MISSOURI PUBLIC SERVICE COMMISSION

STAFF'S GAS INCIDENT REPORT

South Charleston Avenue and East Republic Road
Springfield, Missouri
July 17, 2023

City Utilities of Springfield
Case No. GS-2024-0024

Industry Analysis Division
Safety Engineering Department
December 11, 2024 - Jefferson City, Missouri

** Denotes Confidential Information **

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I. EXECUTIVE SUMMARY

City Utilities of Springfield ("CU") is the natural gas distribution operator for the City of Springfield, MO. On July 17, 2023, CU personnel were preparing a segment of a CU natural gas feeder line[1] in the vicinity of South Charleston Avenue and East Republic Road for inspection. The feeder line has South, West, and North pipeline segments ("legs"), that are joined in a valve pit with a cross fitting. Prior to July 17, 2023, natural gas had been purged from the South leg of the feeder line. The North and West legs still contained natural gas at an estimated pressure of 134 pounds per square inch gauge ("psig"). By 11:20 am on July 17, 2023, CU personnel had closed valves within the valve pit to the North and West legs (still containing gas), and had removed the cross fitting that connected the South, West and North legs. At 11:20 am, the CU personnel observed signs of a large volume gas release within the valve pit. CU personnel first notified 9-1-1 at 11:21 am of the blowing gas. At approximately 11:25 am, the gas ignited and burned until approximately 12:39 pm. The fire caused damages to CU electrical facilities in the vicinity and nearby residences. Emergency responders evacuated residents in the vicinity due to the potential of falling powerlines.

There were no injuries or fatalities as a result of this incident. The estimated cost of property damages was $350,000 with a total incident cost including emergency response and cost of gas released of $368,301.[2]

Several of the valves that CU attempted to close to isolate the flow of gas to the incident location were found to be inoperable. In total, it took approximately one hour and 19 minutes after the time of initial gas release until the gas flow to the North Leg of the feeder line was isolated at approximately 12:39 pm. In Staff's analysis of this incident, Staff determined that only some of the valves ("DOT valves") that CU attempted to close to isolate the flow of gas to the incident location were inspected and maintained in accordance with applicable Commission rules; while

[1] 20 CSR 4240-40.030(1)(B)19. defines feeder line as a distribution line that has a maximum allowable operating pressure (MAOP) greater than 100 psi gauge that produces hoop stresses less than twenty percent (20%) of specified minimum yield strength (SMYS).
[2] CU's Form PHMSA F 7100.1 Supplemental, Final Incident Report form submitted 10/02/2024.

other valves ("non-DOT valves") had not been. The extended amount of time required to isolate the North Leg of the feeder line may have contributed to the magnitude of damages caused by this incident. (See *Section III.E – Valve Maintenance* of this report).

CU's initial investigation of this incident determined that the gas was released when the pipe separated at a Dresser[3] mechanical fitting that was installed on the North Leg of the feeder line upstream of the closed valve. CU hired ** [redacted] ** ("Consultant") to perform a root cause analysis of the incident and the Consultant determined that ** [redacted] **.

Commission rule 20 CSR 4240-40.030 currently requires that the pipeline must be designed and installed so that each joint will sustain the longitudinal pullout or thrust forces caused by contraction or expansion of the piping or by anticipated external or internal loading. The root cause analysis indicates to Staff that the Dresser mechanical fitting from which the pipe separated in this incident ** [redacted] ** and therefore was not designed and installed in accordance with the currently effective Commission rule. However, due to the year this fitting was installed, Staff does not believe that this requirement from 20 CSR 4240-40.030(6)(B)1. was applicable to this installation, and is therefore not enforceable. (See *Section III.H - Joint Design and Installation* of this Report for the analysis of effective date of the applicable rule to municipal gas systems).

CU's Distribution Integrity Management Program (DIMP) Plan that was in effect at the time of the incident had most recently been updated by CU on July 1, 2020. DIMP requires operators to identify threats to their pipeline systems, evaluate and rank risks, and identify and implement measures to reduce risks. Staff performed an inspection of the July 1, 2020 DIMP program plan with CU on December 6-8, 2021. CU's July 1, 2020 plan identified ** [redacted] **. ** Staff provided its inspection findings to CU in a letter dated January 6, 2022, including a finding that ** [redacted]

[3] Dresser refers to a fitting manufactured by Dresser Utility Solutions. See Figure 3 of Appendix B of this report for schematic showing installation location.

[redacted] ** While CU's July 1, 2020 DIMP Plan addressed an aspect of mechanical fittings failures: ** [redacted] ** it does not appear to have identified the specific scenario that resulted in this incident. ** [redacted] **

As a result of this investigation, Staff found that sufficient facts and information[4] exist to assert the following violations of Commission rules:

1. Failure to have a procedure that included inspection and maintenance of valves necessary to achieve 100% isolation of the system or any portion of it as valves necessary for the safe operation of the system[5] was a violation of 20 CSR 4240-40.030(12)(C)2.A.[6] (See *Section III.E – Valve Maintenance* of this report).

2. Failure to inspect and service each feeder line valve, the use of which may be necessary for the safe operation of a distribution system at intervals not exceeding 15 months but at least once each calendar year was a violation of 20 CSR 4240-40.030(13)(V)2. Specifically, the definition of valves necessary for the safe operation of a distribution system listed in 20 CSR 4240-40.030(13)(V)3.A. includes those which provide 100% isolation of the system or any portion of it. Closure of CU's non-DOT designated valves ** [redacted] ** on the West Leg of the feeder line (most recent previous inspection on June 11, 2019), ** [redacted] ** on the North Leg of the feeder line (no record of previous inspection) and two unnumbered valves at the Old Lowes Regulator Station (no record of previous inspection) were required to provide 100% isolation of the West Leg and the North Leg of the feeder line. However, these valves

[4] Prior to finalizing this report, Staff provided a copy of the factual basis for its analysis to CU to provide an opportunity to correct any factual inaccuracies and to identify confidential content. A copy of information edited to address CU's comments is provided in Confidential Appendix A.
[5] As required by 20 CSR 4240-40.030(13)(V)3.A.
[6] 20 CSR 4240-40.030(12)(C)1. requires each operator to prepare and follow for each pipeline a manual of written procedures for conducting operations and maintenance activities and for emergency response. 20 CSR 4240-40.030(12)(C)2. sets forth the minimum requirements for the manual. 20 CSR 4240-40.030(12)(C)2.A requires that the manual must include procedures for operating, maintaining and repairing the pipeline in accordance with each of the requirements in Sections 12, 13 and 14 of 20 CSR 4240-40.030.

were not inspected or maintained in accordance with 20 CSR 4240-40.030(13)(V)2. (See *Section III.E – Valve Maintenance* of this report).

3. Failure to implement its written DIMP Plan is a violation of 20 CSR 4240-40.030(17)(C). Specifically, CU failed to conduct a complete program re-evaluation within the three-year interval required by CU's DIMP Plan. (See *Section III.I – Distribution Integrity Management Program* of this report).

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 CSR 4240-40.020;
    - Missouri Pipeline Safety Standards in 20 CSR 4240-40.030, including but not limited to the operator's[7] emergency response and failure investigation, and
    - Drug and Alcohol Testing requirements in 20 CSR 4240-40.080;
- Make recommendations, as applicable to CU with an objective of minimizing the possibility of recurrence.

III. STAFF ANALYSIS OF INCIDENT

A. Incident Description and Emergency Response

On July 17, 2023, CU personnel were preparing CU's gas facilities in the vicinity of South Charleston Avenue and East Republic Road for inspection. The location is shown on Figures 1 and 2 in *Appendix B – Figures* of this report. The work was being performed on a flanged cross fitting connecting sections of 12-inch diameter steel gas pipelines to the North, West, and South in an exposed valve cluster pit. Figure 3 in Appendix B is a schematic drawing of the valve and

[7] "Operator" is defined in 20 CSR 4240-40.030(1)(B)26 as "a person who engages in the transportation of gas." "Person" is defined in 20 CSR 4240-40.030(1)(B)27 as "any individual, firm, joint venture, partnership, corporation, association, county, state, municipality, political subdivision, cooperative association, or joint stock association, and including any trustee, receiver, assignee, or personal representative of them." Transportation of gas" is defined in 20 CSR 4240-40.030(1)(B)41 as "the gathering, transmission, or distribution of gas by pipeline or the storage of gas in Missouri."

pipe configuration at this location, and Figure 4 is a photograph of the valve cluster taken prior to the incident. The operating pressure of natural gas in the north and west legs of the pipeline at this location was estimated to be 134 psig immediately before the incident.

CU was preparing to perform a camera inspection of the South leg of the pipeline, and potentially perform cleaning by pigging of the pipeline if the results of the camera inspection indicated that cleaning was needed. In anticipation of this, CU had closed the valve to the South Leg of the pipeline and purged it of natural gas.[8]

CU employees were performing work on the pipeline facilities within the valve cluster pit on the morning of July 17, 2023[9] to complete the following activities:

- Between 9:00 am and 10:00 am, CU Natural Gas Operations personnel closed the valves within the valve cluster pit to isolate the flow of gas from the North and West Legs of the pipeline to the cross fitting connecting these legs.[10]
- Between 11:00 am and 11:20 am, CU natural personnel removed the flanged cross fitting and placed it outside of the valve cluster pit in order to gain internal access to the South leg of the pipeline.[11] The nuts and bolts connecting the North, South, and West legs to the cross fitting were removed, and the cross fitting was lifted from the pit by nylon hoisting straps attached to a backhoe.[12] The valve cluster pit was subsequently vacated by all CU personnel.[13]

At approximately 11:20 am, CU personnel reported hearing a loud pop and hissing sound from inside the pit, and observed debris blowing out of the valve pit and causing overhead powerlines to whip back and forth. All CU personnel evacuated the immediate vicinity. At this time CU personnel did not know what failed, or from which leg of the pipeline gas was blowing.[14]

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[8] CU's response to Staff Data Request 0001.
[9] CU's *Attachment DR03-B*, provided in response to Staff Data Request 0003 stated that two employees ** [redacted] ** closed the valves to isolate the North and West legs of the pipeline, and four employees ** [redacted] ** removed the cross fitting and South valve.
[10] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[11] CU's response to Staff Data Request 0001.
[12] CU's response to Staff Data Request 0001.1
[13] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[14] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.

At 11:21 am, CU personnel called 911 to report blowing gas in the area of Nottingham and Charleston requesting Springfield Fire Department (SFD) assistance.[15]

At approximately 11:23 am, CU control room personnel determined that the dropping pressure at the ** [redacted] ** regulator station was an indication of the North leg blowing gas.[16]

At approximately 11:25 am, the blowing gas at the site of the incident was ignited from an unknown source. The ignition created a fire ball that extended above the overhead powerlines. CU equipment, including a backhoe and welding truck, began to burn. The overhead powerline structures also began to burn and fail causing the lines to drop to the ground.[17]

At 11:26 am, CU personnel called 911 to report the ignition and requested additional support from SFD to set up a safety perimeter.[18]

The first SFD truck arrived on scene at 11:27 am. Additional trucks arrived between 11:27 am and 12:07 pm.[19]

SPD personnel began arriving at approximately 11:40 am, and began evacuating homes on both sides of Charleston Avenue from the incident site to East Republic Road due to the potential of falling powerlines. The initial evacuations were completed by 12:10 pm.

Between 11:37 am and 11:55 am, CU Natural Gas Operations personnel closed a valve at the intersection of ** [redacted] ** to isolate gas flow to the West leg of the pipeline, and the inlet valve to the Regulator Station at ** [redacted] ** to prevent gas from back-feeding into the West natural gas feed leg. CU attempted to close a valve at ** [redacted] ** to isolate the North natural gas feeder leg. However, during that attempt, CU turned the nut until it spun free, indicating the valve broke.[20]

At 11:42 am, the SPD began establishing a perimeter around the incident site. The perimeter was established to the South at Nottingham Street and Charleston Avenue; to the North

[15] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[16] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[17] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[18] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[19] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010, and *Attachment DR11-A*, provided in response to Staff Data Request 0011.
[20] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.

at East Republic Road and Charleston Avenue; to the West at Briar Street and Charleston Avenue; and to the East at Bothwell Avenue and Carleton Street.[21]

Between 11:57 am and 12:12 am, CU personnel attempted to close a valve at ** [redacted] ** to isolate flow of gas to the North leg of the pipeline. The valve was inoperable.[22]

At 12:11 pm, CU personnel notified the Missouri Public Service Commission Pipeline Safety Program Manager of the incident.[23]

Between 12:15 pm and 12:34 pm, CU personnel closed the inlet valve at four regulator stations to isolate the North leg of the pipeline.[24]

By 12:32 pm, the fire was contained within the pit.[25]

Between 12:32 pm and 12:42 pm, CU Natural Gas Operations personnel closed natural gas valves along ** [redacted] ** to provide secondary isolation of gas to the West leg of the pipeline.[26]

The CU personnel who were on scene when the incident occurred were transported to Cox Occupational Medicine for medical assessment and drug testing.[27]

At approximately 12:39 pm, the fire at the valve cluster pit was extinguished. SFD continued to spray water on the surrounding houses and at the incident site.[28]

Between 1:00 pm and 4:45 pm, CU personnel opened gauge taps and other access points to confirm natural gas was shut off to both the North and West legs of the pipeline before SFD and SPD departed the scene.[29]

At 1:25 pm, CU Natural Gas Code Compliance Engineer reported the incident to the national response center (NRC).[30]

At 4:45 pm, SPD and SFD departed from the scene.[31]

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[21] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[22] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[23] Missouri PSC Safety Engineering Staff *Gas Incident Notification* record.
[24] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[25] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[26] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[27] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[28] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[29] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[30] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[31] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.

Table 1 presents a summary of the timeline of events that occurred on the day of the incident.

TABLE 1: SUMMARY OF EVENTS	
Time	**Activity**
9:00-10:00 AM	CU personnel closed valves to North and West legs of pipeline.
11:00-11:20 AM	CU personnel removed the cross fitting and vacated the valve pit
11:20 AM	CU personnel heard loud pop and observed debris blown by natural gas escaping the pipeline.
11:21 AM	CU personnel call 911 to report blowing gas.
11:23 AM	CU gas controller identifies North leg of the pipeline as likely source of blowing gas.
11:25 AM	Blowing gas is ignited from an unknown source.
11:26 AM	CU personnel call 911 to report ignition and request additional SPD and SFD support.
11:27 AM	First SFD truck arrives on scene.
11:32 AM	CU Manager-Natural Gas Operations notified CU Director-Natural Gas & Water Operations of incident.
11:37 AM	CU confirms electric outage of downed powerlines.
11:40 AM	SPD begin evacuating homes.
11:37-11:55 AM	CU personnel begin closing valves to isolate the flow of gas.
11:42 AM	SPD begins to establish perimeter around incident site.
11:57 AM-12:34 PM	CU personnel continue closing valves to isolate the flow of gas.
12:32 PM	The fire is contained within the valve cluster pit.
12:32-12:42 PM	CU personnel close additional valves to provide a secondary shut-down of the west natural gas feeder leg
12:33 PM	CU employees transported to Cox Occupational Medicine for medical assessment and drug testing.

Staff met with CU personnel at the incident location on July 19, 2023, following the restoration of the damaged electric utilities in the vicinity. CU had identified the source of the gas

leak as a Dresser fitting located on the North leg of the feeder line upstream of the north valve (See Figure 6 of Appendix B of this report).

1. Regulatory Requirements:

The Commission's Safety Standards – Transportation of Gas by Pipeline requires that each operator shall establish written procedures to minimize the hazard resulting from a gas pipeline emergency.[32] At a minimum, the procedures must provide for:

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

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

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

(I) Gas detected inside or near a building;

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

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

(IV) Natural disaster;

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

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

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

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

[32] The requirements for Emergency Plans are within 20 CSR 4240-40.030(12)(J). 20 CSR 4240-40.030(12)(J)1. lists the minimum requirements for the written plan. Staff notes that effective March 30, 2024, and additional requirement, 20 CSR 4240-40.030(12)(J)1.L was adopted requiring written rupture identification procedures. Staff did not evaluate this requirement because the incident occurred before this rule was amended.

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

I. Safely restoring any service outage;

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

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

2. *CU's Actions to Comply with 20 CSR 4240-40.030(12)(J):*

CU provided a copy of its applicable emergency procedure, *Procedures for Natural Gas Emergencies, 2022*.

CU's actions to comply with Commission's requirements in 20 CSR 4240-40.030(12)(J) and as set forth in its *Procedures for Natural Gas Emergencies, 2022* were as follows:

A. CU personnel were on scene when the initial and secondary events took place. Personnel reacted immediately to assess the scene, coordinate with emergency responders, contact appropriate CU natural gas management, and begin making the area safe;

B. The written accounts from CU, SPD[33] and SFD[34] indicate that throughout the events following this incident that CU maintained adequate communications with appropriate responders and public officials;

C. CU shut off gas to nearby buildings and contacted 911 within minutes of the initial release of gas[35], and again following gas ignition[36];

[33] CU's response to Staff Data Request 0011, *Attachment 11-B.*
[34] CU's response to Staff Data Request 0011, *Attachment 11-A.*
[35] CU's response to Staff Data request 0010 stated that the initial notification to 911 occurred at 11:21 am, approximately one minute after CU became aware of the gas release.
[36] CU's response to Staff Data request 0010 stated that the notification to 911 of ignition occurred at 11:26 am, approximately one minute after CU became aware of the gas ignition.

D. CU made appropriate personnel, equipment and tools available to respond to the emergency;

E. In coordination with the emergency responders, CU took appropriate actions to protect people first, then property;

F. CU closed valves to isolate the section of pipe affected by the incident;

G. In coordination with the emergency responders, CU took appropriate steps to make safe any actual or potential hazard to life or property;

H. CU assisted in making the area safe by contacting 911, and closing valves to isolate the affected section of pipe;

I. Four gas customers lost service as a result of this incident. Three customers had their service restored on July 18, 2023. The fourth was restored on July 20, 2023. The delay in service restoration to the last customer was due to scheduling conflicts;[37]

J. Between the date of the incident and December 26, 2023, it is Staff's understanding that CU was in the process of retaining a consultant to perform a root cause analysis.[38] On March 1, 2024, CU stated that it was in the beginning stages of working with its consultant.[39] CU provided a report with the results of its failure investigation on September 27, 2024;[40]

K. CU's control room aided during the emergency response by monitoring pressure where possible in the system. Base 1 controller stated dropping pressure at the ** [redacted] ** regulator station was indication of the North leg blowing gas.[41]

[37] CU's response to Staff Data Request 0023.
[38] CU's responses to Staff Data Requests 0014, 0014.1 and 0014.2.
[39] CU's response to Staff Data Request 0014.5.
[40] CU Corrected *Attachment DR14.10* provided in response to Staff Data Request 0014.10.
[41] CU's response to Staff Data Request 0010.

3. Staff Analysis:

Staff reviewed CU's Procedure for Natural Gas Emergencies, and found that it addresses the minimum requirements of 20 CSR 4240.40.030(12)(J)1 for written emergency procedures.

Additionally, Staff found that CU's emergency response actions were consistent with the requirements of its written emergency procedures, and Commission's rules in 20 CSR 4240-40.030(12)(J)1.A.-I. and K.

However, with respect to 20 CSR 4240-40.030(12)(J)1.J, beginning a failure investigation as soon as possible after the end of the emergency, Staff notes that the incident occurred on July 17, 2023. CU appears to have spent the time between July 17, 2023, and December 26, 2023 (approximately five months after the end of the emergency) selecting a consultant, and work did not begin until March 1, 2024 (approximately 8 ½ months after the end of the emergency). The timing of the incident to the final completion of the root cause analysis report spanned approximately 14 months. Staff believes that additional planning before an incident occurs, such as pre-qualification of consultants, or training of CU Staff on failure investigation methods could streamline this process for future incidents. The reason it is important to begin work as soon as possible is that the objectives of the failure investigation required by 20 CSR 4240-40.030(12)(L) are to determine what caused or contributed to the incident and to take steps to minimize the possibility of a recurrence.

Additionally, it appears that the failure of certain valves to operate may have delayed isolation of North leg of the pipeline, Staff has evaluated CU's compliance with the Commission's rule pertaining to valve maintenance in Section III.E of this report.

4. Violations:

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

5. Staff Recommendations:

Staff recommends that CU review and revise as necessary its emergency response procedures to be consistent with implementation of the requirements of (12)(J)1.J. and (12)(L). Specifically, Staff recommends that CU revise its procedures to ensure that going forward it can begin the analysis of incidents and failures to determine the causes of failures and minimize the possibility of a recurrence as soon after the end of the emergency as possible.

B. Incident Reporting Requirements

1. Regulatory Requirements:

20 CSR 4240-40.020(3)(A) requires that at the earliest practicable moment following discovery, but no later than one hour after confirmed discovery,[42] each operator shall give notice, in accordance with subsection (3)(B) of 20 CSR 4240-40.020, of each federal incident as defined in section (2) of 20 CSR 4240-40.020.

20 CSR 4240-40.020(3)(B) requires that each notice required by subsection (3)(A) of 20 CSR 4240-40.020 must be made to the National Response Center (NRC).[43]

20 CSR 4240-40.020(3)(C) requires that within 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) of 20 CSR 4240-40.020 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 CSR 4240-40.020(4)(A) requires operators to notify designated Commission personnel by telephone within two hours following discovery of a Missouri reportable incident[44] by the operator, or as soon thereafter as practicable if emergency efforts to protect life and property would be hindered.

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[42] 20 CSR 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.).

[43] The NRC is operated by the United States Environmental Protection Agency in cooperation with the United States Coast Guard.

[44] 20 CSR 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 seventeen thousand five hundred dollars ($17,500) or more, including loss to the gas operator or others, or both, and including the cost of gas lost;
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.; or 3. An event that is reported as a Federal incident under section (3).

20 CSR 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) of 20 CSR 4240-40.020.

2. CU's Actions to Comply with 20 CSR 4240-40.020(2)(C), (3), (4), and (6)

CU confirmed discovery that the incident met the reporting requirements of 20 CSR 4240-40.020(2)(C) and (4)(A) at approximately 1:05 pm on July 17, 2023.[45] The incident reporting requirements in 20 CSR 4240-40.020(3), (4), and (6) were completed as follows:

1. CU made the initial telephone notification of a natural gas incident to a designated Commission personnel at approximately 12:11 pm[46] on July 17, 2023.[47]
2. CU notified the NRC of a natural gas incident at approximately 1:25 pm on July 17, 2023 (NRC Report Number 1373341).[48]
3. CU provided 48-hour confirmation of the incident to the NRC at approximately 9:21 am on July 19, 2023 (NRC Report Number 1373504).[49]
4. CU completed and submitted USDOT-PHMSA Form PHMSA F 7100.1, titled "Incident Report – Gas Distribution System," to Staff and PHMSA on August 15, 2023.[50]

3. Staff Analysis:

CU complied with the reporting requirements of 20 CSR 4240-40.020(4)(A) by telephone notification of a natural gas incident to designated Commission personnel at approximately 12:11 pm on July 17, 2023, with confirmed discovery occurring at approximately 1:05 pm that same day.

[45] City Utilities of Springfield response to Staff Data Request 0019.
[46] City Utilities of Springfield response to Staff Data Request 0010.
[47] 20 CSR 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.).
[48] City Utilities of Springfield response to Staff Data Request 0010.
[49] City Utilities of Springfield response to Staff Data Request 0010.
[50] Information provided by City Utilities of Springfield's August 15, 2023 e-mail to Commission Staff.

CU complied with the reporting requirements of 20 CSR 4240-40.020(3)(A) and 20 CSR 4240-40.030(3)(B), by notification to the NRC of a natural gas incident at approximately 1:25 pm on July 17, 2023.

CU complied with the reporting requirements of 20 CSR 4240-40.020(3)(C) by notification to the NRC within forty-eight (48) hours after confirmed discovery of the incident at approximately 9:21 am on July 19, 2023.

CU complied with the requirements of 20 CSR 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 August 15, 2023. CU's submission time was not more than 30 days after detection of an incident, as required by 20 CSR 4240-40.020(6)(A).

4. Violations:

Staff found no violations of the requirements of 20 CSR 4240-40.020(3), (4), and (6).

5. Staff Recommendations:

Staff has no recommendations relating to CU's incident reporting procedures and actions based on Staff's analysis of this incident.

C. Drug and Alcohol Testing

1. Regulatory Requirements:

Missouri pipeline safety rules adopt the Federal Drug and Alcohol Testing regulations[51] by reference.[52] At the time the incident occurred, the then currently effective Commission Rules had adopted the Code of Federal Regulations ("CFR") dated October 1, 2019, 49 CFR parts 40 and 199.

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

49 CFR 199.202 requires each operator to maintain and follow a written alcohol misuse plan that conforms to Part 199 and the DOT Procedures.

[51] 49 Code of Federal Regulations (CFR) parts 40 and 199, effective October 1, 2015, incorporated by reference by the Commission at the time of the indecent July 17, 2023.
[52] Commission rule 20 CSR 4240-40.080.

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

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

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

49 C.F.R. § 199.3 defines "covered function" as follows: "Covered function means an operations, maintenance, or emergency-response function regulated by part 192, 193, or 195 of this chapter that is performed on a pipeline or on an LNG facility."

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

- *Pre-employment:* 49 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."
- *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."
- *Post-Accident:* 49 C.F.R. § 199.105(b) provides the post-accident drug testing requirements: "As soon as possible but no later than 32 hours after an accident, an operator shall drug test each employee whose performance either contributed to the accident or cannot be completely discounted as a contributing factor to the accident. An operator may decide not to test under this paragraph but such a decision must be based on the best information available immediately after the accident that the employee's performance could not have contributed to the accident or that, because of the time between that performance and the accident, it is not likely that a drug test would reveal whether the performance was affected by drug use."

Additionally, for each large operator having more than 50 covered employees, drug and alcohol test results must be reported annually to PHMSA, in a Management Information System ("MIS") report, no later than March 15 of each year for the previous calendar year.

The requirements for post-accident alcohol testing are provided in 49 C.F.R. § 199.225(a):

> (a) Post-accident.
>
> (1) As soon as practicable following an accident, each operator shall test each surviving covered employee for alcohol if that employee's performance of a covered function either contributed to the accident or cannot be completely discounted as a contributing factor to the accident. The decision not to administer a test under this section shall be based on the operator's determination, using the best available information at the time of the determination that the covered employee's performance could not have contributed to the accident.
>
> (2)(i) If a test required by this section is not administered within 2 hours following the accident, the operator shall prepare and maintain on file a record stating the reasons the test was not promptly administered. If a test required by this paragraph is not administered within 8 hours following the accident, the operator shall cease attempts to administer an alcohol test and shall state in the record the reasons for not administering the test. (ii) Reserved

For the employees performing covered functions at the time of the incident, each would have been required to have passed a pre-employment drug test, and been part of a pool of covered employees to be selected for random drug tests. For employees whose performance either contributed to the incident or could not be completely discounted as a contributing factor to the incident, each should have been tested for drugs within 32 hours after the incident and for alcohol within 2 hours of the incident or if not tested within 2 hours following the accident, the operator shall prepare and maintain on file a record stating the reasons the test was not promptly administered.

2. *CU's Actions to Comply with 20 CSR 4240-40.080:*

CU reported to Staff that, the following employees were on site at the time of the incident:

Employee	Task Assigned on July 17, 2023	Time of Drug and Alcohol Specimen Collection
Employee 1 ** [redacted] **	Helped remove cross fitting and South valve	3:00 pm
Employee 2 ** [redacted] **	Shut valves on North and West legs of pipeline	6:46 pm
Employee 3 ** [redacted] **	Helped remove cross fitting and South valve	2:00 pm
Employee 4 ** [redacted] **	Shut valves on North and West legs of pipeline	6:33 pm
Employee 5 ** [redacted] **	Helped remove cross fitting and South valve	2:39 pm
Employee 6 ** [redacted] **	Helped remove cross fitting and South valve	1:49 pm
Employee 7 ** [redacted] **	Crew Supervisor	3:36 pm

Each of the above listed CU employees had specimens collected for drug and alcohol testing at Cox Health Care. ** [redacted] ** CU provided copies of the post-accident testing along with the pre-employee testing to Staff.

CU stated that the reason test specimens were not collected within the first two hours of confirmed discovery of the incident was that priority following the incident for employees onsite was to notify proper emergency response personnel, secure the scene and minimize the risk of personnel injury or further property damage. Gas flow was controlled, extinguishing the fire at approximately 12:40 pm. Once the scene was secure, the CU Safety Specialist onsite evaluated the employees and transported Employee 3 and Employee 6 to Cox North for medical evaluation and to collect specimens for post-incident drug and alcohol testing following the medical evaluation. The CU Safety Specialist then returned to the scene and transported Employee 1 and Employee 5 to Cox North. CU stated that congestion and Emergency Response activities at the

scene increased travel time to Cox North, resulting in an estimated travel time of 35-40 minutes. Medical evaluation was priority followed by testing. The last alcohol test was conducted at 6:46 pm. At approximately 2:30 pm the cause of the incident was still unknown. Further review of the incident, employees involved, and their duties identified three additional employees whose actions could not be completely discounted as a contributing factor to the incident and therefore were also required to submit specimens for post-accident drug and alcohol testing. The onsite supervisor (Employee 7) was sent to Cox North for specimen collection and testing at 3:36 pm.

During its response to the incident, CU encountered multiple problems with valve operation (See *Section III.E – Valve Maintenance* of this report). As a result, two of the employees (Employee 2 and Employee 4) to be sent for specimen collection and testing were still attempting to operate valves to isolate the flow of gas to the incident location. The alcohol tests for these individuals were conducted at 6:46 pm. CU provided copies of the post-accident testing along with the pre-employee testing to Staff. The results of ** [redacted]. **

3. Staff Analysis:

The initial release of gas occurred at 11:20 am. Ignition occurred at 11:25 am. At 1:05 pm, CU reported that it had confirmed discovery that the incident would be federally reportable. Specimens for drug testing were collected from each of the seven CU employees who were on-site at the time of the incident within 32 hours as required by 49 CFR 199.105(b), adopted into Commission rule 20 CSR 4240-40.080. Specimens for alcohol testing were collected from each of the seven CU employees within 8 hours of confirmed discovery of the incident.

CU complied with the reporting requirements of 20 CSR 4240-40.080 by having a written Anti-Drug and Alcohol Misuse plan and providing the plan to employee's who perform covered task and verifying the plans are complete and up-to-date. Staff reviewed CU's written Anti-Drug and Alcohol Misuse plan and found that meet the minimum requirements of 20 CSR 4240-40.080. All employees on site had pre-employment testing and are in a random testing pool. CU has been performing random drug testing at the required testing rate. All employees were drug tested after the incident and within the required timeframe. Four of the employees were alcohol tested within the 2-hour time frame and the remaining 3 were tested before the 8-hour time limit. A record stating the reasons the test was not promptly administered was submitted to Staff.

Staff believes that it was reasonable for CU to utilize some of the personnel who were involved in the incident to continue operating valves to make the area gas safe before removing personnel to be transported for drug and alcohol testing. However, Staff recommends in the future that if CU has other personnel available who can perform these same tasks, that CU utilize personnel who were not directly involved in the incident to perform the emergency response tasks.

4. Violations:

Staff did not find any violations of Commission rules with respect to CU's drug and alcohol program or its implementation.

5. Staff Recommendations:

Staff recommends in the future that to the extent that CU has personnel available who can perform the required tasks, CU utilize personnel who were not directly involved in the incident to perform the emergency response actions.

D. Prevention of Accidental Ignition

1. Regulatory Requirements:

20 CSR 4240-40.030(13)(X) Prevention of Accidental Ignition requires that each operator shall take steps to minimize the danger of accidental ignition of gas in any structure or area where the presence of gas constitutes a hazard of fire or explosion, including the following:

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

2. CU's Actions to Comply with 20 CSR 4240-40.030(13)(X):

CU provided a copy of its applicable Operation and Maintenance Plan, *Natural Gas Operations and Maintenance Manual* dated March 7, 2022.[53]

[53] City Utilities of Springfield response to Staff Data Request 0022.2.

CU stated that its actions to comply with Commission's requirements in 20 CSR 4240-40.030(13)(X) were as follows:

1. The portion of the line being accessed (the South leg) had been purged of gas and the valves of the North and West legs had been closed. For this reason, the release of gas was not anticipated; however, routine safety measures were followed as fire extinguishers were on the work crew's trucks and the crew wore personal protective equipment, including hard hats, steel toe shoes and fire-resistant clothing.[54]

2. No welding or cutting was performed on the line. Nylon hoisting straps, attached to a backhoe bucket, were secured to the cross fitting and south valve. A socket and wrench were used to remove the nuts from the bolts connecting the fittings. Once free, the fittings were lifted out of the hole by the backhoe.[55]

3. No gas venting was anticipated. The North and West valves were closed and blind flanges were planned to be installed on these valves after removing the cross fitting and South facing valve.[56]

Prior to removal of the cross-tee fitting by CU personnel during the morning of July 17, 2023, the valve to the South Leg of the feeder line (see Figure 4 in Appendix B) was closed and the South Leg of the feeder line was purged of natural gas. The valves for the North Leg and West Leg of the feeder line were also closed, but no purging process was performed for either the North Leg or West Leg of the feeder line. Since both the North Leg and the West Leg of the feeder line contained pressurized natural gas, CU personnel were relying on the closed valves within the valve cluster pit to provide isolation while the cross-tee fitting was removed. No line stopping equipment or purging process was utilized by CU for either the North Leg or West Leg of the feeder line during the removal process of the cross-tee fitting.

[54] City Utilities of Springfield response to Staff Data Request 0002.
[55] City Utilities of Springfield response to Staff Data Request 0001.1.
[56] City Utilities of Springfield response to Staff Data Request 0002.

3. Staff Analysis:

Staff reviewed CU's *Natural Gas Operations and Maintenance Manual* ("O&M Manual") dated March 7, 2022, and found that it satisfied the requirements of 20 CSR 4240.40.030(13)(X) for written prevention of accidental ignition procedures.

Additionally, Staff found that CU's actions to prevent accidental ignition were consistent with the requirements of its written emergency procedures, and Commission's rules.

However, Staff notes that during the time that CU employees were preforming work to loosen bolts on the flanges connecting valves to the cross-fitting within the valve pit (See Appendix B, Figure 4 of this Report), CU did not monitor the atmosphere within the valve pit for the presence of combustible gas. Ideally, the gas would have been entirely isolated from the valve pit by the closed valves on the north and west legs of the feeder line. However, there is a possibility that gas can leak past a closed valve. The valve pit is a semi-enclosed area, which could have delayed employee egress and allowed for concentration of gas in the vicinity of the flange.

4. Violations:

Staff did not find any violations of Commission rules with respect to CU's prevention of accidental ignition.

5. Staff Recommendations:

Staff recommends that CU revise its procedures to require monitoring of combustible gas concentrations in the atmosphere whenever its employees are performing work on facilities containing natural gas, and at a minimum when such work is being performed in enclosed or semi-confining locations such as valve pits where gas can concentrate or employee egress could be delayed.

E. Valve Maintenance

1. Regulatory Requirements:

20 CSR 4240-40.030(12)(C)2.A. requires that CU's O&M Manual must have procedures for safely maintaining the pipeline in accordance with Section (13).

Commission rule 20 CSR 4240-40.030(13)(V) - Valve Maintenance - Distribution Systems requires that operators have valve maintenance and inspection procedures. At a minimum, the procedures must provide for:

1. Each valve, the use of which may be necessary for the safe operation of a distribution system, must be checked for accessibility and serviced at intervals not exceeding fifteen (15) months but at least once each calendar year.

2. Feeder line[57] and distribution line[58] valves, the use of which may be necessary for the safe operation of a distribution system, shall be inspected at intervals not exceeding fifteen (15) months but at least once each calendar year. At a minimum, the valves that are metallic must be partially operated during alternating calendar years.

3. Valves necessary for the safe operation of a distribution system include, but are not limited to, those which provide:

    A. One hundred percent (100%) isolation of the system or any portion of it;

    B. Control of a district regulator station, preferably from a remote location;

    C. Zones of isolation sized such that the operator could relight the lost customer services within a period of eight (8) hours after restoration of system pressure; or

    D. Extensive zone isolation capabilities where historical records indicate conditions of greater than normal pipeline failure risk.

4. Each operator must take prompt remedial action to correct any valve found inoperable, unless the operator designates an alternative valve.

[57] As defined by 20 CSR 4240-40.030(1)(B)15., a feeder line means a distribution line that has a maximum allowable operating pressure (MAOP) greater than 100 psig that produces hoop stresses less than twenty percent (20%) of specified minimum yield strength (SMYS).
[58] As defined by 20 CSR 4240-40.030(1)(B)12., a distribution line means a pipeline other than a gathering or transmission line.

2. CU's Actions to Comply with 20 CSR 4240-40.030(13)(V):

CU provided a copy of its' *Natural Gas Operations and Maintenance Manual* ("O&M Manual")[59] dated March 7, 2022, that was in effect on July 17, 2023, at the time of the incident. Chapter 15 - Natural Gas Valve Inspection and Maintenance, Section 3. DISTRIBUTION DOT VALVES (EXCEPT FOR SERVICE LINE VALVES) contains the CU's procedures for determining DOT valves and for performing inspections of valves that include the following:

a) Feeder line and distribution line valves necessary for safe operation shall be inspected at least once each calendar year, not to exceed 15 months. Distribution line valves which are metal must be partially operated during alternating calendar years.

b) Valves meeting any of the following criteria shall be deemed to be necessary for the safe operation of the distribution system, and thus considered DOT valves, and shall be subject to the requirements of these guidelines:

    i. Control of a district regulator station, preferably from a remote location;

    ii. Zones of isolation which require more than eight hours to relight.

Additionally, CU's O&M Manual, Chapter 15 - Natural Gas Valve Inspection and Maintenance, Section 5. GUIDELINES, parts a. through c. include the following:

a. Each DOT valve shall be checked for accessibility and inspected at least once each calendar year, but at intervals not exceeding 15 months.

b. Each DOT valve shall be partially operated at least once every year to ensure that it is operable. Extreme care shall be exercised when partially operating a plug valve.

c. If any DOT valve is found to be inoperable, prompt remedial action will be taken to return the valve to service or an alternative valve will be designated as a DOT valve.

CU considers a DOT valve to be a valve that is deemed necessary for the safe operation of the distribution system and is required for compliance with the requirements of 20 CSR 4240-40.030(13)(V). CU performs routine inspection and maintenance of its DOT valves on an annual

[59] CU's response to Staff Data Request 0022, including *Amended Attachment DR 22.0-A*.

basis (once each calendar year not to exceed 15 months)[60]. CU has additional valves it refers to as non-DOT valves. CU does not perform routine inspection or maintenance of its non-DOT valves on a set time schedule. CU utilizes the same inspection procedures as required by CU's O&M Manual, Chapter 15 - Natural Gas Valve Inspection and Maintenance, Section 5. GUIDELINES but the inspection frequency is not the same.[61]

CU provided its list of the DOT valves that were installed on both the North and West legs of the 12-inch diameter steel feeder line near the vicinity of ** [redacted] ** that would control the flow of gas to the area where the incident occurred on July 17, 2023. Confidential Figure 5 of Appendix B shows the approximate locations of these valves.[62] For the North leg of the feeder line, CU's DOT valves consist of ** [redacted]. ** CU's DOT valves for the West leg of the feeder line include ** [redacted]. **[63]

Table 2 provides the dates when CU completed its' valve inspection and maintenance.

Table 2 – CU DOT Valve Inspection Dates[64]

Valve ID NO.	Location Description	Date Inspection Completed	Active	Valve Operated and Left Open
** [redacted] **	** [redacted] **	09/08/23	Yes	Yes
		06/14/22	Yes	Yes
		09/29/21	Yes	Yes
		08/25/20	Yes	Yes
		08/05/19	Yes	Yes
** [redacted] **	** [redacted] **	09/08/23	Yes	Yes
		06/14/22	Yes	Yes
		09/29/21	Yes	Yes
		08/25/20	Yes	Yes
		08/05/19	Yes	Yes

[60] Some Missouri natural gas operators refer to these types of valves as essential, or emergency valves.
[61] Information provided by City Utilities of Springfield's response to Staff Data Request 0009.1 and *Attachment DR09.1-A*.
[62] Information provided by City Utilities of Springfield's response to Staff Data Request 0016 and *Attachment DR16-A1* and *Attachment DR16-A2*.
[63] Information provided by City Utilities of Springfield's response to Staff Data Request 009.3, part 2.
[64] Information for Table 2 was obtained from City Utilities of Springfield's November 3, 2023 response to Staff Data Request 0017.0 which included *Attachment DR17-A* (CONFIDENTIAL).

Table 2 – CU DOT Valve Inspection Dates[64]				
Valve ID NO.	**Location Description**	**Date Inspection Completed**	**Active**	**Valve Operated and Left Open**
** [redacted] **	** [redacted] **[65]	07/28/23	Yes	Yes
		06/08/22	Yes	Yes
		07/26/21	Yes	Yes
		07/07/20	Yes	Yes
		06/26/19	Yes	Yes
** [redacted] **	** [redacted] **	09/08/23	Yes	Yes
		06/13/22	Yes	Yes
		10/21/21	Yes	Yes
		08/25/20	Yes	Yes
		08/05/19	Yes	Yes
** [redacted] **	** [redacted] **	07/27/23	Yes	Yes
		06/23/22	Yes	Yes
		06/29/21	Yes	Yes
		06/23/20	Yes	Yes
		06/18/19	Yes	Yes
** [redacted] **	** [redacted] **	09/18/23	Yes	Yes
		06/21/22	Yes	Yes
		05/24/21	Yes	Yes
		06/01/20	Yes	Yes
		05/15/19	Yes	Yes
** [redacted] **	** [redacted] **	03/03/23	Yes	Yes
		03/09/22	Yes	Yes
		08/02/21	Yes	Yes
		07/27/20	Yes	Yes
		07/08/19	Yes	Yes

With respect to valve maintenance, CU stated that "Inspection of these valves found no issues and therefore no work orders were generated."[66]

[65] ** [redacted] **

[66] City Utilities of Springfield's response to Staff Data Request 0017, part b).

3. *CU Valve Operation in Response to the July 17, 2023 Incident:*

In response to the July 17, 2023 incident, CU attempted to operate several DOT and non-DOT valves to isolate the flow of natural gas to the incident area. Table 3 presents a chronological description of the outcome of these attempts.

Table 3 – CU Valve Operation During Incident Response[67]

Time Period	DOT Valve (Yes/No)	Valve Description	Valve Function During Incident
11:37-11:41 AM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted]. ** This valve most recently previously inspected as a non-DOT valve by CU on 6/11/19.	In conjunction with the closing of DOT valve ** [redacted], ** this isolated gas flow to the west leg of the feeder line.
11:37-11:41 AM	Yes	DOT Valve ** [redacted] ** located ** [redacted]. ** The purpose of this regulator station is to reduce the pressure of gas from the feeder line prior to introducing the gas to a lower pressure system.	This DOT valve was closed to prevent the flow of gas from the lower pressure system back into the west leg of the feeder line.
11:38-11:55 AM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted]. ** Most recently previously inspected as a non-DOT valve by CU on 3/21/19.	CU attempted but was not able to close this valve to isolate the north leg of the feeder line. CU turned the nut until it spun free, indicating the valve broke.

[67] Information for Table 3 was obtained from City Utilities of Springfield's responses to Staff Data Requests 0010.0, and 0010.1 which included the following attachments: *Attachment DR10*; *Attachment DR10 (First Amended 12-26-23)*; *Attachment DR0010.1-A1*; *Attachment DR0010.1-A2*; *Attachment DR0010.1-B*, and *Attachment DR0010.1-C*, as well as, CU's response to confidential Staff Data Request 0017.1.

Table 3 – CU Valve Operation During Incident Response[67]			
Time Period	**DOT Valve (Yes/No)**	**Valve Description**	**Valve Function During Incident**
11:57-12:12 PM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted] . ** CU did not have previous records of inspections of this non-DOT valve.	CU attempted but was not able to close this valve to isolate the flow of gas to the north leg of the feeder line. CU informed staff that following the incident Valve ** [redacted] ** was later removed by CU and replaced with a new valve in the same area[68].
11:57-12:12 PM	Yes	DOT Valve ** [redacted] ** located ** [redacted] . ** The purpose of this regulator station is to reduce the pressure of gas from the feeder line prior to introducing the gas to a lower pressure system.	This DOT valve was closed to prevent the flow of gas from the lower pressure distribution system back into the north leg of the feeder line.
12:06-12:15 PM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted] . ** Most recently previously inspected as a non-DOT valve by CU on 3/13/18.	CU attempted but was unable to close this valve to isolate the north leg of the feeder line. CU was unable to get the valve key on the valve nut. Valve ** [redacted] ** was made operational by CU after the incident[69].
12:15-12:19 PM	Yes	DOT Valve ** [redacted] ** inlet valve to Regulator Station #193 located ** [redacted] . ** The purpose of this regulator station is to reduce the pressure of gas from the feeder line prior to introducing the gas to a lower pressure system.	This DOT valve was closed to prevent the flow of gas from the lower pressure distribution system back into the north leg of the feeder line.
12:21-12:34 PM	Yes	DOT feeder line valve ** [redacted] ** located ** [redacted] . **	In conjunction with the non-DOT valve ** [redacted] ** below, CU successfully closed this valve to isolate the North Leg of the feeder line.

[68] City Utilities of Springfield's response to Staff Data Request 0010, part b) and 0010.1, part d).
[69] City Utilities of Springfield's response to Staff Data Request 0010.1, part c).

Table 3 – CU Valve Operation During Incident Response[67]			
Time Period	**DOT Valve (Yes/No)**	**Valve Description**	**Valve Function During Incident**
12:21-12:34 PM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted]. ** CU had no records of previous valve inspections or maintenance for this valve.	In conjunction with the DOT valve ** [redacted] ** above, CU successfully closed this valve to isolate the North Leg of the feeder line.
12:21-12:34 PM	Yes	DOT Valve ** [redacted] **, inlet valve to Regulator Station #139 located ** [redacted]. ** The purpose of this regulator station is to reduce the pressure of gas from the feeder line prior to introducing the gas to a lower pressure system.	This DOT valve and the un-numbered above ground non-DOT valves listed below were closed to prevent gas from flowing from the lower pressure system back into the North Leg of the feeder line.
12:21-12:34 PM	No	Two non-DOT valves on the old Lowe's regulator station piping.[70] CU had no records of previous valve inspections or maintenance for these non-DOT valves.[71]	These two non-DOT valves were both inlet isolation valves that were closed to prevent gas from flowing from the lower pressure system back into the North Leg of the feeder line.
12:32-12:42 PM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted]. **	This valve was closed to provide a secondary isolation of gas flow to the West Leg of the feeder line.

CU estimated that gas flow from the West Leg of the feeder line on July 17, 2023, was isolated between approximately 11:41 am (when DOT valve ** [redacted] ** was closed to prevent District Regulator Station #49, located at ** [redacted] ** from back-feeding

[70] In response to Staff Data Request 0032, part c), CU explained that the "old Lowe's regulator station" was a two-run, above-grade regulator station reducing pressure on one section of City Utilities' feeder system to another. Each run had inlet and outlet isolation valves that were non-DOT valves and had no valve designation. Due to changes in operating conditions on the feeder system in the early 2010's, the regulator station was decommissioned. The regulators were removed and replaced with straight pipe. The two above-grade runs with their isolation valves remained. The "two valves on the old Lowe's regulator station" that were shut on July 17, 2023 were the two inlet isolation valves.

[71] Information provided by CU in response to Staff Data Request 0032.0, part d).

into the West Leg) and 11:47 am (when non-DOT feeder line valve ** [redacted] ** located at ** [redacted] ** was closed to isolate the West Leg from the rest of the feeder line system).[72]

For the North Leg of the feeder line, CU estimated that gas flow from the North Leg of the feeder line on July 17, 2023, was isolated between approximately 12:32 pm (when the fire was contained within the pit after valve closures near the ** [redacted] ** Regulator Station #139) and 12:39 pm (when the residual gas at the incident location stopped burning).[73]

4. Staff Analysis:

Staff found that CU's O&M Manual procedures within Chapter 15 for performing inspections and maintenance of its DOT valves (emergency valves) was consistent with the requirements of 20 CSR 4240-40.030(13)(V). However, CU only included two of the four criteria required by 20 CSR 4240-40.030(13)(V)3. Specifically, CU did not include:

1. Valves necessary to provide 100% isolation of the system or any portion of it (20 CSR 4240-40.030(13)(V)3.A.), or
2. Valves necessary for extensive zone isolation capabilities where historical records indicate conditions of greater than normal pipeline failure risk.

As CU's efforts to isolate the system demonstrate, CU did not have sufficient DOT valves to provide 100% isolation of this portion of the system as required in 20 CSR 4240-40.030(13)(V)3.A. The significance of CU's DOT and non-DOT designations are that CU inspects and maintains the valves with a designation of DOT in accordance with Commission rules, but does not inspect or maintain the non-DOT valves according to the required frequency. CU was unable to operate several of the non-DOT valves (e.g. feeder line valves ** [redacted], ** ** [redacted], ** and ** [redacted] **), which increased the time required to stop the flow of gas to the incident location, and likely increased the severity of the damages that resulted from this incident.

On the West Leg of the feeder line, CU closed DOT valve ** [redacted] ** to prevent gas from flowing back from the lower pressure system into the feeder line and a non-DOT feeder line valve ** [redacted] ** to stop the flow of gas on the West Leg of the feeder line to the incident location. In this instance, the non-DOT feeder line valve was operable and the flow of gas to the

[72] Information provided by CU in response to Staff Data Request 0033.0, part 2).
[73] Information provided by CU in response to Staff Data Request 0033.0, part 1).

incident location from the West Leg of the feeder line was isolated by 11:47 am (approximately 27 minutes after the time of initial gas release and 22 minutes after the time the gas ignited at the incident location).

On the North Leg of the feeder line, CU was able to close DOT valves ** [redacted] ** to prevent gas from flowing back from the lower pressure sides of Regulator Stations 115 and 193 respectively. Closure of both DOT valves were accomplished by approximately 12:19 pm. However, CU also closed DOT valve ** [redacted] ** located ** [redacted] ** in combination with closing non-DOT feeder line valve ** [redacted] ** located ** [redacted] ** to prevent gas from flowing back into the North Leg of the feeder line. Likewise, in addition to closing DOT valve ** [redacted] ** the closure of two unnumbered non-DOT valves were also required to prevent gas from flowing back into the North Leg of the feeder line at Regulator Station #139. This was accomplished at approximately 12:34 pm. To isolate the flow of gas along the North Leg of the feeder line, CU attempted but was unsuccessful in closing non-DOT feeder line valves ** [redacted], ** ** [redacted], ** and ** [redacted] ** between 11:38 am and 12:15 pm. CU was successful in closing non-DOT feeder line valve ** [redacted] ** and two unnumbered non-DOT valves on the North Leg of the feeder line at approximately 12:34 pm, and approximately five minutes later, at 12:39 pm, residual gas in the pit stopped burning.[74] The flow of gas to the incident location from the North Leg of the feeder line was isolated at approximately 12:39 pm (approximately 1 hour and 19 minutes after the time of initial gas release and approximately 1 hour and 14 minutes after the time the gas ignited at the incident location).

Approximately 37 minutes elapsed as CU attempted unsuccessfully to close non-DOT feeder line valves ** [redacted], ** ** [redacted], ** and ** [redacted] ** on the North Leg of the feeder line. This increased the time required to isolate the flow of natural gas from the North leg of the feeder line to the incident location, and likely increased the magnitude of damages. Due to the proximity of non-DOT feeder line valves ** [redacted] ** (near ** [redacted] **) and ** [redacted] ** (near ** [redacted] **) in relation to the incident site location, Staff's opinion is that if these valves had been routinely inspected and maintained in accordance with 20 CSR 4240-40.030(13)(V)2. it is likely that they could have been closed during CU's emergency

[74] Information provided by CU in response to Staff Data Request 0033.0, part 1).

response. This could have reduced the time required to isolate the flow of natural gas from the North leg of the feeder line to the incident location, and likely would have reduced the magnitude of damages caused by the fire.

Due to the extended amount of time required to isolate the North Leg of the feeder line and the number of non-DOT valves that were found operable, Staff recommends that CU reevaluate its designation of DOT and non-DOT valves from a perspective of determining which valves are essential to ensure 100% isolation of any portion of its distribution system, including all feeder line segments.

4. Violations:

1. Failure to have a procedure that included inspection and maintenance of valves necessary to achieve 100% isolation of the system or any portion of it as valves necessary for the safe operation of the system[75] was a violation of 20 CSR 4240-40.030(12)(C)2.A.[76]

2. Failure to inspect and service each feeder line valve, the use of which may be necessary for the safe operation of a distribution system at intervals not exceeding 15 months but at least once each calendar year was a violation of 20 CSR 4240-40.030(13)(V)2. Specifically, the definition of valves necessary for the safe operation of a distribution system listed in 20 CSR 4240-40.030(13)(V)3.A. includes those which provide 100% isolation of the system or any portion of it. Closure of CU's non-DOT designated valves ** [redacted] ** on the West Leg of the feeder line (most recent previous inspection on June 11, 2019), ** [redacted] ** on the North Leg of the feeder line (no record of previous inspection) and two unnumbered valves at the Old Lowes Regulator Station (no record of previous inspection) were required to provide 100% isolation of the West Leg and the North Leg of the feeder line. However, these valves were not inspected or maintained in accordance with 20 CSR 4240-40.030(13)(V)2.

[75] As required by 20 CSR 4240-40.030(13)(V)3.A.
[76] 20 CSR 4240-40.030(12)(C)1. requires each operator to prepare and follow for each pipeline a manual of written procedures for conducting operations and maintenance activities and for emergency response. 20 CSR 4240-40.030(12)(C)2. sets forth the minimum requirements for the manual. 20 CSR 4240-40.030(12)(C)2.A requires that the manual must include procedures for operating, maintaining and repairing the pipeline in accordance with each of the requirements in Sections 12, 13 and 14 of 20 CSR 4240-40.030.

5. Staff Recommendations:

1. Staff recommends that CU reevaluate its designation of DOT valves from a perspective of which valves are essential to ensure 100% isolation of any portion of its distribution system (including all feeder line segments).

2. Staff recommends that CU revise its O&M Manual to include procedures that address each of the requirements of 20 CSR 4240-40.030(12)(C)2., including but not limited to all of the requirements of 20 CSR 4240-40.030(13)(V)3.

3. Staff recommends that CU develop and implement the following pre-work procedures when it performs work on pipeline segments containing natural gas:

A. Identify the specific DOT valves that would be needed to isolate the area where work is to be conducted, and

B. Verify that these DOT valves are accessible and operational prior to beginning work.

F. Failure Investigation

1. Regulatory Requirements:[77]

20 CSR 4240-40.030(12)(C) required each operator to prepare and follow a manual of written procedures for each of the requirements of Sections (12)(14) and (14) of 20 CSR 4240-40.030.

At the time the incident occurred, 20 CSR 4240-40.030(12)(L) – Investigation of Failures required:

> Each operator shall establish procedures for analyzing accidents and failures, including the selection of samples of the failed facility or equipment for laboratory examination, where appropriate, for the purpose of determining the causes of the failure and minimizing the possibility of recurrence.

Subsequent to the incident and effective on March 30, 2024, 20 CSR 4240-40.030(12)(L) was amended to adopt recent federal pipeline safety amendments. As follows:

> Each operator must establish and follow procedures for investigating and analyzing failures and federal incidents as defined in 20 CSR 4240-

[77] There are additional requirements in (12)(L) that pertain to transmission pipelines, not included here as this incident occurred on distribution.

> 40.020(2)(D), including sending the failed pipe, component, or equipment for laboratory testing or examination, where appropriate, for the purpose of determining the causes and contributing factor(s) of the failure or incident and minimizing the possibility of a recurrence.
>
> 2. Post-failure and incident lessons learned. Each operator must develop, implement, and incorporate lessons learned from a post-failure or incident review into its written procedures, including personnel training and qualification programs, and design, construction, testing, maintenance, operations, and emergency procedure manuals and specifications.

2. CU's Actions to Comply with 20 CSR 4240-40.030(12)(C) And (12)(L):

CU provided a copy of its procedure to address the requirements of 20 CSR 4240-40.030(12)(L) that was in effect at the time of the incident.[78] This procedure states in part:

> Every accident involving failure of any facility owned and maintained by CU which results in escaping natural gas or which causes the facility to operate in an unsafe manner, in the judgement of the operator, shall be thoroughly investigated. The purpose of the failure investigations is to determine the cause so that procedures, modification of work methods or additional employee training can be put into effect to protect against possible future recurrences.

CU's investigation of this incident determined that the gas was released when a pipe segment separated from a Dresser mechanical fitting installed on the North Leg of the feeder line upstream of the closed valve as shown on Figure 6 in Appendix B of this Report. CU provided a copy of its confidential investigation report,[79] which is included as Confidential Appendix C to this Report. CU's investigation report identified the root cause of the incident to be ** [redacted] **

[78] CU response to Staff Data Request 0014, *Attachment DR14-A*, City Utilities O&M Procedures Manual, Chapter 2, Section 2, and state that the attachment is from the current version of the manual revised in August 2023, but no substantive revisions were made to this section from the prior one.

[79] CU response to Staff Data Request 0014.10, attachment ** [redacted] **

[redacted] **

In response to a Staff data request asking if CU had identified any actions it could take to minimize the possibility of a recurrence of this incident, CU provided a copy of a memorandum subject line "Steel Natural Gas Line Stopping Procedures – Thrust Restraint"[80] The memo requires use of thrust restraint guidance for design, construction and line stopping.

3. Staff Analysis:

CU's procedure for investigation of incidents addressed the requirements of 20 CSR 4240-40.030(12)(L) at the time of the incident, but does not appear to address subsequent amendments. While this is not a violation, Staff recommends that CU update its procedure to address currently effective amendments.

It does not appear that the internal CU memo requiring thrust restraints for design, construction and line stopping directly addresses the circumstances or root cause of this incident. Specifically, it does not address maintenance work of the type that was being performed at the time of the incident (removal of cross fitting from an existing pipeline, without intent to install a stopple fitting), or ** [redacted] ** as identified in the root cause analysis.

4. Violations:

Staff did not find any violations related to CU's investigation of the incident, but has recommendations related to both CU's procedure for investigation of incidents, and evaluation of actions to be taken to prevent recurrence of this type of incident in the future.

5. Staff Recommendations:

1. Staff recommends that CU update its procedure for investigation of incidents to address the currently effective requirements of 20 CSR 4240-40.030(12)(L). This should include provisions that apply to both distribution and transmission pipelines.

[80] CU response to Staff Data Request 0014, *Attachment DR14-G*.

2. Staff recommends that CU develop a procedure to formally evaluate potential hazards and abnormal conditions that may occur prior to performing non-routine activities on its pipelines. This should include a review of the pipeline design, construction and maintenance history, as well as the environment in which the pipe is installed.

G. Operator Qualification

1. Regulatory Requirements:

20 CSR 4240-40.030(12)(D) Qualification of Pipeline Personnel prescribes the minimum requirements for operator qualification of individuals performing covered tasks on a pipeline facility including contractors acting on behalf of the operator.[81] A summary of the relevant requirements and definitions in 20 CSR 4240-40.030(12)(D) can be found in Appendix D of this Report.

20 CSR 4240-40.030(12)(D)(4).B requires that personnel to whom 20 CSR 4240-40.030(12)(D) applies must possess the knowledge and skills necessary to carry out the procedures in the procedural manual for operations, maintenance, and emergencies established under 20 CSR 4240-40.030(12)(C) that relate to the covered tasks they perform. In addition, each operator is responsible for ensuring that qualified individuals possess the knowledge and skills necessary to recognize and react to abnormal operating conditions, to recognize potential ignition sources, to recognize conditions that would likely cause emergencies, including equipment or facility malfunctions or failure and gas leaks, in order to predict the potential consequence of these conditions and take appropriate corrective action, and to take steps necessary to control any accidental release of gas and to minimize the potential for fire or explosion.

20 CSR 4240-40.030(12)(D)(8).A.(II) requires that qualification records shall include identification of the covered tasks the individual is qualified to perform.

2. CU's Actions to Comply with 20 CSR 4240-40.030(12)(D):

CU provided a copy of its qualification program plan that was in effect at the time of the incident: *Springfield Natural Gas Operator Qualification Plan,* dated May 2021.[82]

[81] 20 CSR 4240-40.030(12)(D)1.A states, "This subsection applies to all individuals who perform covered tasks, regardless of whether they are employed by the operator, a contractor, a subcontractor, or any other entity performing covered tasks on behalf of the operator."
[82] CU response to Staff Data Request 0029.

CU provided a listing of each of the covered tasks each employee working at the Charleston Avenue site was qualified to perform to Staff.[83] CU stated that it conducted an investigation to determine if the performance of any covered task(s) caused or contributed to this incident. No violations were found.

CU provided qualification records for employees working on site at the time of the incident, a summary is included in Confidential Appendix E to this report.

In its qualification testing, CU has not identified any questions as being essential to passing.[84] Instead, CU considers an individual achieving an overall 70%[85] of answers correct to be qualified.

3. Staff Analysis:

CU complied with the requirements of 20 CSR 4240-40.030(12)(D) to have and implement a written Operator Qualification program, to provide the written program to employee's who perform covered task, and to verify that the qualification records are complete and up-to-date.

The CU employees working at the incident site were qualified in accordance with CU's program plan. However, for some specific tasks, Staff's opinion is that there may be specific knowledge that is essential to perform the task in a manner that protects the employee and the public. An employee who does not possess this knowledge may not be able to safely perform the task(s), even if that employee were to score an overall 70% on the test. For example:

- An employee performing inside leak gas odor investigations should know at what gas-in-air concentration a building must be evacuated; and
- An employee performing work on a pipeline containing natural gas should know when measures are required to prevent accidental ignition, and what those measures are.

4. Violations:

Staff did not find any violations of Commission rules with respect to CU's operator qualification program.

[83] CU response to Staff Data Request 0003.
[84] City Utilities of Springfield response to Data Request 0003.1.
[85] City Utilities of Springfield Operator Qualification plan dated May 2021.

5. Staff Recommendations:

Staff recommends that CU review its qualification tests and identify essential task-specific questions that must be answered correctly in order to pass.

H. Joint Design and Installation

1. Regulatory Requirements:

Commission rule 20 CSR 4240-40.030 currently requires that the pipeline must be designed and installed so that each joint will sustain the longitudinal pullout or thrust forces caused by contraction or expansion of the piping or by anticipated external or internal loading.[86] The authority for Commission rule 20 CSR 4240-40.030 is Sections 386.250, 386.310 and 393.140, RSMo (2016).

Historically, the Commission's General Order 45, *Rules Regulating Gas Transmission and Distribution Piping Systems*[87] included similar requirements that pipe joints be designed to withstand longitudinal pullout forces from pipe thrust, but allowed that if such provision was not made in the manufacture of the joint, suitable bracing or strapping shall be provided.[88]

2. CU's Actions to Comply with 20 CSR 4240-40.030(6)(B)1.:

CU provided the installation year of the item involved in the incident as 1968.[89]

3. Staff Analysis:

The root cause analysis[90] indicates to Staff that the mechanical fitting ** [redacted] . ** However, due to the year this fitting was installed, Staff does not believe that this requirement from 20 CSR 4240-40.030(6)(B)1. was applicable to this installation, and is therefore not enforceable.

[86] 20 CSR 4240-40.030(6)(B)1.
[87] First Edition issued by Order of the Commission February 27, 1967.
[88] Paragraph 835.4 of State of Missouri, Public Service Commission, General Order No. 45, Issued by Order of the Commission, February 27, 1967.
[89] CU's PHMSA F 7100.1 report, submitted to the US DOT on 08/15/2023, with supplemental, final submitted on 10/02/2024.
[90] CU's CORRECTED *Attachment DR14.10* (Confidential) provided in response to Staff Data Request 0014.10.

The Natural Gas Pipeline Safety Act was enacted on August 12, 1968. It required the Secretary of Transportation to adopt, within three months, the then existing State safety standards for gas pipelines as interim regulations and to establish within 24 months, minimum Federal safety standards. The interim standards were issued on November 7, 1968, as Part 190 of Title 49 of the Code of Federal Regulations and became effective on December 13, 1968. On August 19, 1970, the Minimum Federal Safety Standards were published[91] with an effective date of November 12, 1970, as a new Part 192 in Title 49, containing the minimum Federal safety standards for the transportation of gas and for pipeline facilities use for this transportation. The preamble states that "Standards affecting the design, installation, construction, initial inspection and initial testing shall not be applicable to pipeline facilities in existence on the date such standards are adopted."

In 1968, the requirements of the 1967 Commission's General Order No. 45 would have been the design and construction standards in effect for pipelines jurisdictional to the Missouri Public Service Commission.

Currently, the Commission's authority to require municipal gas systems to operate in accordance with Commission rules is from Section 386.310, RSMo. Staff reviewed the archived editions of the Revised Statutes of Missouri on the Missouri Secretary of State's Digital Heritage website[92], and found that municipal gas systems were not specifically included in Section 386.310, RSMo, until after the statute was amended in 1989. Staff therefore is not asserting that the requirements of the 1967 Commission's General Order No. 45 would have applied to CU in 1968.

4. Violations:

For reasons discussed above in *Staff Analysis*, Staff did not find any violations of Commission rules with respect to design or installation of the fitting. However, Staff does have a recommendation related to future work around such fittings which is discussed in Section III.I – *Distribution Integrity Management Program* of this report.

5. Staff Recommendations:

Staff has a recommendation related to work conducted in the vicinity of similar fittings which is discussed in Section III.I – *Distribution Integrity Management Program* of this report.

[91] 35 FR 13248-13279.
[92] https://cdm16795.contentdm.oclc.org/digital/collection/p16795coll26/search.

I. Distribution Integrity Management Program ("DIMP")[93]

1. Regulatory Requirements:

Commission rules require each gas distribution operator, other than a master meter operator, to develop and implement a Gas DIMP no later than August 2, 2011.[94] Program elements must include a demonstrated knowledge of the system, identification of threats, evaluation and ranking of risk, identification and implementation of measures to address risks, measurement of performance, monitoring of results and evaluation of effectiveness. Sources of data to be considered in DIMP includes, but is not limited to incident history. In implementation of DIMP, a baseline is established for threats to monitor the effectiveness of the program.

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.

To comply with the knowledge of the system part of this rule[95], an operator must:

- Demonstrate an understanding of its gas distribution system developed from reasonably available information, identify the characters of the pipeline's design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its distribution pipeline,

[93] In its November 6, 2024 letter transmitting comments to Staff and in a subsequent clarification, CU has indicated that ** [redacted] **

[94] 20 CSR 4240-40.030(17)(C).

[95] 20 CSR 4240-40.030(17)(D)1.

- Consider information from past design, operations and maintenance, and
- Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline.

Gas distribution system operators must consider reasonably available information to identify existing and potential threats[96], evaluate the relative importance of each threat, and estimate and rank the risks posed to its pipeline[97]. Operators must determine and implement measures to address the risks[98], then measure performance and evaluate the effectiveness of the program in controlling each identified threat[99]. Additionally, each operator must re-evaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas. Each operator must determine the appropriate frequency period for conducting complete program reevaluations based on the complexity of its systems and changes in factors affecting the risk of failure. The maximum interval for re-evaluation is at least every five years.[100]

2. CU's Actions to Comply with 20 CSR 4240-40.030(17):

Prior to this incident, Staff most recently conducted an inspection of CU's compliance with the requirements of 20 CSR 4240-40.030(17) on December 6-8, 2021. In this inspection, Staff reviewed the Fifth Revision of CU's DIMP Plan, dated July 1, 2020, as well as CU's records of implementation of its DIMP. CU's July 1, 2020 DIMP Plan identified ** [redacted] [101] [redacted] [102] [redacted] **

In a January 6, 2022, letter dated to the chair of the CU board, Staff identified ** [redacted]

[96] 20 CSR 4240-40.030(17)(D)2.
[97] 20 CSR 4240-40.030(17)(D)3.
[98] 20 CSR 4240-40.030(17)(D)4.
[99] 20 CSR 4240-40.030(17)(D)5.
[100] 20 CSR 4240-40.030(17)(D).6.
[101] Analysis on page 188 of CU's July 1, 2020 DIMP Plan.
[102] Page 19 of CU's July 1, 2020 DIMP Plan.

[redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted] **

As part of its investigation into this incident, Staff requested a copy of CU's DIMP that was effective as of the date of the incident. CU provided a copy of the Fifth Revision of its DIMP Plan, dated July 1, 2020, the same version reviewed by Staff in December 2021. Staff notes that although the date of this DIMP Plan is July 1, 2020, the threat evaluation includes data only through 2018.

CU's DIMP Plan dated July 1, 2020 states in Section 8.0:

> City Utilities of Springfield will conduct a complete re-evaluation of this Plan at least every 3 years. Trends in each of the performance measures listed in Chapter 7, MEASURE PERFORMANCE, MONITOR RESULTS AND EVALUATE EFFECTIVENESS will be reviewed during the re-evaluation. If any performance measure indicates that any of the additional action taken is not effective in reducing the risk it is intended to address, City Utilities of Springfield will consider implementing additional actions to address that risk.

In response to a Staff data request inquiring if CU had performed a complete re-evaluation of its DIMP Plan,[103] CU responded:

** [redacted] **

Section 11.4.1.f of CU's DIMP Plan discusses the procedure to be implemented for re-evaluation. This includes but is not limited to:

- Revisit each question answered in the SHRIMP[104] program and either confirm or update the information.
- Review of risk ranking to ensure it is still accurate.
- Review each threat-specific performance measure and compare to the baseline. Particular attention should be given to the threat-specific performance measures that measure the effectiveness of specific actions.

CU Provided a revised DIMP Plan titled ** [redacted] ** to Staff by email on August 29, 2024.

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

Section 8.0 of CU's July 1, 2020 DIMP Plan stated that CU will conduct a complete re-evaluation of this Plan at least every three years. Comparison of frequency of leaks to the listing of known threats[105] is a required element of DIMP, specifically 20 CSR 4240-40.030(17)(D)5. – Measure performance, monitor results and evaluate effectiveness. However, it does not fully satisfy the requirement in 20 CSR 4240-40.030(17)(D)6. to reevaluate threats and risks on its entire

[103] Staff Data Request 0015.1.
[104] CU's DIMP Plan effective at the time of the incident was generated using a program developed by the American Public Gas Association Security and Integrity Foundation (APGA-SIF). The name of the program is Simple, Handy, Risk-based Integrity Management Plan (SHRIMP).
[105] As CU's response to Staff Data Request 0015.1 indicated was done but not documented.

pipeline and consider the relevance of threats in one location to other areas. Additionally, it does not fully satisfy the procedure established in Section 11.4.1.f of CU's July 1, 2020 DIMP Plan for re-evaluation.

The amount of time CU took to re-evaluate its DIMP Plan (4 years, 2 months) exceeded by over a year the time frame specified in CU's July 1, 2020 DIMP Plan. Further, it did not appear that CU continued to implement its July 1, 2020 DIMP Plan during the 4 years and 2-month time interval in which it was performing this re-evaluation. Additionally, while CU documentation supports that it completed a re-evaluation on July 1, 2020, Staff noted that the most recent data used in the July 1, 2020 re-evaluation was from 2018.[106]

20 CSR 4240-40.030(17)(H)2.F. requires that the operator must determine the appropriates period for conducting integrity management evaluations based on the complexity of its pipeline and changes in factors affecting the risk of failure, and that the operator must re-evaluate its entire program at least every five years. Staff reviewed both historical and more recently reported leak data provided by CU in annual reports to PHMSA,[107] from 2010 through 2022 and observed that CU ** [redacted]. **[108] Due to the relatively ** [redacted], ** the staleness of data available to CU for re-evaluation[109], and the size[110] and complexity[111] of the CU gas distribution system, Staff agrees that re-evaluation on a three-year interval was reasonable.

20 CSR 4240-40.030(17)(D)2. requires that an operator must consider reasonably available information to identify existing and potential threats. While CU's July 1, 2020 DIMP Plan addressed an aspect of mechanical fittings failures: ** [redacted]

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[106] ** [redacted] **

[107] 20 CSR 4240-40.020(7)(A) requires providing annual report data to the U.S. Department of Transportation Office of Pipeline Safety.

[108] ** [redacted] **

[109] The most recent data used in the July 1, 2020 DIMP Plan re-evaluation was from 2018.

[110] ** [redacted] **

[111] ** [redacted] **

[redacted][112], [redacted]
[redacted]
[redacted]
[redacted] **

4. Violations:

Failure to implement its written DIMP Plan is a violation of 20 CSR 4240-40.030(17)(C). Specifically, CU failed to conduct a complete program re-evaluation within the three-year interval required by CU's DIMP Plan.

5. Staff Recommendations:

1. Staff recommends that CU consider more frequent re-evaluation of its DIMP Plan going forward.

2. Staff Recommends that in its next re-evaluation of its DIMP Plan, CU include and evaluate the risks associated with the threat of performing maintenance work in proximity to pipeline segments that are joined by mechanical fittings which may not meet the requirements of 20 CSR 4240-40.030(6)(B) to be designed and installed so that each joint will sustain the longitudinal pullout or thrust forces caused by contraction of expansion of the piping or by anticipated external or internal loading.

IV. STAFF'S FINDINGS

As a result of this investigation, Staff found that sufficient facts and information[113] exist to assert the following violations of Commission rules:

1. Failure to have a procedure that included inspection and maintenance of valves necessary to achieve 100% isolation of the system or any portion of it as valves necessary for the safe operation of the system[114] was a violation of 20 CSR 4240-40.030(12)(C)2.A.[115] (See *Section III.E – Valve Maintenance* of this report).

[112] Analysis on page 188 of CU's July 1, 2020 DIMP Plan.
[113] Prior to finalizing this report, Staff provided a copy of the factual basis for its analysis to CU to provide an opportunity to correct any factual inaccuracies and to identify confidential content. A copy of information edited to address CU's comments is provided in Confidential Appendix A.
[114] As required by 20 CSR 4240-40.030(13)(V)3.A.
[115] 20 CSR 4240-40.030(12)(C)1. requires each operator to prepare and follow for each pipeline a manual of written procedures for conducting operations and maintenance activities and for emergency response. 20 CSR 4240-

2. Failure to inspect and service each feeder line valve, the use of which may be necessary for the safe operation of a distribution system at intervals not exceeding 15 months but at least once each calendar year was a violation of 20 CSR 4240-40.030(13)(V)2. Specifically, the definition of valves necessary for the safe operation of a distribution system listed in 20 CSR 4240-40.030(13)(V)3.A. includes those which provide 100% isolation of the system or any portion of it. Closure of CU's non-DOT designated valves ** [redacted] ** on the West Leg of the feeder line (most recent previous inspection on June 11, 2019), ** [redacted] ** on the North Leg of the feeder line (no record of previous inspection) and two unnumbered valves at the Old Lowes Regulator Station (no record of previous inspection) were required to provide 100% isolation of the West Leg and the North Leg of the feeder line. However, these valves were not inspected or maintained in accordance with 20 CSR 4240-40.030(13)(V)2. (See *Section III.E – Valve Maintenance* of this report).

3. Failure to implement its written DIMP Plan is a violation of 20 CSR 4240-40.030(17)(C). Specifically, CU failed to conduct a complete program re-evaluation within the three-year interval required by CU's DIMP Plan. (See *Section III.I – Distribution Integrity Management Program* of this report).

V. STAFF'S RECOMMENDATIONS

1. Staff recommends that CU review and revise as necessary its emergency response procedures to be consistent with implementation of the requirements of (12)(J)1.J. and (12)(L). Specifically, Staff recommends that CU revise its procedures to ensure that going forward it can begin the analysis of incidents and failures to determine the causes of failures and minimize the possibility of a recurrence as soon after the end of the emergency as possible. (See *Section III.A – Incident Description and Emergency Response* of this report).

2. Staff recommends in the future that to the extent that CU has personnel available who can perform the required tasks, CU utilize personnel who were not directly involved in the incident to perform the emergency response actions. (See *Section III.C – Drug and Alcohol Testing* of this report).

40.030(12)(C)2. sets forth the minimum requirements for the manual. 20 CSR 4240-40.030(12)(C)2.A requires that the manual must include procedures for operating, maintaining and repairing the pipeline in accordance with each of the requirements in Sections 12, 13 and 14 of 20 CSR 4240-40.030.

3. Staff recommends that CU revise its procedures to require monitoring of combustible gas concentrations in the atmosphere whenever its employees are performing work on facilities containing gas, and at a minimum when such work is being performed in enclosed or semi-confining locations such as valve pits where gas can concentrate or employee egress could be delayed. (See *Section III.D – Prevention of Accidental Ignition* of this report).
4. Staff recommends that CU reevaluate its designation of DOT and non-DOT valves from a perspective of which valves are essential to ensure 100% isolation of any portion of its distribution system (including all feeder line segments). (See *Section III.E – Valve Maintenance* of this report).
5. Staff recommends that CU revise its O&M Manual to include procedures that address each of the requirements of 20 CSR 4240-40.030(12)(C)2., including but not limited to all of the requirements of 20 CSR 4240-40.030(13)(V)3. (See *Section III.E – Valve Maintenance* of this report).
6. Staff recommends that CU develop and implement the following pre-work procedures when it performs work on pipeline segments containing natural gas:
    a. Identify the specific DOT valves that would be needed to isolate the area where work is to be conducted, and
    b. Verify that these DOT valves are accessible and operational prior to beginning work. (See *Section III.E – Valve Maintenance* of this report).
7. Staff recommends that CU update its procedure for investigation of incidents to address the currently effective requirements of 20 CSR 4240-40.030(12)(L). This should include provisions that apply to both distribution and transmission pipelines. (See *Section III.F – Failure Investigation* of this report).
8. Staff recommends that CU develop a procedure to formally evaluate potential hazards and abnormal conditions that may occur prior to performing non-routine activities on its pipelines. This should include a review of the pipeline design, construction and maintenance history, as well as the environment in which the pipe is installed. (See *Section III.F – Failure Investigation* of this report).
9. Staff recommends that CU review its operator qualification tests to identify essential task-specific questions that must be answered correctly in order to pass. (See *Section III.G – Operator Qualification* of this report).

10. Staff recommends that CU consider more frequent re-evaluation of its DIMP Plan going forward. (See *Section III.I – Distribution Integrity Management Program ("DIMP")* of this report).

11. Staff Recommends that in its next re-evaluation of its DIMP Plan, CU include and evaluate the risks associated with the threat of performing maintenance work in proximity to pipeline segments that are joined by mechanical fittings which may not meet the requirements of 20 CSR 4240-40.030(6)(B) to be designed and installed so that each joint will sustain the longitudinal pullout or thrust forces caused by contraction of expansion of the piping or by anticipated external or internal loading. (See *Section III.I – Distribution Integrity Management Program ("DIMP")* of this report).

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of City Utilities of Springfield, Missouri Concerning a Natural Gas Pipeline Incident in the Vicinity of South Charleston Avenue and East Republic Road in Springfield, Missouri	)))))	Case No. GS-2024-0024

AFFIDAVIT OF BRIAN J. BUCHANAN

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

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

Further the Affiant sayeth not.

Brian Buchanan

Brian J. Buchanan

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 6th day of December 2024.

Dianna L. Vaught

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 City Utilities of Springfield, Missouri Concerning a Natural Gas Pipeline Incident in the Vicinity of South Charleston Avenue and East Republic Road in Springfield, Missouri	)))))	Case No. GS-2024-0024

AFFIDAVIT OF KATHLEEN A. MCNELIS, PE

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

COMES NOW Kathleen A. McNelis, PE and on his oath states that she is of sound mind and lawful age; that she contributed to the foregoing *Staff 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 6th day of December 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 City Utilities of Springfield, Missouri Concerning a Natural Gas Pipeline Incident in the Vicinity of South Charleston Avenue and East Republic Road in Springfield, Missouri	)))))	Case No. GS-2024-0024

AFFIDAVIT OF EVAN P. NEUNER

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

COMES NOW Evan P. Neuner and on his oath states that he is of sound mind and lawful age; that he contributed to the foregoing *Staff Report*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

Evan P. Neuner

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 6th day of December 2024.

Dianna L. Vaught
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 City Utilities of Springfield, Missouri Concerning a Natural Gas Pipeline Incident in the Vicinity of South Charleston Avenue and East Republic Road in Springfield, Missouri	)))))	Case No. GS-2024-0024

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 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 6th day of December 2024.

Dianna L. Vaught

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

APPENDIX A – FACTS

** Denotes Confidential Information **

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STAFF'S INVESTIGATION REPORT

APPENDIX A

City Utilities of Springfield
Case No. GS-2024-0024

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STAFF'S GAS INCIDENT REPORT

CITY UTILITIES OF SPRINGFIELD
CASE NO. GS-2024-0024

I. EXECUTIVE SUMMARY

City Utilities of Springfield ("CU") is the natural gas distribution operator for the City of Springfield, MO. On July 17, 2023, CU personnel were preparing a segment of a CU natural gas feeder line[1] in the vicinity of South Charleston Avenue and East Republic Road for inspection. The feeder line has South, West and North pipeline segments ("legs"), that are joined in a valve pit with a cross fitting. Prior to July 17, 2023, natural gas had been purged from the South leg of the feeder line. The North and West legs still contained natural gas at an estimated pressure of 134 pounds per square inch gauge ("psig"). By 11:20 am on July 17, 2023, CU personnel had closed valves within the valve pit to the North and West legs (still containing gas), and had removed the cross fitting that connected the South, West and North legs. At 11:20 am, the CU personnel observed signs of a large volume gas release within the valve pit. CU personnel first notified 9-1-1 at 11:21 am of the blowing gas. At approximately 11:25 am, the gas ignited and burned until approximately 12:39 pm. The fire caused damages to CU electrical facilities in the vicinity and nearby residences. Emergency responders evacuated residents in the vicinity due to the potential of falling powerlines.

[1] 20 CSR 4240-40.030(1)(B)19. defines feeder line as a distribution line that has a maximum allowable operating pressure (MAOP) greater than 100 psi gauge that produces hoop stresses less than twenty percent (20%) of specified minimum yield strength (SMYS).

There were no injuries or fatalities as a result of this incident. The estimated cost of property damages was $350,000 with a total incident cost including emergency response and cost of gas released of $368,301.[2]

Several of the valves that CU attempted to close to isolate the flow of gas to the incident location were found to be inoperable. In total, it took approximately one hour and 19 minutes after the time of initial gas release until the gas flow to the North Leg of the feeder line was isolated at approximately 12:39 pm.

CU's initial investigation of this incident determined that the gas was released when the pipe separated at a Dresser[3] mechanical fitting that was installed on the North Leg of the feeder line upstream of the closed valve. CU hired ** [redacted] ** ("Consultant") to perform a root cause analysis of the incident and the Consultant determined that ** [redacted] **

CU's Distribution Integrity Management Program (DIMP) Plan that was in effect at the time of the incident had most recently been updated by CU on July 1, 2020. DIMP requires operators to identity threats to their pipeline systems, evaluate and rank risks, and identify and implement measures to reduce risks. Staff performed an inspection of the July 1, 2020 DIMP program plan with CU on December 6-8, 2021. CU's July 1, 2020 plan identified ** [redacted]

[2] CU's Form PHMSA F 7100.1 Supplemental, Final Incident Report form submitted 10/02/2024.
[3] Dresser refers to a fitting manufactured by Dresser Utility Solutions. See Figure 3 of Appendix B of this report for schematic showing installation location.

[redacted] ** Staff provided its inspection findings to CU in a letter dated January 6, 2022, including a finding that ** [redacted] **

II. PURPOSE AND SCOPE OF STAFF'S INVESTIGATION

*** Section intentionally blank – no facts to verify ***

III. STAFF ANALYSIS OF INCIDENT

A. Incident Description and Emergency Response

On July 17, 2023, CU personnel were preparing CU's gas facilities in the vicinity of South Charleston Avenue and East Republic Road for inspection. The location is shown on Figures 1 and 2 in *Appendix B – Figures* of this report. The work was being performed on a flanged cross fitting connecting sections of 12-inch diameter steel gas pipelines to the North, West, and South in an exposed valve cluster pit. Figure 3 in Appendix B is a schematic drawing of the valve and pipe configuration at this location, and Figure 4 is a photograph of the valve cluster taken prior to the incident. The operating pressure of natural gas in the north and west legs of the pipeline at this location was estimated to be 134 pounds per square inch gauge ("psig) immediately before the incident.

CU was preparing to perform a camera inspection of the South leg of the pipeline, and potentially perform cleaning by pigging of the pipeline if the results of the camera inspection indicated that cleaning was needed. In anticipation of this, CU had closed the valve to the South Leg of the pipeline and purged it of natural gas.[4]

[4] CU's response to Staff Data Request 0001.

CU employees were performing work on the pipeline facilities within the valve cluster pit on the morning of July 17, 2023[5] to complete the following activities:

- Between 9:00 am and 10:00 am, CU Natural Gas Operations personnel closed the valves within the valve cluster pit to isolate the flow of gas from the North and West Legs of the pipeline to the cross fitting connecting these legs.[6]
- Between 11:00 am and 11:20 am, CU natural gas construction crew removed the flanged cross fitting and placed it outside of the valve cluster pit in order to gain internal access to the South leg of the pipeline.[7] The nuts and bolts connecting the North, South and West legs to the cross fitting were removed, and the cross fitting was lifted from the pit by nylon hoisting straps attached to a backhoe.[8] The valve cluster pit was subsequently vacated by all CU personnel.[9]

At approximately 11:20 am, the CU natural gas construction crew reported hearing a loud pop and hissing sound from inside the pit, and observed debris blowing out of the valve pit and causing overhead powerlines to whip back and forth. All CU personnel evacuated the immediate vicinity. At this time CU personnel did not know what failed, or from which leg of the pipeline gas was blowing.[10]

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[5] CU's *Attachment DR03-B*, provided in response to Staff Data Request 0003 stated that two employees ** [redacted] ** closed the valves to isolate the North and West legs of the pipeline, and four employees ** [redacted] ** removed the cross fitting and South valve.

[6] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[7] CU's response to Staff Data Request 0001.
[8] CU's response to Staff Data Request 0001.1
[9] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[10] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.

At 11:21 am, CU personnel called 911 to report blowing gas in the area of Nottingham and Charleston requesting Springfield Fire Department (SFD) assistance.[11]

At approximately 11:23 am, CU control room personnel determined that the dropping pressure at the ** [redacted] ** regulator station was an indication of the North leg blowing gas.[12]

At approximately 11:25 am, the blowing gas at the site of the incident was ignited from an unknown source. The ignition created a fire ball that extended above the overhead powerlines. CU equipment, including a backhoe and welding truck, began to burn. The overhead powerline structures also began to burn and fail causing the lines to drop to the ground. [13]

At 11:26 am, CU personnel called 911 to report the ignition and requested additional support from SFD to set up a safety perimeter.[14]

The first SFD truck arrived on scene at 11:27 am. Additional trucks arrived between 11:27 am and 12:07 pm.[15]

Springfield Police Department ("SPD") personnel began arriving at approximately 11:40 am and began evacuating homes on both sides of Charleston Avenue from the incident site to East Republic Road due to the potential of falling powerlines. The initial evacuations were completed by 12:10 pm.

Between 11:37 am and 11:55 am, CU Natural Gas Operations personnel closed a valve at the intersection of ** [redacted] **to isolate gas flow to

[11] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[12] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[13] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[14] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[15] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010, and *Attachment DR11-A*, provided in response to Staff Data Request 0011.

the West leg of the pipeline, and the inlet valve to the Regulator Station at ** [redacted] ** to prevent gas from back-feeding into the West natural gas feed leg. CU attempted to close a valve at ** [redacted] ** to isolate the North natural gas feeder leg. However, during that attempt, CU turned the nut until it spun free, indicating the valve broke.[16]

At 11:42 am, the SPD began establishing a perimeter around the incident site. The perimeter was established to the South at Nottingham Street and Charleston Avenue. To the North at East Republic Road and Charleston Avenue. To the West at Briar Street and Charleston Avenue. And to the East at Bothwell Avenue and Carleton Street.[17]

Between 11:57 am and 12:12 am, CU personnel attempted to close a valve at ** [redacted] ** to isolate flow of gas to the North leg of the pipeline. The valve was inoperable.[18]

At 12:11 pm, CU personnel notified the Missouri Public Service Commission Pipeline Safety Program Manager of the incident.[19]

Between 12:15 pm and 12:34 pm, CU personnel closed the inlet valve at four regulator stations to isolate the North leg of the pipeline. [20]

By 12:32 pm, the fire was contained within the pit.[21]

Between 12:32 pm and 12:42 pm, CU Natural Gas Operations personnel closed natural gas valves along ** [redacted] **, to provide secondary isolation of gas to the West leg of the pipeline.[22]

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[16] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[17] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[18] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[19] Missouri PSC Safety Engineering Staff *Gas Incident Notification* record.
[20] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[21] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[22] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.

The CU personnel who were on scene when the incident occurred were transported to Cox Occupational Medicine for medical assessment and drug testing.[23]

At approximately 12:39 pm, the fire at the valve cluster pit was extinguished. SFD continued to spray water on the surrounding houses and at the incident site.[24]

Between 1:00 pm and 4:45 pm, CU personnel opened gauge taps and other access points to confirm natural gas was shut off to both the North and West legs of the pipeline before SFD and SPD departed the scene.[25]

At 1:25 pm, CU Natural Gas Code Compliance Engineer reported the incident to the national response center (NRC).[26]

At 4:45 pm, SPD and SFD departed from the scene.[27]

Table 1 presents a summary of the timeline of events that occurred on the day of the incident.

TABLE 1: SUMMARY OF EVENTS

Time	Activity
9:00-10:00 AM	CU personnel closed valves to North and West legs of pipeline.
11:00-11:20 AM	CU personnel removed the cross fitting and vacated the valve pit
11:20 AM	CU personnel heard loud pop and observed debris blown by natural gas escaping the pipeline.
11:21 AM	CU personnel call 911 to report blowing gas.
11:23 AM	CU gas controller identifies North leg of the pipeline as likely source of blowing gas.
11:25 AM	Blowing gas is ignited from an unknown source.

[23] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[24] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[25] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[26] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.
[27] CU's *Attachment DR10 (First Amended 12-26-23)*, provided in response to Staff Data Request 0010.

TABLE 1: SUMMARY OF EVENTS	
Time	**Activity**
11:26 AM	CU personnel call 911 to report ignition and request additional SPD and SFD support.
11:27 AM	First SFD truck arrives on scene.
11:32 AM	CU Manager-Natural Gas Operations notified CU Director-Natural Gas & Water Operations of incident
11:37 AM	CU confirms electric outage of downed powerlines.
11:40 AM	SPD begin evacuating homes.
11:37-11:55 AM	CU personnel begin closing valves to isolate the flow of gas.
11:42 AM	SPD begins to establish perimeter around incident site.
11:57 AM-12:34 PM	CU personnel continue closing valves to isolate the flow of gas.
12:32 PM	The fire is contained within the valve cluster pit.
12:32-12:42 PM	CU personnel close additional valves to provide a secondary shut-down of the west natural gas feeder leg
12:33 PM	CU employees transported to Cox Occupational Medicine for medical assessment and drug testing.

Staff met with CU personnel at the incident location on July 19, 2023, following the restoration of the damaged electric utilities in the vicinity. CU had identified the source of the gas leak as a Dresser fitting located on the North leg of the feeder line upstream of the north valve (See Figure 6 of Appendix B of this report).

1. *CU's Actions to Comply with 20 CSR 4240-40.030(12)(J):*

CU Provided a copy of its applicable emergency procedure, *Procedures for Natural Gas Emergencies, 2022*.

CU's actions to comply with Commission's requirements in 20 CSR 4240-40.030(12)(J) and as set forth in its *Procedures for Natural Gas Emergencies, 2022* were as follows:

A. CU personnel were on scene when the initial and secondary events took place. Personnel reacted immediately to assess the scene, coordinate with emergency responders, contact appropriate CU natural gas management, and begin making the area safe;

B. The written accounts from CU, Springfield Police Department[28] and Springfield Fire Department[29] indicate that throughout the events following this incident that CU maintained adequate communications with appropriate responders and public officials;

C. CU shut off gas to nearby buildings and contacted 911 within minutes of the initial release of gas[30], and again following gas ignition[31] ;

D. CU made appropriate personnel, equipment and tools available to respond to the emergency;

E. In coordination with the emergency responders, CU took appropriate actions to protect people first, then property;

F. CU closed valves to isolate the section of pipe affected by the incident;

G. In coordination with the emergency responders, CU took appropriate steps to make safe any actual or potential hazard to life or property;

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[28] CU's response to Staff Data Request 0011, attachment 11-B.
[29] CU's response to Staff Data Request 0011, attachment 11-A.
[30] CU's response to Staff Data request 0010 stated that the initial notification to 911 occurred at 11:21 am, approximately one minute after CU became aware of the gas release.
[31] CU's response to Staff Data request 0010 stated that the notification to 911 of ignition occurred at 11:26 am, approximately one minute after CU became aware of the gas ignition.

H. CU assisted in making the area safe by contacting 911, and closing valves to isolate the affected section of pipe;

I. Four gas customers lost service as a result of this incident. Three customers had their service restored on July 18, 2023. The fourth was restored on July 20, 2023. The delay in service restoration to the last customer was due to scheduling conflicts[32].

J. Between the date of the incident and December 26, 2023, it is Staff's understanding that CU was in the process of retaining a consultant to perform a root cause analysis.[33] On March 1, 2024, CU stated that it was in the beginning stages of working with its consultant.[34] CU provided a report with the results of its failure investigation on September 27, 2024[35].

K. CU's control room aided during the emergency response by monitoring pressure where possible in the system. Base 1 controller stated dropping pressure at the ** [redacted] ** regulator station was indication of the North leg blowing gas.[36]

[32] CU's response to Staff Data Request 0023.
[33] CU's responses to Staff Data Requests 0014, 0014.1 and 0014.2.
[34] CU's response to Staff Data Request 0014.5.
[35] CU Corrected Attachment DR14.10 provided in response to Staff Data Request 0014.10.
[36] CU's response to Staff Data Request 0010.

B. Incident Reporting Requirements

1. *CU's Actions to Comply with 20 CSR 4240-40.020(2)(C), (3), (4), and (6)*

CU confirmed discovery that the incident met the reporting requirements of 20 CSR 4240-40.020(2)(C) and (4)(A) at approximately 1:05 pm on July 17, 2023.[37] The incident reporting requirements in 20 CSR 4240-40.020(3), (4), and (6) were completed as follows:

1. CU made the initial telephone notification of a natural gas incident to a designated Commission personnel at approximately 12:11 pm[38] on July 17, 2023.[39]

2. CU notified the NRC of a natural gas incident at approximately 1:25 pm on July 17, 2023 (NRC Report Number 1373341).[40]

3. CU provided 48-hour confirmation of the incident to the NRC at approximately 9:21 am on July 19, 2023 (NRC Report Number 1373504).[41]

4. CU completed and submitted USDOT-PHMSA form PHMSA F 7100.1, titled "Incident Report – Gas Distribution System," to Staff and PHMSA on August 15, 2023.[42]

C. Drug and Alcohol Testing

1. *CU's Actions to Comply with 20 CSR 4240-40.080:*

CU reported to Staff that, the following employees were on site at the time of the incident:

[37] City Utilities of Springfield response to Staff Data Request 0019.
[38] City Utilities of Springfield response to Staff Data Request 0010.
[39] 20 CSR 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.).
[40] City Utilities of Springfield response to Staff Data Request 0010.
[41] City Utilities of Springfield response to Staff Data Request 0010.
[42] Information provided by City Utilities of Springfield's August 15, 2023 e-mail to Commission Staff.

Employee	Task Assigned on July 17, 2023	Time of Drug and Alcohol Specimen Collection
Employee 1 ** [redacted] **	Helped remove cross fitting and South valve	3:00 pm
Employee 2** [redacted] **	Shut valves on North and West legs of pipeline	6:46 pm
Employee 3 ** [redacted] **	Helped remove cross fitting and South valve	2:00 pm
Employee 4 ** [redacted] **	Shut valves on North and West legs of pipeline	6:33 pm
Employee 5 ** [redacted] **	Helped remove cross fitting and South valve	2:39 pm
Employee 6 ** [redacted] **	Helped remove cross fitting and South valve	1:49 pm
Employee 7 ** [redacted] **	Crew Supervisor	3:36 pm

Each of the above listed CU employees had specimens collected for drug and alcohol testing at Cox Health Care. ** [redacted] ** CU provided copies of the post-accident testing along with the pre-employee testing to Staff.

CU stated that the reason test specimens were not collected within the first two hours of confirmed discovery of the incident was that priority following the incident for employees onsite was to notify proper emergency response personnel, secure the scene and minimize the risk of personal injury property or further damage. Gas flow was controlled, extinguishing the fire at approximately 12:40 pm. Once the scene was secure, the CU Safety Specialist onsite evaluated the employees and transported Employee 3 and Employee 6 to Cox North for medical evaluation and to collect specimens for post-incident drug and alcohol testing following the medical evaluation. The CU Safety Specialist then returned to the scene and transported Employee 1 and Employee 5 to Cox North. CU stated that congestion and Emergency Response activities at the scene increased travel time to Cox North, resulting in

an estimated travel time of 35-40 minutes. Medical evaluation was priority followed by testing. The last alcohol test was conducted at 6:46 pm. At approximately 2:30 pm the cause of the incident was still unknown. Further review of the incident, employees involved, and their duties identified three additional employees whose actions could not be completely discounted as a contributing factor to the incident and therefore were also required to submit specimens for post-accident drug and alcohol testing. The onsite supervisor (Employee 7) was sent to Cox North for specimen collection and testing at 3:36 pm.

During its response to the incident, CU encountered multiple problems with valve operation (See *Section III.E – Valve Maintenance* of this report). As a result, two of the employees (Employee 2 and Employee 4) to be sent for specimen collection and testing were still attempting to operate valves to isolate the flow of gas to the incident location. The alcohol tests for these individuals were conducted at 6:46 pm. CU provided copies of the post-accident testing along with the pre-employee testing to Staff. The results of ** [redacted] **

D. Prevention of Accidental Ignition

1. CU's Actions to Comply with 20 CSR 4240-40.030(13)(X):

CU provided a copy of its applicable Operation and Maintenance Plan, *Natural Gas Operations and Maintenance Manual* dated March 7, 2022.[43]

CU stated that its actions to comply with Commission's requirements in 20 CSR 4240-40.030(13)(X) were as follows:

[43] City Utilities of Springfield response to Staff Data Request 0022.2.

1. The portion of the line being accessed (the South leg) had been purged of gas and the valves of the North and West legs had been closed. For this reason, the release of gas was not anticipated; however, routine safety measures were followed as fire extinguishers were on the work crew's trucks and the crew wore personal protective equipment, including hard hats, steel toe shoes and fire-resistant clothing.[44]

2. No welding or cutting was performed on the line. Nylon hoisting straps, attached to a backhoe bucket, were secured to the cross fitting and south valve. A socket and wrench were used to remove the nuts from the bolts connecting the fittings. Once free, the fittings were lifted out of the hole by the backhoe.[45]

3. No gas venting was anticipated. The North and West valves were closed and blind flanges were planned to be installed on these valves after removing the cross fitting and South facing valve.[46]

Prior to removal of the cross-tee fitting by the CU construction crew during the morning of July 17, 2023, the valve to the South Leg of the feeder line (see Figure 4 in Appendix B) was closed and the South Leg of the feeder line was purged of natural gas. The valves for the North Leg and West Leg of the feeder line were also closed, but no purging process was performed for either the North Leg or West Leg of the feeder line. Since both the North Leg and the West Leg of the feeder line contained pressurized natural gas, the CU construction crew was relying on the closed valves within the valve cluster pit to provide isolation while the cross-tee fitting was removed. No line stopping equipment or purging process was utilized by CU for either

[44] City Utilities of Springfield response to Staff Data Request 0002.
[45] City Utilities of Springfield response to Staff Data Request 0001.1.
[46] City Utilities of Springfield response to Staff Data Request 0002.

the North Leg or West Leg of the feeder line during the removal process of the cross-tee fitting.

E. Valve Maintenance

1. CU's Actions to Comply with 20 CSR 4240-40.030(13)(V):

CU provided a copy of its' *Natural Gas Operations and Maintenance Manual* ("O&M Manual")[47] dated March 7, 2022, that was in effect on July 17, 2023 at the time of the incident. Chapter 15 - Natural Gas Valve Inspection and Maintenance, Section 3. DISTRIBUTION DOT VALVES (EXCEPT FOR SERVICE LINE VALVES) contains the CU's procedures for determining DOT valves and for performing inspections of valves that include the following:

a) Feeder line and distribution line valves necessary for safe operation shall be inspected at least once each calendar year, not to exceed 15 months. Distribution line valves which are metal must be partially operated during alternating calendar years.

b) Valves meeting any of the following criteria shall be deemed to be necessary for the safe operation of the distribution system, and thus considered DOT valves, and shall be subject to the requirements of these guidelines:

   i. Control of a district regulator station, preferably from a remote location;

   ii. Zones of isolation which require more than eight hours to relight.

Additionally, CU's O&M Manual, Chapter 15 - Natural Gas Valve Inspection and Maintenance, Section 5. GUIDELINES, parts a. through c. include the following:

a. Each DOT valve shall be checked for accessibility and inspected at least once each calendar year, but at intervals not exceeding 15 months.

[47] CU's response to Staff Data Request 0022, including Amended Attachment DR 22.0-A.

b. Each DOT valve shall be partially operated at least once every year to ensure that it is operable. Extreme care shall be exercised when partially operating a plug valve.

c. If any DOT valve is found to be inoperable, prompt remedial action will be taken to return the valve to service or an alternative valve will be designated as a DOT valve.

CU considers a DOT valve to be a valve that is deemed necessary for the safe operation of the distribution system and is required for compliance with the requirements of 20 CSR 4240-40.030(13)(V). CU performs routine inspection and maintenance of its DOT valves on an annual basis (once each calendar year not to exceed 15 months)[48]. CU has additional valves it refers to as non-DOT valves. CU does not perform routine inspection or maintenance of its non-DOT valves on a set time schedule. CU utilizes the same inspection procedures as required by CU's O&M Manual, Chapter 15 - Natural Gas Valve Inspection and Maintenance, Section 5. GUIDELINES but the inspection frequency is not the same.[49]

CU provided its list of the DOT valves that were installed on both the North and West legs of the 12-inch diameter steel feeder line near the vicinity of ** [redacted] ** that would control the flow of gas to the area where the incident occurred on July 17, 2023. Confidential Figure 5 of Appendix B shows the approximate locations of these valves.[50] For the North leg of the feeder line, CU's DOT valves consist of ** [redacted]

[48] Some Missouri natural gas operators refer to these types of valves as essential, or emergency valves.
[49] Information provided by City Utilities of Springfield's response to Staff Data Request 0009.1 and Attachment DR09.1-A.
[50] Information provided by City Utilities of Springfield's response to Staff Data Request 0016 and Attachment DR16-A1 and Attachment DR16-A2.

[redacted] **. CU's DOT valves for the West leg of the feeder line include ** [redacted] **.[51]

Table 2 provides the dates when CU completed its' valve inspection and maintenance.

Table 2 – CU DOT Valve Inspection Dates[52]				
Valve ID NO.	**Location Description**	**Date Inspection Completed**	**Active**	**Valve Operated and Left Open**
** [redacted] **	** [redacted] **	09/08/23	Yes	Yes
		06/14/22	Yes	Yes
		09/29/21	Yes	Yes
		08/25/20	Yes	Yes
		08/05/19	Yes	Yes
** [redacted] **	** [redacted] **	09/08/23	Yes	Yes
		06/14/22	Yes	Yes
		09/29/21	Yes	Yes
		08/25/20	Yes	Yes
		08/05/19	Yes	Yes
** [redacted] **	** [redacted] ** [53]	07/28/23	Yes	Yes
		06/08/22	Yes	Yes
		07/26/21	Yes	Yes
		07/07/20	Yes	Yes
		06/26/19	Yes	Yes
** [redacted] **	** [redacted] **	09/08/23	Yes	Yes
		06/13/22	Yes	Yes
		10/21/21	Yes	Yes
		08/25/20	Yes	Yes
		08/05/19	Yes	Yes
** [redacted] **	** [redacted] **	07/27/23	Yes	Yes
		06/23/22	Yes	Yes
		06/29/21	Yes	Yes
		06/23/20	Yes	Yes
		06/18/19	Yes	Yes

[51] Information provided by City Utilities of Springfield's response to Staff Data Request 009.3, part 2.
[52] Information for Table 2 was obtained from City Utilities of Springfield's November 3, 2023 response to Staff Data Request 0017.0 which included Attachment DR17-A (CONFIDENTIAL).
[53] ** [redacted] **

Table 2 – CU DOT Valve Inspection Dates[52]				
Valve ID NO.	**Location Description**	**Date Inspection Completed**	**Active**	**Valve Operated and Left Open**
** [redacted] **	** [redacted] **	09/18/23	Yes	Yes
		06/21/22	Yes	Yes
		05/24/21	Yes	Yes
		06/01/20	Yes	Yes
		05/15/19	Yes	Yes
** [redacted] **	** [redacted] **	03/03/23	Yes	Yes
		03/09/22	Yes	Yes
		08/02/21	Yes	Yes
		07/27/20	Yes	Yes
		07/08/19	Yes	Yes

With respect to valve maintenance, CU stated that "Inspection of these valves found no issues and therefore no work orders were generated."[54]

2. <u>CU Valve Operation in Response to the July 17, 2023 Incident:</u>

In response to the July 17, 2023 incident, CU attempted to operate several DOT and non-DOT valves to isolate the flow of natural gas to the incident area. Table 3 presents a chronological description of the outcome of these attempts.

Table 3 – CU Valve Operation During Incident Response[55]			
Time Period	**DOT Valve ?**	**Valve Description**	**Valve Function During Incident**
11:37-11:41 AM	No	Non-DOT feeder line valve** [redacted] ** located ** [redacted] ** This	In conjunction with the closing of DOT valve ** [redacted] **, this isolated gas flow to the west leg of the feeder line.

[54] City Utilities of Springfield's response to Staff Data Request 0017, part b).
[55] Information for Table 3 was obtained from City Utilities of Springfield's responses to Staff Data Requests 0010.0, and 0010.1 which included the following attachments: Attachment DR10; Attachment DR10 (First Amended 12-26-23); Attachment DR0010.1-A1; Attachment DR0010.1-A2; Attachment DR0010.1-B, and Attachment DR0010.1-C, as well as, CU's response to confidential Staff Data Request 0017.1.

Table 3 – CU Valve Operation During Incident Response[55]			
Time Period	**DOT Valve ?**	**Valve Description**	**Valve Function During Incident**
		valve most recently previously inspected as a non-DOT valve by CU on 6/11/19.	
11:37-11:41 AM	Yes	DOT Valve ** [redacted] ** located ** [redacted] ** The purpose of this regulator station is to reduce the pressure of gas from the feeder line prior to introducing the gas to a lower pressure system.	This DOT valve was closed to prevent the flow of gas from the lower pressure system back into the west leg of the feeder line.
11:38-11:55 AM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted] ** Most recently previously inspected as a non-DOT valve by CU on 3/21/19.	CU attempted but was not able to close this valve to isolate the north leg of the feeder line. CU turned the nut until it spun free, indicating the valve broke.
11:57-12:12 PM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted] ** CU did not have previous records of inspections of this non-DOT valve.	CU attempted but was not able to close this valve to isolate the flow of gas to the north leg of the feeder line. CU informed staff that following the incident Valve ** [redacted] ** was later removed by CU and replaced with a new valve in the same area[56].
11:57-12:12 PM	Yes	DOT Valve ** [redacted] ** located ** [redacted] ** The purpose of this regulator station is to reduce the pressure of gas from the feeder line prior to introducing the gas to a lower pressure system.	This DOT valve was closed to prevent the flow of gas from the lower pressure distribution system back into the north leg of the feeder line.
12:06-12:15 PM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted] ** Most recently previously inspected as a non-DOT valve by CU on 3/13/18.	CU attempted but was unable to close this valve to isolate the north leg of the feeder line. CU was unable to get the valve key on the valve nut. Valve ** [redacted] ** was made operational by CU after the incident[57].
12:15-12:19 PM	Yes	DOT Valve ** [redacted] ** inlet valve to Regulator Station #193 ** [redacted] ** The purpose of this regulator station is to reduce the pressure of gas from the feeder	This DOT valve was closed to prevent the flow of gas from the lower pressure distribution system back into the north leg of the feeder line.

[56] City Utilities of Springfield's response to Staff Data Request 0010, part b) and 0010.1, part d).
[57] City Utilities of Springfield's response to Staff Data Request 0010.1, part c).

Table 3 – CU Valve Operation During Incident Response[55]			
Time Period	**DOT Valve ?**	**Valve Description**	**Valve Function During Incident**
		line prior to introducing the gas to a lower pressure system.	
12:21-12:34 PM	Yes	DOT feeder line valve ** [redacted] ** located ** [redacted] **	In conjunction with the Non-DOT valve ** [redacted] ** below, CU successfully closed this valve to isolate the North Leg of the feeder line.
12:21-12:34 PM	No	Non-DOT feeder line valve ** [redacted] ** located ** [redacted] ** CU had no records of previous valve inspections or maintenance for this valve.	In conjunction with the DOT valve ** [redacted] ** above, CU successfully closed this valve to isolate the North Leg of the feeder line.
12:21-12:34 PM	Yes	DOT Valve ** [redacted] **, inlet valve to Regulator Station #139 at ** [redacted] **. The purpose of this regulator station is to reduce the pressure of gas from the feeder line prior to introducing the gas to a lower pressure system.	This DOT valve and the un-numbered above ground non-DOT valves listed below were closed to prevent gas from flowing from the lower pressure system back into the North Leg of the feeder line.
12:21-12:34 PM	No	Two non-DOT valves on the old Lowe's regulator station piping.[58] CU had no records of previous valve inspections or maintenance for these non-DOT valves.[59]	These two non-DOT valves were both inlet isolation valves that were closed to prevent gas from flowing from the lower pressure system back into the North Leg of the feeder line.
12:32-12:42 PM	No	Non-DOT feeder line valve ** [redacted] ** located along ** [redacted] **.	This valve was closed to provide a secondary isolation of gas flow to the West Leg of the feeder line.

CU estimated that gas flow from the West Leg of the feeder line on July 17, 2023 was isolated between approximately 11:41 am (when DOT valve ** [redacted] ** was closed to prevent

[58] In response to Staff Data Request 0032, part c), CU explained that the "old Lowe's regulator station" was a two-run, above-grade regulator station reducing pressure on one section of City Utilities' feeder system to another. Each run had inlet and outlet isolation valves that were non-DOT valves and had no valve designation. Due to changes in operating conditions on the feeder system in the early 2010's, the regulator station was decommissioned. The regulators were removed and replaced with straight pipe. The two above-grade runs with their isolation valves remained. The "two valves on the old Lowe's regulator station" that were shut on July 17, 2023 were the two inlet isolation valves.

[59] Information provided by CU in response to Staff Data Request 0032.0, part d).

District Regulator Station #49, located at ** [redacted] ** from back-feeding into the West Leg) and 11:47 am (when non-DOT feeder line valve ** [redacted] ** at ** [redacted] ** was closed to isolate the West Leg from the rest of the feeder line system).[60]

For the North Leg of the feeder line, CU estimated that gas flow from the North Leg of the feeder line on July 17, 2023 was isolated between approximately 12:32 pm (when the fire was contained within the pit after valve closures near the ** [redacted] ** Regulator Station #139) and 12:39 pm (when the residual gas at the incident location stopped burning).[61]

F. Failure Investigation

1. CU's Actions to Comply with 20 CSR 4240-40.030(12)(C) And (12)(L):

CU provided a copy of its procedure to address the requirements of 20 CSR 4240-40.030(12)(L) that was in effect at the time of the incident.[62] This procedure states in part:

> Every accident involving failure of any facility owned and maintained by CU which results in escaping natural gas or which causes the facility to operate in an unsafe manner, in the judgement of the operator, shall be thoroughly investigated. The purpose of the failure investigations is to determine the cause so that procedures, modification of work methods or additional employee training can be put into effect to protect against possible future recurrences.

[60] Information provided by CU in response to Staff Data Request 0033.0, part 2).
[61] Information provided by CU in response to Staff Data Request 0033.0, part 1).
[62] CU response to Staff Data Request 0014, Attachment DR14-A, City Utilities O&M Procedures Manual, Chapter 2, Section 2, and state that the attachment is from the current version of the manual revised in August 2023, but no substantive revisions were made to this section from the prior one.

CU's investigation of this incident determined that the gas was released when a pipe segment separated from a Dresser mechanical fitting installed on the North Leg of the feeder line upstream of the closed valve as shown on Figure 6 in Appendix B of this Report. CU provided a copy of its confidential investigation report.[63] This report identified the root cause of the incident to be ** [redacted] **

In response to a Staff data request asking if CU had identified any actions it could take to minimize the possibility of a recurrence of this incident, CU provided a copy of a memorandum subject line "Steel Natural Gas Line Stopping Procedures – Thrust Restraint"[64] The memo requires use of thrust restraint guidance for design, construction and line stopping.

G. Operator Qualification

1. CU's Actions to Comply with 20 CSR 4240-40.030(12)(D):

CU provided a copy of its qualification program plan that was in effect at the time of the incident: *Springfield Natural Gas Operator Qualification Plan,* dated May 2021.[65]

[63] CU response to Staff Data Request 0014.10, attachment ** [redacted] **

[64] CU response to Staff Data Request 0014, Attachment DR14-G.

[65] CU response to Staff Data Request 0029.

CU provided to Staff a listing of each of the covered tasks each employee working at the Charleston Avenue site was qualified to perform.[66] CU stated that it conducted an investigation to determine if the performance of any covered task(s) caused or contributed to this incident. No violations were found.

CU provided qualification records for employees working on site at the time of the incident, a copy is included in Appendix D.

In its qualification testing, CU has not identified any questions as being essential to passing.[67] Instead, CU considers an individual achieving an overall 70%[68] of answers correct to be qualified.

H. Distribution Integrity Management Program ("DIMP")[69]

1. CU's Actions to Comply with 20 CSR 4240-40.030(17):

Prior to this incident, Staff most recently conducted an inspection of CU's compliance with the requirements of 20 CSR 4240-40.030(17) on December 6-8, 2021. In this inspection, Staff reviewed the Fifth Revision of CU's DIMP Plan, dated July 1, 2020, as well as CU's records of implementation of its DIMP. CU's July 1, 2020 DIMP Plan identified **

[redacted]

[66] CU response to Staff Data Request 0003.

[67] City Utilities of Springfield response to DR 0003.1.

[68] City Utilities of Springfield Operator Qualification plan dated May 2021.

[69] In its November 6, 2024 letter transmitting comments to Staff and in a subsequent clarification, CU has indicated that ** [redacted] **.

[70] Analysis on page 188 of CU's July 1, 2020 DIMP Plan.

[71] Page 19 of CU's July 1, 2020 DIMP Plan.

[redacted]**

In a January 6, 2022, letter dated to the chair of the CU board, Staff identified ** [redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted] **

As part of its investigation into this incident, Staff requested a copy of CU's DIMP that was effective as of the date of the incident. CU provided a copy of the Fifth Revision of its DIMP Plan, dated July 1, 2020, the same version reviewed by Staff in December 2021, and which ** [redacted] ** Staff notes that although the date of this DIMP Plan is July 1, 2020, the threat evaluation includes data only through 2018.

Staff inquired why CU had not updated its DIMP Plan since Staff provided the findings of its December 2021 inspection on January 6, 2022. CU responded[72]:

> ** [redacted] **

CU's DIMP Plan dated July 1, 2020 states in Section 8.0:

[72] Response to Staff Data Request 0015.3, submitted January 30, 2024.

> City Utilities of Springfield will conduct a complete re-evaluation of this Plan at least every 3 years. Trends in each of the performance measures listed in Chapter 7, MEASURE PERFORMANCE, MONITOR RESULTS AND EVALUATE EFFECTIVENESS will be reviewed during the re-evaluation. If any performance measure indicates that any of the additional action taken is not effective in reducing the risk it is intended to address, City Utilities of Springfield will consider implementing additional actions to address that risk.

In response to a Staff data request inquiring if CU had performed a complete re-evaluation of its DIMP Plan[73], CU responded:

** [redacted] **

Section 11.4.1.f of CU's DIMP Plan discusses the procedure to be implemented for re-evaluation. This includes but is not limited to:

- Revisit each question answered in the SHRIMP[74] program and either confirm or update the

[73] Staff Data Request 0015.1.
[74] CU's DIMP Plan effective at the time of the incident was generated using a program developed by the American Public Gas Association Security and Integrity Foundation (APGA-SIF). The name of the program is Simple, Handy, Risk-based Integrity Management Plan (SHRIMP).

information.

- Review of risk ranking to ensure it is still accurate.
- Review each threat-specific performance measure and compare to the baseline. Particular attention should be given to the threat-specific performance measures that measure the effectiveness of specific actions.

In response to a follow-up data request asking if the PRA had been completed, CU responded on February 25, 2024:

** [redacted] **

The most recent data used in the July 1, 2020 re-evaluation was from 2018.[75] Staff reviewed both historical and more recently report leak data provided by CU in annual reports to PHMSA, [76] from 2010 through 2022 and observed that CU ** [redacted] **[77]

CU Provided a revised DIMP Plan to Staff titled ** [redacted]

[75] ** [redacted] **

[76] 20 CSR 4240-40.020(7)(A) requires providing annual report data to the U.S. Department of Transportation Office of Pipeline Safety.

[77] ** [redacted] **

[redacted] ** to

Staff by email on August 29, 2024.

CU Personnel Assigned to Covered Tasks at Incident Location[78]

At Incident Location (Immediate Vicinity)	
Name and Employer	**Covered Task and When Assigned**
** [redacted] ** City Utilities	Prior to Incident: Shut valves on North and west legs of pipeline Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 3/1/2023
** [redacted] ** City Utilities	Prior to Incident: Shut valves on North and west legs of pipeline Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 1/26/2021
** [redacted] ** City Utilities	Prior to Incident: helped remove cross fitting and South valve Qualification: OQ – 35 Installation of gas main Date of Qualification: 2/25/2022
** [redacted] ** City Utilities	Prior to Incident: helped remove cross fitting and South valve Qualification: OQ – 35 Installation of gas main Date of Qualification: 9/27/2021
** [redacted] ** City Utilities	Prior to Incident: helped remove cross fitting and South valve Qualification: OQ – 35 Installation of gas main Date of Qualification: 2/22/2023
** [redacted] ** City Utilities	Prior to Incident: helped remove cross fitting and South valve Qualification: OQ – 35 Installation of gas main Date of Qualification: 2/2/2021
** [redacted] ** City Utilities	For Emergency Response: welded end caps on the North and West leg of the incident site Qualification: OQ –38 Steel Pipe Welding Date of Qualification: Hands-On Qualification: 3/14/23. Written Exam: 3/8/21
** [redacted] ** City Utilities	For Emergency Response: welded end caps on the North and West leg of the incident site Qualification: OQ –38 Steel Pipe Welding Date of Qualification: Hands-On Qualification: 3/14/23. Written Exam: 1/25/23

[78] Individual Qualification Records and associated Covered Task information were obtained from City Utilities' response to Staff Data Requests 0003.0, 0003.1, 0003.2, and 0003.3 which included Attachment DR03-A; Attachment DR03-B; Attachment DR03-C; Attachment DR03.1-3A; Attachment DR03.1-3B; Attachment DR03.1-3C; Attachment DR03.2-2, and Attachment DR03.1-3A.

Nearby Incident Location	
Name and Employer	**Covered Task and When Assigned**
** [redacted] ** City Utilities	For Emergency Response: checked and shut off gas valves in surrounding area Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 1/19/2021
** [redacted] ** City Utilities	For Emergency Response: checked and shut off gas valves in surrounding area, performed tapping of 2" and siphon/purging operation 280' West of incident site Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 9/13/21 Qualification: OQ– 45 Tapping and Stopping of Steel Pipe Date of Qualification: 1/26/21 Qualification: OQ– 60 Purging Natural Gas Date of Qualification: 9/13/2021
** [redacted] ** City Utilities	For Emergency Response: checked and shut off gas valves in surrounding area, performed tapping of 2" and siphon/purging operation 280' West of incident site Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 1/24/22 Qualification: OQ– 45 Tapping and Stopping of Steel Pipe Date of Qualification: 3/9/23 Qualification: OQ– 60 Purging Natural Gas Date of Qualification: 1/24/2022
** [redacted] ** City Utilities	For Emergency Response: Checked and shut off gas valves in surrounding area, performed tapping of 2" and siphon/purging operation 280' West of incident site Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 1/26/21 Qualification: OQ– 45 Tapping and Stopping of Steel Pipe Date of Qualification: 1/27/21 Qualification: OQ– 60 Purging Natural Gas Date of Qualification: 1/26/2021

Nearby Incident Location	
Name and Employer	**Covered Task and When Assigned**
** [redacted] ** City Utilities	For Emergency Response: welded on a short stop for siphon on the West leg, 280' West of incident site Qualification: OQ –38 Steel Pipe Welding Date of Qualification: Hands-On Qualification: 3/14/23. Written Exam: 3/8/21
** [redacted] ** City Utilities	For Emergency Response: welded on a short stop for siphon on the West leg, 280' West of incident site Qualification: OQ –38 Steel Pipe Welding Date of Qualification: Hands-On Qualification: 3/14/23. Written Exam: 1/25/23

APPENDIX B - Figures

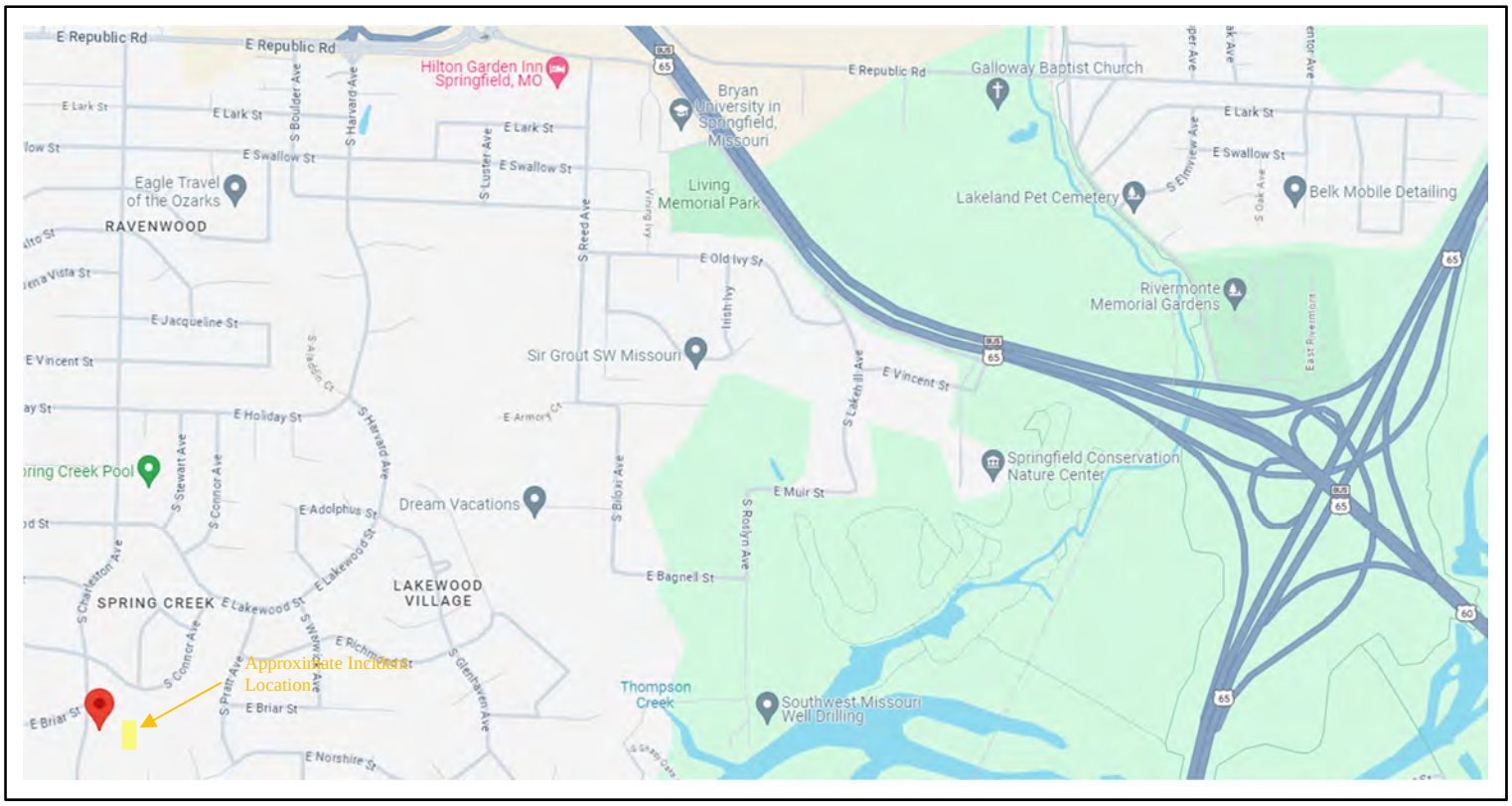

Figure 1: Approximate Location of the July 17, 2023 Natural Gas Incident, Springfield Missouri, Map View
(Source: Google)

Figure 2: Approximate Location of the July 17, 2023 Natural Gas Incident, Springfield Missouri, Satellite View (Source: Google)

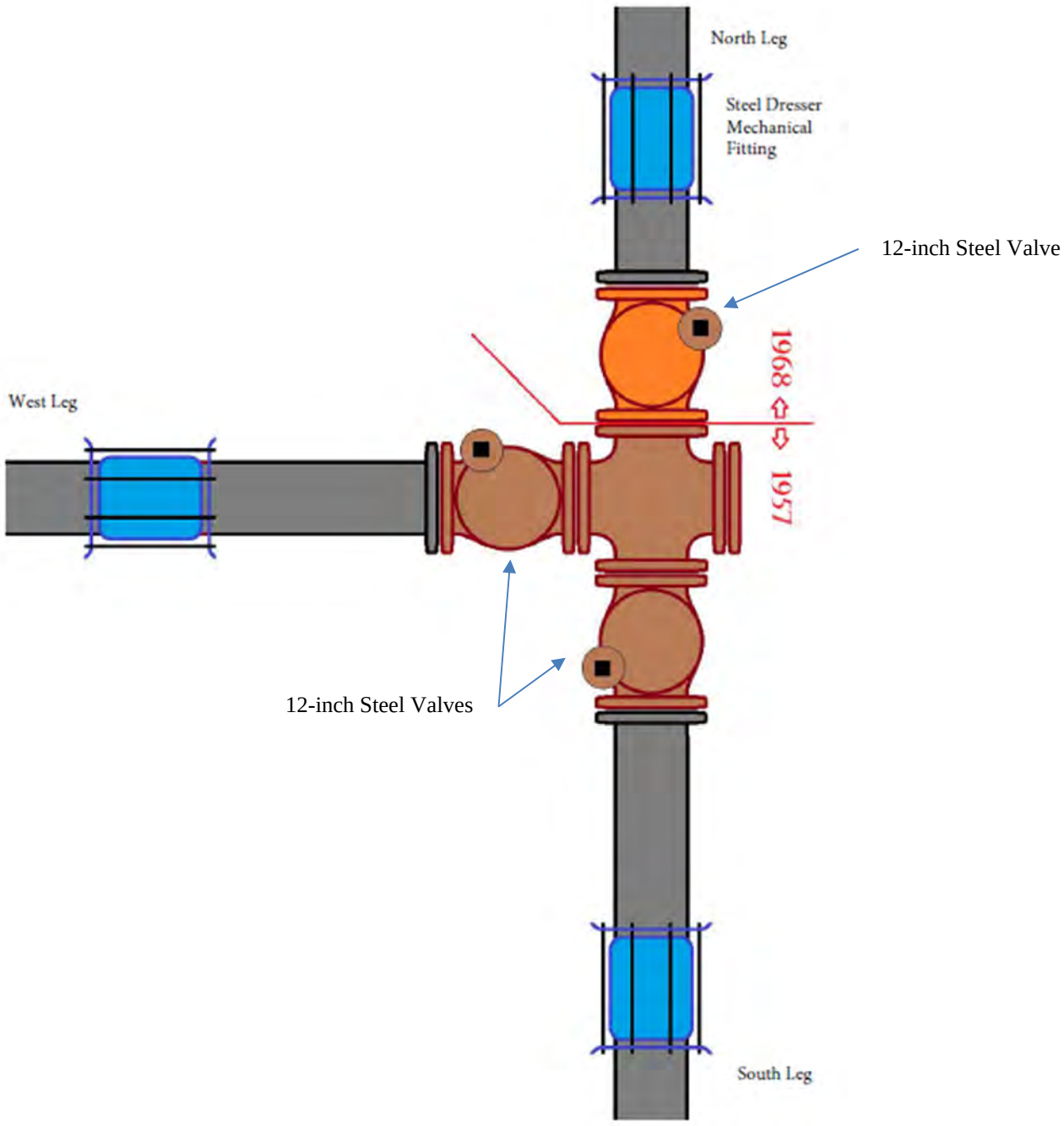

Figure 3: Schematic of Valve Cluster at Location of the July 17, 2023 Natural Gas Incident, Springfield Missouri (Source City Utilities of Springfield)

Figure 4: Photograph of the Valve Cluster Pit that contains the cross-tee fitting. Taken by City Utilities Prior to the July 17, 2023 Natural Gas Incident, Springfield Missouri (Source City Utilities of Springfield in response to Staff Data Request 0006)

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Figure 5: City Utilities of Springfield's Valve Map for their DOT gas valves installed on both the North and West legs of the 12-inch diameter steel feeder line near the vicinity of South Charleston Avenue and East Republic Road. (Source City Utilities of Springfield in response to Staff Data Request 0016, including Attachment DR16-A2(CONFIDENTIAL))

Figure 6: Photograph showing Dresser fitting previously installed on the North Leg of the Feeder line separated from the North Leg piping following the incident (Source: Staff Photograph July 19, 2023).

Case No. GS-2024-0024

APPENDIX C

HAS BEEN DEEMED

CONFIDENTIAL

IN ITS ENTIRETY

Appendix D – Relevant Requirements for 20 CSR 4240-40.030(12)(D)

20 CSR 4240-40.030(12)(D) Qualification of Pipeline Personnel, prescribes the requirements for operator qualification of individuals performing covered tasks on a pipeline facility[1], including any other entity or individual performing covered tasks on behalf of the operator. A "covered task" is defined by 20 CSR 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[2]; and
iv. Affects the operation or integrity of the pipeline[3]."

20 CSR 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[4]."

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

[1] 20 CSR 4240-40.030(1)(B)33 defines 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."
[2] Rule means 20 CSR 4240-40.030 Safety Standards – Transportation of Gas by Pipeline.
[3] 20 CSR 4240-40.030(1)(B)31 defines a "pipeline" as "all parts of those physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenances attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies."
[4] 20 CSR 4240-40.030(12)(D)2.A. defines an "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 a condition exceeding design limits;
(b) Result in a hazard(s) to persons, property, or the environment; or
(c) Require an emergency response."

Program Requirements:

20 CSR 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 CSR 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

(II) Directed and observed by qualified individuals;"

Appendix E – CU Personnel Assigned to Covered Tasks at Incident Location[1]

At Incident Location (Immediate Vicinity)	
Name and Employer	**Covered Task and When Assigned**
** [redacted] ** City Utilities	Prior to Incident: Shut valves on North and west legs of pipeline Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 3/1/2023
** [redacted] ** City Utilities	Prior to Incident: Shut valves on North and west legs of pipeline Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 1/26/2021
** [redacted] ** City Utilities	Prior to Incident: helped remove cross fitting and South valve Qualification: OQ – 35 Installation of gas main Date of Qualification: 2/25/2022
** [redacted] ** City Utilities	Prior to Incident: helped remove cross fitting and South valve Qualification: OQ – 35 Installation of gas main Date of Qualification: 9/27/2021
** [redacted] ** City Utilities	Prior to Incident: helped remove cross fitting and South valve Qualification: OQ – 35 Installation of gas main Date of Qualification: 2/22/2023
** [redacted] ** City Utilities	Prior to Incident: helped remove cross fitting and South valve Qualification: OQ – 35 Installation of gas main Date of Qualification: 2/2/2021
** [redacted] ** City Utilities	For Emergency Response: welded end caps on the North and West leg of the incident site Qualification: OQ –38 Steel Pipe Welding Date of Qualification: Hands-On Qualification: 3/14/23. Written Exam: 3/8/21
** [redacted] ** City Utilities	For Emergency Response: welded end caps on the North and West leg of the incident site Qualification: OQ –38 Steel Pipe Welding Date of Qualification: Hands-On Qualification: 3/14/23. Written Exam: 1/25/23

[1] Individual Qualification Records and associated Covered Task information were obtained from City Utilities' response to Staff Data Requests 0003.0, 0003.1, 0003.2, and 0003.3 which included Attachment DR03-A; Attachment DR03-B; Attachment DR03-C; Attachment DR03.1-3A; Attachment DR03.1-3B; Attachment DR03.1-3C; Attachment DR03.2-2, and Attachment DR03.1-3A.

Nearby Incident Location	
Name and Employer	**Covered Task and When Assigned**
** [redacted] ** City Utilities	For Emergency Response: checked and shut off gas valves in surrounding area Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 1/19/2021
** [redacted] ** City Utilities	For Emergency Response: checked and shut off gas valves in surrounding area, performed tapping of 2" and siphon/purging operation 280' West of incident site Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 9/13/21 Qualification: OQ– 45 Tapping and Stopping of Steel Pipe Date of Qualification: 1/26/21 Qualification: OQ– 60 Purging Natural Gas Date of Qualification: 9/13/2021
** [redacted] ** City Utilities	For Emergency Response: checked and shut off gas valves in surrounding area, performed tapping of 2" and siphon/purging operation 280' West of incident site Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 1/24/22 Qualification: OQ– 45 Tapping and Stopping of Steel Pipe Date of Qualification: 3/9/23 Qualification: OQ– 60 Purging Natural Gas Date of Qualification: 1/24/2022
** [redacted] ** City Utilities	For Emergency Response: Checked and shut off gas valves in surrounding area, performed tapping of 2" and siphon/purging operation 280' West of incident site Qualification: OQ – 55 Inspecting and Maintaining Valves Date of Qualification: 1/26/21 Qualification: OQ– 45 Tapping and Stopping of Steel Pipe Date of Qualification: 1/27/21 Qualification: OQ– 60 Purging Natural Gas Date of Qualification: 1/26/2021

Nearby Incident Location	
Name and Employer	**Covered Task and When Assigned**
** [redacted] ** City Utilities	For Emergency Response: welded on a short stop for siphon on the West leg, 280' West of incident site Qualification: OQ –38 Steel Pipe Welding Date of Qualification: Hands-On Qualification: 3/14/23. Written Exam: 3/8/21
** [redacted] ** City Utilities	For Emergency Response: welded on a short stop for siphon on the West leg, 280' West of incident site Qualification: OQ –38 Steel Pipe Welding Date of Qualification: Hands-On Qualification: 3/14/23. Written Exam: 1/25/23