

A-669



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: MAR - 5 1997

In Reply Refer To: R-96-67 through -69

Mr. Robert D. Krebs
President and Chief Executive Officer
Burlington Northern and Santa Fe Railway Company
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Fort Worth, Texas 76102-5384

About 4:10 a.m. on February 1, 1996, Atchison, Topeka and Santa Fe Railway Company (ATSF) freight train H-BALT1-31, en route from Barstow, California, to Los Angeles, was traveling westbound on the ATSF south main track when it derailed at milepost 60.4 near Cajon Junction, California. After the derailment and the subsequent rail car pileup, which involved five cars containing hazardous materials, a fire ignited that engulfed the train and the surrounding area. The conductor and the brakeman sustained fatal injuries; the engineer suffered serious injuries.¹

The National Transportation Safety Board determines that the probable cause of the derailment of freight train H-BALT1-31 was an undetermined restriction or blockage that prevented the traincrew from achieving and maintaining adequate train braking force and also the lack of adequate Federal Railroad Administration and industry, specifically the ATSF, regulations, policies, procedures, and standards to consistently utilize two-way end-of-train devices as a redundant braking system to protect trains from catastrophic brake system failure.

Safety Board investigators and representatives from each party to the investigation conducted computer simulations at Freightmaster, Inc., in Fort Worth, Texas, on March 19 and 20, 1996. The train dynamics analyzer simulation results were consistent with a blockage or restriction in the train line between the fifth and ninth cars. This simulation analysis, based on the event recorder transit time from Summit to milepost 60.4 and the calculated turnover speed of 70-plus mph at the point of derailment indicated that with three or more working dynamic brakes and a minimum of 16 cars braking, the train would have either stopped or negotiated the derailment curve without serious incident. Using the simulation data that were available, the tests disclosed that with four dynamic brakes and nine cars braking, H-BALT1-31 lacked sufficient braking power to allow it to negotiate the curve at milepost 60.4.

¹For more detailed information, read Railroad Accident Report--Derailment of Freight Train H-BALT1-31. Atchison, Topeka and Santa Fe Railway Company, near Cajon Junction, California, on February 1, 1996 (NTSB/RAR-96/05)

Although the simulation results indicate a blockage near the fifth through ninth cars, the Safety Board is not convinced that a blockage could occur only in that area.

The Safety Board considered the possibility that one or more factors caused the loss of continuity to the train line. A crimp or kink in the air brake hose could block or restrict the train line. Such a crimp or kink will generally occur in a worn or damaged hose or in a hose connected to an unauthorized design or repair. As H-BALT1-31 began its descent to Cajon, the slack in the train couplers and draft gear bunched together. The slack action may have bent or crimped an air brake hose that pinched off air flow from the engines to the rear of the train and resulted in the loss of air brake control. Because of the train line relationship to the undercarriage on cushioned underframe cars, these cars are more susceptible to incur a kink in their train line. The movement of the draft system requires that the train line also be fluid in motion as the rail car moves.

Initially, our investigation had focused on the cushioned underframe car, ATSF 90033, which was the last car added to the train after the repair at Barstow. The Freightmaster computer simulation later eliminated this car as a source of a blockage because the car was too far back (16 cars) in the train to have prevented the engineer from safely stopping or slowing the train for the accident curve. The simulation also indicated that most of the other cushioned underframe cars (11 through 13) in the consist were probably not involved. These cars also were not within the five- to eight-car blockage or restriction zone that the simulation identified as necessary to meet the derailment speed, time, and location.

The fifth car in the consist, SFLC 10005, was a cushioned underframe car and within the effective position for a blockage, as identified by the simulation. However, the derailment sequence, subsequent fires, and wreckage movement prevented close inspection of car SFLC 10005 and precluded constructing a timely simulation. Car repair records for car SFLC 10005 showed no history of intermittent problems indicative of hose kinking or restriction. Safety Board investigators were unable to find any brake hoses that appeared to have been kinked or crimped before the accident or that could be identified to any particular car in the suspect zone (cars five through eight) of the train.

Attempting to determine the likelihood and frequency of kinked hoses, Safety Board investigators, therefore, inspected other cushioned underframe cars. The postaccident inspection of five sister cars (ATSF 90030, 90031, 90032, 90035, and 90036) to ATSF 90033 for condition and design consistency of the end-of-car air hose arrangement revealed three predominate styles of air hose arrangements and several cars having different arrangements at each end. Each of the three predominate styles of air hose arrangement had several customized subversions. Only a few of the air hose arrangements, as found on the sister cars, remained true to the modification drawing arrangement or the manufacturer drawings. One of the greater differences between arrangements was the length of the pipe that attached to the flexible glad-hand air hose, which varied between 6.5 and 45.5 inches. The Safety Board, therefore, concluded that a wide deviation of end-of-car hose arrangements on cushioned underframe cars from the approved end-of-car hose arrangement design is not uncommon and may induce an air hose to kink in operation and block or restrict a train line. Consequently, the Safety Board believes that the Burlington Northern and Santa Fe Railway Company should inspect the end-of-car hose arrangements on its cushioned underframe cars and ensure the hose arrangements match the intended design.

Moreover, the ATSF Barstow car shop had repaired the car ATSF 90033 but had no references or drawings on which to base the repair of the brake pipe and the end-of-car hose arrangement of the car and, thus, made the repair to match the other end of the car. Had a reference of standardized hose arrangement drawings been readily available to the carmen, no confusion should have existed or questionable repair have been made to car ATSF 90033. The Safety Board concluded that had the

Barstow car shop made hose arrangement reference manuals readily available, the carmen could have used guidelines to properly repair the train line on ATSF 90033. Therefore, the Safety Board believes that the Burlington Northern and Santa Fe Railway Company should provide its carmen with readily available means to identify the proper design or specific type of end-of-car hose arrangement on cushioned underframe cars to preclude a possible improper repair or modification.

The Calnev Pipe Line Company became aware of the accident when a Calnev employee heard a radio news broadcast about the derailment and verified that the derailment site was near two Calnev underground pipelines. The ATSF notification of the California Office of Emergency Services and its subsequent notifications of the appropriate state agencies, including the Office of the State Fire Marshal and the California Department of Forestry and Fire Protection, were timely and prompt; however, the ATSF did not contact Calnev directly about the derailment and potential threat to its pipelines.

In previous Safety Board accident investigations,² including a collision between two ATSF freight trains in Corona, California, on November 7, 1990, the Safety Board found that railroads have the responsibility to notify pipeline operators about derailments and wreckage clearing operations that occur near pipelines that may impact the safe operation of such pipelines. After its investigation of the Corona accident, the Safety Board asked in Safety Recommendation R-91-44 that the ATSF, in cooperation with the California Public Utilities Commission and the California Office of the State Fire Marshal, develop a complete list of 24-hour emergency telephone numbers for those pipeline operators whose transmission lines are near the ATSF property. In its November 11, 1993, response to the recommendation, the ATSF stated that it had participated in the information gathering efforts of the public utilities commission concerning pipelines along ATSF rights-of-way and that ATSF distributed a listing of pipeline operator emergency telephone numbers provided by the fire marshal office to appropriate personnel in the Santa Fe System Operations Center. On the basis of this response, Safety Recommendation R-91-44 was classified "Closed--Acceptable Action" on February 14, 1994.

After the February 1, 1996, derailment near Cajon Junction, the ATSF indicated that as a corrective measure, pipeline operators had been added as a line item on its emergency notification check list for accidents occurring in California. This measure should have been a logical step for the ATSF to have taken when implementing Safety Recommendation R-91-44 rather than as a corrective action for the current derailment. The Safety Board, consequently, concluded that the ATSF management failed to ensure that effective procedures to notify pipeline operators were implemented and that its employees complied with them. Therefore, the Safety Board believes that the Burlington Northern and Santa Fe Railway Company should develop and maintain a current list of 24-hour emergency telephone numbers for all pipeline operators that have transmission pipelines on or adjoining any Burlington Northern and Santa Fe Railway Company property and periodically update, at least annually, and distribute the list with written instructions for notifying pipeline operators to all employees who are responsible for completing emergency notifications.

²Railroad Accident Report--*Derailement of Southern Pacific Transportation Company Freight Train on May 12, 1989, and Subsequent Rupture of Calnev Petroleum Pipeline on May 25, 1989, at San Bernardino, California* (NTSB/RAR-90/02); Railroad Accident Report--*Atchison, Topeka and Santa Fe Railway Company (ATSF) Freight Trains ATSF 818 and ATSF 891 on the ATSF Railway, Corona, California, November 8, 1990* (NTSB/RAR-91/03); and Highway Accident Report--*Collision of Amtrak Train No. 88 with Rountree Transport and Rigging, Inc., Vehicle on CSX Transportation, Inc., Railroad Near Intercession City, Florida, November 30, 1993* (NTSB/HAR-95/01)

Therefore, the National Transportation Safety Board recommends that the Burlington Northern and Santa Fe Railway Company:

Inspect the end-of-car hose arrangements on its cushioned underframe cars and ensure the hose arrangements match the intended design. (R-96-67)

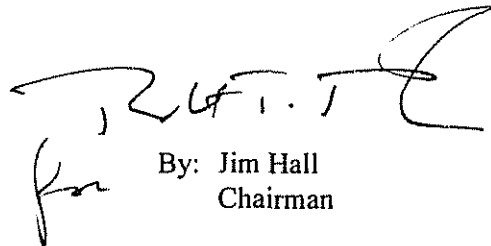
Provide its carmen with readily available means to identify the proper design or specific type of end-of-car hose arrangement on cushioned underframe cars to preclude a possible improper repair or modification. (R-96-68)

Develop and maintain a current list of 24-hour emergency telephone numbers for all pipeline operators that have transmission pipelines on or adjoining any Burlington Northern and Santa Fe Railway Company property and periodically update, at least annually, and distribute the list with written instructions for notifying pipeline operators to all employees who are responsible for completing emergency notifications. (R-96-69)

Also, the Safety Board issued Safety Recommendations R-96-70 through -73 to the Federal Railroad Administration, R-96-74 through -78 to the Association of American Railroads, R-96-79 to the International Association of Fire Chiefs, and R-96-80 to the Chemical Manufacturers Association.

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 action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations R-96-67 through -69 in your reply. If you need additional information, you may call (202) 382-6840.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.



for

By: Jim Hall
Chairman