**Bakken Oil trains and public safety**

Minnesota serves as a crossroads for trains carrying volatile crude oil from North Dakota’s Bakken shale formations. How prepared is the state for an oil train disaster?

It’s been 25 years since a death involving crude oil transportation by rail has occurred in the United States, and hazardous materials incidents on railroads have decreased by more than 90 percent since 1980. But oil train traffic is increasing, and recent accidents and resulting evacuations have underscored the risks.

Those hazards became clear in July 2013 in the town of Lac-Mégantic, in the Canadian province of Quebec, where an untended freight train carrying Bakken crude oil rolled down a hill, derailed and burst into flame, killing 47 people.

The U.S. Department of Transportation predicts trains hauling crude oil or ethanol will derail 10 times a year, on average, over the next two decades, causing more than $4 billion in damage and killing perhaps hundreds of people if the incidents occur in densely populated corridors, the Associated Press reported in February.

The Star Tribune took a closer look at rail incidents and the emergency preparedness improvements the state of Minnesota launched in 2014 in case such an incident occurred here.

**Is your home or work in a potential evacuation zone?**

Type your address in the “Search” box, in the lower left, to zoom the map to your location.

Each day, an average of seven trains carry 3.3 million gallons of crude oil through Minnesota. This map shows the lines that carry the Bakken crude and the half-mile-wide corridors on either side. That’s the area designated by public safety officials as the evacuation zone in the event of a significant leak or fire. Some 326,000 people live within those corridors.

Officials would order an evacuation if a leak posed a major health threat or a fire broke out, said Kevin Reed, operations branch director for Minnesota’s Homeland Security and Emergency Management division. “It’s not automatic,” he said.

**Population centers along the rail lines**

A Star Tribune analysis of the evacuation corridors found that an incident in rural Minnesota might result in fewer than 10 people being evacuated, while one in northeast Minneapolis might result in the evacuation of as many as 8,000 residents and anyone else who happened to be in the area.

This map shows some of the population centers along the rail and the number of people who live within a half-mile. The default evacuation zone for a train carrying crude oil is a half-mile radius around the wreckage. If an explosion occurs or is likely, the zone would be extended to a mile.

Reed, the state emergency management official, noted that crude oil incidents have resulted in “fire balls” rather than explosions, however. Explosions, he said, produce shrapnel, which has the potential to travel farther. Photos taken after crude oil train fires near Charleston, W. Va, and Casselton, N.D., show that the tanker cars burned but were otherwise left virtually intact, he said.

Reed said the last rail incident he could recall that resulted in an evacuation in Minnesota took place in 2012. A semi-trailer truck struck a train near Plummer, killing the driver and puncturing a 30,000-gallon rail tanker that was filled with a flammable, aromatic petroleum-based concentrate. Residents around Plummer, population 292, were evacuated for about two hours.

**Minnesota train accidents have been declining**

Despite the recent incidents involving oil trains, the number of derailments or highway-crossing accidents, both nationally and in Minnesota, has generally declined.

From 2000 to 2014, there were 1,203 railway incidents of all types in Minnesota, according to a Star Tribune analysis. Derailments were the most common type, accounting for nearly two out of three incidents. But they are trending downward, ranging from a high of 65 in 2001 to a low of 39 in 2012 before rebounding to 47 in 2013 and 2014.

The railroad mishaps killed 16 people and injured 79. Four out of five incidents resulting in injuries were attributed to vehicles at rail crossings.

That’s compared to 10 injuries, and no deaths, associated with freight train derailments and other accidents that did not involve collisions with highway vehicles.

This year, the Legislature allocated $5 million for rail projects, less than one-sixth of what Gov. Mark Dayton called for spending. Most of that money will be applied toward 38 rail grade crossing projects, which are projected to cost MnDOT $8.8 million, a spokesman said.

**State beefing up training for first responders**

Legislation that took effect in July2014 tightened public oversight of Minnesota railroads, increased safety inspections and added specialized training for the 343 fire departments along the oil shipment routes.

Public safety officials say the training sessions are on schedule, and expect to have 110 departments through the program by the end of July 2015. As of mid-May, 2,382 first-responders had gone through the training in 96 sessions.

Click on any county in the map to see the number of departments that have been trained, as of mid-May 2015.

**Frequently-asked questions about Bakken oil trains**

Which railroad companies carry crude shipments in Minnesota?

The BNSF Railway and Canadian Pacific Railway originate almost all crude oil shipments from North Dakota's Bakken oil field. The Fort Worth, Tex.-based BNSF (Burlington Northern Santa Fe) railroad transports 75 percent of all North Dakota-produced oil.

What is Bakken oil? What are its qualities? Do local Minnesota refineries process this oil?

Oil from the Bakken field is characterized as a "sweet, light" crude, with the same consistency as diesel or jet fuel. The oil comes from deep beds of shale that is extracted through the application of new technology, including directional drilling and hydraulic fracturing. Bakken oil contains a high percentage of natural gas liquids, which increases its flammability. Minnesota refineries normally do not process Bakken crude, since they are designed to refine heavy sour crude oils such as Canadian tar sand oil.

How much crude travels through Minnesota, including the Twin Cities, by rail each day?

On average, seven oil-carrying trains pass through Minnesota daily, with as many as six through the Twin Cities. Each train carries 3.3 million gallons of oil among 110 loaded cars.

Where are these shipments going?

The majority of the Bakken oil is shipped from oil fields in North Dakota through Minnesota to various refineries in the Midwest and Eastern seaboard.

What steps are railroads taking to prevent future accidents?

Railroad companies have voluntarily agreed to slow down oil trains in 45 "high-threat urban areas," including the Twin Cities. As of March 1, 2014, US DOT and the railroads have agreed to limit speeds in urban areas to 40 m.p.h. Previous speeds were 50 m.p.h. or more. Further steps include more frequent track and car inspections, stricter operating rules and better hazmat documentation. BNSF in particular is taking steps to build new cars with thicker walls and more quickly retiring older cars. Railroads are cooperating on training upgrades for local responders to meet current needs.