Following an upgrade in safety-class on a Canadian pipeline, T.D. Williamson was called in to handle hot-tap and plugging operations on a 30 inch diameter pipeline requiring relocation. The pipeline supplies one third of Canada’s population with gas, so it was imperative that the supply of gas was not interrupted.

Most people who have spent any amount of time in Canada will agree that it’s a scenic country. From the Rockies in British Columbia, to the bays and estuaries of Nova Scotia, and the miles of forests, hills, and lakes in between, Canada is rich in natural beauty.

Canada is also rich in oil and gas. In fact, the nation’s estimated oil reserves rank third in the world, following only Saudi Arabia and Venezuela. Western Canada has the largest collection of oil sands. And the country is the fourth largest producer of natural gas, most of which flows from west to east through a 30 inch diameter pipeline.

The pipeline is responsible for supplying many of the nation’s gas companies and one third of Canada’s population. It is important, understandably, to keep the pipeline flowing at all times.

Compliance and the NEB
In early 2013, the operator of the 30 inch diameter pipeline was handed a challenge: the area around a section of its main pipeline received a safety-class upgrade, which required the company to relocate part of the line.

Canada’s National Energy Board (NEB) states in section 42 of its Onshore Pipelines Regulations that “if the class location of a section of a pipeline changes to a higher designation that has a more stringent location factor, the company shall, within six months after the change, submit the proposed plan to deal with the change to the Board.” The safety standards for each class are outlined in the Canadian Standards Association (CSA) Z662, a document that is updated approximately every four years.

“Safety–classes are based on a bunch of criteria – like population and proximity of residences to the pipeline,” explains Rebecca Taylor, a communications adviser at the NEB. “When a class changes, companies are required to mitigate any hazards related to their pipelines.”

In this specific case, a new subdivision was under construction near the pipeline, and the developing area was too close to comply with the NEB’s regulations.

To help create a safer environment, the operator decided to cut-out a 274 m section of the pipeline and build a new section further from the developing area. In order to keep gas flowing, the pipeline would need to be isolated upstream from the construction area, and re-routed through a by-pass line. The proposed worksite was in an environmentally sensitive area, and safety was of utmost concern. The new section of pipeline would run along the edge of a national park in Quebec, and near a Mohawk native reservation. In addition, any incident during the pipeline project would have dire political consequences for the operator and any other oil and gas companies that want to begin large projects in the region.

Double-block-and-bleed
Desiring to maximise jobsite safety without shutting down the line, the operator contracted pipeline service provider T.D.
Williamson (TDW) to handle the hot-tap and plugging operations. The operator's specifications called for a double-block-and-bleed methodology.

Traditional double-block-and-bleed isolation requires two fittings, two hot taps, and two plugging heads. More taps on a pipeline means more risk, in addition to increasing set-up time and leaving more permanent equipment on the line. However, TDW’s Stopple Train system reduces the overall number of hot taps and plugging heads used in the operation by inserting two plugging heads through a single entry point in the line. The two sealing elements also provide greater safety. Once the seals are in the set position, a bleed port is placed on the line in between the two heads. The bleed is left open and monitored, and any product that escapes past the first seal goes into the bleed port and is removed from the line. The two seals provide a ‘zone of zero energy’ and an extra layer of safety for the technicians working downstream on the pipeline.

“The redundancy provided by this method of double-block-and-bleed is very important to operators,” says Philippe Mari, Account Manager at TDW.

“The Stopple Train system uses half the amount of fittings, less equipment, smaller excavations, and it’s more cost-effective.”

In addition to saving money, performing an isolation using the system “makes the operation just that much safer,” says David Turner, Director of Hot Tapping and Plugging at TDW.

“It means fewer welds and less equipment on the lines.”

Under pressure

Relocating this segment would be a big job. Because work needed to begin within a few months to ensure it was completed before the safety-class change, a plan of action was created that included TDW building and testing new custom 30 inch Stopple Train equipment within ten weeks. Once the fleet was ready to go, the team mobilised to Quebec.

One of the supporting team members was Mr Turner, who contributed engineering calculations and analysis of the pipeline before beginning the isolation. “This particular operator is very thorough. They expect the highest degree of engineering, quality, and safety,” says Mr Turner.

“We worked together to make sure that the force on the plugging heads, created by the flow of product, was well within the tolerance of the equipment.”

First-time success

The success of a traditional isolation job hinges on creating a seal, but an acceptable seal is not always achieved on the first attempt. Mr Turner says that “one of the greatest advantages of the Stopple Train technology over traditional isolation techniques is that it greatly increases the likelihood of achieving an acceptable seal on the first attempt.

“Getting an acceptable first-time seal reduces the number of times you need to remove equipment from the line in order to try again. And as each attempt can take quite some time, especially when working with larger diameter lines, reducing that waiting time has a quantifiable value to operators.

“By providing a greater first-time success rate and less jobsite downtime, the Stopple Train system can even help reduce the cost of labour and machinery. It also minimises the number of times you need to handle equipment, which lowers the chances of damage or incident.”

After TDW achieved a 100 per cent seal with the system and completed the isolation, the gas was re-routed, and the job completed with no issues. Natural gas continued to flow through the temporary bypass, supplying Eastern Canada. By the end of the project, a new pipeline segment was completed, built at a safe distance from the new subdivision. The entire project was completed with minimal disturbance to Canada’s pristine natural environment. 

For more information on TDW’s products and services visit www.tdwilliamson.com

A diagram of 30 inch Stopple Train isolation and by-pass.