

**VIA CERTIFIED MAIL AND FACSIMILE TO: (713) 495-7432**

December 21, 2009

Mr. Dwayne Burton  
Vice President, Operations and Engineering  
Kinder Morgan Energy Partners, L.P.  
One Allen Center  
500 Dallas Street, Suite 1000  
Houston, TX 77002

Re: CPF No. 3-2009-1024H

Dear Mr. Burton:

Enclosed is a Notice of Proposed Corrective Action Order (Notice) issued in the above-referenced case. The Notice proposes that you take certain measures with respect to Spread I of your Rockies Express East Pipeline that failed on November 14, 2009. Service is being made by certified mail and facsimile. Your receipt of this Notice constitutes service of that document under 49 C.F.R. § 190.5.

If you have any questions regarding this Notice, please direct them to me at (816) 329-3829. Thank you for your cooperation.

Sincerely,

Ivan A. Huntoon  
Director, Central Region

Enclosures: Notice of Proposed Corrective Action Order  
Copy of 49 C.F.R. § 190.233

**DEPARTMENT OF TRANSPORTATION  
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION  
OFFICE OF PIPELINE SAFETY  
CENTRAL REGION  
KANSAS CITY, MO 64106**

In the Matter of	)	
	)	
Kinder Morgan Energy Partners, L.P.,	)	CPF No. 3-2009-1024H
	)	
Respondent	)	
	)	

**NOTICE OF PROPOSED CORRECTIVE ACTION ORDER**

**Background and Purpose**

On November 14, 2009, a failure occurred on the Rockies Express interstate natural gas pipeline operated by Kinder Morgan Energy Partners, L.P. (Respondent) near Philo, Ohio, resulting in the release of natural gas. The cause of the failure has not yet been determined. Pursuant to 49 U.S.C. § 60117, the Pipeline and Hazardous Materials Safety Administration (PHMSA) initiated an investigation of the failure.

PHMSA issues this Notice of Proposed Corrective Action Order, in accordance with 49 U.S.C. § 60112, notifying Respondent of the preliminary findings of the investigation, and proposing that Respondent take corrective measures to protect the public, property, and the environment from potential hazards associated with the failure.

**Preliminary Findings**

- At approximately 10:20 a.m. local time on November 14, 2009, pipe in Spread I of Respondent's 42-inch Rockies Express East Pipeline running from Mile Post (MP) 547.9 to MP 578.8 (hereafter "REX-East Spread I") failed near the town of Philo, Ohio (Muskingum County). The failure occurred at MP 575.5, approximately ½-mile downstream of the Chandlersville Compressor Station. The accident was reported to the National Response Center (NRC Report No. 923529).
- Respondent reported to PHMSA that the failure resulted in the release of approximately 127,046 thousand cubic feet (MCF) of natural gas. No fires, injuries, or fatalities were reported in connection with the failure but several homes in the area were evacuated.

- Respondent's personnel at a nearby compressor station audibly detected the failure and initiated a shutdown. Respondent closed the upstream block valve at the Chandlersville Compressor Station at MP 575.0 and the downstream block valve at MP 590.5.
- A preliminary inspection at the failure site indicated a field girth weld (welded by the shielded metal arc weld (SMAW) process) failure at the top of the pipe at a transition from line pipe to a segmented induction bend. The sag bend was near the low point of a valley in hilly terrain and indications of excessive longitudinal stresses were present.
- Respondent removed the section of pipe containing a 2-foot pup, the failed girth weld, the cut down fitting, girth weld, and another 2-foot pup. The two girth welds each containing 2-foot of pipe and a 2-foot piece of the fitting were sent to a metallurgist for analysis. On November 25, 2009, Respondent provided PHMSA with Metallurgical Investigation Report NGI-09-46. The report indicated the following:
  - The caliper tool survey noted ovality in the sag bend indicating that the field modified induction bend appeared to be under stress. The ovality was confirmed by diameter measurements;
  - The coating contained circumferential cracks indicative of pipe deformation.
  - Pipe body cross sections through the fracture indicated deformation or "necking" indicating the tensile strength was exceeded;
  - Indications of poor joint fit-up and misalignment of the field cut segmented induction bend were found; and
  - The weld joint was prepared using a taper angle that exceeded the maximum internal taper allowed by the ASME B31.8 standard and Respondent's procedures.
- The Rockies Express East Pipeline was newly constructed in 2009 and extends approximately 638 miles from Missouri to Ohio. The line is part of the larger Rockies Express system that originates in Colorado. REX-East Spread I is approximately 31 miles in length and crosses Muskingum and Perry Counties in the southeastern part of Ohio.
- Line pipe used in REX-East Spread I consists of 42-inch nominal diameter, Grade X-70, double-submerged arc welded (DSAW) 0.555-inch wall thickness spiral weld pipe manufactured by Wellspun and has a fusion bond epoxy coating. The factory induction bends used have wall thicknesses of 0.740, 0.888, and 1.0-inches.
- The maximum allowable operating pressure (MAOP) of the line at the time of the failure was 1480 psig based on 80 percent SMYS, however the pipeline was restricted to a MAOP of 1332 psig corresponding to 72 percent SMYS pending certain requirements being met. The pressure recorded at the Chandlersville Compressor

Station discharge was 1197 psig and the failure occurred approximately 1660 feet downstream of this point.

- Respondent reported that it performed hydrostatic testing of REX-East Spread I prior to performing rough clean-up of the right-of-way using heavy equipment.
- Respondent reported that it performed an inline inspection of REX-East Spread I using a geometry tool following hydrostatic testing but prior to rough clean-up.

### **Allegation of Hazardous Condition and Right to Hearing**

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

After evaluating the foregoing preliminary findings of fact and considering the pipe materials involved, the manufacturer, the construction practices used, the hazardous nature of the product transported, the pressure required for transporting such product, the accessibility of the pipeline route to the public, the information contained in Metallurgical Investigation Report NGI-09-46, and the ongoing investigation to determine the root cause of the failure, it appears that the continued operation of REX-East Spread I from MP 547.9 to MP 578.8 without corrective measures would be hazardous to life, property, and the environment.

Accordingly, PHMSA issues this Notice of Proposed Corrective Action Order to notify Respondent of the agency's intent to issue a Corrective Action Order and to propose that Respondent take measures specified herein to protect the public, property, and the environment.

### **Response to this Notice**

Respondent may request a hearing on this Notice, to be held as soon as practicable, by notifying the Director, Central Region, PHMSA, 901 Locust Street, Suite 462, Kansas City, MO 64106 in writing within 10 days of service of this notice. Failure to submit such written notification waives the opportunity for a hearing and allows the Associate Administrator for Pipeline Safety to proceed to determine whether or not a Corrective Action Order is required in accordance with 49 C.F.R. § 190.233. If a hearing is requested, it will be held telephonically or in-person in Kansas City, Missouri, on a date that is mutually convenient to Respondent and PHMSA.

As soon as practicable after the conclusion of a hearing, or if no hearing is requested, the Associate Administrator for Pipeline Safety will determine whether or not a Corrective Action Order is required. If the Associate Administrator finds the facility is or would be hazardous to life, property, or the environment, the Associate Administrator shall issue a Corrective Action Order in accordance with 49 C.F.R. § 190.233. If the Associate Administrator does not find the facility is or would be hazardous to life, property, or the environment, the Associate

Administrator shall withdraw the allegation of the existence of a hazardous condition contained in this Notice, and promptly notify Respondent in writing.

### **Proposed Corrective Action**

Pursuant to 49 U.S.C. § 60112 and 49 C.F.R. § 190.233, PHMSA proposes to issue to Kinder Morgan Energy Partners, L.P. a corrective action order incorporating the following remedial requirements with respect to REX-East Spread I from MP 547.9 to MP 578.8:

1. Prior to resuming operation of REX-East Spread I, develop and submit a written re-start plan for prior approval of the Director, Central Region, OPS, Pipeline and Hazardous Materials Safety Administration, 901 Locust Street, Suite 462, Kansas City, MO 64106-2641 (Director).
2. The restart plan must include all of the following elements:
  - (A) The performance of metallurgical testing and failure analysis as follows:
    - When handling and transporting the failed pipe section and other evidence from the failure site, document the chain-of-custody;
    - Obtain the Director's prior approval of the mechanical and metallurgical testing protocols, including approval of the testing laboratory;
    - 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
    - Ensure that the testing laboratory distributes all resulting reports, whether draft or final, to the Director at the same time as they are made available to Respondent.
  - (B) A detailed review of the data from the Enduro caliper tool inspection including the minimum and maximum pipe diameters including bend and pipe wall thickness, induction bend ovality (% OD), a profile diagram, and depth measurements within 6-inches on either side of both the field cut and factory cut ends of all field segmented induction bends for the purpose of identifying the induction bends to be excavated and evaluated. Make this information available to the Director.
  - (C) A detailed review of the welding inspection records including all transition welds, backfill and rough clean-up records, induction bend procedure and inspection records, and segmenting of induction bend procedure and inspection records for each induction bend. Make this information available to the Director.

- (D) The performance of finite element analysis (FEA) of the joint configuration and weld defect interaction associated with the failed girth weld and additional FEA analyses will be completed utilizing the additional information gathered during the recent fitting removal and examination program undertaken by Respondent. FEA analysis should include worst case joint geometry of approximately 3/8-inch maximum external misalignment and weld defects that were found during the recent investigation that do not meet API 1104 standards for weld quality.
- (E) Based on the results of the FEA and other actions conducted pursuant to this item, conduct the excavation, weld radiographing and alignment examination of the field segmented induction bends located in terrain similar to the terrain at the failure site, or alternatively run an in-line inspection on Spread I using a tool capable of assessing girth welds.
- (F) Based on the actions and evaluations performed pursuant to paragraphs (A)–(E) of this item, segmented induction bends are to be cut out and replaced as appropriate based on a risk-ranked matrix that includes but is not limited to the following factors:
- Whether induction bend was cut in the field;
  - Whether records exist indicating the wall thickness offset has an internal transition that does not meet Respondent's procedures;
  - Whether the induction bend was field cut in the bending radius in one or more locations, leaving one or both ends of the induction bend field segmented prior to installation in the pipeline. Particular consideration should be given for segmented induction bends that were cut in the original induction bend between 30 and 60 degrees.
  - Whether the pipe out-of-round axis tolerance exceeds API 5L limits of  $\pm 1$  percent or  $\leq 0.625$ -inches for pipe diameter to wall thickness ( $D/t$ )  $\leq 75$ ;
  - Whether construction records indicate the induction bend may not have been properly backwelded;
  - Whether construction records indicate that rough clean up was performed after hydrostatic testing; and
  - Whether construction records indicate the use of excessive force in accomplishing a tie-in that may have placed undue stress on an existing girth weld.
- (G) Any replacement bends for cut outs of defective segmented induction bends must be installed as follows:

- Pipe and induction bend bevel design must be in accordance with ASME B31.8 and Respondents procedures for wall thickness variances;
  - Tolerances for weld ends must be taken into account in accordance with API 5L Table 8 and ASME B31.8 to ensure that segmented induction bend bevel design and weld alignment tolerances do not create undue stress risers in the new joint design and weld;
  - Replacements must be welded and backwelded in accordance with API 1104 and Respondents approved welding procedures and hydrostatically tested in accordance with Part 192, Subpart J;
  - Appropriate on-site quality control personnel must be present to provide oversight;
  - Adequate support for the pipe and induction bend must be provided and applicable backfill procedures followed to ensure the segmented induction bends and associated welds are not unduly stressed; and
  - Maintain complete records of all replacements and make the records available to PHMSA.
- (H) Provision for adequate patrolling of the pipeline segment during the restart process. Specify a daylight restart and detail advance communications with local emergency response officials.
- (I) Conduct two instrumented leak surveys of Spread I, at 600 psig and again at 1080 psi, either ground or aerial leak surveys can be used.
- (J) Perform ongoing ground patrols on a weekly basis to observe for any loading or earth movement that may place additional loads on the pipeline. The use of high speed aerial patrols can not be used to meet this requirement.
3. Perform all field work involved in the restart plan and provide the Director with ongoing updates as to the results of the field work. Based on the results or any other relevant data, the Director may require other actions, including high resolution caliper or deformation tool in-line inspections or hydrostatic testing prior to resumption of operations.
  4. Obtain written approval to resume operation of the line from the Director prior to resuming operation.
  5. After receiving approval from the Director to restart the line, establish a reduced maximum operating pressure on REX-East Spread I that does not exceed 1080 psig. All affected compressor stations and pressure control devices must be set to ensure this reduced maximum operating pressure is not exceeded. This pressure restriction 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.

6. Within 30 days following receipt of the order, develop and submit to the Director for approval a written remedial work plan that includes corrective measures. The work plan must fully address all known or suspected factors that caused or contributed to the November 14, 2009 failure and must include all of the following elements:
  - (A) The integration of the information developed from the actions required by Items 1-5 with any relevant pipeline system information, including: construction records, hydrostatic testing records, previous failure investigations, leak history, repair records, internal inspections, operating procedures, and other relevant operating data for the purpose of performing a comprehensive root cause analysis of the available information associated with the factors that caused or contributed to the failure.
  - (B) The performance of any additional field testing, inspections, and evaluations to determine whether and to what extent the conditions associated with the failure, or any other integrity-threatening conditions, are present elsewhere on the line. The field testing must include:
    - Consideration of a high-resolution deformation tool in-line inspection capable of  $\pm 1$  percent accuracy;
    - Consideration of a hydrostatic test to 100 percent SMYS;
    - A detailed description of the criteria to be used for the evaluation and prioritization of any integrity threats/anomalies that are identified;
    - Make the results of the inspections, field excavations, and evaluations available to PHMSA or its representative; and
    - The performance of repairs or other corrective measures not already made prior to the restart that fully remediate the condition(s) associated with the pipeline failure and any other integrity-threatening condition everywhere along the pipeline where such conditions are identified by the evaluation process. Include a detailed description of the repair criteria and method(s) to be used in undertaking any repairs or other remedial actions.
  - (C) Provisions for continuing long-term periodic testing and integrity verification measures to ensure the ongoing safe operation of the pipeline considering the results of the analyses, inspections, and corrective measures undertaken pursuant to the Corrective Action Order.
  - (D) A proposed schedule for completion of the actions required by paragraphs (A) through (C) of this Item.

7. Revise the remedial work plan as necessary to incorporate new information obtained during the failure investigation and associated remedial activities. Submit any such plan revisions to the Director for prior approval. The Director may approve plan elements incrementally. The remedial work plan shall become incorporated into the corrective action order.
8. Implement the work plan as it is approved by the Director, including any revisions to the plan.
9. Submit quarterly reports to the Director that: (1) include available data and results of the testing and evaluations required by this Order; and (2) describe the progress of the repairs and other remedial actions being undertaken.
10. Maintain documentation of the costs associated with implementation of the corrective action order. Include in each quarterly report submitted pursuant to Item 9, the to-date total costs associated with: (1) preparation and revision of procedures, studies and analyses; and (2) physical changes to pipeline infrastructure, including repairs, replacements and other modifications.
11. The Director may allow the removal or modification of the pressure restriction set forth in Item 5 upon a written request from Respondent demonstrating that the hazard has been abated and that restoring the affected pipeline, or portion thereof, 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.
12. 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.
13. 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 the 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. In the event that 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.
14. Respondent may appeal any decision of the Director to the Associate Administrator for Pipeline Safety. Decisions of the Associate Administrator shall be final.

The actions proposed by this Notice of Proposed 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. Parts 190 through 199, 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.

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

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Ivan A. Huntoon  
Director  
Central Region, PHMSA

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Date Issued