BEFORE THE
PIPELINE AND HAZARDOUS MATERIALS
SAFETY ADMINISTRATION

PETITION FOR FINAL SPECIFICATION FOR TANK CARS USED TO TRANSPORT TIH MATERIALS

SUBMITTED BY
THE CHLORINE INSTITUTE
AMERICAN CHEMISTRY COUNCIL
THE FERTILIZER INSTITUTE
ASSOCIATION OF AMERICAN RAILROADS
RAILWAY SUPPLY INSTITUTE

IN COOPERATION UNDER THE
ADVANCED TANK CAR COLLABORATIVE RESEARCH PROGRAM

December 13, 2016

The Chlorine Institute (CI), American Chemistry Council (ACC), The Fertilizer Institute (TFI), Association of American Railroads (AAR) and Railway Supply Institute (RSI) (collectively referred to herein as "Industry Partners"),[1] in cooperation under the Advanced Tank

[1] CI is a 189-member, not-for-profit trade association of chlor-alkali producers worldwide, as well as packagers, distributors, users, and suppliers. The Institute's North American Producer members account for more than 93 percent of the total chlorine production capacity of the U.S., Canada, and Mexico. Chlorine and related chemicals, including caustic and hydrochloric acid, are used throughout the U.S. economy and are key to the protection of public health.

ACC represents the leading companies engaged in the business of chemistry. ACC members apply the science of chemistry to make innovative products and services that make people's lives better, healthier and safer. ACC is committed to improved environmental, health and safety performance through Responsible Care®, common sense advocacy designed to address major public policy issues, and health and environmental research and product testing. The business of chemistry is a $797 billion enterprise and a key element of the nation's economy. It is one of the nation's largest exporters, accounting for fifteen percent of all U.S. exports. Chemistry companies are among the largest investors in research and development.

TFI is the leading voice of the nation's fertilizer industry. Tracing its roots back to 1883, TFI's membership includes fertilizer producers, wholesalers, retailers and trading firms. TFI's full-time staff, based in Washington, D.C., serves its members through legislative, educational, technical, economic information and public communication programs. Find more information about TFI online at TFI.org and follow us on Twitter at @Fertilizer_Inst. Learn more about TFI's nutrient stewardship initiatives at nutrientstewardship.org and on Twitter at @4rnutrients.

AAR is a national, non-profit trade association that represents the nation's major freight railroads. AAR's membership includes freight railroads that operate 83 percent of the line-haul mileage, employ 95 percent of the

Car Collaborative Research Program (ATCCRP)[2], submit this petition to the Pipeline and Hazardous Materials Safety Administration (PHMSA) requesting that the "interim" tank car specifications issued as part of the HM-246 rule be considered the "final" specifications.

SUMMARY

In 2009, under the HM-246 rulemaking, a new interim standard was adopted for tank cars transporting TIH materials to be used until a "permanent" standard is issued by PHMSA. The HM-246 rule was the result of industry consensus that a standard was needed which improved accident survivability while further research continued toward a long-term toxic-by-inhalation (TIH) specification. Since that time, the Industry Partners continued further research under ATCCRP in partnership with PHMSA, the Federal Railroad Administration (FRA), Department of Homeland Security (DHS), Transportation Security Administration (TSA) and Transport Canada (TC) (collectively referred to herein as "Government Partners"). For the last seven years, the ATCCRP has commissioned many projects to further understand impact scenarios, performance of existing TIH tank car specifications under those impact scenarios and the performance of various tank car design concepts and materials (current and potentially new). The basic conclusions from all of these projects are as follows:

1) The "interim" standard designs provide significant improvement in accident survivability over the legacy, i.e., former specifications, and

2) No design feature or material was identified that would provide a significantly greater level of improvement, or would be a reasonable alternative (from an economic and manufacturability standpoint) that should be required industry-wide.

PROPOSED LANGUAGE

The Industry Partners propose the following regulatory revisions:

- 49 C.F.R. §173.244(a)(2) - For the list of authorized tank car specifications in the

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workers, and account for 97 percent of the freight revenues of all railroads in the United States. AAR's membership also includes 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 RSI is the international trade association of the railway supply industry and is headquartered in Washington, D.C. The members of the RSI Committee on Tank Cars ("RSI-CTC") collectively build more than ninety-five percent (95%) of all new railroad tank cars and own and provide for lease over sixty-five percent (65%) of railroad tank cars operating in North America. The membership of the RSI-CTC includes American Railcar Industries; American Railcar Leasing; CIT Rail; GATX Corporation; The Greenbrier Companies; Trinity Rail Group, LLC; and Union Tank Car Company.

[2] The overall objective of ATCCRP was to conduct research that would provide a better understanding of the factors contributing to tank car safety and security, as well as investigate options for increasing the safety, security and cost-effectives of tank cars used to transport TIH materials. The goal for the research was to provide the basis for developing balanced risk-benefit regulations and permanent specifications for tank cars carrying TIH materials.

table of PIH materials, replace the last specification delimiter "I" with "W."

- 49 C.F.R. §173.314(c) - For the list of authorized tank car specifications in the table of PIH materials, replace the last specification delimiter "I" with "W."

- 49 C.F.R. §179.22(e) – Revise this paragraph as follows (revised text underlined):

  "Each tank car manufactured after March 16, 2009 and before [*insert effective date of new rule*] to meet the requirements of §173.244(a)(2) or (3) or §173.314(c) or (d) shall be remarked with the letter "W" following the test pressure instead of the letter "I" during the tank car's next qualification. (Example: DOT 105J600I would be marked as 105J600W)."

SUPPORT FOR ACTION

I. Service Experience of HM-246 Compliant TIH Tank Cars

TIH tank cars are some of the strongest tank cars on the rails today. Modeling conducted under the private Next Generation Rail Tank Car (NGRTC) Project and ATCCRP has indicated that the interim TIH tank cars provide a significant level of improvement in accident survivability compared to the TIH tank cars built prior to issuance of the HM-246 specifications. This is also evident from the service and accident record of the current HM-246 compliant TIH tank car fleet[3]. Currently there are 1,542 HM-246 compliant tank cars in the total chlorine fleet of approximately 5,108 tank cars).

Using chlorine tank cars as an example, there have been ZERO reported releases to date from HM-246 compliant tank cars that were attributed to damage in derailments that have occurred. In fact, chlorine tank car owners of HM-246 compliant tank cars have reported that, to date, thirty-three of these tank cars have been involved in derailments/incidents. Fourteen of those tank cars were considered to have received extensive damage with repair costs exceeding $35,000 each. Six of those fourteen cars were known to have been on their sides. ALL of the thirty-three cars retained their contents – no product was released. Ten HM-246 compliant cars with other TIHs are known to have derailed, and these also lost no lading.

Based on this accident data, tank cars built to the HM-246 interim specification requirements already have a proven safety performance track record.

II. Summary and Conclusions of ATCCRP Projects

Projects under ATCCRP have modeled and tested the performance of HM-246 compliant tank cars in accidents compared to legacy specification cars, including correlating the modeling and test data to the probability of product release. The attached ATCCRP Executive Summary and Conclusions report provides summaries of the various projects that have been undertaken by ATCCRP which support this petition. The ATCCRP, as it currently exists, will conclude at the end of 2016.

[3] The chlorine tank car fleet numbers are approximate and based on CI member reports to date.

Some of the significant conclusions resulting from the ATCCRP and supporting tank car safety research efforts are as follows:

1. We have vastly improved our understanding of tank impact and puncture behaviors and developed new experimental data and analytical results to support ongoing and future tank car safety efforts.

2. No new high technology design or material that produced significant new protection levels (e.g. composites, crushable foams, advanced engineered energy absorbing sandwich panels) has been identified. Traditional tank car designs with monolithic layers of good quality steel are relatively efficient structures for resisting the impact threats in the railroad safety environment.

3. The HM-246 interim specification cars provide a significant level of improvement over the legacy designs. The HM-246 rule interim car puncture energy improvements were on average 90%, 100%, and 45% for the anhydrous ammonia (AA), ethylene oxide (EO), and chlorine cars (Cl) respectively. Empirically-derived probabilities of lading release for interim cars were 51 to 61 percent lower than those of legacy cars. Table 1 below compares the accident performance of interim cars to legacy cars that are used for the same commodity.

The only option identified by the research for possible improvements in puncture protection over the HM-246 compliant car designs are potential optimized sandwich designs, requiring alternative steels in the jacket (outer tank) for enhanced puncture protection. This conclusion is based on puncture analyses performed for various tank design configurations. Functional tank car designs for these sandwich cars were not developed in the research and the protection levels have not been demonstrated by testing. One ATCCRP project ("TWP-17") looked at the empirical safety performance of tank cars in FRA-reportable accidents. This project derived estimates of the conditional probability of release (CPR) and quantity lost for each of the four car components (head, shell, top and bottom fittings), and for the whole car, for all "conventional" designs. These formulas indicate which variables have a significant effect on each component CPR.

"CPR" as defined in TWP-17 is the fraction of tank cars of a given description (i.e., the probability that one such tank car of that description) that will lose some quantity of lading from impact damage, given that they are derailed in an accident that requires a report from the railroad to the FRA. Damage and losses caused by exposure to heat are not part of the CPR calculation.

TWP-17 produced CPR estimates for TIH cars as shown in Table 1. The table also compares the accident performance of interim cars to legacy cars that are used for the same commodity.

Table 1

CPRs for Selected TIH Tank Cars
Under Average Mainline Derailment Conditions*

Chlorine

Car Spec.	Head Thickness (in.)	Shell Thickness (in.)	Jacket	Head Shield	Shell Inside Diameter (in.)	CPR	Percent Improvement Over Pre-HM-246 Baseline
105A500W	0.812	0.775	Yes	No	100.45	0.042	n/a
105J600I	0.954	0.954	Yes	Full	100.45	0.019	54.8 %

Anhydrous Ammonia

Car Spec.	Head Thickness (in.)	Shell Thickness (in.)	Jacket	Head Shield	Shell Inside Diameter (in.)	CPR	Percent Improvement Over Pre-HM-246 Baseline
112J340W	0.625	0.625	Yes	Full	119	0033	n/a
112J500I	0.900	0.900	Yes	Full	116.75	0.016	51.5 %

Ethylene Oxide

Car Spec.	Head Thickness (in.)	Shell Thickness (in.)	Jacket	Head Shield	Shell Inside Diameter (in.)	CPR	Percent Improvement Over Pre-HM-246 Baseline
105J300W	0.603	0.562	Yes	Full	117.87	0.041	n/a
105J500I	0.900	0.900	Yes	Full	116.75	0.016	61.0%

* Train speed at time of derailment = 26 mph, 11 cars derailed, tank car is the 6th car derailed

The car dimensions shown in Table 1 are meant to be illustrative. They are based on the most commonly built designs as of the publication of this report.

More detailed summaries of the individual research projects leading to these conclusions are provided in the attached report.

III. Increase Fleet Modernization

Significant progress has been made in modernizing the North American (U.S. and Canada) TIH fleet, particularly the chlorine fleet, of which now approximately 30% of the cars meet the HM-246 tank car standards. The chlorine fleet's progress is more than double that which was anticipated by PHMSA to occur for the entire TIH fleet by this time.[4]

From the perspective of shippers who own tank cars used to transport TIH materials, and lessors who lease tank cars to transport TIH materials, the incentive to invest in new tank cars is enhanced by regulatory certainty for a permanent tank car specification. While supportive of continuously improving safety, car owners are reluctant to invest in HM-246 compliant cars that are not aligned to a permanent regulatory specification, because they cannot ensure that the cars will be used long enough for the owners to achieve adequate returns on their investments. By accepting this petition and amending the regulations as requested, the regulatory certainty of a permanent specification would incentivize car owners to invest in HM-246 compliant cars, greatly enhancing the safety of transporting hazardous materials by rail.

[4] In the HM-246 Final Rule preamble, PHMSA stated the rule would result in approximately a 14% car replacement rate over six years (RIN 2130-AB69, Fed. Reg. page 1794.

CONCLUSION

In conclusion, TIH tank cars that are built in compliance with HM-246 interim standards have performed well in service and conclusions from the various ATCCRP projects provide scientific support to convert the interim specifications to permanent specifications. Adopting this change would bolster fleet modernization and continue PHMSA's mission of providing continued safety improvement in hazardous materials transportation. The Industry Partners remain committed to our mission of ensuring safe hazardous materials rail transportation.

Sincerely,

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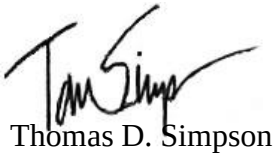

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