BEFORE THE
U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

DOCKET NO. PHMSA–2018–0025 (HM–264)
NOTICE OF PROPOSED RULEMAKING (NPRM) TO AUTHORIZE THE TRANSPORTATION OF LIQUEFIED NATURAL GAS BY RAIL TANK CAR

COMMENTS OF THE ASSOCIATION OF AMERICAN RAILROADS and THE AMERICAN SHORT LINE and REGIONAL RAILROAD ASSOCIATION

The Association of American Railroads (AAR) and The American Short Line and Regional Railroad Association (ASLRRA), on behalf of themselves and their member railroads, submits these comments in response to the Pipeline and Hazardous Materials Safety Administration's October 24, 2019 Notice of Proposed Rulemaking (NPRM) to authorize the transportation of liquefied natural gas (LNG) by rail tank car.[1] As noted in the NPRM, on January 17, 2017, AAR filed a petition for rulemaking (PFR) requesting authorization for the transportation of LNG in rail tank cars.

As noted in AAR's January 17, 2017 PFR, there is a safety benefit in transporting LNG in rail tank cars, which is currently permitted to be transported by motor vehicles on our nation's highways. Safety would be enhanced if transportation of LNG by rail were permitted, because the transportation of hazardous materials by rail has a demonstrated strong safety record on a ton-mile basis that exceeds the record of hazardous materials transportation by motor vehicles:

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[1] AAR is a non-profit trade association, representing freight railroads that operate 83 percent of the line-haul mileage, employ 95 percent of the workers, and account for 97 percent of the freight revenues of all railroads in the United States. AAR also represents passenger railroads that operate intercity passenger trains and provide commuter rail service. AAR is the nation's leading railroad policy, research, standard setting, and technology organization. AAR and its members are committed to operating the safest, most efficient, cost-effective, and environmentally sound rail transportation system in the world.

The American Short Line and Regional Railroad Association (ASLRRA) is a non-profit trade association representing the interests of approximately 450 short line and regional railroad members and railroad supply company members in legislative and regulatory matters. Short lines operate 50,000 miles of track in 49 states, or approximately 38% of the national railroad network, touching in origination or termination one out of every four cars moving on the national railroad system, serving customers who otherwise would be cut off from the national railroad network.

- Railroads have about 3 percent of the hazardous materials incidents that trucks are involved in, despite roughly equal hazmat ton-mileage.[2]

- Railroads have less than 10 percent of the hazardous materials accidents that motor vehicles have, despite roughly equal hazmat ton-mileage.[3]

- Railroads incurred 2 fatalities in the last 10 years attributable to hazardous materials, while motor vehicles incurred 101.[4]

- Railroad hazardous materials accident rates have declined 43 percent since 2009.[5]

- Railroad hazardous materials Non-Accident Release (NAR) rates have declined 49 percent since 2009.[6]

- Over the last 10 years, less than 1 percent of train accidents have resulted in a release of hazardous materials.[7]

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[2] Pipeline & Hazardous Materials Safety Administration, Hazardous Materials Incidents By Year & Mode, for 2009-2018, as of October 2019, at https://hip.phmsa.dot.gov/analyticsSOAP/saw.dll?Dashboard. In 2012, trucks hauled 97 billion hazmat net ton-miles (BTS, 2012 Commodity Flow Survey, Hazardous Materials, issued February 2015, Table 1b). In 2012, railroads hauled 85 billion hazmat ton-miles (excluding intermodal) according to the CFS and about 160 billion hazmat ton-miles overall, according to AAR Analysis of the 2012 STB Waybill Sample.

[3] Id.

[4] USDOT, Pipeline & Hazardous Materials Safety Administration, Hazardous Materials Incident Fatalities By Year & Mode, from: https://hip.phmsa.dot.gov/analyticsSOAP/saw.dll?Dashboard for 2009 through 2018, as of October 2019.

[5] Rate of train accidents involving release of HazMat per Hazmat carloads terminated. AAR analysis of FRA Train Accident Database at safetydata.fra.dot.gov and PHMSA Hazardous Materials Incident Database at portal.PHMSA.dot.gov. Hazardous materials carloads of all car types terminated in the U.S. are from TRAIN II via BOE Annual Reports, Exhibit 5 (2009 BOE Report) and Exhibit 9 (2018 BOE Report).

[6] Rate of non-accident HazMat releases per HazMat carloads terminated. AAR analysis of PHMSA Hazardous Materials database for 2009 and 2018. Hazardous materials carloads of all car types terminated in the U.S., from BOE Annual Reports, Exhibit 5 (2009 BOE Report) and Exhibit 9 (2018 BOE Report).

[7] AAR Analysis of FRA Train Accident Database and PHMSA Hazardous Materials Incident Database, 2009-2018, as of October 2019. Note: Includes grade crossing train accidents meeting FRA monetary reporting threshold.

PHMSA Should Include an 113C140 Option

In this NPRM, PHMSA is proposing to adopt the 113C120 tank car for transportation of LNG. AAR and ASLRRA urge PHMSA to add the 113C140 tank car as well. The C140 specification requires a thicker product tank shell, which would allow a higher pressure relief valve setting and provide additional protection. However, if PHMSA believes it is necessary to undertake a separate evaluation of the 113C140 specification for this purpose, PHMSA should proceed with the 113C120W specification while evaluating the C140 specification. In addition, if PHMSA considers allowing loading to 286,000 pounds, tank car thickness requirements should be increased to 9/16th inch. Additional valve protection should also be considered to accommodate the additional loading.

Many of the Operational Controls Should Not be Adopted

The NPRM "is not proposing to incorporate by reference Circular Letter OT-55 or to adopt the requirements for 'Key Trains' in the HMR in this rulemaking.[8]" AAR and ASLRRA support this decision. AAR and ASLRRA members have an excellent safety record in transporting hazardous materials, and part of the reason for this record is industry recommended practices like OT-55. Turning voluntary best practices into regulation would be a disincentive for railroads to adopt voluntary standards and recommended practices that are more rigorous than federal regulation requires.

With respect to train length, research on the safety impact of operating so-called "long" trains suggests that there is no increased risk of derailment, and indeed, the use of fewer, longer trains may reduce derailment rates.[9] PHMSA should not create a limit on train length within the context of this rulemaking.

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[8] 84 Federal Register No.206 Page 56968.

[9] Research conducted in the 1990s by Arthur D. Little (ADL), Inc. working with the AAR-CMA-RPI Inter-Industry Rail Safety Task Force categorized derailment causes into two broad categories, those that are a function of train-miles (TM), and of car-miles (CM). TM causes are proportional to the number of train miles operated. They tend to be related to signal failures, human factors errors, exposure to grade crossings, severe weather, and other derailment causes that occur as a function of train operations. TM derailments tend to occur independently of train length, but will increase with the number of trains operated. CM causes are proportional to the number of car-miles operated and include most rolling stock or track causes. These are primarily due to physical factors related to load cycles on components of track or equipment such as broken rails, bearing failures, track geometry causes, etc. CM-caused derailments will vary with the volume of traffic (i.e. car-miles), but their occurrence will not vary with the number of trains operated. The TM/CM derailment cause concept was further refined in the 2000s in several papers by researchers at the University of Illinois, and was used in an FRA analysis of hazardous materials transportation risk in 2013. The concept was further extended in a recent Ph.D. dissertation by Wang (2019), who showed that properly accounting for TM/CM causes results in more accurate estimates of derailment rates.

With respect to train composition, a significant body of research establishes that the current train placement regulations provide an acceptable level of safety to train crews. HMWG-REF-07, *Safe Placement of Train Cars*: A Report [to Congress], dated June 2005 has the following statement:

> *Train placement of hazardous materials has been thoroughly reviewed with appropriate consideration for possible regulatory change. For reasons set forth in this report, FRA currently sees no merit in disturbing established and very effective requirements already embodied in the Department of Transportation's Hazardous Materials Regulations. Although there is a theoretical basis for adoption of various refinements to train placement requirements, in no case is it apparent that their implementation would offer advantages sufficient to offset the costs involved – particularly the safety risk associated with additional switching of cars.*

A January 2017 report to the Rail Safety Advisory Committee Hazardous Materials Workgroup came to the following conclusions about buffer cars and crew safety in particular:

> *Specifically looking at locating hazardous materials next to internal combustion engines (locomotives and refrigerated cars), the risk of fires initiating from contact between materials and a heat source isn't apparent.*
>
> *After a review of potential hazards, buffer cars may improve the safety of train crews though the assessment involves some uncertainty. In addition, it appears as though unoccupied locomotives could be used to achieve this buffer without adversely affecting this level of safety.*

There should not be additional buffer car requirements for trains transporting LNG or any other hazardous material. An additional buffer car requirement is not justified from a safety and risk standpoint, consistent with the studies cited above.[10]

With respect to speed restrictions, the High Hazard Flammable Train (HHFT) regulations do require reduced speeds in high threat urban areas (HTUA's), but only if

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For a given volume of traffic, operating longer trains means that fewer trains are needed. Consequently, operating fewer trains reduces exposure to TM-caused derailments so the overall derailment rate should be lower with longer trains. Artificially limiting train length, and thus increasing the number of trains needed to transport the same freight, could have the perverse effect of increasing derailment rates. In the absence of data showing increased safety risk from longer trains, AAR does not support limits on train length.

[10] Note however, under Canadian law, a train only needs to have one buffer car between an engine or an occupied rail car and a placarded car. *See Transportation of Dangerous Goods Regulations*, SOR/2012-245, 10.6 Location of Placarded Railway Vehicle in a Train.

all the cars in the train are not DOT-117 cars. In this case, all the cars would be new DOT-113 tank cars hence speed restrictions should not apply.

With respect to braking and routing requirements, there is no justification for enhanced requirements for trains carrying LNG shipments more restrictive than the requirements for HHFTs at 49 CFR § 174.310(a)(3). If braking and routing requirements similar to those imposed on HHFTs were applied to trains carrying LNG, the requirements should only apply to a train transporting 20 or more loaded tank cars of LNG in a continuous block, or to a train carrying 35 or more loaded tank cars of LNG throughout the train. As PHMSA notes in the NPRM, there is insufficient data about movements of LNG by tank car to propose more restrictive requirements at this time.[11]

A Conditional Probability of Release (CPR) Cannot be Calculated for DOT-113 Tank Cars

A statistically significant CPR cannot be calculated for DOT-113 tank cars because there is insufficient accident and incident data with respect to DOT-113 cars. However, the RSI-AAR report RA-19-04 states that existing CPR estimates for other cars may shed some light on what to expect, if understood with appropriate caveats.

Higher Filling Densities Should be Considered

AAR's PFR requested maximum permitted filling densities (percent by weight) of 38.4 and 37.5 for maximum start to discharge pressures of 45 and 70 psig, respectively. AAR has subsequently obtained information from a cryogenic tank car builder that indicates these filling density limits would decrease the capacity of the cars from 30,681 gallons to 26,171 gallons – a decrease of 4,510 gallons or 14.5 percent. AAR therefore requests that DOT consider the risks and benefits of higher filling densities and discharge pressures. Allowing LNG tank cars to operate closer to capacity and thereby reduce the number of tank cars required to transport LNG has the potential to reduce the number of opportunities for release.

Tank Car Committee DOT-113 Task Force

At DOT's request, AAR's Tank Car Committee (TCC), of which ASLRRA is a member, currently has a task force evaluating the DOT-113 specification for LNG. The task force is discussing potential improvements in puncture resistance, thermal protection, insulation, tank thickness, location and types of valves/fittings and protective housing, and other items for the transportation of LNG in DOT-113 cars. The task force also is reviewing the work done by the AAR Locomotive Committee (with support from the TCC), that developed the LNG tender standards for natural gas as a locomotive fuel. PHMSA and the Federal Railroad Administration are participating on the LNG DOT-113 task force. The TCC will report the results of that review to PHMSA as soon as recommendations are available, which should be by summer 2020, allowing ample time for consideration within the context of this rulemaking.

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[11] 84 Federal Register No.206 Page 56969.

The RSI-AAR Railroad Tank Car Safety Research and Test Project provided the task force with a report on November 24, 2019 (copy attached).[12] The report indicates that increasing the outer tank thickness from 7/16" (the thickness of a standard DOT-113C120 tank car) to 9/16" improves the conditional probability of release (CPR) of the outer tank from 0.092 to 0.074, which is nearly a 20 percent improvement with respect to shell punctures. Likewise, increasing the head from 1/2" to 9/16" increases the CPR of the head from 0.049 to 0.047 or by over 2 percent. The shipper / car builder - manufacturer representatives on the TF would like to see the LNG car be built to a 286,000-pound gross rail load. Previous DOT rulemakings utilized some of the 23,000 pounds in increased weight from 263,000 to 286,000 pounds for improved safety in the form of additional shell thickness. The railroad members of the TCC suggest that the outer tank and head of the new DOT-113 tank cars be 9/16." This would be equivalent to inner tank of a DOT-117J tank car which was promulgated as the new car for flammable liquids going forward. The additional weight can be accommodated by the 23,000-pound increase in gross rail load without adversely impacting the amount of LNG the car can carry.

The railroad members of the TCC would also like to have DOT evaluate the structural integrity of the protective housing for valves and fittings. The protective housing for the LNG fuel tender was hardened considerably over a standard protective housing. The railroad members of the TF do not think the protective housing for the LNG tank cars needs to hardened as much as the LNG tender, but would like DOT to consider some additional hardening to reduce the probability of a piping/fitting failure in a derailment.

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Subject to these comments, PHMSA should authorize LNG in DOT-113C120 and DOT-113C140 Tank cars.[13] Thank you for your consideration.

Respectfully submitted,

Robert E. Fronczak, PE
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[12] RA-19-04 - Data Related to the Puncture Resistance of DOT-113 Cryogenic Tank Cars" November 24, 2019, RSI-AAR Railroad Tank Car Safety Research & Test Project.

[13] 84 Federal Register No.206 Page 56971.