



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 27, 2006

(Corrected Recommendation Number¹)

In reply refer to: R-06-23

Mr. James R. Young
President and Chief Executive Officer
Union Pacific Corporation
1400 Douglas Street
Omaha, Nebraska 68179

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

The recommendation addresses the Union Pacific Railroad (UP) practices related to notification of and coordination with local emergency responders in accidents involving the release of hazardous materials. The recommendation is derived from the Safety Board's investigation of the October 15, 2005, collision of two UP freight trains at UP's Texarkana rail yard,² and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has issued four recommendations, one of which is addressed to the UP. Information supporting the recommendation is provided below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

The Accident

At 4:56 a.m. on October 15, 2005, westbound UP train ZYCLD 13³ collided with the rear of standing UP train MPBHG 15 in the UP rail yard in Texarkana, Arkansas. The collision resulted in the puncture of a railroad tank car containing propylene, a compressed flammable

¹ This letter supercedes the letter dated October 26, 2006. Only the recommendation number has been changed; no text has been changed.

² For additional information, see National Transportation Safety Board, *Collision of Two Union Pacific Railroad Freight Trains in Texarkana, Arkansas, October 15, 2005*, Railroad Accident Brief NTSB/RAB-06/04 (Washington, DC: NTSB, 2006).

³ Each train will be identified by the letters in its identifier without the number.

gas.⁴ The propylene was heavier than air and flowed near the ground into a nearby neighborhood. The flowing gas reached a house where an unknown ignition source ignited the gas, and the house exploded. The single occupant was killed. The fire moved quickly along the flowing gas back to the punctured tank car. A second, unoccupied, home was destroyed in the fire, and a wooden railroad trestle burned completely. Approximately 3,000 residents within a 1-mile radius of the punctured tank car were advised to evacuate the area. The two crews and the employees working at the Texarkana yard were not injured, and they evacuated the area safely.

The National Transportation Safety Board determined that the probable cause of the October 15, 2005, collision of Union Pacific Railroad train ZYCLD 13 with Union Pacific Railroad train MPBHG 15 in Texarkana, Arkansas, was the failure of the crew of train ZYCLD 13 to remain attentive and alert and thereby able to stop short of an observable standing train. Contributing to the severity of the accident was the puncture of a tank car during the collision, which resulted in the release of propylene and a fire.

Emergency Response

When train ZYCLD struck the rear car of train MPBHG, the forces of the striking train derailed the rear three cars of train MPBHG, but the cars remained upright. Then the forces were transmitted through the next 12 cars without derailing them. The 18th car was forced out of the train completely, and the 17th car continued forward until it struck the end of the 19th car (tank car TIMX 33429) and punctured the head of the tank car with its uncoupled coupler. The tank car was loaded with liquefied propylene gas, and immediately after it was punctured, about half of its propylene load was released. The propylene did not ignite immediately, however. Eyewitnesses said that after the collision they saw fog-like conditions near the track, and a local law enforcement officer stated that he saw the fog-like substance reach a local residence, which then exploded. The ignition and explosion of the propylene and the subsequent fire, the explosion of a home, and the fatal injuries to the occupant occurred at 5:08 a.m., about 12 minutes after the first reports of chemical odors came in to the Texarkana 911 communications center.

Although the Texarkana fire and police departments responded immediately, and the UP yardmaster attempted to assess the condition of the two trains, several adverse conditions, such as darkness and the restricted visibility of the accident scene from the yard tower, hampered the efforts of the emergency responders and the UP to immediately assess the accident. The possibility that flammable propylene had been released was not discussed until the first communication between the yardmaster and the 911 dispatcher, which occurred at 5:04 a.m., 8 minutes after the accident and 4 minutes before the propylene ignited and exploded. Consequently, the UP and Texarkana emergency responders did not have sufficient time to assess the scope of the accident in order to implement measures that might have averted the ignition and explosion of the propylene.

⁴ Propylene is regulated under the U.S. Department of Transportation's hazardous materials regulations, 49 *Code of Federal Regulations* 173.115, as a Division 2.1 flammable gas, which is defined as any material which is a gas at 68° F or less and 14.7 pounds per square inch, gauge, of pressure and has a flammable range of at least 12 percent.

Local, county, and State law enforcement and emergency management agencies responded and provided support. Following their arrival about 10:30 a.m., UP contractors deployed air monitoring equipment, conducted a detailed assessment of the damaged tank cars, and developed a plan for removing the damaged tank cars. All of these actions contributed to the conclusion of the emergency about 19 hours after the accident. Although many of the emergency response actions worked well, with positive results, there were fundamental problems with notification, communication, and coordination on the part of the UP during the initial hours following the accident. The lack of coordination between the UP and Texarkana prompted the Safety Board to look at emergency planning and preparedness efforts of the UP and the city of Texarkana. Although the city had a copy of the 1997 systemwide UP emergency plan, it did not have the most current UP emergency plan. In addition, the UP did not have a copy of Texarkana's response plan for hazardous materials incidents. Regarding emergency planning, joint drills and exercises, including tabletop exercises, between the city and the UP had not been conducted for several years before the accident. Consequently, Texarkana and the UP were ill-prepared to effectively respond to the accident. Specifically, the Safety Board considers the following actions taken by UP personnel during the initial hours of the emergency response to be deficient:

- The yardmaster—the senior UP employee in the yard—failed to notify the city about the accident. The yardmaster's first conversation with the 911 dispatcher occurred 8 minutes after the 911 dispatch center began receiving reports from residents about chemical odors.
- The yardmaster failed to provide the 911 dispatcher with a complete list of the cars in train MPBHG that contained hazardous materials. When the yardmaster was told about reports of chemical odors during his initial conversation with the 911 dispatcher, the yardmaster mentioned one tank car loaded with propylene. Although the yardmaster was unable to confirm any car damage or release of hazardous materials at that time, he could have identified from the available consist for train MPBHG the seven tank cars loaded with propylene and other cars containing hazardous materials on the train. He also did not offer to obtain this information and provide it to the 911 dispatcher or incident commander.
- After the evacuation of the Texarkana yard, no UP employees remained in the yard to respond to telephone inquiries, and no UP employee was assigned to check in at the command post to coordinate with and provide information to the incident commander as needed.
- Lack of coordination between the manager of rail operations and the fire department resulted in unnecessary duplication of effort in conducting a damage assessment. After the manager of rail operations arrived at the yard, about 5:20 a.m., he conducted a damage assessment of the accident trains. When he completed the assessment, before 6:40 a.m., he gave this information to UP headquarters in Omaha, Nebraska. He did not, however, give the same information to the incident commander. As a result, the fire department had to conduct its own damage survey, starting about 7:30 a.m.

These events throughout the first several hours of the emergency demonstrate that the failure of local UP officials to provide and share critical information in a timely manner, to maintain communications, and to coordinate with the incident commander delayed the completion of a proper threat assessment and the implementation of an effective response. A coordinated response involving the UP and the local emergency responders did not occur until the arrival of UP contractors, about 10:30 a.m.

The Safety Board over many years has advocated and recommended structured planning and coordination between railroads and communities to minimize the danger and damage posed by hazardous materials released in a rail accident. In a 1985 special investigation report on rail yard safety,⁵ the Safety Board reviewed the status of emergency preparedness for handling releases of hazardous materials in rail yards and addressed the need for coordinated emergency response planning between communities and railroads. Based on its investigation, on June 6, 1986, the Board issued the following safety recommendation to all railroads that operate railroad yards:

R-85-53

In coordination with communities adjacent to your railroad yards, develop and implement emergency planning and response procedures for handling releases of hazardous materials. These procedures should address, at a minimum, initial notification procedures, response actions for the safe handling of releases of the various types of hazardous materials transported, identification of key contact personnel, conduct of emergency drills and exercises, and identification of the resources to be provided and the actions to be taken by the railroad and the community.

The UP did not respond to Safety Recommendation R-85-53, and as a result the recommendation was classified “Closed—Unacceptable Action—No Response Received/ Superceded” by the Board in its 1991 safety study on the transport of hazardous materials by rail.⁶ In the 1991 safety study, the Board concluded that many railroads and community emergency response organizations had not jointly developed written emergency response plans and procedures and had not regularly participated in joint disaster drills of simulated emergencies. The Board also concluded that railroad employee training, when limited primarily to rules examinations based on classroom instruction, had not adequately prepared railroad employees to handle an accident or incident involving hazardous materials. Consequently, the Board recommended on July 1, 1991, that all Class I railroads and railroad systems, including the UP:

⁵ National Transportation Safety Board, *Hazardous Material Yard Safety – Hazardous Materials and Emergency Preparedness, April 30, 1985*, Special Investigation Report NTSB/SIR-85/02 (Washington, DC: NTSB, 1985).

⁶ National Transportation Safety Board, *Transport of Hazardous Materials by Rail, Safety Study NTSB/SS-91/01* (Washington, DC: NTSB, 1991).

R-91-15

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 release 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 and emergency response personnel, and the conduct of disaster drills or other appropriate methods to test emergency response plans.

R-91-16

Establish, for employees responsible for the safe transport of hazardous materials (such as traincrews and first-line supervisors), methods to evaluate (a) the employee's level of knowledge of emergency procedures, and (b) the employee's ability to apply such knowledge in an actual emergency. Evaluations of employees could be performed during efficiency checks, disaster drills, or simulated emergencies.

In its initial response to Safety Recommendations R-91-15 and -16 dated July 30, 1991, the UP indicated that it had developed emergency action plans for all hazardous materials incidents involving mainlines, rail yards, and terminals. The UP also advised the Safety Board that it maintained separate yard plans that included information about notification of key railroad personnel, identification of hazardous materials, and the conduct of emergency drills with local communities. The UP also described training provided to local emergency response personnel and the participation of UP officials on local emergency planning committees. On August 28, 1997, the UP provided additional information about its mainline emergency plan (1987–1993) and separate yard plans with a list of drills and emergency exercises conducted with local communities since 1993. Based on these responses, the Board classified Safety Recommendations R-91-15 and -16 to the UP “Closed—Acceptable Action” on January 21, 1998.

The circumstances of the accident in Texarkana suggest that the UP systemwide plan and local emergency plan were comprehensive, but they were not executed by either yard or train crew personnel. The delay in providing critical information and the subsequent delay in completing a proper threat assessment indicate that additional efforts are needed to improve the UP's response to yard accidents involving hazardous materials. Training and testing on company emergency response plans and participation in drills and exercises, particularly with local emergency responders, have been shown to provide employees with the necessary knowledge and understanding. Postaccident critiques, evaluations of drills and exercises, and dissemination of lessons learned are measures that can help to ensure that emergency response procedures are executed.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Union Pacific Railroad:

Implement measures to ensure that all of your field personnel understand and comply with your procedures for responding to hazardous materials incidents, with particular emphasis on timely notifications and appropriate coordination with local emergency responders. (R-06-23)

The Safety Board also issued one recommendation to the city of Texarkana, one to the International Association of Fire Chiefs, and one to the Association of American Railroads and the American Short Line and Regional Railroad Association. In your response to the recommendation in this letter, please refer to Safety Recommendation R-06-23. If you need additional information, you may call (202) 314-6177.

Chairman ROSENKER, Vice Chairman SUMWALT, and Members HERSMAN and HIGGINS concurred in this recommendation.

[Original Signed]

By: Mark V. Rosenker
Chairman