the apparent cause of the incident as "excavation damage."[160] An operator's DIMP must consider "excavation damage" as one of the threat categories. In the DIMP Plan that was effective for Spire Missouri West at the time of the incident,[161] ** [redacted]. **

[158] Staff conducts routine inspections of the DIMP Plans and DIMP implementation by the natural gas operators jurisdictional to the Commission. Staff conducted its most recent inspection of Spire's DIMP in September 2020.
[159] 20 C.S.R. 4240-40.020(6)(A) (requiring 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 20 C.S.R. 4240-40.020(3)). (Spire provided the initial incident report in Response to Staff Data Request 0034, and a supplemental incident report in Response to Staff Data Request 0034.1).
[160] Ibid.
[161] Spire Response to Staff Data Request 0004 (Spire stated that the DIMP plan that was in effect on July 1, 2020, was revised on December 31, 2019. The Company provided Staff a copy of this plan on January 15, 2020. Staff notes that a copy of this DIMP plan has been filed in Commission Case GE-2020-0295 (file date August 28, 2020)).

The instructions for completing the incident report requires that operators further delineate type of excavation damage by party causing the damage as first party (operator personnel), second party (contractor working for operator) or third party (people or contractors not associated with the operator). In its incident report provided to PHMSA, Spire indicated that the incident was the result of third-party excavation damage. Spire's Narrative description of the incident includes the following statements:

> The contractor was not working under a valid locate at the time of the damage. A locate was requested by the contractor on May 28th for the area being worked. The locator did not complete a proper locate at that time, and the original locate had expired before the work began and was not renewed.[162]

Beginning with the reporting period for calendar year 2015, PHMSA has required operators to categorize and report excavation damages according to the following apparent root causes in annual reports to PHMSA[163]:

> **One-Call Notification Practices Not Sufficient:** Damages resulting from no notification made to the One-Call Center; or notification to one-call center made, but not sufficient; or wrong information provided to One Call Center.

> **Locating Practices Not Sufficient:** Damages resulting from facility that could not be found or located; or facility marking or location not sufficient; or facility was not located or marked; or incorrect facility records/maps.

> **Excavation Practices Not Sufficient:** Damages resulting from failure to maintain marks; or failure to support exposed facilities; or failure to use hand tools where required; or failure to test-hole (pot-hole); or improper backfilling practices; or failure to maintain clearance; or other insufficient excavation practices.

[162] Spire Response to Staff Data Request 0034 (Spire provided the initial incident report).
[163] 20 C.S.R. 4240-40.020((7)(A) (requiring annual reports); *See* App. D, Ex. 2 (Instructions for completing the annual reports from 2015 to present).

Other: Damages resulting from One-Call Center error; or abandoned facility; or deteriorated facility; or previous damage or data not collected; or other.[164]

In the DIMP Plan that was effective for Spire Missouri West at the time of the incident, Spire identified and tracks these apparent root causes as "sub-threats" under the "primary threat" of excavation damage.[165]

In response to Staff data request 0056, Spire stated that the subject incident will be included in the threat of Main Excavation Damage with the sub-threat of "Excavation Practices Not Sufficient" for the MO-West suburban region in Spire's DIMP.

4. Staff Analysis:

Spire has indicated that it will attribute the subject incident to the sub-threat of "Excavation Practices Not Sufficient" in its DIMP.[166] By attributing the cause of the incident solely to this sub-threat, Spire is recognizing only the risk associated with actions of excavators (in this instance: failing to renew requests to locate facilitates). However, Staff notes that additional causes attributable to errors made by Spire prior to the incident contributed to this incident. The Excavator properly requested that the facilities be located in the area of excavation activity on May 28, 2020. Spire incorrectly responded that the area was "Clear/No Conflict," thus failing to provide for temporary markings of buried pipelines in the area of excavation activity. Only after this incorrect response by Spire did the Excavator fail to renew the request to locate the facilities.

Staff's concern is that by attributing the cause of the incident solely to the actions of the Excavator ("Excavation Practices Not Sufficient") in its DIMP, Spire is overlooking the role that "Locating Practices Not Sufficient" (inaccurate facility maps and failure to have and follow adequate procedures) had in this incident. Spire's failure to recognize the role that "Locating Practices Not Sufficient" had in this incident may make it less likely that Spire will place sufficient emphasis on the need to determine and implement measures to reduce this risk as required by 20 C.S.R. 4240-40.030(17)(D)4. going forward.

[164] Operator Reports Submitted to PHMSA - Forms and Instructions | PHMSA (dot.gov)
[165] Spire Response to Staff Data Request 0004(Spire stated that the DIMP plan that was in effect on July 1, 2020, was revised on December 31, 2019)(The Company provided Staff a copy of this plan on January 15, 2020). Staff notes that a copy of this DIMP plan has been filed in Commission Case GE-2020-0295 (file date August 28, 2020)).
[166] Spire Response to Staff Data Request 0056

5. Violations

Staff did not find any violations of 20 C.S.R. 4240-40.030(17).

6. Staff Recommendations:

Staff recommends that Spire begin including considerations of all factors contributing to incidents in its DIMP risk evaluation going forward.

Staff Expert: Kathleen A. McNelis PE

IV. STAFF'S FINDINGS

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

1. Failure to have adequate procedures within Spire's ** [redacted] ** to comply with 20 C.S.R. 4240-40.030(12)(I)3.G. was a violation of 20 C.S.R. 4240-40.030(12)(I)1.

(See III.C. *Damage Prevention: Staff Experts Clinton L. Foster and Greg A. Williams*)

2. Failure to provide a copy of the applicable sections of Chapter 319, RSMo in Spire's annual mailings to excavators was a violation as a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program to comply with the provisions of 20 C.S.R. 4240-40.030(12)(I)3.B.

(See III.C. *Damage Prevention: Staff Experts Clinton L. Foster and Greg A. Williams*)

3. Failure to provide temporary marking of Spire's buried pipeline in the area of excavation activity before, as far as practical, the activity begins was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program to comply with the provisions of 20 C.S.R. 4240-40.030(12)(I)3.G.

(See III.C. *Damage Prevention: Staff Experts Clinton L. Foster and Greg A. Williams*)

4. Failure to evaluate the notification of a planned excavation activity to determine the need for and extent of inspections, was a violation of 20 C.S.R. 4240-40.030(12)(I)1. to carry out Spire's written program ** [redacted] **, a procedure necessary to meet the requirements of 20 C.S.R. 4240-40.030(12)(I)4.

(See III.C. *Damage Prevention: Staff Experts Clinton L. Foster and Greg A. Williams*)

5. Failure to have and follow written procedures for the oversight and inspection of a contract locator in its procedural manual for operations, maintenance and emergencies required by 20 C.S.R. 4240-40.030(12)(C)1., was a violation of 20 C.S.R. 4240-40.030(12)(C)2.A.

(See III.F. *Spire Oversight of Contractors: Staff Expert Greg A. Williams*)

V. STAFF'S RECOMMENDATIONS

In summary, throughout this Report, Staff has identified several areas that either require improvement or are violations of Commission rules. Staff summarizes below its recommendations related to these areas requiring improvement and violations of Commission rules.

1. Staff recommends that Spire review, evaluate and update, as necessary, its reporting procedures to ensure that such procedures require revision or confirmation of its initial telephonic notice to the NRC within 48 hours after the confirmed discovery of an incident as required by 20 C.S.R. 4240-40.020(3)(C).[167]

2. Subsequent to the incident, Spire has taken action to update its damage prevention program from ** [redacted] ** to ** [redacted] **. In order to ensure compliance with the requirements of 20 C.S.R. 4240-40.030(12)(I)3.G. to provide for temporary markings of buried pipelines in the area of excavation going forward, Staff recommends that Spire:

[167] *See supra* Section III.B., Mo. Pub. Serv. Comm'n Rep. Requirements: Staff Experts Greg A. Williams.

A. Review the Common Ground Alliance Best Practice Marking Standards and determine which practices and procedures Spire intends to incorporate by reference within a Standard Operating Procedure (SOP) and then identify which are considered as best practices and which are procedures.

B. Reference a specific version of the Common Ground Alliance Best Practice Marking Standards as opposed to referencing "the current version".

C. Establish a schedule for review of revisions to Common Ground Appliance Best Practice Marking Standards. Staff further recommends that Spire follow this schedule.

D. Reviews revisions to Common Ground Appliance Best Practice Marking Standards to determine when and how to adopt into Spire's procedures and training requirements.[168]

3. In future annual mailers to excavators, Staff recommends that Spire include a copy of the applicable sections of Chapter 319, RSMo concerning underground facility safety and damage prevention pertaining to excavators. Subsequent to the incident, Spire has taken action to update its damage prevention program from ** [redacted] ** to ** [redacted] ** In order to ensure that Spire's written program complies with the requirements of 20 C.S.R. 4240-40.030(12)(I)3.B., Staff recommends that Spire amend ** [redacted] ** to include a requirement that the annual mailers include a copy of the applicable sections of Chapter 319, RSMo concerning underground facility safety and damage prevention pertaining to excavators.

4. Regarding Spire's ** [redacted] ** Staff recommends that ** [redacted] ** be amended to include all of the factors listed in 20 C.S.R. 4240-40.030(12)(I)4. as considerations for determining the need for, and extent of, inspections. Staff further recommends that Spire follow this procedure.

[168] *See supra* Section III.C., Damage Prevention: Staff Experts Greg A. Williams & Clinton L. Foster.

5. Additionally, Staff recommends that Spire consider adding the following criteria as considerations for determining the need for, and extent of, inspections to ** [redacted]:

   A. [redacted]

   B. [redacted]

   C. [redacted] **[169]

6. Staff recommends Spire develop and include in its damage prevention program a description of Spire's ** [redacted] ** and procedures for its implementation. Staff further recommends Spire follow these procedures.[170]

7. In order to ensure compliance with the requirements of 20 C.S.R. 4240-40.030(12)(B)3., Staff recommends that Spire:

   A. Create or modify existing O&M procedures to define the process of how Spire personnel will conduct oversight and inspection of contractors performing the task of locating Spire's facilities to ensure compliance with 20 C.S.R. 4240-40.030(12)(B)3. Such procedure must include but not be limited to oversight and inspection of instances when a contractor completes a locate request as a "Clear/No Conflict". Staff further recommends that Spire follow these new or modified procedures.

   B. Develop and implement a written procedure for conducting random field quality audits of "Clear/No Conflict" locates and include consideration of all factors that contributed to this incident. Staff further recommends that Spire follow these new or modified procedures.[171]

8. Staff recommends that Spire create or modify existing O&M procedures to require Spire personnel and its contractors to report mapping errors of Spire's natural gas system when identified through O&M activities, including but not limited to, patrols and leakage surveys. Staff further recommends that Spire follow these new or modified procedures.[172]

[169] *See supra* Section III.C., Damage Prevention: Staff Experts Greg L. Williams & Clinton L. Foster.
[170] *See supra* Section III.C., Damage Prevention: Staff Experts Greg L. Williams & Clinton L. Foster.
[171] *See supra* Section III.C., Spire Oversight of Contractors: Staff Expert Greg L. Williams.
[172] *See supra* Section III.G., Investigation of Failures: Staff Expert Clinton L. Foster.

9. Staff recommends that Spire create or modify existing O&M procedures to investigate each field reported mapping error, and make timely corrections of identified errors in the mapping system. Staff further recommends that Spire follow these new or modified procedures.[173]

10. Staff recommends that Spire create or adopt a standardized, rigorous root cause analysis procedure. This procedure should be used when conducting investigations of failures. The procedure should address how to determine the predominant reason(s) that the event occurred, and to identify where a change in behavior would reasonably be expected to lead to a change in the outcome, i.e. avoidance of the event. Staff further recommends that Spire follow this procedure.[174]

11. Staff recommends that Spire update Part G3 of its PHMSA F 7100.1 Incident Report for this incident to reflect that Spire received an initial notification from the One-Call Center to request marking of underground utilities.[175]

12. Staff recommends that Spire begin including considerations of all causes contributing to incidents in its DIMP risk evaluation going forward.[176]

Staff recommends that the Commission order Spire to file an action plan, by December 31, 2021, which addresses the recommendations (numbered 1-11 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.

[173] *See supra* Section III.G., Investigation of Failures: Staff Expert Clinton L. Foster.
[174] *See supra* Section III.G., Investigation of Failures: Staff Expert Clinton L. Foster.
[175] *See supra* Section III.G., Investigation of Failures: Staff Expert Clinton L. Foster.
[176] *See supra* Section III.H., Distribution Integrity Mgmt. Program ("DIMP"): Staff Expert Kathleen McNelis P.E.

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.

APPENDICES

A. DETAILED DISCUSSION OF FACTS AND STAFF INVESTIGATION

B. FIGURES

C. PHOTOGRAPHS

D. COPIES OF REFERENCED DOCUMENTS

E. 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 Pipeline Incident Along Highway 169 in Kansas City, Missouri	)))	Case No. GS-2021-0019

AFFIDAVIT OF CLINTON L. FOSTER

STATE OF MISSOURI)
) ss
COUNTY OF JACKSON)

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 Jackson, State of Missouri, at my office in Kansas City, on this 28th day of June, 2021.

Notary Public

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

M. RIDENHOUR
My Commission Expires
July 22, 2023
Platte County
Commission #19603483

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 Pipeline Incident Along Highway 169 in Kansas City, Missouri	)))	Case No. GS-2021-0019

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 28th day of June, 2021.

Notary Public

DIANNA L. VAUGHT
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: July 18, 2023
Commission Number: 15207377

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 Pipeline Incident Along Highway 169 in Kansas City, Missouri	)))	Case No. GS-2021-0019

AFFIDAVIT OF GREG A. WILLIAMS

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

COMES NOW Greg A. Williams, 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.

Greg A. Williams
Greg A. Williams

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 28th day of June, 2021.

Dianna L. Vaught
Notary Public

DIANNA L. VAUGHT
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: July 18, 2023
Commission Number: 15207377

MISSOURI PUBLIC SERVICE COMMISSION

STAFF's GAS INCIDENT REPORT

Appendix A

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

Case No. GS-2021-0019

Commission Staff Division
Safety Engineering Department
June 30, 2021 - Jefferson City, Missouri

** Denotes Confidential Information **

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STAFF's GAS INCIDENT REPORT

Appendix A

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

Case No. GS-2021-0019

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, Spire Missouri Inc. West ("Spire" or "Company") 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 and Spire Emergency Response

Spire uses ** [redacted] ** ("Contract Locator"), a Kansas City, Missouri contract locate company, to respond to calls received through the Missouri One Call System (MOCS)[2] and to locate Spire's natural gas facilities.[3] ** [redacted] ** is currently Spire's only contract locator.

On May 28, 2020 an employee of ** [redacted] ** ("the Excavator"), an excavating company on contract for the Missouri Department of Transportation, called MOCS to notify MOCS that it planned to excavate under the grass median and west shoulder of the northbound lanes of U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri on June 3, 2020.[4]

[1] Including Pipeline Data Mart [accessed through the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration ("PHMSA") Portal].
[2] Missouri One Call System, Inc, is a nonprofit corporation providing a single point of contact at which member utilities may receive locate requests.
[3] Spire Response to Staff Data Request 0003, 0019, and 0020.
[4] Spire Response to Staff Data Request 0003, 0003.1.

On June 1, 2020 the Contract Locator responded by stating "Clear/No Conflict," indicating that Spire had no facilities in the area to be excavated.[5] ** [redacted] ** hereafter referred to as Contract Locator Employee A, and ** [redacted] ** hereafter referred to as Contract Locator Employee B are employees of the Contract Locator assigned to responding to the notice of planned excavation.[6]

At approximately 3:32 p.m. CDT[7] on July 1, 2020, the Excavator, using auger equipment to install a new guard rail, damaged[8] a 12 inch diameter gas distribution main which is part of Spire's system.[9] This pipeline runs east to west under U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri.[10] The auger penetrated the edge of a protective casing and into the pipeline, resulting in an unplanned release of natural gas.[11]

The main was operating at a pressure of approximately 128 pounds per square inch gauge (psig) at the time of the incident.[12] The maximum allowable operating pressure established by Spire for this main is 150 psig.[13]

At the time of damage, the pipeline facility was operating at approximately 128 psig[14]. The damage and subsequent natural gas release occurred on a section of pipeline that crosses beneath U.S. Route 169 Highway south of Northwest Barry Road in Kansas City, Missouri.[15] The unplanned release

[5] Spire Response to Staff Data Request 0003, 0023.1.
[6] Spire Response to Staff Data Request 0021 indicated among other things that once a locate request has been sent by Missouri One Call to the contract locator and Company, the locate request is assigned to a contract locator by the contract supervisor. However, Spire clarified in response to Staff Data Request 0039.1 that the contract supervisor was assigned to locate request 201494113 and was assigned to covered task 1291: Locate Underground Pipelines.
[7] All subsequent time references in this report are in CDT.
[8] *See* Appendix C, Photographs 5 and 6.
[9] Spire Response to Staff Data Request 0034.
[10] Spire Response to Staff Data Request 0002. *See* Appendix C, Photograph 1.
[11] Spire Response to Staff Data Request 0002.
[12] Spire Response to Staff Data Request 0034.1.
[13] Spire Response to Staff Data Request 0034.1.
[14] Pounds per square inch gauge.
[15] Spire Response to Staff Data Request 0002. *See* Appendix C, Photograph 1.

met the criteria for a federal incident, because[16] Spire estimated property damage to be $65,283 not including the estimated cost of natural gas loss.[17]

The Excavator notified a Spire Civic Improvement Inspector soon after the damage occurred. The Spire Civic Improvement Inspector notified an operations supervisor, who dispatched a serviceperson and a maintenance crew to the site at approximately 3:37 p.m. The serviceperson arrived on-site at 3:40 p.m., and the maintenance crew arrived at 3:45 p.m. The Kansas City Fire Department closed the remainder[18] of U.S. Route 169 in the area of the incident at approximately 3:45 p.m. At approximately 4:00 p.m. the auger equipment was removed and Spire began excavating to further expose the damaged segment of pipeline. At 5:00 p.m. Spire attempted to stop the flow of gas to the damaged pipeline segment by closing the valve on the west side of U.S. Route 169, however the valve did not fully close and allowed natural gas to flow past.

Because Spire was unable to stop the flow of gas using a valve, Spire decided to stop the flow of natural gas to the leaking segment by installing temporary control fittings on the pipeline upstream and downstream of the damage. Spire began excavating to expose the pipeline on the west and east sides of the highway at 7:00 p.m. and 7:30 p.m., respectively, to install control fittings. By 7:40 p.m. the pipeline pressure decreased to 80 psig. At 8:00 p.m. the leaking pipeline

[16] 20 C.S.R. 4240-40.020 (2)(D) defines a federal incident to be any of the following events: 1. An event that involves a release of gas from a pipeline and that results in one or more of the following consequences: A. A death or personal injury necessitating in-patient hospitalization; or B. Estimated property damage of fifty thousand dollars ($50,000) or more, including loss to the operator and others, or both, but excluding the cost of gas lost; or C. Unintentional estimated gas loss of three (3) million cubic feet or more; or 2. An event that is significant, in the judgement of the operator, even though it did not meet the criteria of paragraph (2)(D)1.

[17] Spire Response to Staff Data Request 0034.1.

[18] One lane in the northbound direction was closed prior to the incident due to the work being completed by the Excavator.

was further exposed and a repair clamp[19] was installed in an attempt to stop the leak, however the repair clamp did not fully stop the leaking natural gas.

Additionally, on July 1, 2020 Spire conducted a leakage survey of the area surrounding the incident site to check for the migration of natural gas and any additional leaks; no migration of natural gas nor additional leaks were identified.[20]

On the next day, July 2, 2020, the excavations located on either side of U.S. Route 169 were used to hot tap and line stop[21] the pipeline. The hot tapping and line stopping was completed on the west and east sides of U.S. Route 169 at 8:51 a.m. and 11:07 a.m., respectively, stopping the flow of natural gas to the leaking segment.

At 11:25 a.m. the band clamp was removed from the damaged section of pipeline, and at approximately 3:30 p.m. an encapsulation sleeve[22] was installed on the damaged section of pipeline. By 5:40 p.m., the line stops were both removed and the pipeline was returned to service.

Staff Expert: Clinton L. Foster

B. Personal Injuries

According to the information Spire submitted in the completed PHMSA F 7100.1 Incident Report- Gas Distribution System report, there were no fatalities nor injuries as a result of this incident.[23]

Staff Expert: Clinton L. Foster

[19] A repair clamp is a type of repair equipment which fits around the pipeline and is tightened to "clamp" onto the pipeline. *See* Appendix C, Photographs 3 and 4.
[20] Spire Response to Staff Data Request 0002.
[21] Hot tapping and line stopping a pipeline is a method to isolate a segment of a pipeline through the use of a specialized fitting(s) which can tap an active pipeline and insert a plug into the pipeline which stops the flow of product. *See* Appendix C, Photograph 2.
[22] An encapsulation sleeve or weld-over sleeve is a type of repair equipment which is welded onto and around the pipeline.
[23] Spire Response to Staff Data Request 0034.1.

C. Damages

There were no reported public or non-operator damages. Spire's cost to repair damages to its facilities were estimated to be $64,783, an estimated $414 of natural gas was lost, and the estimated cost of Spire's emergency response was $500. The total damages, not including gas loss, were $65,283. The total estimated cost of this incident to Spire was $65,697.[24]

Staff Expert: Clinton L. Foster

D. Site Description

The damage to the pipeline occurred under the grass median and west shoulder of the northbound lanes of U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri.[25] In this area, U.S. Route 169 is a limited access, divided highway running north to south. Northwest Barry Road runs east to west, crossing U.S. Route 169 by an overpass.

Staff Expert: Clinton L. Foster

E. Missouri Public Service Commission Reporting Requirements

At approximately 5:24 p.m. on July 1, 2020, Spire confirmed an incident meeting the reporting requirements of 20 C.S.R. 4240-40.020(2)(C).[26] The incident reporting requirements in 20 C.S.R. 4240-40.020(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 6:08 p.m. on July 1, 2020.[27]
2. Spire notified the United States Department of Transportation-Pipeline and Hazardous Materials Safety Administration (PHMSA) of a natural gas incident at approximately 7:00 p.m. on July 1, 2020 (NRC Report Number 1280866).[28]

[24] Spire Response to Staff Data Request 0034.1.
[25] *See* Appendix B, Figures 1 and 2, and Appendix C, Photograph 1.
[26] Spire Response to Staff Data Request 0048.
[27] 20 C.S.R. 4240-40.020(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.
[28] Spire Response to Staff Data Request 0034.1

3. Spire provided 48-hour confirmation of the incident to PHMSA at approximately 10:00 p.m. on July 5, 2020 (NRC Report Number 1281146).
4. USDOT-PHMSA form PHMSA F 7100.1 titled "Incident Report – Gas Distribution System" was completed by Spire and submitted to Staff and PHMSA on July 31, 2020.[29]

Staff Expert: Greg A. Williams

F. Missouri Public Service Commission Staff Investigation

At the direction of the Missouri Public Service Commission Pipeline Safety Program Manager, one Safety Engineering Department Staff inspector was dispatched to the incident site on July 2, 2020. The inspector arrived on-site at 9:00 a.m. and observed Spire's work to stop the flow of gas to the damaged portion of the pipeline, and the beginning of Spire's work to repair the damaged portion of the pipeline. The Pipeline Safety Program Manager assigned three Safety Engineering Department inspectors to the incident investigation, including the inspector dispatched to the site of the incident, to conduct additional discovery. This additional discovery included submitting Data Requests to Spire and reviewing responses, and collecting information from additional sources.[30]

Staff Expert: Clinton L. Foster

[29] Information provided by Spire's July 31, 2020 e-mail to commission Staff and Spire Response to Staff Data Request 0034.
[30] Including Pipeline Data Mart [accessed through the PHMSAPortal].

G. Investigation of Failure

The unplanned release met the criteria for a federal incident,[31] because Spire estimated property damage to be $65,283 not including the estimated cost of natural gas loss.[32]

In response to Staff Data Request 0061, Spire provided ** [redacted] ** as the procedure in effect at the time of the incident to investigate reportable incidents on Spire facilities.[33] This procedure requires among other things, an investigation and attempt to determine the incident cause,[34] and recommendations, if any, on corrective action needed to prevent a recurrence.[35]

According to Spire, the results of its failure analysis[36] were as follows:

** [redacted][37] **

In response to Staff Data Request 0033.5, Spire stated:

> Chapter 319.026(6.) RSMO states, 'When markings have been provided in response to a notice of intent to excavate, excavators may commence or continue to work within the area described in the notice for so long as the marking are visible. If an excavator is unable to begin the excavation within ten working days as described in the request,

[31] 20 C.S.R. 4240-40.020 (2)(D) defines a federal incident to be any of the following events: 1. An event that involves a release of gas from a pipeline and that results in one or more of the following consequences: A. A death or personal injury necessitating in-patient hospitalization; or B. Estimated property damage of fifty thousand dollars ($50,000) or more, including loss to the operator and others, or both, but excluding the cost of gas lost; or C. Unintentional estimated gas loss of three (3) million cubic feet or more; or 2. An event that is significant, in the judgement of the operator, even though it did not meet the criteria of paragraph (2)(D)1.
[32] Spire Response to Staff Data Request 0034.
[33] Spire Response to Staff Data Request 0061.3.
[34] Section 2.3.
[35] Section 5.2.6.
[36] Spire Response to Staff Data Request 0033.
[37] Spire Response to Staff Data Request 0033.

> the excavator shall make a relocate request before beginning the excavation.' The excavator's locate request was made on May 28, 2020 and the excavator stated that they did not commence work until June 23, 2020. Therefore, the excavator was required to 'make a relocate request' by law and did not.

In response to Staff Data Request 0005.2 Spire stated that the pipeline crossing was mapped 200 feet south of the actual crossing in Spire's mapping records.

Further, Spire stated that "[t]he Company has determined that the mapping error was a contributing factor to the mis-locate but not the cause of the incident."[38]

Staff requested Spire's explanation of the Contract Locator's error that contributed to this incident. Spire stated that "The contract locator did not perform a visual scan of the area or confirm the location of the facility using conductive methods."[39]

Since the incident, Spire established the procedure ** [redacted] ** to investigate reportable incidents on Spire facilities, which replaces ** [redacted] **[40] The new procedure includes similar requirements to the prior standard it replaces including, among other things, an investigation and attempt to determine the incident cause,[41] and recommendations, if any, on corrective action needed to prevent a recurrence.[42]

Staff requested Spire identify additional information the Company has identified as being needed as a result of this incident, and describe the Company's plan for gaining this information over time. In response Spire stated:

[38] Spire Response to Staff Data Request 0005.3.
[39] Spire Response to Staff Data Request 0014.2, part A.
[40] Spire Response to Staff Data Request 0061.3.
[41] Section 2.3.
[42] Section 5.2.5.

> As a result of this incident, the Company has identified that verifying highway crossing locations would be beneficial additional information to obtain on its system. The Company already has a process in place to report inaccurately mapped facilities and plans to further enhance this process during its upcoming Mobile Workforce System Implementation in Fall of 2020. After implementation, the system will show the field personnel their approximate location in relation to the mapped facilities. If the physical location of the facility is not accurate they will be able to submit a map correction condition to have the location updated.

Staff Expert: Clinton L. Foster

H. Distribution Integrity Management Program ("DIMP")

Spire has one Distribution Integrity Management Program (DIMP) for its Missouri operations, and it is in compliance with the requirements of 20 C.S.R. 4240-40.030(17).[43]

In its report for this incident provided to PHMSA,[44] Spire lists the apparent cause of the incident as "excavation damage." "Excavation damage" is one of the threat categories that must be considered in an operator's DIMP, and Spire ** [redacted] ** in its DIMP in effect at the time of the incident.[45] Spire also identified the damage as caused by a third party, i.e. by people or contractors not associated with it. Spire's description of the incident includes the following statements:

> The contractor was not working under a valid locate at the time of the damage. A locate was requested by the contractor on May 28th for the area being worked. The locator did not complete a proper locate at that time, and the original locate had expired before the work began and was not renewed.

[43] Staff conducts routine inspections of the DIMP Plans and DIMP implementation by the natural gas operators jurisdictional to the Commission. The most recent inspection of Spire's DIMP was conducted in September 2020.
[44] 20 C.S.R. 4240-40.020(6)(A) (requiring 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 20 C.S.R. 4240-40.020(3)). (Spire provided the initial incident report in Response to Staff Data Request 0034).

[45] Spire Response to Staff Data Request 0004stated that the DIMP plan that was in effect on July 1, 2020, was revised on December 31, 2019. The Company provided Staff a copy of this plan on January 15, 2020. Staff notes that a copy of this DIMP was filed in Commission Case GE-2020-0295 (file date August 28, 2020).

Beginning with calendar year 2015, PHMSA requires utilities to categorize and report excavation damages according to the following apparent root causes in annual reports submitted to PHMSA:[46]

> **One-Call Notification Practices Not Sufficient:** Damages resulting from no notification made to the One-Call Center; or notification to one-call center made, but not sufficient; or wrong information provided to One Call Center.
> **Locating Practices Not Sufficient:** Damages resulting from facility that could not be found or located; or facility marking or location not sufficient; or facility was not located or marked; or incorrect facility records/maps.
> **Excavation Practices Not Sufficient:** Damages resulting from failure to maintain marks; or failure to support exposed facilities; or failure to use hand tools where required; or failure to test-hole (pot-hole); or improper backfilling practices; or failure to maintain clearance; or other insufficient excavation practices.
> **Other**: Damages resulting from One-Call Center error; or abandoned facility; or deteriorated facility; or previous damage or data not collected; or other.

In the DIMP in effect for Spire at the time of the incident,[47] these apparent root causes are identified and tracked by Spire as "sub-threats" under the "primary threat" of excavation damage.

In response to Staff data request 0056, Spire stated that the subject incident will be included in the threat of Main Excavation Damage with the sub-threat of "Excavation Practices Not Sufficient" for the MO-West suburban region in Spire's DIMP.

Staff Expert: Kathleen A. McNelis, PE

I. Natural Gas System

Natural gas service in Kansas City, Missouri is provided by Spire. The gas distribution main damaged in this incident was a twelve (12) inch diameter steel pipe[48], running east to west under U.S. Route 169 south of Northwest Barry Road in Kansas City, Missouri. The main was operating at a pressure of approximately 128 psig at the time of the incident.[49] The maximum allowable

[46] 20 C.S.R. 4240-40.020(7)(A) requires annual reports. Instructions for completing the annual reports from 2015 to present are included in Appendix D of this report.
[47] Spire Response to Staff Data Request 0004 stated that the DIMP plan that was in effect on July 1, 2020, was revised on December 31, 2019. The Company provided Staff a copy of this plan on January 15, 2020. Staff notes that a copy of this DIMP plan has been filed in Commission Case GE-2020-0295 (file date August 28, 2020).
[48] Spire Response to Staff Data Request 0034.1.
[49] Spire Response to Staff Data Request 0034.1.

operating pressure established by Spire for this main was 150psig.[50] The pipeline crossing the highway was ** [redacted] **[51]

Staff Expert: Clinton L. Foster

J. Damage Prevention

Table 1 displays the number of excavation damages on Spire distribution facilities for 2015-2019.[52]

Table 1 - Excavation damages in Spire Missouri West distribution system operating area by apparent root cause 2015-2019

Year	Excavation Damage Apparent Root Cause				Total
	One-Call Notification Practices Not Sufficient	Locating Practices Not Sufficient	Excavation Practices Not Sufficient	Other	
2015	125	418	377	0	920
2016	152	349	311	9	821
2017	130	449	301	9	889
2018	159	297	364	50	870
2019	151	361	392	27	931
Totals (2015-2019)	**717**	**1,874**	**1,745**	**95**	**4,431**

Table 2 displays data about federal incidents attributed to Excavation Damage cause with root cause or contributing factor of locating practices not sufficient from Jan 1, 2015 through date of Staff Data Request 0046 (9/22/2020) in Spire Missouri West operating Area.

Table 2 - Federal Incidents attributed to Excavation Damage cause with root cause or contributing factor of locating practices not sufficient from Jan 1, 2015 through date of Staff Data Request 0046 (9/22/2020) in Spire Missouri West operating area

Date	Address	Property Damage	Property Damage Including Gas Loss	Gas Released (MCF)
3/13/2015	SEC of Rangeline & Newman Rd., Joplin, MO	$13,152.00	$41,708.00	5,436.00
6/9/2017	6512 E 155th St, Grandview, MO	$155,284.00	$157,082.00	309.85
7/1/2020	MO 169 Highway and Barry Road, Kansas City, MO	$65,283.00	$65,697.00	100.59
	Total between 1/1/2015 and 9/22/2020	$233,719.00	$264,487.00	5,846.44

[50] Spire Response to Staff Data Request 0034.1.
[51] Spire Response to Staff Data Request 0002.
[52] Spire Response to Staff Data Request 0044.

Table 3 displays data about Missouri state reportable incidents attributed to Excavation Damage cause with root cause or contributing factor of locating practices not sufficient from Jan 1, 2015 through date of Staff Data Request 0046 (9/22/2020) in Spire Missouri West operating Area.

Table 3 - Missouri state reportable incidents attributed to Excavation Damage cause with root cause or contributing factor of locating practices not sufficient from Jan 1, 2015 through date of Staff Data Request 0046 (9/22/2020) in Spire Missouri West operating

Date	Address	Property Damage	Property Damage Including Gas Loss	Gas Released (MCF)
3/30/2016	E. Gregory Blvd. & Oak St., Kansas City, MO	$19,537.00	$23,499.00	923.21
4/4/2016	100 N Broadway, Oak Grove, MO	$16,928.00	$19,766.00	661.36
7/29/2019	2015 W Foxwood Dr, Raymore, MO	$24,564.00	$25,628.00	215.42
7/6/2020	3250 N Progress Ave, Joplin, MO	$15,517.00	$19,434.00	950.74
	Total between 1/1/2015 and 9/22/2020	$76,546.00	$88,327.00	2,750.73

Spire stated that ** [redacted][53] ** was the program in effect on May 28, 2020 and June 1, 2020 designed to prevent damage by excavation for the area where this incident occurred.[54] Spire provided a copy of this program to the Contract Locator on May 25, 2020.[55]

Additionally, regarding Spire's ** [redacted] **, Spire indicated that this standard did not include procedures for conducting a "visual scan of the area" or to "confirm the location of the facility using conductive methods" but was covered in the Contract Locator training slides during 2018.[56]

[53] Spire Response to Staff Data Request 0018.1.
[54] Spire Response to Staff Data Request 0001, part b, indicated that "The contract locator received the locate request through Missouri One Call on May 28, 2020 at approximately 6:56 p.m. The contract locator responded to the locate as "Clear/No Conflict" on June 1, 2020 at 6:25 p.m."
[55] Spire Response to Staff Data Request 0042.2.
[56] Spire Response to Staff Data Request 0014.3, 0024.2.

On July 1, 2020 Spire adopted a new damage prevention program titled ** [redacted] **, superseding ** [redacted] .[57] ** In response to Staff Data Request 0053.1, part 1), Spire stated that Section 6 of its ** [redacted] ** procedure states that "Spire marking standards should follow the current version of the Common Ground Alliance Best Practice Marking Standards." Additionally, Spire indicated that these standards require a visual scan and electromagnetic locating when possible and the Company provides its standards to the Contract Locating Company.

Spire provided Staff with a copy of the annual mailer sent to excavators in 2019 and 2020, which is required by 20 C.S.R. 4240-40.030(12)(I)3.B.[58] The mailer provides, among other things, information about Spire's natural gas system, describes how to make a request to locate underground utilities, and what to do in the event a natural gas pipeline is damaged. Additionally, Spire provided its 2019 and 2020 mailer distribution lists, and both lists included the Excavator.[59]

Commission Rule 20 C.S.R. 4240-40.030(12)(I)3.B requires Spire to include in this mailer a copy of the applicable sections of Chapter 319, RSMo, or a summary of the provisions of Chapter 319, RSMo approved by designated commission personnel to excavators annually. Spire stated that it did not provide a copy of Chapter 319, RSMo to excavators and instead "has chosen to provide a summary of the provisions."[60] Spire was unable to locate a copy of the approval of the summary by designated commission personnel. However, Spire has been utilizing the same summary for at least the last 15 years.[61]

[57] Spire Response to Staff Data Request 0014, 0018.
[58] Spire Response to Staff Data Request 0009.2, 0018.7.
[59] Spire Response to Staff Data Request 0018.2, 0018.9.
[60] Spire Response to Staff Data Request 0018.9.
[61] Spire Response to Staff Data Request 0018.9.

In response to Staff Data Request 0014.2, part A., which requested Spire to explain specifically what the Contract Locating Company did, or failed to do that contributed to this incident, Spire stated that "The contract locator did not perform a visual scan of the area or confirm the location of the facility using conductive methods". Staff asked Spire to explain specifically what the Contract Locator did or failed to do that contributed to this incident. Spire responded that

** [redacted][62] **

** [redacted] ** that became effective on July 1, 2020 states the following:

** [redacted] **

[62] Spire Response to Staff Data Request 0014.2, 0030.

At the time of the subject incident, Spire's procedures required the Contract Locator to flag locates and notify Spire when work was planned in a high-profile area,[63] such as the area where the subject incident occurred.[64] The Contract Locator was required to select the appropriate high-profile (HP) reason in the Contract Locating Company software regardless of whether the ticket was marked or indicated to be "clear/no conflict."[65]

As required by 20 C.S.R. 4240-40.030(12)(I)4., Spire established ** [redacted] . **[66] Subsection 8.2 of the standard states:

** [redacted] **

The location of the incident included a 12-inch steel pipeline operating at 128 psig in an area where a serious incident occurred due to damage to the pipeline.[67]

[63] Spire Response to Staff Data Request 0053.1 defines a high profile facility to include ** [redacted] **.
[64] Spire Response to Staff Data Request 0047.
[65] Spire Response to Staff Data Request 0033.6.
[66] Spire Response to Staff Data Request 0018.1, 0064.
[67] Spire Response to Staff Data Request 0034.1.

** [redacted] **

describes that each on-site inspection should include:

- ** [redacted]

[redacted] **

In response to Staff Data Request 0033.1, Spire provided its procedure in place to identify locations where inspections of planned excavations was necessary:[68]

** [redacted] **

Additionally, Spire stated that ** [redacted] ** Rather, the Company's process for checking accuracy of locates applies to all tickets regardless of response types or location.

Spire provided the ** [redacted] ** in response to Staff Data Request 0033. In the report, Spire stated:

** [redacted] **

Since the time of the incident, Spire has updated this process. The new system is an automated notification system which alerts Spire in the event a notification of planned excavation is

[68] Note: Spire refers to the locations where inspections of planned excavations were necessary per 20 C.S.R. 4240-40.030(12)(I)4. as "high profile" locations.

received within an identified "high profile" area. In response to Staff Data Request 0033.1, Spire stated:

> ** [redacted] **

In response to Staff Data Request 0064, part 3), Spire provided its effectiveness evaluation of procedures utilized with respect to compliance with the requirements of 20 C.S.R. 4240-40.030(12)(I)4. following the July 1, 2020 incident. Spire's response stated that:

> Prior to the incident, the Company had begun assessing what constitutes a high profile locate ticket as part of its Ticket Management System rollout. The Company continues this process and has not made any revisions at this time.

Since the incident, Spire updated its damage prevention program from ** [redacted] ** to ** [redacted] ** provided in response to Staff Data Request 0014. The new program does not include procedures relating to Spire's ** [redacted] . **

Staff Experts: Clinton L. Foster and Greg A. Williams

K. Spire Oversight of Contractors

Staff requested copies of all Spire policies and procedures related to its oversight and inspection of the Contract Locator.[69] Spire responded that ** [redacted] . **[70]

[69] Spire Response to Staff Data Request 0023.
[70] Spire Response to Staff Data Request 0023.

In addition to Spire's ** [redacted] **, Spire provides oversight as described in its contractual agreements with its contract locators.[71] Spire provided a copy of its ** [redacted] ** to the Contract Locator in 2015.[72]

According to the ** [redacted] ** Spire ** [redacted] [73]; [redacted]. ** For the timeliness and accuracy metrics, Spire tracks daily reports generated from MOCS that show total measurable tickets, pending tickets, on-time tickets, and late tickets. From this, daily percentages and monthly percentages are calculated. Spire tracks accuracy and effectiveness via quarterly quality reports that calculate billable locates and damages where the contract locators were at fault.[74] Spire's minimum standard for timeliness is 98% on time per month, and the minimum standard for accuracy is 99.97% accurate.[75] In general, ** [redacted] [76] [redacted]

[71] Spire Response to Staff Data Request 0023, 0053.1.
[72] Spire Response to Staff Data Request 0067.
[73] Spire's timeliness is defined as the percentage of excavation notices for which an on-site location is provided within 2 working days or by the mutually arranged date between the excavator and locator.
[74] Spire Response to Staff Data Request 0025.
[75] Spire Response to Staff Data Request 0026.
[76] Spire Response to Staff Data Request 0023 defines ** [redacted] **

[redacted][77]

[redacted][78]

[redacted][79] [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted][80] **.

Spire began implementation of the Field Quality Audits in July 2015, and on April 1, 2018 it began ** [redacted] ** of the audited locate requests.[81] Field audits are divided into two regions. In general, the North Region includes the city of Kansas City and all the facilities north of the Missouri River, and the South Region includes facilities outside of Kansas City south of the Missouri River.[82] The criteria used to select audit locations may include but is not limited to: type of excavation work, past locator performance,

[77] Spire Response to Staff Data Request 0023 defines the Locate Accuracy Rate means a rate of locates physically performed per At-Fault Damage equal to, for the applicable Service Year quarter: (x) the total number of Locate Requests physically performed divided by (y) the total number of At-Fault Damages.
[78] Spire Response to Staff Data Request 0023.1, part 6, defines a "Service Year" to include the period of October 1 to September 30.
[79] ** [redacted] **
[80] Spire Response to Staff Data Request 0023.
[81] Spire Response to Staff Data Request 0023.2, parts a) and b).
[82] Spire Response to Staff Data Request 0023.1, part 7).

potential impact to facilities, locator tenure, and past excavator performance. The 100 locates are selected across all regions and would include locates completed as "Clear/No Conflict."[83] During the period of January 2020 through and including June 2020, Spire conducted 62 field quality audits Inside KC and 140 field quality audits completed for Spire MOW (meaning Spire Missouri West).[84] If a locator fails a field quality audit, the failure is addressed with the Contract Locator by Spire, and the locate marks are corrected in the field as needed.[85]

In response to a Staff request, Spire provided a detailed description of the quality control/audit process and a copy of Spire's procedures for evaluating a locate request completed as a "Clear/No Conflict.".[86] Spire responded that "During an audit of a "Clear/No Conflict" locate, the Company verifies the response provided by the contract locator using Company installation records and other information provided by contract locator. The Company does not have a written procedure detailing this process."

Staff Expert: Greg A. Williams

L. Operator Qualification

Spire provided copies of its ** [redacted] ** the Contract Locator's ** [redacted] ** and Spire's covered task list that was in effect at the time of the July 1, 2020 incident. Spire also indicated that contract locators performing work on its facilities are required to qualify under its Operator Qualification (OQ) plan.[87]

[83] Spire Response to Staff Data Request 0023.1, part 14), and Spire Response to Staff Data Request 0028.
[84] Spire Response to Staff Data Request 0023.1, part 13.
[85] Spire Response to Staff Data Request 0040.1, part c).
[86] Spire Response to Staff Data Request 0023.1, part 1), indicates that a "Clear/No Conflict" response only applies when there are no Company facilities within the dig area.
[87] Spire Response to Staff Data Request 0040, 0040.2.

Spire verified that it and the Contract Locator were using the same Operator Qualification (OQ) program as the Company and that their OQ program was reviewed by Spire during January 2020.[88]

In response to Staff Data Request 0041, part 1), Spire stated that "The covered task of 1291 – Locate Underground Pipelines is the only covered task that applies to contract locators that perform or manage locating of the Company's natural gas facilities." The Contract Locator provides its own operator qualification performance evaluations and training for its employees.[89] For training purposes, a copy of ** [redacted] ** was provided to ** [redacted] ** or the Contract Locator on May 25, 2020 and a copy of ** [redacted] ** was provided to the Contract Locator in 2015.[90]

Spire indicated that the operator qualification evaluation methods used by the Contract Locator to evaluate covered task 1291 – Locate Underground Pipelines for Contract Locator employees included methods such as Written Exam, Oral Exam, Gas Locating Work Observation Checklist, Performance on the job, and on the job training.[91] Spire's response to Staff Data Request 0041.1 stated: ** [redacted] **.

In response to Staff Data Request 0042, Spire provided its operator qualification records for both Contract Locator Employee A and ** [redacted] **, hereafter referred to as Contract Locator

[88] Spire Response to Staff Data Request 0060, part b).
[89] Spire Response to Staff Data Request 0041, part 2).
[90] Spire Response to Staff Data Request 0042.2, 0067.
[91] Spire Response to Staff Data Request 0043.1, part c), subpart i).

Employee B who were initially assigned to Missouri One-Call locate ticket number 201494113 on May 28, 2020 for the area along Highway 169 and south of Northwest Barry Road in Kansas City, Missouri[92]. The qualification records included ** [redacted] .** The ** [redacted] ** for both Contract Locator Employee A and Contract Locator Employee B individuals included ** [redacted] **. Spire also provided the Contract Locator qualification records conducted during May 2019 for both Contract Locator A and Contract Locator B related to their ** [redacted] ** training.[93]

Staff Expert: Greg A. Williams

M. Compliance with Drug and Alcohol Testing Requirements

Spire provided copies of its substance abuse testing policy, which is titled ** [redacted] . **[94]

Spire also provided documentation that Contract Locator Employees A and B were drug tested consistently with pre-employment requirements.[95] ** [redacted]

[92] Spire Response to Staff Data Request 0002, 0020.
[93] Spire Response to Staff Data Request 0042.1.
[94] Spire Response to Staff Data Request 0035.
[95] Spire Response to Staff Data Request 0039.

[redacted] **[96] Additionally, ** [redacted] **[97]

For the most recently completed quarter prior to the incident,[98] Spire provided the number of covered employees working for Spire and the number of covered employees working for Contract Locator, as well as the number of random drug tests conducted in response to Staff Data Request 0038. For the quarter during which the incident occurred,[99] Spire provided the number of covered employees working for Spire and the number of covered employees working for the Contract Locator, as well as the number of random drug tests conducted.[100]

Spire provided documentation of drug and alcohol testing for the 2020 calendar year for both Spire and the Contract Locator.[101] Spire had 436 covered employees during the 2020 calendar year and conducted 219 random drug tests. The Contract Locator had 8810 covered employees during the 2020 calendar year and conducted 5254 random drug tests. **

Staff Expert: Clinton L. Foster

[96] Spire Response to Staff Data Request 0037.
[97] Spire Response to Staff Data Request 0037.
[98] The quarter prior to the incident began on April 1, 2020 and ended June 30, 2020.
[99] The quarter including the incident began on July 1, 2020, and ended September 30, 2020.
[100] Spire Response to Staff Data Request 0038.1.
[101] Spire Response to Staff Data Request 0038.2.

APPENDIX B: Figures

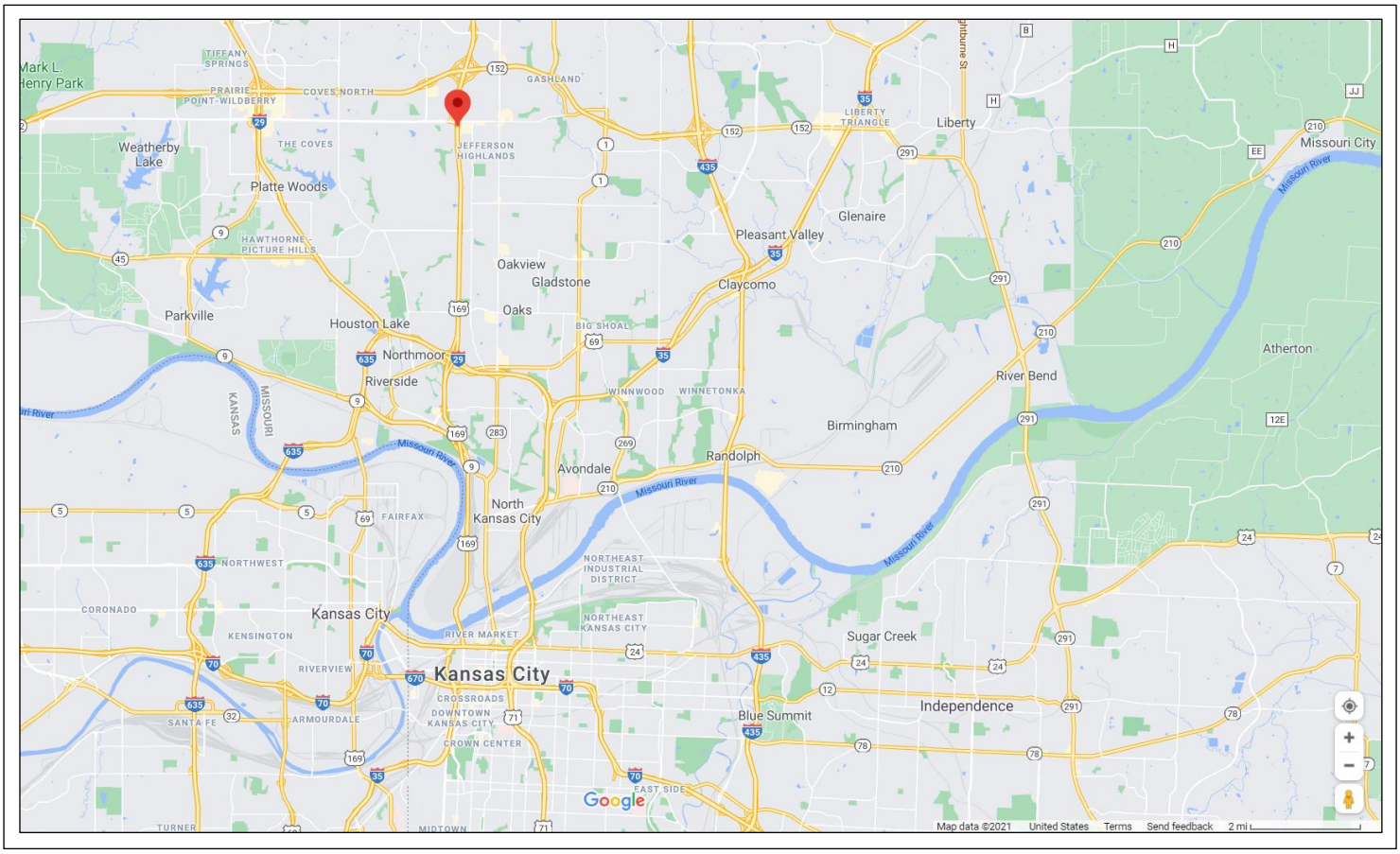

Figure 1: Approximate Location of Incident (Source: Google)

**

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Figure 2: Site Diagram (Source: Spire)

Appendix C: Photographs

Photograph 1: Photograph looking north along the northbound lanes of U.S. Route 169 toward Northwest Barry Road overpass. The excavation in the median contains the damaged pipeline. (Source: Staff)

Photograph 2: Photograph of tapping and line stop fitting affixed to the pipeline on the west side of U.S. Route 169. (Source: Staff)

Photograph 3: Photograph of the damaged section of pipeline looking northeast. The red arrow (added by Staff) points to a repair clamp surrounding the damaged portion of the pipeline. (Source: Staff)

Photograph 4: Photograph of the damaged portion of the pipeline looking southeast. A repair clamp is surrounding the damaged portion of the pipeline. (Source: Staff)

Photograph 5: Photograph of the damage to the pipeline. (Source: Staff)

Photograph 6: Photograph of the damage to the pipeline. (Source: Staff)

MISSOURI PUBLIC SERVICE COMMISSION

STAFF's GAS INCIDENT REPORT

Appendix D

Exhibits

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

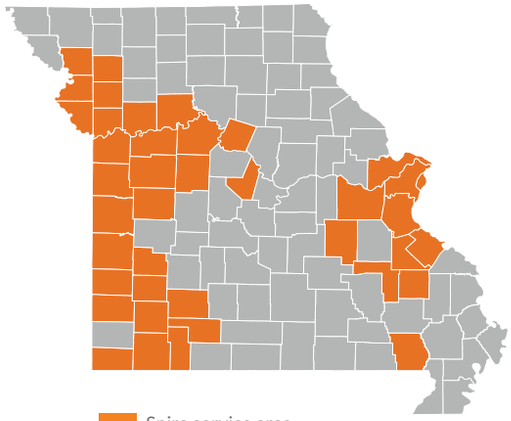
Case No. GS-2021-0019

Commission Staff Division
Safety Engineering Department
June 30, 2021 - Jefferson City, Missouri

Knowing what to do in an emergency

In the event a natural gas pipeline is damaged, severe injury or death could occur. If you are ever involved in an emergency situation, please follow these steps:

- **Remove all ignition sources.** Turn off equipment and leave it in place. Do not light a match, start an engine, use a cell phone (in the area) or do anything that may create a spark.
- **Immediately leave the area and go to a safe location.** Move upwind and warn others to stay away from the area.
- **Call for help.** Once you are safely away from the area, call 911 for emergency assistance. Then call Spire's emergency number at 800-887-4173 in eastern Missouri and 800-582-1234 in western Missouri.
- **Never attempt to stop a leak.** Do not touch, attempt to repair or conceal a damaged pipeline.



Spire service area

Learn more about digging safely

Spire
SpireEnergy.com

811
call811.com

Common Ground Alliance
commongroundalliance.com

Missouri Common Ground Alliance
mocommonground.org

Missouri Public Service Commission
psc.mo.gov

Office of Pipeline Safety
phmsa.dot.gov

USIC
usicllc.com

Heath Consultants
heathus.com

For more information about digging safely, contact us at **314-706-2399**. You can also visit www.commongroundalliance.com to learn more on damage prevention.

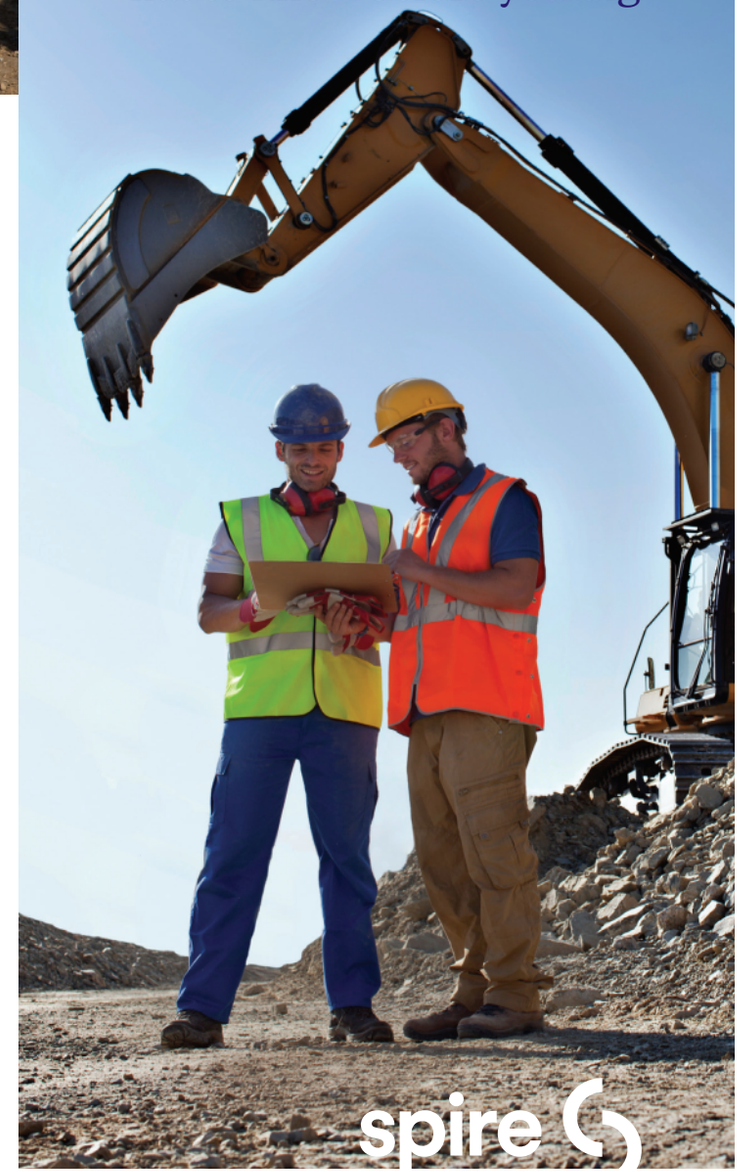
In case of an emergency, call us at **800-887-4173** in eastern Missouri or **800-582-1234** in western Missouri.

00473-MO-0319

spire

Working together to keep our communities safe

What to know before you dig



Protecting our pipelines

Pipelines are one of the safest, most reliable forms of transporting natural gas and other petroleum products. And like any source of energy, it's important to always use caution when working around underground pipelines. So before beginning any excavation project, be sure to call 811 to confirm the position of underground facilities free of charge.

If you're working around underground pipelines, we encourage the use of "hand-dig/soft-dig" techniques to verify the exact location of all pipes before using any electric-powered equipment. You must also closely monitor the boring equipment during any excavation project.

If a gas pipeline is scratched, bumped or disturbed during an excavation project, reach out to us immediately at 314-706-2399 so we can assess the situation and prevent future safety hazards. In most cases, we will not pursue inspection or repair costs on disturbances that don't result in a gas leak.

The American Public Works Association (APWA) uses above-ground markers to identify underground utilities and alert people about future excavation activities in the area. These markers help keep our communities safe.

- White: Proposed excavation
- Fluorescent Pink: Temporary survey markings
- Red: Electric power lines, cables, conduit and lighting cables
- Yellow: Gas, oil, steam, petroleum or gaseous materials
- Orange: Communication, alarm or signal lines, cables or conduit
- Blue: Potable water
- Purple: Reclaimed water, irrigation and slurry lines
- Green: Sewers and drain lines

Working together to protect what matters most

The "Underground Facility Safety and Damage Prevention Act" (RSMo319), commonly referred to as the one-call law, requires everyone to call for facility marking before they dig.

You can stay safe by following these simple steps:

1 Make the call.

Call 811 (national one-call number) and request that your project area be marked. The call and locating services are free of charge.

2 Wait the required time.

Give utilities at least three working days to mark underground facilities. By law, a call is required no less than three working days and not more than 10 working days before digging starts.

3 Respect the marks.

Spire natural gas facilities are marked with yellow paint and, if possible, with flags. If marks aren't clearly visible when starting your project, call 811 to have them marked again.

4 Dig with care.

Remember to always verify the exact location and depth of gas facilities prior to digging with boring equipment and closely monitor the equipment during operations.

Monitoring and maintaining our pipelines

There's nothing more important than the safety of our community, so we take steps to monitor and maintain our pipeline system via aircraft, vehicle and on foot.

For instance, we use markers to show the general location of our pipelines. Markers are placed in prominent areas and at points where the pipeline changes direction. Because safety is our number one priority, emergency contact information is listed on each pipeline marker.

Instructions (rev 10-11-2018) for completing Form PHMSA F 7100.1-1 (rev 10-11-2018)
ANNUAL REPORT FOR CALENDAR YEAR 20_____
GAS DISTRIBUTION SYSTEM

12-3-2018 minor correction in Part G pending OMB approval

All section references are to Title 49 of the Code of Federal Regulations. Reporting requirements are contained in Part 191, "Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports and Safety Related Condition Reports." Except as provided in §191.11(b), each operator of a gas distribution pipeline (see definitions below) must submit an annual report Form PHMSA F 7100.1-1 for the preceding calendar year not later than **March 15th**. Be sure to report TOTAL miles of main pipeline and services in the system at the end of the reporting year, including additions to the system during the year. The annual reporting period is on a calendar year basis ending on December 31st of each year.

If you need copies of the Form PHMSA F 7100.1-1 and/or instructions, they can be found on http://www.phmsa.dot.gov/pipeline/library/forms. The documents are included in the section titled Accident/Incident/Annual Reporting Forms.

ONLINE SUBMISSION IS REQUIRED UNLESS AN ALTERNATIVE REPORTING METHOD IS GRANTED BY PHMSA

ALTERNATE REPORTING METHOD

If electronic reporting imposes an undue burden and hardship, an operator may submit a written request for an alternative reporting method to the Information Resources Manager, Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, PHP-20, 1200 New Jersey Avenue, SE Washington DC 20590. The request must describe the undue burden and hardship. PHMSA will review the request and may authorize, in writing, an alternative reporting method. An authorization will state the period for which it is valid, which may be indefinite. An operator must contact PHMSA at 202-366-8075, or electronically to informationresourcesmanager@dot.gov or make arrangements for submitting a report that is due after a request for alternative reporting is submitted but before an authorization or denial is received.

ONLINE REPORTING METHOD

Annual Reports must be submitted online through the PHMSA Portal at https://portal.phmsa.dot.gov/portal, unless an alternate method is approved (see Alternate Reporting Methods below).

You will not be able to submit reports until you have met all of the Portal registration requirements – see http://opsweb.phmsa.dot.gov/portal_message/PHMSA_Portal_Registration.pdf
Completing these registration requirements could take several weeks. Plan ahead and register well in advance of the report due date.

Use the following procedure for online reporting:

1. Go to the PHMSA Portal at https://portal.phmsa.dot.gov/portal

OMB No. 2137-0629 Expires: 10/31/2021

2. Enter PHMSA Portal Username and Password ; press *enter*
3. Select OPID; press "*continue"* button.

4. Under "**Create Reports**" on the left side of the screen, under *Annual* select "Gas Distribution" and proceed with entering your data. *Note: Data fields marked with a single asterisk are considered required fields that must be completed before the system will accept your initial submission.* Also, only one annual report by commodity for an OPID may be submitted per year.

5. To save intermediate work without formally submitting it to PHMSA, click **Save**. To modify a draft of an annual report that you saved, go to **Saved Reports** and click on *Gas Distribution*. Locate your saved report by the date, report year, or commodity. Select the record by clicking on it once, and then click **Modify** above the record.

6. Once all sections of the form have been completed, click on **Validate** to ensure all required fields have been completed and data meets all other requirements. A list of errors will be generated that must be fixed prior to submitting an Annual Report.

7. Click **Submit** when you have completed the Report (for either an Initial Report or a Supplemental Report), and are ready to initiate formal submission of your Report to PHMSA.

8. A confirmation message will appear that confirms a record has been successfully submitted. To save or print a copy of your submission, go to **Submitted Reports** on the left hand side, and click on *Gas Distribution*. Locate your submitted report by the date, report year, or Commodity Group, and then click on the PDF icon to either open the file and print it, or save an electronic copy.

9. To submit a *Supplemental Report*, go to **Submitted Reports** on the left hand side, and click on *Gas Distribution*. Locate your submitted report by the date, report year, or Commodity Group. Select the record by clicking on it once, and then click "Create Supplemental".

GENERAL INSTRUCTIONS

The following definitions are from § 192.3:

1. "Distribution line" means a pipeline other than a gathering or transmission line.

2. "Gathering line" means a pipeline that transports gas from a current production facility to a transmission line or main.

3. "Transmission line" means a pipeline, other than a gathering line, that:
   a. Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume customer that is not downstream from a distribution center;
   b. Operates at a hoop stress of 20 percent or more of SMYS; or

c. Transports gas within a storage field. A large volume customer may receive similar volumes of gas as a distribution center, and includes factories, power plants, and institutional users of gas.

4. "Operator" means a person who engages in the transportation of gas.

Make an entry in each block for which data are available. Estimate data if necessary. Avoid entering any data in the **UNKNOWN** columns, if possible. Some companies may have very old pipe for which installation records do not exist. Estimate the total of such mileage in the **UNKNOWN** column of Part B, item 2 "Miles of Main in System at End of Year" and item 3 "Number of Services in System at End of Year", and item 4 "Miles of Main and Number of Services by Decade of Installation."

Do not report miles of pipe, pipe segments, or pipeline in feet. When main miles and service counts for the same set of pipelines is reported in different parts of the form, the online system will require the different parts to be consistent. Main miles and service counts over 60 must be within 0.5% of the baseline and values under 60 must be within 0.3 miles for main and service counts must match exactly. Part B4, decade of installation, will serve as the baseline for main miles and service counts. For example, if you report 60 miles of main in Part B4, the miles of main in Parts B1 and B2 must be within 0.3 miles of 60. For main miles, use the number of decimal places needed to satisfy these consistency checks. Service counts may only be entered as positive integers.

For a given OPID, a separate Annual Report is required for each Commodity Group within that OPID. As an example, if an operator uses a single OPID and has one set of pipeline facilities transporting natural gas and another transporting landfill gas, this operator must file two Annual Reports – one Annual Report covering natural gas facilities and a second for the landfill gas facilities. When a pipeline facility transports two or more Commodity Groups, the pipeline facility should be reported only once under the predominantly transported Commodity Group.

PART A – OPERATOR INFORMATION

1. Name of Operator

This is the company name associated with the OPID. For online entries, the name will be automatically populated based on the OPID entered in A3. If the name that appears is not correct, you need to submit an Operator Name Change (Type A) Notification.

2. Location of Office Where Additional Information May Be Obtained

Enter the appropriate address.

3. Operator's 5-digit Identification Number (OPID)

For online entries, the OPID will automatically populate based on the selection you made when entering the Portal. If you have log-in credentials for multiple OPID, be sure the report is being created for the appropriate OPID. Contact PHMSA's Operator Hotline at 202-366-8075 if you need assistance with an OPID.

4. Headquarters Name and Address

This is the headquarters address associated with the OPID. For online entries, the address will automatically populate based on the OPID entered in A3. If the address that appears is not correct, you need to change it in the online Contacts module.

5. State of Operation

Enter the **State for which information is being reported. Submit a separate report for each State** in which the company operates a gas distribution pipeline system.

6. Commodity Group

It is a PHMSA requirement that operators submit separate Reports for each Commodity Group within a particular OPID.

File a separate Annual Report for each of the following Commodity Group**s**:

Natural Gas

Synthetic Gas (such as manufactured gas based on naphtha)

Hydrogen Gas

Propane Gas

Landfill Gas (includes biogas)

Other Gas – If this Commodity Group is selected, report the name of the other gas in the space provided.

Note: When a pipeline facility transports two or more of the above Commodity Groups, the pipeline facility should be reported only once under the predominantly transported Commodity Group. For example, if an operator has a pipeline segment that is used to transport natural gas during the majority of the year and propane for a couple of weeks, that operator should only file an annual report for the natural gas. If an operator has two pipeline segments with one pipeline segment used to transport natural gas and the other pipeline segment transporting hydrogen gas, that operator should file two annual reports - 1 report for natural gas and 1 report for hydrogen gas.

7. Operator Type

Enter the Type of Operator based on the structure of the company included in this OPID for which this report is being submitted. "Investor Owned" means the operator is controlled by a corporation with publicly traded stock. "Municipally Owned" means the operator is controlled by any type of State or local government entity including, county, parish, utility district, or municipality. "Privately Owned"

means the operator is controlled by a corporation without publicly traded stock. All other operators should report "Cooperative."

PART B – SYSTEM DESCRIPTION

"Coated" means pipe coated with any effective hot or cold applied dielectric coating or wrapper.

"Reconditioned Cast Iron" means cast iron gas distribution pipe that has been lined internally by use of suitable materials that ensure safe operation at an MAOP not to exceed the previously established MAOP. "Reconditioned Cast Iron" does not include cast iron pipe inserted with a gas pipe that is, by itself, suitable for gas service under Part 192, e.g., an ASTM D2513 pipe meeting code requirements for the intended gas service. Such insertions shall be reported as the material used in the insertion. The intent of the definition is to make a clear distinction between a liner and inserted pipe. An example of "Reconditioned Cast Iron" would be the insertion of a liner inside cast iron pipe where the liner relies on the structural integrity of the cast iron pipe. For details on liner insertion, see ASTM F2207, Standard Specification for Cured-in-Place Pipe Lining System for Rehabilitation of Metallic Gas Pipe. Methods of installation like pipe-splitting or bursting that involve the installation of a new stand-alone pipe while the host pipe is destroyed does not result in "Reconditioned Cast Iron".

"PVC" means polyvinyl chloride plastic.

"PE" means polyethylene plastic.

"ABS" means acrylonitrile-butadiene-styrene plastic.

"Cathodically protected" applies to both "bare" and "coated."

"Other" means a pipe of any material not specifically designated on the form. If you enter miles of main or services in the "other" category, describe these materials in the appropriate text box.

"Number of service" is the number of service lines, not the number of customers served.

Provide miles of main and numbers of services by decade installed in Part B, section 4.

If you do not know the decade of installation of the pipe because there are no records containing such information, enter an estimate in the UNKNOWN column. The sum total of mileage and number of services reported for Part B, section 4 must be consistent with total mileage and number of services reported in sections 1, 2, and 3 in Part B.

PART C – TOTAL LEAKS AND HAZARDOUS LEAKS ELIMINATED/REPAIRED DURING YEAR

In the appropriate column, include the total number of leaks and the number of hazardous leaks eliminated by repair, replacement or other action during the reporting year. The number of "hazardous leaks" eliminated or repaired during the year is reported as a performance measure for integrity management per § 192.1007(g). When reporting leaks or hazardous leaks eliminated by replacing or

abandoning a segment of pipe, count the leaks that existed in the pipe segment before it was replaced or abandoned. Also include leaks and hazardous leaks reported on form PHMSA 7100.1, "Incident Report Gas Distribution Systems." A reportable incident is one described in § 191.3. Do not include leaks that occurred during testing.

A "leak" is defined as an unintentional escape of gas from the pipeline. Do NOT report a leak determined to be non-hazardous and eliminated by lubrication, adjustment, or tightening.

A "hazardous leak" means a leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous. A "hazardous leak" which occurs aboveground or belowground is a leak and must be reported.

Operators who do not grade leaks for hazard, but rather repair all leaks when found, need not grade repaired leaks solely for the purpose of this report. Such operators treat all leaks as if hazardous. Operators who do not grade leaks must report the same values for both total and hazardous leaks for each cause.

The "number of known system leaks at the end of the year scheduled for repair" is the total number pipeline system leaks being monitored and scheduled for repair at the end of the calendar year. Monitored leaks also include those leaks which have been temporarily repaired until a permanent repair can be performed. These leaks are non-hazardous unless reclassified following the operator's operation and maintenance procedures.

Leak causes are classified as:

CORROSION FAILURE: leak caused by galvanic, atmospheric, stray current, microbiological, or other corrosive action. A corrosion release or failure is not limited to a hole in the pipe or other piece of equipment. If the bonnet or packing gland on a valve or flange on piping deteriorates or becomes loose and leaks due to corrosion and failure of bolts, it is classified as Corrosion. (Note: If the bonnet, packing, or other gasket has deteriorated to failure, whether before or after the end of its expected life, but not due to corrosive action, report it under a different cause category, such as G4 Incorrect Operation for improper installation or G6 Equipment Failure if the gasket failed)

NATURAL FORCE DAMAGE: leak caused by outside forces attributable to causes NOT involving humans, such as earth movement, earthquakes, landslides, subsidence, heavy rains/floods, lightning, temperature, thermal stress, frozen components, high winds (Including damage caused by impact from objects blown by wind), or other similar natural causes. Lightning includes both damage and/or fire caused by a direct lighting strike and damage and/or fire as a secondary effect from a lightning strike in the area. An example of such a secondary effect would be a forest fire started by lightning that results in damage to a gas distribution system asset which results in an incident.

EXCAVATION DAMAGE: leak resulting directly from excavation damage by operator's personnel (oftentimes referred to as "first party" excavation damage) or by the operator's contractor (oftentimes referred to as "second party" excavation damage) or by people or contractors not associated with the operator (oftentimes referred to as "third party" excavation damage). Also, this section includes a release or failure determined to have resulted from previous damage due to excavation activity. For damage

from outside forces OTHER than excavation which results in a release, use Natural Force Damage or Other Outside Force, as appropriate.

OTHER OUTSIDE FORCE DAMAGE: leak resulting from outside force damage, other than excavation damage or natural forces such as:

- Nearby Industrial, Man-made or Other Fire/Explosion as Primary Cause of Incident (unless the fire was caused by natural forces, in which case the leak should be classified Natural Forces. Forest fires that are caused by human activity and result in a release should be reported as Other Outside Force),
- Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation. Other motorized vehicles/equipment includes tractors, mowers, backhoes, bulldozers and other tracked vehicles, and heavy equipment that can move. Leaks resulting from vehicular traffic loading or other contact (except report as "Excavation Damage" if the activity involved digging, drilling, boring, grading, cultivation or similar activities.
- Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels so long as those activities are not excavation activities. If those activities are excavation activities such as dredging or bank stabilization or renewal, the leak repair should be reported as "Excavation Damage".
- Previous Mechanical Damage NOT Related to Excavation. A leak caused by damage that occurred at some time prior to the release that was apparently NOT related to excavation activities, and would include prior outside force damage of an unknown nature, prior natural force damage, prior damage from other outside forces, and any other previous mechanical damage other than that which was apparently related to prior excavation. Leaks resulting from previous damage sustained during construction, installation, or fabrication of the pipe, weld, or joint from which the release eventually occurred are to be reported under "Pipe, Weld, or Joint Failure". Leaks resulting from previous damage sustained as a result of excavation activities should be reported under "Excavation Damage" unless due to corrosion in which case it should be reported as a corrosion leak.
- Intentional Damage/. Vandalism means willful or malicious destruction of the operator's pipeline facility or equipment. This category would include pranks, systematic damage inflicted to harass the operator, motor vehicle damage that was inflicted intentionally, and a variety of other intentional acts.
- Terrorism, per 28 C.F.R. § 0.85 General functions, includes the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.
- Theft. Theft means damage by any individual or entity, by any mechanism, specifically to steal, or attempt to steal, the transported gas or pipeline equipment.

PIPE, WELD, OR JOINT FAILURE : Leak resulting from a material defect within the pipe, component or joint due to faulty manufacturing procedures, desing defects, or in-service stresses such as vibration, fatigue and environmental cracking. Material defect means an inherent flaw in the material or weld that occurred in the manufacture or at a point prior to construction, fabrication or installation. Design defect means an aspect inherent in a component to which a subsequent failure has been attributed that is not associated with errors in installation, i.e., is not a construction defect. This could include, for example, errors in engineering design. Fitting means a device, usually metal, for joining lengths of pipe into various piping systems. It includes couplings, ells, tees, crosses, reducers, unions, caps and plugs. Any leak that is associated with a component or process that joins pipe such as threaded connections, flanges, mechanical couplings, welds, and pipe fusions that leak as a result from poor construction should be classified as "Incorrect Operation". Leaks resulting from failure of original sound material from force

applied during construction that caused a dent, gouge, excessive stress, or other defect, including leaks due to faulty wrinkle bends, faulty field welds, and damage sustained in transportation to the construction or fabrication site that eventually resulted in a leak, should be reported as "Pipe, Weld or Joint Failure".

EQUIPMENT FAILURE: leak caused by malfunctions of control and relief equipment including regulators, valves, meters, compressors, or other instrumentation or functional equipment, Failures may be from threaded components, Flanges, collars, couplings and broken or cracked components, or from O- Ring failures, Gasket failures, seal failures, and failures in packing or similar leaks. Leaks caused by overpressurization resulting from malfunction of control or alarm device; relief valve malfunction: and valves failing to open or close on command; or valves which opened or closed when not commanded to do so. If overpressurization or some other aspect of this incident was caused by incorrect operation, the incident should be reported under "Incorrect Operation."

INCORRECT OPERATION: leak resulting from inadequate procedures or safety practices, or failure to follow correct procedures, or other operator error. It includes leaks due to improper valve selection or operation, inadvertent overpressurization, or improper selection or installation of equipment. It includes a leak resulting from the unintentional ignition of the transported gas during a welding or maintenance activity.

OTHER CAUSE: leak resulting from any other cause not attributable to the above causes. A best effort should be made to assign a specific leak cause before choosing the Other cause category. An operator replacing a bare steel pipeline with a history of external corrosion leaks without visual observation of the actual leak, may form a hypothesis based on available information that the leak was caused by external corrosion and assign the Corrosion cause category to the leak.

PART D – EXCAVATION DAMAGE

Excavation damages are reported as a measure of the effectiveness of integrity management programs (§ 192.1007(g)).

Report the "Number of Excavation Damages" experienced during the calendar year by the following apparent root cause which are classified as:

One-Call Notification Practices Not Sufficient: Damages resulting from no notification made to the One-Call Center; or notification to one-call center made, but not sufficient; or wrong information provided to One Call Center.

Locating Practices Not Sufficient: Damages resulting from facility could not be found or located; or facility marking or location not sufficient; or facility was not located or marked; or incorrect facility records/maps.

Excavation Practices Not Sufficient: Damages resulting from failure to maintain marks; or failure to support exposed facilities; or failure to use hand tools where required; or failure to test-hole (pot-hole); or improper backfilling practices; or failure to maintain clearance; or other insufficient excavation practices.

Other: Damages resulting from One-Call Center error; or abandoned facility; or deteriorated facility; or previous damage or data not collected; or other.

The Total Number of Excavation Damages will be calculated automatically based on the data entered. For this purpose, "Excavation Damage" means any impact that results in the need to repair or replace an underground facility due to a weakening, or the partial or complete destruction, of the facility, including, but not limited to, the protective coating, plastic pipe tracer wire, lateral support, cathodic protection or the housing for the line device or facility.

Report also the "Number of Excavation Tickets" received during the year, (i.e., receipt of information by the operator from the notification center).

PART E – EXCESS FLOW VALVE (EFV) AND SERVICE VALVE DATA

Report the number of EFV and manual service line shut-off valves installed during the calendar year. Report the estimated total number of EFV and manual service line shut-off valves in the system at the end of the calendar reporting year. Be sure to include the number installed during the calendar year when reporting the estimated number in the system at the end of the calendar year.

PART F – TOTAL NUMBER OF LEAKS ON FEDERAL LAND REPAIRED/ELIMINATED OR SCHEDULED FOR REPAIR

Federal Lands: As defined in 30 U.S.C. §185, federal lands means "all lands owned by the United States except lands in the National Park System, lands held in trust for an Indian or Indian tribe, and lands on the Outer Continental Shelf." Indicate only those leaks repaired, eliminated, or scheduled for repair during the reporting year, including those incidents reported on Form PHMSA F 7100.1.

PART G – PERCENT OF UNACCOUNTED FOR GAS

"Unaccounted for gas" is gas lost; that is, gas that the operator cannot account for as usage or through appropriate adjustment. Adjustments are appropriately made for such factors as variations in temperature, pressure, meter-reading cycles, or heat content; calculable losses from construction, purging, line breaks, etc., where specific data are available to allow reasonable calculation or estimate; or other similar factors.

State the amount of unaccounted for gas as a percent of total consumption for the 12 months ending June 30 of the reporting year.

[(Purchased gas + produced gas) minus (customer use + company use + appropriate adjustments)] divided by (customer use + company use + appropriate adjustments) times 100 equals percent unaccounted for.

OMB No. 2137-0629 Expires: 10/31/2021

PART H – ADDITIONAL INFORMATION

Include any additional information which will assist in clarifying or classifying the reported data.

PART I - PREPARER

PREPARER is the name of the person most knowledgeable about the report or the person to be contacted for more information. Please include the direct phone number and email address as applicable (e-mail address is desired but not required). It should be noted that PHMSA will use your e-mail address to issue correspondence that is normally sent via mass mailings. "Correspondence" includes notifications such as the annual reminder letter for Annual Report filings.

OMB No. 2137-0629 Expires: 10/31/2021

MISSOURI PUBLIC SERVICE COMMISSION

STAFF's GAS INCIDENT REPORT

Appendix E

Credentials and Case Participation

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

Case No. GS-2021-0019

Commission Staff Division
Safety Engineering Department
June 30, 2021 - Jefferson City, Missouri

TABLE OF CONTENTS OF
STAFF's GAS INCIDENT REPORT
CREDENTIALS AND CASE PARTICIPATION

Spire Missouri Inc. d/b/a Spire Missouri West
CASE NO. GS-2021-0019

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 an Associate Engineer in the Safety Engineering Department in the Industry Analysis 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-PL1297 Gas Integrity Management (IM) Protocol Course
PHMSA-PL3SCCDA Stress Corrosion Cracking Direct Assessment
PHMSA-PL1ICDA Internal Corrosion Direct Assessment
PHMSA-PL3306 External Corrosion Direct Assessment (ECDA) Field Course
PHMSA-PL3292 Safety Evaluation of Inline Inspection (ILI)/Pigging Programs Course
PHMSA-PL3PIG Fundamentals of Launching and Receiving Maintenance Pigs
PHMSA-PL3HIP The History of Intelligent Pigging
PHMSA-PL3355 Safety Evaluation of Control Room Management Programs
PHMSA-PL3267 Fundamentals of Integrity Management Course
PHMSA-PL1IPROC Integrity Management Processes
PHMSA-PL3ECDA External Corrosion Direct Assessment
PHMSA-PL1RA Introduction to Risk Assessment Methods
PHMSA-PL3PAP Public Awareness Programs for Pipeline Operators
PHMSA-PL3291 Fundamentals of (SCADA) System Technology and Operation Course
PHMSA-PL3DA Drug and Alcohol Testing for the Pipeline Industry
PHMSA-PL3SCADA Fundamentals of SCADA Systems
PHMSA-PL1245 Safety Evaluation of Distribution Integrity Management Programs (DIMP) Course
PHMSA-PL3600 Root Cause/Incident Investigation Course
PHMSA-PL3322 Evaluation of Operator Qualification (OQ) Programs Course
PHMSA-PL3OQ Operator Qualification

PHMSA-PL1255 Gas Pressure Regulation and Overpressure Protection Course
PHMSA-PL1PRESS Fundamentals of Gas Pressure Regulators
PHMSA-PL3293 Corrosion Control of Pipeline Systems Course
PHMSA-PL3IC - Investigating and Managing Internal Corrosion of Pipelines
PHMSA-PL3CP Fundamentals of Pipeline Corrosion and Cathodic Protection
PHMSA-PL1310 Plastic and Composite Materials Course
PHMSA-PL3242 Welding and Welding Inspection of Pipeline Materials Course
PHMSA-PL3ELEC Fundamentals of Basic DC Electricity
PHMSA-PL1HCA High Consequence Areas
PHMSA-PL3PP Fundamentals of Plastic Pipe
PHMSA-PL3257 Pipeline Safety Regulation Application and Compliance Procedures Course
PHMSA-PL3WELD Introduction to Pipeline Welding
PHMSA-PL3256 Pipeline Failure Investigation Techniques Course
PHMSA-PL1250 Safety Evaluation of Gas Pipeline Systems Course
PHMSA-PL1GLAW Introduction to Gas Laws
PHMSA-PL3REG Regulatory Overview
PHMSA-PL1P192 - Introduction to Part 192
PHMSA-PL1ODOR Natural Gas Odorization
PHMSA-PL1DIMP Introduction of Distribution Integrity Management Program

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	5/17/2018
Spire Missouri, Inc.	GC-2020-0127	Complaint	11/6/2019
Spire Missouri, Inc.	GE-2020-0295	Staff Recommendation	7/31/2020
Spire Missouri, Inc.	GS-2019-0015	Staff's Gas Incident Report	7/31/2019

Company	Case Number	Filing Description	EFIS file date
City of New Florence	GS-2017-0324	Progress Report	12/29/2017, 6/29/2018, 12/28/2018, 3/29/2019, 6/28/2019, 9/30/2019, 12/27/2019, 3/31/2020, 6/30/2020, 12/15/2020
Laclede Gas Company	GS-2014-0226	Staff Gas Incident Report	12/18/2014

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 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:

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-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
PHMSA-PL1PRESS Fundamentals of Gas Pressure Regulators

Course Title from PHMSA TQ Learner Transcript
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)
PHMSA-PL4253 Liquefied Natural Gas (LNG) Safety Technology and Inspection Course

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
Summit Natural Gas of Missouri	GA-2020-0251	Staff Recommendation	4/24/2020
Spire Missouri	GC-2018-0159	Staff Report	5/17/2018
Summit Natural Gas of Missouri	GO-2018-0195	Staff Preliminary Report	3/21/2018
Spire Missouri	GE-2020-0373	Staff Response	6/5/2020
Ameren Missouri	GE-2021-0143	Staff Recommendation	12/11/2020
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

Company	Case Number	Filing Description	EFIS file date
Laclede Gas Company	GS-2016-0160	Staff Gas Incident Report	10/21/2016
City of New Florence	GS-2017-0324	Progress Reports	Various
Spire Missouri Inc.	GS-2019-0015	Staff Gas Incident Report	07/31/2019

Educational and Employment Background and Credentials
of
Greg A. Williams

I earned a Bachelor of Science in Mechanical 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 National Association of Corrosion Engineers (NACE), the National Association of Fire Investigators (NAFI), and the Professional Fire and Fraud Investigators Association (PFFIA).

I am currently employed as an Associate Engineer in the Safety Engineering Department in the Industry Analysis 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-PL3PIG Fundamentals of Launching and Receiving Maintenance Pigs
PHMSA-PL3HIP The History of Intelligent Pigging
PHMSA-PL3306 External Corrosion Direct Assessment (ECDA) Field Course
PHMSA-PL4253 Liquefied Natural Gas (LNG) Safety Technology and Inspection Course
PHMSA-PL4LNG Fundamentals of Liquefied Natural Gas (LNG)
PHMSA-PL3267 Fundamentals of Integrity Management Course
PHMSA-PL1IPROC Integrity Management Processes
PHMSA-PL1RA Introduction to Risk Assessment Methods
PHMSA-PL3ECDA External Corrosion Direct Assessment
PHMSA-PL3DA Drug and Alcohol Testing for the Pipeline Industry

(Cont.) Course Title from PHMSA TQ Learner Transcript
PHMSA-PL3291 Fundamentals of (SCADA) System Technology and Operation Course
PHMSA-PL3SCADA Fundamentals of SCADA Systems
PHMSA-PL3322 Evaluation of Operator Qualification (OQ) Programs Course
PHMSA-PL3OQ Operator Qualification
PHMSA-PL1245 Safety Evaluation of Distribution Integrity Management Programs (DIMP) Course
PHMSA-PL1DIMP Introduction of Distribution Integrity Management Program
PHMSA-PL3365 Public Awareness Program Effectiveness Evaluation (PAPEE) Seminar
PHMSA-PL3PAP Public Awareness Programs for Pipeline Operators
PHMSA-PL-WB1103 Risk Assessment for Pipeline Integrity Management Program Webinar
PHMSA-PL-WB1100 Distribution Integrity Management Program Webinar
PHMSA-PL3291 Fundamentals of (SCADA) System Technology and Operation Course
PHMSA-PL3SCADA Fundamentals of SCADA Systems
PHMSA-PL3322 Evaluation of Operator Qualification (OQ) Programs Course
PHMSA-PL3OQ Operator Qualification
PHMSA-PL1245 Safety Evaluation of Distribution Integrity Management Programs (DIMP) Course
PHMSA-PL1DIMP Introduction of Distribution Integrity Management Program
PHMSA-PL3365 Public Awareness Program Effectiveness Evaluation (PAPEE) Seminar
PHMSA-PL3PAP Public Awareness Programs for Pipeline Operators
PHMSA-PL-WB1103 Risk Assessment for Pipeline Integrity Management Program Webinar
PHMSA-PL-WB1100 Distribution Integrity Management Program Webinar
PHMSA-PL3600 Root Cause/Incident Investigation Course
PHMSA-PL3OQ Operator Qualification
PHMSA-PL3257 Pipeline Safety Regulation Application and Compliance Procedures Course
PHMSA-PL3252 Safety Evaluation of Pipeline Corrosion Control Systems II
PHMSA-PL3293 Corrosion Control of Pipeline Systems Course
PHMSA-PL3251 Safety Evaluation of Pipeline Corrosion Control Systems I
PHMSA-PL3254 Joining of Pipeline Materials Course
PHMSA-PL1310 Plastic and Composite Materials Course
PHMSA-PL3242 Welding and Welding Inspection of Pipeline Materials Course
PHMSA-PL1255 Gas Pressure Regulation and Overpressure Protection Course
PHMSA-PL3256 Pipeline Failure Investigation Techniques Course
PHMSA-PL1250 Safety Evaluation of Gas Pipeline Systems Course
PHMSA-PL3257 Pipeline Safety Regulation Application and Compliance Procedures Course

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
Summit Natural Gas of Missouri, Inc.	GA-2020-0251	Staff Recommendation	4/24/2020
Spire Missouri, Inc.	GC-2018-0159	Staff Report	5/17/2018
Spire Missouri, Inc.	GC-2020-0057	Staff Report	12/5/2019
Roeslein Alternative Energy Services, LLC	GE-2020-0238	Staff Recommendation	4/7/2020
Roeslein Alternative Energy Services, LLC	GE-2021-0049	Staff Recommendation	12/8/2020
Spire Missouri, Inc.	GM-2020-0292	Staff Recommendation	6/22/2020
Union Electric Company d/b/a Ameren UE	GR-2003-0517	Direct Testimony	10/24/2003
City Utilities of Springfield, Missouri	GS-2004-0040	Staff's Gas Incident Report	12/16/2003
Missouri Gas Energy	GS-2008-0002	Staff's Gas Incident Report	12/14/2007
Laclede Gas Company	GS-2009-0270	Staff's Gas Incident Report	7/15/2009
West Central Energy	GS-2005-0246	Staff's Gas Incident Report	6/17/2005
City Utilities of Springfield, Missouri	GS-2003-0129	Staff's Gas Incident Report	2/21/2003