Annexe 2

Communications personnelles de Richard Kuprewicz aux Citoyens au Courant

De: **RICHARD KUPREWICZ** kuprewicz@comcast.net
Objet: Re: Enbridge 9B : NEB changes the hydrostatic test requirements
Date: 29 juillet 2015 16:54
À: Lorraine caronlor@yahoo.com
Cc: Katherine Massam kathmassam@gmail.com

RK

The test modifications now mimic the dismal approach utilized in the US regarding hydrotest in which all those rupture failures have occurred. No where does it say what the minimum % SMYS of the hydrotest at the 125 % MOP new standard will be, which is very important for crack failure determination and crack engineering assessments.

The NEB has gone extremely backward with this modification, safety wise. This is an area you do not want to mimic the U.S regs on.

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From: Lorraine <caronlor@yahoo.com>
Date: Wednesday, July 29, 2015 at 1:41 PM
To: RICHARD KUPREWICZ <kuprewicz@comcast.net>
Cc: Katherine Massam <kathmassam@gmail.com>
Subject: Enbridge 9B : NEB changes the hydrostatic test requirements

Hello Richard,

First of all thank you very much for letting us use your June 22 comments regarding the NEB recent decision on Enbridge Line 9B.

We have submitted our request for administrative review of the NEB decision on July 20. We argue that the NEB has not adequately nor sufficiently demonstrated why the NEB is not ordering a hydrostatic test of the entire Line.

You may remember that one positive aspect of the NEB order was the method chosen for the hydrostatic test :

« Enbridge must test each segment **to a stress level of 100% SMYS at the highest point in the segment with the test pressure held for one hour** after pressure stabilization. This test must be followed by a four hour leak test at the segment MOP as specified in CSA-Z662-11.»

Following Enbridge's proposed hydrostatic test plan, the NEB has modified its order that now states :

«Enbridge must test each segment **to a pressure of 125% MOP with the test pressure held for one hour** after pressure stabilization. This test must be followed by a four hour leak test at the segment MOP as specified in CSA-Z662-15.»

Enbridge and the NEB justify this change by saying that test pressures greater than 125% MOP would exceed the repair criteria imposed by the NEB in condition 10 of its initial order XO-E101-003-2014.

What do you think of this change ? Can we still have a decent test under these new conditions ?

Your input on this point would very much help us decide what to do with this change.

Lorraine Caron
Les Citoyens au Courant

De: **RICHARD KUPREWICZ** kuprewicz@comcast.net
Objet: Fixing my spelling.
Date: 29 août 2015 08:46
À: Lorraine caronlor@yahoo.com
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RK

I have had a chance to review and I would describe these proposed hydrotests as "weird," just going through the motions and not actually understanding the purpose of a hydrotest to look for or flush out cracks or crack threats. These proposed hydrotests are not really designed for addressing crack integrity threats that are prevalent on Line 9B.

The major information missing in these test segments is just what segments are the thinner walled pipe (how many miles is thinner and how many miles are thicker) and why is so much of the thicker pipe being strength tested at such low SMYS levels (if it is a few feet no big deal)? Normally we would not really focus on a test between arbitrary existing valves, especially if there is considerable difference in pipe thickness for the same grade etc that causes such low % SMYS and elevation. I can't give you a more clear answer cause the above information is missing, but generally to your questions:

> **1) How would you qualify this change in pressure safety-wise given what you know about the type of defects on this pipeline ? Big change ? Moderate change ? Small change ?**
>
> Its a big change whose compromise clearly indicates someone doesn't understand how to perform hydrotests focussed on getting rid of crack threats or at least those cracks that can fail fairly rapidly depending on the operation. The much lower % SMYS test if it in a lot of the test segment will leave very large and/or deep cracks that can grow quickly with time. Remember this is a pipeline that will be moving dilbit and other much lighter crudes that are going to aggressively pressure cycle the heck out of this pipeline. Such cycling is going to really grow these cracks much more quickly and the ECAs have tended to be anything but conservative (an often over used term). Also the crack growth will cause a pipeline rupture at pressures well below MOP.

2) How would you qualify the security margin in terms of remaining number of years to the pipeline that could be estimated by successful testing at 100% SMYS instead of 93% SMYS ? Would it double ? Or is it not worth mentioning ?

I would have no confidence in the nature of this hydrotest approach as without further pipe thickness data that permits an independent analysis of the %SMYS profile along the test segment I must conclude some games are going on here given what appears to be a poor approach to hydrotesting protocol that should be different for cracks. For the diameter, thickness and minimum %SMYS, the pipeline engineers should be able to make public the % SMYS profile and then they can determine just how long or how deep cracks are that would survive such a poorly designed test are really.

Most likely if they proceed with these tests as proposed, get no test failures and proceed with startup, and then get a failure at a later date while operating they will try to blame the hydrotest as the cause of an operating rupture when in reality they are performing a very poor crack integrity hydrotest not designed for crack threat reduction. By the way, the operating pressure failure will occur at pressures much less than the MOP.

Many U.S pipelines operate at 72% SMYS and operators in the U.S. are allowed to exceed this limit and many do (actually the real limit is 110% of 72% SMYS or 79% SMYS). You can even exceed this 79%SMYS limit but I won't bore you with these details.

Sorry that I can't be more specific but this hydrotest appears to be very poor given the data provided to date.

It is not unusual to raise the % SMYS by breaking up a hydrotest section into more segments.

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Objet: Re: Enbridge 9B : NEB changes the hydrostatic test requirements
Date: 29 août 2015 09:57
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Cc: Katherine Massam kathmassam@gmail.com, Christian Foisy chfoisy@yahoo.com

RK

I have just gotten back from all week pipeline Joint Technical Committee Meetings in DC so I'm playing a little catch up.

One of the meetings was on Thursday and was on liquid pipeline IVP that is just starting to deal with Integrity verification of pipelines that have shall we say lost their records for MOP determination and have crack threats. At the IVP meeting it is becoming clear that some in the industry are trying to demonize hydrotesting for crack integrity management assessment when it is a superior IM approach for cracks - it is a proof test if properly designed and performed for cracks.

I did make it very clear in that public meeting that the crack rupture failures in Marshall MI Line 6B occurred at approximately 52 % SMYS operating stress and that the Mayflower crack rupture in Arkansas occurred at about 52 – 53% SMYS from a seam crack rupture. Both of these high profile ruptures were well below MOP and both lines were running dilbit and probably experiencing hyper aggressive pressure cycling that accelerates crack growth. I didn't mention in that meeting, but as a matter of public record, the Mayflower pipeline had undergone a series of poorly designed hydrotests about five years earlier, where the pipeline operator tested to an MOP ration of 1.25 but lowered their test pressures and MOP because they were getting a batch of hydrotest failures (these hydrotests are a matter of public record). Here in the U.S. Such hydrotest failures are suppose to be analyzed for their root cause of test failure. Such lowering of hydrotest test pressures to meet the MOP 1.25 ratio can leave very large and/or deep cracks such as that that failed at Mayflower.

To your questions quickly:

1. **Question : Do you agree that Figure 6.25 is a good qualitative example to translate the consequence of Hydrostatic Pressure Test reduction from a security stand-point ?**

Yes, though it generally is focused on vintage ERW manufacturing threats that can be much harder to evaluate with ECAs and can be more and very unpredictable when compared to SCC crack threats. Note the critical issue is that the lower the stress level of a hydrotest the longer and deeper the cracks that remain. The critical issue then becomes how will these remaining cracks grow with time during pressure cycling of the operating liquid pipeline.

2) If so, how would you assess the time and data required to produce such a graph with the actual data of the Line 9 segment selected for hydrotest ?

I've said this in an earlier email that there is important information missing about the hydrotest segments, but generally the pipeline operator and the NEB should for the hydrotest profile, the specific various different pipeline thicknesses and diameter be able to predict combination of the longest and deepest cracks that will remain after the hydrotest that can grow with time. Time to failure estimates are based on the specific pipe grade, diameter and thickness (the most critical parameters) and one always incorporates a very large safety margin on top of time to failure estimates based on predicted pressure cycling. The NEB and Enbridge have failed to produce adequate data for this and will not be able to go the next important step on how quickly will the remaining cracks grow to rupture failure. I bet they will claim decades even hundreds of years – they should be able to publicly demonstrate such reckless claims.

3) If it is not a good example, why ?

Directionally moving in right direction but you are trying to calculate on very limited information about the pipe that should be made public that will really indicate lowering test pressures and more importantly lower % SMYS is not not good for a 30 inch diameter pipeline.

Most likely these tested pipelines will prematurely rupture well ahead of what will be claimed by Enbridge/NEB as ECA time to failure **and the hydrotesting will be blamed for causing such a failure when the fact is the hydrotests were not crack integrity hydrotests and performed poorly like the hydrotests performed on the Mayflower pipeline some 5 years earlier on that system.**

I think the rush, secrecy and change in direction and limited application of hydrotesting already tell you that many games are going on to go through the motions of safety from a poorly performed hydrotest not really intended to address crack integrity threats.

This project appears to be another classic "Space Shuttle Syndrome" where belief that risks are low is rushing decisionmakers in an effort to more quickly launch that will result in a catastrophic failure.

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From: Lorraine <caronlor@yahoo.com>
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Subject: Re: Enbridge 9B : NEB changes the hydrostatic test requirements

Hi Richard,

Based on our understanding of Enbridge Hydrostatic Test Plan, we produced the attached powerpoint presentation that explains the drop in pressure between 100% SMYS at high point and 125% MOP and the consequence of this pressure reduction, this time using the example of the Gananoque segment for our friends in Ontario.

http://faitspipelines.com/resources/hydrotest-gananoque-v2.pdf

For the above presentation, we extracted Figure 6.25 from Baker (Spike Hydrostatic Test, 2004) which describes the reduction in the safety margin (in terms of time to failure) provided by a successful hydrotest when the test specification chosen is 100 % SMY or 90 % SMYS.

Baker (2004) :
https://primis.phmsa.dot.gov/gasimp/docs/TTO06_SpikeHydrostaticTestEvaluation_FinalReport_July2004.pdf

We believe this Graph 6.25 provides a good qualitative indication of the reduction in time to failure and hence in the security margin that a drop in 5-10% SMYS may have.

1) Question : Do you agree that Figure 6.25 is a good qualitative example to translate the consequence of

1) Question : Do you agree that Figure 6.25 is a good qualitative example to translate the consequence of Hydrostatic Pressure Test reduction from a security stand-point ?

2) If so, how would you assess the time and data required to produce such a graph with the actual data of the Line 9 segment selected for hydrotest ?

3) If it is not a good example, why ?

Thanks for helping us understanding the situation and translating this information to the layperson,

Lorraine Caron