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## Government Data Sharpens Focus on Crude-Oil Train Routes

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by Isaiah Thompson

The oil boom underway in North Dakota has delivered jobs to local economies and helped bring the United States to the brink of being a net energy exporter for the first time in generations.

But moving that oil to the few refineries with the capacity to process it is presenting a new danger to towns and cities nationwide — a danger many appear only dimly aware of and are ill-equipped to handle.

Follow up:

Much of North Dakota's oil is being transported by rail, rather than through pipelines, which are the safest way to move crude. Tank carloads of crude are up 50 percent this year from last. Using rail networks has saved the oil and gas industry the time and capital it takes to build new pipelines, but the trade-off is greater risk: Researchers estimates that trains are three and a half times as likely as pipelines to suffer safety lapses.

Indeed, since 2012, when petroleum crude oil first began moving by rail in large quantities, there have been eight major accidents involving trains carrying crude in North America. In the worst of these incidents, in July, 2013, a train derailed at Lac-Mégantic, Quebec and exploded, killing 47 and burning down a quarter of the town. Six months later, another crude-bearing train derailed and exploded in Casselton, North Dakota, prompting the evacuation of most of the town's 2,300 residents.

See our interactive map of the crude-oil train data.

In those and other cases, local emergency responders were overwhelmed by the conflagrations resulting from these accidents. Residents often had no idea that such a dangerous cargo, and in such volume, was being transported through their towns.

Out of the disasters came a scramble for information. News outlets around the country began reporting the history of problems associated with the DOT-111 railroad tank cars carrying virtually all of the crude.

Local officials, environmental groups, and concerned citizens began to ask what routes these trains were taking and whether the towns in their paths were ready should an accident occur.

In July, the U.S. Dept. of Transportation ordered railroads to disclose route information to state emergency management officials. Railroads had fought hard to keep this information private, citing security concerns. Even after federal regulators required more disclosure, railroads pressured many state governments to withhold their reports from the public. Some have come out, often as a result of public records requests by news organizations: The Associated Press has obtained disclosures in several states initially unwilling to release them.

Map: Where Do Trains Carry Crude Oil?

Our interactive map uses federal government data to show where safety incidents on trains were reported, where each train began its journey, and where it was ultimately headed. Explore the app »

(Yue Qiu, Eric Sagara and Lena Groeger, ProPublica, and Isaiah Thompson, special to ProPublica)

Still, those disclosures offer scant detail, often consisting of little more than a list of counties through which crude oil is passing, without further specifics.

There have been attempts to fill in the blanks. KQED in Northern California, for example, combined the information disclosed in federal route reports with maps of the major railroads to show where trains carrying crude passed through California. The environmental group Oil Change International superimposed major refineries and other facilities that handle crude oil onto a national railroad map.

A ProPublica analysis of data from the federal Pipeline and Hazardous Materials Safety Administration adds new details by plotting out where trains carrying crude have experienced safety incidents, most of them minor. The data shows such incidents in more than 250 municipalities over the last four years. We've used the data to create an interactive map showing where safety incidents on trains were reported, where each train began its journey, and where it was ultimately headed.

The data also shows that factors that contributed to major, or even catastrophic, accidents have also been present in hundreds of minor ones: outdated tank car models; component failures; and missing, damaged and loose parts.

Bit by bit, a more realistic notion of where the dangers of crude-bearing trains are most substantial is emerging.

"Frankly, the [previous] disclosures weren't of that much use," says Kelly Huston, a spokesman for the California Governor's Office of Emergency Services, one of the first

state agencies to make those disclosures available for anyone on its website. When it comes to a detailed picture of where crude is moving, Huston says, "The expectation of the public is very far from the reality of what we're actually getting."

The hazardous materials data reviewed by ProPublica adds to that picture.

Only a handful of places around the country have the refinery capacity and infrastructure necessary to handle the massive amounts of oil being extracted from North Dakota's Bakken Shale: Bakersfield, Carson, and Long Beach in California; St. James, Lake Charles, Lacassine in coastal Louisiana; Philadelphia, Paulsboro, New Jersey. Delaware City, Delaware in the Mid-Atlantic.

These cities have become the terminuses for "unit trains" carrying up to 100 tank cars, each containing as much as 30,000 gallons of crude oil. These endpoints also have shaped the paths along which crude-bearing trains now cross hundreds of communities, many of which have never seen such traffic. Tracks all but abandoned for years have sprung back to life on account of the oil boom.

The vulnerabilities of the DOT-111 tank cars in which much of the oil is moved are well known by now. For decades, federal officials have cited concerns over their relatively thin shells, which are prone to puncturing or rupturing in an accident and releasing the hazardous material inside. They also have other components prone to damage, including protruding fittings often left unprotected, and hinged lids held on by bolts that have a history of coming loose, especially if not properly tightened by the original shipper.

Firefighters douse blazes after the oil-train derailment in Lac-Mégantic in Canada.  
(François Laplante-Delagrave/AFP/Getty Images)

When a tank car full of oil ruptures, the consequences can be dire. At a panel held by the National Transportation Safety Board in April, one technical expert with the agency described a "fireball release," in which "the entire content of the tank car, up to 30,000 gallons, is instantly released, along with the potential for rocketing car parts." When one tank car ignites, the heat can set off a chain reaction, causing other cars to explode as well.

In most cases, the tanks cars used to transport crude are supplied by railroad shipping companies, not railroads themselves. Railroads have typically pushed for more stringent safety requirements since they have to move the cars. Shipping companies and oil producers have pushed back against stricter proposals.

In 2011, as the crude-by-rail industry was ramping up and federal regulators were preparing to introduce new rules, industry groups adopted voluntary safety modifications to add thicker shells and other protections to new tank cars. But roughly 85 percent of the fleet currently carrying flammable liquids still consists of the older models. And while PHMSA is expected to issue rules requiring safer tank cars, railroads will have years to

phase in the upgrades and it's not yet clear to what extent they will be required to retrofit existing cars.

For most local fire departments, a blaze involving even a single tank car, let alone many, would be too much to handle, emergency response officials acknowledge. According to Richard Edinger, vice chairman of the International Association of Fire Chief's hazardous materials committee:

"[Most] fire departments don't have the capacity to deal with more than a standard gasoline tank [fire], which is about 9,000 or 10,000 gallons of fuel. Well, one DOT-111 car holds about 30,000 gallons — that pretty much exceeds our capacity."

Complicating matters, many towns don't even know that trains carrying crude oil are passing through.

Along the journey south from North Dakota, for example, many trains now make a stop in the tiny town of El Dorado, Arkansas, population 18,500, bound for a refinery that recently added capacity to accommodate Bakken crude. The PHMSA hazmat data includes more than a dozen leaks found on trains headed for the town.

Yet Union County Emergency Management Services deputy director Bobby Braswell, a former Chief Deputy for the El Dorado Fire Department, was unaware of the new crude traffic and its potential risks.

Braswell said that if state emergency management officials have a plan to respond to oil train derailments, they haven't shared it with El Dorado yet:

"We've got a little old railroad here, but if they transport crude, I don't know. I don't remember anybody calling about crude."

Along the trains' route to the Mid-Atlantic, according to PHMSA's hazmat data, is Mineral City, Ohio, where Tuscarawas county emergency services director Patty Levengood said she didn't know whether fire departments in her jurisdiction had been trained or otherwise advised on the new oil traffic. Such planning was "pretty much left to the individual chiefs," she said.

Other responders said they are acutely aware of the new risks facing their towns, and some expressed alarm. Asked whether his fire department had the capacity to handle a single tank car fire, Duane Hart, fire chief for Juniata County, Pennsylvania, answered with an emphatic "I know we don't!" Crude trains now pass through Port Royal, a town of 925 in Juniata County for which Hart's department provides services.

In many circumstances, all local responders would be able to do in the event of a large tank car fire is simply let it burn, experts say. At the recent NTSB rail safety panel, Gregory Noll, a chairperson for the hazardous materials committee of the National Fire Protection Association, summarized the situation bluntly.

He said:

"There's very little that we as a responder are going to do. Other than... to isolate the area, remove people from the problem, and allow the incident to go its natural course until it essentially burns down to a level where we can extinguish it."

But that approach would still involve tremendous damage in the many densely populated areas through which crude is now moving by rail, officials acknowledge. From Jeff Simpson, a 30-year firefighter who lives in North Virginia and teaches a course called "Training for Railroad Emergencies":

"The standard evacuation is typically a half-mile. But if you're in the middle of a big city, the footprint is going to be much bigger."

The Pittsburgh-based nonprofit news organization PublicSource reported in August that up to 40 percent of that city's roughly 300,000 residents live within the potential evacuation zone of trains carrying crude through the city.

Another Pennsylvania metropolis, Philadelphia, has become one of the biggest destinations in the U.S. for Bakken crude thanks to newly retrofitted refineries and a brand new rail unloading facility opened just two years ago.

The city appears frequently in hazmat reports: In at least 65 cases over the last two years, tank cars bound for or arriving in Philadelphia were found to have loose, leaking or missing safety components. These parts are meant to prevent flammable contents from escaping in the event of an accident.

There was a more serious incident last January, when a train full of oil derailed a few miles from the city's downtown. Luckily, no one was injured. The train was soon righted and the railroad made repairs, assuring city officials that the danger had passed.