# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

**Date:** June 12, 2001

**In reply refer to:** R-01-6
R-97-9 (Reiterated)

Mr. S. Mark Lindsey
Acting Deputy Administrator
Federal Railroad Administration
1120 Vermont Avenue, N.W.
Washington, D.C. 20590

About 1:58 a.m. eastern standard time on January 17, 1999, three Consolidated Rail Corporation (Conrail) freight trains operating in fog on a double main track were involved in an accident near Bryan, Ohio. Westbound Mail-9, traveling near maximum authorized speed on track No. 1, struck the rear of a slower moving westbound train, TV-7, at milepost (MP) 337.22. The collision caused the derailment of the 3 locomotive units and the first 13 cars of Mail-9 and the last 3 cars of TV-7. The derailed equipment fouled the No. 2 track area and struck the 12th car of train MGL-16, which was operating eastbound on the adjacent track. The impact caused 18 cars in the MGL-16 consist to derail. The engineer and conductor of Mail-9 were killed in the accident. The crewmembers of TV-7 and MGL-16 were not injured. Total estimated damages were $5.3 million.[1]

The National Transportation Safety Board determined that the probable cause of this accident was the failure of the crew of train Mail-9 to comply with restrictive signal indications while operating at or near maximum authorized speed in dense fog. Contributing to the accident was the lack of uniformity and consistency in the operating practices of Consolidated Rail Corporation train crews when they encountered conditions of reduced visibility. Also contributing to the accident was the lack of a backup safety system that would have helped alert the crewmembers of train Mail-9 to the restrictive signal indications.

Between 12:15 a.m. and 1:08 a.m. on January 17, 1999, four westbound Conrail freight trains departed Toledo and were routed one behind the other onto Chicago main line track No. 1. When the lead train, PIEL-6A, was a little more than an hour out of Toledo, the train engineer radioed the dispatcher that he had run into very heavy fog at signal 3341W. The dispatcher did not, nor was he required to, notify the trailing van trains about the visibility conditions or advise them to adjust their speeds for the fog.

The first two van trains, TV-99 and TV-7, operating near maximum authorized speed, passed signal 3341W on *clear* indications less than 5 minutes apart. Based on radio

[1] For more information, see National Transportation Safety Board, *Collision Involving Three Consolidated Rail Corporation Freight Trains Operating in Fog at Bryan, Ohio, January 17, 1999*, Railroad Accident Report NTSB/RAR-01/01 (Washington, D.C.: NTSB, 2001).

communications with PIEL-6A, the TV-99 engineer then slowed his train, passing 3351W (the next signal after 3341W) at 42 mph. Because of the dense fog, the TV-7 engineer slowed his train from 60 mph at 3341W to 39 mph at 3351W. When he saw that 3351W displayed an *approach* indication, he continued to slow his train because he could not see the signals until he "was just about on top of them," and he thought the next one (3381W) would be displaying a *stop and proceed* indication.

Following another radio communication with the PIEL-6A engineer, the TV-99 engineer radioed TV-7 that he was moving slowly toward a specified control point. About 2 minutes later, the TV-99 engineer had to stop his train at the control point because PIEL-6A occupied the block ahead. The TV-99 engineer radioed the TV-7 engineer that he was stopped. Because of the denseness of the fog, the TV-7 engineer slowed his train more than usual after passing 3351W. About 1 mile west of 3351W, TV-7 was operating at 6 mph.

Meanwhile, the third van train, Mail-9, was approaching the slowed trains at or near maximum authorized speed. Mail-9 crewmembers did not lower their train speed despite the reduced visibility, and they appear not to have been aware that the trains ahead of them were stopping or slowing considerably. They continued to operate their train as if all conditions were normal, as if appropriate spacing were being maintained between all the trains on that section of track, and as if they would be able to see and comply with all signal indications. At no time did Mail-9 deviate by more than a few miles per hour from the maximum authorized speed, and locomotive event recorder data indicated that neither dynamic brakes nor automatic air brakes were applied from the time the train passed the *approach* indication at signal 3341W until the collision with the rear of train TV-7.

The Safety Board attempted to determine why the Mail-9 crew proceeded past two restrictive signal indications without appreciably slowing the train.

Event recorder data show the speeds at which train Mail-9 proceeded through the blocks controlled by signals 3341W and 3351W. Based on measurements taken from the engineer's position inside the locomotive cab, Safety Board investigators determined the engineer's likely field of view as the locomotive approached and passed the signals. Investigators then used time and distance calculations to help determine how much time Mail-9 crewmembers would have had, under low-visibility conditions, to see and respond to the two signals immediately before the point of collision.

Even at a visibility of 200 feet, which is substantially better than the visibility estimated by those on the scene at the time, the 28-foot-high signal 3341W that the Mail-9 operator failed to comply with (which showed an *approach*, or yellow, aspect) would have been within his field of view for about 1.5 seconds or less as he passed it at about 56 mph. Had the engineer been even momentarily distracted, or had he taken a few seconds to check his speed or even scan the instrument panel, he could easily have missed the signal.

At a visibility of 100 feet, the yellow signal would have been within the engineer's field of view for less than 0.21 seconds. The 17-foot-high signal 3351W (which displayed a *stop and proceed*, or red, aspect) would have been within the engineer's view for less than 1.2 seconds before it passed to the right of his cab window.

Based on witness statements, the visibility at the time of the accident was only 10 to 25 feet. Under these conditions, the Mail-9 engineer could not have seen the yellow signal at all before it passed out of his field of view. The red signal would have been visible for less than 0.23 seconds as it passed across the right edge of the windshield, behind the pillar, and across the side window. The Safety Board acknowledges that the actual visibility at the signal locations at the time Mail-9 passed cannot be known. Furthermore, one or both of the crewmembers could have been positioned where their angle of view would have been greater than the one calculated. Nevertheless, based on all available information, the Safety Board concluded that because of the diminished signal visibility in the dense fog and the speed of the train, the Mail-9 crew probably did not see either the *approach* or the *stop and proceed* signal that indicated the presence of another train on the same track ahead.

Although the signals in the area of the accident were operating properly, the traffic control system did not include any mechanism to help make train crews aware of signal indications and did not incorporate safeguards to prevent engineers from accidentally or purposely failing to comply with restrictive signals. Most Conrail locomotives, including the lead locomotive on Mail-9, had automatic cab signal equipment that was designed to display signal indications inside the locomotive cab. The system was not functional, however, because the track was not wired for it. Had the system been functional, the restrictive signals in this accident would have been displayed inside the cab of Mail-9, where they might have been seen and responded to by the engineer.

At one time, the Chicago main line was equipped with an intermittent automatic train stop system that was designed to automatically apply the air brakes and stop the train should the engineer not acknowledge an audible alarm within a few seconds of passing a restrictive wayside signal. This feature, however, was eliminated, with the approval of the Federal Railroad Administration (FRA), in the early 1970s after the Penn Central Railroad was created from the merger of the Pennsylvania and New York Central Railroads.

Even though a working automatic cab signal or automatic train stop system might have helped prevent this accident, the Safety Board notes that these systems, too, rely for their effectiveness on the alertness, judgment, and responsiveness of the train crew. For example, the automatic cab signal system displays signal indications but does nothing to ensure that the crew responds appropriately. Similarly, the automatic train stop system, while offering a level of safety beyond that of cab signals, does not enforce compliance with restrictive signal indications. So long as the engineer pushes a button or turns a lever to acknowledge and silence the system alarm, the automatic stop system does not activate.

The Safety Board has long been a proponent of automated systems that prevent train collisions by automatically interceding in the operation of a train when the engineer does not comply with the requirements of the signal indication. Had Mail-9 been equipped with such a system, the system would have intervened by slowing the train when the train operator failed to slow in response to passing the *approach* signal indication, whether or not the operator had actually seen the signal. Likewise, had the operator failed to see or respond to the *stop and proceed* indication of the next signal, a positive train control (PTC) system would have intervened to automatically stop the train. The Safety Board concluded that a fully implemented

PTC system would have prevented Mail-9 from passing the *stop and proceed* indication at signal 3351W and striking the rear car of TV-7.

The Bryan collision is only the latest in a very long list of collision accidents investigated by the Safety Board in which a PTC system that incorporated collision avoidance could have prevented the tragic outcome.

As early as 1970, following its investigation of the August 20, 1969, head-on collision of two Penn Central Commuter trains near Darien, Connecticut, in which 4 people were killed and 45 people were injured,[2] the Safety Board asked the FRA to study the feasibility of requiring a form of automatic train control system to protect against operator error and prevent train collisions. Following the Darien accident, the Safety Board continued to investigate one railroad accident after another caused by human error and, during the next two decades, issued a number of safety recommendations to the FRA or individual railroads asking for train control measures to prevent train collisions.[3] Following its investigation of the May 7, 1986, rear-end collision involving a Boston and Maine Corporation commuter train and a Conrail freight train in which 153 people were injured, the Safety Board made the following recommendation to the FRA:

> R-87-16
> Promulgate Federal standards to require the installation and operation of a train control system on main line tracks that will provide for positive separation of all trains.

In a June 1990 response to the Safety Board, the FRA stated that it fully supported the use of automatic train control equipment by the railroads; however, the agency stated that practical reasons precluded issuing such regulations "for the entire country."

In subsequent investigations, the Safety Board found that despite the efforts by railroads to train and test their train crews for compliance with operating rules, accidents resulting from human error continued to occur. Consequently, in September 1990, the Safety Board placed positive train separation (PTS) (meaning a PTC system that provides collision avoidance) on its "Most Wanted" list.[4]

In May 1991, the FRA, writing in response to Safety Recommendation R-87-16, provided the Safety Board with a copy of its report prepared in response to the Railroad Safety Improvement Act of 1988. That act required the FRA to assess the feasibility of requiring automatic train control on all rail corridors that handle passengers or hazardous cargo. The FRA concluded that requiring automatic train control on all rail corridors that handled trains carrying passengers or hazardous materials was not feasible because of the anticipated costs to the

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[2] National Transportation Safety Board, *Head-on Collision between Penn Central Trains N-48 and N-49 at Darien, Connecticut, August 20, 1969*, Railroad Accident Report NTSB/RAR-70/03 (Washington, D.C.: NTSB, 1970).

[3] This section is not intended as a comprehensive discussion of all the Safety Board's previous investigations and recommendations regarding positive train control; rather, it discusses only three of the more important safety recommendations that have been issued to the FRA on this issue.

[4] In October 1990, the Safety Board developed the "Most Wanted" list, drawn up from previously issued safety recommendations, to bring special emphasis to the safety issues the Board deems most critical. The Most Wanted list is reviewed, revised, and reissued annually.

industry. The FRA stressed that it was concerned about the issue of automatic train control and stated that it was actively monitoring industry developments that required less costly systems.

In 1992, the Rail Safety Enforcement and Review Act required the FRA to conduct a safety inquiry on the matter of automatic train control systems, which included a PTS component. In a June 1993 letter to the Safety Board, the FRA cited several test projects with automatic train control system communications platforms that major railroads were beginning to install. The agency also cited a number of research initiatives that would enable it to evaluate rail lines for priority application of automatic train control systems. Based on the FRA's response, the Safety Board classified Safety Recommendation R-87-16 "Open—Acceptable Response."

In 1993, following its investigation of a head-on collision on the Burlington Northern Railroad near Ledger, Montana,[5] the Safety Board issued the following safety recommendation to the FRA:

> R-93-12
> In conjunction with the Association of American Railroads and the Railroad Progress Institute, establish a firm timetable that includes at a minimum, dates for final development of required advanced train control system hardware, dates for an implementation of a fully developed advanced train control system, and a commitment to a date for having the advanced train control system ready for installation on the general railroad system.

The Safety Board classified Safety Recommendation R-93-12 "Open—Acceptable Response" after the FRA took action to seek the "final system definition, migration path, and timetable" for a PTC system by December 1994.

In 1996, the Safety Board investigated the February 16, 1996, accident in Silver Spring, Maryland, in which the crew of a Maryland Rail Commuter (MARC) train did not comply with signal indications and collided with an Amtrak passenger train.[6] The collision, derailment, and subsequent fire killed 11 people, including the entire MARC train crew, and injured 26 other people. In its report on that accident, the Safety Board, noting the FRA's lack of progress toward fully complying with Safety Recommendation R-87-16, reiterated the recommendation to the FRA.

Also as a result of its investigation of the Silver Spring accident, the Board issued the following safety recommendation to the FRA:

> R-97-13
> Require the implementation of positive train separation control systems for all trains where commuter and intercity passenger railroads operate.

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[5] National Transportation Safety Board, *Head-on Collision Between Burlington Northern Freight Trains 602 and 603 near Ledger, Montana, on August 29, 1991*, Railroad Accident Report NTSB/RAR-93/01 (Washington, D.C.: NTSB, 1993).

[6] National Transportation Safety Board, *Collision and Derailment of Maryland Rail Commuter MARC Train 286 and National Railroad Passenger Corporation (Amtrak) Train 29 Near Silver Spring, Maryland, February 16, 1996*, Railroad Accident Report RAR-97-02 (Washington, D.C.: NTSB, 1997).

In a February 25, 1998, letter responding to Safety Recommendation R-97-13, the FRA acknowledged the safety value of signal-based positive train control systems and noted that:

> [I]nnovative train control approaches are emerging that can meet the safety needs identified by the board in its recommendations…. The FRA concurs that implementation of more capable train control systems can contribute significantly to the safety of passenger rail service…. To bring about PTC, the FRA has set out to: assess risk on rail corridors that could be reduced by PTC systems; update and refine cost-benefit analyses; demonstrate and evaluate PTC technologies; invest in enhanced train control on the northeast corridor; promote interoperability of PTC systems; facilitate introduction of new technology through regulatory action; and support federal policies necessary for successful PTC systems.

In its response to the FRA letter, the Safety Board expressed its disappointment with the pace of development of train control systems. The Safety Board also noted that one important issue that remained to be addressed was a timetable for the installation of such systems as a mandatory part of passenger operations. Pending a requirement that PTC systems be implemented where commuter and intercity passenger railroads operate, the Board classified Safety Recommendation R-97-13 "Open—Acceptable Response."

The Safety Board notes the efforts that have been and are being made to refine train control technology and to address the barriers to implementation. A number of projects, variously described as "pilot," "demonstration," "technology development," and "commercial installation," have been undertaken to focus on PTC issues. In one of the most recent such projects, the FRA is cooperating with the AAR and the Illinois Department of Transportation to design, test, build, and install a PTC system on a section of the high-speed Chicago–St. Louis Corridor. In 1995, the FRA funded a demonstration project of a train control system between Porter, Indiana, and Kalamazoo, Michigan. That system has been in use for about 1 year on the 71-mile Amtrak-owned portion of the Chicago-Detroit high-speed corridor under FRA sponsorship in partnership with the State of Michigan, Amtrak, and Harmon Industries.

The Board also notes the efforts by some railroads on some corridors to implement automatic train control systems that have a collision avoidance component. For example, the Safety Board is encouraged by the employment of such a system along the high-density Northeast Corridor between New Haven, Connecticut, and Boston, Massachusetts. Another project, an advanced speed enforcement system with collision avoidance capabilities, is being planned for installation on 540 track miles owned by New Jersey Transit. Also, the Alaska Railroad Corporation is midway through a four-phase project to install a PTC system on the corporation's approximately 600 miles of right-of-way.

The Safety Board also acknowledges the ongoing work of the FRA's Railroad Safety Advisory Committee, which in 1997 established a working group to address PTC. Among other objectives, the group is attempting to address the current Federal regulations and their applicability to new train control systems under development and to draft new regulations as necessary. The working group has also done preliminary work to identify specific rail corridors where a PTC system would have the greatest impact.

Despite these partial initiatives and other efforts in the area of PTS, the Safety Board continues to be disappointed with the pace of development and implementation of collision avoidance technologies. As noted above, the FRA and the railroad industry have created numerous study groups and carried out several demonstration projects and, in some locations, have successfully implemented systems with collision avoidance capabilities. Nevertheless, no plan for industry-wide integration has been developed. And while progress has been particularly slow along rail lines that primarily serve freight carriers, even those lines with significant passenger traffic remain largely unprotected today, some 11 years after this item was first placed on the Safety Board's "Most Wanted" list. Meanwhile, the Safety Board continues to investigate accidents that could have been prevented by a working PTC system. The Safety Board concluded that, without the installation of PTC systems, preventable collision accidents will continue to occur and will continue to place railroad employees and the traveling public at risk.

The Safety Board acknowledges progress in this area but is disappointed that automatic train control standards have not been established after 14 years. The Board will continue to urge the FRA to require the implementation of proven collision avoidance technologies. In the meantime, and in recognition of the promise of PTC, the Safety Board believes that the FRA should continue to focus on this issue and facilitate the actions necessary for development and implementation of PTC systems that include collision avoidance, and require implementation of PTC systems on main line tracks, establishing priority requirements for high-risk corridors such as those where commuter and intercity passenger railroads operate.

Because neither crewmember of Mail-9 survived the accident, the Safety Board can only speculate about why they did not slow their train in response to the reduced visibility. As indicated above, they may have been anticipating train movements and signal changes by using peripheral cues, such as voice communications on the radio or status transmissions from defect detectors. Or their focus may have been on maintaining their schedule rather than on safety. Though event recorder data indicated that no Mail-9 mechanical malfunction was reflected within the parameters monitored on the night of the accident, the crew may have been distracted by some real or perceived mechanical problem. Unfortunately, the actual reasons may never be known, and the industry will thus be denied possible lessons learned that could prevent future accidents of this kind.

Investigators were aided in this accident by information obtained from the trains' locomotive event recorders, the computer-aided train dispatcher's facility logs, the radio communications tape, the grade crossing event recorders, the wayside defect detector recorders, and the statements from the accident survivors. One key source of information—the radio communications tape—does not contain verifiable conversations between Mail-9 and other trains or between Mail-9 and the train dispatcher. For the most part, the tape contains the verifiable conversations and acknowledgments of crews on the trains ahead of Mail-9 on track No. 1 and of crews on the trains on track No. 2. The transmissions that investigators attribute to the Mail-9 crew are, for unknown reasons, garbled and unintelligible.

Even if the radio transmissions from Mail-9 had been intelligible, investigators would still have been missing one piece of information that could have been decisive in determining the cause of this accident: the conversation of the crewmembers in the cab of Mail-9 in the moments preceding the collision. The Safety Board is convinced that at least one additional recording

device is needed to identify conditions or events within the cab that may adversely affect railroad safety.

For several years, the Safety Board has been a proponent of installing and using locomotive cab audio recorders (LCARs) to help determine the cause of accidents. In the Bryan accident, audio recordings would have captured the voices of the crewmembers if and when they called out the signal indications to one another, as required by Northeast Operating Rules Advisory Committee rule No. 94. According to the testimony of several Conrail employees and of a road foreman of engines, many operating crewmembers had lapsed into the practice of not calling *clear* indications; however, all the Conrail employees interviewed stated that they called restrictive indications. If the MAIL-9 operating crew, like their peers, had been calling restrictive indications by name or color, an audio recorder in the locomotive cab would have recorded them calling out "*approach*" or "yellow" at 3341W. The absence of a callout at 3341W could mean either that they perceived the indication to be *clear* or that they failed to see the signal because of the denseness of the fog or because they were distracted.

An LCAR would have captured the conversations between the engineer and the conductor, which would have shown how the crewmembers were interacting and whether they were using crew resource management techniques to operate their train. An LCAR could have captured the crew possibly discussing equipment problems and, depending on the nature of the equipment malfunction, the noises generated by some equipment problems. The LCAR might have captured other sounds within the locomotive cab that could have been important in reconstructing the accident.

The Safety Board concluded that, had the Mail-9 train been equipped with an LCAR, the recorded crew communications may have provided valuable clues in reconstructing the accident, which, in turn, could have possibly enabled the carrier, the railroad unions, and the FRA to make systemic changes to prevent similar accidents from occurring.

In its investigation of the February 16, 1996, accident in Silver Spring, Maryland, involving the collision of a MARC train with an Amtrak passenger train, the Safety Board identified the need for train operating cabs to have voice recording devices, similar to the type installed in the cockpit of aircraft. In its report of the Silver Spring accident, the Safety Board observed that in aviation, for more than 35 years, the cockpit voice recorder (CVR) has been a key tool in documenting the circumstances leading up to an accident and has proven to be invaluable in determining the cause of aviation accidents and in enhancing aviation safety. The Board noted that, although current locomotive event recorders had great utility in providing mechanical response data, they could not answer some human performance questions about the crewmembers' actions. In the case of the Silver Spring accident, the Safety Board concluded that if the MARC locomotive had been equipped with an LCAR, investigators could have determined from the communications before the collision the factors that may have affected the MARC train operator's actions. The Safety Board therefore made the following recommendation to the FRA:

> R-97-9
> Amend 49 *Code of Federal Regulations* Part 229, to require the recording of train crewmembers' voice communications for exclusive use in accident investigations and with appropriate limitations on the public release of such recordings.

The FRA responded on February 25, 1998, stating, in part,

Unlike event recorders, which have value in determining rules compliance prior to an accident, use of voice recorder information would, as suggested by the recommendation, be limited exclusively to use in an accident investigation. Other uses would be viewed as inappropriate electronic monitoring of employees' conversations in the workplace, whether or not work related. Capturing voice recordings in a locomotive cab may present practical issues not encountered in aviation. Headsets with intercom capability are the exception, rather than the rule, in locomotive cabs. Significant interrelationships exist between efforts to limit occupational noise exposure in cabs and the effective recording of conversations. Issues of comfort have also been raised by employees and their representatives when use of headsets has been proposed for reduction of occupational noise exposure. Employee representatives cite 8-12-hour shifts and varying environmental conditions in locomotive cabs.

The potential release of voice recordings subsequent to an accident presents additional issues. A special statutory exception has been required in the aviation context to prevent inappropriate use of voice recordings following events drawing significant notoriety. Enacting full effective regulations in the absence of special-purpose legislation would appear to present a difficult conflict in public policy.… Since the Board would be the primary user of voice data, does the Board intend to utilize the power conferred under its charter statute to recommend legislation affording appropriate controls on release of voice recordings in the rail mode?

On September 30, 1999, the Safety Board responded, in part,

The issues you raise, while new to the railroad industry, have been resolved concerning the use of voice recordings in aviation. You may wish to discuss the issues with [the] Federal Aviation Administrator…to obtain an understanding of how these issues were satisfactorily resolved allowing the use of this important technology to improve aviation safety. This understanding would be useful in helping to overcome the obstacles to the use of cab voice recorders to improve railroad safety.

We also suggest that the FRA contact the Coast Guard to review the pending requirements for the use of voice recordings on the bridges of vessels. The International Maritime Organization, a United Nations' specialized agency responsible for improving maritime safety and preventing pollution from ships, is developing requirements that certain ships have voice recorders by 2002. You may also be aware that legislation to address voice recording privacy in all the modes of transportation is included in the Board reauthorization bill pending before Congress. However, while we are ready to work with you to resolve this matter, we believe there is more than enough experience in the other modes of transportation for the FRA to begin the process leading to the use of cab voice recorders. Since your reply indicates a lack of positive action, the Board classifies R-97-9 "Open—Unacceptable Response."

In answer to the FRA's concern about the release of information, the Safety Board notes that Public Law 106-424, signed on November 1, 2000, includes provisions for withholding from public disclosure voice and video recorder information for all modes of transportation. Section 5 (d)(1), "Confidentiality of Recordings," stipulates, in part:

> The [Safety] Board may not disclose publicly any part of a surface vehicle voice or video recorder recording or transcript of oral communications by or among drivers, train employees, or other operating employees responsible for the movement and direction of the vehicle or vessel, or between such operating employees and company communication centers, related to an accident investigated by the Board. However, the Board shall make public any part of a transcript or any written depiction of visual information that the Board decides is relevant to the accident.

With the passage of this legislation, the Safety Board is now able to protect the data obtained from an LCAR in the same manner the Board has always protected data obtained from a CVR.

The Safety Board is convinced that, for the safety of train operating crews, the conversations and voice communications of those in the locomotive cab must be recorded to help identify the causes of accidents.

Based on its investigation of the Bryan, Ohio, accident, the National Transportation Safety Board makes the following safety recommendation to the Federal Railroad Administration:

> Facilitate actions necessary for development and implementation of positive train control systems that include collision avoidance, and require implementation of positive train control systems on main line tracks, establishing priority requirements for high-risk corridors such as those where commuter and intercity passenger railroads operate. (R-01-6)

In addition, the Safety Board reiterates the following safety recommendation to the Federal Railroad Administration:

> R-97-9
> Amend 49 *Code of Federal Regulations* Part 229, to require the recording of train crewmembers' voice communications for exclusive use in accident investigations and with appropriate limitations on the public release of such recordings.

Because Safety Recommendation R-01-6 incorporates the intent of the three following recommendations, these recommendations have been reclassified "Closed—Acceptable Action/Superseded":

> R-87-16
> Promulgate Federal standards to require the installation and operation of a train control system on main line tracks that will provide for positive separation of all trains.

R-93-12
In conjunction with the Association of American Railroads and the Railroad Progress Institute, establish a firm timetable that includes at a minimum, dates for final development of required advanced train control system hardware, dates for an implementation of a fully developed advanced train control system, and a commitment to a date for having the advanced train control system ready for installation on the general railroad system.

R-97-13
Require the implementation of positive train separation control systems for all trains where commuter and intercity passenger railroads operate.

The Safety Board also issued safety recommendations to all Class I railroads, the Brotherhood of Locomotive Engineers, the United Transportation Union, the Association of American Railroads, and the American Short Line and Regional Railroad Association.

Please refer to Safety Recommendations R-01-6 and R-97-9 in your reply. If you need additional information, you may call (202) 314-6607.

Acting Chairman CARMODY and Members GOGLIA and BLACK voted in favor of these recommendations. Member HAMMERSCHMIDT concurred, in part, with these recommendations, and in his concurring and dissenting statement, he was joined by Member GOGLIA. (For more information, see Member HAMMERSCHMIDT's concurring and dissenting statement in the published report referenced on page 1 of this letter.)

*Original signed*

By: Carol J. Carmody
Acting Chairman