U.S. Department
of Transportation

**Pipeline and Hazardous
Material Safety
Administration**

Administrator

1200 New Jersey Avenue, SE
Washington, DC 0590

October 19, 2012

The Honorable Deborah A. P. Hersman
Chairman
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, DC 20594

Dear Chairman Hersman:

This letter provides an update on Pipeline and Hazardous Materials Safety Administration (PHMSA) actions relating to several rail Safety Recommendations issued by the National Transportation Safety Board (NTSB), specifically, R-92-23, R-01-03, R-07-4, and R-08-13.

Before I discuss actions taken to address these recommendations in greater detail, I would like to inform NTSB of the publication of a final rule that is relevant to Safety Recommendations R-92-23 and R-01-03. On June 25, 2012, PHMSA published a final rule (HM-216B; 77 FR 37961) that incorporated the Alternative Tank Car Qualification Program into the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). This program was established by the Federal Railroad Administration (FRA) in 1998 in collaboration with PHMSA (under special permit DOT-SP 12095) and the railroad industry. The program served as a minimally acceptable framework for an owner's qualification program for all DOT and non-DOT specification rail tank cars and their components, and now provides a regulatory alternative to the prescribed qualification requirements in Part 180 of the HMR. The conditions of this new regulation require a tank car owner to develop a qualification program with inspection procedures and intervals, along with acceptance criteria for each prescribed inspection and test. The acceptance criteria must be based on service reliability data and/or analytical evaluation of the tank car or its components. For example, with regard to crack detection, the program allows an owner to develop an alternative qualification program suited to the tank car design and use by permitting an alternative inspection and test program or interval based on a damage tolerance analysis, and contingent on FRA approval. With regard to deterioration and inspection of a pressure relief device (PRD), the program requires qualification of service equipment at least once every ten years and requires an owner to collect and analyze data, and based on the analysis, adjust the inspection and test frequency to ensure that the design level of reliability and safety of service is met. The use of DOT-SP 12095 was widespread with over 550 parties to this special permit. PHMSA is not aware of any incidents associated with owner's use of the program under this

special permit and, moreover, its widespread use resulted in more owners evaluating the performance of their service equipment, including PRDs, over time.

I believe promulgation of this final rule provides a suitable alternative to address Safety Recommendations R-92-23 and R-01-03. In addition, PHMSA and FRA have undertaken other actions to address these and other recommendations, which are discussed further below.

R-92-23

> *The FRA and PHMSA develop and promulgate requirements for the periodic testing and inspection of rail tank cars that help to ensure the detection of cracks before they propagate to critical length by establishing inspection intervals that are based on the defect size detectable by the inspection method used, the stress level, and the crack propagation characteristics of the structural component (requirements based on a damage-tolerance approach).*

The NTSB issued Safety Recommendation R-92-23 to PHMSA as a result of a special investigation of the inspection and testing of rail tank cars in response to accidents in Dragon, Mississippi and Kettle Falls, Washington that led to the release of hazardous material because of structural failure of the rail tank cars. The FRA has sponsored and supported several research projects that will assist tank owners in developing a damage tolerance analysis and continues to conduct research, however, PHMSA and FRA have no plans to codify inspection intervals based on this approach. It is our assessment that this is best left to the tank car owners based on their determination of critical flaw size and defect growth rate through damage tolerance analysis. This information along with an appropriate nondestructive testing (NDT) method (based on the respective probability of detection (POD) curves) can be selected for use in an inspection. Adoption of the abovementioned alternative tank car qualification program into the HMR will allow owners to tailor a tank car qualification to their needs using the resources and capabilities provided through the below research efforts and will help to ensure the detection of cracks before they propagate to critical length through inspection intervals established by the tank car owner.

PHMSA previously informed the NTSB about FRA research efforts on NDT methodology, specifically, an evaluation of NDT methods used for structural integrity inspections (*Railroad Tank Car Nondestructive Methods Evaluation*; DOT/FRA/ORD-01/04) and a follow-up research project that developed procedures for assessing the structural integrity of stub sill tank cars to provide greater assurance against the occurrence of structural failure of a rail tank car (*Tank Car Reliability Design and Analysis*; DOT/FRA/ORD-07/05). As a result of this latter research, it was recommended that consideration be given to creating a new multi-level procedure for establishing safe inspection intervals in which tank car builders and owners can trade off the cost of more frequent inspections against the time and expense of conducting more accurate engineering evaluations.

Since we last corresponded, FRA completed another research project to support informed decision-making and planning for reliability-centered maintenance (RCM). The project developed a methodology that applies RCM methods to perform reliability analysis on tank car structures (*Development and Application of Methodology for Reliability Assessment of Tank Car Structures: Phase I*; DOT/FRA/ORD-07/29). The research demonstrated that reliability analysis can be used to quantify probability of common failure mechanisms for rail tank cars: corrosion and fatigue. Use of the information on the quantified risk allows better risk management through informed decision-making on inspection intervals.

In addition, an FRA-sponsored research project evaluated a variety of NDT methods used to inspect tank cars (*Quantitative Nondestructive Testing of Railroad Tank Cars Using the Probability of Detection Evaluation Approach*; DOT/FRA/ORD-09/10). The resources developed and the capabilities demonstrated are initial steps in providing quantitative data for extending and validating the detection capabilities of nondestructive inspection methods, processes, and procedures. Results show variability in operators and procedures both of which can be influenced by training, experience, and how recent the operator has performed the inspection. Through continued POD curve evaluation the determination of minimum detectable flaw size along with the POD curve for critical flaw sizes for each of the NDT methods can be achieved. Reports on the research mentioned above are available at http://www.fra.dot.gov/rpd/policy/419.shtml.

Additional studies with the Transportation Technology Center, Inc. are ongoing to support the derivation of POD curves of NDT methods and the application of these methods to tank car substructures. FRA plans another POD test for the third quarter of 2012. Following this testing, FRA plans to take test plates to various locations around the country so that smaller companies can bring their technicians to perform the tests, thereby updating the POD curve library that has already been developed.

Finally, the Association of American Railroads (AAR) Tank Car Reliability Research task force is evaluating data related to the in-train forces (e.g., tension, compression, torsion) experienced by freight cars as collected by instrumentation on in-service tank cars. The evaluation of the data is aimed at ensuring current design requirements accurately reflect current operating conditions. The research includes an FRA-funded Tank Car Inspection database (TCID), which will enable efficient collection, organization and analysis of data from inspection of tank car underframes that are the structures that absorb and transfer loads to and from a tank car to an adjacent car in a train.

PHMSA and FRA believe that, collectively, the information and resources developed through these research efforts and the adoption of the alternative tank car qualification program into the HMR will provide assurance of the periodic testing and inspection of rail tank cars that will help to ensure the detection of cracks in tank cars before they propagate to critical length.

R-01-03

The FRA and PHMSA evaluate, with the assistance of the Association of American Railroads (AAR) and the Railway Progress Institute (RPI), the deterioration of pressure relief devices through normal service and then develop inspection criteria to ensure that the pressure relief devices remain functional between regular inspection intervals. Incorporate these inspection criteria into the U.S. DOT HMR.

The NTSB issued Safety Recommendation R-01-03 to PHMSA as a result of a special investigation of the rupture of a rail tank car in Clymers, Indiana that lead to a release of hazardous waste. We have noted the impact of adoption of the alternative tank car program into the HMR previously in this letter. Further, FRA has offered guidance to tank car owners that all valves intended to remain in service, including PRDs, must be rebuilt at the time of qualification. The rebuilt valves must meet the start-to-discharge (STD) tolerance of 49 CFR § 179.15. As such, tank car owners are responsible for determining the condition of the PRD at the end of a prescribed inspection interval and adjusting the inspection interval, as needed.

Additionally, PHMSA participated in the AAR Tank Car Committee task force that reviewed and evaluated over 1,300 in-service inspection reports on PRDs. Subsequently, the AAR (aided by PHMSA and FRA) developed an inspection report for PRDs and suggested this document alone surpassed the intent of Safety Recommendation R-01-04 issued to the AAR by the NTSB. The NTSB closed that recommendation based on AAR's action to incorporate the inspection report and accompanying instructions into Appendix U of the 2007 edition of the *Manual of Standard and Recommended Practices – Specifications for Tank Cars, M-1002*. In-service information on PRDs gathered using the inspection form must be used to set the testing frequency and justify inspection intervals prescribed in the tank car owner's alternative tank car qualification program in accordance with the new regulations adopted under HM-216B.

The missing piece is the criterion for in-service STD pressure that would require adjustment of the inspection interval. The FRA has initiated a research project to quantify the effect of environmental factors on the measured STD pressure of the PRD. The results of this research will allow FRA to quantify the effect, if any, of environmental factors and make necessary corrections to the measured STD pressure. Moreover, FRA with support from PHMSA has performed initial research using the Analysis of Fire on Tank Cars (AFFTAC) to determine the sensitivity of changes in the STD pressure of PRD on the survivability of tank cars when exposed to fire conditions (e.g., pool and torch fires). The initial results indicate that AFFTAC is a useful tool for such analyses and we will continue the initial research to cover a representative sample of commodities and evaluate similar sensitivity considering additional variables. The results of these research projects will provide the information needed to develop a meaningful tolerance for the STD pressure of in-service PRDs.

Thus, I believe promulgation of HM-216B and the data collection and analysis requirements along with the development of an in-service tolerance for STD pressure will ensure proper functioning of PRDs between inspections.

R-07-4

> *With the assistance of the Federal Railroad Administration, require that railroads immediately provide to emergency responders accurate, real-time information regarding the identity and location of all hazardous materials on a train.*

In a March 12, 2012 letter to PHMSA, and again in an August 2, 2012 letter, NTSB reiterated Safety Recommendation R-07-4 in association with a number of new recommendations issued to PHMSA as a result of a train derailment at a rail grade crossing in Cherry Valley, Illinois. NTSB originally issued Safety Recommendation R-07-4 as a result of a head-on collision between two freight trains in Anding, Mississippi. PHMSA initiated a project on September 26, 2011 with DOT's Volpe Center entitled "*Hazardous Materials Automated Cargo Communication for Efficient and Safe Shipping*" (HM-ACCESS). This research has since been emphasized by the recent enactment of the Moving Ahead for Progress in the 21st Century Act (MAP-21), which includes a requirement for DOT to conduct pilot projects to evaluate the feasibility and effectiveness of using paperless hazard communications systems. The intent of HM-ACCESS is to identify and evaluate options to complement existing regulatory requirements for a hazardous material shipping paper to allow for electronic communication of the information provided on a shipping paper consistent with the directive under MAP-21. PHMSA has updated its Research and Development website at: http://phmsa.dot.gov/initiatives/r-and-d to communicate the progress and status of this research initiative, as well as through other public outreach efforts. Additionally, PHMSA held a series of workshops on September 27 – 28, 2012 that will be followed by a public meeting to discuss information gathered from stakeholders and next steps toward implementation. I encourage the NTSB to attend and participate. Finally, under the abovementioned HM-216B final rule, PHMSA has authorized for rail transportation the transfer of hazardous material shipping paper information by electronic data interchange. This will further assist in attaining the recommendation to require immediate, real-time information to emergency responders on the identity of hazardous material on a train.

R-08-13

> *With the assistance of the Federal Railroad Administration (FRA), evaluate the risks posed to train crews by unit trains transporting hazardous materials, determine the optimum separation requirements between occupied locomotives and hazardous materials cars, and revise 49 Code of Federal Regulations 174.85 accordingly.*

NTSB issued Safety Recommendation R-08-13 following its investigation of a train derailment on October 20, 2006 in New Brighton, Pennsylvania. In that incident, a Norfolk Southern Railway Company (NS) train hauling tank cars loaded with denatured alcohol derailed while crossing the Beaver River railroad bridge resulting in a release of hazardous material. In previous communications with PHMSA, NTSB had asked us to conduct a safety analysis to validate the one-car buffer standard. To date, PHMSA and FRA have not initiated a safety

analysis to validate the one-car buffer standard. And, based on agency safety and research priorities, we do not intend to initiate such an analysis in the near term. However, FRA is initiating a review of 49 CFR Part 174, which will involve a review of the train placement regulations including the one-car buffer standard associated with unit trains offered in 49 CFR § 174.85. PHMSA and/or FRA may revisit the need for a safety analysis in the future but because the probable cause of the accident was determined to be a broken rail and there was no evidence that train placement contributed to the severity of the derailment we continue to believe such an analysis is not warranted. PHMSA will inform NTSB of any conclusions drawn from the FRA review of 49 CFR Part 174.

If you have questions, or comments regarding this or any other hazardous materials safety matter, please feel free to contact me directly at 202-366-4433.

Regards,

Cynthia L. Quarterman