



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: June 29, 2006

In reply refer to: R-06-11 and -12

Mr. Matthew K. Rose
Chairman, President and Chief Executive Officer
BNSF Railway Company
P.O. Box 961052
Fort Worth, Texas 76161-0052

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 recommendations in this letter. The Safety Board is vitally interested in these recommendations because they are designed to prevent accidents and save lives.

These recommendations address the issuance of track warrant authority that contains an after-arrival stipulation and the informal communication of proposed meeting locations for trains in non-signaled territory. The recommendations are derived from the Safety Board's investigation of the May 19, 2004, collision between two BNSF Railway Company (BNSF) freight trains near Gunter, Texas, and are consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Board has issued four safety recommendations, two of which are addressed to the BNSF. Information supporting these recommendations is discussed below. The Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendations.¹

About 5:46 p.m., central daylight time, on May 19, 2004, two BNSF freight trains collided head on near Gunter, Texas. The southbound train, BNSF 6789 South, was traveling about 37 mph, and the northbound train, BNSF 6351 North, was traveling about 40 mph when the collision occurred. The trains were being operated under track warrant control rules on non-signaled single track. The collision resulted in the derailment of 5 locomotives and 28 cars. About 3,000 gallons of diesel fuel were released from the locomotives and resulted in a fire. The southbound train engineer was killed, and the southbound train conductor was airlifted to a hospital in Dallas with serious burns. The crewmembers on the northbound train were transported to a local hospital, where they were admitted. Estimated property damages exceeded \$2 million.

¹ For additional information, see National Transportation Safety Board, *Collision Between Two BNSF Railway Company Freight Trains Near Gunter, Texas, May 19, 2004*, Railroad Accident Report NTSB/RAR-06/02 (Washington, DC: NTSB, 2006).

The National Transportation Safety Board determined that the probable cause of the May 19, 2004, collision near Gunter, Texas, was the southbound train (BNSF 6789 South) crew's failure to adhere to an after-arrival track warrant requiring them to stay at Dorchester until the northbound train (BNSF 6351 North) arrived. Contributing to the accident was the BNSF's use of after-arrival track warrant authority in non-signaled territory, and the Federal Railroad Administration's (FRA's) failure to prohibit the use of such authority. Also contributing to the accident was the train dispatcher's informal communications regarding planned train meeting locations.

In the hours leading up to the accident, there were two types of communication between the dispatcher and the BNSF 6789 South crew. Communications transmitting mandatory directives (track warrant authorities) consisted of a formal process in which trains were referred to by their operational identification (for example, BNSF 6789 South), and an accurate read back was required to confirm the directives. Other communications between the dispatcher and the BNSF 6789 South crew were more informal as the dispatcher discussed future train movements and meeting points. Trains were referred to by various nicknames; sometimes several different nicknames were used for the same train.

Safety Board investigators listened to audio recordings of the radio transmissions between the dispatcher and the BNSF 6789 South crew when the after-arrival track warrant was issued. The dispatcher transmitted the track warrant word for word as entered into the dispatch center computer. The BNSF 6789 South engineer² repeated the track warrant incorrectly, adding a box 1³ entry that the dispatcher had not stated. The dispatcher caught the error, and the engineer acknowledged that there was no box 1 instruction on the track warrant. The rest of the text read back by the BNSF 6789 South crew was correct, including the repetition of the after-arrival stipulation.

The track warrant form recovered from the BNSF 6789 South wreckage had a number of incorrect entries. Box 1 was checked, then blacked out, and "3593" was entered on the box 1 line, reflecting the error that was made and corrected during the read back. Boxes 2, 7, and 20 were marked with an "X." The box 2 line had several words crossed out in the "Proceed from" space, and the entry was not legible. The entry in the box 7 line read, "B6351 North South SS Dorchester." The line 20 box was marked with an "X," and no switch was listed. Box 21 (permission to leave a switch in reverse) was checked, and "SSS DOR" was entered on that line.

The BNSF 6789 South crew was informed on four separate occasions that they would meet a single train at Dorchester. During the last two occasions, they were also informed that they would be traveling beyond Dorchester to meet a second train. When the plan changed, the dispatcher asked the BNSF 6789 South crew if they could fit between siding switches at Dorchester. He asked this question to ensure that BNSF 6789 South could clear the switches without blocking a road crossing. However, the dispatcher did not explain that he was changing the original plan and that BNSF 6789 South would then meet a second train at Dorchester.

² The dispatcher said that he recognized the engineer's voice after listening to the recorded communications.

³ *Box 1* is used when a previously issued track warrant is made void.

The Safety Board recognizes that some informal communication may be useful (for example, to avoid blocked crossings, to keep trains moving on heavy grades, or to pace trains for fuel conservation). However, such informal communication can establish expectations that may not be resolved when plans change and a mandatory directive is issued, as likely occurred in this accident. The use of train nicknames can add further confusion. On two occasions, the dispatcher first referred to BNSF 2917 North as the Sherman Rock Train or the Rock Train before correcting himself. (BNSF 6351 North—the train overlooked by the BNSF 6789 South crew—was the Sherman Rock Train, and the majority of trains on the Madill Subdivision carried rock cars.) Therefore, the Safety Board concluded that had the dispatcher consistently referred to all of the trains by their engine numbers—the identification mechanism required in mandatory directives—it would have reinforced the need to verify engine numbers when the trains met.

In the very last radio communication that followed the dispatcher's OK on the after-arrival track warrant issued to BNSF 6789 South at Dorchester, the BNSF 6789 South crew reported the south siding switch at Dorchester as restored to normal.⁴ The dispatcher replied: "I can't show it normal because that Rock Train, the Sherman Switcher's got a box 7 on you." This was potentially confusing because the dispatcher used two names to describe the northbound train; and while the Sherman Switcher (BNSF 2917 North) did have a box 7 track warrant naming BNSF 6789 South, that track warrant authorized movement from the Dorchester north siding switch, not the south siding switch. The other train name the dispatcher used, the Rock Train (BNSF 6351 North, the train that never reached Dorchester), did not have a box 7 marked on its track warrant. However, BNSF 6351 North did have a box 21 marked, allowing it to leave the south siding switch at Dorchester in reverse position when it entered the siding. The BNSF 6789 South crew had been issued a track warrant with box 20 checked, advising them to be prepared to stop at that switch if it was aligned for the siding after they met BNSF 6351 North. If the BNSF 6789 South crew believed that they had met BNSF 6351 North at Dorchester, it was appropriate for them to report the switch as normal.

Another factor that may have resulted in confusion involved BNSF 2917 North reporting clear of its track warrant authority and, therefore, not being listed on any of the track warrants issued to BNSF 6789 South. BNSF 6789 South crewmembers were told (on four occasions) that they would meet one train at Dorchester. They received an after-arrival track warrant requiring them to meet one train at Dorchester, and they did pass one train at Dorchester. However, it was not the train listed on the after-arrival track warrant they were issued.

The after-arrival portion of the track warrant was transmitted and read back correctly, and the BNSF 6789 South crew should have waited at Dorchester. However, the BNSF 6789 South crewmembers were never specifically advised of the dispatcher's change in plans. Train dispatchers should be acutely aware of how informal communications can create expectations that do not always correspond with the dispatchers' intentions. The dispatcher involved in this accident might have further reinforced incorrect expectations by frequently using the phrase "here we go"⁵ as a closing salutation, when after his last communication it was necessary for

⁴ *Normal* is aligned for movement on the main track, as opposed to reverse, which is aligned for a movement into or out of the siding.

⁵ A review of dispatcher communication transcripts between 3:11 p.m. and the time of the collision showed that the dispatcher ended his conversations with BNSF 6789 South with "here we go" on six occasions.

BNSF 6789 South to remain in place. Therefore, the Safety Board concluded that informal communications between the dispatcher and train crews regarding authority limits, train names, and meeting or stopping points may lead to misunderstandings and errors.

As illustrated by the May 19, 2004, accident near Gunter, Texas, it is apparent that non-signaled (dark) territory presents a unique problem for rail safety. In dark territory there are no signals to warn trains as they approach each other, and the avoidance of collisions relies solely on dispatchers and train crews adhering to operating procedures. Issuing after-arrival track warrants under these conditions only exacerbates an already potentially tenuous and contingent work situation. While the railroad industry contends that after-arrival track warrants facilitate the expedient and efficient movement of trains and reduce the amount of wasted resources, and the FRA sees merit in the industry's logic,⁶ ultimately, the role of human error and the cost of human casualties also must be considered in this equation. The FRA acknowledges that "until positive train control can be fully achieved, we need to take those steps that will decrease the risk of collisions that may occur as a result of employee error."⁷ Yet, the FRA has not taken the proactive steps to address this issue as the Safety Board has recommended.

The Safety Board has investigated a number of accidents involving track warrants in non-signaled territory. In 1996, in Smithfield, West Virginia,⁸ the Board investigated a head-on collision between two CSX Transportation freight trains. CSX Transportation subsequently discontinued the use of after-arrival authorities in non-signaled territory. In 1997, the Board investigated a collision between two Union Pacific Railroad freight trains in Devine, Texas.⁹ As a result of the Devine investigation, the Board issued Safety Recommendation R-98-27, which advised the FRA to permanently discontinue the use of after-arrival orders in non-signaled territory. Safety Recommendation R-98-27 was classified "Closed—Unacceptable Action" on June 29, 1999.

In 2002, the Safety Board investigated a collision between two BNSF trains in Clarendon, Texas.¹⁰ In its accident report, the Board issued Safety Recommendation R-03-2, which advised the FRA to limit the use of after-arrival orders in non-signaled territory to trains that have stopped at the location at which they will meet the opposing train. Safety Recommendation R-03-2 was classified "Closed—Unacceptable Action" on August 6, 2004. In Safety Recommendation R-03-3, the Board also recommended that the General Code of Operating Rules Committee add language to its track warrant rules to ensure the same. In response to the Clarendon investigation, the BNSF established procedures requiring a train to stop before receiving an after-arrival track warrant and to make positive radio contact with the

⁶ FRA letter to the Safety Board dated October 3, 2003.

⁷ FRA letter to the Safety Board dated October 3, 2003.

⁸ National Transportation Safety Board, *Head-On Collision, Trains Q317-19 and Q316-18, CSXT Railroad, Smithfield, West Virginia, August 20, 1996*, Railroad Accident Brief NTSB/RAB-98/13 (Washington, DC: NTSB, 1998).

⁹ National Transportation Safety Board, *Collision and Derailment of Union Pacific Railroad Freight Trains 5981 North and 9186 South in Devine, Texas, June 22, 1997*, Railroad Accident Report NTSB/RAR-98/02 (Washington, DC: NTSB, 1998).

¹⁰ National Transportation Safety Board, *Collision of Two Burlington Northern Santa Fe Freight Trains Near Clarendon, Texas, May 28, 2002*, Railroad Accident Report NTSB/RAR-03/01 (Washington, DC: NTSB, 2003).

train to be met in non-signaled territory. After the Gunter collision, the BNSF further strengthened these procedures by requiring more communication between the restricted train, the train(s) to be met, and the dispatcher.

The FRA has declined to implement either of the Safety Board's recommendations (R-98-27 and R-03-2) regarding after-arrival track warrants that were developed in response to the Devine and Clarendon, Texas, accidents. The FRA's final written response to Safety Recommendation R-03-2, dated October 3, 2003, indicated that disallowing after-arrival orders in non-signaled territory would reduce flexibility and hinder the efficient movement of trains. The FRA also stated that like the industry, it expects that railroad employees will adhere to all applicable operating rules. Unfortunately, expecting employees to always adhere to all applicable rules is more often an ideal than a reality. The Board has investigated too many railroad accidents in which the avoidance of a collision depended on the use of an operating rule or standard practice that proved to be insufficient to prevent accidents caused by human error.

Even though the BNSF strengthened its procedures for after-arrival track warrants after the Clarendon accident, the BNSF 6789 South crew still did not make positive radio contact to verify that the train they were passing was the train listed on their track warrant. In the Gunter accident, the BNSF 6789 South crew had already stopped at the location where they were to meet the opposing train, BNSF 6351 North. Therefore, the circumstances of this accident also raise concerns regarding the effectiveness of limiting the issuance of after-arrival orders to trains that have already stopped at the location at which they will meet the opposing train. Regardless of how the after-arrival order is implemented, this practice places full responsibility for ensuring a proper meet on the crew involved. When a crew does not follow procedures in non-signaled territory, as occurred in the Gunter accident, there are no additional warnings to either train. By contrast, when after-arrival track warrants are used in territory with automatic block signals, both trains receive restrictive signals requiring the trains to slow and eventually stop short of a collision point. Although there may be some circumstances where the use of after-arrival orders in non-signaled territory is beneficial, the accident record has demonstrated that any use of these procedures increases the risk of train collisions.

The Safety Board recognizes that unless an automated collision avoidance system is in place, there is no assurance that a collision will not occur. The Board remains convinced that the ultimate safety goal is positive train control (PTC). However, even if PTC becomes more widely adopted, the current non-signaled areas of the U.S. railroad network will probably be among the last to be outfitted with PTC for the same reasons they remain non-signaled now—train volume and type of traffic. Consequently, non-signaled territories will remain higher risk areas for collisions. Based on the Gunter accident as well as several other investigations, the Safety Board concluded that the use of after-arrival track warrants for train movements in dark (non-signaled) territory creates an unacceptable risk of collision.

The National Transportation Safety Board therefore makes the following safety recommendations to the BNSF Railway Company:

Use the Gunter collision as a case study in train crew and dispatcher training and retraining to illustrate how informal communications can lead to misunderstandings and errors. (R-06-11)

Discontinue the use of after-arrival track warrants for train movements in dark (non-signaled) territory not equipped with a positive train control system. (R-06-12)

The Safety Board also issued safety recommendations to the Federal Railroad Administration, the Association of American Railroads, and the American Short Line and Regional Railroad Association. In addition, Safety Recommendation R-03-3, previously classified "Open—Unacceptable Response," was reclassified "Closed—Reconsidered." In your response to the recommendations in this letter, please refer to Safety Recommendations R-06-11 and -12. If you need additional information, you may call (202) 314-6177.

Acting Chairman ROSENKER and Members HERSMAN and HIGGINS concurred in these recommendations.

[Original Signed]
By: Mark V. Rosenker
Acting Chairman