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News / GTA

Is Bakken oil safe enough for the GTA?

The Lac-Mégantic disaster raises concerns about fracked crude from North Dakota and Saskatchewan. More explosive, it may be safer in Line 9 pipe than on rails.



MATHIEU BELANGER / REUTERS

Charred tanker cars lie in the ruined town of Lac Megantic on July 9, after a derailment and explosion that surprised oil safety experts with its ferocity. The oil being carried, from the Bakken formation, was far more volatile than its documentation suggested.

By: Jessica McDiarmid News reporter, Published on Sat Dec 14 2013

The fires burned for four days after the explosions.

A train carrying 72 cars of crude oil had barreled into the sleepy Quebec town of [Lac-Mégantic and derailed](#). And the oil did what crude oil isn't supposed to do: it blew up, killing 47 people, leaving the downtown core in ruin.

The crude oil on that train came from North Dakota, where it was pulled from the shale of the Bakken formation, which stretches from western North Dakota into southern Saskatchewan and eastern Montana.

It's the same oil Enbridge plans to pump through Line 9, [a pipeline that cuts through the GTA](#) if federal regulators approve plans to reverse the flow in the 38-year-old pipeline to supply Quebec refineries with cheaper products from western Canada and the Bakken region.

The composition — and flammability — of crude oil varies, depending on where it's extracted. The [oil that exploded in Lac-Mégantic was mislabelled](#) in shipping documents as less dangerous than it really was.

Now, railway regulators in Canada and the U.S. are homing in on Bakken oil and potential safety concerns when it is shipped by rail. There are worries it may be

more corrosive and more explosive than oil extracted elsewhere.

Line 9 would also carry diluted bitumen — heavy, tar-like crude from Alberta's oil sands, diluted with chemicals so it can flow through a pipe — though the majority of product would be light crude from the Bakken, according to Enbridge.

Industry reports have noted the corrosive effects of Bakken oil on drilling and refinery infrastructure, but there are no special rules for its handling, nor have its effects on pipelines been probed by federal regulators on either side of the border.

“Regulators don't treat crude oil from the Bakken any different than they treat crude oil from the tar sands or from Oklahoma,” said Carl Weimer, executive director of the Washington-based Pipeline Safety Trust. “No one's ever really looked at whether different types affect pipelines different.

“It seems like it should be a concern, we just really haven't heard about it that much.”

In the days that followed the blasts in Lac-Mégantic, as police officers and firefighters pulled bodies from the mangled wreckage, safety investigators said the crude oil — not generally seen as a highly flammable product — had acted in an “abnormal” way.

“Most people were quite surprised by the strength of the fire and the subsequent explosions,” said lead investigator Don Ross.

Months later, Ross's investigation would find the flammability of the oil — misclassified in documents — was closer to that of gasoline than typical crude.

Most of the oil produced in North Dakota is extracted using hydraulic fracturing, or “fracking,” a controversial process of blasting apart underground rock formations with a high-pressure mix of water, sand and chemicals to get at oil and gas trapped within.

Producers use a toxic soup of chemicals, such as hydrochloric acid, a highly corrosive component that critics fear could eat away at pipelines and tank cars if not fully removed from the oil.

And Bakken crude can contain high levels of hydrogen sulfide, a toxic, corrosive chemical that's extremely flammable.

Earlier this year, Enbridge got into a spat with shippers when it asked federal regulators for permission to reject crude oil with hydrogen sulfide levels higher than 5 parts-per-million — after tests revealed a batch of crude bound for a pipeline at its Berthold, N.D., facility had levels of 1,200 ppm.

Human exposure to hydrogen sulfide at 50 ppm or higher can cause death. The batch Enbridge successfully rejected contained 24 times the lethal level.

But it was Enbridge that pushed for that 5 ppm limit, which was protested by oil producers. No regulations require it. Some companies don't have such limits.

Enbridge spokesperson Graham White said the company samples batches of crude that goes through its lines. Oil with high levels of contaminants, such as

hydrogen sulfide, are flagged and dealt with, to protect both people and pipeline. “We take immediate steps to address the contaminated batch and to determine the source to prevent repeat deliveries,” said White. “If we can’t identify the source we will take the necessary measures to eliminate the problem, including issuing complaints to the regulator as we did at our Berthold facility.”

But when it comes to determining the potential for a product to combust, it’s not correct to treat railways and pipelines the same way, he said.

An explosion requires three elements: fuel (such as oil), an ignition source, and oxygen.

Unlike oil in a pipeline, White said, oil in rail cars is readily exposed to one of those elements: atmospheric levels of oxygen.

Secondly, trains move at high speed, with the potential for derailments that could cause cars to collide and create sparks, a potential ignition source for an explosion.

“This doesn’t happen in a pipeline incident, and industry experience reinforces this,” said White. “Fire and ignition of the product are almost never factors in even a large incident.”

Rhona Delfrari, a spokesperson for Alberta-based oil producer Cenovus Energy, said the composition of its oil from the Bakken in southern Saskatchewan isn’t very different from other sources.

“It’s not drastically more explosive by any means, not even close,” said Delfrari. “Oil is pretty much oil.”

Chemical engineer Gregory Patience, who studies explosions in petroleum and fossil fuels, looked up a safety data sheet published by Cenovus on its Bakken product.

The oil’s flammability classification is the highest there is, level 4 — the same as methane gas and propane, which are also frequently moved by pipeline.

In the case of a spill, the Bakken oil could ignite, with a spark, at 20C. To ignite in the absence of a spark would require temperatures of 250C, Patience said.

“Is it more dangerous, is there a hazard? Yes, there’s a hazard; yes, there’s a risk,” said Patience. “But ... I would say that this is what you want to pipe. You don’t want to put this on the road; you don’t want to put this on the railroad. You want to keep it in a pipeline.”

That’s the problem with Line 9, according to pipeline consultant Richard Kuprewicz. He argues that Line 9 is at high risk of rupture due to “insidious” cracks.

Enbridge has called his assertions “entirely unfounded” and “grossly unfair.”

Canada’s National Energy Board is now considering Enbridge’s proposal to reverse the flow in the 38-year-old pipeline eastward and raise its capacity from 240,000 to 300,000 barrels a day.

A rail car has one advantage over a pipeline, in that it carries a relatively small amount of oil, Kuprewicz said. “The first rule of pipelines is: Do not rupture. The

consequences of a release can be far more significant.”

Keith Stewart, climate and energy campaign coordinator at Greenpeace, said “unconventional oil,” whether diluted bitumen from Alberta or fracked oil from the Bakken, is giving rise to a host of unforeseen dangers that should be probed before shipping products past communities and waterways, whether by rail or pipeline.

An Enbridge spill of diluted bitumen in Michigan in 2010, for example, proved far harder to clean up than typical oil, as the heavy crude from the oil sands sank to the bottom of waterways, while the chemicals used to dilute it evaporated.

Cleanup of the 3.3 million litres spilled near Kalamazoo, Mich., is still not complete.

His next example is the exploding crude in Lac-Mégantic.

“The assumption was we knew what we were dealing with. And we didn’t,” said Stewart. “We’re basically conducting experiments, finding things go wrong, and then trying to figure it out.”

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