Testimony of the Honorable Christopher A. Hart
Vice Chairman
National Transportation Safety Board
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Reforms and Improvements to Reduce Regulatory Burdens
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Good morning Chairman Shuster, Ranking Member Brown, and the Members of the Subcommittee. Thank you for the opportunity to appear before you today on behalf of the National Transportation Safety Board (NTSB) regarding safe rail transportation and the safe transportation of hazardous materials. Today, I would like to highlight some specific issues of concern to the NTSB.

Positive Train Control (PTC)

For nearly 40 years, the NTSB has investigated numerous train collisions and over-speed derailments caused by operational errors involving human performance failures. In one year alone, the NTSB investigated 5 such accidents: Graniteville, SC; Anding, MS; Shepherd, TX; Chicago, IL; and Texarkana, AR. The NTSB attributed these human performance failures to a variety of reasons, including fatigue, sleeping disorders, use of medication, loss of situational awareness, reduced visibility and distractions in the operating cab such as the use of cell phones. Many of these accidents occurred after train crews failed to comply with train control signals, failed to follow operating procedures in non-signaled or "dark" territories, or failed to comply with other specific operating rules such as returning track switches to normal position after completing their work at railroad sidings.

To address human performance deficiencies, the NTSB has advocated for the implementation of a system that compensates for human error and incorporates collision avoidance. The NTSB has repeatedly concluded that technological solutions, such as a positive train control system, have great potential to reduce the number of serious train accidents by providing safety redundant systems to protect against human performance failures. The NTSB has issued several recommendations specifically supporting the implementation of PTC, especially on tracks where both passenger and freight trains operate. The objective of PTC is to prevent train collisions and over-speed accidents by requiring automatic control systems to override mistakes by human operators. This is a worthwhile goal to pursue, and the NTSB remains committed to the goal of implementing a safety redundant system.

Because of the NTSB's repeated findings that technology based collision avoidance systems could provide the needed safety redundancy to prevent accidents, PTC was placed on the NTSB Most Wanted List of Transportation Safety Improvements at its inception in 1990. Following the

tragic head-on collision between a passenger train and a freight train in Chatsworth, California, on September 12, 2008, which resulted in 25 fatalities and more than 130 injuries, Congress enacted the Rail Safety Improvement Act of 2008 (RSIA). This law requires each Class I railroad over which poisonous-by-inhalation (PIH) or toxic-by-inhalation (TIH) hazardous materials is transported and regularly scheduled intercity or commuter rail passenger transportation travels to implement a PTC system by December 31, 2015.[1] Encouraged by this legislative action, the NTSB's Safety Recommendation calling for PTC to be installed on railroads, was classified as closed and was removed from the Most Wanted List in October 2008.

While this specific recommendation was closed, the NTSB remains committed to the safety benefits of PTC. The NTSB is on the record in support of this technology and remains supportive. In fact, four NTSB safety recommendations regarding PTC remain open.[2]

The NTSB continues to monitor the implementation of the PTC Congressional mandate. To that end, the NTSB commented on a 2009 Federal Railroad Administration (FRA) rulemaking about the importance of PTC systems for passenger and freight railroads. The NTSB reiterated its support for PTC systems that include train separation, speed and signal enforcement, rail roadway worker protection, and protection from running through misaligned switches. The NTSB believes this proposed rule will improve safety by creating a safety redundancy for human performance failures. The NTSB also commented on the importance of ensuring interoperability of PTC systems.

In 2010, the NTSB again emphasized its support for the safety benefits of appropriate and fully deployed PTC. Currently, FRA has the flexibility to review, modify, or retire conventional signal systems through Part 235 of its regulations and has successfully used this authority. The NTSB believes this authority can be used to review amendments to PTC required installation on a case-by-case basis rather than granting blanket exemptions. We have found that lives can be saved and destruction prevented through this safety redundant system.

Also, as a result of the NTSB's longstanding interest in this issue, the NTSB participated, as a non-voting technical advisor, in the FRA's, Rail Safety Advisory Committee (RSAC) PTC working group meetings. This group's goal was to develop regulatory language for processor-based signal and train control safety standards, which include PTC systems. After several years of work on this issue, FRA promulgated regulations to support the *voluntary* introduction of innovative technology, including systems utilizing computers and radio data links, to accomplish PTC functions. In 2005, NTSB held a symposium on PTC to learn about the industry's progress on

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[1] Not all hazardous material shipments by rail fall under the TIH class. In fact, there is a significant amount of other hazardous materials shipped by rail that could be involved in a train accident, resulting in potential catastrophic damage.

[2] To METRA (Northeast Illinois Regional Commuter Railroad): Install a positive train control system on your commuter train routes. (R-05-013)

To the Canadian National Railway: Develop and implement a positive train control system that includes collision avoidance capabilities on main line tracks, establishing priority requirements for high-risk corridors such as those where passenger trains operate. (R-07-007)

To the Massachusetts Bay Transportation Authority: Develop and implement a positive train control system for all your rail lines.) (R-09-014)

To CSX Transportation Inc.: Develop and install a positive train separation control system on track segments that have commuter and intercity passenger trains. (R-97-026)

this issue and to reinvigorate dialogue among rail carriers, component manufacturers and government agencies. Some railroads were moving to develop PTC systems. In January 2007, the FRA approved a BNSF Railway project for its Electronic Train Management System (ETMS), an overlay technology that augments an existing train control method.

In December 2008, the RSAC was asked to provide advice on the best way to implement PTC. This task was referred to the PTC working group for the purpose of providing advice regarding the development of regulations for PTC systems and their deployment under the RSIA. NTSB provided technical assistance in the development of the PTC regulations and on July 21, 2009, FRA published the previously referenced Notice of Proposed Rulemaking (NPRM).

In addition to addressing train collisions and overspeed derailments, the RSIA requires implementation of PTC systems that prevent incursions into established work zone limits and the movement of a train through a switch left in the wrong position. These are additional areas where NTSB believes PTC can enhance railroad safety. The severity of these type of accidents was highlighted when a freight train collided with a standing train in Graniteville, South Carolina after being diverted into an occupied siding by a switch that was left in the wrong position by a crew working in the siding earlier. As a result of the accident, a tank car filled with chlorine was punctured, releasing a cloud of chlorine gas into the town, killing nine persons including the locomotive engineer.

Transit

The NTSB has issued several recommendations to the Federal Transit Administration (FTA) and its predecessor agencies, addressing the need for the FTA to promulgate regulations and to establish mandatory safety guidelines and requirements for recipients of FTA funding. It has been the longstanding position of the FTA that it does not have the legal authority to promulgate regulations or to require an entity that receives funding through the FTA to comply with its guidelines and recommended best practices as a condition of federal financial assistance. The extent of the FTA's efforts to this point has been to encourage recipients to adhere to industry best practices and recommendations made by the NTSB.

Following the tragic accident that occurred in Washington, DC on June 22, 2009, when a Washington Metropolitan Area Transit Authority Metrorail train struck the rear of a stopped Metrorail train, the NTSB made the following safety recommendation to the U.S. Department of Transportation (DOT):

> Continue to seek the authority to provide safety oversight of rail fixed guideway transportation systems, including the ability to promulgate and enforce safety regulations and minimum requirements governing operations, track and equipment, and signal and train control systems. (R-10-3)

The NTSB has previously issued recommendations to the FTA:

> Develop transit railcar design standards to provide adequate means for safe and rapid emergency responder entry and passenger evacuation. (R-06-005)

Develop minimum crashworthiness standards to prevent the telescoping of transit railcars in collisions and establish a timetable for removing equipment that cannot be modified to meet the new standards. (R-06-06)

The NTSB continues to support legislation that would direct the DOT, in consultation with the NTSB, to establish federal safety standards for rail transit systems.

Air Transportation of Lithium Batteries

There are two types of lithium batteries: primary and secondary. Primary lithium batteries are non-rechargeable and they are commonly used in items such as watches and pocket calculators. They contain metallic lithium that is sealed in a metal casing. The metallic lithium will burn when exposed to air if the metal casing is damaged, compromised, or exposed to sustained heating. Secondary lithium batteries, also known as lithium-ion batteries, are rechargeable and are commonly used in items such as cameras, cell phones, laptop computers, and hand power tools. Secondary lithium batteries contain electrically charged lithium atoms, or ions, in a flammable liquid electrolyte. Overheating of the battery can result in the ignition of the flammable electrolyte. Another type of secondary battery, known as lithium polymer batteries, contains a flammable polymeric material rather than a liquid, as the electrolyte. Halon suppression systems, the only fire suppression systems certified for aviation, are not effective in extinguishing fires involving primary lithium batteries but can be effective in extinguishing fires involving secondary lithium batteries.

The demand for primary and secondary lithium batteries has skyrocketed since the mid-1990s as the popularity and use of electronic equipment of all types has grown. As the use of lithium batteries has increased, the number of incidents involving fires or overheating of lithium batteries, particularly in aviation, has likewise grown. The NTSB has investigated three such aviation accidents: Los Angeles, CA; Memphis, TN; and Philadelphia, PA.

The fires in these accidents included both primary and secondary lithium batteries, and the NTSB issued several recommendations as a result of these investigations. As a result of its investigation of the Los Angeles and Memphis incidents, the NTSB recommended that the Pipeline and Hazardous Materials Safety Administration (PHMSA), with the Federal Aviation Administration (FAA), evaluate the fire hazards posed by lithium batteries in an aviation environment and require that appropriate safety measures be taken to protect the aircraft and occupants. The NTSB also recommended that packages containing lithium batteries be identified as hazardous materials, including appropriate labeling of the packages and proper identification in shipping documents when transported on aircraft. These recommendations have been closed with acceptable action by the regulator.

Following the Philadelphia accident, the NTSB issued six safety recommendations urging PHMSA to address the problems with lithium batteries on a number of fronts, including reporting all incidents; retaining and analyzing failed batteries; researching the modes of failure; and eliminating regulatory provisions that permit limited quantities of these batteries to be transported without labeling, marking, or packaging them as hazardous materials. In January 2008, the NTSB issued additional recommendations to PHMSA and the FAA to address the NTSB's concerns about

the lack of public awareness about the overheating and ignition of lithium batteries. PHMSA issued a NPRM on January 11, 2010 to address some of these recommendations. The NTSB commented on this notice, but no final rule has been issued. Of the six recommendations issued, one (A-07-106) has been classified "Closed—Acceptable Action," two (A-07-105 and -109) classified "Open—Acceptable Response" and three (A-07-104, -107, and 108) classified "Open—Unacceptable Response."

Most recently, in September 2010, a UPS cargo plane crashed in Dubai. The United Arab Emirates (UAE) is leading this investigation, and this week they issued a preliminary accident report in which they state that no hazardous materials were declared as cargo on the flight despite at least 3 shipments of lithium ion battery packs that meet Class 9 hazardous material designation.[3] In this report, the UAE also recommends appropriate declaration, stowage, and handling of lithium batteries carried in flight. The investigation is on-going.[4]

Another recent development with regard to lithium batteries occurred just last week when the U.S. House of Representatives passed H.R. 658, the FAA Reauthorization bill. It contains a provision that U.S. hazardous materials regulations on the air transportation of lithium metal cells or batteries or lithium ion cells or batteries could not exceed the International Civil Aviation Organization *Technical Instructions for the Safe Transport of Dangerous Goods by Air*. The NTSB notes DOT has for some years worked to ensure that the U.S. hazardous materials regulations are compatible with international standards and, accordingly, has been very active in the development of international standards for the transportation of hazardous materials. However, the DOT has never relinquished its rulemaking authority to an international body. The NTSB concurs with that position and believes the DOT should continue to implement more stringent standards in U.S. regulations if deemed necessary.

Wet Lines on Highway Cargo Tanks

Presently, each external product pipe or wet line on a cargo tank semitrailer transporting flammable liquid may contain as much as 50 gallons of product directly underneath a fully loaded cargo tank. Because the wet lines are designed to break away in order to prevent damage to the tank shell, the lines could release a substantial amount of product on a striking passenger vehicle, which may be trapped beneath the cargo tank and engulfed in a fire.

In 1978, the Office of Motor Carrier Safety within the Federal Highway Administration established a policy allowing gasoline to be carried in wet lines because of "economic and practicality considerations." In 1985, PHMSA published a NPRM that increased the bottom accident damage protection for cargo tanks, including wet lines. In 1988, in the process of developing the final rule, PHMSA staff prepared an issue outline memorandum that discussed the external piping issue. The memorandum noted:

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[3] http://www.gcaa.gov.ae/en/ePublication/admin/iradmin/Lists/Incidents%20Investigation%20Reports/Attachments/16/2010-Preliminary%20Report%20B747-400F%20-%20N571UP%20-%20Report%20132010.pdf

[4] Foreign investigative entities have authority equivalent to the NTSB under ICAO Annex 13. For this accident, in particular, the NTSB has been involved as the accredited representative as the State of Operator, Registration, and Manufacturer. The operator, manufacturers, and regulator (FAA) are technical advisors to the NTSB accredited representative. The NTSB plans to issue recommendations based on the findings of the UAE investigation.

> It is unreasonable and illogical to allow the piping to be considered as an acceptable container for the transport of gasoline. Therefore, the petroleum industry's decision to bottom load in compliance with the Clean Air Act and their unwillingness or inability to drain the cargo lines has resulted in widespread non-compliance with the intent and letter of the *Hazardous Materials Regulations* as interpreted by RSPA [PHMSA] for the transportation of gasoline.

In the final rule in 1989, PHMSA noted that wet lines were not appropriate packaging for hazardous materials.

In addressing comments from the petroleum industry regarding the infrequency of accidents resulting in damage to the wet lines and the loss of lading, PHMSA responded that although such accidents were infrequent, the consequences of such accidents could be substantial, especially given that they would likely occur on neighborhood streets in residential areas. PHMSA encouraged the petroleum industry to consider and evaluate all possible ways to eliminate this risk in the most cost effective manner. The American Petroleum Institute (API) replied that the analysis of wet line accident statistics indicates that the probability is quite low that a fatality will be directly attributed to a wet line failure. Based on the results of its analysis, API cancelled a study to evaluate alternate means of loading cargo tanks that would result in dry loading lines. Consequently, PHMSA prohibited the transportation of poison B liquids, oxidizer liquids, liquid organic peroxides, and liquid corrosives in wet lines, but allowed gasoline and petroleum products in external unprotected wet lines. PHMSA justified the exception for gasoline by the lack of sufficient accident data and the inadequacy of information concerning possible alternative procedures and/or equipment.

Subsequent to this rulemaking activity, the NTSB investigated two accidents in which wet lines were damaged, and gasoline in the wet lines was released and ignited. As a result of these investigations, the NTSB recommended that PHMSA prohibit the carrying of hazardous materials in external piping of cargo tanks, such as wet lines, which may be vulnerable to failure in an accident.[5]

On July 1, 2009, NTSB investigated another accident involving wetlines. In this accident a cargo tank truck was struck by a car in Upper Pittsgrove, New Jersey, and the driver of the car was fatally injured in a fire as a result of the release of gasoline from the wetlines.

In December 2004, PHMSA published a NPRM addressing the transportation of flammable liquids in external wet lines. In its March 5, 2005, comment letter to PHMSA on the NPRM, the NTSB stated (1) that it did not believe that reliance upon impact damage protection devices for wet lines would provide the greatest level of safety and (2) that the hazards from wet lines full of a hazardous cargo can be more effectively eliminated if the wet lines are purged of the cargo. On June 7, 2006, PHMSA published a notice withdrawing the NPRM.

On July 31, 2007, PHMSA advised the NTSB that while it would not eliminate wet lines, it developed an outreach program focused on best practices for fueling operations, maintenance procedures, and other safeguards. PHMSA also advised that it was working with industry to refine

[5] Safety Recommendation H-98-027

data on the wet line issue. While recognizing these increased activities, the NTSB advised PHMSA on September 4, 2008, that these actions still do not address the need to eliminate wet lines and that they do not satisfy the NTSB's 1998 recommendation.

On January 27, 2011, PHMSA published a NPRM that proposed to prohibit the transportation of flammable liquids in wet lines on cargo tank trucks unless the trucks are equipped with bottom damage protection. Under the proposed rulemaking, this prohibition would not be required for straight trucks or cargo tank trucks transporting combustible liquids. [6] The NTSB is in the process of commenting on the proposed rulemaking.

Loading and Unloading of Hazardous Materials from Railroad Tank Cars and Highway Cargo Tanks

The NTSB investigated eight accidents involving the loading or unloading of highway cargo tanks or railroad tank cars between June 1998 and August 2003. In these accidents, the NTSB found that DOT failed to establish and oversee compliance with adequate safety requirements for unloading hazardous materials. Also, the NTSB found inadequate inspection and maintenance of cargo transfer equipment.

In an NPRM issued on June 14, 2001, PHMSA stated that loading and unloading bulk liquid containers such as tank cars and highway cargo tanks generally were not transportation activities and, therefore, were not subject to the *Hazardous Materials Regulations*. The NPRM was strongly opposed by many carriers and shippers of hazardous materials who were concerned the NPRM, if implemented, would replace a national system of uniform and consistent regulations with differing regional standards established by local jurisdictions, the Environmental Protection Agency (EPA), and the Occupational Safety and Health Administration (OSHA).

The NTSB also strongly opposed the NPRM. In comments, the NTSB stated the NPRM would clearly reverse the statutory and regulatory definition for the transportation of hazardous materials as "the movement of property and loading, unloading, or storage incidental to that movement." Furthermore, the NTSB stated its belief that the DOT had both the statutory mandate and the authority to regulate loading and unloading operations. The NTSB also stated that the proposed rules "may result in the elimination of effective Federal oversight" of these operations and that "DOT should strengthen its oversight rather than ignore these issues." In the fall of 2002, OSHA notified the NTSB of its willingness to work with the DOT to review the adequacy of current requirements and to identify any gaps or inconsistencies that may exist and endanger the safety of workers. PHMSA published the final rules on October 30, 2003, with virtually no changes from the NPRM.

[6] Flammable liquids can easily catch fire under normal circumstances with the help of minimal ignition source. Flammable liquids have a flash point of 100^{o}F or less. Combustible liquids require more vigorous conditions to burn. Combustible liquids have a flashpoint above 100^{o}F.

In the fall of 2006, the PHMSA administrator reexamined the issue and directed PHMSA staff to establish a working group of government and industry representatives to develop recommended practices for loading and unloading of these bulk liquid tanks. On January 4, 2008, PHMSA published a notice requesting comments on the "proposed recommended practices" that had been developed. PHMSA stated in the notice that between 2004 and 2006, bulk loading and unloading operations accounted for 27 percent of all serious unintentional release accidents.

Although the 2008 proposed practices are comprehensive, the NTSB is still concerned that the practices would not be enforceable because they are not required. On March 11, 2011, PHMSA published a NPRM that proposes to amend the hazardous materials regulations to require motor carriers and facilities that engage in cargo tank loading and unloading operations to develop and implement safe operational procedures. Additionally, PHMSA is proposing additional training and qualifications for employees who engage in cargo tank loading and unloading operations. While the NTSB is in the process of reviewing and preparing our comments on this NPRM, it should be noted that the proposed rule only addresses loading and unloading of hazardous materials from highway cargo tanks and does not address railroad cargo tanks or other bulk containers. PHMSA has stated that they plan to address these types of containers through separate rulemakings.

Highway Cargo Tank Rollovers

Since its inception the Safety Board has been investigating rollovers involving cargo tank trucks. Shortly after the NTSB was formed, a team was launched in 1969 to investigate the rollover and fire involving a truck-tractor in combination with a cargo tank semi-trailer carrying 9,257 gallons of liquefied petroleum gas. At rest, the overturned cargo tank impeded the southbound lanes and shoulder of the New Jersey Turnpike and triggered a multiple fatal crash involving 29 vehicles.

Today, we are investigating another tank truck rollover that occurred in Indianapolis in 2009 involving the release and explosion of liquefied petroleum gas. The Indianapolis accident caused damage to the overpass, including separating a bridge pier, but luckily, did not result in any fatalities. However, tank truck rollover accidents often do produce fatalities. For example, although cargo tank vehicles represent only 6 percent of large trucks,[7] they account for 31 percent of all fatal truck rollover crashes.[8] One characteristic that makes cargo tank vehicles susceptible to rollover is the high center of gravity. According to a recent Battelle study, lowering the center of gravity of a cargo tank by three inches can reduce the incidence of rollovers by more than 10 percent.[9]

Another factor associated with cargo tank vehicle rollovers is some form of driver error which accounts for 78 percent of cargo tank rollovers.[10] Safety bulletins and training videos have been developed to educate and raise the awareness of cargo tank drivers,[11] but given that 66 percent

[7] Tank *Truck Drivers: This Sign's for You!*, Safety News, FMCSA, May 13, 2008
[8] *Vehicle Inventory and Use Survey*, 2002 Economic Census, United States Department of Commerce, December 2004
[9] *Cargo Tank Roll Stability Study*, Final Report, FMCSA, April 30, 2007
[10] *Tank Truck Drivers: This Sign's for You!*, Safety News, FMCSA, May 13, 2008
[11] *Anything other than Full or Empty*, On Guard, Office of Motor Carriers, FHWA, Vol. 23, No. 2, March 1995

of cargo tank rollovers involve drivers with more than 10 years of driving experience, it seems that training cannot prevent all rollovers.[12]

Factors that should be considered to prevent tank truck rollovers include:

1. The capability and limitations of electronic stability control systems;
2. The role of driver training and testing;
3. Roadway factors;
4. Protection of highway bridge piers from vehicle impacts;
5. Vehicle design changes for improving dynamic stability and rollover threshold; and
6. Crashworthiness standards for cargo tanks that transport high-risk hazardous materials.

Conclusion

Mr. Chairman, the NTSB has a long record of support for PTC, enhanced safety authority for the DOT, safe transportation of lithium batteries, eliminating wet lines, safe loading and unloading of hazardous materials from railroad tank cars and highway tank trucks, and reducing cargo tank truck rollovers. As you know, our mission is to promote safety, and I know that the implementation of our recommendations in these areas would promote and improve safety.

Thank you for the opportunity to testify before you today.

[12] *Tank Truck Drivers: This Sign's for You!*, Safety News, FMCSA, May 13, 2008