



U.S. Department  
of Transportation

**Pipeline and  
Hazardous Materials Safety  
Administration**

400 Seventh Street, S.W.  
Washington, D.C. 20590

APR 20 2006

Mr. Ron McClain  
Vice-President  
Operations and Engineering Products Pipelines  
Kinder Morgan Energy Pipelines  
500 Dallas Street, Suite 100  
Houston TX 77002

Re: Kinder Morgan CPF No. 1-2006-5003-H

Dear Mr. McClain:

Enclosed is a Corrective Action Order issued by the Associate Administrator for Pipeline Safety in the above-referenced case. It requires you to take certain corrective actions with respect to the operation of your pipeline.

Service is being made by certified mail and facsimile. Your receipt of the enclosed document constitutes service of that document. The terms and conditions of this Corrective Action Order are effective upon receipt.

Sincerely,

A handwritten signature in black ink, appearing to read "James Reynolds".

James Reynolds  
Pipeline Compliance Registry  
Office of Pipeline Safety

Enclosure

**VIA CERTIFIED MAIL (RETURN RECEIPT REQUESTED) AND FAX**

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

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In the Matter of )  
Kinder Morgan Energy Pipelines, )  
Respondent. )  
\_\_\_\_\_ )

CPF No. 1-2006-5003-H

**CORRECTIVE ACTION ORDER**

**Purpose and Background**

This Corrective Action Order is being issued, under authority of 49 U.S.C. § 60112, to require Kinder Morgan Energy Pipelines (Respondent) to take the necessary corrective action to protect the public and environment from potential hazards associated with a failure on Respondent's 12-inch petroleum product pipeline.

On or about April 17, 2006, a failure occurred on Respondent's Plantation Pipeline in Henrico County, VA, resulting in the release of jet fuel. Pursuant to 49 U.S.C. § 60117, the Eastern Region, Pipeline and Hazardous Materials Safety Administration (PHMSA), assisted by the Virginia State Corporation Commission (SCC) acting as agent, initiated an investigation of the failure.

**Preliminary Findings**

1. On or about April 17, 2006, at 4:40 p.m. EDT, Respondent's Plantation Pipeline experienced a failure in Henrico County, approximately 11.5 miles NNW of Richmond, VA. The failure resulted in the release of an unknown quantity of jet fuel in a residential area. The jet fuel sprayed for approximately 14 minutes and the spray traveled the distance of approximately 200 feet. The jet fuel did not ignite.
2. The failure occurred in a residential area. The jet fuel sprayed two homes adjacent to the pipeline. As a precaution, the power was shutoff at nine homes.
3. There were no deaths or injuries.
4. The line is routed through populated areas in Henrico County, Virginia and passes within 1-2 miles of numerous small communities along the route as well populated areas designated as

High Consequence Areas (HCA). Ninety-one (91) of the one hundred and one (101) miles of pipeline could affect HCAs. The pipeline also crosses numerous state and public roadways, including I-64, I-295 and US 250. and as well as crossing rivers, drainage areas, and streams.

5. Following the failure, Respondent isolated the line by closing the upstream mainline valve #3 at (MP 10.2) which is 4 miles from the failure site and the downstream mainline block valve #4 at (MP 28.0) which is 13.8 miles from the failure site. Vacuum trucks were positioned to remove jet fuel from the pipeline.
6. The preliminary investigation indicates a seam failure. The rupture propagated along the longitudinal seam. The length of the rupture is approximately 38 inches long and located at the 10:00 o'clock position. The split is approximately 2 inches wide at its widest point. This preliminary determination is based on a visual examination of the pipe.
7. The failed pipe segment will be sent to Kiefner & Associates, Inc. metallurgical laboratory for further analysis.
8. The maximum operating pressure (MOP) of the 12-inch petroleum product pipeline is 1,080 psig. The discharge pressure at Richmond Pump Station (MP 0.0) was 1,154 psig at the time of failure. Respondent exceeded the established MOP for the pipeline. The failed segment of the 12-inch pipeline is approximately 800 feet north of Church Street in Henrico County, Virginia at MP 14.2.
9. Plantation operates a 3,100-mile long pipeline network and is a subsidiary of Kinder Morgan Energy Pipelines Eastern Operating Area. The pipeline is owned 51% by KinderMorgan and 49% by ExxonMobil. Plantation is one of the largest refined products pipelines in the U.S. This pipeline network serves Atlanta, Charlotte, Washington, D.C., and other destinations in the southeast United States. Plantation delivers more than 20 million gallons of motor gasoline, diesel, home heating fuel, aviation gasoline, kerosene, and commercial and military jet fuels each day.
10. The 12-inch petroleum product pipeline is 101 miles long and originates at the Richmond Junction Pump Station (MP 0.0) in Chesterfield County, proceeds north crossing the James River and continues north to Ashland Station (MP 24.1) in Hanover County on to Bowling Green (MP 49) in Caroline County, then north to Fredericksburg Terminal (MP 64) in the City of Fredericksburg, north through Stafford Station (MP 75); to Cockpit Point (MP 88) in Prince Williams County and ends at the Newington Station (MP 101.5) in Fairfax County.
11. The 12-inch pipeline from the Richmond Junction Station (MP 0.0) to Newington Station Pump Station (MP 101.5) was installed in 1964 and is constructed predominantly of 12-inch x 0.203-inch w.t., API 5L X52, low frequency electric-resistance welded pipe (ERW) pipe manufactured by Bethlehem Steel. The pipe has an asphalt coating.

12. The pipeline was last hydrostatically pressure tested in 1997, with an eight (8) hour test in four sections with pressure ranging from 1,359-1,465 psig. The failure site is within the section tested at 1,359 psig.
13. In March 2005, a Geometry Tool and Rosen Axial Flaw tool runs were performed. Approximately 150 feet upstream of the current discharge incident site, there was an indication from the Rosen tool. A field Shear Wave tool was used for verification and a metal loss signal indicated lamination. A type B sleeve was applied.
14. In December 2005, a GE PII Ultra Scan (CD Crack Pig) was run with no features reported at the failure location site. The raw data from this run was reviewed as a result of this incident and no features were found that met the threshold reporting limits. In 1988, a low resolution MFL and geometry tool was used and the same in 1993. Multiple digs were performed for corrosion with no long seam issues identified. A review by the Eastern Region of PHMSA's Operator Thirty (30) Day Accident Reports show no split seam issues.
15. PHMSA identified low-frequency ERW pipe to be subject to failures in the longitudinal seam because of manufacturing defects. PHMSA issued Alert Notices on January 28, 1988, and again on March 8, 1989, to inform pipeline operators of the problem and to advise them to take additional precautions to limit pressure, to hydrostatically pressure test, and to assure adequate cathodic protection. Failures of the longitudinal seam of the pipe had been caused by the growth over time of manufacturing defects in the ERW seams. Selective corrosion of the seam and cyclic fatigue contribute to the growth of these defects. Although OPS review has also shown that in many cases pipelines that had been hydrostatically tested had operated safely since they were tested, there are also cases in which selective corrosion or cyclic fatigue have led to operating failures many months or years after the test.

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

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

Section 60112, and the regulations promulgated thereunder, provides 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 result in likely 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 12-inch pipeline at normal operating pressures without corrective measures would be hazardous to life, property and the environment. Additionally, after considering the age of the pipe and the method of manufacturing, lack of apparent cause of the failure, the proximity of the pipeline to populated areas, public roads, and environmentally sensitive areas, the pressure required for transporting the material, and the size of the line, I find that a failure to issue expeditiously this Order, requiring immediate corrective action, would result in likely serious harm to life, property, and the environment.

Accordingly, this Corrective Action Order mandating needed 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, delivered personally, by mail or by fax at (202) 366-4566. The hearing will be held in 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. In that event, 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, I hereby order Respondent to immediately take the following corrective actions with respect to its 12-inch Plantation petroleum product pipeline:

1. Maintain a 20 percent (20%) reduction in the operating pressure along the pipeline from Richmond Pump Station (MP 0.0) to Newington Pump Station (MP 101.5). The operating pressure is not to exceed 80 percent (80%) of the maximum operating pressure at Richmond Pump Station. Specifically, the discharge pressure is not to exceed 864 psig, with the trip point at 904 psig, at the Richmond Pump Station. This pressure restriction shall 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, Eastern Region, PHMSA.
2. Conduct a detailed metallurgical analysis of the pipe that failed on April 17, 2006 to determine the cause and contributing factors. Direct Kiefner & Associates to send a copy of the report of this analysis concurrently to Kinder Morgan and to the Director, Eastern Region, PHMSA. The metallurgical analysis shall include evaluation for possible influence of cyclic fatigue and selective seam and crevice corrosion.

3. Commission a third-party consultant to examine the Rosen Axial Flaw tools and the GE PII Ultra Scan (CD Crack Pig) logs and tabulate the results. Provide an analysis of the results reported by the vendor.
4. Provide detailed explanation for why the pressure spike occurred on April 17, 2006 at 15:39:19 to 15:39:44 operator time. Provide detailed explanation for when the SCADA System picked up the leak and compare time to when field personnel called leak in to Respondent.
5. Within 30 days of receipt of this order, develop and submit a written plan, with corrective measures for prior approval by the Director Eastern Region, PHMSA. The plan must verify the integrity of the line from Richmond Pump Station (MP 0.0) to the Newington Pump Station (MP101.5). The plan must also address all known or suspected factors that caused or contributed to the April 17, 2006 failure, including:
  - a) Submit a protocol for mechanical and metallurgical testing of the failed pipe section to the Director, Eastern Region, PHMSA at least one (1) week before the metallurgical examination.
  - b) Address all known or suspected factors in the failure site and any and all anomalies identified by the inspection tools run in 2005, with emphasis on identifying and evaluating the following: 1) anomalies associated with dents, gouges and grooves; 2) metal loss due to corrosion; 3) the orientation of the longitudinal seam of the pipe; 4) pipe deformation, and 5) longitudinal cracks, mill defects and stress corrosion cracking
  - c) Compare actual operating conditions (prior to pressure restrictions) to metallurgical analysis and determine if adjustments in hydraulic operating parameters are necessary to prevent future seam failures.
  - d) Include a detailed description of the inspection and repair criteria that will be used in the field evaluation of the anomalies that are excavated and a description of how any defects are to be graded and the schedule for repairs or replacement.
  - e) Include an integration of all available data from internal inspections, metallurgical analyses, and historical data, including repair and cathodic protection records.
6. Each element of the plan must be approved by the Director, Eastern Region, who may provide approvals incrementally. Implement the plan as approved, including any revisions to the plan.
7. Submit the plan to: Director, Eastern Region, Office of Pipeline and Hazardous Materials Safety Administration, 409 3<sup>rd</sup> Street, S.W., Suite 300, Washington, D.C. 20024. The plan must be revised as necessary to incorporate new information obtained during the failure investigation and remedial activities undertaken pursuant to this Order. Submit any such revision to the Director for prior approval.

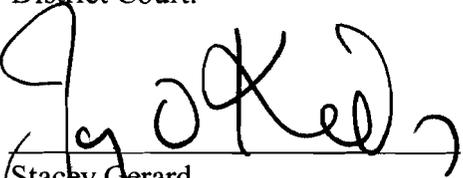
- 8. If a determination is made that a new internal inspection is necessary, provide the Director, Eastern Region with a report of the results of the internal inspection within 2 weeks of receipt of the report, including the identification (and location) of any anomalies that remain in the 12-inch line that have not yet been evaluated or repaired and the criteria used for classifying the anomalies for evaluation. Include your schedule for completing the evaluation and repair of these anomalies.
- 9. Respondent may submit a written request for removal or modification of the pressure restriction. The Director, Eastern Region, may allow the removal or modification of the pressure restriction set forth in Item 1, based on showing that the hazard has been abated and restoring the pipeline to its pre-failure operating pressure is justified based on reliable engineering analysis showing that the pressure increase is safe considering all known defects, anomalies and operating parameters of the pipeline. The Director's determination will be based on cause of failure and provision of evidence that mitigation actions taken by the operator provide for the safe operation of the pipeline.
- 10. Respondent shall maintain documentation of the costs associated with fulfilling this Corrective Action Order and submit the total to the Director, Eastern Region, PHMSA.
- 11. The Director, Eastern Region, PHMSA may grant an extension of time for compliance with any of the terms of this order for good cause. A request for an extension must be in writing.

The corrective actions required by the Corrective Action Order are in addition to and do not waive any requirements that apply to the pipeline under 49 C.F.R. Part 195, including the integrity management program regulations.

The procedures for the issuance of this Order are described in Part 190, Title 49, Code of Federal Regulations, § 190.233, a copy of which is enclosed, is made part of this Order and describe the Respondents' procedural rights relative to this Order.

Respondent may appeal any decision of the Director, Eastern Region, 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 of not more than \$100,000 per day and in referral to the Attorney General for appropriate relief in United States District Court.

*John*  
  
 Stacey Gerard  
 Associate Administrator  
 for Pipeline Safety

APR 20 2006  
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 Date Issued