

**JULY 30 2012**

**VIA CERTIFIED MAIL AND FAX TO: 832-325-5473**

Mr. Richard Adams  
Vice President, US Operations  
Enbridge Energy, LP  
City Center Office  
1409 Hammond Avenue  
Superior, WI 54880-5247

**Re: CPF No. 3-2012-5017H**

Dear Mr. Adams:

Enclosed is a Corrective Action Order issued in the above-referenced case. It finds that operation of the 24-inch diameter Line 14 would be hazardous to life, property, and the environment without immediate corrective action. The Corrective Action Order requires you to take certain corrective actions to protect the public, property, and the environment in connection with the failure of Line 14 that occurred on July 27, 2012, near Grand Marsh, Wisconsin. 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 failure in a manner that will ensure the safe operation of the pipeline. Please direct any questions on this matter to David Barrett, Director, Central Region, OPS, at (816) 329-3800.

Sincerely,

Jeffrey D. Wiese  
Associate Administrator  
for Pipeline Safety

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

cc: Mr. Alan Mayberry, Deputy Associate Administrator for Field Operations, OPS  
Mr. David Barrett, Director, Central Region, OPS  
Mr. Mark Maki, President, Enbridge Energy Management, LLC  
Mr. Steve Wuori, President, Liquids Pipelines, Enbridge Pipelines Inc.

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

In the Matter of	)	
	)	
Enbridge Energy, LP,	)	CPF No. 3-2012-5017H
	)	
Respondent.	)	
	)	

**CORRECTIVE ACTION ORDER**

**Purpose and Background**

This Corrective Action Order (Order) is being issued, under authority of 49 U.S.C. § 60112, to Enbridge Energy, LP (Enbridge or Respondent), the operator of the 24-inch diameter hazardous liquid pipeline designated as Line 14 that runs from Respondent’s Superior Terminal and pump station in Superior, Wisconsin, to its Mokena delivery facility in Mokena, Illinois (Affected Pipeline). This Order finds that continued operation of the pipeline without corrective action would be hazardous to life, property, or the environment and requires Respondent to take immediate corrective action to ensure the safe operation of the pipeline.

On July 27, 2012, Respondent experienced a failure on the Affected Pipeline near Grand Marsh, WI (Failure), in Adams County. Respondent estimates the volume of product spilled to be approximately 1,200 barrels of crude oil.

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 Failure. OPS has determined that the release originated from the Affected Pipeline but the cause of the Failure has not yet been determined. The preliminary findings of the investigation are as follows:

**Preliminary Findings**

- The Affected Pipeline originates at the Superior Terminal in Wisconsin, proceeds southeast for approximately 467 miles, and terminates at the Mokena delivery facility near Chicago, Illinois.
- At approximately 2:41 pm CDT on July 27, 2012, Respondent’s control center staff noted indications of a release on the Affected Pipeline. Respondent initiated shut down of the pipeline and notified field personnel in Wisconsin at 3:00 pm CDT.

- At approximately 2:45 pm CDT on July 27, 2012, Respondent received a call from a landowner who reported that crude oil was spraying on the pipeline right-of-way. The local sheriff's office also called the control center at 2:50 pm CDT.
- At approximately 2:55 pm CDT on July 27, 2012, Respondent isolated the failed pipe section by closing remotely controlled valves located upstream and downstream of the Failure site.
- At 3:27 pm CDT on July 27, 2012, Respondent's field personnel confirmed the location of the Failure as being approximately 5.7 miles east of Grand Marsh, Wisconsin, at 2487 County Road G in Adams County. The Failure site was located at milepost (M.P.) 232 on the Affected Pipeline.
- At 5:16 pm CDT on July 27, 2012, Respondent notified the National Response Center of the discharge of crude oil (NRC Report No. 1019189). Respondent reported 1,200 barrels of crude oil were released.
- Two households were evacuated due to their proximity to the Failure site. Several cattle and horses required veterinary attention. No further injuries have been reported.
- The Affected Pipeline crosses multiple rivers, including a navigable waterway, i.e., the Illinois River in the Chicago area, and intersects multiple High Consequence Areas (HCAs), including drinking water sources, "Other Populated Areas," "High Population Areas," and ecological resources. The Affected Pipeline also crosses numerous state highways in Wisconsin and Illinois, and multiple interstate highways before terminating at Mokena, Illinois.
- The Failure site is 2.5 miles away from a drinking water source, which so far shows no signs of contamination.
- The Affected Pipeline was constructed in 1998 of 24-inch, API 5L grade X70, high frequency electric resistance welded (ERW) pipe manufactured by the Stupp Pipe Corporation, with wall thicknesses ranging from 0.328-inch to 0.500-inch. The pipe at the Failure site has a 0.328-inch nominal wall thickness. The Affected Pipeline has a fusion bonded epoxy coating and an impressed-current cathodic protection system.
- Just prior to the time of the Failure, the discharge pressure at the Adams pump station (M.P. 227.4), located approximately 4.6 miles upstream of the Failure site, was 1,329 psig. The established maximum operating pressure (MOP) of the pipeline is 1,378 psig.
- Respondent performed a hydrostatic test of the pipeline in 1998 from M.P. 227.49 to M.P. 253.15 to a test pressure of 1,875 psig, which included the Failure site.
- The cause of the Failure is unknown but PHMSA has is continuing an onsite investigation. PHMSA investigators observed a 4.18-foot-long split in the high

frequency ERW seam of the pipe with a maximum opening of 6.25 inches. The pipeline currently remains out of service.

- During construction of the Affected Pipeline in 1998, radiography of girth welds revealed lack-of-fusion defects in the ERW seams at multiple locations along the Affected Pipeline.
- On January 1, 2007, a rupture of the Affected Pipeline occurred in Atwood, Wisconsin, releasing 1,500 barrels of crude oil. The rupture was located at M.P. 149.4, approximately one mile downstream of Respondent's Owen pump station in Clark County, Wisconsin. The OPS investigation of the 2007 failure found that a pre-existing lack-of-fusion defect in the ERW seam had grown to failure by a fatigue mechanism due to cyclic loads and that the chemical and mechanical properties of the pipe joint fracture surface also had indications of low toughness of the ERW seam.
- Following the January 1, 2007 failure, Respondent utilized ultrasonic crack detection technology to assess the Affected Pipeline. Multiple crack anomalies associated with the ERW seam were reported by the inline inspection (ILI) vendor. Based on the ILI results, Respondent made repairs to the Affected Pipeline for a 1.25 x MOP factor of safety. Calculations performed by Respondent in 2008 predicted that Line 14 would not fail for a minimum of 10 years based on a crack growth analysis that considered the operating pressure spectrum.
- Respondent performed an ILI of the Affected Pipeline in the area of the Failure in 2011 utilizing high-resolution geometry and magnetic flux leakage (MFL) tools. An ultrasonic crack detection technology ILI inspection was scheduled to be performed in the area of the failure in August 2012.
- The history of failures on Respondent's Lakehead Pipeline system, of which the Affected Pipeline is a part, the defects originally discovered during construction, and the 2007 failure indicate that Respondent's integrity management program may be inadequate.

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

Under 49 U.S.C. § 60112 and 49 C.F.R. § 190.233, the Associate Administrator for Pipeline Safety (Associate Administrator) may issue a corrective action order after providing reasonable notice and the opportunity for a hearing if he finds that a particular pipeline facility is or would be hazardous to life, property, or the environment. The terms of such an order may include the suspended or restricted use of a pipeline facility, physical inspection, testing, repair, replacement, or any other action as appropriate. The Associate Administrator may also issue a corrective action order without providing any notice or the opportunity for a hearing if he finds that a failure to do so expeditiously will result in likely serious harm to life, property or the

environment. The opportunity for a hearing will be provided as soon as practicable after the issuance of the CAO in such cases.

After evaluating the foregoing preliminary findings of fact, I find that the continued operation of the pipeline without corrective measures would be hazardous to life, property and the environment. Additionally, after considering the age and failure history of the pipe, the circumstances surrounding the Failure, the proximity of the pipeline to populated areas, water bodies, drinking water resources, public roadways, and High Consequence Areas, the hazardous nature of the product being transported, the uncertainties as to the cause of the Failure, and the ongoing investigation to determine the cause of the Failure, I find that a failure to issue this Order expeditiously to require immediate corrective action would likely result in serious harm to life, property, and the environment. Accordingly, this Corrective Action Order 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, delivered personally, by mail or by fax at (202) 366-4566. The hearing will be held in Kansas City, Missouri, or Washington, DC, on a date that is mutually convenient to PHMSA and Respondent.

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 Action**

Pursuant to 49 U.S.C. § 60112, Enbridge Energy, LP, is ordered to immediately take the following corrective actions to ensure the safe operation of the Affected Pipeline:

1. Develop and submit a written re-start plan for prior approval of the Director, Central Region, OPS (Director). Obtain written approval from the Director prior to resuming operation of the Affected Pipeline. Submit the written plan to the Director at the Pipeline and Hazardous Materials Safety Administration, 901 Locust Street, Suite 462, Kansas City, MO 64106-2641. The plan must provide for adequate patrolling of the Affected Pipeline during the restart process to ensure the prompt detection of leaks, include a daylight restart, and detail advance communications with local emergency response officials.
2. After receiving approval from the Director to restart, maintain a minimum twenty percent (20%) pressure reduction in the operating pressure of the Affected Pipeline. Submit the operating pressures for each pump station on the Affected Pipeline at the time of failure and the reduced discharge pressure limits for approval by the Director in the restart plan

referenced in Item 1. The reduced discharge pressure limits must also consider any ILI features and anomalies that are present in the Affected Pipeline to provide for continued safe operation while further corrective actions are completed. The approved pressure restrictions will remain in effect until written approval to increase the pressure or return the pipeline to its pre-failure operating pressure is obtained from the Director pursuant to Item 12. Respondent must maintain documentation to show that these requirements have been met.

Review the pressure restrictions monthly, taking into account any ILI features present in the pipeline and analysis of operating pressure cycle data. Based on the monthly review, Enbridge must immediately reduce operating pressure accordingly to maintain safe operations. Submit results of the monthly review, the current discharge set points, including any additional reductions, and any exceedance of discharge set points, in the reports pursuant to Item 10.

3. Within 45 days of receipt of this Order, complete mechanical and metallurgical testing and failure analysis of the failed pipe and other pipe removed, including analysis of soil samples and any foreign materials. Complete the testing and analysis as follows:
  - A. Document the chain-of-custody when handling and transporting the failed pipe section and other evidence from the failure site;
  - B. Submit the testing protocols and the selection of the testing laboratory to the Director 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, to the Director at the same time as they are made available to Respondent.
4. Within 30 days of receipt of this Order, conduct an evaluation of the previous inline inspection (ILI) results, including a review and reporting by the ILI vendors' analysts (including raw data) of the Affected Pipeline as follows:
  - A. Submit any and all reports from the 2007 ILI runs as received from the vendors;
  - B. Re-evaluate the 2007 inline inspection results to determine whether any features were present in the failed pipe joint and other pipe removed. Determine if any features with similar characteristics are present elsewhere on the Affected Pipeline. Submit to the Director the scheduled dates, times, and locations of meetings with the ILI vendors to allow PHMSA representatives to attend;

- C. Submit a report describing the ILI features present in the failed joint and other pipe removed, the process used to re-evaluate ILI results, and the results of the re-evaluation including characterization of the size and location of similar features on the Affected Pipeline.
5. As recommended in PHMSA Advisory Bulletin 2012–06, verify the records for the Affected Pipeline relating to operating specifications for maximum operating pressure (MOP). Within 45 days of receipt of this Order, submit a report on this record verification and copies of these records to the Director.
  6. Within 90 days following receipt of this Order, complete an evaluation utilizing multiple root cause failure analysis techniques, including a Management Oversight and Risk Tree (MORT) analysis, to determine the underlying causes and contributing factors to the Failure, including preventive measures employed by Enbridge. Within 10 days of receipt of this Order, submit a list of proposed independent third-party contractors for prior approval by the Director, along with contractor qualifications and scope of work. The scope of the evaluation must include, but not be limited to: Enbridge’s procedures; failure, operating and maintenance history; use of safety factors; review of ILI results; application of assessment methods, analysis and monitoring of pressure cycles in determining assessment intervals and operating pressures; decision processes regarding repair methods, including pipe replacement; a detailed review of the adequacy of the operator’s spill prevention plans; and a detailed review of all emergency response activities, including initial controller response. All reports in their entirety (including all media), whether draft or final, shall be submitted to the Director at the same time they are made available to Respondent. Submit the final report for the Director’s approval.
  7. Within 90 days following receipt of this Order, submit an integrity verification and remedial work plan (Work Plan) for implementing continuing long-term periodic testing to the Director for approval. The Work Plan must provide for the verification of the integrity of the pipeline and must address all factors known or suspected in the July 27, 2012 failure, including, but not limited to the following:
    - A. The integration of the results of the failure analyses and other actions required by this Order, with all relevant operating data, including all historical repair information, construction, operating, maintenance, testing, metallurgical analysis or other third-party consultation information, and assessment data for the Affected Pipeline. Data gathering activities must include a review of the failure history of the pipeline (including in-service and pressure test failures) and development of a written report to be approved by the Director containing all available information regarding locations, dates, and causes of leaks and failures;
    - B. The performance of additional field testing, inspections, and evaluations to determine whether and to what extent the conditions associated with the failures,

or any other integrity-threatening conditions are present elsewhere on the Affected Pipeline. At a minimum, the inspections and evaluations must consider use of in-line inspection that can reliably detect and identify anomalies. Include a detailed description of the criteria to be used for the evaluation and prioritization of any integrity threats and anomalies that are identified (accounting for uncertainties in anomaly and defect sizing by the ILI vendor and field non-destructive examination), establishing a minimum 1.39 x MOP factor of safety upon completion of testing, inspections, evaluations, replacements and repairs as described in this Order;

- C. The performance of repairs or other corrective measures that fully remediate the conditions associated with the pipeline failures and any other integrity-threatening condition everywhere along the Affected Pipeline. The plans must be based on the known history and condition of the pipeline, and must be scheduled to be completed as follows: (1) repairs must be completed within 6 months of receipt of the ILI vendor's final report; (2) confirmatory hydrostatic pressure testing of the Affected Pipeline by December 31, 2013; and (3) replacement of the Affected Pipeline or portions thereof by July 31, 2015. Include a detailed description of the criteria and methods to be used in undertaking any repairs, replacements, or other remedial actions to establish a minimum 1.39 x MOP factor of safety.
8. The approved Work Plan will be incorporated into this Order. Respondent must revise the Work Plan 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. Submit any such plan revisions to the Director for prior approval. The Director may approve plan elements incrementally.
  9. Implement the Work Plan as it is approved by the Director, including any revisions to the plan.
  10. Submit monthly reports to the Director that: (1) include all available data and results of the testing and evaluations required by this Order; and (2) describe the progress of the repairs or other remedial actions being undertaken. The first monthly report for the period from August 1 through August 31, 2012 shall be due by September 7, 2012.
  11. It is requested that Respondent 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 infrastructure, including repairs, replacements and other modifications; and (3) environmental remediation, if applicable.
  12. The Director may allow the removal or modification of the pressure restriction set forth in Item 2 upon a written request from Respondent demonstrating that the hazard has been



abated and 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.

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 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 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 must take all actions required by the submission as approved or modified by the Director. If the Director disapproves all or any portion of the submission, Respondent must 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), you must provide, along with the complete original document, a second copy of the document with those portions you believe qualify for confidential treatment redacted, along with 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. 3-2012-5017H” and for each document you submit, please provide a copy in electronic format whenever possible. 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 195, 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.

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 Corrective Action Order are effective upon receipt.

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Jeffrey D. Wiese  
Associate Administrator  
for Pipeline Safety

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Date Issued