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September 7, 2017

Rail Transportation of Crude Oil and the FAST Act: An Update

Introduction

After a multiyear boom, the volume of crude oil carried by U.S. railroads has fallen to the lowest level since 2012. This decline may have implications for efforts by the U.S. Department of Transportation (DOT) to finalize regulations concerning the safety of rail transportation of crude.

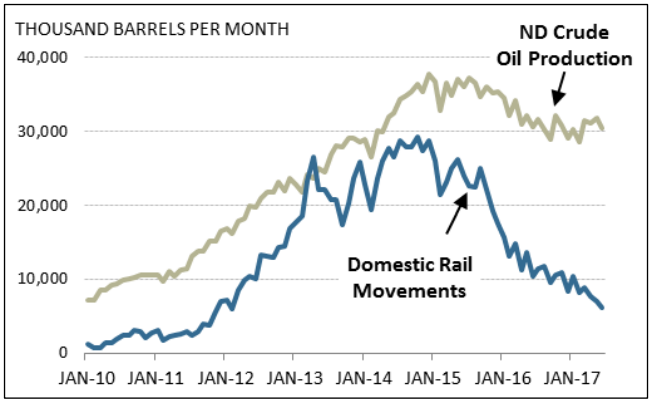
Increased oil drilling in North Dakota's Williston Basin (also known as the Bakken), made possible by new drilling methods such as hydraulic fracturing and directional drilling, led to a sharp rise in the movement of crude oil by railroads beginning about 2010 (see **Figure 1**). Large-scale oil production was new to the region, which lacked pipeline capacity to handle the volume. As an alternative, oil producers began shipping more oil to refineries by railroad. Some of these trains derailed, leading to oil spills, fires, and explosions. Several incidents required emergency evacuations of nearby residents, and one resulted in fatalities. (For further background, see CRS Report R43390, *U.S. Rail Transportation of Crude Oil: Background and Issues for Congress*.)

DOT issued emergency orders requiring new safety measures for oil trains in 2014 and 2015. Congress enacted or modified many of these measures in the Fixing America's Surface Transportation Act (the FAST Act; P.L. 114-94, Title VII, Subtitle C) in December 2015. These measures include use of stronger tank cars, more frequent safety inspections, speed limits for oil trains, and enhanced emergency response preparations.

Pipelines Replace Rail Movements

A substantial fall in the volume of crude oil carried by railroads has taken place since summer 2015, as shown in **Figure 1**.

Figure 1. Domestic Crude Oil Movements by Railroad



Source: CRS presentation of Energy Information Agency (EIA) data; Movements of Crude Oil and Selected Products by Rail.

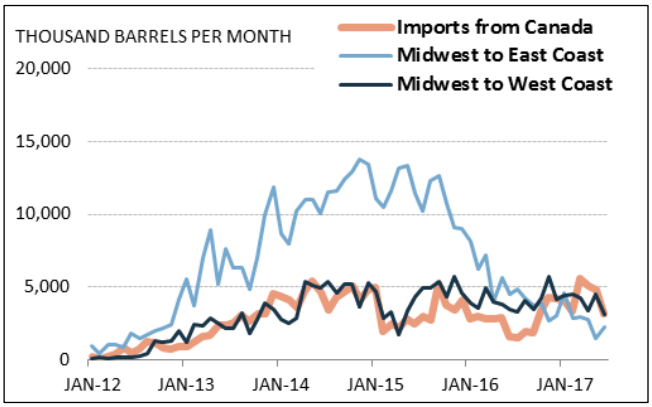
One cause of this fall is the diminishing price of imported oil versus the domestic price. As this price gap narrows, coastal refineries switch to importing oil by tanker, which entails much lower transport costs per barrel than rail transport. Also, pipeline capacity from the Williston Basin has gradually increased. Pipelines, including the recently opened Dakota Access Pipeline, now have the capacity to carry all of the Williston Basin's current production at lower cost than rail.

According to the North Dakota Pipeline Authority, at the peak of crude-by-rail volumes during fall 2014, railroads were carrying away 60% of the Williston Basin's production, while pipelines transported about 35%. In June 2017, railroads carried 7%, while pipelines carried 78%; the remaining 15% was refined locally or trucked to Canada. An oil train with 100 tank cars carries 70,000 barrels, so as volume declined by more than 800,000 barrels per day, the required number of trains has fallen from approximately 14 per day in the fall of 2014 to about three per day at present.

Railroads Still Used for West Coast Shipments

As **Figure 2** indicates, most of the decline in rail volumes has occurred in movements of North Dakota oil to East Coast refineries. Movement of North Dakota oil by rail to West Coast refineries has remained relatively steady, as there is no pipeline available. The United States continues to import Canadian oil by rail, most of which is destined for refineries on the Gulf Coast.

Figure 2. Selected Crude by Rail Routes



Source: CRS presentation of EIA data; Movements of Crude Oil and Selected Products by Rail.

Issues for Congress

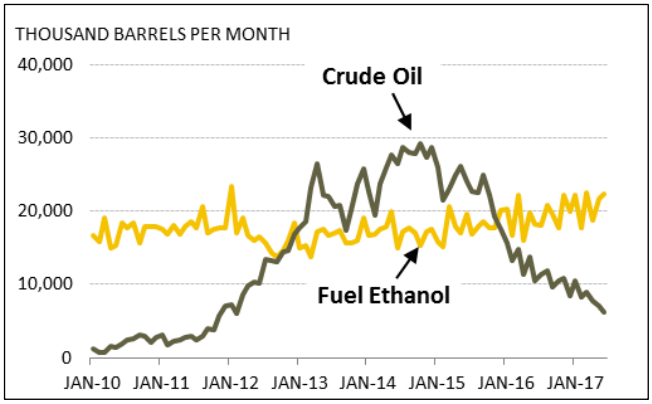
The FAST Act, enacted at a time when crude by rail volumes were three times greater than they are today, set deadlines for DOT to issue a number of regulations affecting transportation of oil by rail. Some of these proposed regulatory changes are still pending, and the

decline in volume could lead to further discussion of DOT's plans.

Older Tank Car Phase-Out Schedule

The FAST Act requires shippers to stop using older, less robust tank cars when transporting oil beginning in 2018; when transporting ethanol, however, the older cars can be used until May 2023. As **Figure 3** illustrates, there has been no falloff in the movement of ethanol by railroad; ethanol volumes are now about three times greater than those of crude oil. Moreover, ethanol rail movements traverse much of the national rail network, moving from the corn belt to every coastal region. Derailments of ethanol trains have caused fires and evacuations, but Congress decided on a comparatively slow phaseout schedule for older cars due partly to concern about how quickly railcar manufacturers could ramp up production of the stronger cars. With the falloff in crude oil volumes, there may be a sufficient number of the new cars for ethanol service, allowing the May 2023 deadline to be moved up.

Figure 3. Crude Oil and Ethanol by Railroad



Source: CRS presentation of EIA data; Movements of Crude Oil and Selected Products by Rail.

Reporting of Hazardous Material Trains

The FAST Act (§7302) requires railroads to provide cargo details for trains carrying hazardous materials to fusion centers, established to coordinate responses to disasters and terror incidents. This information is needed by firefighters when responding to a train incident involving railcars carrying a multitude of hazardous materials. Firefighters state that they and the railroads have already developed a software application, "AskRail," which provides this information in real time; they argue that fusion centers are not needed as a conduit and are not suitable for this task since they do not operate 24 hours a day. (See Docket no. PHMSA-2016-0015, http://www.regulations.gov).

While the frequency of oil trains has declined significantly, domestic oil and natural gas booms are expected to stimulate chemical manufacturing, which could increase the volume of other hazardous materials carried by rail. Rail movement of propane, for example, a by-product of domestic gas drilling used in the chemical industry, among other sectors, has doubled since 2013 to 10 million barrels in January 2017. Thus, hazmat train reporting, despite the smaller number of oil trains, could be increasingly important for emergency responders.

Oil Spill Response Plans

In the FAST Act (§7307), Congress urged DOT to complete a rulemaking requiring more comprehensive oil spill response plans from railroads. In 2016, DOT issued a proposed rule that would require response resources to be located within 12 hours of any point along an oil train route. State agencies filed comments seeking a shorter, four- to six-hour mobilization time frame instead. They also sought to have the plans made available to state emergency response commissions (see Docket no. PHMSA-2014-0105).

Crude Oil Volatility

Section 7309 of the FAST Act requires the Departments of Energy and Transportation to advise how the chemical characteristics of crude oil might be made safer for rail transport, once they have finished a study on the matter. Whether the characteristics of Bakken oil pose a greater risk when transported by rail compared to other oils has been debated. The oil industry asserts that a DOT proposal to limit the vapor pressure of oil transported by rail by pretreating it will not reduce the likelihood of fires or explosions at derailment sites (see Docket no. PHMSA-2016-0077). Oil producers contend that almost any flammable liquid, no matter the vapor pressure, will catch fire and explode when subjected to the physical forces and circumstances of a train derailment, and that pretreatment of oil from the Bakken therefore is unnecessary.

Preventing Derailments

By far, the leading cause of train derailments is defective track. Much of the time these defects are invisible fractures within the interior of a piece of rail. A secondary cause is rolling stock defects such as a broken axle or wheel. Railroads have deployed detection technologies such as ultrasonic probes or acoustic and temperature sensors that are intended to spot equipment defects long before they advance to a point where they can cause a derailment. Railroads also evaluate equipment failure history and operational and environmental factors to pinpoint track segments and railcars that are at higher risk and warrant more frequent inspection.

Congress funds a rail safety research and development program under DOT's Federal Railroad Administration (FRA) at about $35 million per year, and typically provides direction as to how these funds should be spent. This program seeks to advance technologies and methods for detecting rail defects. The program was recently evaluated by an independent review panel convened by the Transportation Research Board of the National Academies: *Evaluation of the Federal Railroad Administration Research and Development Program*, Special Report 316, 2015. One of the panel's recommendations was for Congress to give more flexibility to FRA in deciding how to spend research funds.

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