M E M O R A N D U M

TO: Missouri Public Service Commission
Official Case File No. GS-2022-0047
Spire Missouri, Inc.

FROM: Safety Engineering Department
Clinton Foster, Associate Engineer
Trevor Rucker, Associate Engineer
Kathleen A. McNelis, PE, Engineer Manager

/s/ Kathleen A. McNelis, PE 02/01/2024
Safety Engineering Department/ Date

SUBJECT: Staff's Reply to Spire's Response in the Matter of an Investigation into Spire Missouri Inc, d/b/a Spire's Compliance with The Commission's Rules Regarding Natural Gas Safety Found at 20 CSR 4240-40.030

DATE: February 01, 2024

Staff filed *Staff's Investigation Report* in this Case on November 15, 2023. In its investigation report, Staff asserted four violations of Commission rules,[1] provided nine numbered recommendations to Spire Missouri, Inc. ("Spire"),[2] and a final unnumbered recommendation that the Commission order Spire to file an action plan to address the numbered recommendations.[3]

Spire filed its Response to Staff's Report and Recommendations in this case on January 19, 2024. Spire stated that it does not contest the violations that Staff put forth in the report,[4] and provided a response to each of Staff's numbered recommendations,[5] as well as Staff's final unnumbered recommendation.[6]

[1] Pages 4-5 of Staff's Investigation Report
[2] Pages 67-71 of Staff's Investigation Report
[3] Pages 71-72 of Staff's Investigation Report
[4] Paragraph 6 of Spire's Response
[5] Paragraphs 8-16 of Spire's Response
[6] Paragraph 17 of Spire's Response

On January 24, 2024, the Commission ordered Staff to file either its reply to Spire's response or a status report stating when it expects to file its reply. In the order, the Commission noted that Spire's response is not a complete acceptance of Staff's recommendations and that the response suggests some changes and areas for further discussion with Staff.

Staff's reply is provided below. For ease of reference, each of Staff's recommendations and associated response from Spire are copied prior to Staff's reply in instances where there is not complete acceptance of Staff's recommendation. Emphasis has been added (bolded text) to identify the part(s) of Staff's recommendations on which Spire has suggestions for changes, or areas for further discussion with Staff. Staff appreciates Spire's proposal for further discussion and agrees that such discussion may be helpful in reaching agreement on the details of actions going forward.

1. **Staff Recommendation 1.** Staff and Spire are in agreement.

2. **Staff Recommendation 2.**

   A. Recommendation (emphasis added)

      Staff recommends that Spire develop and implement a written plan for **removing and testing a statistically valid sample** of the plastic pipe joints were installed by joiners during a time interval in which the joiner had not been requalified within 15 months. Staff recommends that this sampling and testing plan includes at a minimum:

      a. A statistical basis for selecting the number of joints to be tested, including total number of joints, and number of each different type of joint installed using a different method,

b. A method for testing the joints that will identify if the joint has been completed in accordance with the applicable requirements of 20 CSR 4240-40.030(6),

c. A method to evaluate the results of the sampling and testing program to determine the relative probability of each joint type failure,

d. Criteria for how the results of the sampling program will be used **to evaluate the need for additional joint replacement,** and

e. A schedule for implementation of the sampling and testing program.

B. Spire Response (emphasis added)

Spire Missouri has reviewed this recommendation and will develop and implement a written plan for exposing and **testing a statistically valid sample** of the plastic pipe joints that were installed by joiners during a time interval in which the joiner had not been requalified within 15 months. **Spire Missouri does not believe that planning to remove the joints is appropriate, as it has not been determined that the joints were incorrectly installed.**

C. Staff Reply

Staff Recommendation 2 contains two references to removal of joints. The first is related to testing a statistically valid sample, the second is related to establishing criteria for how the results of the sampling program will be used to determine the need for additional joint replacement. It is unclear to Staff to which of these references to joint removal Spire's response pertains, therefore both are addressed below:

i. Remove and Test a Statistically Valid Sample of Joints: In this recommendation, Staff anticipated that Spire would remove and destructively test a statistically valid sample

of the joints installed by joiners during a time interval in which the joiner had not been requalified within 15 months. This expectation is based on the performance criteria for mechanical joints or fittings installed after April 22, 2019 which includes destructively testing joint specimens to failure:

> 20 CSR 4240-40.030(6)(F)4.D.: All mechanical joints or fittings installed after April 22, 2019, must be Category 1 as defined by a listed specification for the applicable material, providing a seal plus resistance to a force on the pipe joint equal to or greater than that which will cause no less than twenty-five percent (25%) elongation of pipe, or the pipe fails outside the joint area if tested in accordance with the applicable standard.

Staff is not aware of any non-destructive test methods that would demonstrate that joints meet these criteria. However, if Spire is aware of non-destructive testing methods that can be used to demonstrate joints meet the criteria of 20 CSR 4240-40.030(6)(F)4.D., Staff is willing to consider the method(s).

ii. Part d. of Staff's Recommendation 2 – Establish Criteria to Determine the Need for Additional Joint Replacement

In its investigation report, Staff noted that as of June 6, 2023, there had been 12 leak indications identified at locations where mechanical plastic pipe joints may have been installed by Spire employees when the interval between requalification exceeded 15 months. However, Spire did not fully investigate the causes of all of these leaks.[7] As also noted in Staff's investigation report, the consequences of pipe joint failures can be severe, including loss of life, serious injury, and property damages.[8] Evaluations of risk generally consider both the probability and consequences of an

[7] Page 21 of Staff's Investigation Report
[8] Pages 23-26 of Staff's Investigation Report

event occurring. The purpose of implementing a sampling and testing program is to better evaluate the probability of joint failures.

Staff believes that a criteria should be set for the removal of joints if the results of the sampling and testing of joints indicate an elevated probability of failure. What Staff is seeking in this part of the recommendation is what that criteria will be, such as a failure rate. For example: If results of the sampling and testing program indicate that any joints do not meet the applicable requirements of 20 CSR 4240-40.030(6), Spire will implement a program to replace all such joints.

3. **Staff Recommendation 3.** Staff and Spire are in agreement.

4. **Staff Recommendation 4.**

A. Recommendation (emphasis added)

Staff recommends that Spire track and monitor 1) the total number of leaks eliminated or repaired on plastic pipe joints that may have been completed by joiners when requalification had not been completed within 15 months and 2) the number of eliminated or repaired leaks caused by incorrect installation of plastic pipe joints that may have been completed by joiners when requalification had not been completed within 15 months. To implement this tracking and monitoring, Staff recommends that Spire determine:

a. The frequency for review of the number of eliminated or repaired leaks described above,

b. A method to identify an increasing frequency of eliminated or repaired leaks that requires additional actions (above what is required by 20 CSR 4240-

40.030) to mitigate the risk of further leaks on joints that may have been completed by joiners when requalification had not been completed within 15 months, such as earlier repair or replacement of similar non-leaking joints,

c. A threshold frequency of eliminated or repaired leaks that requires additional actions (above what is required by 20 CSR 4240-40.030) to mitigate the risk of further leaks on joints that may have been completed by joiners when requalification had not been completed within 15 months, such as earlier repair or replacement of similar non-leaking joints, and

d. How additional actions will be developed and carried out (above what is required by 20 CSR 4240-40.030) to mitigate the risk of further leaks on joints that may have been completed by joiners when requalification had not been completed within 15 months, such as earlier repair or replacement of similar non-leaking joints.

Staff further recommends that in instances when Spire does not expose leaks on plastic pipe joints that may have been completed by joiners when requalification had not been completed within 15 months, that Spire attribute the cause of these leaks to be incorrect installation.

B. Spire Response (emphasis added)

To the best of the Company's ability, it will track and monitor the total number of leaks eliminated or repaired on plastic pipe joints completed by joiners when requalification had not been completed within 15 months, including those leaks that were

caused by incorrect installation of such joiners. Also, to the best of the Company's ability, Spire Missouri will implement this tracking and monitoring utilizing Staff's recommendations in 4.a. through 4.d. **However, Spire Missouri does not agree with Staff's recommendation that when the Company does not expose leaks on plastic pipe joints that may have been completed by joiners when requalification had not been completed within 15 months, that the cause of the leak should be attributed to incorrect installation. Attributing the leak to incorrect installation could result in attributing the leak to an incorrect cause, instead of other possible causes, such as excavation damage or natural forces.**

C. Staff Reply

Staff understands Spire's concern with the possibility of attributing leaks to incorrect causes. However, Staff noted in its investigation report a number of leaks on Spire's facilities where leak repairs were completed without exposing the leak, and specific leak causes were attributed to these leaks.[9] It is unclear to Staff how Spire made the determination of the leak causes, or determined that incorrect installation was not the cause, without exposing the leaking facilities to investigate the cause of the failures.

Staff's concern is that in instances where Spire does not expose a leaking facility, Spire would not be able to determine when the cause of a leak was incorrect installation of a plastic pipe joint. Staff notes that this recommendation is specifically tied to the monitoring of leaks on plastic pipe joints that may have been installed by joiners when requalification had not been completed within 15 months in 2020.

[9] Pages 35-47 of Staff's Investigation Report

Ideally Spire will expose and investigate the cause(s) of all leaks on newly installed facilities going forward. However, in instances when Spire does not do so, Staff does not believe that incorrect installation of the plastic pipe joints can be ruled out. As an alternative to attributing the causes of leaks to incorrect installation when Spire does not expose its facilities to determine the causes of the leaks, Staff would suggest that if Spire classified the causes of the leaks as "other", the monitoring objects could still be achieved. For the purposes of monitoring to address Staff's Recommendation 4, Spire could then add together the number of leaks determined to be caused by "incorrect installation" and leaks that were not investigated and the cause attributed to "other".

5. Staff Recommendation 5.

A. Recommendation (emphasis added)

Staff recommends that Spire perform leakage surveys **at intervals not exceeding fifteen (15) months but at least once each calendar year** at locations where plastic pipe joints may have been completed by a joiner during a time interval in which the joiner had not been requalified within 15 months.

B. Spire Response (emphasis added)

In response to this recommendation, **Spire Missouri proposes waiting for the completion of the sample testing to deviate from the leakage survey schedule already utilized by the Company.** The approximately 6,112 locations where fittings may have been installed by joiners after their qualifications had lapsed are located across the entire greater St. Louis region, of which Spire Missouri currently performs leakage surveys on a three-year schedule. In order to perform leakage surveys of the joints in question once per

calendar year, Spire Missouri would have to devote significant resources to essentially cover the same region that takes three years to cover. Prior to taking such an action, Spire Missouri would propose waiting until the sample testing is performed, so Staff, Spire Missouri, and the Commission may evaluate whether the fittings are leaking, whether those leaks are due to incorrect installation, and where such leaks may be located.

C. Staff Reply

Staff recommended more frequent leakage surveys as a means to increase the public's safety by identifying potential leaks sooner (within one year) than such leaks might otherwise be found by the current leakage survey schedule (within three years) in the areas where joints may have been completed by a joiner during a time interval in which the joiner had not been requalified within 15 months. As discussed in Staff's investigation report,[10] Staff's opinion is that the plastic pipe joints that may have been installed by a joiner during a time interval in which the joiner had not been requalified within 15 months are at an unknown higher risk of failure than joints installed by timely requalified individuals. Staff therefore intended that leakage surveys would be performed more frequently while waiting for the results of the sampling and testing program (Staff Recommendation 2) to be completed.

However, Staff does not yet know the extent and schedule for Spire's sampling and testing program (Staff Recommendation 2). In the event that preliminary results of the program are available within a year and demonstrate that the risk of joint failures is negligible, Staff agrees that waiting for the results of the sampling and testing program

[10] Pages 19-23 of Staff's Investigation Report

before implementing an accelerated leakage survey schedule may be appropriate. If, however, Spire does not anticipate that results of the sampling and testing program will be available within a year, Staff maintains that additional monitoring for failure of affected in-service joints should start as soon as possible. Staff is open to considering methods other than leakage surveys that would accomplish monitoring for failure of the in-service joints until such time as the results of Spire's sampling and testing program are available.

6. Staff Recommendation 6.

A. Recommendation (emphasis added)

Staff recommends that Spire develop and follow written procedures that include a detailed summary of the processes put in place by Spire's Quality Assurance department for the purpose of monitoring of OQ expiration dates and conducting field audits to verify the qualification of individuals completing work in the field. **Staff further recommends that Spire include the installation of service lines as a work type that is prioritized for periodic field audits in addition to those listed in Spire's response to Staff Data Request No. 0035.3.**

B. Spire Response (emphasis added)

Spire Missouri accepts Staff's recommendation that the Company develop and follow written procedures for monitoring operator qualification ("OQ") expiration dates and conducting field audits to verify the qualification of individuals completing work in the field. **However, Spire Missouri is concerned that if it is required to prioritize the installation of services lines a work type for periodic field audits, as Staff also recommends, this would take resources away from currently prioritized items.** The

Company performs a considerable number of service line installations per year and prioritizing such installations may result in other items being ignored. The Company would like to discuss the purpose of this recommendation with Staff to determine if Staff's goal can be achieved in a different manner.

C. Staff Reply

To clarify, Staff's intention was for service line installations to be a work type that is considered when selecting field audits, in addition to those work types listed as priorities in Spire's response to Staff Data Request No. 0035.3.[11] Staff's concern is that because service line installation is not included in the listing of prioritized work for selecting field audits, there is no assurance that service line installations would ever be selected for field audits. Staff's intention was not that significant resources should be taken from conducting field audits on other work types, rather, Staff is recommending that some portion of the field audits include service line installations.

7. Staff Recommendation 7. Staff and Spire are in agreement.

8. Staff Recommendation 8.

A. Recommendation (emphasis added)

Staff recommends that Spire revise its procedure for determining leak causes ** [redacted] ** to include:

a. When leaks must be exposed to determine the leak cause,

b. When it is acceptable to not expose a leak,

[11] Spire's response to Staff Data Request 0035.3 lists the following work types: directional boring, pulling back of main, fusion/installation of main, and welding

c. Failure category and leak classification information consistent with the information for the leak causes in PHMSA's Instructions for Completing Form PHMSA F 7100.1-1,

d. Instructions for completing leak repair documentation and additional information for which "Leak Cause" and "Leak SubCause" field personnel should select for determining leak causes,

e. **That field personnel must document leak repairs in sufficient detail to support the leak causes that are determined, and**

f. **That if a leaking facility is not exposed to determine the leak cause, the justification for that decision must be documented.**

Staff further recommends that Spire train field personnel responsible for determining leak causes following procedure revisions.

B. Spire Response (emphasis added)

Spire Missouri accepts Staff's recommendation to include the information listed in 8.a. through 8.d. **For the information recommended in 8.e., the Company believes it is already capturing "sufficient detail" to support the leak cause.** 8.f. recommends the Company provide justifications for why a leaking facility is not exposed to determine the leak cause. When Spire Missouri does not expose a leaking facility, the Company performs one of two actions: it will either replace the facility immediately, or the facility will be replaced in the course of the Company's planned replacements. This is because it is often more cost and time effective and convenient for the Company and its customers than

digging up and exposing the facilities. **A requirement to document justifications would provide no further information beyond reporting which above action the Company takes, both of which result in the leaking facility being replaced.**

C. Staff Reply

Spire's response accepted parts a. through d. of Staff's Recommendation 8, but not parts e. and f. of the recommendation. Staff has addressed these parts of the recommendation below:

i. Part e. of Staff's Recommendation 8 – Documenting Sufficient Detail to Support Leak Cause Determinations: As discussed and supported by specific examples in Staff's investigation report,[12] Spire's determination of leak causes does not always appear to be supported by the leak repair documentation. However, Staff also noted in its investigation report that Spire objected to Staff data requests for additional information regarding how Spire determined leak causes,[13] so it is possible that there is additional documentation Staff has not yet reviewed.

ii. Part f. of Staff's Recommendation 8 – Documenting Reasons Why a Leaking Facility was Not Exposed to Investigate the Leak Cause: Spire's response focuses on how Spire addresses eliminating leaks when the leaking facility is not exposed. To clarify, this recommendation is focused on the determination of leak causes, and this part of Staff's recommendation is focused on instances when there is not a clear reason why the leaking facility was not exposed to determine the leak cause.

[12] Pages 45-46 of Staff's Investigation Report
[13] Pages 46-47 of Staff's Investigation Report

Commission rules require that each operator establish procedures for analyzing accidents and failures, including the selection of samples of the failed facility or equipment for the purpose of determining the causes of the failures and minimizing the possibility of a recurrence.[14] There is not an exception for when it is more cost effective and convenient for the Company and its customers to replace without exposing the facilities.

In some instances, it may be clear why a leaking facility was replaced to eliminate a leak without first exposing the facility to determine leak cause(s). Staff recognizes that the Company often omits investigation of leak causes when leaks occur on its aging pipeline infrastructure because of a low likelihood that new information will be gained by exposing the facilities, and Commission approved replacement programs for certain pipeline materials (including cast iron and unprotected steel). However, Staff notes that the leak indications discussed in its investigation report were on newly installed polyethylene facilities.

Staff does not agree that it is appropriate to omit performing an investigation of failures on newly installed facilities based only on an assumption that it will be more cost effective to replace the failed facility. Instead, Staff would argue that a great deal of additional cost and inconvenience could potentially be avoided going forward if the Company timely determines the cause(s) of failures on newly installed pipe and facilities. For example, timely investigation of failures could result in earlier

[14] 20 CSR 4240-40.030(12)(L)

detection of manufacturing defects or incorrect installation and allow for earlier correction and remediation of the issues.

9. **Staff Recommendation 9.** Staff and Spire are in agreement.

10. **Staff's Final Recommendation.** Staff and Spire are in general agreement and anticipate further discussions may facilitate an agreement regarding actions to be taken going forward; however, further discussions or potential agreements on the violations and/or recommendations would be better suited within the forthcoming Complaint case to be filed by Staff Counsel. The forthcoming Complaint will address the violations of the Commission pipeline safety rules, as well as Staff's recommendations.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of an Investigation into Spire Missouri Inc. d/b/a Spire's Compliance with The Commission's Rules Regarding Natural Gas Safety Found at 20 CSR 4240-40.030	))))	Case No. GS-2022-0047

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 Response, in Memorandum form*; 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 Kanas City, on this 1st day of February 2024.

M. RIDENHOUR
MY COMMISSION EXPIRES
7-22-2027
NOTARY SEAL
#19603483
PLATTE COUNTY
NOTARY PUBLIC, STATE OF MISSOURI

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of an Investigation into Spire Missouri Inc. d/b/a Spire's Compliance with The Commission's Rules Regarding Natural Gas Safety Found at 20 CSR 4240-40.030	))))	Case No. GS-2022-0047

AFFIDAVIT OF TREVOR RUCKER

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

COMES NOW TREVOR RUCKER, and on his oath states that he is of sound mind and lawful age; that he contributed to the foregoing *Staff Response, in Memorandum formn*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

TREVOR RUCKER

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 Jefferson City, on this 31st day of January 2024.

Notary Public

DIANNA L. VAUGHT
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: July 18, 2027
Commission Number: 15207377

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of an Investigation into Spire Missouri Inc. d/b/a Spire's Compliance with The Commission's Rules Regarding Natural Gas Safety Found at 20 CSR 4240-40.030	))))	Case No. GS-2022-0047

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 Response, in Memorandum form;* 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 Jackson, State of Missouri, at my office in Jefferson City, on this 31st day of January 2024.

Notary Public

DIANNA L. VAUGHT
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: July 18, 2027
Commission Number: 15207377