

Oil Transport: PHMSA Proposes Comprehensive New Rules for High-Hazard Flammable Trains

Proposed sweeping new safety requirements for rail transportation of large quantities of flammable liquids, including crude oil, could increase costs significantly.

Since 2013, the Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) and Federal Railroad Administration (FRA) have proposed or undertaken a range of regulatory actions aimed at increasing the safety of rail transportation of hazardous materials, including the transportation of crude oil by rail. On July 23, 2014, PHMSA issued a comprehensive Notice of Proposed Rulemaking (NPR) ¹ proposing revisions to the Hazardous Materials Regulations ² that establish requirements for "high-hazard flammable trains" (HHFTs). ³ The NPR addresses a number of issues primarily impacting the rail transportation of crude oil and ethanol, including proposed enhanced tank car standards, speed restrictions, improved braking controls, and new sampling and testing requirements. ⁴

Background

In the wake of a number of well publicized accidents involving the rail transportation of crude oil, including derailments in Lac-Mégantic, Quebec; Aliceville, Alabama; Casselton, North Dakota; and Lynchburg, Virginia, PHMSA and FRA have greatly increased their regulatory scrutiny over such transportation, particularly with regard to crude oil sourced from the Bakken shale. Beginning in 2013, FRA and PHMSA (either individually or jointly) have issued or initiated the following actions, among others:

- An Emergency Order (Emergency Order No. 28) requiring railroads to implement additional procedures to ensure that certain unattended trains and vehicles are properly secured against unintended movement ⁵
- Two Joint Safety Advisories reiterating the necessity for improving the safety and security of rail transportation of, as well as the proper characterization and classification of, crude oil ⁶
- An Emergency Order, as subsequently amended and restated, requiring that all rail shipments of crude oil properly classed as a flammable liquid in Packing Group (PG) III material be treated as a PG I or PG II material ⁷
- A joint compliance initiative (Operation Classification) involving unannounced sampling, testing, and inspections of crude oil to verify that offerors of the materials for rail transportation have properly classified, described and labelled such materials

- An Emergency Restriction/Prohibition Order requiring all railroads carrying one million gallons or more of Bakken crude oil to notify State Emergency Response Commissions (State Commissions) regarding the estimated volume, frequency and transportation route of those shipments (State Commission Order)⁸
- A Joint Safety Advisory advising those shipping or offering Bakken crude to use tank car designs with the highest available level of integrity⁹
- A Safety Alert warning of potential crude oil variability and emphasizing the use of proper testing to ensure accurate characterization and classification of crude oil¹⁰

Operation Safe Delivery Update

In conjunction with the NOPR, PHMSA and FRA released a report (Bakken Report) updating the testing results of its analysis of Bakken crude oil as part of Operation Safe Delivery, which is part of a broader DOT effort also encompassing Operation Classification.¹¹ Based on sampling and testing conducted from August 2013 to May 2014, PHMSA/FRA found that “the majority of crude analyzed from the Bakken region displayed characteristics consistent with those of a Class 3 flammable liquid, PG I or II, with a predominance to PG I, the most dangerous class of Class 3 flammable liquids.”¹²

Given that finding, PHMSA/FRA concluded that Bakken crude oil “*is more volatile* than most other types of crude – which correlates to increased ignitability and flammability.”¹³ Thus, PHMSA/FRA concluded that (given such increased volatility) there is an increased risk of a significant incident involving Bakken crude oil due to the significant volume that is transported, as well as the routes and the extremely long distances that the crude oil is moving by rail.¹⁴

Notice of Proposed Rulemaking

Definition of High-Hazard Flammable Trains (HHFT)

The transportation of crude oil by rail typically takes place in a “key train,” usually described as a unit train containing twenty or more loaded tank cars of hazardous materials. The NOPR proposes a new designation to specifically define the term HHFT, meaning “a single train carrying 20 or more carloads of a Class 3 flammable liquid.”¹⁵ The current Hazardous Materials Regulations define a flammable liquid (Class 3) as a liquid having a flashpoint of not more than 60 °C (140 °F), or any material in a liquid phase with a flash point at or above 37.8 °C (100 °F) that is intentionally heated and offered for transportation or transported at or above its flash point in a bulk packaging, with certain exceptions.¹⁶ Examples of commodities that typically meet this definition for transportation purposes are crude oil, acetone, ethanol gasoline and ethyl methyl ketone.¹⁷

The new proposed definition of HHFT incorporates certain relevant designations set forth in Emergency Order No. 28, as well as the definition of a “key train” included in the Association of American Railroads’ Circular OT-55-N.¹⁸ However, while both of those documents include trains transporting Division 2.1 (flammable gas) material and combustible liquids, the NOPR does not propose to cover trains transporting such materials in the definition of HHFT. PHMSA’s stated purpose in limiting its HHFT definition is to ensure that the most widely used car in the current fleet of rail tank cars (DOT 111) can be repurposed and “continue to be used for flammable liquids when not being transported in a HHFT [as well as for] combustible liquids which pose a lower risk than other flammable liquids.”¹⁹

Notification to State Commissions

DOT's State Commission Order requires each railroad transporting one million gallons or more of Bakken crude oil in a single train within the US to provide certain transportation-related information in writing to the State Commission for each state in which it operates a train. Specifically, the State Commission Order explains that, among other items, a railroad must provide notification:

- Estimating the number of affected trains transporting Bakken crude oil through each county within the state
- Identifying and describing the crude oil expected to be transported
- Identifying the routes over which the material will be transported
- Providing at least one point of contact at the responsible railroad²⁰

Moreover, DOT notes that for purposes of compliance with the State Commission Order, Bakken crude oil includes "crude oil tendered to railroads for transportation from any facility directly located within the Williston Basin (North Dakota, South Dakota, Montana in the United States or Saskatchewan or Manitoba in Canada)."²¹

The NOPR largely seeks to codify the directives of the State Commission Order. Importantly, however, PHMSA explains that its focus may be expanded broadly beyond merely Bakken-sourced crude in a final rule: "PHMSA notes it may be possible in any final rule action that this proposed new [rule] could be expanded to include threshold quantities of *all petroleum crude oils or all HHFTs* (versus only trains transporting threshold quantities of Bakken crude oil)."²²

Rail Routing

The current Hazardous Materials Regulations provide that rail carriers transporting certain security-sensitive hazardous materials must select the practicable route posing the least overall safety and security risk,²³ and assess available routes by considering, at a minimum, 27 different factors, including: volume of hazardous material transported; rail traffic density; trip length for route; presence and characteristics of railroad facilities; track type, class, and maintenance schedule; areas of high consequence along the route, including high-consequence targets; and speed of train operations.²⁴

The NOPR explains that the railroad industry has already taken steps to extend the routing requirements in the Hazardous Materials Regulations to certain HHFTs transporting crude oil — for example, by voluntarily reducing speeds to restricted limits in a number of circumstances. Thus, PHMSA proposes to explicitly modify the routing requirements of the Hazardous Materials Regulations by adding HHFTs to the types of carriers subject to the requirements.

Classification and Characterization of Mined Liquids and Gases

The current Hazardous Materials Regulations establish the proper classification and characterization of a hazardous material as a key requirement of the rules. Classification involves ensuring the proper hazard class and packing group are assigned to a particular material (if applicable — PG I poses the highest danger and PG III presents the lowest), while characterization includes identifying a material's effects on both the reliability and safety of the packaging that contains it.²⁵

The NOPR explains that proper classification and characterization of mined liquids and gases, including crude oil, is particularly vital given that their properties are inherently variable. As such, PHMSA proposes

to add a new regulation explicitly requiring a sampling and testing program designed to ensure proper classification and characterization of crude oil by addressing the following key elements:

- Frequency of sampling and testing to account for appreciable variability of the material, including the time, temperature, means of extraction and location of extraction
- Sampling at various points along the supply chain to understand the variability of the material during transportation
- Sampling methods that ensure a representative sample of the entire mixture, as packaged, is collected
- Testing methods to enable complete analysis, classification and characterization of the material under the Hazardous Materials Regulations
- Statistical justification for sample frequencies
- Duplicate samples for quality assurance purposes
- Criteria for modifying the sampling and testing program²⁶

Further, PHMSA is proposing that each person required to develop and implement such a program would be required to maintain an accessible copy of the sampling and testing program documentation (or an electronic file thereof) and must make the documentation available upon request to an authorized official of DOT.

PHMSA is also proposing to revise certain bulk packaging sections of the Hazardous Materials Regulations to provide a timeline for the phase-out of DOT 111 tank cars in HHFT service. Specifically, PHMSA proposes that:

- For PG I, DOT 111 cars would not be authorized after October 1, 2017
- For PG II, DOT 111 cars would not be authorized after October 1, 2018
- For PG III, DOT 111 cars would not be authorized after October 1, 2020²⁷

Additional Requirements for HHFTs

The NOPR incorporates two new operational requirements for HHFTs: (1) speed restriction and (2) alternative brake signal propagation systems. With regard to speed restriction, PHMSA is proposing a 50-mph maximum speed restriction for HHFTs. Additionally, in the event that a rail carrier cannot comply with the proposed braking requirements discussed below, the rail carrier would not be permitted to operate HHFTs at speeds exceeding 30 mph.

In addition, PHMSA is proposing three options for a 40-mph speed restriction for any HHFT unless all tank cars meet or exceed the proposed performance standards that PHMSA is recommending for new tank cars (DOT 117). Option 1 provides that all HHFTs would be limited to a maximum speed of 40 mph, unless all tank cars containing a flammable liquid meet or exceed the DOT 117 proposed performance standards. Option 2 provides that all HHFTs would be limited to a maximum speed of 40 mph while

operating in an area that has a population of more than 100,000 people, unless all tank cars in the HHFT containing flammable liquids meet or exceed the DOT 117 proposed performance standards. Option 3 provides that all HHFTs would be limited to a maximum speed of 40 mph while the train travels within the limits of high threat urban areas (HTUAs),²⁸ unless all tank cars in the HHFT containing flammable liquids meet or exceed the DOT 117 proposed performance standards.²⁹

With regard to alternative brake signal propagation systems, PHMSA is requiring that all HHFTs would be operated with either an electronic controlled pneumatic brake system (ECP), distributed power or a two-way end-of-train device. As the NOPR explains, an ECP simultaneously sends a braking command to all cars in the train (thus reducing the time before a car's pneumatic brakes are engaged compared to conventional brakes) and provides real-time information on the performance of the train's entire braking system.³⁰ A distributed power system provides control of a number of locomotives dispersed throughout a train from a controlling locomotive (located in the lead position) by allowing the lead locomotive to send command signals to the rearward locomotives. A two-way end-of-train device includes two pieces of equipment (linked by radio) that initiate an emergency brake application from the front unit located in the controlling locomotive, which then activates an emergency air valve at the rear of the train within one second.³¹

PHMSA is proposing to require the following:

- HHFTs to be equipped with a two-way end-of-train device by October 1, 2015
- HHFTs to be equipped with a distributed power system or an ECP system by October 1, 2016
- After October 1, 2015, a tank car built to DOT 117 standards for use in an HHFT must be equipped with ECP brakes
- After October 1, 2015, HHFTs comprised entirely of tank cars manufactured in accordance with certain variations of the DOT 117 standard (as described below), except for required buffer cars, must be operated in ECP brake mode³²

However, to reduce the burden on small carriers, if a rail carrier does not comply with the proposed braking requirements above, the carrier may continue to operate HHFTs at speeds not to exceed 30 mph.³³

New Tank Cars for HHFTs

The NOPR explains that PHMSA is proposing three separate options for tank cars designed in accordance with the new DOT 117 standard. PHMSA is also proposing a performance standard for the design and construction of tank cars equivalent to the DOT 117 standard (DOT 117P). PHMSA is planning to require new tank cars constructed after October 1, 2015 that are used to transport Class 3 flammable liquids in HHFTs to meet the specification requirements for the DOT 117 standard or the proposed performance specifications.³⁴

The first option (Option 1) for the DOT 117 standard would, among other items, be outfitted with: ECP brakes; a thermal protection system, including a reclosing pressure relief device; wall thickness of at least 9/16-inch steel; and roll-over protection. PHMSA estimates that the addition of ECP brakes, roll-over protection and increased shell thickness would collectively add \$5,000 to the cost of a car that would be constructed in the absence of the proposed rule.³⁵

The second option (Option 2) would include many of the same features as the first option, such as increased wall thickness, but would not include roll-over equipment and ECP brakes. As a result, PHMSA estimates that the increased thickness would only add \$2,000 to the cost of a car that would be constructed in the absence of the proposed rule.³⁶

The third option (Option 3) would allow a thinner shell (7/16 inch) and also would not include roll-over equipment or ECP brakes.³⁷

Existing Tank Cars for HHFTs

PHMSA proposes to require existing tank cars to be retrofitted in order to meet the same DOT 117P performance standard as new cars, except for a requirement to include certain top fittings protections. Thus, the NOPR explains that existing tank cars may continue to rely on equipment installed at the time the car was manufactured.³⁸ In terms of cost, PHMSA expects that retrofitting a DOT 111 tank car to the different options would cost approximately: \$33,000 for Option 1, \$29,000 for Option 2, and \$27,000 for Option 3.

As noted above, PHMSA is proposing to phase out the use of DOT 111 tank cars in HHFTs and eventually limit the continued use of such cars for other commodities including flammable liquids, provided they are not in a HHFT.³⁹ In addition to the retrofit option, PHMSA is proposing that DOT 111 tank cars may be repurposed, retired, or operated under speed restrictions for up to five years, based on packing group assignment of the flammable liquids being shipped by rail.

Conclusion

Until additional takeaway pipeline capacity is developed to deliver oil out of the Bakken, producers and distributors will continue to rely heavily on rail transport. While the new regulations, if adopted, may result in significant costs for upgrading rail tank cars, it remains to be seen the extent to which these costs will be passed on to shippers.

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Endnotes

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- ¹ See Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains, Notice of Proposed Rulemaking (issued July 23, 2014), *available at* http://www.phmsa.dot.gov/pv_obj_cache/pv_obj_id_9F3CE4CB7A6FCBD43CE1757CD2E41F85A4C41000/filename/Signed_Proposed_Rulemaking-for_High-Hazard_Flammable_Trains.pdf.
 - ² See 49 C.F.R. pts. 171-180.
 - ³ On the same date, PHMSA also issued an Advanced Notice of Proposed Rulemaking (ANPRM) addressing oil spill response plans for HHFTs. The ANPRM is not discussed in this Client Alert.
 - ⁴ As discussed in the first section of this Client Alert, PHMSA and FRA also issued a report updating the results of its ongoing testing analysis of Bakken crude oil as part of a joint compliance initiative. See Operation Safe Delivery Update (issued July 23, 2014), *available at* http://www.phmsa.dot.gov/pv_obj_cache/pv_obj_id_8A422ABDC16B72E5F166FE34048CCCBFED3B0500/filename/07_23_14_Operation_Safe_Delivery_Report_final_clean.pdf.

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- ⁵ See Emergency Order Establishing Additional Requirements for Attendance and Securement of Certain Freight Trains and Vehicles on Mainline Track or Mainline Siding Outside of a Yard or Terminal, FRA Emergency Order No. 28, Notice No. 1, 78 Fed. Reg. 48218 (Aug. 7, 2013).
- ⁶ See Lac-Mégantic Railroad Accident Discussion and DOT Safety Recommendations, Safety Advisory 2013-06, 78 Fed. Reg. 48224 (Aug. 7, 2013); Safety and Security Plans for Class 3 Hazardous Materials Transported by Rail, Safety Advisory 2013-07, 78 Fed. Reg. 69745 (Nov. 20, 2013).
- ⁷ See Petroleum Crude Oil Offerors & Petroleum Crude Oil Rail Carriers, Emergency Restriction/Prohibition Order, Docket No. DOT-OST-2014-0025 (Feb. 25, 2014); Petroleum Crude Oil Offerors & Petroleum Crude Oil Rail Carriers, Amended and Restated Emergency Restriction/Prohibition Order, Docket No. DOT-OST-2014-0025 (Mar. 6, 2014).
- ⁸ See Petroleum Crude Oil Railroad Carriers, Emergency Restriction/Prohibition Order, Docket No. DOT-OST-2014-0067 (May 7, 2014).
- ⁹ See Recommendations for Tank Cars Used for the Transportation of Petroleum Crude Oil by Rail, Safety Advisory 2014-01, *available at* http://www.phmsa.dot.gov/pv_obj_cache/pv_obj_id_9084EF057B3D4E74A2DEB5CC86006951BE1D0200/filename/Final_FRA_PHMSA_Safety_Advisory_tank_cars_May_2014.pdf.
- ¹⁰ See Safety Alert: Preliminary Guidance from Operation Classification (Jan. 2, 2014), *available at* <http://phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnextoid=c6efec1c60f23410VgnVC1M100000d2c97898RCRD&vgnnextchannel=0f0b143389d8c010VgnVCM1000008049a8c0RCRD&vgnnextfmt=print>.
- ¹¹ See n.4, *supra*.
- ¹² See Bakken Report at 16.
- ¹³ See *id.* (emphasis added).
- ¹⁴ See *id.*
- ¹⁵ See NOPR at 187.
- ¹⁶ See 49 C.F.R. § 173.120(a).
- ¹⁷ See NOPR at 73.
- ¹⁸ See *id.*
- ¹⁹ See *id.* at 74.
- ²⁰ See State Commission Order at 2.
- ²¹ See Frequently Asked Questions on DOT's May 7, 2014, Emergency Order (EO) Regarding Notification to Communities of Bakken Crude Oil Shipments, *available at* www.fra.dot.gov/Elib/Document/3873.
- ²² See NOPR at 80 (emphasis added).
- ²³ See 49 C.F.R. § 172.820.
- ²⁴ See Appendix D to 49 C.F.R. Part 172.
- ²⁵ See NOPR at 22.
- ²⁶ See *id.* at 88-89.
- ²⁷ See *id.* at 86.
- ²⁸ See 49 C.F.R. § 1580.3 (defining a "high threat urban area" as an area comprising one or more cities and surrounding areas including a 10-mile buffer zone, as listed in appendix A to 49 C.F.R. Part 1580).
- ²⁹ See NOPR at 96-97.
- ³⁰ See *id.* at 102.
- ³¹ See *id.* at 103.
- ³² See *id.* at 107.
- ³³ See *id.*
- ³⁴ See *id.* at 110.
- ³⁵ See *id.* at 112-13.
- ³⁶ See *id.* at 113-14.
- ³⁷ See *id.* at 114.
- ³⁸ See *id.* at 132.
- ³⁹ See *id.* at 141-43.