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# NEW FACTS TO KNOW ABOUT CRUDE BY RAIL

The game is changing by the day

by Fred W. Frailey



**C**rude oil is like nothing else that railroads handle. Oil and railroads go back almost a century and a half, but in modern times this traffic sprang out of nowhere in North Dakota seven years ago and mushroomed starting in 2012. Last September, producers in the Williston Basin in western North Dakota and eastern Montana shipped a record 800,938 barrels by rail, up 19 percent in a year's time. This amounted to about 11 trains per day. Meanwhile, crude oil loading facilities, most of them able to load entire crude oil trains at once, are popping up in Alberta, Colorado, New Mexico, Saskatchewan, Texas, Utah, and Wyoming. But this business, like the oil itself when it comes out of the

ground, is unstable. Here today for railroads, it could be gone tomorrow. Every new oil pipeline, and every new crude-by-rail terminal, alters the competitive equation. Warfare in the Ukraine, or pricing decisions made in Riyadh, can instantly make rail attractive to a refiner or uncompetitive. So the long term is a few months and the very long term maybe a year. It's hard to make business decisions in such an environment. To help you gain perspective in this volatile situation, here are five points that are important to know in 2015 about railroading's most highly visible new cargo. Understand them, and you'll know more about the subject than most people in the oil business.

## 1 \$40 A BARREL OIL DOES NOT MEAN THE END OF CRUDE BY RAIL

Interestingly enough, BNSF Railway moved about 300 crude oil unit trains in December, up substantially from the month before, despite the colder weather and holidays. And bear in mind that oil at \$40 a barrel is less than half the price it fetched in mid-2014. So those trains go contrary to expectations.

Two things are happening.

First, extraction of oil in North Dakota and other western states is as likely to increase as decrease in the short term this year. That's because having made the investment in drilling, the cash cost of bringing oil out of the ground is modest. Continental Resources, a large producer in North Dakota, says its cash cost is \$18 a

barrel. So even at \$30 a barrel (the wellhead price per barrel in North Dakota in mid-January), producers can make a profit. Bringing up all the oil they can today helps producers service their debts and keeps the businesses going.

Second, oil companies will have no choice but to rely on railroads in the upper Midwest. Pipeline capacity does not yet exist to take most of the oil out of North Dakota. The state's pipeline authority says that not until 2017, at the earliest, will pipeline capacity increase enough to challenge the primacy of railroads.

But make no mistake: Oil companies are slashing their capital budgets and canceling leases of drilling rigs. So fewer new wells will be started in 2015. By the second half of 2015, the impact will be felt as pro-

duction tops off and heads down.

So crude by rail is reaching a plateau, as production heads down and new pipelines open in the fracking fields. And then what?

The natural markets for railroads are refineries on the east and west coasts, not reached by pipelines. Railroads do a good job of quenching appetites of east coast refineries, sending them six to seven trains of oil per day. The buildup of terminals on the west coast — in particular, an ambitious rail-to-barge facility in Vancouver, Wash., to reach California refineries — is opposed by environmentalists, and politicians generally side with them.

The outcome of these fights could determine whether the rail market for oil will resume growing at some point when pricing and production recover, or wither.

**A westbound BNSF empty tank train at Seward, Neb., heads toward Fort Laramie, Wyo., for another load of crude oil.** Darrell D. Wendt



## 2 RAILROADS ARE ON THE DEFENSIVE WHEN IT COMES TO SAFETY

The July 2013 crash at Lac-Mégantic changed everything. Never mind that 99.997 percent of crude oil tank cars get where they're going safely and without incident. The loss in 2013 of 47 lives in that small Quebec town, caused by a series of mistakes that will probably never be replicated, has outshouted every message the railroads put up.

Bad enough the damage to the reputation of railroads. Witness the following. Bloomberg/Business Week: "Trains That Go Boom." Mother Jones: "Exploding Trains, Explained." Politico: "Oil Boom Downside: Exploding Trains." The volume of shoddy reporting and slanted headline writing is distressing. But Lac-Mégantic (and subsequent derailments and spectacular fires in Casselton, N.D., and Lynchburg, Va.) handed ammunition to special-interest groups opposed to fossil fuels that they continually lob back at railroads while vocally opposing crude oil unloading facilities, particularly on the west coast.

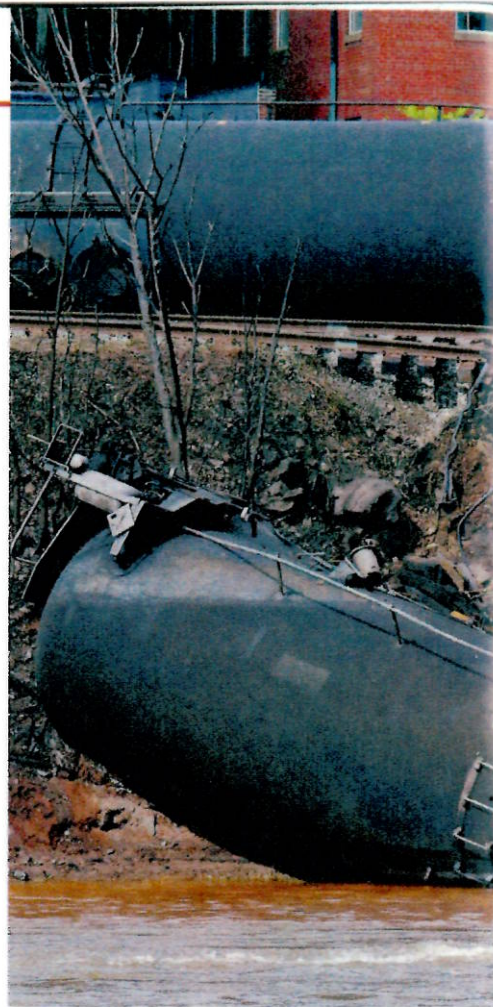
Explosive-crude-by-rail.org maps show rail lines carrying oil and asks: "How close are you and your family to a disaster waiting to happen?"

By and large, the oil industry is no help, either. Its trade group says bad track is to blame. Says Randy Meyer, vice president of corporate development for Altex Energy: "You've got to prevent the accident: Don't derail."

In this politically poisoned atmosphere, the U.S. Department of Transportation is contemplating a series of new tank car and operating standards. Options include distributed power and electronically controlled pneumatic braking to speed up braking, thicker car shells, phasing out or retrofitting most of the existing tank car fleet, and perhaps even a maximum speed of 40 mph for oil trains.

So whatever comes from the transportation department's rulemaking, crude by rail will become more expensive, in the worst case prohibitively so. Says C.A. "Beau" Maida, director of rail operations for GT Logistics in Port Arthur, Texas: "The Transportation Safety Board of Canada identified 18 things that went wrong in Lac-Mégantic. Only one was the car, and all we focus on is the car. The attitude is, 'we have to do something,' But if it doesn't answer to those 47 people in Lac-Mégantic, then don't do it." Wise words, but fat chance of that happening.

**Crews inspect the damage after a crude oil train derailed and caught fire along the James River near downtown Lynchburg, Va., on May 1, 2014. AP: Steve Helber**





### 3 SPEND TO ADD CAPACITY? SOMETIMES RAILROADS AREN'T SURE

Crude oil represents a sliver (3 percent) of railroad revenues, but evidence suggests it clogs railroad arteries across the northern tier of the U.S. Those six to seven trains a day that BNSF Railway and Canadian Pacific send to the east coast almost all go through Chicago for interchange with CSX Transportation and Norfolk Southern. Next, throw in the frac sand headed from quarries in Illinois and Wisconsin to oil and gas drillers in Pennsylvania and Ohio. Now return the trains empty. Each train's passage must be negotiated *ad hoc* between the delivering and receiving railroad. It's a mess out there.

Congestion across the northern half of the U.S. in 2014 cried out for investments to increase capacity. That's easy to say, but huge uncertainties face railroads as they wade into the crude oil business. Oil producers have more transport choices than owners of coal mines, and can switch to pipelines if the economics of rail worsen. As domestic and international oil prices zoom up and swoop down, and the spread between expensive

foreign and cheaper U.S. oil fluctuates, the attractiveness of rail can change overnight.

East coast refiners, who gobble up crude oil trains today, may find it's cheaper to buy from Africa or the Middle East, or buy their oil in Texas and have it barged to the Delaware River (30,000 barrels a day reportedly made that trip in late 2014). Meanwhile, pipelines are being built into the new oil fields made possible by hydraulic fracturing and horizontal drilling; once they get there, railroads are less attractive to oil producers.

The question for railroads: Is this business going to stay or walk away? Should we invest as if it is going to stick around? Or gut it out and wait to see what happens? So far the answer seems to be that BNSF, Canadian National, CP, and NS are investing substantially (BNSF on a massive scale, actually), whereas CSX is more wait-and-see.

What's obvious is that there are no safe answers. Don't invest heavily and you could see a continuation of today's congestion and invite more intense regulation. Invest heavily and if those oil trains disappear in a year or two, you're a chump.

Empty (at left) and loaded oil trains pass in November 2013 on Norfolk Southern in Pennsylvania, a few miles east of the summit of the Allegheny Mountains. Eric Williams

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4 HEAD TO HEAD, PIPELINES STILL WIN BUT OPPORTUNITIES ABOUND

To survive in their new role hauling crude oil, railroads need an edge. In a direct matchup between rail and pipe between Point A and Point B, the pipeline can almost always quote a cheaper rate. There's just no way around it.

The good news is, there are lots of edges for railroads to play. Let's use the Bakken shale oil from North Dakota as an example. At first, there was no other way to get the oil out than by railroad — a big edge, indeed. Even today, pipeline capacity from North Dakota is barely half the rate of oil production. It could be years before pipeline capacity catches up with rising oil production in that state.

Here's another strong edge: Railroads go where the pipelines don't go, such as the east and west coasts. It's doubtful the competition will ever get there, due to the difficult geography of the Appalachian and Rocky mountains and permitting controversies, although pipeline company Kinder Morgan may again try to sign up users for a pipeline from West Texas to Southern California.

When U.S. oil prices were more than \$20 a barrel cheaper than on international

markets, refiners could pay the rail rate of, say, \$10 a barrel and still come out \$10 ahead. Even in early 2015, with the U.S. discount at about \$2, three of every four oil trains leaving North Dakota were destined to east and west coast refineries.

Meanwhile, as fracking opens up new oil fields in parts of Colorado, New Mexico, Utah, and Wyoming, it's the railroad that is already there and ready to do business. Pipeline developers take years to get commitments, obtain rights-of-way, and build their way in.

Until they do, railroads have an edge.

Or look for edges at places like the Uinta Basin oil field in northern Utah. "Rail is extremely important because no pipelines go out of state," says Alan Yahev, crude oil marketing manager of Newfield Exploration. And in any case, the waxy oil (imagine a liquid with the consistency of shoe polish) won't flow through a pipeline anyway. So what doesn't go by heated truck to Salt Lake City's five refineries is a natural for rail to pickup and carry elsewhere. Rail volume from this field was 35,000 barrels a day (equal to about half of a unit train per day) in late 2014 but has been growing steadily. So, if railroads want it, the business is there.

Norfolk Southern engineers exchange greetings as empty Bakken crude train 65R, left, passes loaded train 64R, right, at Perryville, Md., in April 2013. Michael S. Murray





## 5 CANADA IS THE LAND OF OPPORTUNITY AND THE PLACE OF FRUSTRATION

One place railroads can potentially under-price pipelines is from northern Alberta to the U.S. Gulf Coast. To flow through a pipeline, heavy bitumen, which is mined from tar sands, must be diluted almost 30 percent by light oil, or condensate. Producers must buy the condensate, refiners must pay to separate and dispose of it, and in between, the pipeline is only 70 percent efficient. However, tank cars are being built with heating coils to permit rail shipments of pure, undiluted bitumen. Heated bitumen goes into the car in Alberta and steam reheats it for unloading at the destination.

Roughly half of U.S. oil refining capacity is on the Gulf Coast, and those refineries are tuned to process heavy oil like the kind from Alberta. Here is how Altex's Randy Meyer figures the cost: For rail, a 2,500-mile trip from Fort McMurray, Alta., to the Gulf is \$16.77 per barrel of pure bitumen, plus another \$5.64 for terminal expenses and car leasing, or \$22.41 total. He used average freight rates to come up with the figure.

To get the comparable amount of bitumen to the Gulf by pipeline (including the cost of using the condensate as diluent), total cost comes to \$24.79 under long-term pipeline contract and \$29.29 for spot users. Insists Mark Viator, director of public and government affairs of Jefferson Energy: "If you can ship pure bitumen, it makes sense on the Gulf Coast."

But pure bitumen unit trains aren't making this trip to the Gulf, and maybe they never will. The bitumen is diluted as it comes out of the ground, so that it can be transported to shipping centers and to date no terminal exists to extract the diluent. So it's hard to even find pure bitumen to put inside a heated tank car, even though at the receiving end in the U.S. more than two dozen heat terminals can unload it.

Having invested billions to develop their bitumen mines, producers are hunkered down to keep their volumes up even at today's low prices. But the inability to load the pure thing onto unit trains makes it uncertain whether railroads will ever be major players in moving the stuff. **I**

**Tank cars rest at a crude oil loading terminal near Carseland, Alberta, on Aug. 31, 2014.**

AP: Larry MacDougal

