



A PROFESSIONAL CONSULTING FIRM SERVING THE ENERGY, CHEMICAL, AND RELATED INDUSTRIES WORLDWIDE

END OF THE LINE (5)? - REFINERY IMPACTS IF ENBRIDGE'S MICHIGAN CRUDE PIPELINE IS SHUT DOWN

July 18, 2019

The battle over the future of Enbridge's Line 5 light crude oil pipeline through Michigan is heating up. In recent weeks, Michigan's new attorney general filed suit to throw out the 1953 easement the state granted to allow the pipeline to be laid under the Straits of Mackinac — the narrow waterway between Michigan's upper and lower peninsulas — and to block implementation of an agreement Enbridge and the state's then-governor reached last fall to replace the section of Line 5 under the straits by the mid-2020s. Enbridge is pressing ahead, maintaining that the existing pipeline is safe and the 2018 agreement is legal and fully enforceable. All that raises two questions: just how important is Line 5 to the Michigan and Eastern Canadian refineries, and what would those refineries do if the pipeline were to cease operations? Today, we discuss recent developments and examine the issues at hand.

Enbridge's Line 5, part of the Canadian midstream company's much larger Mainline/Lakehead crude oil pipeline system, has been an important conduit for moving Western Canadian and Bakken crude oil and NGLs across Michigan's upper and lower peninsulas — and into Ontario — for more than 65 years. Line 5 (purple line in Figure 1) is one of multiple Enbridge pipelines out of the company's terminal in Superior, WI. The 540-Mb/d pipeline transports "batches" of either light crude, light synthetic crude or mixed NGLs 645 miles east/southeast through Michigan to Sarnia, ON. The crude oils and NGLs are sourced primarily in Western Canada (but also in the Bakken) and are bound for Michigan, Ontario and Quebec. At the Straits of Mackinac (dashed red oval) — the four-mile-wide water passage between Michigan's upper and lower peninsulas (and Lake Michigan and Lake Huron) — the 30-inch-diameter, single-pipe Line 5 splits into two 20-inch-diameter, parallel pipes that are anchored along the straits' lakebed.

Enbridge has been under increasing pressure from environmental groups to shut Line 5 since 2010 (see Tunnel of Crude), when a rupture on the company's Line 78 (formerly Line 6B, neon-green line in Figure 1) across southern Michigan resulted in a major oil spill into a tributary of the Kalamazoo River. In recent years, Enbridge had been working with Michigan state officials on steps to help minimize the risk of a rupture on Line 5, especially the underwater section at the Straits of Mackinac. In November 2017, Enbridge and the state agreed that the midstream company would replace the Line 5 section under the St. Clair River (between Michigan and Ontario) as soon as permits for the project are in hand. (Canada National Energy Board, or NEB, approved plans for the project last Friday, July 12.) The company and state also committed to completing a detailed analysis of options for replacing the pipe's Straits of Mackinac section, and to taking a series of steps to ensure the safe operation in the interim — including a plan under which Enbridge will temporarily shut down the straits portion of Line 5 during sustained periods of adverse weather (waves eight feet or higher).



A PROFESSIONAL CONSULTING FIRM SERVING THE ENERGY, CHEMICAL, AND RELATED INDUSTRIES WORLDWIDE



Figure 1. Line 5, Selected Other Pipelines and Refineries. Source: RBN

Enbridge and the state of Michigan built on that agreement with a new pact they reached last October and signed in December. That agreement allows Enbridge to continue operating the existing Line 5 under the straits until the company designs and builds a new multi-use utility tunnel to be located about 100 feet beneath the Straits of Mackinac’s lakebed, a process it estimated would take seven to 10 years. The tunnel would house a new, single, 30-inch-diameter replacement pipe and would be designed to fully contain any spill that might occur within it. The tunnel also could accommodate electric-transmission and telecommunications lines.

The fate of the agreement — and the future of Line 5 — were thrown into question almost immediately, however, by incoming Governor Gretchen Whitmer and Michigan Attorney General (AG) Dana Nessel. The new governor pressed Enbridge to agree to a date certain for shutting down the old Line 5 pipes under the Straits of Mackinac, and insisted that it be no later than 2021; Enbridge countered that it would be impossible to complete the new tunnel before 2024 (a year sooner than the company’s initial estimate). The governor also asked AG Nessel for an opinion regarding the constitutionality of the state law (Act 359) enacted in the closing days of 2018 to help push the tunnel project across the finish line. In March 2019, the AG issued an opinion finding that the new law was, in fact, unconstitutional — we won’t get into the legal argument here — and in June, the AG made two pipeline-related filings in state court. One asked a Michigan Court of Claims judge to reject Enbridge’s plea that the tunnel agreement remain in force; the other asked a Michigan Circuit Court to find that the 1953 easement agreement allowing Line 5 to run along the Straits of Mackinac’s lakebed violates the state’s “public trust doctrine” and declare the easement deal null and void. For its part, Enbridge appears to be pressing ahead, assuming the easement and agreement will stand and the tunnel project will move forward.



A PROFESSIONAL CONSULTING FIRM SERVING THE ENERGY, CHEMICAL, AND RELATED INDUSTRIES WORLDWIDE

The outcome of this argument is uncertain at this point. But how important is the continued operation of Line 5 to U.S. and Canadian refineries that receive light oil via the pipeline?

According to Federal Energy Regulatory Commission (FERC) Form 6 data, an average of 2.63 MMb/d of crude oil crossed the international border between Canada and Minnesota on the Enbridge Mainline/Lakehead system in 2018. The system picked up some barrels after it crossed the border, mostly from the Bakken region. The majority of the crude oil that flowed into the U.S. ended up in U.S. refineries; however, 724 Mb/d eventually crossed the border between Michigan and Ontario near Sarnia (ON). The majority of this volume was destined for Eastern Canadian refineries, while a small fraction was bound for a refinery in northwestern Pennsylvania via the international boundary near Buffalo, NY.

The portion of the crude that makes its way through the Mainline/Lakehead system to Sarnia can come from (1) Line 5, which has a capacity of 540 Mb/d and breaks off at Superior (WI) before traversing northern Michigan and then moving south towards Sarnia; or (2) Line 78 (neon-green line in Figure 1), which has an initial capacity of 570 Mb/d to Stockbridge, MI, before constricting to 500 Mb/d, and moves crude from the Chicago area to Sarnia. Line 5 is dedicated to light crude oils and NGLs, while Line 78 can carry light, medium, and heavy crude oil. From Sarnia, there are other Enbridge pipelines that move crude farther east; including:

- 1) Line 7 (yellow line), which moves crude from Sarnia to Enbridge's Westover Station near Hamilton, ON. From there it can flow on Line 10 (pink line) to the Kiantone Pipeline in West Seneca, NY (and from there to the United Refinery in western Pennsylvania) or on Line 11 (orange line) to Nanticoke, ON; or
- 2) Line 9 (lighter blue plus red lines), which runs through Sarnia, ON, to Montreal, QC. Notably, Line 9B — the portion of Line 9 between Westover and Montreal (red line) — has flowed east to west and west to east at varying points in time. However, between 1998 and late 2015, it flowed east to west to facilitate imported crude oil movements to the Ontario refineries. In late 2015, it was reversed (again) to allow more Western Canadian and Bakken crude to flow eastward (see Come On the Sloop 9B).

The loss of Line 5 would restrict the volume of crude oil that can head to Sarnia to a maximum of 500 Mb/d, assuming that none of Line 78's capacity is needed for refineries in the Michigan and Ohio area. However, according to FERC Form 6 filings, Enbridge delivered 238 Mb/d of crude to Michigan and Ohio area refineries in 2018. Assuming this quantity stays the same and that there are no system constraints between Superior and Chicago, only 332 Mb/d of oil could potentially enter Eastern Canada on the Enbridge system.

Considering that six refineries in Ontario and Quebec — plus the United Refinery in Warren, PA — have a combined capacity of 836 Mb/d and currently rely on Lines 5 and 78 for the majority of their crude oil needs, the loss of Line 5 would change the crude oil sourcing dynamics of these refineries. The Ontario refineries connected to the Enbridge system include Imperial Sarnia (119 Mb/d), Suncor Sarnia (85 Mb/d), Shell Sarnia (77 Mb/d) and Imperial Nanticoke (113 Mb/d), while the Quebec refineries include Suncor Montreal (137 Mb/d) and Valero Quebec City (235 Mb/d). In addition, the United Refinery in northwestern Pennsylvania has a capacity of 70 Mb/d.



A PROFESSIONAL CONSULTING FIRM SERVING THE ENERGY, CHEMICAL, AND RELATED INDUSTRIES WORLDWIDE

According to Baker & O'Brien estimates, the Eastern Canadian refineries tied to the Enbridge system process a crude slate that is lighter than 30 degrees API. Notably, the crude slate for four of the six refineries is lighter than 35 API, which lines up with the light crude oil transported by Line 5. What alternatives would these refineries have if Line 5 were to be shut down? Prior to the reversal of Line 9, crude oil reached the refineries via ship down the St. Lawrence River and via the Portland-Montreal Pipe Line from Portland, ME to Montreal, QC (this pipeline is also tied up in legal/regulatory issues due to a desired reversal, but we'll save that for another day). Some crude oil — including Eagle Ford and WTI — from the U.S. Gulf Coast — still reaches the refineries via the water, but the Portland-Montreal Pipe Line route has diminished in importance, transporting less than 2.5 Mb/d in 2018.

To summarize, a shutdown of Line 5 would once again cause a structural change in crude oil sourcing to Eastern Canadian refineries and cause an unfortunate lack of direct pipeline linkage to North American-produced crude oils. While these refineries have relied on imported crude oils from non-North American locations before, it would be a disappointing outcome, and a financial hardship to potentially switch back to these sources, given the abundance of North American crude oils available that are ideally suited to these refineries today.

Note: The article was authored by Amy Kalt of Baker & O'Brien and published on RBN Energy's Daily Energy Post on July 18, 2019.

"End of the Line" was written by George Harrison, along with fellow Traveling Wilburys Bob Dylan, Tom Petty, Jeff Lynne and Roy Orbison. It was the final cut on their debut album, Traveling Wilburys Vol. 1, and the second single from the album, released in January 1989. Personnel on the record were: George Harrison (lead and backing vocals, acoustic and electric guitars, slide guitar), Tom Petty (lead and backing vocals, bass, acoustic guitar), Jeff Lynne (lead and backing vocals, acoustic and electric guitars), Roy Orbison (lead and backing vocals, acoustic guitar), Bob Dylan (lead and backing vocals) and Jim Keltner (drums). The video for "End of the Line" featured the Wilburys traveling on a train, with Roy Orbison's guitar shown rocking in a chair during his vocal parts as a tribute to Orbison, who died suddenly in December 1988, before the video was made.

This article is copyrighted © 2019 by Baker & O'Brien, Inc. and publication or distribution of this article without the express written consent of Baker & O'Brien, Inc., is prohibited.