Testimony of Bob Chipkevich, Director
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National Transportation Safety Board
before the
U.S. House of Representatives
Committee on Transportation and Infrastructure
Subcommittee on Railroads
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Good morning Chairman LaTourette, Ranking Member Brown, and Members of the Subcommittee. My name is Bob Chipkevich. I am the Director of the National Transportation Safety Board's Office of Railroad, Pipeline and Hazardous Materials Investigations. The Safety Board's Acting Chairman, Mark Rosenker, asked me to represent the Board today to discuss current issues on the transportation of hazardous materials by railroad. The Chairman is unable to be here today because the Board has a previously scheduled Sunshine Act meeting to deliberate on the probable cause of a head-on collision between two BNSF Railway freight trains near Gunter, Texas, and that meeting is on-going at this time.

Following catastrophic railroad accidents in the 1970s, safety mandates, such as shelf couplers, head shields, and thermal protection, improved the performance of tank cars during derailments. Additional improvements have included enhanced accident protection for valves and fittings and requirements that specific hazardous materials, such as environmentally harmful substances, be transported in stronger tank cars.

However, despite these improvements, railroad accidents in the past five years, such as those in Minot, North Dakota; Macdona, Texas; and Graniteville, South Carolina have raised new concerns about the safety of transporting hazardous materials in railroad tank cars. The derailment of a Canadian Pacific Railway freight train near Minot, North Dakota, on January 18, 2002, resulted in the catastrophic failure of five tank cars. Each tank car held almost 30,000 gallons of anhydrous ammonia, a poisonous liquefied gas. The nearly instantaneous release of 146,700 gallons of anhydrous ammonia resulted in a toxic vapor plume that was approximately 300 feet thick and 5 miles long. An estimated 11,600 residents of Minot were affected by the toxic plume. One resident was fatally injured, 11 were seriously injured and 322 others sustained minor injuries. Damages and environmental clean-up activities exceeded $10 million dollars. Another 74,000 gallons of anhydrous ammonia were released from six additional damaged tank cars over a five-day period following the derailment.

On June 28, 2004, a westbound Union Pacific Railroad freight train struck an eastbound BNSF Railway freight train as the BNSF train entered a siding near Macdona, Texas. As a result of the collision, a tank car loaded with liquefied chlorine was derailed and punctured. The liquefied chlorine, which is poisonous-by-inhalation, escaped from the punctured tank car and immediately vaporized into a cloud of chlorine gas. The conductor from the Union Pacific train and two residents, who lived nearby, died as a result of chlorine gas inhalation.

The accident in Graniteville, South Carolina, occurred on January 6, 2005. A northbound Norfolk Southern Railway Company freight train, while traveling through Graniteville, encountered an improperly lined switch that diverted the train from the main track onto an industry siding, where it struck an unoccupied, parked train head-on. As a result of the collision, a tank car filled with liquefied chlorine was punctured, and a chlorine vapor cloud filled the area. Nine people died as a result of chlorine gas inhalation. Approximately 554 people complained of respiratory difficulties and were taken to local hospitals. Of these, 75 were admitted for treatment. An estimated 5,400 residents within a 1-mile radius of the accident site were evacuated for several days.

In the Minot accident investigation report, the Safety Board concluded that the low fracture toughness of the steels used for the tank shells of the five cars that catastrophically ruptured contributed to their complete fracture and separation. The Board issued four safety recommendations to the Federal Railroad Administration (FRA):

- Conduct a comprehensive analysis to determine the impact resistance of the steels in the shells of pressure tank cars constructed before 1989;

- Based on this analysis, rank the pre-1989 pressure tank cars according to risk and implement measures to eliminate or mitigate their risk;

- Validate the predictive model being developed to quantify the dynamic forces acting on railroad tank cars under accident conditions; and

- Develop and implement fracture toughness standards for steels and other materials of construction for pressure tank cars used to transport liquefied compressed gases.

We believe that the development of the predictive model and implementation of fracture toughness standards go hand-in-hand and will lead to tank car designs that can provide improved structural integrity and puncture resistance. The FRA has been responsive to these safety recommendations.

In the Graniteville accident investigation, the Safety Board again examined tank car crashworthiness issues. The Board found that the steel in the tank shell of the punctured chlorine car had a fracture toughness that was significantly greater than the fracture toughness of the ruptured tank cars in Minot. The higher fracture toughness in the Graniteville tank car contributed to the relatively quick arrest of the crack even though there was brittle fracture in its outer portions. Because of the improved properties of the steel and increased wall thickness, the Graniteville tank car was among the strongest tank cars currently in service. However, the Board concluded that, as shown in the Graniteville accident, even the strongest tank cars in service can be punctured in accidents that involve trains operating at moderate speeds.

The Safety Board believes that modeling accident forces and applying fracture toughness standards, as recommended in the Minot accident report, will improve the crashworthiness of tank cars. However, because of the time that it will take to design and construct improved tank cars, the Board believes that the most expedient and effective means to reduce the public risk

from the release of highly poisonous gases in train accidents is for railroads to implement operational measures that will minimize the vulnerability of tank cars transporting these products. Therefore, the Board recommended that the FRA:

- Require railroads to implement operating measures, such as positioning tank cars toward the rear of trains and reducing speeds through populated areas, to minimize impact forces from accidents and reduce the vulnerability of tank cars transporting chlorine, anhydrous ammonia, and other liquefied gases designated as poisonous by inhalation.

The Macdona accident investigation is nearing completion and staff expects to present a report to the Safety Board next month. Among other things, the Macdona report will examine FRA's progress toward implementation of the safety recommendations issued as a result of the Minot and Graniteville accident investigation reports.

Improvements in the design and construction of tank cars are needed. However, the tank car failures I have discussed today are the consequences of train derailments and train-to-train collisions. Therefore, reducing train derailments and collisions can also reduce the risk of catastrophic tank car failures.

During the past five years, the Safety Board has found that human performance failures have resulted in numerous railroad accidents that could have been prevented with a safety redundant system, such as positive train control. Examples of these failures include: missed train control signals, over-speed derailments, and the diversion of trains into industrial sidings because main line track switches were left in the wrong positions. A recommendation for a requirement for positive train control systems has been on the Safety Board's List of Most Wanted Transportation Safety Improvements since 1990.

Finally, Safety Board accident investigations have also found that inadequate track maintenance and inspections have been causal to several serious accidents, including the anhydrous ammonia accident in Minot, North Dakota and Amtrak derailments in Flora, Mississippi; Kensington, Maryland; Crescent City, Florida; and, Nodaway, Iowa. Currently there are 7 open safety recommendations to the FRA related to improving track safety. The Safety Board has recommended that the FRA:

- Require railroads to conduct inspections to identify cracks in rail joint bars, and to establish a program to periodically review data from those inspections;

- Require railroads to conduct ultrasonic or other appropriate inspections to ensure that rail used to replace defective segments of existing rail is free from internal defects; and

- Improve FRA track inspector procedures.

Any train derailment can be serious. When trains transporting hazardous materials derail, however, the consequences can quickly change from serious to catastrophic. Greater attention to

track inspections and maintenance, and positive train control by the railroads and the FRA can help reduce the potential for catastrophic failure of tank cars transporting hazardous materials.

Mr. Chairman, this completes my statement, and I will be happy to respond to questions at the appropriate time.