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BEFORE THE
SENATE COMMITTEE ON APPROPRIATIONS
SUBCOMMITTEE ON TRANSPORTATION

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Mr. Chairman. This is *not* a difficult accident to reconstruct. At approximately 1:30 p.m., Sunday, January 4, 1987, Amtrak's Colonial and a three engine Conrail train were moving northbound toward Gunpow Interlocking on parallel track. The Amtrak train was authorized to proceed through the interlocking at 105 m.p.h. The Conrail units were to stop short of the interlocking, permitting the Colonial to pass through.

Three distinct warning devices had been installed to alert the Conrail crew to the need to slow and stop:

- Wayside signals, the basic "stop and go" warning devices of the railroad industry.

- Cab signals, which are miniature versions of the wayside signal installed in the interior of the locomotive cab.

- The alerting whistle, a device designed to warn a distracted or inattentive crew that a slowdown or stop is approaching. The whistle sounds at the moment cab signals issue a slowdown order, and continues to sound until the engineer responds.

FRA regulations require predeparture testing of both the cab signal and the alerter whistle. The Conrail engineer has stated that he performed both tests prior to departure, and found the systems to be operative.

The event recorder recovered from the lead Conrail locomotive shows graphically what transpired. (See attachment "A".)

The Conrail units approached the interlocking at 60 m.p.h. At 11,793 feet from the track junction, the first wayside signal became visible. The engineer contends that it displayed a "slow to 40 m.p.h. and proceed" aspect. We believe it ordered him to slow to 30 m.p.h. and prepare to stop. That conflict is academic, however, because the event recorder reveals that he proceeded through the signal at a constant 60 m.p.h.

As he passed the approach signal, the cab signal should have displayed a "slow to 30 m.p.h." order, and triggered a warning from the alerting whistle. As the event recorder illustrates, the engineer nonetheless continued at a constant 60 m.p.h.

At 5,375 feet from the track junction the home signal became visible. All parties agree that the home signal functioned properly, ordering the freight to an absolute stop. The engineer continued through this sight point at a constant 60 m.p.h.

At 4,647 feet from the track junction the cab signal flashed a "slow to no more than 20 m.p.h. and prepare to stop" warning, and the alerting whistle was again triggered. As the event recorder illustrates, the Conrail freight actually accelerated through this point, to a maximum speed of 62 m.p.h.

As the National Transportation Safety Board's (NTSB) post-accident simulation illustrated, the stopping distance for this Conrail freight under normal braking procedures is approximately 2,800 feet. In emergency braking it is shorter. Had the train crew observed and responded in a timely manner to any of the six warning signals, it would have stopped short of the interlocking. But as the event recorder illustrates, the train continued to accelerate until it was a short distance from the intersection, where the crew apparently perceived the danger and threw the train into emergency braking. It ran through the switch, and stopped less than seven seconds before impact.

Post-accident testing of the three warning systems disclosed the following:

- The wayside signal system performed properly under every test administered during five days of intense post-accident testing. FRA discovered no evidence contradicting the data on the signal event recorder, which indicates that the wayside signal operated properly at the time of the accident.

- Investigators found, however, that the alerting whistle did not function properly because it had been tampered with and intentionally disabled. Duct tape had been placed across the air nozzle, silencing the whistle and effectively disabling the principal safety device designed to ensure crew attention. Tests confirmed that the alerting whistle worked properly when the tape was removed.

- There was a curious finding regarding the cab signal system. The engineer has certified that he tested the cab signal prior to departure, and found each of the four lights operating properly. We have no reason to question the accuracy of his statement. But at the scene of the accident, investigators found one of the four cab signal bulbs missing -- not burned out, but missing. Otherwise, the system operated as designed. I will not conjecture on how these apparently contradictory circumstances can be reconciled. It is essential to note, however, that the absence or removal of this particular bulb would not have affected the cab signal's ability to either trigger the alerting whistle, or provide the critical "slow to no more than 20 m.p.h. and prepare to stop" warning 4,450 feet from the interlocking.

As the Committee is certainly aware, toxicological tests taken after the accident have proven negative for the three Amtrak employees tested. Both Conrail crew members tested positive for cannabinoids in both blood and urine. These findings will be considered with all other evidence developed during the investigation of the accident.

Obviously, issues of probable cause remain open in this investigation. Nevertheless, the data developed over the last 14 days fits an all too familiar pattern. Track, signals, braking systems--the hardware we govern with regulations and use our inspectors to monitor--appears to have functioned properly, to the extent it was not disabled. And yet a serious accident occurred. The investigation is now focusing, as it has so often in recent years, on human performance.

Federal inspection practices have tightened considerably over the past five years, and the industry's cash flows have improved. With these trends has come a consistent improvement in the railroads' safety performance.

Railroad accident statistics have improved annually and dramatically, with 1985 producing the lowest accident rate in the industry's long history. Figures for the first nine months of 1986 reflect an accident rate more than 20 percent lower than the comparable period in the record year of 1985. Overall, accident rates in the railroad industry have been cut in half since the passage of the Staggers Deregulation Act.

But as accident rates have fallen, the pattern of causation in railroad accidents has shifted. Traditional causes, such as track and signal failure, have declined sharply. Track related accidents, for example, have fallen more than 65 percent in the 1980's. At the same time, human performance accidents have become an increasing percentage of all accidents, and a dominant cause of the truly serious incidents. We are now past the era in which we could easily generate dramatic improvements in safety with a few more track inspections, or the investment of additional dollars in eliminating deferred maintenance. The challenges of the future will be far more complex. If we are going to keep the accident rate moving downward, we need to develop mechanisms to deal effectively with the very complex issues that arise from human performance accidents.

FRA has played a meaningful role in driving the improvement in accident rates by analyzing every major accident, sorting through numerous post-accident recommendations, and forcing change wherever necessary through regulation or voluntary agreement. That process is at work today in the aftermath of the January 4 tragedy. While I am certain the Committee will have a number of questions and proposals as we proceed with this hearing, let me begin that discussion by commenting briefly on the major points that have emerged in public discussion, and our discussions with Committee staff, over the past fourteen days.

1. Tampering

In this accident, a basic warning device designed to insure crew attention in a stopping emergency had been intentionally disabled. This is not an isolated incident. During the week of January 12, an FRA dragnet of the five major yards on the Northeast Corridor discovered 6 locomotives with whistles disabled in an identical manner -- notwithstanding the fact that considerable advance warning of the inspection was given. We have received continuing reports of tampering on "dead man controls," and some even on Automatic Train Control.

This is an extremely serious problem. The best safety devices we can design will have little impact if they are disabled by the very people they are designed to protect -- railroad employees. And our ability to deal with this issue is impaired by the approach taken in the Railroad

Safety Act, which gives us only the authority to sanction railroad companies--and no civil enforcement authority over railroad employees.

We will have to work with both the railroads and the railway supply industry to determine what modifications, if any, can be made to state-of-the-art equipment to render it less susceptible to tampering. But few devices can truly be made tamper proof. We are going to need the active support and involvement of railway labor leaders in creating a peer environment that does not tolerate this type of equipment tampering.

2. Automatic Train Control

Automatic Train Control (ATC) -- which forces a locomotive to slow in response to a signal should the engineer disregard it -- has been a functioning part of Northeast Corridor operations for a number of years. Roadbed transmission units have been installed on the Corridor from Washington, D.C. to Boston; virtually all Amtrak power units operating on the Corridor have now been equipped with ATC receivers. The Amtrak locomotive destroyed in the collision of January 4 was ATC-equipped.

It's doubtful that ATC will be extended to other regions of the country. Installation costs for track infrastructure range from $160,000 per mile for single track to $240,000 per mile for double track. ATC receiver units cost $35,000 to $50,000 per locomotive. The cost of retrofitting only the nation's signalled main lines would exceed $13 billion -- which approaches the net worth of the railroads operating that trackage.

In the Northeast Corridor, however, the most expensive part of the ATC system -- the roadbed transmission infrastructure -- is already in place. Because of FRA's efforts, much of that system has been upgraded. Since this is the area of the country with the heaviest passenger volume, and the area in which passenger trains operate at the highest authorized speeds, we believe there is merit in exploring the feasibility and potential safety impact of requiring that non-Amtrak locomotives operating on the Corridor be equipped with receiver units. Freight volumes on Conrail have declined substantially since the costs and benefits of such an approach were debated a decade ago, and the issue is one of a number of options worth revisiting in our post-accident assessment. We intend to do so.

Having financed the modernization of ATC on the Northeast Corridor, we are thoroughly familiar with its advantages and its limitations. And I must caution the Committee that this system is not a panacea.

ATC cannot prevent an accident that involves false proceed signal indications, since the signal system triggers the ATC. It addresses one, but only one, of the several accident situations that can arise in a railroad operating environment -- the case in which a train crew fails to respond to warning devices and runs an operating signal. That is an extremely rare occurrence, although its consequences can be severe. The system is susceptible to tampering, and freight operators have questioned whether its effectiveness in stopping short, light weight passenger trains necessarily implies that it would be equally safe or effective in stopping heavy long haul freights. While these questions are susceptible to resolution, and remedial design if necessary, they are factors to be weighed and judging what is in fact a complex and difficult issue.

3. Freight off the Corridor

As recently as November 1986, FRA submitted to the Congress a comprehensive report summarizing options for diverting freight traffic from the Northeast Corridor. Similar

reports had been published by this Agency and the United States Railway Association (USRA) in the mid 1970's and early 1980's. Freight diversion is an extremely complex issue. For costs ranging from $23 to $344 million, systems can be constructed by Conrail and connecting railroads to shift from 26 to 100 percent of freight traffic to other lines. But these figures do not include additional operating costs for Conrail, nor do they measure the impact of added circuity on Conrail's operations. Large scale diversion would also shift freight traffic from the most modern rail Corridor in the nation, with state-of-the-art safety devices and without grade crossings, to a line with more than sixty grade crossings and conventional safety systems. Full diversion would, in addition, deprive Amtrak of more than $25 million in revenues.

The various reports recommending freight diversion have done so principally for reasons of efficiency and improved maintenance capacity, with safety a secondary objective. There is nothing inherently unsafe about shared passenger/freight operations. Amtrak shares every mile of its 23,500 mile system with freight operations, as American passenger trains have done for more than 100 years. Nor is there anything in this accident unique to freight operations. A signal that fails does not distinguish between passenger and freight, and a crew that misreads or

ignores a signal in a freight locomotive is just as likely to do so in a passenger cab. Only in the extremely rare case of a shifting load or overhanging freight on parallel track operations, is there any accident exposure unique to shared trackage.

Of course, the exposure to accident potential is in direct relation to volume, and by lowering volumes on the Corridor, diversion would reduce safety exposure to at least some extent. This is not an issue that can be addressed through regulation. Conrail's right to run on the Corridor is a property right, resulting from an easement retained in the transfer of the Corridor to Amtrak. To eliminate Conrail's right to operate on the Corridor, that easement would have to be condemned, and compensation to Conrail provided.

4. Crashworthiness

FRA has worked with Amtrak over a period of years to redesign intercity passenger cars to improve their ability to survive impact accidents and derailments. As a consequence of those efforts, Amtrak vehicles are now equipped with crash posts, seats have been retrofitted with improved locking devices, and a prototype luggage restraint system designed especially for intercity passenger traffic has been developed.

This is the only true high speed accident Amtrak has experienced in this decade. We must respond to this tragedy by analyzing the impact of those design changes, and developing further refinements where necessary.

On the day after the accident, FRA inspectors photographed the interiors of the surviving cars, and are translating those photographs into charts defining the effect of the impact on Amtrak's interior fixtures.

Preliminary counts on seat survivability are encouraging. Only nine of the 692 seats in the surviving cars appear to have separated from their moorings. That is an extraordinary result in a collision between an object moving at 105 m.p.h. and a stationary object. In the past, seat separation had been a problem in accidents at lower speeds. We have determined that approximately 15% of the seats rotated to some degree, and are attempting to determine how much of that occurred on impact, and how much is a consequence of rescue operations. We will evaluate the safety impact of those findings, if any.

Inspection of the post-accident vehicles has reinforced our standing concern about loose baggage. While baggage is rarely implicated in actual injuries, its presence in

aisles and doorways is an obstacle to maximum efficiency in rescue operations. FRA has been working with Amtrak since last summer to develop prototype designs for a luggage restraint system adapted to the particular needs of railroad passengers. In-service testing is scheduled to begin in early February, and the data compiled from this accident should assist us in evaluating and, if necessary, refining the prototype design.

Finally, despite a retrofit by Amtrak to resecure the microwave ovens in its cafe cars, it appears two of these ovens came free from their moorings on impact. While they caused no known injuries, we are concerned about the potential for injury and will work with Amtrak to determine whether the microwaves in this train had received the retrofit, and if they had, to develop a more effective system.

In underview, however, it is remarkable that in an accident as severe as this -- with a train striking a standing object at more than 100 miles per hour -- 579 of the 595 crew and passengers survived, and more than 365 walked away without injury. We have made progress, but we can do more and will leave no stone unturned in that process.