

OPINION PIPELINE SAFETY

Pipeline safety: how to the fight against corrosion

**ALAN YOUNG**

It is difficult, if not impossible, to pick up a newspaper, watch a news broadcast, or check a Twitter feed without seeing a story about pipelines. Keystone XL—will U.S. President Barack Obama say “yes” or “no”? Northern Gateway—now that the National Energy Board (NEB) has approved the project with 209 conditions, when will it proceed? TransCanada Pipeline’s Energy East Project. Enbridge’s Line 9B Proposal. Kinder Morgan’s Trans Mountain Pipeline Expansion Project. A natural gas pipeline explosion in Manitoba. The list goes on.

Pipelines may be news, but they aren’t new. Canada’s first pipeline moved natural gas to light the street lamps of Trois-Rivières, Que., in 1853. Our first oil pipeline connected the oilfields in Petrolia, Ont., to Sarnia five years before Confederation. These early projects were just the start of the vast system of pipelines criss-crossing the country, transporting crude oil, natural gas and petroleum products to markets throughout Canada. Today,

there are some 825,000 kilometres of transmission, gathering and distribution lines in Canada, of which approximately 72,000 kilometres are regulated federally by the NEB.

Not only is Canada’s pipeline network big, it is also big business. Federally-regulated pipelines alone transport some \$100-plus-billion of product annually. We can reasonably expect that number to increase exponentially should some or all of the aforementioned projects be transformed from proposals to reality.

The economic benefits of pipelines to Canada’s economy today and into the future are numerous and well-documented. But, as anyone who has been following Keystone and Northern Gateway and the others will attest, there is another side to the story—the impact of oil and natural gas pipelines on the environment, on relations with First Nations, and on public safety.

It is natural to be concerned about the potential damage—in both human and environmental terms—that a ruptured pipeline can cause. Accidents do happen. Just ask the Manitobans who recently went without power for several cold winter days.

Notwithstanding the newsworthy pipeline explosion in Manitoba, how is Canada’s track record on pipeline safety?

The NEB tracks and reports on the safety and environmental performance of federally-regulated pipelines. In its most recent report, released in December 2011, the NEB reported a total of 16 pipeline ruptures (some oil, some natural gas) between 2000 and 2009, releasing a total of 6.4 million litres of liquid from the pipebody. Putting that figure into perspective, with approximately one billion barrels of oil moving through NEB-regulated pipelines per year, 99.99996 per cent of that oil was transported without any leaks from the pipebody.

Pipeline failures, when they do occur, have many causes—construction damage, overpressure, joint issues. But, according to the NEB, the primary cause of ruptures on pipelines they regulate is corrosion. This should not be surprising. Corrosion occurs naturally over time as the steel that is used in pipeline construction is exposed to oxygen and other elements in the environment. Corrosive effects can be found both on the interior and the exterior of pipelines, causing fatigue and metal loss.

If corrosion is the number one enemy of pipeline safety, what is being done to mitigate its effects? Natural Resources Canada’s CanmetMATERIALS is on it. They have a pipelines research program focusing on the maintenance of aging pipelines and the construc-

tion of new pipelines. The globally recognized body that develops international standards for improving safety standards, the American Society for Testing and Materials, has recently approved five standards for the testing and use of corrosion inhibitors proposed by CanmetMATERIALS. Moreover, CanmetMATERIALS is developing innovative strategies to advance steel technology to control fractures and corrosion, which includes corrosion control through the application of coatings.

A 2002 study by the U.S. Federal Highway Administration found that the total annual estimated direct cost of corrosion in the U.S. was a staggering \$276-billion. It is reasonable to suggest that similar costs, on a relative basis, hit Canada’s economy. NACE International, the acknowledged world authority on corrosion, advises that 30 per cent of all costs associated with the effects of corrosion are preventable. Astonishingly, about 85 per cent of these preventable costs are in the area of coatings. It should be abundantly clear that the application of appropriate coating materials in pipelines is critically important to human and environmental safety, not to mention saving money.

It seems odd, then, that until very recently there were many programs to certify industrial coatings but, unlike other skilled

trades, there was no recognized certification program available for those who apply the coatings. This gap was closed in 2010 with the establishment of the Coating Application Specialist (CAS) certification, developed in the United States by The Society for Protective Coatings and the Finishing Trades Institute. The CAS certification is now being introduced gradually into Canada, as demand for these skilled workers grows and as the supply of fully-trained tradespeople increases.

Canada is blessed to be an energy-rich country. We have the technology and the know-how to safely move our energy resources through pipelines across the country to domestic and international markets. We can never eliminate all risk, especially the cause of the majority of pipeline incidents in Canada—corrosion. But we can, and we should, mitigate the risk of corrosion through ongoing research, supporting advances in new materials, and investing in the tradespeople who can help make our pipelines even safer.

Alan Young is co-president of TACTIX government relations and public affairs, an Ottawa-based consulting firm that works with clients in a number of sectors, including Canada’s oil, gas and pipeline industries as well as the skilled trades.

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