# I've Been Working on the Railroad - Crude-by-Rail 2014

**The Oil Transportation Revolution – 171 New or Expanded Rail Terminals in 2 Years**

- Railroads are transporting more than 11% of US crude oil production to market, up from a fraction of 1% five years ago, and rail's share of crude-movement will increase further.
- Crude-by-rail's market impact is greater than that 11% may suggest; the rail option is giving producers flexibility and boosting the prices they get for their oil.
- Developers are planning more unit-train operations to optimize efficiency and lower costs.
- The pace of rail terminal development in Canada is increasing, both for heavy Canadian bitumen crude via heated railcars and light crude from the Canadian side of the Bakken
- Fluctuating benchmark oil price differentials are frequently changing the "netbacks" associated with moving crude by rail or pipeline to major destinations.
- New and expanding pipelines will increasingly challenge the huge number of new rail facilities.
- The wildcard for crude-by-rail is the likelihood of new regulations, brought on by several high profile accidents over the past few months.

## 1. Introduction

Technological advances that allow for the economical extraction of large volumes of crude from shale deposits have transformed the US oil industry. It could be argued, however, that the industry's second-most important development in recent years has been the proliferation of by-rail delivery of crude. Not only has the development of rail loading terminals in the Bakken and other emerging shale plays supplemented the congested pipelines that serve those regions, it has given producers the flexibility to transport their crude to the market where it can garner the highest price.


In this report, RBN Energy updates and expands upon its pioneering "Crude Loves Rock'n'Rail" analysis of the North American crude-by-rail market. The study begins with a summary of how by-rail shipment of crude emerged as a cost-effective and profitable alternative for producers. It then identifies key participants, provides a primer on crude transportation costs and netback calculation, and offers a comprehensive listing of rail loading and offloading terminals now in operation or under construction in the US and Canada. The study concludes with several trends to watch, and a forecast of what's next for crude-by-rail and oil transport as a whole.

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## 2. The Resurgence of Crude-by-Rail

Moving crude by rail is by no means a new development. The first great monopoly of the US oil industry was created by Rockefeller's control over a then dominant crude-by-rail distribution system in the early 1900's before innovations that made long distance pipelines possible. Pipelines became commonplace in the second half of the 20th Century because they represented a safer and more economic way to move petroleum liquids over long distances. By the 1960s more expensive rail movements had been relegated to a marginal role in US crude distribution. The resurgence of crude-by-rail in the past three years was born of necessity - driven by surging crude production.

According to the Energy Information Administration (EIA), total U.S. crude oil production jumped 1 MMb/d to 7 MMb/d in 2012 and another 0.8 MMb/d to 7.8 MMb/d during the first three quarters of 2013. The crude basins that experienced the greatest growth over this period were the Bakken in North Dakota, the Eagle Ford in South Texas and the Permian in West Texas. Canadian production also increased – albeit at a slower pace – up 230 Mb/d to 3.4 MMb/d in 2012 and an estimated 300 Mb/d to 3.7 MMb/d in 2013 (source National Energy Board). Growth in both US and Canadian production is forecast to continue well into the next decade. As production volumes increased, traditional paths to get this crude to market – in the shape of pipeline infrastructure - were planned but could not be built quickly enough to keep up with growing volumes.

As a result, about three years ago existing pipeline routes to market became congested – particularly in the Midwest at the Cushing, OK hub. Too much oil from surging North Dakota and Canadian production overwhelmed Midwest refineries and could not find a path to plentiful coastal refining capacity because pipelines were not yet in place. Congestion in the Midwest led to huge crude stockpiles at Cushing and big discounts for inland crudes priced against West Texas Intermediate (WTI) crude – the domestic US benchmark. Unable to secure supplies of these cheaper inland crudes, coastal refiners had to pay higher prices set by imported grades priced against the international benchmark Brent.

In the circumstances although rail transportation is almost always a more expensive solution, delays in pipeline construction and wide crude price differentials between inland and coastal markets suddenly made crude-by-rail a viable alternative to pipelines in 2011. The resulting rapid build out of rail loading and unloading terminals transformed the crude distribution network from a famine of pipelines to a feast of rail in just three short years. And along the way - despite starting as a stopgap solution driven by necessity - crude-by-rail rapidly became accepted by producers and refiners as a flexible and competitive compliment to traditional pipeline development.

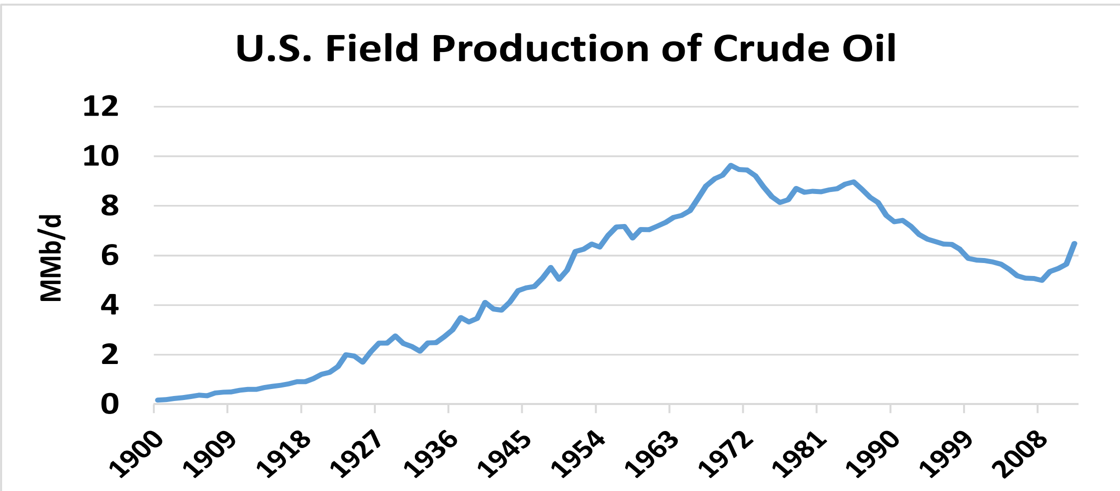
Today continued expansions in crude production look set to sustain significant crude-by-rail traffic in the coming years.

Three primary drivers lie behind the resurgence of crude-by-rail: the need to move increasing volumes of crude to market from remote locations not yet served by adequate pipelines; the crude price differentials that can make rail shipments more economically advantageous than pipeline transportation; and the shared desire of crude producers and refiners for the inherent flexibility provided by rail transportation.

### 2.1 The Need to Move Crude

According to the EIA, US field production of crude oil peaked at 9.6 MMb/d in 1970, sagged to 8.7 MMb/d by 1985, and fell to 5.0 MMb/d —its lowest level since 1946—in 2008. In the past five years, however, crude production has experienced an unprecedented revival, due almost exclusively to technological advances in removing oil (and natural gas and natural gas liquids) from shale.




Source: EIA

Not surprisingly, the crude-by-rail trend started where post-2008 growth in crude production was the most pronounced: the Bakken in North Dakota. There, crude production nearly quadrupled in four years, rising from 0.2 MMb/d in 2008 to 0.3 MMb/d in 2010 and 0.7 MMb/d in 2012. By the end of 2013, North Dakota was producing about 1 MMB/d, and accounting for more than 10% of US crude production. The Bakken is now the fourth-largest US producing region, behind only the Gulf of Mexico, the Eagle Ford and the Permian Basin.

The success of rail loading terminals in the Bakken led to similar projects in other crude production areas challenged by a lack of takeaway capacity. It happened in the northern reaches of the Bakken in Manitoba and Saskatchewan; in the Permian Basin in Texas and New Mexico; the Western Canadian Sedimentary Basin in Saskatchewan and Alberta; the Niobrara in Colorado and Wyoming; and the Uinta in Utah.

According to a December 2013 report by the Association of American Railroads (AAR)[1], the use of railroads to move crude continues to skyrocket. AAR said in 2008, Class 1 railroads "originated"—or loaded--only 9,500 carloads of crude oil. By 2011, origination volumes had increased to 66,000 carloads, and the upward trend accelerated in 2012, when crude-by-rail volume rose to 234,000 carloads. In the first three quarters of 2013, US railroads moved 300,000 carloads of crude—a 96 percent increase from the same period in 2012—suggesting that the 2013 total might hit or surpass 400,000 carloads.

[1] Moving Crude Oil By Rail, Association of American Railroads, December 2013