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September 20, 2012

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Mr. Patrick Fahn
North Dakota Public Service Commission
600 E. Boulevard, Dept 408
Bismarck, ND 58505-0780

VIA ELECTRONIC DELIVERY AND COURIER

Dear Mr. Fahn:

Attached is the August monthly report which summarizes the monthly report submitted to the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) as required under the Amended Corrective Action Order (CAO) issued on June 23, 2011. As Ms. Sacco requested in her May 17th, 2011 email, we are providing documents that do not require FOIA protection.

If you have any questions regarding the enclosed documents, please contact

me. Sincerely,

Ken Crowl

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CPF No. 3-2011-5006H – Keystone Pipeline Corrective Action Order
August 2012 Monthly Report

Executive Summary

In accordance with the Corrective Action Order (CAO) issued by PHMSA on June 3, 2011 and amended on June 28, 2011, TC Oil Pipeline Operations, Inc. (Keystone) submits the following information in a report format.

Remediation Work not completed in Q1 2012 has been now completed at all delivery terminals, fixed speed and VFD stations. Validation vibration tests were completed at all facilities with the exception of Patoka and Cushing Delivery Terminals. Vibration measurements of 2467 small diameter branch connections and piping attachments were taken in three principal directions at 24 fixed speed and VFD pump stations and one delivery terminal. Detailed validation testing data will be provided in the final report, which will be submitted no later than September 30, 2012.

The latest series of validation testing identified opportunities to further improve the long term integrity of three types of small diameter branch connections and attachments. In addition, connections at Hartford Delivery Terminal and pump #4 unit drains at two fixed pump stations require further assessment to determine their acceptability. Some of the additional scope may not be fully completed and tested by September 30, 2012. An addendum to the final report will be issued once all the remaining work is completed.

Introduction

Keystone oil pipeline system operates from Hardisty, Alberta to delivery terminals in Wood River and Patoka, Illinois and Cushing, Oklahoma. On May 7, 2011, the system experienced a reportable oil release of approximately 400 barrels at the Ludden, ND pump station. On May 29, 2011, a second reportable oil release of approximately 10 barrels occurred at the Severance, KS pump station.

A Corrective Action Order (June 3, 2011) and subsequent Amended Corrective Action Order (June 28, 2011) were issued to TC Oil Pipeline Operations, Inc. A series of Monthly Reports have been submitted beginning in July of 2011 to document TC Oil Pipeline Operations, Inc.'s progress regarding the work undertaken to ensure the reliable operation of the Keystone Pipeline.

The following Monthly Report is submitted per Item 11 of the CAO.

Vibration Remediation Work

Remediation Work not completed in Q1 2012 has been now completed at all delivery terminals, fixed speed and VFD stations. Validation vibration tests were completed at all facilities with the exception of Patoka and Cushing Delivery Terminals. Vibration measurements of 2467 small diameter branch connections and piping attachments were taken in three principal directions at 24 fixed speed and VFD pump stations and one delivery terminal. In total, almost 7500 data points have been recorded. Detailed validation testing data will be provided in the final report, which will be submitted no later than September 30, 2012.

The latest series of validation testing identified opportunities to further improve the long term integrity of the following small diameter branch connections:

1. Unit Discharge MOV Bypass Nozzles

Unit discharge MOV bypass nozzles are located upstream and downstream from the pump discharge motor operated valve (MOV). Recent validation testing determined that vibration of the nozzles located on pump #4 at eight fixed speed stations exceeded the screening criteria when energy dissipation across the PCV was at the 3000 kW level. Subsequent strain testing of the bypass nozzle located at Severance fixed speed station, which showed the highest level of vibration of any such nozzles in the system, determined that the peak strain in the main piping was 270 με. The nozzle is shown in Figure 1. A 3D Finite Element Analysis was used to determine the strain amplification between the measured strain and strain at the adjacent weld toe due to nozzle bending. The calculated strain amplification is 2.63 as shown in Figure 2.The resulting factor of safety for this nozzle is 1.22, based on the material endurance limit of 866 με.

Additional testing will be conducted to validate test results. Should the strain levels be confirmed, pump #4 discharge MOV bypass nozzles at all fixed speed stations will be braced. The bracing will be first installed at Severance pump station and tested to prove its effectiveness before implementing the bracing at the remaining seven stations.

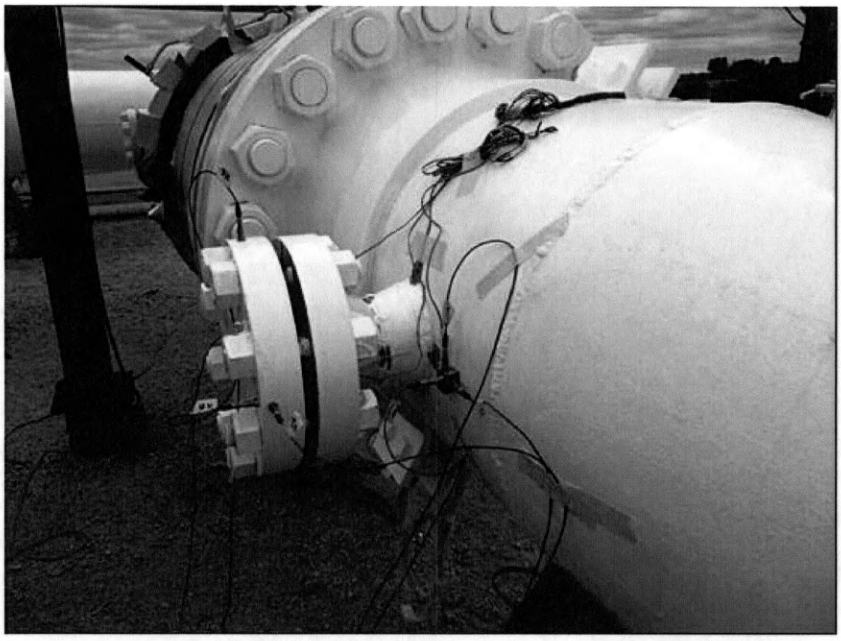

Figure 1: Pump #4 discharge MOV bypass nozzle at Severance fixed speed station.

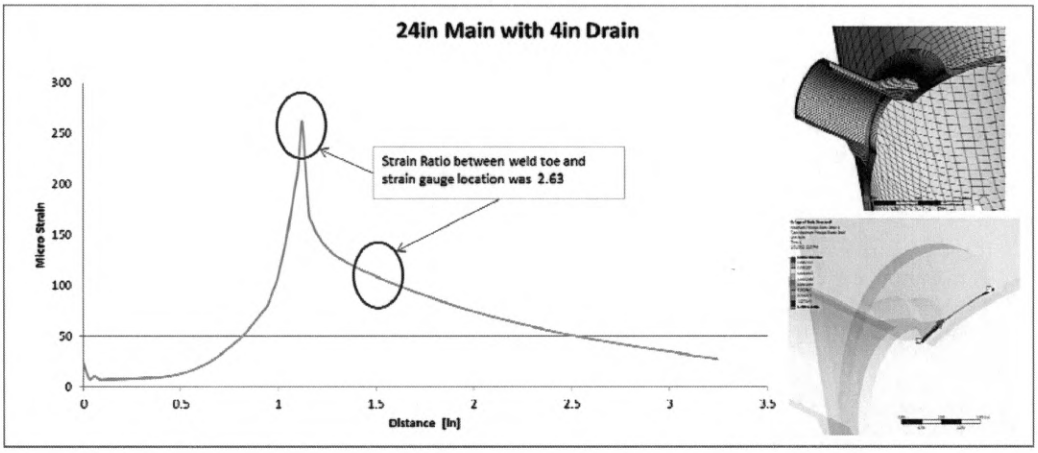

Figure 2: Strain amplification calculation for 4" nozzle and 24" main pipe.

2. Fort Ransom Station Drain Upstream from the PCV

Validation vibration and strain testing of the braced station drain upstream from the pressure control valve (PCV) at Fort Ransom fixed speed station determined that bracing is not as effective as expected. Because of the local piping configuration at this station, the existing bracing can not be improved. The drain is shown in Figure 3. The highest measured strain peak was 275 με. A 3D Finite Element Analysis was used to determine the strain amplification between the measured strain and strain at the adjacent weld toe due to nozzle bending. The

calculated strain amplification is 2.7, as shown in Figure 4. The resulting factor of safely for this branch connection is 1.17, based on the material endurance limit of 866 με.

Additional testing will be conducted to validate test results. Should the strain levels be confirmed, the drain valve will be removed and the drain nozzle closed with a blind flange. The existing bracing will be modified to provide support for this abandoned drain and validation testing will be carried out to prove the effectiveness of this modification.

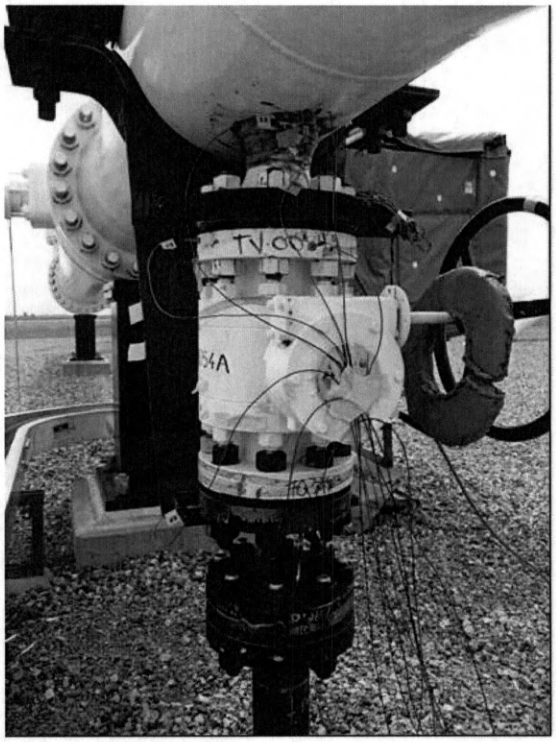

Figure 3: Fort Ransom station drain upstream from the PCV

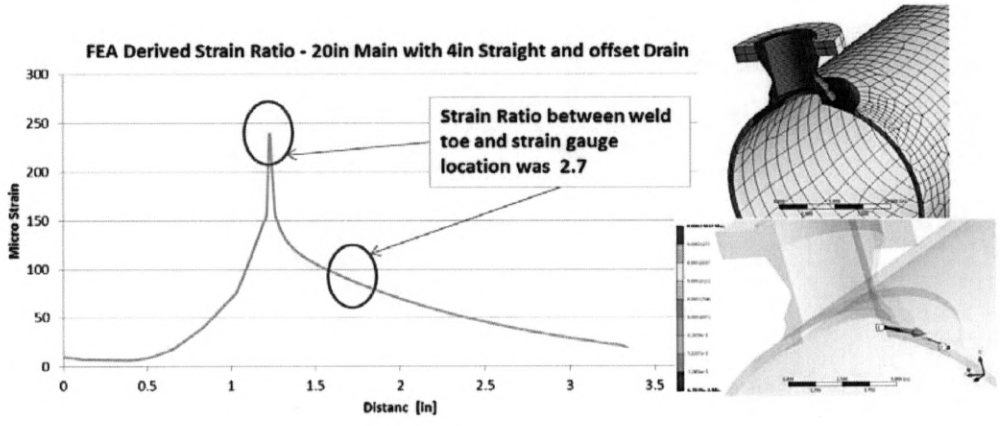

Figure 4: Strain amplification calculation for 4" nozzle and 20" main pipe

3. Fort Ransom Pig Launcher Vent Nozzle

Validation vibration testing revealed high levels of a vibration at a predominant frequency at a vent nozzle located on the pig launcher at Fort Ransom fixed speed station. The nozzle is shown in Figure 5 and the vibration frequency spectrum showing vibration at a predominant frequency of 169 Hz is provided in Figure 6. The nozzle will be shortened to improve the design. The modified nozzle will be tested to verify the results of the modification.

Figure 5: Fort Ransom pig launcher vent nozzle

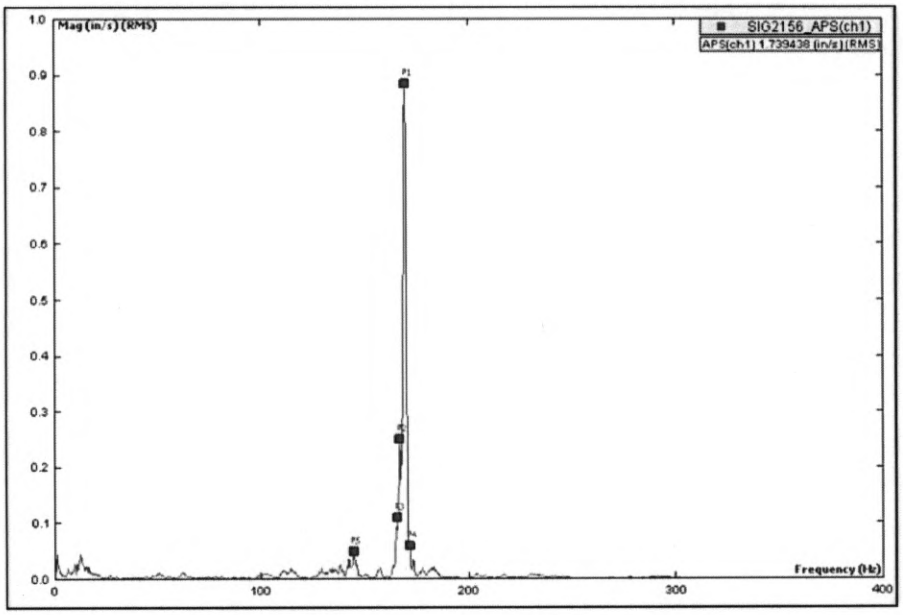

Figure 6: Fort Ransom pig launcher vent nozzle vibration frequency spectrum

4. Hartford Delivery Terminal

Vibration of eight branch connections and attachments at Hartford Delivery Terminal exceeded the screening value of 1 in/s (0-pk) when energy dissipation across the PCV was at 2000 kW level. These components will be further evaluated to determine their acceptability.

5. Pump #4 Unit Drains at Fixed Speed Stations

While the results were still within acceptable limits, strain testing of unbraced pump #4 unit drains at Fort Ransom and Ludden fixed speed stations revealed strain levels that were somewhat higher than expected, based on previously completed tests of similar drains at the Freeman fixed speed station. All tests were carried out at similar energy dissipation levels across the station PCV (>3000 kW). The highest measured strain was 150 με and the associated factor of safety is 2.14, based on the material endurance limit of 866 με. Additional pump #4 unit drains will be tested at two fixed speed stations to ensure all drains are acceptable.

Final Vibration Report

A final Vibration Report providing a summary of all the completed Remediation Work, in depth vibration and strain validation testing at selected facilities and site-by-site vibration test results for all small diameter branch connections and attachments will be completed no later than September 30, 2012.

Some of the additional scope described above may not be fully completed and tested by September 30, 2012. The final report will be updated once all the remaining work is completed.