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PUBLIC INTEREST COMMENT

HAZARDOUS MATERIALS: ENHANCED TANK CAR STANDARDS AND OPERATIONAL CONTROLS FOR HIGH-HAZARD FLAMMABLE TRAINS

Docket No: PHMSA-2012-0082 (HM-251)

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INTRODUCTION

The Regulatory Studies Program of the Mercatus Center at George Mason University is dedicated to advancing knowledge about the effects of regulation on society. As part of its mission, the program conducts careful and independent analyses that employ contemporary economic scholarship to assess rulemaking proposals and their effects on the economic opportunities and social well-being available to all members of American society.

This comment addresses the efficiency and efficacy of this proposed rule from an economic point of view. Specifically, it examines how the proposed rule may be improved by more closely examining the societal goals the rule intends to achieve and whether this proposed regulation will successfully achieve those goals. In many instances, regulations can be substantially improved by choosing more effective regulatory options or more carefully assessing the actual societal problem.

BACKGROUND

The proposed rule is promulgated by the Pipeline and Hazardous Materials Safety Administration (PHMSA) of the Department of Transportation (DOT) and recommends new requirements for trains transporting a large volume of Class 3 flammable liquids (mostly ethanol and Bakken crude).[1] The purpose of this rule is to lessen both the number of train accidents and the consequences that follow when trains carrying flammable liquids spill their contents. The regulation focuses on six areas. The agency's Regulatory Impact Analysis (RIA) calculates the

1. US Department of Transportation (DOT), PHMSA, *Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains; Notice of Propose Rule Making*, 79 Fed. Reg. 148, 2014, http://www.gpo.gov/fdsys/pkg/FR-2014-08-01/pdf/2014-17764.pdf.

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20-year costs and benefits of the individual provisions of the proposed rule[2] and costs and benefits of combined provisions of the proposed rule.[3] The six areas are:

1. Rail routing restrictions
2. Tank car integrity
3. Speed restrictions
4. Braking systems
5. Proper classification and characterization of mined liquid and gas
6. Notification to State Emergency Response commissions (SERCs)[4]

The PHMSA has failed to make a case for regulation for the following four reasons. First, the PHMSA fails to show that there is actually a problem with increased accidents and hence the need for regulation. Second, the PHMSA is working with incomplete data and highly questionable assumptions to provide an economic justification for their regulation. Third, the PHMSA states that the regulation is needed due to market failure, but its own analysis shows that current government policy is likely the cause of the problem. Fourth, the PHMSA fails to consider alternatives such as pipelines or legal liability, which might be safer and more cost-efficient than the proposed rule.

ANALYSIS

Issue 1. Failure to show reason for regulation.

The PHMSA claims that the number of accidents occurring with rail cars is increasing and that regulation is needed to reduce them. The draft Notice of Proposed Rulemaking (NPRM) notes that crude oil transported by rail increased 423 percent in one year (2011 to 2012).[5] In 2009, 10,800 rail cars of crude were transported. In 2013, 400,000 rail cars of crude were transported. There have also been large increases in ethanol shipment.[6]

The PHMSA notes that in general, rail accidents involving hazardous materials have declined by 16 percent since 2003. The PHMSA then notes that there were zero mainline train accidents in 2010, but this number increased to five in 2013; hence, the need for regulation. It appears, however, that the inconsistent use of starting dates (2009 for oil transport and 2010 for accidents) is driving some of the PHMSA's conclusions.

Figure 1 reproduces the data from the draft NPRM and RIA. Note that in 2010, there was there was one accident, not zero accidents. Using the baseline as 2009, the trend goes from 1 accident then to 5 accidents in 2013.[7] At the same time shipping volume went from shipping 10,800 rail cars of crude to 434,000 rail cars of crude.[8] This shows that there was a 400 percent increase in accidents while at the same time there was a more than 3900 percent increase in the shipment of crude oil by rail car. This indicates that per rail car shipped, the accident rate has actually declined by nearly 88 percent (see table 1). The number of accidents increased to five in 2013 because much larger volumes of crude were being shipped by rail—not because rail transport became less safe.

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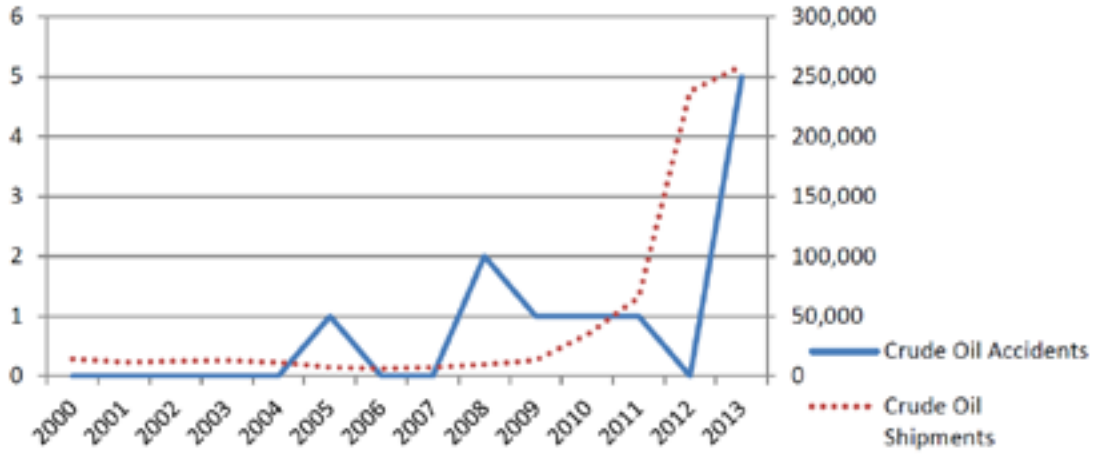
2. DOT, *Draft Regulatory Impact Analysis—Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains; Notice of Proposed Rulemaking*, Docket No. PHMSA-2012-0082 (HM-251): Pipeline and Hazardous Materials Safety Administration, 2014, 5, http://www.regulations.gov/#!documentDetail;D=PHMSA-2012-0082-0179.
3. Ibid., 6.
4. DOT, *Hazardous Materials*; DOT, *Draft Regulatory Impact Analysis*, 2.
5. DOT, *Draft Regulatory Impact Analysis,* 7.
6. DOT, *Hazardous Materials*, 11.
7. Note that there were two accidents in 2008.
8. John Frittelli, Paul W. Parfomak, Jonathan L. Ramseur, Anthony Andrews, Robert Pirog, and Michael Ratner, *U.S. Rail Transportation of Crude Oil: Background and Issues for Congress*, 7-5700 (Congressional Research Service, 2014), http://fas.org/sgp/crs/misc/R43390.pdf.

Figure 1. Carloads of crude oil shipped and rail accidents (mainline derailments), 2000–13.



Source: DOT, *Draft NPRM*, 156.

An additional caveat in this analysis is that one and maybe two[9] of the rail accidents involving crude oil in 2013 occurred in Canada. If the PHMSA wants to include Canadian accidents in its analysis, it also has to include Canadian crude oil shipments to determine rail safety. Therefore, instead of only 434,000 rail cars in 2013, one would have to add the number of crude shipments in Canada. If Canadian data are excluded, then rail safety is even better than estimated and the need for this regulation is lessened.

The PHMSA's proposed regulation looks to solve a nonexistent problem. Further, the safety numbers would look even better if we used 2008 as the starting year (see table 2), as there were two accidents that year and only 9500 rail cars used to transport crude, indicating that the accident rate declined almost 95 percent. Tables 1 and 2 below show different safety scenarios, all indicating that the problem does not exist.

Table 1. Rail accidents per rail car shipped, 2009–13.[10]

	Rail cars of crude transported	Accidents	Accidents minus Quebec, Canada	Accidents / 10,000 cars	Accidents minus Quebec / 10,000 cars
2009	10,800	1	1	0.93	0.93
2013	434,000	5	4	0.12	0.09
% change	3,919	400	300	-87.56	-90.05

Table 2. Rail accidents per rail car shipped, 2008–13.[11]

	Rail cars of crude transported	Accidents	Accidents minus Quebec, Canada	Accidents / 10,000 cars	Accidents minus Quebec / 10,000 cars
2008	9500	2	2	2.11	2.11
2013	434000	5	4	0.12	0.09
% change	4468	150	100	-94.53	-95.62

9. See Appendix B in RIA showing one accident in Gainford, Alberta, and another in Lac Megantic, Quebec.
10. Frittelli et al., *U.S. Rail Transportation of Crude Oil.*
11. Ibid.

Further, the data from page 24 of the agency's own RIA (see table 3 below for reproduction) show that the derailment rate for ethanol and crude oil is declining over time. The last column in table 3 is the author's calculations, which found that mainline derailments decline from 1.6 per 100,000 carloads in 2015 to 0.68 per 100,000 carloads (a decline of over 57 percent) in 2034 in the absence of the proposed regulation. It is not clear why the regulation is needed if this is the case.

Table 3. Projected carloads of ethanol and crude and mainline derailments with derailment rate.

Year	Carloads	Main line derailments	Main line derailments per 100,000 carloads
2015	898,500	14.36	1.60
2016	924,707	14.34	1.55
2017	937,808	14.09	1.50
2018	949,434	13.80	1.45
2019	962,470	13.53	1.41
2020	971,605	13.19	1.36
2021	969,195	12.69	1.31
2022	965,957	12.18	1.26
2023	956,047	11.60	1.21
2024	948,974	11.05	1.16
2025	934,230	10.43	1.12
2026	909,673	9.72	1.07
2027	892,919	9.11	1.02
2028	873,274	8.49	0.97
2029	851,981	7.87	0.92
2030	829,771	7.26	0.87
2031	810,028	6.70	0.83
2032	790,030	6.15	0.78
2033	772,230	5.64	0.73
2034	755,613	5.16	0.68
2015–34 Total		207.36	

Source: DOT, *Draft Regulatory Impact Analysis*, 24.

Issue 2. Questionable assumptions and incompleteness in the PHMSA's analysis.

The analysis above is based on accepting the data that the PHMSA presented. A closer look at this data, however, reveals that much of it is incomplete and fails to support the need for this proposed regulation. For example, for the accidents listed in table 1 in the RIA[12] and used in tables 1 and 2 above, it is unclear what caused many of the recent accidents. Since February 2011, eight out of ten accidents have causes "yet to be determined." Once these causes are determined, they may be found to be due to factors that will not be affected by the proposed rule or for which there might be a cheaper solution than the one proposed. In one study highlighted in the NPRM, more than 88 percent of derailments from 2001 to 2010 occurred because of broken rails or welds.[13] It would probably be more cost-effective to focus on tackling this problem instead of the current proposed solution by the PHMSA.

12. DOT, *Draft Regulatory Impact Analysis*, 19.
13. DOT, *Hazardous Materials*.

While this NPRM does not deal with inspection and track maintenance, the PHMSA states that "existing regulations and ongoing rulemaking efforts" together with features in this NPRM are sufficient for now.[14]

Moreover, the economic justification for this regulation hinges on one high-consequence accident (with more than $1 billion in damages) that occurred in Canada but has a greater consequence than any accident that has ever occurred in the United States.[15] Because of this single high-consequence event that occurred outside of the United States in 2013, the PHMSA imagines that in the next 20 years, the United States will experience an additional zero to 10 high-consequence events, with one such event being a superevent ("nightmare scenario") likely to cause damages above $6 billion.[16] It seems that this subjective probability is being used to justify the regulation.

Table 4 below reproduces the calculations of the PHMSA. In nearly all instances, we find that the costs are greater than the benefits (costs avoided by the spill). Only the second and third proposal show possible positive net benefits, and that is only possible when the benefits calculation assumes that 10 high-consequence events (one of them a superevent) **will** occur in the next 20 years. A one-time event in a foreign country has been transformed into a systemic event in the United States.

A related use of questionable data occurs when the PHMSA calculates property and environmental damages. The PHMSA uses $300/gallon spilled for low-consequence events.[17] However, this number is derived from the high-consequence event in Canada and inflates the benefits calculation for low-consequence events.

Table 4. Twenty-year costs and benefits of combinations of proposed regulatory amendments, 2015–34.

Proposal	Benefit Range	Cost
PHMSA and FRA Design Standard + 40 MPH System Wide, 7% Discount Rate	$1,436 - $4,386	$5,820
PHMSA and FRA Design Standard + 40 MPH in 100K, 7% Discount Rate	$1,292 - $3,836	$3,380
PHMSA and FRA Design Standard + 40 MPH in HTUA, 7% Discount Rate	$1,269 - $3,747	$3,163
AAR 2014 Standard + 40 MPH System Wide, 7% Discount Rate	$794 - $3,034	$5,272
AAR 2014 Standard + 40 MPH in 100K, 7% Discount Rate	$641 - $2,449	$2,831
AAR 2014 Standard + 40 MPH in HTUA, 7% Discount Rate	$616 - $2,354	$2,614
CPC 1232 Standard + 40 MPH System Wide, 7% Discount Rate	$584 - $2,232	$4,741
CPC 1232 Standard + 40 MPH in 100K, 7% Discount Rate	$426 - $1,626	$2,300
CPC 1232 Standard + 40 MPH in HTUA, 7% Discount Rate	$400 - $1,527	$2,083

Source: DOT, *Draft Regulatory Impact Analysis*, 6.

14. DOT, *Hazardous Materials*, 33.
15. DOT, *Draft Regulatory Impact Analysis*, 36.
16. DOT, *Draft Regulatory Impact Analysis*, 42.
17. DOT, *Draft Regulatory Impact Analysis*, 34.

Issue 3: Compliance with government policy is not a market failure.

The RIA states that the reason the PHMSA needs to act is because of market failure. The PHMSA states that shippers and railroads do not insure "against full liability of the consequences involving hazardous materials. As a result, these events impose externalities."[18] Most Class I railroads carry a self-insured retention of between $25 million to $50 million and maintain between $750 million to a $1 billion in coverage.[19] Further, up to $1 billion is available per incident per carrier, though this amount of coverage is usually spread over numerous insurance companies.[20] The PHMSA asserts that even if rail carriers choose to have large amounts of insurance, it won't be enough for a possible higher-consequence event (or "nightmare scenario"). Additionally, while the railroad tariffs have inbuilt terms that force the shipper to indemnify the railroad for all claims not related to the railroad's negligence, the railroad contract, gives room for negotiation between the shipper and the railroad. In most cases, the railroad will indemnify the shipper only for the lost crude oil, but if a shipper wants full liability, it must pay higher prices to ship the product.[21]

If railroads fail to have higher levels of insurance, the question arises as to why a rational firm would choose not to have higher levels of insurance. It could be that higher levels are not needed. In one estimate involving 40 mainline derailments since 2006, the total damages came to only $47,252,409 ($14.13/gal released) or $1.18 million per derailment.[22] Even if we go with the PHMSA's preferred numbers of $300/gal released,[23] it works out to $25 million per derailment. Railroads appear to be purchasing sufficient insurance and are more than able to cover their expected damages from a typical low-consequence event and even a high-consequence event. The argument suggesting market failure is not persuasive.

The optimal amount of insurance will depend on the tort regime one is under, whether that regime is strict liability (where the defendant is liable for harm to plaintiff *regardless* of whether or not the defendant took reasonable precautions) or negligence (the defendant is liable for the plaintiff's harm if the plaintiff can establish that the defendant was negligent).[24] Moreover, the tort regime determines who buys insurance (the injurer or the injured) and how much insurance they must purchase. The PHMSA could certainly make a case for regulation of liability insurance, especially in the instance of the judgment-proof issue (when injurers "do not have assets sufficient to pay fully for the losses they cause" and therefore go bankrupt).[25] The PHMSA should examine the current liability system, figure out if it leads to externalities, and then determine if there is a better way of doing things. Further, using torts and insurance (or prohibiting insurance) might be a much safer and more cost-effective alternative than the proposed rules from the PHMSA.

The strict liability regime might be the best system since we are dealing with hazardous materials. Additionally, defendants (usually railroads[26]) in this case are always (or nearly always) the least-cost avoiders, as they can avoid accidents at the lowest cost. Under a strict liability tort regime, railroads would seek higher insurance. To avoid the issue of moral hazard, insurance companies might require railroads to take certain precautions, and, in a sense, insurance companies are an additional regulator to the PHMSA. Additionally, railroads can spread the costs of their higher insurance premiums. Strict liability also encourages firms to internalize their externalities and settle lawsuits out of court, thus keeping costs low. Cases that do go to court would result in courts estimating damages. Depending on how courts rule, the defendant either exercises the optimal level of precaution or may take insufficient or too much precaution.[27]

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18. DOT, *Draft Regulatory Impact Analysis*, 17.
19. DOT, *Hazardous Materials*.
20. Ibid.
21. J. O. Moreno, "The Hidden Issues in Crude-by-Rail Contraction," Oil and Gas Monitor (Monitor Publishing, Inc., 2014).
22. DOT, *Draft Regulatory Impact Analysis*, 30. These numbers include "material loss, carrier damage, property damage, response cost, and remediation cleanup cost."
23. This higher number was obtained from calculations for the high consequence event (damage over $1 billion) in Canada in 2013.
24. David H. Cole and Peter Z. Grossman, *Principles of Law and Economics* (Upper Saddle River, NJ: Pearson Education, 2005).
25. S. Shavell, *Foundations of Economic Analysis of Law* (Cambridge, MA: The Belknap Press of Harvard University Press, 2004).
26. The defendant might be the shipper if that is in the contract.
27. Cole and Grossman, *Principles of Law and Economics*.

The biggest government failure here is the restriction on competition caused by failure to approve new pipelines (as proposed pipelines could serve origins and destinations that would make them a substitute for rail). Since the main goal of the PHMSA is "reducing the risks posed by HHFTs [High Hazard Flammable Train], . . . taking action to prevent accidents from occurring, and . . . mitigat[ing] the consequences when accidents do occur,"[28] one obvious solution would be to transport crude oil through pipelines. While there is currently a debate as to which of the transportation modes is safer and cheaper,[29] the pipeline option, along with transporting crude oil with barges, tanker ships, and tanker trucks, should all be analyzed.[30] A State Department report cited in a *Wall Street Journal* editorial suggests that crude oil transported via Keystone XL would spill 518 barrels per year, while the same amount transported by rail would spill 1335 barrels per year, at minimum.[31] However, a brochure from the Association of American Railroads shows that the spill rate for crude oil transported by rail is 0.38 gallons spilled per million barrel miles moved vs. 0.88 by pipeline.[32] Another metric shows that transporting oil by pipeline is safer in terms of injuries.[33] While the PHMSA might not have the final authority to approve the Keystone XL pipeline, it would still be prudent for the PHMSA to consult with appropriate experts so that their analysis addresses all relevant issues and is more thorough.[34]

CONCLUSION

According to the OMB, a good regulatory analysis should have three elements: "(1) a statement of the need for the proposed action, (2) an examination of alternative approaches, and (3) an evaluation of the benefit and costs—quantitative and qualitative—of the proposed action and the main alternatives identified by the analysis."[35] The PHMSA regulatory analysis in its RIA and NPRM falls short of this standard for the following reasons: The accident data used to justify the regulation shows that the alleged problem of increasing accident is not occurring and in fact is declining without the regulation. Second, the data used to calculate the benefits is based on an event that has never occurred in the United States, making it difficult to justify the argument that the benefits outweigh the costs under any scenario. Third, the proposal does not show any serious discussion on alternatives such as using pipeline or other methods to transport crude and fails to discuss the issue of torts in solving the issue of crude oil spills.

28. DOT, *Hazardous Materials*, 16.
29. Julie M. Carey, "Rail Emerging as Long-Term North American Crude Option," *Oil & Gas Journal* (2013), http://www.ogj.com/articles/print/volume-111/issue-8/transportation/rail-emerging-as-long-term-north-american.html; Terry L. Anderson, "Stopping Keystone Ensures More Railroad Tank-Car Spills," *Wall Street Journal*, May 13, 2014, http://online.wsj.com/news/articles/SB10001424052702304431104579548030702494254.
30. Frittelli et al., *U.S. Rail Transportation of Crude Oil.*
31. Anderson, "Stopping Keystone."
32. Seythe McCoy, "North American Energy Independence Is within Reach, and Freight Railroads—with an Unparalleled Safety Record - Are Helping Make It Possible by Transporting New Supplies of Crude Oil," Association of American Railroads, last modified April 18, 2013, https://www.aar.org/safety/Documents/Freight%20Railroads%20Safely%20Moving%20Crude%20Oil.pdf.
33. D. Furchtgott-Roth, Pipelines Are Safest for Transportation of Oil and Gas (Manhattan Institute for Policy Research, 2013).
34. OMB, *Circular A-4*, 3.
35. Ibid, 2.