



U.S. Department  
of Transportation

**Pipeline and Hazardous  
Materials Safety  
Administration**

1200 New Jersey Avenue SE  
Washington, DC 20590

Mr. Mark A. Hewitt  
President and CEO  
Northern Natural Gas Company  
1111 South 103<sup>rd</sup> Street  
Omaha, NE 69124

SEP 01 2016

**Re: CPF No. 4-2016-1010H**

Dear Mr. Hewitt:

Enclosed is a Corrective Action Order issued in the above-referenced case. It requires Northern Natural Gas Company to take certain corrective actions with respect to your 640A natural gas mainline that failed on August 25, 2016, near Ellsworth, Kansas. Service is being made by certified mail and facsimile. Service of the Corrective Action Order by electronic transmission is deemed complete upon transmission and acknowledgement of receipt, or as otherwise provided under 49 C.F.R. § 190.5. The terms and conditions of this Order are effective upon completion of service.

Thank you for your cooperation in this matter.

Sincerely,

Alan K. Mayberry  
Acting Associate Administrator  
for Pipeline Safety

Enclosure

cc: Ms. Linda Daugherty, Acting Deputy Associate Administrator for Field Operations, OPS  
Mr. Rodrick Seeley, Regional Director, Southwest Region, OPS

**VIA CERTIFIED MAIL AND FAX**

**U.S. DEPARTMENT OF TRANSPORTATION  
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION  
OFFICE OF PIPELINE SAFETY  
WASHINGTON, D.C. 20590**

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| <b>In the Matter of</b>                                   | ) |                             |
|   | ) |                             |
| <b>Northern Natural Gas Company,</b>                      | ) | <b>CPF No. 4-2016-1010H</b> |
| <b>a subsidiary of Berkshire Hathaway Energy Company,</b> | ) |                             |
|   | ) |                             |
| <b>Respondent.</b>  | ) |                             |
|   | ) |                             |

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**CORRECTIVE ACTION ORDER**

**Purpose and Background:**

This Corrective Action Order (Order) is being issued, under the authority of 49 U.S.C. § 60112, to require Northern Natural Gas Company (NNG or Respondent), to take the necessary corrective actions to protect the public, property, and the environment from potential hazards associated with the recent failure on NNG’s 640A natural gas mainline.<sup>1</sup>

On August 25, 2016, an incident occurred on the company’s 640A natural gas mainline (640A Pipeline), resulting in the release of an unknown amount of natural gas (Failure). The 640A Pipeline is a 26-inch-diameter transmission pipeline approximately 606.9 miles in length that transports natural gas from Bushton, Kansas, to Palmyra, Kansas, with an east leg that ends at Ogden, Iowa, and a west leg that ends at Sioux City Nebraska.<sup>2</sup> The cause of the Failure has not yet been determined. Pursuant to 49 U.S.C. § 60117, the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), initiated an investigation of the incident. The preliminary findings of the ongoing investigation are as follows.

**Preliminary Findings:**

- The failed pipeline segment is a 26-inch-diameter line that transports natural gas from Bushton, Kansas, to Tescott, Kansas, a distance of approximately 45.6 miles. The Failure occurred near Milepost 30 (MP 30 or Failure Site) near Ellsworth, Kansas.

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<sup>1</sup> NNG, a subsidiary of Berkshire Hathaway Energy Company, owns and operates the largest interstate natural gas pipeline system in the United States, crossing 11 states from the Permian Basin in Texas to Michigan's Upper Peninsula. See <http://www.northernnaturalgas.com/aboutus/Pages/Overview.aspx> (last accessed August 29, 2016).

<sup>2</sup> While the incident occurred in Kansas (PHMSA Central Region), the Southwest Region is responsible for the inspection of this System.

- The incident occurred on the 640A line, which is a coupled, bare steel line. In this area, it is protected by rectifiers, since all the dresser couplings are bonded.
- The Failure occurred in a remote, rural location, with no injuries, fatalities, evacuations, or ignitions reported.
- NNG has five parallel pipelines in the area. The nearest parallel line is approximately 500 feet away and does not appear to be impacted. The adjacent lines are being examined to ensure their continued serviceability and the site investigation of the failed line will continue once the confirmation of the parallel lines' integrity is complete.
- At the Failure Site, two pieces of pipe were found; one was found roughly 10-20 yards east of the Failure Site and a larger piece (about 30 feet in length) was found roughly 100 yards east of the Failure Site.
- The 640A Pipeline was constructed in the 1930's. The Affected Segment is a 26-inch bare steel, dresser-coupled line, constructed of Grades X40, X42 and X52. The integrity of the Affected Segment is unknown.
- The maximum allowable operating pressure (MAOP) of the 640A Pipeline is 520 psig. MAOP was established using a hydrostatic test that was performed in 1963. At the time of the Failure, the actual operating pressure of the pipeline was 476 psig.
- At approximately 1:40 pm CST on August 25, 2016, NNG received notification from the local sheriff's office regarding the release of natural gas from its pipeline.
- At approximately the same time as the notification from the sheriff's office, NNG noticed an indication on its SCADA system and began taking steps to isolate the failed section of pipeline in the area. NNG closed Valve 640ABA04 at MP 26.73 and Valve 640ABA07 at MP 42.45.
- The cause of the Failure is currently unknown and the investigation is ongoing. The pipeline remains shut-in from MP 26.73 (Valve 640ABA04) to MP 42.45 (Valve 640ABA07).
- The Failure Site is approximately 150 yards north of I-70 and approximately 1100 feet from the nearest structure. Interstate 70 and several local roads were closed for a short period of time because of the Failure.
- PHMSA's last Integrated Inspection Unit profile included information regarding three previous incidents on the 640A Pipeline. Contributing factors in those events included corrosion, incorrect operation, stripped threads, and a broken pipe coupling. In addition, a review of previous failures identified a 2004 failure just south of Clifton, Kansas,

involving a girth weld failure (Accident report #20040123) on a 26-inch diameter, 0.280 inch wall thickness, grade X52 pipeline manufactured by AO Smith.

**Determination of Necessity for Corrective Action Order and Right to Hearing:**

Section 60112 of Title 49, United States Code, provides for the issuance of a Corrective Action Order, after reasonable notice and the opportunity for a hearing, requiring corrective action, which may include the suspended or restricted use of a pipeline facility, physical inspection, testing, repair, replacement, or other action, as appropriate. The basis for making the determination that a pipeline facility is or would be hazardous, requiring corrective action, is set forth both in the above-referenced statute and 49 C.F.R. § 190.233, a copy of which is enclosed.

Section 60112 and the regulations promulgated thereunder provide for the issuance of a Corrective Action Order, without prior notice and opportunity for hearing, upon a finding that failure to issue the Order expeditiously would result in the likelihood of serious harm to life, property, or the environment. In such cases, an opportunity for a hearing and expedited review will be provided as soon as practicable after the issuance of the Order.

After evaluating the foregoing preliminary findings of fact, I find that continued operation of the pipeline without corrective measures is or would be hazardous to life, property, or the environment. Additionally, having considered the uncertainties as to the cause of the Failure; the proximity of the pipeline to populated areas and public highways; the age of the 640A Pipeline; the difficulty in obtaining recent/accurate pressure-testing information for these older coupled pipelines; and the history of problems or failures on the 640A Pipeline, I find that a failure to issue this Order expeditiously to require immediate corrective action would result in the likelihood of serious harm to life, property, or the environment.

Accordingly, this Order mandating immediate corrective action is issued without prior notice and opportunity for a hearing. The terms and conditions of this Order are effective upon receipt.

Within 10 days of receipt of this Order, Respondent may contest its issuance obtain expedited review either by answering in writing or requesting a hearing under 49 C.F.R. § 190.211, to be held as soon as practicable under the terms of such regulation, by notifying the Associate Administrator for Pipeline Safety in writing, with a copy to the Director, Southwest Region, PHMSA (Director). If Respondent requests a hearing, it will be held telephonically or in-person in Southwest Region office or Washington, D.C.

**After receiving and analyzing additional data in the course of this investigation, PHMSA may identify other corrective measures that need to be taken.** In that event, PHMSA will notify Respondent of any additional measures that are required and an amended Order issued, if necessary. To the extent consistent with safety, Respondent will be afforded notice and an opportunity for a hearing prior to the imposition of any additional corrective measures.

**Required Corrective Actions:**

The "*Affected Segment*" means approximately 606.9 miles of NNG's 26-inch Line 640A from Bushton, Kansas to Palmyra, Kansas where it splits into two segments, the west leg that travels

to Sioux City, Nebraska and the other east leg travels to Ogden, Iowa. The "*Affected Segment*" generally runs northerly and passes through portions of Kansas, Nebraska and Iowa. According to NNG, approximately 95% of the line is coupled.

The "*Isolated Segment*" means the 15.6-mile segment of NNG's 26-inch Line 640A between MP 26.73 (640ABA04) and MP 42.45 (640ABA07). It is the portion of the "*Affected Segment*" that was shut-in after the Failure on August 25, 2016, by closing main line valves MLV 640ABA04 (upstream of the Failure Site) and MLV 640ABA07 (downstream of the Failure Site).

The "*Director*" means the Director, Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety, Southwest Region. The Director's address is 8701 S. Gessner, Suite 630, Houston, Texas 77074.

Pursuant to 49 U.S.C. § 60112, I hereby order NNG to immediately take the following corrective actions for the Affected Segment and Isolated Segment, if applicable:

**1. Operating and Pressure Restrictions.** The Isolated Segment is to remain shut-in from regular operation.<sup>3</sup> NNG may request approval from the Director to re-start the pipeline, pursuant to Item 2. Pressure within the Affected Segment is not to exceed 80% of the actual operating pressure of 476 psig of the Affected Segment just prior to failure. The 80% pressure reduction will result in an operating pressure of 380 psig. This pressure restriction shall remain in place until written approval, pursuant to Item 7, is obtained from the Director.

**2. Restart Plan.** Prior to resuming operation of the *Isolated Segment*, NNG must develop and submit a written *Restart Plan* to the Director for prior approval.

- a. The Director may approve the *Restart Plan* incrementally without approving the entire plan but the *Isolated Segment* cannot resume operation until the *Restart Plan* is approved in its entirety.
- b. Once approved by the Director, the *Restart Plan* will be incorporated by reference into this Order.
- c. The *Restart Plan* must provide for adequate patrolling of the *Isolated Segment* during the restart process and must include incremental pressure increases during start up, with each increment to be held for at least two hours.
- d. The *Restart Plan* must include sufficient surveillance of the pipeline during each pressure increment to ensure that no leaks are present when operation of the line resumes.
- e. The *Restart Plan* must specify a day-light restart and include advance communications with local emergency response officials.
- f. The *Restart Plan* must provide for a review of the *Affected Segment* for conditions similar to those of the Failure, including a review of construction, operating and maintenance (O&M) and integrity management records such as in-line inspection (ILI) results,

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<sup>3</sup> At the time of this Order, NNG reports that the *Isolated Segment* is shut-in and not in service. In the event that NNG returns the *Isolated Segment* to service before receipt of this Order, NNG must immediately shut-in the *Isolated Segment* and seek approval from the Director before re-starting.

hydrostatic tests, root cause failure analysis of prior failures, aerial and ground patrols, corrosion, cathodic protection, excavations and pipe replacements. Operator must address any findings that require remedial measures to be implemented prior to restart.

- g. The *Restart Plan* must also include documentation of the completion of all mandated actions, and a management of change plan to ensure that all procedural modifications are incorporated into NNG's operations and maintenance procedures manual.

**3. Return to Service.** After the Director approves the *Restart Plan*, NNG may return the *Isolated Segment* to service but the operating pressure must not exceed eighty percent (80%) of the actual operating pressure in effect immediately prior to the Failure (380 psig).

**4. Metallurgical Analysis.** NNG must conduct a detailed metallurgical analysis of the pipe that failed, to determine the cause and contributing factors for the Failure as follows:

- a. Document the chain-of-custody when handling and transporting the failed pipe section and other evidence from the Failure Site;
- b. Within 10 days of receipt of this Order, submit to the Director a proposed selection of the testing laboratory and proposed metallurgical testing protocol for prior approval.
- c. Prior to commencing the mechanical and metallurgical testing, provide the Director with the scheduled date, time, and location of the testing to allow a PHMSA representative to witness the testing; and
- d. Ensure that the testing laboratory distributes all resulting reports in their entirety (including all media), whether draft or final, are provided to the Director at the same time as they are made available to NNG.

**5. Root Cause Failure Analysis.** Within 90 days following receipt of this Order, complete a root cause failure analysis (RCFA) and submit a final report of this RCFA to the Director. The final report must include findings and any lessons learned and whether the findings and any lessons learned are applicable to other locations within NNG's pipeline system.

**6. Remedial Work Plan.** Within 90 days following receipt of this Order, NNG must submit a Remedial Work Plan (RWP) to the Director for approval. The Director may approve the RWP incrementally without approving the entire RWP. Once approved by the Director, the RWP will be incorporated by reference into this Order.

- a. The RWP must specify the tests, inspections, assessments, evaluations, and remedial measures NNG will use to verify the integrity of the *Affected Segment*. It must address all known or suspected factors and causes of the Failure. NNG should consider both the risk of another failure and the consequence of another failure to develop a prioritized schedule for RWP-related work along the *Affected Segment*.
- b. The RWP must include a procedure or process to:
  - i. Identify pipe in the *Affected Segment* with characteristics similar to the contributing

factors identified in the Failure.

- ii. Gather all data necessary to review the failure history (in service and pressure test failures) of the *Affected Segment* and to prepare a written report containing all the available information, such as the locations, dates, and causes of leaks and failures.
  - iii. Integrate the results of the metallurgical testing, root cause failure analysis, and other corrective actions required by this Order with all relevant pre-existing operational and assessment data for the *Affected Segment*. Pre-existing operational data includes, but is not limited to, construction, operations, maintenance, testing, repairs, prior metallurgical analyses, and any third party consultation information. Pre-existing assessment data includes, but is not limited to, ILI tool runs, hydrostatic pressure testing, direct assessments, close interval surveys, and DCVG/ACVG surveys.
  - iv. Determine if conditions similar to those contributing to the Failure are likely to exist elsewhere within the NNG pipeline systems.
  - v. Describe the inspection and repair criteria NNG will use to prioritize, excavate, evaluate, and repair anomalies, imperfections, and other identified integrity threats. Include a description of how any defects will be graded and a schedule for repairs or replacement.
  - vi. Based on the known history and condition of the *Affected Segment*, describe the methods NNG will use to repair, replace, or take other corrective measures to remediate the conditions associated with the Failure and to address other known integrity threats along the *Affected Segment*.
  - vii. Implement continuing long-term periodic testing and integrity verification measures to ensure the ongoing safe operation of the *Affected Segment*, considering the results of the analyses, inspections, evaluations, and corrective measures undertaken pursuant to this Order.
  - viii. Conduct additional field tests, inspections, assessments, and/or evaluations to determine whether, and to what extent, the conditions associated with the Failure and other failures from the failure history or any other integrity threats are present elsewhere on the *Affected Segment*. At a minimum, this process must consider all failure causes and specify the use of one or more of the following:
    1. ILI tools that are technically appropriate for assessing the pipeline system based on the cause of Failure on August 25, 2015 and that can reliably detect and identify anomalies;
    2. Hydrostatic pressure-testing;
    3. Close-interval surveys;
    4. Cathodic protection surveys, to include interference surveys in coordination with other utilities (e.g. underground utilities, overhead power lines, etc.) in the area; and
    5. Other tests, inspections, assessments, and evaluations appropriate for the failure causes.
- c. Include a proposed schedule for completion of the RWP.

- d. NNG must revise the RWP as necessary to incorporate new information obtained during the failure investigation and remedial activities, to incorporate the results of actions undertaken pursuant to this Order, and/or to incorporate modifications required by the Director.
  - i. Submit any plan revisions to the Director for prior approval.
  - ii. The Director may approve plan revisions incrementally.
  - iii. Any and all revisions to the RWP after it has been approved and incorporated by reference into this Order will be fully described and documented in the CAO Documentation Report (CDR).
- e. Implement the RWP as it is approved by the Director, including any revisions to the plan.

**7. Removal of Operating and/or Pressure Restriction.** NNG may request approval from the Director to remove or modify the operating and/or pressure restriction of the *Isolated* and *Affected Segments*, based on demonstrating that the hazard has been abated or that a higher pressure is justified, and based on an analysis showing that the pressure increase is safe, considering all known defects, anomalies and operating parameters of the *Isolated* and *Affected Segments*. The request should include a return to service plan with the final results of all testing and activities conducted pursuant to Items 2 and 3 above. The Director's determination will be based on satisfactory completion of these requirements and evidence that mitigative actions taken by the operator provide for the safe operation of the *Isolated* and *Affected Segments*.

**8. Reporting.** NNG must submit quarterly reports to the Director that: (1) include all available data and results of the testing and evaluations conducted pursuant to this Order; and (2) describe the progress of the repairs or other remedial actions being undertaken. The first quarterly report is due on December 1, 2016. The Director may change the interval for the submission of these reports.

**9. Documentation of Costs.** It is requested, but not required, that NNG maintain documentation of the costs associated with implementation of this Corrective Action Order. Include in each monthly report submitted, the to-date total costs associated with: (1) preparation and revision of procedures, studies and analyses; (2) physical changes to pipeline facilities, including repairs, replacements and other modifications; and (3) environmental remediation, if applicable.

**10. Approvals.** With respect to each submission that under this Order requires the approval of the Director, the Director may: (a) approve, in whole or part, the submission; (b) approve the submission on specified conditions; (c) modify the submission to cure any deficiencies; (d) disapprove in whole or in part, the submission, directing that NNG modify the submission, or (e) any combination of the above. In the event of approval, approval upon conditions, or modification by the Director, NNG shall proceed to take all action required by

the submission as approved or modified by the Director. If the Director disapproves all or any portion of the submission, NNG must correct all deficiencies within the time specified by the Director, and resubmit it for approval.

**11. Extensions of Time.** The Director may grant an extension of time for compliance with any of the terms of this Order upon a written request timely submitted demonstrating good cause for an extension.

The actions required by this Corrective Action Order are in addition to and do not waive any requirements that apply to Respondent's pipeline system under 49 C.F.R. Part 192, under any other order issued to Respondent under authority of 49 U.S.C. § 60101, *et seq.*, or under any other provision of Federal or State law.

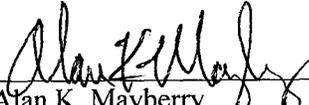
Respondent may appeal any decision of the Director to the Associate Administrator for Pipeline Safety. Decisions of the Associate Administrator shall be final.

Be advised that all material you submit in response to this enforcement action is subject to being made publicly available. If you believe that any portion of your responsive material qualifies for confidential treatment under 5 U.S.C. 552(b), along with the complete original document you must provide a second copy of the document with the portions you believe qualify for confidential treatment redacted and an explanation of why you believe the redacted information qualifies for confidential treatment under 5 U.S.C. 552(b).

Failure to comply with this Order may result in the assessment of civil penalties and in referral to the Attorney General for appropriate relief in United States District Court pursuant to 49 U.S.C. § 60120.

In your correspondence on this matter, please refer to CPF No. 4-2016-1010H and for each document you submit, please provide a copy in electronic format whenever possible.

The terms and conditions of this Corrective Action Order are effective upon receipt.

  
\_\_\_\_\_  
Alan K. Mayberry  
Acting Associate Administrator  
for Pipeline Safety

SEP 01 2016

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Date Issued