

Determining a pipe's blast zone:

The technical term for a blast zone is called **Potential Impact Radius (PRI)**. The PRI is a scientific calculation using a formula based on the pipe's alloy, content, pressure, axis, stress, and likely prevailing wind direction.

- 1) **Safety Expert, Charles Rhodes** calculates a blast zone of this size pipe to be **1200-1500 ft**
<https://drive.google.com/file/d/0B550ru3QDcfqFZ6eTNvSUpkRnM/view?usp=sharing>
- 2) **The Pipeline & Hazardous Materials Safety Administration (PHMSA)** calculates the blast zone a little differently but it is still **929 feet** for a pipe this size
<https://drive.google.com/file/d/0B550ru3QDcfqLUixMi16NmtDNjA/view?usp=sharing>
- 3) **Department of Transportation (DOT) & Gas Transmissions Integrity Management Enforcement Guidelines (GTIME)** has formulas for calculating the PRI. FERC & Nexus should be following these guidelines and avoiding the Impact Radius
<https://drive.google.com/file/d/0B550ru3QDcfqRG1mWfVIY2IMTkE/view?usp=sharing>

Dr Charles Rhodes is available as an expert witness in eminent domain cases. He is willing to prepare a report and testify on a specific pipe's blast zone (PRI). See an email below that I was copied on earlier this year. (Please make note that he says the San Bruno's failure was less than 600 psi. Nexus' psi is 1400-1600. San Bruno was only a 30" pipe that took out a neighbor, killed 8 people, and had a fire wall 1,00 ft high. Nexus is 36" with more than double the psi)

I am available to act as an expert witness in your large diameter high pressure natural gas pipeline case.

In order to participate I need the following:

- 1) An adequate deposit - see attachment
- 2) I need reasonably firm dates. I have other obligations to meet.
- 3) I need in writing up to date technical information concerning the pipeline:
 - a) _diameter
 - b) wall thickness
 - c) working pressure
 - d) required test pressure
 - e) pipe alloy
 - f) specified minimum yield stress for pipe (SMYS)
 - g) natural gas energy content (1000 BTU / standard ft³ or something else)
 - h) position of pipeline axis with respect to residences at risk

- i) scope of immediately available fire fighting equipment and services
 - j) contour map showing pipeline route and proposed alternative route
 - k) aerial photographs
 - l) likely prevailing wind direction
 - m) availability of water for fire fighting
 - n) availability of water bombers and persons with authority to dispatch them on short notice
 - o) copies of all specifications, standards or regulations referred to by the pipeline proponents
- or otherwise relevant to the case

I strongly recommend that you obtain a copy of the NTSB report, aerial photos and news reports relating to the 2010 pipeline fire in San Bruno, California. Likewise the NTSB report and aerial news photos relating to the pipeline fire at Appomattox, Virginia in 2008 would be helpful.

At the San Bruno fire the pipeline pressure at failure was less than 600 psi and the available fire fighting services were likely the best in the USA. However, like most municipalities, limited fire hydrant capacity was a problem.

In order to prepare I need this information well ahead of time as there might be complicating circumstances about which I am not presently aware and which you or your clients need to investigate. I plan to prepare a short (3 page) document for presentation purposes indicating projected damage radii and what in my view ought to be done in the circumstances.

One of the issues in a pipeline fire is radiant heat that makes it impossible for conventional municipal fire fighting services to approach the fire. In those circumstances wind blown embers spread the fire much further than the direct ignition distance claimed by pipeline companies..The radiant heat also makes escape from the proximity of the fire difficult or impossible.

In my view it is important that your clients present the court and Enbridge a viable alternative pipeline route that makes economic sense.

I believe that Enbridge is self insuring. One of the issues that has been raised in Canada is the limited ability of Enbridge to meet a multi-billion dollar damage claim such as might occur if Enbridge Line 9 ruptured in Toronto.. A fall back position for your clients is for the court to require Enbridge to maintain sufficient 3rd party liability insurance.and re-insurance relating to the Nexus pipeline.. .This issue of parties and insurers not having sufficient assets to meet potential claims is non-trivial..

.You might find that if Enbridge believes that the court might order such insurance then Enbridge might be more accommodating with respect to the pipeline route.

Regards

Charles Rhodes, P.Eng., Ph.D.

Xylene Power Ltd.

Tel [905 473 1704](tel:9054731704)

cslrhodes@gmail.com