National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: May 22, 2008

In reply refer to: R-08-13

Honorable Carl T. Johnson
Administrator
Pipeline and Hazardous Materials Safety Administration
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About 10:41 p.m. eastern daylight time on Friday, October 20, 2006, Norfolk Southern Railway Company (NS) train 68QB119, en route from the Chicago, Illinois, area to Sewaren, New Jersey, derailed while crossing the Beaver River railroad bridge in New Brighton, Pennsylvania. The train consisted of a three-unit locomotive pulling 3 empty freight cars followed by 83 tank cars loaded with denatured ethanol, a flammable liquid. Twenty-three of the tank cars derailed near the east end of the bridge, with several of the cars falling into the Beaver River. Of the 23 derailed tank cars, about 20 released ethanol, which subsequently ignited and burned for about 48 hours. Some of the unburned ethanol liquid was released into the river and the surrounding soil. Homes and businesses within a seven-block area of New Brighton and in an area adjacent to the accident were evacuated for 2 days. No injuries or fatalities resulted from the accident. The NS estimated total damages to be $5.8 million.[1]

The National Transportation Safety Board determined that the probable cause of the derailment of Norfolk Southern Railway Company train 68QB119 was the Norfolk Southern Railway Company's inadequate rail inspection and maintenance program that resulted in a rail fracture from an undetected internal defect. Contributing to the accident were the Federal Railroad Administration's inadequate oversight of the internal rail inspection process and its insufficient requirements for internal rail inspection.

Twenty-three placarded ethanol tank cars derailed, starting with the 23rd car behind the locomotive units. The 3 locomotives, the first 22 cars (3 empty buffer cars and 19 placarded tank cars), and the last 41 cars (all placarded tank cars) did not derail. Because the first derailed tank car was the 23rd car behind the locomotive units, the train crew was not endangered by the ethanol that was released from the derailed tank cars. Therefore, the placement of the ethanol tank cars in the accident train was not a factor with respect to crew protection in the accident. However, because the accident train was a unit train transporting hazardous materials, questions

[1] For additional information, see <http://www.ntsb.gov/publictn/2008/RAR0802.pdf>. National Transportation Safety Board, *Derailment of Norfolk Southern Railway Company Train 68QB119 with Release of Hazardous Materials and Fire, New Brighton, Pennsylvania, October 20, 2006*, Railroad Accident Report NTSB RAR-08/02 (Washington, DC: NTSB, 2008).

were raised on scene about the number of buffer cars needed to separate train crews from the hazardous materials on unit trains.

Regulations governing the placement of hazardous material cars in trains for crew protection are contained in 49 *Code of Federal Regulations* (CFR) 174.85. The regulations specify that, "when the length of the train permits," a hazardous materials car must be no closer than the sixth car from the locomotive. However, when the length of the train (meaning the number of available buffer cars in the train) does not allow a five-car buffer, trains may move with only a single buffer car. Buffer car regulations were initially developed to address the risks of transporting explosives, which needed to be isolated from ignition sources and from the train crew.

When the basic provisions of 49 CFR 174.85 were developed in the early 1900s, main-line freight trains consisted mostly of a mix of hazardous materials and non-hazardous materials freight cars. As is still the case today, main line trains traveled from one yard to the next (sometimes picking up or dropping off cars along the way), where they were broken down and reassembled into other trains, or where cars were interchanged with other carriers. While the intent of 49 CFR 174.85 was clearly to mandate a minimum five-car buffer on all main-line trains, the regulation made allowances for short trains moving small numbers of cars during switching operations at or between yards. This was the basis for the allowance of a one-car minimum buffer.

Although unit trains transporting nonhazardous commodities such as coal and grain have existed for many years, 49 CFR 174.85 does not address unit trains transporting tank cars or other freight cars containing a single hazardous materials commodity. The Federal Railroad Administration (FRA), the Pipeline and Hazardous Materials Safety Administration (PHMSA), and the railroads have recognized that buffer cars should be required on unit trains transporting hazardous materials to comply with the intent of 49 CFR 174.85. Because a unit train does not permit the repositioning of cars in the train to provide the five-car buffer (because all the loaded cars contain hazardous materials), the FRA, PHMSA, and the railroads have interpreted the regulation to mean that a one-car buffer is applicable to unit trains transporting hazardous materials. This can result in the contradictory circumstance in which a train of mixed freight cars with a single hazardous materials car must have a five-car buffer and a unit train consisting of all hazardous materials cars may travel across the country with a one-car buffer.

The Safety Board recognizes that the five-car buffer standard was not based upon any rigorous engineering safety analysis, but since the 1920s it has become accepted by regulators and railroads as a proven and effective standard. Although the five-car buffer standard is considered to have been validated over many years, the one-car buffer standard for unit trains does not have as lengthy a historical record and may not be sufficiently validated by historical data.

The Safety Board therefore concludes that without sufficient validation of the one-car buffer standard, the current regulations for the separation of hazardous materials cars from locomotives and their interpretation by the FRA, PHMSA, and the railroads create different levels of safety for crew protection from hazardous materials on unit trains and general freight trains.

The FRA has indicated that the one-car minimum buffer is justified and has concerns regarding regulations that will increase the switching movement for cars of hazardous materials. But unit trains typically involve switching only at the origin and at the final destination. Consequently, adding a specified number of buffer cars to a train at the originating yard generally should not entail additional switching of the hazardous materials cars and therefore would not cause increased risks. Rather, the additional separation could provide greater protection to train crews in the event of an accident.

Unit trains that carry hazardous materials present a special risk because of the high concentration of hazardous materials. Therefore, the National Transportation Safety Board makes the following recommendation to the Pipeline and Hazardous Materials Safety Administration:

> With the assistance of the Federal Railroad Administration, 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. (R-08-13)

The Safety Board also issued safety recommendations to the Federal Railroad Administration and the Norfolk Southern Railway Company.

In response to the recommendation in this letter, please refer to Safety Recommendation R-08-13. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our Tumbleweed secure mailbox procedures. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Chairman ROSENKER, Vice Chairman SUMWALT, and Members HERSMAN, HIGGINS, and CHEALANDER concurred in these recommendations.

[*Original Signed*]

By: Mark V. Rosenker
Chairman