



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Log I-104

Date: March 2, 1995

In reply refer to: I-95-1

Honorable Gene Roberts
Mayor
City of Chattanooga
11th and Lindsay Streets
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On June 6, 1994, a conductor for the Norfolk Southern Railway Company detected product leaking from the bottom of tank car UTLX 79211 in the Norfolk Southern Harry deButts yard in Chattanooga, Tennessee. The tank car contained 12,184 gallons of a 75-percent concentration of arsenic acid, which is classified as a poisonous material and also designated as a marine pollutant under the Department of Transportation (DOT) Hazardous Materials Regulations.

A total of 3,079 gallons of arsenic acid was released from UTLX 79211. An undetermined amount of the arsenic acid entered the storm drain system for the yard. Although the sluice gate for the storm drain system was closed, arsenic-contaminated water from the storm drain system was discharged into Citico Creek about 1 1/2 miles upstream of the mouth of the creek into the Tennessee River. The intake pipes for the city's municipal water supply cross the mouth of the creek and extend about 175 feet into the Tennessee River. Cleanup, containment, and disposal costs were estimated at \$8.77 million as of January 31, 1995. There was no evacuation, and no injuries were attributed to the release.¹

The tank car involved in the release of arsenic acid was tank car UTLX 79211, a DOT specification 111A100W1 tank car, built by the Union Tank Car Company (Union) in March 1966. Because of the jacket and insulation covering the tank shell of UTLX 79211, Norfolk Southern personnel at the deButts yard were unable to

¹ National Transportation Safety Board. 1995. Tank car failure and release of arsenic acid in Chattanooga, Tennessee, on June 6, 1994. Hazardous Materials Accident Report NTSB/HZM-95/01. Washington, DC.

determine the precise location of the leak from UTLX 79211 and assumed the leak was coming from multiple locations. Although the leak was not from multiple locations, the trainmaster correctly concluded by 0330 that the leak could not be stopped without offloading the tank car. The trainmaster also correctly recognized that the tank car, if left in its current location, would not be accessible to emergency responders and the equipment and vehicles that were needed to contain the spill and offload the tank car. Therefore, the trainmaster directed the yardcrew to move the tank car to a location that would be more accessible to emergency responders.

The trainmaster was aware that storm drains were located throughout the yard; however, many of these drains were covered with ballast and were not visible. The movement of UTLX 79211 was also made in darkness. Under these circumstances, the placement of the tank car near the storm drain was unfortunate but was not due to carelessness. However, the placement of UTLX 79211 near a storm drain could have been avoided if there had been designated containment tracks or areas within the yard for leaking tank cars. A 1988 tank car spill in the deButts yard that resulted in a discharge into Citico Creek and revealed that the sealing capabilities of the sluice gate system were inadequate should have sensitized the railroad to the need for a containment area within the yard. Consequently, the Safety Board concludes that Norfolk Southern failed to adequately anticipate and plan for the best location within the deButts yard to place a leaking tank car. Yard facilities should include designated areas where cars that develop leaks that cannot be readily stopped may be placed to contain the leaking cargo and to provide access for offloading operations. The need for containment areas is especially important when leaking cargoes are environmentally harmful and nearby water supplies can be threatened. The Safety Board, therefore, is recommending that Norfolk Southern identify and designate within the deButts yard, and its other rail yards that handle tank cars carrying hazardous materials, areas where leaking tank cars can be placed to contain the leaking cargo and to provide access for offloading operations.

Although the trainmaster was aware of the hazards of the arsenic acid as a poison and as a designated marine pollutant by 0330 on June 6, he did not view the incident as a major leak (for poison liquids, corrosives, and non-flammable gases). However, the leak was beyond the capabilities of yard personnel to manage, and the leaking arsenic acid posed an environmental threat. Norfolk Southern's definition of a major leak from a tank car is based solely on the subjective description of the leak as a steady continuous stream or heavy gas and does not take into account equally important considerations such as the location of the leak on the tank car, its accessibility, whether the leak can be readily stopped, and the potential threats to the environment or long-term public health, including contamination of water supplies. For jacketed and insulated tank cars such as UTLX 79211, the bottom shell and sump areas are not readily visible and accessible. Because the trainmaster did not perceive the leak of arsenic acid from UTLX 79211 to constitute a major leak as defined in the emergency plans, the trainmaster did not have a sense of urgency to directly notify the Chattanooga fire department that he would have had if he believed

the leak from UTLX 79211 was a major leak. Because the notification procedures are prompted by the definition of a major leak that fails to consider any of the factors previously described, the existing definition for a major leak is not adequate to provide meaningful guidance to Norfolk Southern employees to assess the need to directly notify local emergency responders. Therefore, the Safety Board is recommending that *Norfolk Southern* revise the definition for a major leak to include these other equally important considerations.

Although Norfolk Southern knew at 0340 (when the trainmaster made his report to the dispatcher) that the arsenic acid posed an environmental threat and that the leak could not be stopped or contained by yard personnel, Norfolk Southern did not attempt to contact an environmental contractor until 0630. The delay in contacting an environmental contractor, particularly one not in the Chattanooga area and therefore unable to respond to the scene for several hours, indicates that Norfolk Southern did not recognize the seriousness of the environmental threat or appreciate the measures that would have to be taken to clean up the released arsenic acid. Further, although a local contractor was subsequently contacted by Norfolk Southern and obtained the lime, rolls of plastic, absorbent materials, and a child's swimming pool for a catch basin, these actions were taken nearly 5 hours after the leak was first detected. Once these materials were obtained, there was virtually no effort by the fire department or Norfolk Southern to use these materials until the arrival of shipper and environmental contractor personnel between 1100 and 1300.

The incident commander recognized that the fire department had no way to contain the leaking acid and that offloading of the tank car was the only solution to stop the release. Further, he did not believe that the benefit from limited containment actions—such as placing a drum beneath the tank car—were worth the risk to the personnel performing the work. He also did not believe that there was a safe means readily available to handle the drums once they became filled with leaking cargo. More importantly, the incident commander, knowing that the acid had already entered the storm drain system, believed that the storm drain system was isolated, and that additional acid spilling into the storm drain system would not adversely affect the situation.

These actions collectively demonstrate that Norfolk Southern and the Chattanooga fire department failed to adequately recognize the potential environmental consequences of not responding more expeditiously to the release. Had Norfolk Southern or the fire department recognized the environmental consequences, they may have been prompted to take more aggressive action to contain the leaking cargo rather than waiting until the arrival of shipper and environmental contractor personnel. Therefore, the Safety Board believes that the actions of Norfolk Southern and the fire department would have been more timely and efficient had Norfolk Southern's definition of a major leak included leaks that had the potential to damage the environment and had Norfolk Southern identified containment areas in the deButts yard.

The circumstances of this accident also raise concerns about the lack of joint training and coordination between the city of Chattanooga and Norfolk Southern. Exercises or drills have not been regularly conducted between the fire department and the deButts yard to assess the effectiveness of their respective emergency action plans. The in-service calls made annually by the fire department to the yard only familiarize firefighters with the physical layout of the yard. Prior to the accident, there had not been any type of regular exchange between the fire department and the deButts yard to discuss the types of hazardous materials releases that could occur at the yard, the consequences of such a release, and the actions each could be expected to take in such an accident. If effective emergency response exercises between the city and Norfolk Southern had been conducted and the other improvements addressed above been in place, a more timely response with sufficient resources to contain the leaking cargo would likely have been initiated.

The Safety Board most recently addressed these issues in a 1991 safety study on the transport of hazardous materials by rail.² The Board concluded in this study that many railroads and community emergency response organizations have not jointly developed written emergency response plans and procedures and have not regularly participated with community emergency response organizations in joint disaster drills of simulated emergencies.

Consequently, the Safety Board recommended on July 1, 1991, that all class I railroads and railroad systems, including Norfolk Southern:

Develop, implement, and keep current, in coordination with communities adjacent to your railroad yards and along your hazardous materials routes, written emergency response plans and procedures for handling releases of hazardous materials. The procedures should address, at a minimum, key railroad personnel and means of contact, procedures to identify the hazardous materials being transported, identification of resources for technical assistance that may be needed during the response effort, procedures for coordination of activities between railroad emergency response personnel, and the conduct of disaster drills or other appropriate methods to test emergency response plans. (R-91-15)

In its initial response to the recommendation, dated July 30, 1991, Norfolk Southern indicated that it had developed an emergency action plan for hazardous materials incidents that was available at all yard facilities and on file with certain company officials. Norfolk Southern also advised the Safety Board that it maintained separate yard plans that included information about hazardous materials passing through the yard, emergency response telephone numbers for local hospitals, the police department, and the fire department. On November 1, 1991, Norfolk Southern

² National Transportation Safety Board. 1991. Transport of hazardous materials by rail. Safety Study NTSB/SS-91/01. Washington, DC.

provided additional information about its efforts to coordinate with communities along its rail lines. The company indicated that it intended to share copies of the individual yard plans and the emergency action plan with local communities. Norfolk Southern also described training provided to local emergency response personnel, and the participation of Norfolk Southern officials on local emergency planning committees. Based on these responses, the Safety Board classified Safety Recommendation R-91-15 to Norfolk Southern "Closed--Acceptable Action" on December 17, 1991.

The circumstances of this accident suggest that additional efforts are needed to improve Norfolk Southern's response when environmentally harmful materials are involved in accidents. The Safety Board is recommending, therefore, that Norfolk Southern initiate and participate in emergency response drills and exercises with local emergency response agencies at all rail yards within its operating system. The Safety Board believes that the city of Chattanooga and Hamilton County, the local jurisdictions with responsibility for coordinating emergency response efforts, also should coordinate with and involve regional and local transporters of hazardous materials, such as railroads and trucking companies, in planned emergency response drills and exercises.

Therefore, as a result of its investigation of this accident, the National Transportation Safety Board recommends that the city of Chattanooga and Hamilton County Emergency Services:


Coordinate with and involve regional and local transporters of hazardous materials, such as railroads and trucking companies, in planned emergency response drills and exercises. (Class II, Priority Action) (I-95-1)

Also as a result of this accident investigation, the Safety Board issued safety recommendations to the Federal Railroad Administration, the Research and Special Programs Administration, the Union Tank Car Company, the Association of American Railroads, the Norfolk Southern Corporation, the Hickson Corporation, and the Railway Progress Institute.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation I-95-1 in your reply.

Chairman HALL, Vice Chairman FRANCIS, and Member HAMMERSCHMIDT concurred in this recommendation.

By:



Jim Hall
Chairman