



U.S. Department
of Transportation
**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

**SECOND AMENDED CORRECTIVE ACTION ORDER
ISSUED WITHOUT PRIOR NOTICE**

VIA ELECTRONIC MAIL TO: william.yardley@enbridge.com

William T. Yardley
Executive Vice President and President
Gas Transmission and Midstream
Enbridge, Inc.
5400 Westheimer Court
Houston, Texas 77056

Re: CPF No. 2-2019-1002H

Dear Mr. Yardley:

Enclosed is a Second Amended Corrective Action Order issued in the above-referenced case to your subsidiary, Texas Eastern Transmission, LP. It requires certain corrective actions that need to be taken with respect to Lines 10, 15 and 25 for failures on August 1, 2019, near Danville, Kentucky, and May 4, 2020, near Hillsboro, Kentucky. Service of the Second Amended Corrective Action Order by electronic mail 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 Second Amended Order are effective upon completion of service.

Thank you for your cooperation in this matter.

Sincerely,

**ALAN KRAMER
MAYBERRY**

Digitally signed by ALAN
KRAMER MAYBERRY
Date: 2020.06.01 11:42:15
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Alan K. Mayberry
Associate Administrator
for Pipeline Safety

Enclosure

cc: Ms. Linda Daugherty, Deputy Associate Administrator for Field Operations, Office of Pipeline Safety, PHMSA
Mr. James Urisko, Director, Southern Region, Office of Pipeline Safety, PHMSA
Ms. Mary McDaniel, Director Southwest Region, Office of Pipeline Safety, PHMSA
Mr. Rick Kivela, Manager, Operational Compliance, Enbridge, rick.kivela@enbridge.com
Ms. Catherine Little, Counsel, Troutman Sanders, LLP, catherine.little@troutman.com

CONFIRMATION OF RECEIPT REQUESTED

	)	
In the Matter of	)	
	)	
Texas Eastern Transmission, LP,	)	CPF No. 2-2019-1002H
a subsidiary of Enbridge, Inc.,	)	
	)	
Respondent.	)	
	)	

The purpose of these amendments is to update the terms of the Amended Corrective Action Order to address the May 4, 2020 failure.

The second amended preliminary findings of PHMSA's ongoing investigation are as follows:

Second Amended Preliminary Findings:

- TETLP is a wholly-owned subsidiary of Spectra Energy Partners, LP, which is, in turn, a wholly-owned subsidiary of Enbridge, Inc. (Enbridge), which is based in Calgary, Alberta, Canada.¹ TETLP operates an approximately 9,100-mile pipeline system, transporting natural gas from the northeastern United States to the Gulf Coast Region.
- TETLP's system transports natural gas to and through Texas, Louisiana, the Gulf of Mexico, Mississippi, Arkansas, Missouri, Tennessee, Illinois, Indiana, Kentucky, Ohio, Pennsylvania, New Jersey, and New York.

Failure 1: August 1, 2019 near Danville, Kentucky

- The failed pipeline (Line 15) is a component of the above-referenced TETLP system. It is a 775-mile long, 30-inch diameter, bi-directional pipeline that transports natural gas between Kosciusko, Mississippi and Union Township, Pennsylvania. Line 15 is one of three parallel TETLP pipelines running in a common corridor near the site of Failure 1. The other two TETLP pipelines are the 30-inch Line 10 and the 30/36-inch Line 25. At the Failure 1 Site, Line 15 is the middle of the three pipelines. Failure 1 occurred near Mile Post (MP) 423.4, approximately 4.5 miles south of Danville, Kentucky, on the Danville to Tompkinsville portion of the Line 15 (Failure 1 Site).
- Line 15 was constructed beginning in 1957. The portion of Line 15 at the Failure 1 Site consists of 0.375-inch wall thickness, American Petroleum Institute X-52 grade pipe, manufactured by A.O. Smith using flash welding, and is coated with coal tar enamel. The line is cathodically protected with impressed current.
- Line 15 originally flowed south-to-north, with a maximum allowable operating pressure (MAOP) of 1000 psig, established as 76.92 percent of the specified minimum yield strength (SMYS). In 2014, TETLP reversed the flow to north-to-south, and the MAOP was reestablished as 936 psig, or 72 percent of the SMYS, commensurate with 49 C.F.R. § 192.105. At the time of Failure 1, Line 15 was flowing north-to-south and was operating at 925 psig.
- It is estimated that approximately 66 million cubic feet of natural gas was released as a result of Failure 1.
- Failure 1 occurred at approximately 1:24 a.m. EDT. At approximately 1:25 am, Enbridge's Gas Control in Houston, Texas, received a rate of change alarm on Line 15 on the south side of Danville Compressor Station and during the ensuing minutes, received reports from the public of a fire in the area south of Danville Compressor Station. A Danville Compressor Station operator also received a rate of change alarm and observed

¹ Enbridge, Inc., website, *available at*

<https://www.enbridge.com/~media/Enb/Documents/Investor%20Relations/Texas%20Eastern%20Transmission/TE TLP%20Q1%202019%20Financial%20Statements%20-%20Final.pdf?la=en> (last accessed April 22, 2020).

the rupture fire from the window of the compressor station control room. During the ensuing minutes, other Enbridge employees confirmed the reported fire, indicating the failure of Line 15.

- TETLP's Danville Compressor Station personnel closed the Line 15 discharge valve located north of the Failure 1 Site. TETLP field personnel responded by closing the Line 15 Main Line Block Valve located at Valve Site #4 (MP 408.48), located south of the Failure 1 Site. Following confirmation of Failure 1, Enbridge further isolated a portion of Line 15 by closing Valve 15-382 at MP 408.48 and Valve 15-393 at the Danville Compressor Station near MP 427.5. Enbridge also shut down and shut in Lines 10 and 25, which were blocked in between the Danville Compressor Station and the Tompkinsville Compressor Station.
- Failure 1 resulted in the ejection of an approximately 30-foot long section of Line 15, which landed approximately 481 feet from the Failure 1 Site. Additionally, Failure 1 resulted in a 43-foot long, 30-foot wide, 10-foot deep crater at the Failure 1 Site. Gas released from Failure 1 ignited, causing a fire that resulted in the death of one person, the hospitalization of six people, and the destruction of several nearby homes and other structures. Railroad tracks operated by Norfolk Southern Corporation (NSC) were also damaged by the fire. NSC temporarily suspended rail service through the area. The fire also scorched or burned approximately 30 acres of land, resulting in numerous burned trees and grass.
- Fire fighters from the Lincoln County were the first responders to arrive at the Failure 1 Site. Other local fire departments responded to this event and evacuated approximately 75 people from the nearby Indian Camp subdivision. Casey County emergency medical services transported one injured person to Ephraim McDowell emergency medical center and Boyle County emergency medical services transported two injured persons to the same emergency medical center. Other injured persons were self-transported to medical centers.
- Line 15 contains approximately 353 miles of A.O. Smith-manufactured pipe of similar vintage and type to the pipe involved in Failure 1. The origin of Failure 1 was identified and the specimen pipe is under control of the NTSB. NTSB and PHMSA investigators collected information related to potential causal factors and circumstances that may have led to Failure 1. The NTSB will conduct a metallurgical investigation to determine the exact cause.
- Lines 10 and 25 run on either side of Line 15 in the immediate vicinity of the Failure 1 Site. Lines 10 and 25 were evaluated and determined to have suffered no damage from the concussive force or thermal damage resulting from Failure 1.
- Following TETLP's analysis, PHMSA approved a return to MAOP for Lines 10 and 25 on August 30, 2019, and August 23, 2019, respectively.
- On November 2, 2003, Line 15 failed at MP 501.72 near Morehead, Kentucky, between the Danville Compressor Station and the Owingsville Compressor Station to the north of

the Danville Compressor Station. The 2003 failure also occurred on A.O. Smith-manufactured pipe, and resulted from interactions between hard spots and mid-wall lamination, and in PHMSA's predecessor agency issuing a Corrective Action Order to TETLP's predecessor entity on November 6, 2003, in CPF No. 2-2003-1018H.

- TETLP reported that it performed an in-line inspection (ILI) to detect hard spots on Line 15 in 2011. The company also reported that it ran an ILI with a magnetic flux leakage tool in 2018 and an ILI with a dent and inertial measurement unit tool in 2019. The 2018 tool data indicated a small dent with metal loss that did not require action under federal pipeline safety regulations or TETLP's procedures.
- The 2011 hard spot in-line inspection of Line 15 resulted in no evidence of hard spot indications. A 2019 post-incident review of the same hard spot in-line inspection data revealed ten hard spots located in the failed pipe joint. Further analysis revealed the location of the Line 15 failure origin coincided with the locations of two newly discovered hard spot indications.

Failure 2: May 4, 2020 near Hillsboro, Kentucky

- The failed pipeline (Line 10) is a component of the above-referenced TETLP system. On the afternoon of May 4, 2020, the TETLP controllers observed a pressure drop from 654 psig to 0 psig. Upon investigation, the operator's personnel discovered a rupture on Line 10. The rupture resulted in the release of 51,676 MCF (52 MMCF) of natural gas which ignited. Reports and media video identified large fireballs in the area of failure, a heavily wooded, rural location with one road into the site. The failure resulted in a crater of an estimated 20 feet in diameter with residual gas burning as of 10 p.m. on May 4, 2020 (Failure 2 Site).
- Immediately following the pressure drop, TETLP personnel isolated Line 10 at 5:05 PM, and subsequently isolated and depressurized Line 15 and Line 25. Suspecting a rupture, crews were deployed to investigate the site. An aerial patrol was conducted to fly over the site of the failure to confirm any nearby structures and impacted area.
- The site is located approximately 1.75 miles west of HWY 32 and 3.18 miles north east of Hillsboro, Kentucky, the coordinates (lat/long) are 38.302493, -83.601636.
- Line 10 is a bi-directional flow, approximately 774.76 miles in length, 30-inch diameter, pipeline that transports natural gas between Kosciusko, Mississippi and North Union Township, Pennsylvania. The line's original MAOP was established at 1139 psig. At the time of Failure 2, Line 10 was operating at 954 psig. It shares a common corridor along with Lines 15 and 25.
- Line 25 is a bi-directional flow, approximately 775.18 miles in length, 30/36-inch diameter pipeline that runs from Kosciusko, Mississippi and North Union Township, Pennsylvania.

- Line 10 was constructed beginning in 1952. The portion of Line 10 at the Failure 2 Site consists of 0.375-inch wall thickness, API X-52 grade pipe, and is coated with coal tar enamel. The line is cathodically protected with impressed current.
- The failed pipe is currently shut in and Lines 15 and 25 were depressurized and isolated. Line 25 returned to service at a reduced pressure on May 26, 2020.
- The preliminary failure cause appears to be due to land movement, and seems to originate on a girth weld in a right of way (ROW) containing a slip shelf, cracks, natural springs and trees with S shape trunks.
- Line 10 traverses similar land conditions along the length of the pipeline. The potential environmental impacts include damage to trees and grass due to failure fire. Lines 10, 15, and 25 traverse through several states and within close proximity to houses and other structures involving human occupancy. The issue of land-movement is potentially systemwide as evidenced by inertial measurement unit testing already completed by the operator. The ROW for Lines 10, 15, and 25 contains many hills/slopes from north of Nashville through Kentucky and into Southwestern Ohio. Northern Kentucky and Southeastern Ohio have shown to be the worst areas for slippage.
- On January 21, 2019, Line 10 also failed in Noble County, Ohio. The line was operating in a north to south flow at the time of the failure. A DNV lab report indicated the failure of the girth weld “was a result of ductile overload from a longitudinal tensile or bending force that exceeded the load carrying capacity of the weld.” The DNV report went on to conclude that the “ductile overload” was the result of unintended land movement. Further, DNV’s analysis revealed two incomplete penetration flaws on the fracture surface.
- Following the January 21, 2019 failure in Ohio, TETLP established a program using ILI tools with inertial mapping capability to assess Lines 10, 15, and 25 for additional areas subject to strain from unintended land movement. Initial results from these assessments indicated potential areas of strain due to unintended land movement along Lines 10 and 15 in the vicinity of Failure 2, and no indications of strain along Line 25 in the same area. The referenced area was scheduled for remediation, along with several other areas along the common ROW.
- TETLP submitted a Safety Related Condition (SRC) Report on March 25, 2020, for Line 25 due to land movement causing a deflection of 7 feet along a length of about 10 feet of the pipeline. The SRC location is 220 miles northeast on the ROW at MP 721.35 to MP 722.90. Line 25 was isolated and the pressure reduced to zero psig. Per the SRC, the referenced land movement along Line 25 stemmed from a land wall mining operation in the corridor. TETLP temporarily moved the pipeline above ground and eventually plans to re-bury the line as a permanent repair. Line 25 lies in a corridor adjacent to Lines 10 and 15.
- On July 29, 2019, Line 10 also failed at MP 658.85 due to material failure of pipe or weld near Beverly, Ohio. Per the submitted incident report, sub-causes are identified as a dent

and crack caused by the pipe being laid on a sharp rock during its original construction. The failure resulted in a release of 45 MMCF of natural gas. There were no injuries or fatalities. A total of \$514,406 in operator property damage was reported, with no impacts private or public property.

Determination of Necessity for Second Amended 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 and requiring corrective action, is set forth both in the above-referenced statute and 49 C.F.R. § 190.233.

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 Affected Segment without corrective measures is or would be hazardous to life, property, or the environment. In addition, having considered the uncertainties of the cause of the Failure 1, the pressure at which gas is transported, the vintage and type of pipe, the risk of fire to the environment and populated areas in the vicinity of the Affected Segment, as well as the apparent cause of Failure 2 related to land-movement, prior occurrences of failures due to land-movement, and the similarity of land conditions, 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 Second Amended Order mandating immediate corrective action is issued without prior notice and opportunity for a hearing. The terms and conditions of this Second Amended Order are effective upon receipt.

Within 10 days of receipt of this Second Amended Order, Respondent may contest its issuance and 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, Southern Region, PHMSA (Director). If Respondent requests a hearing, it will be held telephonically or in-person, if practicable, in Atlanta, Georgia or Washington, D.C, unless a different location is expressly agreed-to in writing by the Director.

After receiving and analyzing additional data in the course of this investigation, PHMSA may identify other corrective measures that need to be taken on the Affected Segment or other pipelines in the TETLP system. In that event, PHMSA will notify Respondent of any additional measures that are required and a further Amended Order will be 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:

Definitions:

Affected Segment means the three parallel bi-directional pipelines operated by TETLP located within the common ROW that transports natural gas from Kosciusko, Mississippi to Union Township, Pennsylvania. Line 10 is approximately 775 miles in length, 30-inch diameter pipeline; Line 15 is approximately 775 miles in length, 30-inch diameter pipeline; and Line 25 is approximately 775 miles in length, 30/36-inch diameter pipeline.

Failure 1 Isolated Segment means the approximately 19 miles of the Affected Segment between the Danville Compressor Station at MP 427.5 and Valve 15-382 at MP 408.48. It is the portion of the Affected Segment that was shut-in after the Failure on August 1, 2019, by closing main-line valves upstream and downstream of the Failure Site and that remains shut-in as of August 8, 2019.

Failure 2 Isolated Segment means the approximately 14.7 miles of the Affected Segment between the Owingsville Compressor Station at upstream valve (10-367, MP 516.82) and the downstream valve (10-353, MP 502.11) of Line 10. Line 15 was isolated from upstream valve (15-522, MP 517.32) to downstream valve (15-513, MP 502.62). Line 25 was isolated from upstream valve (25-725, MP 517.32) to downstream valve (25-656, MP 502.62). It is the portion of the Affected Segment that was shut-in after Failure 2 on May 4, 2020, by closing main-line valves upstream and downstream of the Failure 2 Site and that remains shut-in as of May 30, 2020 for Lines 10 and 15. The Identified segment for each pipeline in the incident corridor are the following; Line 10 (KY-2 & 6702), Line 15 (KY-1 & 2802), and Line 25 (KY-2 & 6702).

Director means the Director, Southern Region, Office of Pipeline Safety, PHMSA.

Pursuant to 49 U.S.C. § 60112, I hereby order TETLP to immediately take the following corrective actions for the Affected Segment:

Failure 1 Corrective Actions:

1. ***Shutdown of Failure 1 Isolated Segment.*** The Director approved TETLP's Restart Plan on March 20, 2020. TETLP restarted the Failure 1 Isolated Segment on March 25, 2020. The operating pressure for the Failure 1 Isolated Segment must not exceed eighty percent (80%) of the actual operating pressure in effect immediately prior to Failure 1, in accordance with Item 2 below.
2. ***Operating Pressure Restriction.*** With respect to the remainder of the Affected Segment not shut down under Item 1, above, TETLP must reduce and maintain a twenty percent

(20%) pressure reduction in the actual operating pressure along the entire length of the Affected Segment such that the operating pressure along the Affected Segment will not exceed eighty percent (80%) of the actual operating pressure in effect immediately prior to Failure 1.

- (A) This pressure restriction is to remain in effect until the Director provides written approval for TETLP to either increase the pressure or return the pipeline to its pre-Failure operating pressure. A copy of the TETLP Restart Plan was provided to the Southern Region. After the region's review, approval of the Restart Plan was given to TETLP to return the pipeline to the pre-Failure operating pressure on March 20, 2020.
 - (B) This pressure restriction requires any relevant remote or local alarm limits, software programming set-points or control points, and mechanical over-pressure devices to be adjusted accordingly.
 - (C) When determining the pressure restriction set-points, TETLP must take into account any ILI features or anomalies present in the Affected Segment to provide for continued safe operation while further corrective actions are completed.
 - (D) TETLP must review the pressure restriction monthly by analyzing the operating pressure data. TETLP must take into account any ILI features or anomalies present in the Affected Segment and immediately reduce the operating pressure to maintain the safe operations of the Affected Segment, if warranted by the monthly review. TETLP must submit the results of the monthly review to the Director. The results must include, at a minimum, the current discharge set-points (including any additional pressure reductions), and any pressure exceedance at discharge set-points.
3. ***Removal or Modification of Pressure Restriction.*** The pressure restriction required by the above Items may be removed or modified, as follows:
- (A) The Director may allow the removal or modification of the pressure restriction upon a written request from TETLP demonstrating that restoring the pipeline to its pre-Failure operating pressure is justified based on a reliable engineering analysis showing that the pressure increase is safe considering all known defects, anomalies, and operating parameters of the pipeline.
 - (B) The Director may allow the temporary removal or modification of the pressure restrictions upon a written request from TETLP demonstrating that temporary mitigative and preventive measures are being implemented prior to and during the temporary removal or modification of the pressure restriction. The Director's determination will be based on the Failure cause and provision of evidence that preventive and mitigative actions taken by TETLP provide for the safe operation of the Affected Segment during the temporary removal or modification of the pressure restriction. Appeals to determinations of the Director in this regard will be decided by the Associate Administrator for Pipeline Safety.

4. ***Instrumented Leakage Survey.*** TETLP completed an aerial or ground instrumented leakage survey of the Affected Segment on November 20, 2019. A re-survey was completed during the restart of Line 15 on March 24, 2020.
5. ***Records Verification.*** TETLP submitted documentation confirming the MAOP for Line 15 on October 30, 2019.
6. ***Review of Prior ILI Results.*** Within 30 days of receipt of the Amended Corrective Action Order, conduct a review of the previous ILI results of the Affected Segment. TETLP must re-evaluate all ILI results from the past 20 calendar years, include a review of the ILI vendors' raw data and analysis. TETLP must determine whether any features were present in the failed pipe joint and/or any other pipe removed. Also, TETLP must determine if any features are present elsewhere on the Affected Segment. TETLP must submit documentation of this ILI review to the Director within 45 days of receipt of the Amended Corrective Action Order as follows:
 - (A) List all ILI tool runs, tool types, and the calendar years of the tool runs.
 - (B) List, describe (type, size, wall loss, etc.), and identify the specific location of all ILI features present in the failed joint and/or other pipe removed.
 - (C) Explain the process used to review the ILI results and the results of the reevaluation.

TETLP has begun this re-evaluation and has been submitting monthly reports to the Director, along with additional data. The latest report was received on May 13, 2020.
7. ***Mechanical and Metallurgical Testing.*** Mechanical and metallurgical testing, including failure analysis will be performed by the NTSB in accordance with NTSB procedures and protocols. In the event the NTSB does not perform these functions, TETLP will be responsible for completing all testing and analysis. If the NTSB does not perform the analysis, TETLP must submit to the Director for prior approval a plan to complete the testing and analysis.
8. ***Root Cause Failure Analysis.*** The NTSB will perform a root cause failure analysis (RCFA) to determine the cause of the Failure. TETLP must incorporate the findings the NTSB RCFA into its integrity management plan and operations and maintenance manual. If the NTSB does not perform these tasks, TETLP must submit to the Director for prior approval a plan to complete an RCFA.
9. ***Emergency Response Plan and Training Review.*** TETLP must review and assess the effectiveness of its emergency response plan and operational actions with regards to Failure 1. TETLP must include in the review and assessment the on-scene response and support, coordination, and communication with emergency responders and public officials. Also, TETLP must include a review and assessment of the effectiveness of its emergency training program. TETLP must amend its emergency response plan and emergency training, if necessary, to reflect the results of this review. The documentation of this Emergency Response Plan and Training Review must be included in the CAO Documentation Report (see Item 12 for description of the CAO Documentation Report).

10. **Public Awareness Program Review.** TETLP must review and assess the effectiveness of its Public Awareness Program with regards to Failure 1. TETLP must amend its Public Awareness Program, if necessary, to reflect the results of this review. The documentation of this Public Awareness Program Review must be provided to the Director.

11. **Remedial Work Plan (RWP).**

- (A) TETLP must submit a Remedial Work Plan (RWP) to the Director for approval by August 2, 2020.
- (B) The Director may approve the RWP incrementally without approving the entire RWP.
- (C) Once approved by the Director, the RWP will be incorporated by reference into the Amended Order.
- (D) The RWP must specify the tests, inspections, assessments, evaluations, and remedial measures TETLP will use to verify the integrity of the Affected Segment. The RWP must address all known or suspected factors and causes of Failure 1. TETLP should consider both the risks and consequences of another failure arising from the same root cause as Failure 1 to develop a prioritized schedule for RWP related work along the Affected Segment.
- (E) The RWP must include a procedure or process to:
 - i. Identify pipe in the Affected Segment with characteristics similar to the contributing factors identified for Failure 1.
 - 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 and conclusions of the NTSB's metallurgical testing as well as those of the final RCFA, and other corrective actions required by the Amended 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 Failure 1 are likely to exist elsewhere on the Affected Segment.
 - v. 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 (*see* Item 11(E)(ii),

above) 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:

- a. Inline inspection (ILI) tools that are technically appropriate for assessing the pipeline system based on the cause of Failure 1, and that can reliably detect and identify anomalies;
- b. Hydrostatic pressure testing;
- c. Close-interval surveys;
- d. Cathodic protection surveys, to include interference surveys in coordination with other utilities (e.g., underground utilities, overhead power lines, etc.) in the area;
- e. Coating surveys;
- f. Stress corrosion cracking surveys;
- g. Selective seam corrosion surveys; and
- h. Other tests, inspections, assessments, and evaluations appropriate for the failure causes.

Note: TETLP may use the results of previous tests, inspections, assessments, and evaluations if approved by the Director, provided the results of the tests, inspections, assessments, and evaluations are analyzed with regard to the factors known or suspected to have caused Failure 1.

- vi. Describe the inspection and repair criteria TETLP 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.
- vii. Based on the known history and condition of the Affected Segment, describe the methods TETLP will use to repair, replace, or take other corrective measures to remediate the conditions associated with Failure 1, and to address other known integrity threats along the Affected Segment. The repair, replacement, or other corrective measures must meet the criteria specified in Item 11(E)(iv), above.
- viii. 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 the Amended Order.

- ix. Implement specific actions TETLP will take on its entire pipeline system as a result of the lessons learned from work on the Amended Order. Incorporate lessons learned on TETLP's entire pipeline system. TETLP will report lessons learned in the CAO Documentation Report (see Item 12 for description of the CAO Documentation Report).

(F) TETLP must include a proposed schedule for completion of the RWP.

(G) TETLP must revise the RWP as necessary to incorporate new information obtained during the NTSB and PHMSA's failure investigation and remedial activities taken under the Amended Order, to incorporate the results of actions undertaken pursuant to the Amended Order, and/or to incorporate modifications required by the Director.

- i. TETLP must 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 the Amended Order will be fully described and documented in the CAO Documentation Report (CDR).

(H) Implement the RWP as it is approved by the Director, including any revisions to the plan.

12. **CAO Documentation Report (CDR).** TETLP must create and revise, as necessary, a CDR. When TETLP has concluded all the items in the Amended Order it will submit the final CDR in its entirety to the Director. This will allow the Director to complete a thorough review of all actions taken by TETLP with regards to the Amended Order prior to approving the closure of the Amended Order. The intent is for the CDR to summarize all activities and documentation associated with the Amended Order in one document.

(A) The Director may approve the CDR incrementally without approving the entire CDR.

(B) Once approved by the Director, the CDR will be incorporated by reference into the Amended Order.

(C) The CDR must include but not be limited to:

- i. Table of Contents;
- ii. Summary of the pipeline Failure, and the response activities;
- iii. Summary of pipe data/properties and all prior assessments of the Affected Segment;
- iv. Summary of all tests, inspections, assessments, evaluations, and analysis required by the Amended Order;

- v. Summary of the Mechanical and Metallurgical Testing as required by the Amended Order;
- vi. Documentation of all actions taken by TETLP to implement the RWP, the results of those actions, and the inspection and repair criteria used;
- vii. Documentation of any revisions to the RWP including those necessary to incorporate the results of actions undertaken pursuant to the Amended Order and whenever necessary to incorporate new information obtained during the failure investigation and remedial activities;
- viii. Lessons learned while completing the Amended Order;
- ix. A description of specific actions TETLP will take on its entire pipeline system as a result of the lessons learned from work on the Amended Order; and
- x. Appendices (if required).

Failure 2 Corrective Actions:

13. ***Shutdown of Isolated Section.*** TETLP must not operate the Failure 2 Isolated Segment of Lines 10 or 15 until authorized to do so by the Director.
14. ***Operating Pressure Restriction.*** With respect to the remainder of the Affected Segment not shut down under Item 13, above, TETLP must reduce and maintain a twenty percent (20%) pressure reduction in the actual operating pressure along the entire length of the Affected Segment such that the operating pressure along the Affected Segment will not exceed eighty percent (80%) of the actual operating pressure in effect immediately prior to Failure 1 and Failure 2.
 - (A) This pressure restriction is to remain in effect until the Director provides written approval for TETLP to either increase the pressure or return the pipeline to its pre-Failure operating pressure.
 - (B) By June 1, 2020, TETLP must provide the Director the actual operating pressures of each compressor station and each main line pressure regulating station on the Affected Segment at the time of Failure 2 and the reduced pressure restriction set-points at these same locations.
 - (C) This pressure restriction requires any relevant remote or local alarm limits, software programming set-points or control points, and mechanical over-pressure devices to be adjusted accordingly.
 - (D) When determining the pressure restriction set-points, TETLP must take into account any ILI features or anomalies present in the Affected Segment to provide for continued safe operation while further corrective actions are completed.

- (E) TETLP must review the pressure restriction monthly by analyzing the operating pressure data. TETLP must take into account any ILI features or anomalies present in the Affected Segment and immediately reduce the operating pressure to maintain the safe operations of the Affected Segment, if warranted by the monthly review. TETLP must submit the results of the monthly review to the Director. The results must include, at a minimum, the current discharge set-points (including any additional pressure reductions), and any pressure exceedance at discharge set-points.
15. **Restart Plan.** Prior to resuming operation of any part of the Failure 2 Isolated Segment, TETLP must develop and submit a written Restart Plan to the Director.
- (A) The Director may approve the Restart Plan incrementally without approving the entire plan but the Failure 2 Isolated Segment cannot resume operation until the Restart Plan has been approved in its entirety.
 - (B) Once approved by the Director, the Restart Plan will be incorporated by reference into this Second Amended Order.
 - (C) The Restart Plan must provide for adequate patrolling of the Failure 2 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-increase 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 Failure 2 Isolated Segment for conditions similar to those surrounding the Failure including a review of construction, operating and maintenance (O&M) and integrity management records such as ILI results, hydrostatic tests, root cause failure analysis of prior failures, aerial and ground patrols, corrosion, cathodic protection, excavations and pipe replacements. TETLP 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 TETLP's operations and maintenance procedures manual.
 - (H) Procedures for the exposure, testing, and repair of Line 10 must include:
 - i. Exposure of Line 10 extending for at least two girth welds on either side of the Failure 2 Site to examine for corrosion, coating condition, concussive damage, and thermally-impacted areas. If damage to the exposed pipe is discovered, TETLP must expose additional pipe until at

least 10 feet of undamaged pipe is exposed and examined. TETLP must perform safe operating-pressure calculations and remediation for any anomalies or threat found, using permanent repair methods and design factors based upon 49 C.F.R. §§ 192.713 and 192.111 and using ASME/ANSI B31G or R STRENG methods. TETLP must repair or replace pipe or coating, as necessary. Upon completion of pipe replacement and repairs, TETLP must provide proper backfill and protection from stones and rocks, pursuant to procedures developed under this Second Amended Order;

- ii. Establishment of adequate cathodic protection for the area where Failure 2 occurred. TETLP must replace any damaged rectifier(s) and must re-establish the electrical test station at the railroad crossing. Once backfill and land settling have occurred, TETLP must ensure pipe-to-soil readings are within applicable criteria; and
- iii. Development of additional requirements for remediation and the eventual restart for Line 10 as the investigation yields more information about the cause of Failure 2 and the condition of the Affected Segment.

(I) Procedures for the exposure, examination, remediation, and restart of Lines 10 and 15 must include:

- i. Development of assessment, remediation, and restart plans that are aligned with the criteria shown immediately below;
- ii. Exposure of Lines 15 extending for at least two girth welds in both directions from the Failure 2 location. TETLP must examine the girth welds and pipeline coating materials for damage caused by thermal and concussive forces. TETLP must continue a broader exposure of each line if associated damage is discovered, until 10 feet of undamaged pipe is reached and verified. Any needed repairs are to be guided by established Enbridge procedures and safe operating-pressure calculations and the remediation for any pits or other forms of anomalies found, using engineering permanent repair methods and design factors based upon 49 C.F.R. §§ 192.713 and 192.111 and using ASME/ANSI B310 or R-STRENG methods. TETLP must repair or replace pipe or coating, as necessary. Upon completion of pipe replacement and repairs, and provide proper backfill and protection from stones and rocks, all pursuant to Enbridge's established procedures;
- iii. Restarts for each individual line in pressure-increase increments, at twenty-five percent (25%), fifty percent (50%), and eighty percent (80%), with each increment held for at least one hour after pressure stabilization. After reaching eighty percent (80%) pressure, Respondent must obtain specific individual written approval from the Director to increase pressure to pre-Failure normal pressure. Respondent must obtain separate approval

for Line 15 before increasing pressure to the final normal operating pressure; and

- iv. A ground-level, instrumented leak survey on Lines 15 for the entire Isolated Segment. TETLP must investigate any elevated readings and make all appropriate repairs.

16. ***Return to Service.*** TETLP may return the Failure 2 Isolated Segment to service, but the operating pressure must not exceed 80 percent (80%) of the actual operating pressure in effect immediately prior to Failure 2, in accordance with Item 14 above.

17. ***Removal or Modification of Pressure Restriction.*** The pressure restriction required by the above Items may be removed or modified, as follows:

(A) The Director may allow the removal or modification of the pressure restriction upon a written request from TETLP demonstrating that restoring each pipeline within the Affected Segment to its pre-Failure operating pressure is justified based on a reliable engineering analysis showing that the pressure increase is safe considering all known defects, anomalies, and operating parameters of the pipeline.

(B) The Director may allow the temporary removal or modification of the pressure restrictions upon a written request from TETLP demonstrating that temporary mitigative and preventive measures are being implemented prior to and during the temporary removal or modification of the pressure restriction. The Director's determination will be based on the Failures' causes and provisions of evidence that preventive and mitigative actions taken by TETLP provide for the safe operation of the Affected Segment during the temporary removal or modification of the pressure restriction. Appeals to determinations of the Director in this regard will be decided by the Associate Administrator for Pipeline Safety.

18. ***Instrumented Leakage Survey.*** Within 180 days of receipt of this Second Amended Order, TETLP must perform an aerial or ground instrumented leakage survey of the Affected Segment. TETLP must investigate all leak indications and remedy all leaks discovered. TETLP must submit documentation of this survey to the Director within 45 days of the completion of the leak survey.

19. ***Records Verification.*** As recommended in PHMSA Advisory Bulletin 2012-06, verify the records for the Affected Segment to confirm the MAOPs for Lines 10, 15, and 25. TETLP must submit documentation of this records verification to the Director within 45 days of receipt of this Second Amended Order.

20. ***Review of Prior ILI Results.*** Within 30 days of receipt of this Second Amended Order, conduct a review of the previous ILI results of the Affected Segment. TETLP must re-evaluate all ILI results from the past 20 calendar years, include a review of the ILI vendors' raw data and analysis. TETLP must determine whether any features were present in the failed pipe joint and/or any other pipe removed. Also, TETLP must determine if any features are present elsewhere on the Affected Segment. TETLP must

submit documentation of this ILI review to the Director within 45 days of receipt of this Second Amended Order as follows:

- (A) List all ILI tool runs, tool types, and the calendar years of the tool runs.
- (B) List, describe (type, size, wall loss, etc.), and identify the specific location of all ILI features present in the failed joint and/or other pipe removed.
- (C) Explain the process used to review the ILI results and the results of the reevaluation.

TETLP has begun this re-evaluation and has been submitting monthly reports to the Director, along with additional data. The latest report for the Original CAO was received on April 14, 2020.

21. ***Mechanical and Metallurgical Testing.*** Mechanical and metallurgical testing, including failure analysis will be performed by DNV-GL in accordance with NTSB and PHMSA procedures and protocols. DNV-GL was selected as the laboratory and accepted by both PHMSA and NTSB. TETLP is required to notify DNV-GL to submit all reports regarding tests/finding simultaneously with PHMSA at the time of its completion.
22. ***Root Cause Failure Analysis.*** The RCFA is to be conducted by a third party selected by TETLP and approved by PHMSA to determine the cause of the Failure. TETLP must submit to the Director for prior approval a plan to complete an RCFA. TETLP must incorporate the findings the RCFA into its integrity management plan and operations and maintenance manual. TETLP must incorporate the findings the RCFA into its integrity management plan and operations and maintenance manual.
23. ***Emergency Response Plan and Training Review.*** TETLP must review and assess the effectiveness of its emergency response plan and operational actions with regards to the Failures. TETLP must include in the review and assessment the on-scene response and support, coordination, and communication with emergency responders and public officials. Also, TETLP must include a review and assessment of the effectiveness of its emergency training program. TETLP must amend its emergency response plan and emergency training, if necessary, to reflect the results of this review. The documentation of this Emergency Response Plan and Training Review must be included in the CAO Documentation Report (see Item 26 for description of the CAO Documentation Report).
24. ***Public Awareness Program Review.*** TETLP must review and assess the effectiveness of its Public Awareness Program with regards to the Failures. TETLP must amend its Public Awareness Program, if necessary, to reflect the results of this review. The documentation of this Public Awareness Program Review must be provided to the Director.
25. ***Remedial Work Plan (RWP).***
 - (A) Within 90 days following receipt of the RCFA, TETLP must submit a RWP to the Director for approval.

- (B) The Director may approve the RWP incrementally without approving the entire RWP.
- (C) Once approved by the Director, the RWP will be incorporated by reference into this Second Amended Order.
- (D) The RWP must specify the tests, inspections, assessments, evaluations, and remedial measures TETLP will use to verify the integrity of the Affected Segment. The RWP must address all known or suspected factors and causes of the failures on January 21, 2019, August 1, 2019, and May 4, 2020. TETLP should consider both the risks and consequences of another failure arising from the same root cause as these Failures to develop a prioritized schedule for RWP related work along the Affected Segment.
 - i. Inertial Measurement Unit and High-Resolution Deformation Tool runs looking for bending/buckling and movement areas;
 - ii. Walk the pipeline with Geotech engineers; and
 - iii. Aerial photo review.
- (E) The RWP must include a procedure or process to:
 - i. Identify pipe in the Affected Segment with characteristics similar to the contributing factors identified for the Failures.
 - 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 and conclusions of the NTSB's metallurgical testing for Failure 1 and the DNV-GL metallurgical testing for Failure 2 as well as those of the final RCFA, and other corrective actions required by this Second Amended 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 Failures are likely to exist elsewhere on the Affected Segment.
 - v. Conduct additional field tests, inspections, assessments, and/or evaluations to determine whether, and to what extent, the conditions associated with the Failures, and other failures from the failure history (*see* Item 25(E)(ii), above) 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:

- a. ILI tools that are technically appropriate for assessing the pipeline system based on the cause of the Failures, and that can reliably detect and identify anomalies;
- b. Hydrostatic pressure testing;
- c. Close-interval surveys;
- d. Cathodic protection surveys, to include interference surveys in coordination with other utilities (e.g. underground utilities, overhead power lines, etc.) in the area;
- e. Coating surveys;
- f. Stress corrosion cracking surveys;
- g. Selective seam corrosion surveys; and
- h. Other tests, inspections, assessments, and evaluations appropriate for the failure causes.

Note: TETLP may use the results of previous tests, inspections, assessments, and evaluations if approved by the Director, provided the results of the tests, inspections, assessments, and evaluations are analyzed with regard to the factors known or suspected to have caused the Failures.

- vi. Describe the inspection and repair criteria TETLP 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.
- vii. Based on the known history and condition of the Affected Segment, describe the methods TETLP will use to repair, replace, or take other corrective measures to remediate the conditions associated with the Failures, and to address other known integrity threats along the Affected Segment. The repair, replacement, or other corrective measures must meet the criteria specified in Item 25(E)(iv), above.
- viii. 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 the Second Amended Order.
- ix. Implement specific actions TETLP will take on its entire pipeline system as a result of the lessons learned from work on this Second Amended

Order. Incorporate lessons learned on TETLP's entire pipeline system. TETLP will report lessons learned in the CDR (see Item 26 for description of the CDR).

(F) TETLP must include a proposed schedule for completion of the RWP.

(G) TETLP must revise the RWP as necessary to incorporate new information obtained during the NTSB and PHMSA's failure investigation and remedial activities taken under this Second Amended Order, to incorporate the results of actions undertaken pursuant to this Second Amended Order, and/or to incorporate modifications required by the Director.

- i. TETLP must 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 Second Amended Order will be fully described and documented in the CDR.

(H) Implement the RWP as it is approved by the Director, including any revisions to the plan.

26. **CAO Documentation Report (CDR).** TETLP must create and revise, as necessary, a CDR. When TETLP has concluded all the items in this Second Amended Order it will submit the final CDR in its entirety to the Director. This will allow the Director to complete a thorough review of all actions taken by TETLP with regards to this Second Amended Order prior to approving the closure of this Second Amended Order. The intent is for the CDR to summarize all activities and documentation associated with this Second Amended Order in one document.

(A) The Director may approve the CDR incrementally without approving the entire CDR.

(B) Once approved by the Director, the CDR will be incorporated by reference into this Second Amended Order.

(C) The CDR must include but not be limited to:

- i. Table of Contents;
- ii. Summary of the pipeline Failures, and the response activities;
- iii. Summary of pipe data/properties and all prior assessments of the Affected Segment;
- iv. Summary of all tests, inspections, assessments, evaluations, and analysis required by the Second Amended Order;

- v. Summary of the Mechanical and Metallurgical Testing as required by the Second Amended Order;
- vi. Documentation of all actions taken by TETLP to implement the RWP, the results of those actions, and the inspection and repair criteria used;
- vii. Documentation of any revisions to the RWP including those necessary to incorporate the results of actions undertaken pursuant to this Second Amended Order and whenever necessary to incorporate new information obtained during the failure investigation and remedial activities;
- viii. Lessons learned while completing this Second Amended Order;
- ix. A description of specific actions TETLP will take on its entire pipeline system as a result of the lessons learned from work on this Second Amended Order; and
- x. Appendices (if required).

Other Requirements:

26. **Reporting.** Submit monthly reports to the Director that: (1) include all available data and results of the testing and evaluations required by this Second Amended Order; and (2) describe the progress of the repairs or other remedial actions being undertaken. The Director may change the interval for the submission of these reports.
27. **Documentation of Costs.** It is requested but not required that Respondent maintain documentation of the costs associated with implementation of this Second Amended Order. Include in each monthly report the to-date total costs associated with: (1) preparation and revision of procedures, studies and analyses; (2) physical changes to pipeline infrastructure, including repairs, replacements and other modifications; and (3) environmental remediation, if applicable.
28. **Approvals.** With respect to each submission requiring the approval of the Director, the Director may: (a) approve the submission in whole or in part; (b) approve the submission on specified conditions; (c) modify the submission to cure any deficiencies; (d) disapprove the submission in whole or in part and direct Respondent to modify the submission; or (e) any combination of the above. In the event of approval, approval upon conditions, or modification by the Director, Respondent 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 a submission, Respondent must correct all deficiencies within the time specified by the Director and resubmit it for approval.
29. **Extensions of Time.** The Director may grant an extension of time for compliance with any of the terms of this Second Amended Order upon a written request timely submitted and demonstrating good cause for an extension.

30. 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).

In your correspondence on this matter, please refer to “CPF No. 2-2019-1002H” and for each document you submit, please provide a copy in electronic format whenever possible. The actions required by this Second Amended Order are in addition to and do not waive any requirements that apply to Respondent’s pipeline system under 49 C.F.R. Parts 190 through 199, under any other order issued to Respondent under authority of 49 U.S.C. Chapter 601, 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.

Failure to comply with this Second Amended 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.

The terms and conditions of this Second Amended Order are effective upon service in accordance with 49 C.F.R. § 190.5.

ALAN KRAMER
MAYBERRY

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Alan K. Mayberry
Associate Administrator
for Pipeline Safety

June 1, 2020

Date Issued