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Shipping Crude Oil by Rail: New Front in Tar Sands Wars

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As debate over the Keystone XL and other pipeline projects continues, crude oil from the Alberta tar sands and western U.S. oil fields is increasingly being hauled by railroad. Critics warn that this development poses a threat not only to the environment but to public safety.

by Jacques Leslie

On New Year's Eve 2009, a train with 104 tank cars of light crude oil traveled 1,123 miles from North Dakota's Bakken oil fields to a terminal in Stroud, Oklahoma, and opened a new front in the war over development of Canada's tar sands.

It didn't seem that way at the time. EOG Resources, the company that owned the oil, simply needed a way to get its crude out of North Dakota,

Andrew Burton/Getty Images Tanker cars at a depot in North Dakota, where railroads now move 600,000 barrels of oil a day from the Bakken fields.

where production since the advent of oil fracking there nearly a decade earlier had far exceeded the capacity of available pipelines and trucks. The 2009 shipment is now considered a bellwether event, marking the first significant movement of U.S. crude oil by rail in many decades. Less than four years later, railroads have shipped as much as 600,000 barrels a day from the Bakken and are transporting crude not just from North Dakota but from oil-fracking sites in Montana, Texas, Utah, Ohio, Wyoming, Colorado, and southern Canada. Across North America, trains are now moving nearly a million barrels of crude a day, and that number will continue to grow rapidly.

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A million barrels a day is more than the capacity of the controversial Keystone XL pipeline, 830,000 barrels — a fact that has led some oil industry analysts to declare that heavy crude from Alberta's tar sands will find a way to refineries regardless of Keystone XL's fate. Even *The New York Times* has supported this claim. An October 30 *Times* news story, headlined "Looking for a Way Around Keystone XL, Canadian Oil Hits the Rails," said, "Even if President Obama rejects the pipeline, it might not matter much" because of rail's emergence. That's also the prevailing view at the U.S. State Department, whose March 2013 environmental assessment of Keystone XL concluded that rail "should be capable" of transporting all tar sands crude even "if there were no additional pipeline projects

approved."

Tar sands advocates are happy to promote the idea that continued development of the tar sands is inevitable because it implies that opposition to Keystone XL is futile and that Americans should therefore cash in on its jobs and construction expenditures before somebody else does. However, as tar sands opponents point out, much evidence suggests that this conclusion is at best premature and perhaps flat-out wrong.

What is certain is that rail has now joined a half-dozen proposals for tar sands pipelines as an arena of contention, with the future of the Florida-sized Alberta basin of western Canada at stake. Just as pipeline safety has been a key issue in the Keystone XL debate, this development

> Safety questions have intensified since a tanker accident in Quebec last July that killed 47 people.

has raised questions about the safety of crude-by-rail to new prominence, especially since a tanker accident in Quebec last July that killed 47 people. With these safety questions, such arcane matters as the design of tank cars and the carbon-hydrogen ratio of their contents have taken on heightened importance. How regulations governing these issues are decided will help determine whether the tar sands basin — the world's largest fossil fuel reserve outside Saudi Arabia — stays close to its current production level of 1.8 million barrels a day or expands to four or five times as much, as its developers hope. That in turn will have a significant impact on climate change's intensity in coming decades.

Of the million barrels now being shipped by rail in North America, only a small fraction — around 50,000 barrels — consists of the "heavy crude" that is produced in the tar sands; the rest is "light crude" from southern Alberta, Saskatchewan, and the U.S. Light crude is hydrogen-heavy and carbon-light; its high hydrogen content enables it to flow easily but also makes it alarmingly explosive. Bitumen, the chief constituent of heavy crude, is the opposite, carbon-heavy and hydrogen-light, as viscous as peanut butter, unable to flow through pipelines unless diluents are added to it, but also unable to be loaded into railcars unless it is heated or diluted. Heavy crude is therefore more expensive to transport by rail than light crude, which is one reason tar sands crude lags far behind light crude in rail shipments. Another is that few rail cars are equipped to carry heavy crude. Some oil industry analysts predict that both obstacles will eventually fall away, leading to massive heavy crude transport by rail, while others think that rail will never serve more than a niche market, serving newly developed oil fields only until pipelines to them are built.

Sandy Fielden, an energy markets consultant at RBN Energy and blogger whose entries include "Crude Loves Rock'n'Rail," said in an interview, "If there is money to be made, people will figure out a way of getting oil to market. Pipelines are the safest and most efficient way to accomplish that, but if there aren't pipelines, people will figure out alternatives, and clearly the current emphasis on crude-by-rail is one such alternative."

Yet the Canadian Association of Petroleum Producers, whose member companies produce about 90 percent of Canada's crude oil and natural gas, takes a less upbeat view of rail transport. Rail is "a complement to pipelines," said Greg Stringham, the group's vice president for markets and oil sands. "The rail companies can provide some service on a short-term, short-distance basis, maybe even longer-distance, until a pipeline is in

place…They're seeing this as an opportunity to be much more complementary to the long-haul pipeline system that needs to be built."

Whether rail replaces or only complements pipelines, the oil industry's budding romance with it is not necessarily a sign of the tar sands' rosy prospects, for it could also be an indication of developers' setbacks in building pipelines. Although American media provide relentless coverage of Keystone XL's prospects, their focus is myopic. Keystone XL is only one of seven proposed pipelines intended to transport tar sands crude — the projects extend from Alberta not just south to the Gulf of Mexico but east and west to both the Atlantic and Pacific coasts, and are aimed at reaching vast export markets from ports in Portland, Maine; St. John, New Brunswick; Kitimat, British Columbia; and Anacortes, Washington.

The Canadian and Alberta governments avidly support all these proposals, yet opponents have entangled every one in so much protest and legal conflict that their fates are uncertain. Based on the assumption that at least some of the pipelines will be approved, tar sands developers are investing at a current rate of $19 billion a year in tar sands projects. Now they face the real possibility that delays in pipeline construction (never mind outright rejections) will leave them without transport outlets within a year or two. That's one reason that last month Alberta bitumen sold for as low as $29.40 a barrel, while benchmark West Texas light crude sold for $94.25. There's a hint of desperation in the developers' embrace of rail.

Just like pipelines, railroads face significant obstacles as conveyors of tar sands crude — and for some of the same reasons. Just as pipelines leak, trains derail, sometimes with devastating consequences. On the night of July 6, 2013, a train with 72 tank cars carrying Bakken light crude was left on a hill overlooking the Quebec town of Lac-Mégantic, 130 miles east of Montreal. The train's sole engineer apparently failed to apply hand brakes to enough rail cars before he checked into a hotel for the evening, and at 12:56 a.m. the train began rolling. It reached a speed of 60 miles per hour — far exceeding a 10-mile-per-hour limit considered safe in the town — when, just after crossing Lac-Mégantic's main street, it derailed. Bakken crude is highly flammable, and explosions went on for hours, leveling half the town of 6,000 people, destroying 30 buildings and killing 47 people, including six whose bodies were so thoroughly vaporized in the prodigiously high temperatures that no trace of them was found.

The accident was the biggest Canadian train disaster in more than a century. It received massive coverage in Canada, but it got far less attention in the U.S. That's unfortunate, since it revealed the lax state of regulation of the railroad industry in both Canada and the U.S — and the huge expansion of rail-by-crude increases the odds that such accidents will happen again. Employing only one engineer to operate a train that was nearly a mile long might have been imprudent, but it did not violate regulations. The light crude in the Lac-Mégantic train turned out to have been mislabeled as conventional crude, which is not explosive, but even with proper labeling, the dangerous cargo wouldn't have had to be handled any differently.

As long ago as 1991, the U.S. National Transportation Safety Board singled out the model of tank car used in the Lac-Mégantic train for its susceptibility to releasing its contents when derailed. Nevertheless, this model, known as the DOT-111, dominates North American tank fleets. Older versions are entirely unsuited to carrying light crude, but thanks to the crude-by-rail boom there's a backlog of at least two years on orders for an upgraded, somewhat

safer version that has been in circulation since 2011.

Frustrated by the halting pace of change to federal railroad regulations, the American Association of Railroads voluntarily tightened tank car rules in 2011. Last month, after a 90-car train carrying Bakken light crude derailed and ignited in western Alabama, the association called on federal regulators to require retrofits of 72,000 older DOT-111s and upgrades in 14,000 newer ones to lessen the likelihood of light crude explosions after derailment. If carried out quickly, this change would limit the supply of tank cars even more, and would place still another obstacle in the way of a rapid buildup in rail shipments of tar sands crude.

Unlike Bakken crude, bitumen-laden heavy crude is not explosive, but rail shipments of it pose another sort of danger: If bitumen is spilled into a body of water, it sinks, making cleanups highly difficult, if not impossible. That was clearly demonstrated when an Enbridge Inc. pipeline leaked more than 31,000 barrels of tar sands crude into Michigan's Kalamazoo River in July 2010. Bitumen covered 36 miles of riverbed, triggering a complicated cleanup that has so far cost the company about a billion dollars and is far from complete.

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The rapid development of Alberta's tar sands has spawned a proposed 731-mile pipeline that would transport oil to the British Columbia coast. As **Ed Struzik** reported last year, the project is strongly opposed by conservationists and First Nations leaders, who fear the environmental risks it would bring.
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In addition, some refineries lack offloading facilities to handle crude arriving by rail. An October 8 Goldman Sachs report questioned whether refiners "have access to sufficient terminal off-loading capacity to handle the growing rail volumes of heavy crude oil." Shipping crude by rail is more expensive than using pipelines, and construction of new loading and offloading facilities will drive the cost higher.

On top of this, some of these projects are certain to face local opposition. Communities with refineries may oppose proposed facilities to offload tar sands crude, since refining bitumen emits substantially more pollutants than conventional crude; communities with ports may fear that proposed crude-by-rail terminals will increase chances of oil spills in their waterways. And because tar sands oil extraction releases far more greenhouse gases than conventional crude does, some communities may also resist as a way of fighting climate change. Such concerns were reflected in recent decisions in Benicia, California, and Grays Harbor, Washington, to delay construction of crude-by-rail terminals while environmental evaluations are conducted.

"The rail guys right now are in the same space the pipeline guys were five years ago," said Keith Stewart, Greenpeace Canada's climate and energy campaign coordinator. "They're assuming they can have massive growth rates and there won't be any hiccups along the way. I think the pipeline guys have now realized it's not that easy, and the unnatural exuberance about rail will soon come crashing down in the same way."

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