SALLE DE COURRIER

2009 NOV 19 A 9:01

NEB/ONE

TransCanada
In business to deliver

450 - 1st Street, S.W.
Calgary, Alberta, Canada T2P 5H1

Tel: (403) 920.2977
Fax: (403) 920.2354
E-mail: jennifer_scott@transcanada.com

November 18, 2009

Filed Courier

National Energy Board
444 Seventh Avenue S.W.
Calgary, Alberta
T2P 0X8

Attention: Ms. Anne-Marie Erickson, Acting Secretary of the Board

Dear Ms. Erickson:

Re: TransCanada Keystone Pipeline GP Ltd. ("Keystone")
Certificate OC-51
Line 100-1 Engineering Assessment Addendum – Mitigation Plan
NEB File: NEB File: OF-Fac-Oil-T241-2006-01-02

On November 4, 2009, Keystone filed with the National Energy Board (the "Board" or "NEB") a proposal to implement additional mitigation measures to demonstrate to the Board a significant reduction in the POF that assures Line 100-1 is suitable for liquid service (the "Mitigation Plan"). A copy of the Mitigation Plan, entitled "TransCanada Keystone Line 100-1 Engineering Assessment Addendum – Mitigation Plan MLV 2-36+28.298, November 4, 2009" was filed with the Board that day, followed by a technical conference held November 6, 2009 during which clarifications to the Mitigation Plan were discussed, including clarifications to Section 4 of the Plan and confirmation in Section 5 of Keystone's intent to provide biweekly reports to the Board. A revised version of Section 4 of the Mitigation Plan was shared informally shortly thereafter, reflecting the clarifications and dialogue that took place during the technical meeting. Keystone now attaches for filing with the Board, the revised Section 4 of the Mitigation Plan.

Should the Board require additional information with respect to this filing, please contact the undersigned.

Yours truly,
TransCanada Keystone Pipeline GP Ltd.

Jennifer R. Scott

Jennifer Scott
Senior Legal Counsel
Law and Regulatory Affairs

Enclosure

4. Deterministic Analysis of Critical Defects

This analysis is a deterministic analysis of the critical defects that could remain in the pipeline with regard to its operational and inspection history. It incorporates the pressures history and its implications for remaining defects in the pipeline, the over speed sections and the operational pressures in these particular sections, and the minimum detectable flaw length given the over speed experienced. Illustrations of the safety margins of the new mitigative actions are presented.

The analysis done here considers the mitigative actions taken by Keystone namely:

1. 20% MOP Restriction
2. Advance date of re-inspection from 2-years to 9 months

This analysis also considers that the pipeline was operated at 6,070 kPa during gas service and therefore during that time period the defects that are critical at 6,070 kPa would not exist. However as the remaining defects would grow during the line fill and operational periods the growth due to corrosion fatigue is taken in to account.

In Table 9 of EA Chapter 5, a growth rate of a 4 mm by 75 mm defect was examined. Similar analysis with operational and line fill parameters associated with the additional mitigation measures in place show growth rates of 0.47 mm for the line fill and 9 months of operation. Line 100-1 hydrotest failures were due to high pH SCC. High pH SCC growth rates are reported to be in a similar range in liquid pipelines as in gas pipelines [0.2 to 0.6 mm/yr]. Even for toe cracks that grow at a higher rate, 0.6 mm/yr is considered an aggressive rate by examining industry failure data. Line fill is considered as equivalent to one year's growth (0.6 mm/yr). 9 months of operational considers a growth of 0.4 mm/yr. The total growth of this period is 1.0 mm. Therefore the growth in depth in this analysis was taken to be 0.5 and 1.0 mm. Growth in length due to fatigue is insignificant.

Tool over-speed categories have been binned into 3 major categories as follows:

Table 4

Over speed category definitions and corresponding minimum detectable lengths

Over-speed Category	Tool Speed (m/s)	Minimum Detectable length (mm)
1	1.3 < tool speed ≤ 3.7	72
2	3.7< tool speed ≤ 6.08	120
3	6.08< tool speed ≤ 11.19	215

These minimum detectable lengths are plotted in red in the analysis plots (Figure 5, Figure 6, and Figure 7).

As the pressures at steady state change along the pipeline the maximum operating pressures that each over speed category would experience are calculated as given below:

Table 5

Max operational pressures for over speed categories

	Max Pressure (kPa)			
Overspeed Category	MLV 2-13	MLV 13-25	MLV 25-37	For all sections
1	4544	4856	4134	4856
2	4450	4060	4093	4450
3	2146	N/A	3821	3821

4.1. Category 3 - Regions where tool speed is 6.08 to 11.19 m/s

The sentence plot in Figure 5 is for Category 3 sections. The pressures (with critical crack sizes) represented are:

- 6,070 kPa which is the pressure at which the gas service was provided in 2009
- 4,856 kPa which is the reduced maximum pressure that these sections will be operated at
- 3,821 kPa which is the maximum operational pressure that the Category 3 sections will experience during the first 9 months of commercial operation

Consequently any defects that are at or above the 6,070 kPa critical size line will not exist in the pipeline in 2009. These are the remaining defects after gas operation and are shown illustratively in Figure 5 as red stars. The remaining defects below the 6,070 kPa line can grow in size before the next CDILI and mitigation. Therefore the 6,070 kPa line has been grown by 0.5 and 1 mm in depth. The rationale for the growth value is given above.

All defects that could exist on the pipeline in 2010 before the next CDILI and mitigation are below the growth lines. As the growth lines are completely below the 4,856 kPa line and well below the actual operational line of 3,821 kPa for Category 3, a safety factor of more than 2.0 is noted for growth. Therefore with new mitigative operational pressures even without considering the CDILI run there is a large margin of safety.

Considering the maximum tool velocity achieved during inspection all critical defects greater than 215 mm length will have been detected. This flaw length is at the leak rupture boundary of 3,821 kPa. Therefore for all over-speed sections running at the reduced pressures dictated by the mitigation plan, any defect that could rupture would have been detected by the ILI tool. This shows that even in the worst over-speed areas, the minimum detectable flaw length is large enough to detect the smallest flaw that could rupture at the planned operating condition.

The defects that are shorter than 215 will lead to leaks but they too have an acceptable margin of safety considering the previous higher gas operational pressures.

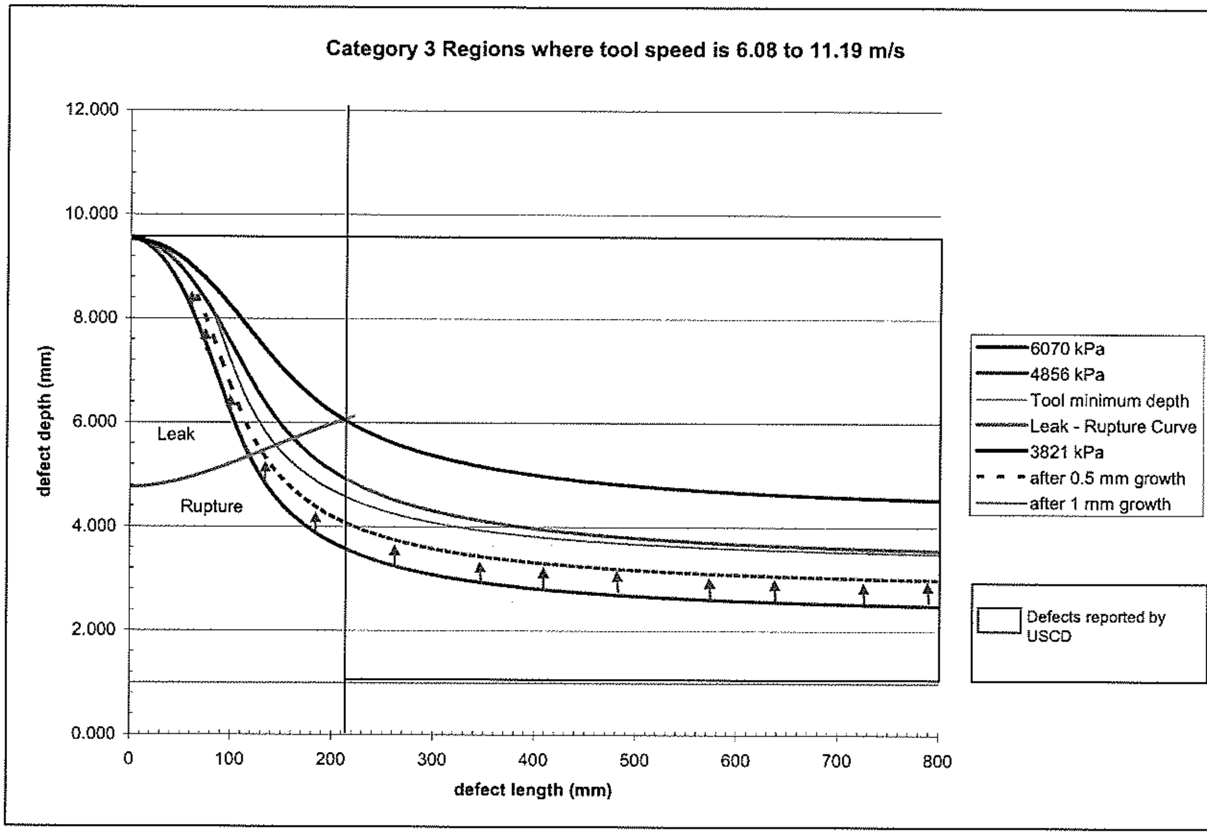

Figure 5

Analysis of critical defects in Category 3 regions

4.2. Category 2 - Regions where tool speed is 3.7 to 6.08 m/s

The following sentencing plot is for Category 2 sections. The pressures (with critical crack sizes) represented are 6,070, 4,856 and 4,450 kPa. The Category 2 sections see a maximum pressure of 4,450 kPa. Similar to what was described in Section 4.1, 6,070 kPa is the pressure at which this pipeline operated in gas service prior to 2009. The 6,070 kPa line and the growth lines are shown. Because the growth lines are well below the 4,450 kPa line no existing defects will become critical within the first 9 months of commercial operation.

Considering the tool velocity in this region all defects that could rupture are well within the tool detection capability. This shows that in Category 2, the minimum detectable flaw size is sufficient to detect the smallest flaw that could rupture at the planned operating condition.

The defects that are shorter than 120 mm will lead to leaks but they too have an acceptable margin of safety considering the previous higher gas operational pressures.

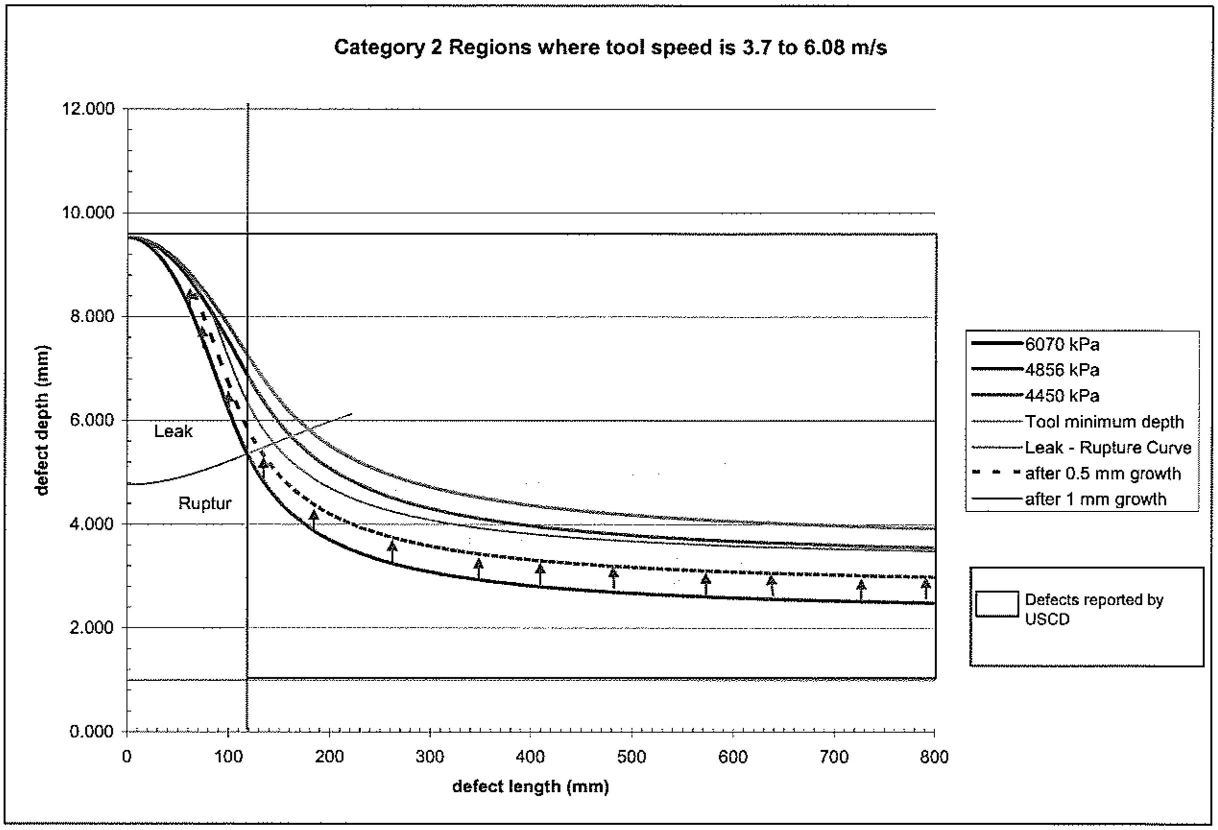

Figure 6

Analysis of critical defects in Category 2 regions

4.3. Category 1 - Regions where tool speed is 1.3 to 3.7 m/s

The following sentencing plot is for Category 1 sections. The pressures (with critical crack sizes) represented are 6,070 and 4,856 kPa. Because some sections of Category 1 areas run at the new maximum operating pressure that is the maximum pressure used for Category 1. Similar to what was described in Section 4.1, 6,070 kPa is the pressure at which this pipeline operated in gas service prior to 2009. The 6,070 kPa line and the growth lines are shown below. Because the growth lines are well below the 4,856 kPa line, no existing defects will become critical within first 9 months of commercial operation.

Considering the tool velocity in this region all defects that could rupture are well within the tool detection capability. This shows that in Category 1, the minimum detectable flaw size is sufficient to detect the smallest flaw that could rupture and cause large leaks at the planned operating condition.

The defects that are shorter than 72 mm will lead to leaks but they too have an acceptable margin of safety considering the previous higher gas operational pressures.

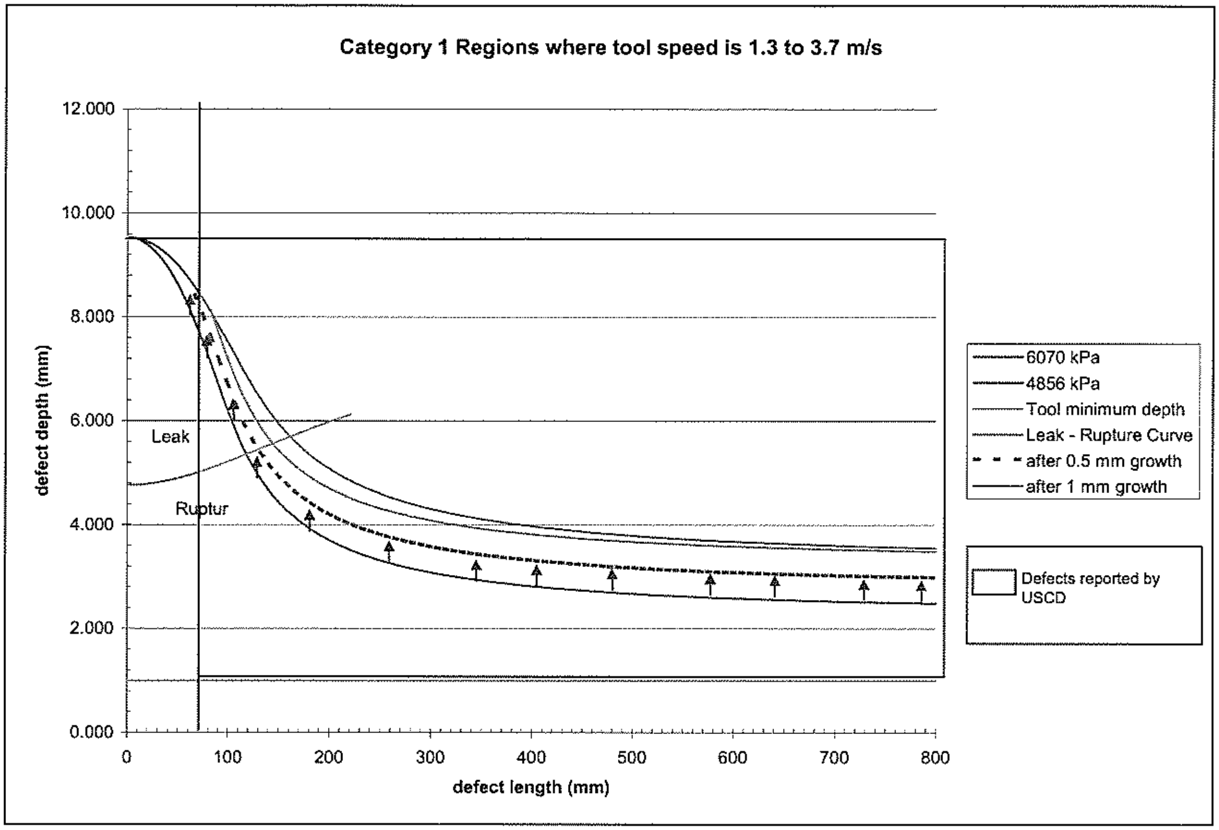

Figure 7

Analysis of critical defects in Category 1 regions

When the gas service pressure history with the consequent remaining sizes of defects (grown at the highest growth rate seen by similar liquid pipelines in industry) and the hydraulic gradient of pressure is considered, a deterministic analysis shows that:

1. The 20% pressure reduction alone will prevent remaining sizes of defects growing to critical sizes
2. In all the locations of the over speed sections the USCD tool had a minimum detectable length that detected even the smallest defect that can lead to rupture under the 20% derate pressure.