

November 28, 2017

VIA CERTIFIED MAIL AND FAX TO: (403) 920-2200

Mr. Russell K. Girling
President and Chief Executive Officer
TransCanada Corporation
450 1st Street, S.W.
Calgary, Alberta T2P 5H1

CPF No. 3-2017-5008H

Dear Mr. Girling:

Enclosed is a Corrective Action Order (CAO) issued in the above-referenced case to your subsidiary, TransCanada Oil Pipeline Operations, Inc. It finds that continued operation of the company's Keystone 30-inch Phase 1 crude-oil pipeline between the Ludden and Ferney pump stations near Amherst, South Dakota, is or would be hazardous to life, property, and the environment without immediate corrective actions. The CAO requires TransCanada to take certain corrective actions to protect the public, property, and the environment from a hazardous condition resulting from the pipeline leak initially reported to the National Response Center on November 16, 2017. Service is being made by certified mail and facsimile. Your receipt of this Corrective Action Order constitutes service of that document under 49 C.F.R. § 190.5. The terms and conditions of this Order are effective upon receipt.

We look forward to the successful resolution of the concerns arising out of this accident to ensure the safe operation of this TransCanada facility. Please direct any questions on this matter to Allan Beshore, Region Director, Central Region, OPS, at (816) 329-3811.

Sincerely,

Alan K. Mayberry
Associate Administrator
for Pipeline Safety

Enclosure: Corrective Action Order and Copy of 49 C.F.R. § 190.233

cc: Ms. Linda Daugherty, Deputy Associate Administrator for Field Operations, OPS
Mr. Allan Beshore, Region Director, OPS
Mr. Lee Romack, Manager US Regulatory Compliance, TransCanada Corporation, 700
Louisiana Street, Houston, TX 77002
Ms. Sonya Kirby, Vice President, Pipeline Safety & Compliance, TransCanada
Corporation, 700 Louisiana Street, Houston, TX 77002

**PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
OFFICE OF PIPELINE SAFETY
WASHINGTON, D.C. 20590**

In the Matter of

TransCanada Oil Pipeline Operations, Inc.,

Respondent.

CPF No. 3-2017-5008H

CORRECTIVE ACTION ORDER

Purpose and Background:

This Corrective Action Order (Order) is being issued under authority of 49 U.S.C. § 60112 to require TransCanada Oil Pipeline Operations, Inc. (TC or Respondent), to take necessary corrective actions to protect the public, property, and the environment from potential hazards associated with a release from its 30-inch crude oil transmission pipeline near Amherst, South Dakota (Failure). The Failure occurred on the approximately 46.8-mile pipeline segment referred to as “the Keystone 30-inch Phase 1 Line” that runs between the Ludden Pump Station and Ferney Pump Station (Affected Segment). The Affected Segment is part of TC’s existing Keystone Pipeline, which is a 2,687-mile hazardous liquid pipeline system between Hardisty, Alberta, Canada and Patoka, Illinois, and Port Arthur, Texas.¹ This Order finds that continued operation of the Affected Segment without corrective action is or would be hazardous to life, property, or the environment and requires Respondent to take immediate action to ensure its safe operation.

On November 16, 2017, TC notified the National Response Center (NRC) of a crude-oil release from its 30-inch pipeline near Amherst, South Dakota. TC’s Keystone Pipeline Supervisory Control and Data Acquisition (SCADA) system detected a drop in pipeline pressure and an increase in flow rate on the line at 5:33 am CST. According to documents under review by PHMSA, the TC Control Center (Control Center) initiated shut down and isolation of the pipeline at 5:36 AM CST following the SCADA release indication. The initial release estimate was 5,000 barrels (210,000 gallons). Further review has resulted in an unconfirmed lower spill estimate. On November 26, 2017, TC excavated the failed section of pipe and metallurgists identified a rupture originating at the 12:00 o’clock position.

Pursuant to 49 U.S.C. § 60117, the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), initiated an investigation immediately following notice of the incident. The preliminary findings of the agency's ongoing investigation are as follows:

¹ <http://www.transcanada.com/oil-pipelines.html> (last accessed November 27, 2017).

Preliminary Findings:

- TC initially reported the incident to the NRC at 9:15 am CST (local time) on November 16, 2017 (NRC Report No. 1197446), indicating the quantity released as 5,000 barrels (210,000 gallons). An updated report was provided to the NRC at 11:25 am CST on November 18, 2017 (NRC Report No. 1197610), indicating no change.
- On November 16, 2017, at 5:33 am CST (according to pressure data reviewed by PHMSA), Respondent's Control Center identified a pressure and flow deviation. TC initiated shut-down of the entire pipeline at 5:36 am CST. The release location is in a rural agricultural area located between 115th Street and 116th Street in Marshall County, South Dakota, approximately three miles southeast of Amherst (Failure Site). The Failure Site is located at Mile Post (MP) 234.2, approximately 17 miles downstream of the Ludden pump station. There are approximately 23.8 miles between the Ludden pump station upstream of the Failure Site and the nearest block valve downstream of the Failure Site.
- On November 26, 2017, TC and PHMSA identified the source of the release. The rupture has characteristics of mechanical damage from original construction. Preliminary information indicates the Failure may have been caused by mechanical damage to the pipeline and coating associated with a weight installed on the pipeline in 2008. Weights are placed on the pipeline in areas where water could potentially result in buoyancy concerns.
- TC, after consultation with PHMSA, has removed the portion of pipe containing the failure location and will ship it to the National Transportation Safety Board's (NTSB) metallurgical lab in Virginia for testing.
- The Keystone Pipeline moves crude oil from Hardisty, Alberta, Canada to Patoka, Illinois, and to Port Arthur, Texas. This 30-inch Phase 1 portion of the system consists of a 1,082-mile-long pipeline, 23 pump stations, a terminal facility in Patoka, Illinois, and related facilities that start at the Canadian Border in North Dakota and traverse the midwestern states of South Dakota, Nebraska, Kansas and Missouri, terminating in Patoka, Illinois. It was constructed from June 2008 until March 2010.
- The specific pipeline section that failed was installed in 2008 as part of Spread 2A. The pipe is 30 inches in diameter and constructed of API 5L X-70 line pipe manufactured by Berg Steel Pipe Corporation. The pipe has a double-submerged arc welded (DSAW) seam and is coated with a fusion bond epoxy coating.
- PHMSA issued a special permit to TC for construction and operation of the Keystone Pipeline on April 30, 2007, allowing the pipeline to be operated at a stress level of 80 percent of the steel pipe's specified minimum yield strength (SMYS), as opposed to the normal operating pressure for hazardous liquid pipelines of 72 percent of SMYS under

49 CFR 195.106 (Special Permit). The Special Permit contained 51 conditions and was designed to provide for a level of safety equal to, or greater than, the regulations in effect at the time by requiring TC to more closely inspect and monitor the pipeline over its operational life than similar pipelines installed without a special permit. The Special Permit remains in effect for the life of the Keystone Pipeline unless suspended, modified or terminated by PHMSA.

- PHMSA issued a Corrective Action Order (CPF No. 3-2016-5003H) to TC on April 9, 2016, due to a leak in a cracked tie-in weld. This Order was closed on March 30, 2017, after TC had completed all the required corrective actions.
- Keystone Pipeline traverses several High Consequence Areas (HCA), as defined under 49 C.F.R. § 195.450, and navigable rivers. The nearest HCA “could-affect” pipeline segment is approximately 6.5 miles upstream of the Failure Site.
- TC was operating a cleaning tool (pig) and SmartBall® in the Keystone Pipeline at the time of the release. Both tools passed the Failure Site prior to the rupture without identifying any oil leakage from the pipeline at this location. There is no indication the tools contributed to the release.
- Removal of crude oil from the spill area is underway. Various state agencies and numerous contractors working on behalf of the operator, as well as other operating personnel, are performing clean-up, remediation, and monitoring activities.
- The PHMSA failure investigation is on-going and information could change. This order may be amended based on further findings during the investigation.

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 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 hazardous and 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 opportunity for notice and hearing, upon a finding that failure to issue the Order expeditiously will likely result in serious harm to life, property or the environment. In such cases, an opportunity for a hearing will be provided as soon as practicable after the issuance of the Order.

After evaluating the foregoing preliminary findings of fact, I find that the continued operation of the Affected Segment without corrective measures is or would be hazardous to life, property and the environment. Furthermore, after considering the age of the pipe, the circumstances

surrounding the Failure, the hazardous nature of the product being transported, the pressure required for transporting the material, the other recent failure of the Keystone Pipeline in April 2016, the unusual characteristics of the pipe and other equipment used in the Keystone Pipeline and the associated Special Permit issued to ensure its safety, the uncertainties as to the cause of the Failure and the ongoing investigation to determine its cause, I find that a failure to issue this Order expeditiously to require immediate corrective action would result in likely serious harm to life, property, and the environment.

Accordingly, this Corrective Action 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 request a hearing, to be held as soon as practicable, by notifying the Associate Administrator for Pipeline Safety in writing, with a copy to the Director, Central Region, PHMSA (Director). If a hearing is requested, it will be held telephonically or in-person in Kansas City, Missouri.

After receiving and analyzing additional data in the course of this investigation, PHMSA may identify other corrective measures that need to be taken. Respondent will be notified of any additional measures required and amendment of this Order will be considered. 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:

Pursuant to 49 U.S.C. 60112, I hereby order TC to immediately take the following corrective actions with respect to the Affected Segment:

1. ***Shutdown of the Affected Segment.*** The 30" Keystone Pipeline from Ludden Pump Station (MP 216.7) to Ferney Pump Station (MP 263.5), defined above as the Affected Segment, is being returned to service. The Deputy Associate Administrator has provided written approval of a Return-to-Service Plan under this Order.
2. ***Return-to-Service Plan.*** The Return-to-Service Plan shall be comprised of a Repair Plan and a Restart Plan. Respondent has submitted the Return-to-Service Plan to the Central Region Director for approval. The Repair Plan documents the procedures and scope of work for repairing the Keystone Pipeline. The Restart Plan includes provisions for increased patrolling of the Affected Segment during restart and for 72 hours following restart. The Deputy Associate Administrator, on behalf of the Director, has authorized TC to return the Affected Segment to service, whereby the pressure on the Affected Segment shall be limited to a maximum discharge pressure set-point at the Ludden pump station of 1046 psig. Additionally, Line Pressure Control settings have been temporarily reduced to a Maximum Operating Pressure (MOP) of 1152 psig from the US/Canadian border to the Freeman (South Dakota) Pump Station. These pressure restrictions shall remain in effect until removed in accordance with Paragraph 5 below.

3. **Testing of Failed Pipeline Section.** Respondent is delivering the failed section of pipe to the NTSB laboratory in Virginia for metallurgical analysis and testing as soon as possible. Chain-of-custody shall be documented when handling and transporting the failed pipe section and other evidence from the Failure Site. TC shall provide PHMSA with the opportunity to have a representative be present for any metallurgical testing performed, regardless of location.
4. **Remedial Work Plan.** Within 120 days following receipt of this Order, TC must submit a Remedial Work Plan (RWP) to the Director for approval. The plan must provide for the verification of the integrity of the Affected Segment and must address all factors known or suspected in the Failure, including, but not be limited to, the integration of the following information, conducted and documented in accordance with sound engineering principles, as follows:
 - A. A review of records for the entire construction Spread 2A, in-line inspection reports, and any other data pertinent to the analysis of the failed pipe;
 - B. A proposal to analyze available data on other weight locations, for similar characteristics as the Failure location;
 - C. The performance of internal inspections with technologies appropriate to identify mechanical damage and/or crack indications with similar characteristics to those of the Failure; and
 - D. Utilizing all information gained through history review, operational experience, the failure investigation, and root cause analysis, integrate all available data and implement a RWP designed to prevent reoccurrence.
5. **Removal of Pressure Restriction.** The Director may allow the removal or modification of the pressure restrictions described above upon a written request from TC 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 and considering all known defects, anomalies, and operating parameters of the Keystone Pipeline.
6. **Root Cause Failure Analysis.** Within 90 days following receipt of the metallurgical analysis from NTSB, complete a root cause failure analysis (RCFA) and submit a final report of this RCFA to the Director. The RCFA must be supplemented/facilitated by an independent third party acceptable to the Director and must document the decision-making process used in the analysis and all factors contributing to the Failure. The final report must include findings and any lessons learned and whether the findings and any lessons learned are applicable to other locations on the Keystone Pipeline.
7. **Order Revisions.** Upon approval by the Director, the RWP shall automatically be incorporated into this Order and shall be revised as necessary to incorporate the results of actions undertaken pursuant to this Order and, whenever necessary, to incorporate new information obtained during the failure investigation and remedial activities. TC must submit any such plan revisions to the Director for prior approval. The Director may approve plan elements incrementally.

8. **Implementation of Approved Work Plan.** TC must implement the RWP as approved by the Director, including any revisions to the plan.
9. **Quarterly Reports.** TC must submit quarterly reports to the Director that:
 - a. Include all available data and results of the testing and evaluations required by this Order; and
 - b. Describe the progress of the repairs or other remedial actions being undertaken under this Order. The first quarterly report for the period from November 16, 2017, through March 31, 2018 shall be due by April 15, 2018.

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.

With respect to each submission under this Order that 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 Respondent 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 the submission, Respondent shall correct all deficiencies within the time specified by the Director, and resubmit it for approval. If a resubmitted item is disapproved in whole or in part, the Director may again require Respondent to correct the deficiencies in accordance with the foregoing procedure, and the Director may otherwise proceed to enforce the terms of this Order.

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. 3-2017-5008H" and for each document you submit, please provide a copy in electronic format whenever possible. The actions required by this Order are in addition to and do not waive any requirements that apply to the Keystone Pipeline under 49 C.F.R. Parts 190 through 199, the Special Permit, 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.

TC 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 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 Order are effective upon service in accordance with 49 C.F.R. § 190.5.

November 28, 2017

Alan K. Mayberry
Associate Administrator
for Pipeline Safety

Date Issued