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Brake System Safety Standards for Freight and Other Non-Passenger Trains and Equipment; End-of-Train Devices; Final Rule

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

49 CFR Parts 229, 231, and 232

[FRA Docket No. PB–9; Notice No. 17]

RIN 2130–AB16

Brake System Safety Standards for Freight and Other Non-Passenger Trains and Equipment; End-of-Train Devices

AGENCY: Federal Railroad Administration (FRA), DOT.

ACTION: Final Rule.

SUMMARY: FRA is issuing revisions to the regulations governing the power braking systems and equipment used in freight and other non-passenger railroad train operations. The revisions are designed to achieve safety by better adapting the regulations to the needs of contemporary railroad operations and facilitating the use of advanced technologies. These revisions are being issued in order to comply with Federal legislation, to respond to petitions for rulemaking, and to address areas of concern derived from experience in the application of existing standards governing these operations.

EFFECTIVE DATE: April 1, 2001. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of April 1, 2001.

ADDRESSES: Any petition for reconsideration should reference FRA Docket No. PB–9, Notice 17, and be submitted in triplicate to FRA Docket Clerk, Office of Chief Counsel, RCC–10, 1120 Vermont Avenue, Mail Stop 10, Washington, DC 20590.

FOR FURTHER INFORMATION, CONTACT: Leon Smith, Deputy Regional Administrator—Region 3, FRA Office of Safety, RRS–14, 1120 Vermont Avenue, Stop 25, Washington, DC 20590 (telephone 404–562–3800), or Thomas Herrmann, Trial Attorney, Office of the Chief Counsel, RCC–10, 1120 Vermont Avenue, Stop 10, Washington, DC 20590 (telephone 202–493–6053).

SUPPLEMENTARY INFORMATION:

I. Background

In 1992, Congress amended the Federal rail safety laws by adding certain statutory mandates related to power brake safety. *See* 49 U.S.C. 20141. These amendments specifically address the revision of the power brake regulations by adding a new subsection which states:

(r) POWER BRAKE SAFETY.—(1) The Secretary shall conduct a review of the Department of Transportation's rules with respect to railroad power brakes, and not later than December 31, 1993, shall revise such rules based on such safety data as may be presented during that review.

(2) In carrying out paragraph (1), the Secretary shall, where applicable, prescribe standards regarding dynamic brake equipment. * * *

Pub. L. 102–365, section 7; codified at 49 U.S.C. 20141, superseding 45 U.S.C. 431(r).

In response to the statutory mandate, the various recommendations and petitions for rulemaking, and due to its own determination that the power brake regulations were in need of revision, FRA published an Advance Notice of Proposed Rulemaking (ANPRM) on December 31, 1992 (57 FR 62546), and conducted a series of public workshops in early 1993. The ANPRM provided background information and presented questions on various subjects including the following: the use and design of end-of-train (EOT) telemetry devices; the air flow method of train brake testing; the additional testing of train air brakes during extremely cold weather; the training of employees to perform train brake tests and inspections; computer-assisted braking systems; the operation of dynamic brakes on locomotives; and other miscellaneous subjects relating to conventional brake systems as well as information regarding high speed passenger train brakes. The questions presented in the ANPRM on the various topics were intended as fact-finding tools and were meant to elicit the views of those persons outside FRA charged with ensuring compliance with the power brake regulations on a day-to-day basis.

Based on the comments and information received, FRA published a Notice of Proposed Rulemaking (1994 NPRM) regarding revisions to the power brake regulation. *See* 59 FR 47676 (September 16, 1994). In the 1994 NPRM, FRA proposed a comprehensive revision of the power brake regulations which attempted to preserve the useful elements of the current regulatory system in the framework of an entirely new document. FRA attempted to delineate the requirements for conventional freight braking systems from the more diverse systems for various categories of passenger service. In developing the NPRM, FRA engaged in a systems approach to the power brake regulations. FRA considered all aspects of a railroad operation and the effects that the entire operation had on the train and locomotive power braking systems. Therefore, the proposed requirements not only addressed specific brake equipment and inspection requirements, but also attempted to encompass other aspects of a railroad's operation which directly affect the quality and performance of the braking system, such as personnel qualifications; maintenance requirements; written procedures governing operation, maintenance, and inspection; record keeping requirements; and the development and integration of new technologies.

Following publication of the 1994 NPRM in the **Federal Register**, FRA held a series of public hearings in 1994 to allow interested parties the opportunity to comment on specific issues addressed in the NPRM. Public hearings were held in Chicago, Illinois on November 1–2; in Newark, New Jersey on November 4; in Sacramento, California on November 9; and in Washington, DC on December 13–14, 1994. These hearings were attended by numerous railroads, organizations representing railroads, labor organizations, rail shippers, and State governmental agencies. Due to the strong objections raised by a large number of commenters at these public hearings, FRA announced by notice published on January 17, 1995 that it would defer action on the NPRM and permit the submission of additional comments prior to making a determination as to how it would proceed in this matter. *See* 60 FR 3375. Although the comment period officially closed April 1, 1995, FRA continued to receive comments on the NPRM as well as other suggested alternatives well into October 1995.

Furthermore, beginning in mid-1995, FRA internally committed to the process of establishing the Railroad Safety Advisory Committee (RSAC). The determination to develop the RSAC was based on FRA's belief that the continued use of ad hoc collaborative procedures for appropriate rulemakings was not the most effective means of accomplishing its goal of a more consensual regulatory program. FRA believed that the establishment of an advisory committee to address railroad safety issues would provide the best opportunity for creating a consensual regulatory program to benefit the Administrator in the conduct of her statutory responsibilities. FRA envisioned that the RSAC would allow representatives from management, labor, FRA, and other interested parties to cooperatively address safety problems by identifying the best solutions based on agreed-upon facts, and, where regulation appears necessary, by identifying regulatory options to implement these solutions. The process of establishing the RSAC was not complete until March 1, 1996, and on March 11, 1996, FRA published a notice

in the **Federal Register** that the Committee had been established. *See* 61 FR 9740.

In the interim, based on these considerations and after review of all the comments submitted, FRA published a notice in the **Federal Register** on February 21, 1996, stating that, in order to limit the number of issues to be examined and developed in any one proceeding, FRA would proceed with the revision of the power brake regulations via three separate processes. *See* 61 FR 6611. In light of the testimony and comments received on the 1994 NPRM, emphasizing the differences between passenger and freight operations and the brake equipment utilized by the two, FRA decided to separate passenger equipment power brake standards from freight equipment power brake standards. As passenger equipment power brake standards are a logical subset of passenger equipment safety standards, it was determined that the passenger equipment safety standards working group would assist FRA in developing a second NPRM covering passenger equipment power brake standards. *See* 49 U.S.C. 20133(c). In addition, in the interest of public safety and due to statutory as well as internal commitments, FRA determined that it would separate the issues related to two-way EOTs from both the passenger and freight issues, address them in a public regulatory conference, and issue a final rule on the subject as soon as practicable. A final rule on two-way EOTs was issued on December 27, 1996. *See* 62 FR 278 (January 2, 1997). Furthermore, it was announced that a second NPRM covering freight equipment power brake standards would be developed with the assistance of RSAC. At the Committee's inaugural meeting on April 1–2, 1996, the RSAC officially accepted the task of assisting FRA in development of revisions to the regulations governing power brake systems for freight equipment. *See* 61 FR 29164.

Members of RSAC nominated individuals to be members of the Freight Power Brake Working Group (Working Group) tasked with making recommendations regarding revision of the power regulations applicable to freight operations. The Working Group was comprised of thirty-one voting members as well as a number of alternates and technical support personnel. The following organizations were represented by a voting member and/or an alternate on the Working Group:

Association of American Railroads (AAR)
The American Short Line Railroad Association (ASLRA)
Brotherhood of Locomotive Engineers (BLE)
The Burlington Northern and Santa Fe Railway Company (BNSF)
Canadian National Railroads (CN)
Canadian Pacific Rail Systems (CP)
Consolidated Rail Corporation (CR)
CSX Transportation, Incorporated (CSX)
Illinois Central Railroad Company (IC)
International Association of Machinists & Aerospace Workers (IAMAW)
National Transportation Safety Board (NTSB)(Advisor)
National Association of Regulatory Commissioners (NARUC)
California Public Utilities Commission (CAPUC)
Norfolk Southern Corporation (NS)
Railway Progress Institute (RPI)
Sheet Metal Workers International Association (SMWIA)
Southern Pacific Lines (SP)
Transportation Communications International Union/Brotherhood of Railway Carmen (TCU/BRC)
Transport Workers Union of America (TWU)
Union Pacific Railroad Company (UP)
United Transportation Union (UTU)

The Working Group held seven multi-day sessions in which all members of the working group were invited. These sessions were held on the following dates:

May 15–17, 1996 in Washington D.C.;
June 11–13, 1996 in Chicago, Illinois;
July 31, 1996 in Chicago, Illinois;
August 21–23, 1996 in Annapolis, Maryland;
September 26–27, 1996 in Washington D.C.;
October 29–30, 1996 in Washington D.C.; and
December 4, 1996 in St. Louis, Missouri.

General minutes of each of these meetings are contained in FRA Docket PB–9 and are available for public inspection during the times and at the location noted previously. In addition to these meetings, there were numerous meetings conducted by smaller task force groups designated by the Working Group to further develop various issues. All of these smaller task forces were made up of various members of the Working Group or their representatives, with each task force being represented by management, labor, FRA, and other interested parties. The Working Group designated smaller task forces to address the following issues: Dry air; dynamic brakes; periodic maintenance and testing; electronically controlled locomotive brakes; and inspection and testing requirements. These task forces were assigned the job of developing the issues related to the broad topics, presenting reports to the larger Working Group, and if possible making recommendations to the Working Group for addressing the issues.

Although the Working Group discussed, debated, and attempted to reach consensus on various issues related to freight power brakes, consensus could not be reached. However, the working group in conjunction with the various task forces developed a wealth of information on various issues and further clarified the parties' positions regarding how the issues could or should be addressed in any regulation. The major cluster of issues, upon which resolution of many of the other issues rested, were the requirements related to the inspection and testing of brake equipment. The inspection and testing task force met on numerous occasions and gathered and reviewed data, and the labor and rail management representatives to the task force drafted various proposals and options related to the inspection and testing of freight brake equipment. The Working Group discussed the proposals and investigated many of the costs and benefits related to the various proposals as well as the safety implications; however, the Working Group could not reach any type of consensus position. Consequently, FRA declared that an impasse had been reached and announced, at the December 4, 1996 meeting of the Working Group, that FRA would proceed unilaterally with the drafting of the NPRM.

Subsequent to December 4, 1996, several members of the Working Group, including representatives from both rail management and labor, continued informal discussions of some of the issues related to the inspection and testing of freight equipment. These representatives informed FRA that a consensus proposal might be possible, provided that the Working Group were permitted to continue deliberations. Consequently, FRA agreed to reconvene the Working Group, and in April 1997 three additional meetings were conducted on the following dates:

April 2–3 in Kansas City, Missouri;
April 10–11 in Phoenix, Arizona; and
April 23 in Jacksonville, Florida.

Representatives of both rail management and rail labor presented the Working Group with inspection and testing proposals for consideration and review both before and during this period. Although the proposals were discussed and deliberated, the Working Group was once again unsuccessful in

reaching consensus on any of the freight power brake inspection and testing issues. Consequently, by letter dated May 29, 1997, FRA informed the members of the Working Group that FRA would be withdrawing the freight power brake task from the Working Group at the next full RSAC meeting on June 24, 1997. FRA provided this notice to avoid any misunderstanding regarding the process by which the proposed rule would be drafted. FRA also informed the members of the Working Group that it would not invest further time in attempting to reach consensus unless all other members of the Working Group jointly indicated that they have reached consensus on a proposal and wanted to discuss it with FRA. FRA noted that if that were to occur prior to June 24, 1997, it would reconsider withdrawing the task from RSAC. As no consensus proposal was presented to FRA prior to June 24, 1997, FRA withdrew the task from the Working Group and informed the members of RSAC that FRA would proceed independently in the drafting of a freight power brake NPRM.

FRA carefully considered the information, data, and proposals developed by the Freight Power Brake Working Group as well as all the oral and written comments offered by various parties regarding the 1994 NPRM on power brakes when developing a revised power brake NPRM. On September 9, 1998, an NPRM (1998 NPRM) was published in the **Federal Register** proposing brake system safety standards for freight trains and equipment. *See* 63 FR 48294 (September 9, 1998).

As evidenced by the preceding discussion, FRA spent years developing the 1998 proposed power brake regulations. During that time, FRA instituted rulemakings to address passenger and commuter operations and equipment and two-way end-of-train devices, and developed a channel of communication to address tourist and excursion operational concerns. Consequently, the 1998 proposal focused solely on freight and other non-passenger operations. FRA did not, for the most part, attempt to include provisions related to the inspection and maintenance of locomotive braking systems or to the performance of other mechanical inspections that are currently addressed by other parts of the regulations. FRA believed that although those requirements are interrelated to the inspection, testing, and maintenance of freight power brakes, they are adequately addressed in other regulations and would only add to the complexity of the proposal, causing confusion and misunderstanding by members of the regulated community.

When developing the 1998 NPRM, FRA determined that the proposal would closely track the existing requirements related to the inspection, testing, and maintenance of the braking systems used in freight operations. Although FRA recognized that the current regulatory scheme tended to create incentives to ''overlook'' defects or fail to conduct vigorous inspections, FRA also believed that the current regulatory scheme is an effective and proven method of ensuring safety and that many of the ''negative incentives'' could be greatly reduced by strict and aggressive enforcement coupled with moderate revisions to address specific concerns raised by interested parties. Furthermore, representatives of both rail labor and rail management indicated that if a consensus proposal could not be developed then FRA should proceed on its own with developing a proposal which tracks the current requirements, and that FRA should strictly enforce those requirements.

The 1998 NPRM proposed a moderate, although comprehensive, revision of the existing requirements related to the inspection, testing, and maintenance of brake equipment used in freight operations. The proposal attempted to balance the concerns of rail labor and management and increase the effectiveness of the regulation. In the 1998 NPRM, FRA attempted to reorganize, update, and clarify the existing regulations related to freight power brakes and eliminate potential loopholes created by the existing regulatory language. Furthermore, completely new requirements were proposed to address the qualifications of those individuals conducting brake inspections and tests. FRA also proposed requirements related to the movement of freight equipment with defective or inoperative brakes which were consistent with existing statutory requirements and other federal regulations addressing the movement of defective freight equipment. The 1998 NPRM also attempted to codify existing maintenance requirements related to the brake system and its components and prevent unilateral changes to those provisions by the very party to which they apply. Moreover, the proposal also contained specific requirements related to dynamic brakes and requirements aimed at increasing the quality of air introduced into brake systems by yard air sources.

In addition to the above, the 1998 proposal also contained various incentives to the railroads to encourage the performance of quality brake inspections, particularly at locations where trains originate. These included incentives to use qualified mechanical forces to conduct brake system tests at major terminals where long-distance trains originate in order to move these trains greater distances between brake inspections than existing regulations permitted. Consequently, the 1998 proposal retained the basic inspection intervals and requirements contained in the existing regulations and preserved the useful elements of the existing system, but also proposed additions, clarifications, and modifications that FRA believed would increase the safety, effectiveness, and enforceability of the regulations.

Following publication of the 1998 NPRM, FRA held two public hearings and a public technical conference to allow interested parties the opportunity to comment on specific issues addressed in the NPRM. The public hearings were held in Kansas City, Missouri on October 26 and in Washington, DC on November 13, 1998. The public technical conference was conducted in Walnut Creek, California on November 23 and 24, 1998. The hearings and technical conference were attended by numerous railroads, organizations representing railroads, labor organizations, rail shippers, and State governmental agencies. During the hearings and technical conference a vast amount of oral information was presented, and a considerable number of issues were raised and discussed in detail.

Subsequent to conducting these public hearings and technical conference, FRA issued a notice extending the comment period on the NPRM from January 15, 1999 to March 1, 1999. *See* 64 FR 3273. This extension was provided based on the requests of several interested parties for more time in which to develop their responses. At the public hearings and technical conference conducted in relation to the NPRM and in written comments submitted subsequent to the public hearings and technical conference, concerns were raised regarding the data discussed by FRA in the NPRM. The comments raised concerns regarding FRA's collection of data related to FRA's inspection activity and the number of conditions not in compliance with Federal regulations found during that inspection activity. The comments and correspondence received alleged that there were substantial problems with FRA's database, that there had been substantial overreporting of the number of units inspected, and that there had been a systematic deflation of power brake defect ratios.

As the allegations and concerns raised were general in nature, FRA believed it prudent and necessary to allow interested parties to fully explain and discuss their concerns. Therefore, FRA conducted a public meeting on May 27, 1999 to permit the exchange of information and concerns regarding FRA's database and the information developed from that database. *See* 64 FR 23816 (May 4, 1999). The purpose of the meeting was to allow FRA to provide information regarding its internal review of the data and address some of the concerns raised as well as to allow interested parties to further develop and articulate the issues and concerns they had with regard to the data gathered and presented by FRA in the NPRM.

FRA has carefully considered all the information, data, and proposals submitted in relation to FRA Docket PB–9 when developing this final rule. This includes: the information, data and proposals developed by the RSAC Freight Power Brake Working Group; all oral and written comments submitted in relation to the 1994 NPRM on power brakes; and all oral and written comments submitted regarding the 1998 NPRM on freight power brakes. In addition to the preceding information, FRA's knowledge and experience with enforcing the existing power brake regulations were also relied upon when developing this final rule.

II. Overview of Comments and General FRA Conclusions

The following discussions are grouped by major themes and issues addressed in the 1998 NPRM and the oral and written comments submitted in relation to that document. In each of the major issue areas, FRA has attempted to outline the significant portions of the proposal, discuss the comments received on the proposal and any alternative approach recommended, and provide a general idea of how FRA has decided to address the issues or approaches.

A. Accident/Incident History and Defective Equipment

The 1998 NPRM contained a detailed discussion regarding the accident/incident data which FRA considered when developing the proposal. In that discussion, FRA noted that it considers a variety of factors in attempting to determine the relative condition of the industry as it relates to the safety of train power brake systems. Two of the factors considered when making this assessment are the number of recent brake-related incidents and the amount of defective brake equipment recently discovered operating over the railroad system, both of which provide some indication as to the potential or likelihood of future brake-related incidents. Due to concerns raised in both written comments and at the public meeting conducted on May 27, 1999, regarding the accident/incident data and power brake defect ratio data discussed above, FRA believes it is necessary to further explain how these data were used in developing this final rule.

1. Accident/Incident Data

In order to determine the potential quantifiable safety benefits to be derived from the provisions proposed in the NPRM and either retained or modified in this final rule, FRA conducted a review of all accidents/incidents reported to FRA to determine which incidents/accidents could potentially have been prevented had the provisions of the rule been in place. For purposes of the NPRM, FRA identified a brake-related incident as being an incident reported to FRA as being caused by one of the following: brake rigging down or dragging; air hose uncoupled or burst; broken brake pipe or connections; other brake components damaged, worn, broken or disconnected; brake valve malfunction (undesired emergency); brake valve malfunction (stuck brake); hand brake broken or defective; hand brake linkage and/or connections broken or defective. For purposes of the NPRM, FRA did not consider brake pipe obstruction-related incidents because FRA believed they had been fully considered at the time that FRA promulgated the final rule relating to the use of two-way end-of-train devices.

In written comments and at the public meeting held in conjunction with the NPRM, several labor representatives raised concerns regarding FRA's reliance on accident/incident information which is essentially reported to FRA by the railroads. These representatives contend that railroads have an economic incentive to report accidents/incidents as being due to human factors rather than to mechanical problems or deficiencies. Thus, they contend that the potential safety benefits identified by FRA in the NPRM are inaccurate and underestimated because the data used to determine those benefits are developed by the railroads. FRA tends to agree with the concerns raised by these commenters and raised this concern in its discussion of the accident/incident data in the NPRM.

In the NPRM, FRA acknowledged that the presented brake-related incidents most likely did not accurately reflect the total number of incidents that were potentially linked, in some part, to brake-related causes and did not provide a complete picture of the costs associated with the identified incidents. *See* 63 FR 48297. FRA recognized that the information on most incidents is provided by the railroads which generally identify the direct cause of an incident but may not sufficiently identify all of the contributory causes in a manner to permit FRA to conclude that the brake system played a part in the incident. Thus, FRA acknowledged that there may be numerous incidents which occurred in the industry which were at least partially due to brake-related problems, but which were ultimately more closely linked to human error or other mechanical problems and thus, were reported to FRA under different cause codes. However, as it is extremely difficult to identify those accidents/incidents that may have been in some part related to a brake problem, FRA elected to include only those accidents specifically identified as brake-related in its quantified safety benefits and included other potential incidents as qualitative safety benefits in the NPRM. FRA also recognized that the damage costs provided to FRA by the railroads for the incidents identified in the NPRM failed to consider all of the costs associated with an accident such as: loss of lading; wreck clearance; track delay; environmental clean-up; removal of damaged equipment; evacuations; or the impact on local traffic patterns. *See* 63 FR 48297. Thus, for purposes of the NPRM, the property damages reported by the railroads were multiplied by a factor of 1.5625 in an effort to capture these non-reported damages. *See* 63 FR 48297.

In calculating the potential quantifiable safety benefits to be derived from this final rule, FRA has slightly expanded the criteria for determining the accidents/incidents which are addressed by this final rule. Thus, for purposes of this final rule the quantified safety benefits include a percentage of certain types of accidents reported as being due to human error or other than a brake-related mechanical problem. The quantified safety benefits for this final rule also include a percentage of those incidents which are considered brake pipe obstruction-related. Although these accidents were considered in relation to the two-way EOT final rule, FRA believes that this final rule will prevent an additional percentage of those incidents that were not captured by the two-way EOT final rule.

Table 1 below contains a compilation of the relevant incidents that FRA

considers to be preventable that have been reported to FRA from 1994 through 1998. The incidents included in this table contain incidents reported to FRA as being caused by one of the following: Brake rigging down or dragging; air hose uncoupled or burst; broken brake pipe or connections; other brake components damaged, worn, broken or disconnected; brake valve malfunction (undesired emergency); brake valve malfunction (stuck brake); hand brake broken or defective; hand brake linkage and/or connections broken or defective. Table 1 also contains incidents reported as being related to brake pipe obstructions and certain brake-related human factor incidents which include: runaway cuts of cars; train handling; and improper use of brakes. FRA believes that various provisions of this final rule have the potential of preventing a certain percentage of the incidents reported as being due to these causes. However, in developing the cost/benefit analysis for this final rule, FRA used a very conservative effectiveness rate of .2 for incidents with these reported causes. The Regulatory Impact Analysis prepared in connection with this final rule provides a detailed discussion of how certain human factor and brake pipe obstruction incidents were utilized when evaluating this rule.

It should be noted that the damage costs noted in Table 1 for the identified incidents are based on the damage to railroad property or equipment. Thus, the damages presented fail to consider the costs associated with the injuries and fatalities involved. These costs are calculated in detail in the Regulatory Impact Analysis prepared in connection with this final rule. The costs presented in Table 1 also do not consider such things as: loss of lading; wreck clearance; track delay; environmental clean-up; removal of damaged equipment; evacuations; or the impact on local traffic patterns. Consequently, the railroad property damages have been multiplied by a factor of 1.5625 in an effort to capture some of these non-reported damages.[1]

TABLE 1.—BRAKE-RELATED INCIDENTS

Year	Number of accidents	Injuries	Fatalities	Damages *
1994	99	24	1	$11,414,346
1995	121	65	0	9,431,582
1996	112	44	3	20,637,986
1997	98	8	0	9,651,569
1998	121	3	0	10,791,626
Total	551	140	4	61,927,107

* Increased by 56.25% to reflect unreported damages.

2. Use of Power Brake Defect Data

A second factor that is considered by FRA, to some extent, in determining the relative condition of the industry in regard to the safety of power brake equipment is the percentage of equipment found with defective brakes during FRA inspections and special projects. As noted in the preceding discussions, the method for calculating and determining the percentage of equipment with defective brakes was a contentious subject within the RSAC Power Brake Working Group prior to the issuance of the NPRM and at the public hearings and meetings conducted subsequent to the issuance of the NPRM. In the NPRM, FRA provided a lengthy discussion regarding the data it had available regarding power brake defect ratios and the limitations regarding the use of such data. *See* 63 FR 48298. In that discussion, FRA explained that data on brake defects is collected by FRA inspectors as they do rail equipment inspections and during special projects conducted under the Safety Assurance and Compliance Program (SACP). The NPRM made clear that the data collected during these activities is not suitable for use in any statistical analysis of brake defects.

In order to perform a statistically valid analysis, either all cars and locomotives must be inspected (prohibitively expensive), or a statistically valid sample must be collected. For the sample to be valid for the purpose of statistical analysis, the sample must be randomly selected so that it will represent the same characteristics as the universe of data. Random samples have several unique characteristics. They are unbiased, meaning that each unit has the same chance of being selected. Random samples are independent, or the selection of one unit has no influence on the selection of other units. Most statistical methods depend on independence and lack of bias. Without a randomized sample design there can be no dependable statistical analysis, and no way to measure sampling error, no matter how the data is modified. Random sampling ''statistically guarantees'' the accuracy of the results.

The sampling method used for regular FRA inspections is not random. It is more of a combination between a *judgement* sample and an opportunity sample. The opportunity sample basically just takes the first sample population that comes along, while the judgement sample is based on ''expert'' opinion. The sampling method used for SACP inspections is also a judgement sample, where FRA is focusing its inspections on a specific safety concern. This method is extremely prone to bias, as FRA is typically investigating known problem areas. Furthermore, some SACP inspections are joint inspections with labor. Consequently, it is unknown whether the final reports reflect only FRA defects, as many of the joint inspections had both AAR and FRA defects recorded.

Neither the regular FRA inspections nor the SACP inspections were designed for random data collection. Although both are very useful to FRA, they were not designed for this purpose and the data should be used carefully. FRA believes that data collected during routine inspections are the most likely data to accurately reflect the condition of the fleet. However, both FRA inspection data and SACP data lack any measuring device, a defect is a defect and no distinction is made between a critical defect versus a minor defect. Furthermore, the estimated correlation coefficients between defects and

[1] AAR surveyed its members and reported that, on average, these other costs constitute an additional 56.25 percent of the reported damages.

accidents were not found to be statistically significant. This does not mean that defects cannot lead to collisions or derailments as the lack of correlation could easily be a result of non-random sampling. Therefore, the data collected both during routine FRA inspections and under SACP cannot be used as a proxy for data collected by means of a random sample for the purpose of statistical analysis. The sample is not random, so no dependable statistical analysis may be performed. Consequently, FRA did not and will not use the data regarding power brake defects for the purpose of conducting any type of statistical analysis.

In the NPRM, FRA provided brake defect ratio's for the years 1993 through 1997 based upon the data contained in its database. *See* 63 FR 48298, Table 2. The average brake defect ratio for this five year period was 3.84 percent. The NPRM also noted that the available SACP data (which focuses on known problem areas) indicated brake defect ratios as high as 35 percent at some locations. FRA stated that the SACP data in all likelihood indicates that there are localized areas of concern and that some railroads have particular yards or operations with persistent problems. The NPRM attempted to make clear that FRA believes that brake defects are in all likelihood higher than that indicated by FRA's database and that the reality of power brake defects lies somewhere between the 3.84 percent represented in FRA's database and the 35 percent found at certain locations. FRA noted that actual power brake defect ratios are probably closer to the percentage reflected in FRA's database because FRA examines almost ½ million freight cars and locomotives annually. Thus, contrary to the assertions of certain commenters, FRA did not assert or contend that the power brake defect ratios represented by its database were an accurate or precise reflection as to the relative condition of the industry. In fact, as evidenced by the preceding discussion, FRA attempted to point out the limited usefulness of the data contained in its database. Furthermore, review of the defect data submitted by the BRC at the technical conference in Walnut Creek, California, as discussed below, appears to support FRA's conclusions regarding power brake defect ratios.

The NPRM made clear that the power brake defect ratios indicated in FRA's database were specifically relied on only to calculate the cost of the requirement to conduct retests on cars found with brakes that are not applied during the performance of the various required brake tests. Power brake defect ratios were not specifically relied on when developing any provision contained in the NPRM or in this final rule. Although power brake defect ratios were considered, they were not used as the basis for any of the provisions proposed in the NPRM or contained in this final rule. They were generally used to aid FRA in identifying problem areas, which in turn helped FRA identify brake issues and practices that needed to be addressed. For example, the existence of high power brake defect ratios at a particular location or on a particular railroad likely indicate the existence of certain practices or procedures that create or contribute to the high defect levels. As is evident from the discussions of the various requirements contained in both the NPRM and in this final rule, FRA considered a massive amount of information when developing this rule. These included accident/incident data; information and data provided in relation to the 1994 NPRM, the RSAC Power Brake Working Group, and the 1998 NPRM as well as FRA's experience in the enforcement of existing regulations and the expertise and knowledge of FRA's field inspectors.

Although the data regarding defect ratios contained in FRA's database has limited usefulness in the context of developing a regulation, the data is very useful to FRA in other ways. The data is useful in measuring a railroad's general compliance level and aids in identifying problem areas or locations. This information aids FRA in allocating its inspections forces and permits FRA to focus its enforcement on locations or issues which are in the greatest need of such scrutiny. By focusing its enforcement in this manner FRA is able to make the best use of its limited resources.

3. Discussion of Concerns Regarding FRA's Collection of Power Brake Defect Data

Although the NPRM and the preceding discussion detail the limitations of using the data collected by FRA regarding power brake defects when developing a regulation, FRA believes that a more detailed discussion of FRA's collection of power brake defect data is needed in order to address the issues raised by various commenters subsequent to the issuance of the NPRM. As noted above, FRA conducted a public meeting on May 27, 1999 in order to address general concerns raised by various parties regarding the accuracy of the brake defect data presented in the NPRM and to provide interested parties the opportunity to develop the issues they generally raised in oral and written comments regarding that data. At this public meeting, representatives of several labor organizations raised issues regarding the accuracy and use of the power brake defect data complied by FRA. These commenters generally allege that the method by which FRA collects defect data results in the underreporting of defects which in turn results in a systematic deflation of power brake defect ratios.

Specific issues raised at this public meeting and in subsequent written comments include: the overreporting of units inspected during FRA inspections; the calculation and deflation of the power brake defect ratio; the inspection procedures used by FRA that tend to exclude certain categories of power brake defects; potential discrepancies in the input data relative to the activity codes from FRA field inspection reports to FRA's database; the performance of power brake inspections by FRA inspectors on cars that are not properly charged or connected to a source of compressed air; FRA's reliance on the railroads for the total number of cars inspected; and the wide variance between FRA inspectors and FRA regions in the number of units inspected, the number of defects reported, and the resulting defect ratios.

In order to understand some of the issues raised, it is necessary to understand how inspection data developed by an FRA inspector are entered into FRA's database. FRA Motive Power & Equipment (MP&E) inspectors conduct inspections of railroad freight equipment pursuant to various parts of the Federal regulations contained in chapter 49 of the Code of Federal Regulations. Principally, these include inspections under the following: Part 215—Freight Car Safety Standards; part 229—Locomotive Safety Standards; part 231—Safety Appliance Standards; and part 232—Power Brakes and Drawbars. When performing an inspection under each of these parts, an FRA inspector will fill out the appropriate inspection form which indicates the number of units inspected under each part as well as the number of defective conditions found on those units. In the context of performing power brake inspections under part 232, an inspection of a car means a unit count of one. When this type of inspection is conducted, inspectors inspect various brake-related car components such as: Foundation brake rigging, air hoses, angle cocks, brake shoes, and, where possible, piston travel. When an inspector performs an inspection of a brake test required under part 232, the unit count for such a test

is the train consist, block of cars, or car being tested. For example, when an inspector observes the performance of an initial terminal brake test, the entire train would constitute one unit count.

Certain labor representatives raised various issues regarding FRA's calculation of power brake defect ratios. Several of these concerns involve the potential overreporting of the number of units inspected which then results in the deflation of power brake defect ratios. One concern addressed the practice of counting a single car or locomotive as a unit count under each of the MP&E regulations that it is inspected under. For example, a freight car could be considered a unit count under part 215, part 231, and part 232 if an FRA inspector were to inspect that freight car under each of those provisions. Thus, one freight car could be represented as three unit counts. It is claimed that this practice inflates the number of units inspected and thus, deflates defect ratios. This concern would be valid if FRA were to attempt to express a defect ratio for combined parts of the CFR. For example, if FRA were to attempt to express an MP&E defect ratio (a combination of parts 215, 229, 231, and 232) then the method by which FRA collects data would result in an inflation of the number of units inspected and the resulting defect ratio would be skewed. For purposes of analysis, FRA's database is constructed so that defect ratios are expressed only in terms of each separate part of the CFR. Therefore, the power brake defect ratios discussed in the NPRM were calculated based solely on the units inspected by FRA under the provisions contained in part 232.

A second concern involves the potential of duplicate inspection reports being submitted by different FRA inspectors when engaged in team inspections. Certain labor representatives allege that FRA inspectors are significantly inflating the number of power brake units being inspected by submitting duplicate reports for the same inspection activity when groups of FRA inspectors perform inspections at the same location. In an effort to investigate this concern, FRA designed a computer program to search for potentially duplicate inspection reports submitted during the years of 1995 through 1998. Table 2 displays the figures regarding power brake inspections conducted by FRA for the years of 1995 through 1998 that is contained in FRA's database.

TABLE 2.—POWER BRAKE INSPECTIONS AND DEFECT RATIOS: 1995 THROUGH 1998*

Calendar year	Power brake units	Power brake defective units	All railroads power brake defect ratios	Class I RRs power brake defect ratios
1995	611,824	24,387	.03986	.0369
1996	646,140	28,795	.04456	.0419
1997	582,685	26,004	.04463	.045
1998	585,663	26,286	.04488	N/A

***Note**: Class I Railroads Power Brake Defect Ratios column information comes from the Regulatory Impact Analysis (RIA) for the 1998 NPRM on freight power brakes. No defect ratio was used in the report for calendar year 1998 because the RIA was finalized in August of 1998.

In order to identify potential duplicate reports the computer program identified inspection reports in which two or more FRA inspectors were in the same county, on the same day, on the same railroad, and in which at least one unit-count code matched. Table 3 displays the results of this search, showing the number of potential duplicate reports that were submitted from 1995 through 1998 and showing the potential number of over reported units.

TABLE 3.—POTENTIAL DUPLICATE POWER BRAKE INSPECTIONS 1995 THROUGH 1998

Calendar year	Inspection reports with more than one matching unit	Units	Potential duplicate units (half of units)
1995	39	1,965	983
1996	154	12,646	6,323
1997	342	19,482	9,741
1998	182	8,692	4,346

Table 4 and Table 5 display the impact of the potential duplicate reports on the calculation of power brake defect ratios. FRA believes that the data contained in Tables 4 and Table 5 establish that the impact of potential duplicate reports on the defect ratios presented in the NPRM is insignificant when considered in the context of nationwide data.

TABLE 4.—REVISED POWER BRAKE DATA CONSIDERING POTENTIAL DUPLICATE REPORTS 1995 THROUGH 1998

Calendar year	Power brake units	Potential duplicate units	Units minus potential duplicate units	Defective units	Defect ratios after adjusting for potential duplicate units
1995	611,824	983	610,841	24,387	.03992
1996	646,140	6,323	639,817	28,795	.04501
1997	582,685	9,741	572,944	26,004	.04539
1998	585,663	4,346	581,317	26,286	.04522

TABLE 5.—AFFECT OF POTENTIAL DUPLICATE REPORTS ON POWER BRAKE DEFECT RATIOS 1995 THROUGH 1998

Calendar year	Defect ratios before adjustment	Defect ratios after adjustment	Difference
1995	.03986	.03992	.00006
1996	.04456	.04501	.00045
1997	.04463	.04539	.00076
1998	.04488	.04522	.00034

It should be noted that the numbers presented in Tables 3 through Table 5 overstate the actual impact of potential duplicate inspection reports. For the year 1998, FRA conducted an in-depth analysis of the potential duplicate reports found by the computer program. The computer program identified 393 potential duplicate inspection reports for the year 1998. However, included in this grouping were unique inbound inspection reports, outbound inspection reports and split inspection reports. In addition, there were inspection reports from inspectors who worked in the same county, but at different locations. Each of these reports was removed from the 393 potentially duplicate inspection reports identified by the computer program based on a report-by-report analysis of each of the reports by FRA MP&E specialists. This analysis left 182 potential duplicate reports for 1998, which were used to calculate the figures presented in Tables 3 through 5 for 1998. Although these tables note 182 potential duplicate inspection reports involving 8,692 units (4,346 duplicates), a further analysis of the reports by FRA found that only 54 of the inspection reports were actually found to be duplicative. These 54 duplicate inspection reports involved the over-reporting of just 3,073 units rather than the 4,346 units identified in Table 4. As an in-depth analysis was not performed on the potential duplicate inspection reports identified by the computer program for the years of 1995 through 1997, the figures provided for those years in all likelihood greatly overstate the actual number of duplicate claims submitted in each of those years. Thus, the actual impact of duplicate inspection reports is even less than the small percentages indicated in Table 5 above.

Although the impact of duplicate inspection reports is insignificant, FRA believes that a brief discussion of how these duplicate inspection reports happened is necessary in order to assure interested parties that such occurrences are rare and that FRA has taken steps to avoid these inaccuracies. In 1994, FRA had four inspection forms for the Agency's five inspection disciplines. The Operating Practices and Hazardous Materials disciplines shared the same form. FRA also had a Quality Improvement Plan (QIP) daily activity report form to help the Agency track resource allocations, including the amount of time required to perform certain inspections. When ''team inspections'' occurred, one inspector completed the inspection report for the entire team. However, each inspector on the team was also required to complete a separate QIP report to receive credit for the inspection. On January 1, 1995, a newly developed single inspection form (FRA 6180.96) for all disciplines became operational. Furthermore, in May of 1995, FRA discontinued the collection of QIP-time data based on FRA's conclusion that it had adequate information from previous QIP reports regarding the time it takes to conduct various inspections. In addition, the new inspection form incorporated many of the previous QIP codes. In August 1995, FRA converted to a data collection system using personal computers.

After conducting the analysis discussed above, it was determined that 26 FRA MP&E inspectors inadvertently prepared all of the involved duplicate inspection reports. Furthermore, FRA was not aware that the new computer system did not filter out duplicate inspection reports. After becoming aware of these problems based on reports from its field personnel, FRA specifically addressed the issue of inspection reporting at FRA's multi-regional conference conducted in 1998. At this conference, FRA's Office of Safety management provided specific guidance on preparing reports that would eliminate potential duplicate reporting. During this same period, FRA also changed its computer software to give inspectors credit for inspections while at the same time preventing potential duplicate reporting. Furthermore, on March 5, 1999, FRA re-issued reporting procedures designed to prevent duplicate inspection reports when team inspections are conducted. These procedures were issued to all Federal and State inspection personnel and to all FRA Regional Administrators and Deputy Regional Administrators.

Subsequent to the public meeting conducted in May of 1999, FRA made two modifications to the summary data produced by its database in order to clarify the meaning of the data and to avoid misunderstanding by outside parties. The first modification relates to safety appliance inspections conducted under 49 CFR part 231. The summary data previously contained the heading ''SA & PB (cars and locomotives).'' This heading may have caused some confusion because the heading suggests that it applies to both safety appliance and power brake inspections when in reality the data captured under this heading only concerns safety appliance inspections under part 231. This heading has been modified to read ''SA (cars and locomotives)'' to more accurately reflect the information contained under this heading. FRA has also modified the summary data by eliminating the calculation of an MP&E defect ratio. As discussed above, FRA believes that the calculation of a composite MP&E defect ratio is inappropriate based on the way FRA collects the information contained in its database and would result in a deflation of MP&E defect ratios. Therefore, defect ratios will only be presented for each separate MP&E CFR part.

In response to the issue raised regarding FRA's practice of conducting brake inspections under part 232 while cars are not connected to a source of compressed air or not completely charged with air, FRA has developed a separate reporting code for brake inspections conducted in this manner. This reporting code will become effective in mid-2000 and will indicate when brake inspections are conducted on cars or trains that are not charged with compressed air. Although FRA agrees that the most thorough brake inspection is performed when a car or train is charged, a large majority of the brake components on a car can be inspected for abnormalities without the actual application of the air brakes. For example, cut-out air brakes, brake connection pins missing, brake rigging down or dragging, brake shoes worn to the extent that the backing plate comes in contact with the tread of the wheel,

angle cocks missing or broken, retainer valves broken or missing, and air brake piping bent or broken can all be discovered regardless of whether a car or train is charged with air. When FRA inspectors conduct train air brake tests, they inspect all of the components noted above as well as the operation of the train air brakes while under the required air pressures. FRA has conducted inspections of brake equipment in this manner for decades and will continue to conduct brake inspections under part 232 on equipment that is both on and off a source of compressed air. FRA believes that the addition of a code to identify those inspections conducted while equipment is not connected to a source of compressed air will provide a more accurate assessment of defective brake system components.

Two other issues raised by various individuals at the May 27, 1999, public meeting concerned FRA's reliance on railroads to determine the number of cars inspected and the wide disparity between FRA inspectors and regions with regard to the number of units inspected and defects reported. FRA acknowledges that FRA inspectors frequently rely on information provided by the railroad regarding car counts when initially conducting an inspection, which is sometimes higher than the actual number of cars being inspected. However, in most instances FRA inspectors request a copy of the consist prior to finalizing their inspection reports to ensure a proper unit count. FRA has issued guidance to its inspectors to ensure that the unit counts on all inspections are accurate.

Although FRA acknowledges that the number of brake inspections conducted varies somewhat from inspector to inspector and from region to region, FRA contends that these variances are the result of competing priorities and varying workloads within each region. FRA makes every effort to standardize its inspection activities by providing substantial training to each of its inspectors. This training is comprised of both classroom and on-the-job training. Classroom training conducted at least once a year at the Regional or Multi-Regional conferences, and through training provided by General Electric, General Motors-EMD, and Westinghouse Air Brake Company. Many regions also conduct discipline specific conferences with training on new regulations and issues provided by various subject matter experts. On-the-job training is provided through Regional Specialists and journeyman inspectors. These individuals will work one-on-one with the inspectors on the various types of inspections that the inspector is required to conduct. FRA also frequently issues enforcement guidance to its inspectors in the form of technical bulletins in order to ensure consistent enforcement of the regulations.

4. Review of Defect Data Submitted by the Brotherhood of Railway Carmen (BRC)

After issuance of the 1998 NPRM, FRA conducted a technical conference in Walnut Creek, California, on November 23 and 24, 1998. At this technical conference individuals representing the BRC submitted a vast amount of data collected either by its members at various locations or through joint labor and FRA inspection activities conducted at various locations. The data provided by BRC representatives addressed defective equipment found in various trains at seven different locations across the country during various time periods from October of 1997 to November of 1998. The BRC submitted this data in order to establish that the power brake defect ratios developed based on the information contained in FRA's database were inaccurate.

FRA conducted an in-depth review of the data submitted by BRC representatives. Although the BRC attempted to summarize the data for many of the locations addressed, FRA's review of the data discovered that the BRC's summaries counted defects that were not power brake defects, failed to summarize all the data for all the trains covered by the supporting documentation, and double counted some brake defects when calculating the number of defective cars. It should also be noted that approximately 80–90 percent of the defective conditions noted on the supporting documentation merely listed the defective condition as being ''brake shoes.'' This notation does not make clear whether the defective brake shoe was defective under the federal regulations or defective under AAR industry standards. However, in order to assess the data in a manner that is most favorable to the party submitting the data, FRA assumed that all defects noted as ''brake shoes'' were defective under Federal requirements. In conducting its analysis of the data submitted, FRA only considered power brake defects, whereas, BRC's summary data appear to consider other mechanical and safety appliance defects which are not the subject of this proceeding.

Table 6 contains a summary of FRA's in-depth analysis of the data submitted. FRA's analysis determined that the data submitted by the BRC establish a power brake defect ratio of approximately 4.96 percent, which is less than 1 percent higher than the power brake defect ratios developed based on the information contained in FRA's database for the years of 1996 and 1997, discussed in the 1998 NPRM. *See* 63 FR 48298. The analysis of the data submitted by the BRC indicates that some locations and some trains have power brake defect ratios in excess of 11 and 12 percent, which is consistent with the findings made and reported by FRA during various SACP inspections as noted in the preceding discussion and in the 1998 NPRM.

TABLE 6.—ANALYSIS OF DEFECT DATA SUBMITTED BY THE BRC

Location	Total trains inspected	Total cars inspected	Cars with power brake defect	Power brake defect ratio (percent)
North Platte, Nebraska	1,625	150,926	8,136	5.39
Hinkle Yard, Oregon	151	13,455	425	3.15
Oak Island-Newark, New Jersey	13	618	72	11.65
Kansas City, Missouri	180	11,917	159	1.33
Clovis, Alliance, Temple Yards—Texas	16	1,419	41	2.88
Sparks Yard—Sacramento, California	8	781	30	3.84
Various Locations, Mississippi	4	296	37	12.5
Totals	1,997	179,412	8,900	4.96

B. Inspection and Testing Requirements

As noted in the preceding discussions and in the 1998 NPRM, the issues related to the inspection and testing of the brake equipment on freight trains are some of the most complex and sensitive issues with which FRA deals on a daily basis. Consequently, the requirements related to the inspection and testing of freight power brakes must be viewed as the foundation on which the rest of the requirement contained in this final rule are based.

1. Brake Inspections—General

In the 1998 NPRM, FRA fully discussed the information and proposals submitted in response to the 1994 NPRM, as well as the proposals developed as part of the RSAC process. *See* 63 FR 48298–304 (September 9, 1998). Based on its review of that information and those proposals and based upon its experience in the enforcement of the current power brake regulations, FRA provided a detailed discussion as to why those alternatives were not viable models upon which a revision of the freight power brake requirements could be based. *See* 63 FR 48301–304. Rather than reiterate those discussions, FRA refers interested parties to the discussions contained in the 1998 NPRM noted above. In developing the inspection requirements contained in the NPRM, FRA determined that the proposed requirements should closely track the existing inspection requirements and intervals as they have proven themselves effective in ensuring the safety of railroad operations. FRA believed that moderate modifications to the existing requirements were necessary to ensure clarity, eliminate potential loopholes, incorporate current best practices of the industry, and enhance enforcement while providing some flexibility to the railroads to utilize new technologies and recognize contemporary railroad operations.

The current regulations are primarily designed around the following four different types of brake system inspections: Initial terminal; 1,000-mile; intermediate terminal; and brake pipe continuity check. *See* 49 CFR 232.12 and 232.13. These brake system inspections differ in complexity and detail based on the location of the train or on some event that affects the composition of the train. Each of the inspection provisions details specific actions that are to be performed and identifies the items that are to be observed by the person performing the inspection.

The initial terminal inspection described in § 232.12(c)–(j) is intended to be a comprehensive inspection of the brake equipment and is primarily required to be performed at the location where a train is originally assembled. This inspection requires the performance of a leakage test and an in-depth inspection of the brake equipment to ensure that it is properly secure and does not bind or foul. Piston travel must be checked during these inspections and must be adjusted to a specified length if found not to be within a certain range of movement. The brakes must also be inspected to ensure that they apply and release in response to a specified brake pipe reduction and increase. FRA recently issued enforcement guidance to its field inspectors clarifying that both sides of a car must be observed sometime during the inspection process in order to verify the condition of the brake equipment as required when performing an initial terminal inspection.

The current regulations require an intermediate brake inspection at points not more than 1,000 miles apart. These inspections are far more limited than the currently required initial terminal inspections in that the railroad is required only to determine that brake pipe leakage is not excessive, the brakes apply on each car, and the brake rigging is secure and does not bind or foul. *See* 49 CFR 232.12(b). In the 1982 revisions to the power brake rules, FRA extended the distance between these inspections from 500 miles to 1,000 miles.

The existing regulations also mandate the performance of an intermediate terminal brake inspection on all cars added to a train after it leaves its initial terminal, en route to its destination, unless they have been previously given an initial terminal inspection. This inspection requires the performance of a leakage test and verification that the brakes on each car added to the train and the rear car of the train apply and release. *See* 49 CFR 232.13(d). Railroads are permitted to use a gauge or device at the rear of the train to verify changes in brake pipe pressure in lieu of performing an application and release on the rear car. The current regulations also require that if cars that are given an intermediate terminal brake inspection and have not previously been provided an initial terminal inspection and are then added to a train, then the added cars must be given an initial terminal inspection at the next location where facilities are available for performing such an inspection.

The current regulations also require the performance of a brake pipe continuity test whenever minor changes to a train consist occur. This inspection requires that a brake pipe reduction be made and verification that the brakes on the rear car apply and release. Railroads are permitted to use a gauge or device at the rear of the train to verify changes in brake pipe pressure in lieu of visually verifying the rear car application and release. This inspection is to be performed when a locomotive or caboose is changed, when one or more consecutive cars are removed from the train, and when previously tested cars are added to a train.

In the 1998 NPRM, FRA noted that in its opinion railroads have not conducted the excellent initial terminal inspections that were contemplated in 1982, when FRA extended the 500-mile inspection interval to 1,000 miles. FRA also contended that many initial terminal brake inspections are being performed by individuals who are not sufficiently qualified or trained to perform the task. FRA recognized that since 1982 new technology and improved equipment have been developed that allow trains to operate for longer distances with fewer defects. However, the key to achieving this improved capability is to ensure the proper operation and condition of the equipment at the location where the train is initially assembled.

Although FRA agreed that many of the initial terminal inspections conducted by train crews are not of the quality anticipated in 1982 when the inspection interval was increased from 500 miles to 1,000 miles, FRA also conceded that properly trained and qualified train crew personnel can perform certain brake inspections and have been performing such inspections for many years. FRA stated that it did not believe that a reversion to a 500-mile inspection interval restriction on trains inspected by train crews, as sought by some commenters, would adequately address the concerns regarding the safety of those trains and would impose an economic burden on the railroads that could not be justified. In FRA's view, two of the major factors in ensuring the quality of brake inspections are the proper training of the persons performing the inspections and adequate enforcement of the requirements. Therefore, FRA proposed that the current 1,000-mile inspection interval be retained but that general training requirements for persons conducting brake inspections be established. The proposed training requirements included general provisions requiring both classroom and ''hands-on'' training, general testing requirements, and annual refresher training provisions. FRA also proposed that various training records be

maintained by the railroads in order for FRA to determine the basis for a railroad's determination that a particular person is qualified to perform a brake inspection, test, or repair. FRA believed that the proposed general training and recordkeeping requirements would provide some assurances that qualified people were conducting brake system inspections and tests. (See discussion below titled ''Training and Qualification of Personnel.'')

In addition to proposing general training requirements, FRA also noted its intent to enhance and increase its enforcement activities with regard to the performance of the brake inspections and tests eventually finalized in this rule, particularly those performed by train crews. FRA made clear that it would make a concerted effort to focus on the qualifications of train crew members and would strictly scrutinize the method and length of time spent by these individuals in the performance of the required inspections. FRA also committed to focus its inspection activities to ensure that train crews are provided the proper equipment necessary to perform many of the required inspections.

In addition to focusing its enforcement and to aid in that initiative, FRA proposed various clarifications, modernizations, and modifications of the current inspection requirements in order to close what are perceived to be existing loopholes and to incorporate what FRA believed to be the best practices existing in the industry while updating the requirements to recognize existing technology. FRA believed, and many representatives of rail labor and management agreed, that the current inspection requirements are very good for the most part and are sufficient to ensure a high level of safety, but that they need to be strictly enforced, clarified, and updated to recognize existing and new technology. Therefore, as noted above, FRA did not propose an extensive revision of the basic brake inspection intervals or requirements. Rather, FRA proposed a moderate revision of the requirements, with the intent of tightening, expanding, or clarifying those inspection or testing requirements that have created enforcement problems or inconsistencies in the past. FRA recognized some of the technological improvements made in the industry such as the use of two-way EOTs during the brake tests and use of the air flow method of qualifying train air brake systems. FRA also recognized that some trains are capable of moving extended distances between inspections provided that comprehensive inspections are performed at the locations where the trains are originated. (See discussion below titled ''Extended Haul Trains.'')

In order to clarify the requirements regarding where and when various brake inspections and tests were to be performed, FRA proposed modification of the terminology related to the power brake inspection and testing requirements contained in the current regulations, which is generally based on the locations where the inspections and tests must be performed (*e.g.,* ''initial terminal'' and ''intermediate terminal''). Instead, FRA proposed various ''classes'' of inspections based on the duties and type of inspection required, such as: Class I; Class IA; and Class II. This is similar to the approach taken by FRA in the 1994 NPRM and in the final rule on passenger equipment safety standards. *See* 64 FR 25682–83. FRA believed that this type of classification system would avoid some of the confusion that currently arises regarding when and where a certain brake inspection must be performed.

Currently, the brake system inspection and testing requirements are interspersed within §§ 232.12 and 232.13 and are not clearly delineated. Therefore, FRA proposed a reorganization of the major types of brake inspections into separate and distinct sections in order to provide the regulated community with a better understanding as to when and where each inspection or test would be required. Although FRA proposed a change in the terminology used to describe the various power brake inspections and tests, the requirements of these inspections and tests mirrored the current requirements and were not intended to change or modify any of the voluminous case law that had been developed over the years regarding the inspections. Consequently, FRA proposed four different types of brake inspections that were to be performed by freight railroads some time during the operation of the equipment. FRA proposed the terms ''Class I,'' ''Class IA,'' ''Class II,'' and ''Class III'' to identify the four major types of brake inspections required by this proposal.

The proposed Class I brake test, currently known as the ''initial terminal'' test, generally contained the requirements currently contained in § 232.12(a) and (c)–(j). *See* 63 FR 48362–63. The requirements were reorganized to clearly delineate when and how the inspection was to be performed based on current interpretations and comments received since the 1994 NPRM. The requirements were also modified to require written notification that the test was performed and that the notification was to be retained in the train until it reached its destination. The proposed revisions also acknowledged the use of the air flow method for qualifying train brake systems and permitted the use of end-of-train devices in the performance of the test. The proposal also provided some latitude to trains received in interchange that had a pre-tested car or solid block of cars added at the interchange point or that were to be moved less than 20 miles after being received in interchange by permitting these types of trains to continue without the performance of a comprehensive Class I brake test.

The proposed Class IA brake test clarified the requirements for performing 1,000-mile brake inspections currently contained in § 232.12(b). *See* 63 FR 48363. The proposal made clear that the most restrictive car or block of cars in the train would determine when the inspection was to be performed on the entire train. FRA also proposed that railroads designate the locations where these inspections would be conducted and did not permit a change in those designations without 30-day notice to FRA or the occurrence of an emergency situation. The proposed Class II and Class III brake tests essentially clarified the intermediate terminal inspection requirements currently contained in § 232.13(c) and (d) regarding the performance of brake system inspections when cars were added to the train en route or when the train consist was slightly altered en route. *See* 63 FR 48364.

In addition to the modifications and clarifications proposed with regard to the four major types of brake system inspections, FRA's proposal also retained, with clarification and elaboration, the basic inspection requirements related to transfer trains currently contained at § 232.13(e) as well as the requirements for performing brake system inspections using yard air sources currently contained at § 232.12(i). *See* 63 FR 48365. The proposal also retained the requirements related to the inspection and testing of locomotives when used in double heading and helper service currently contained at § 232.15 and proposed additional inspection requirements of locomotives when used in helper service or in distributed power operations to ensure the proper functioning of the brakes on these locomotives as these types of inspections are not adequately addressed in the existing regulation. *See* 63 FR 48365. Furthermore, the proposal recognized that trains, if properly inspected, could safely travel greater

than 1,000 miles between brake inspections. (See discussion below titled ''Extended Haul Trains.'')

FRA received numerous comments in response to the 1998 NPRM from representatives of rail labor and rail management, various private car owners, the NTSB, manufacturers of rail equipment, and one state public utility commission relating to these proposed provisions. These individuals and representatives submitted comments addressing the qualifications of individuals conducting the proposed inspections, the methods by which the proposed inspections are to be conducted, the frequency with which the proposed inspections should be required, and various other specific aspects of the language used in the proposed inspection requirements.

Several labor representatives objected to the proposed change in the names of the specific required inspections. These commenters believe that the proposed new terminology of Class I, Class IA, Class II, and Class III would result in a number of problems including confusion among those individuals responsible for performing the inspections as the existing terminology has been used for decades, imposition of additional training costs on the railroads as workers will need to be reeducated, and the risk of upsetting years of case law dealing with the various inspections.

Certain labor representatives also objected to the language used in connection to the proposed inspections that would permit a qualified person to perform many of the required inspections. Various labor organizations and their representatives reiterated their concerns that such an approach would continue to allow untrained and unqualified train crew personnel to perform the required inspections. These commenters continued to assert that FRA should mandate that carmen, or persons similarly trained and experienced, perform all of the required brake inspections except for the cursory train line continuity inspections covered by the proposed Class III brake test. It is their belief that only carmen possess the necessary training, skill, and experience to properly perform the other brake inspections contained in the proposal. These commenters contend that FRA is ignoring the commitment made by rail management in 1982, when the regulations were revised to permit trains to travel up to 1,000 miles between brake inspections, to conduct high quality inspections at a train's initial terminal. They contend that the 1982 revisions were intended to require that these brake inspections be performed only by carmen. Several labor representatives also contend that since the railroads have failed to live up to the commitment made in 1982, to conduct high quality initial terminal inspections, that FRA should reconsider its proposals to permit trains to travel 1,000 miles or more between brake inspections. These commenters recommended that FRA reduce the inspection interval to 500 miles.

Conversely, representatives of rail management and private car owners suggest that FRA failed to adequately consider the industry's safety record in proposing the inspection requirements. Several of these commenters recommended that FRA reconsider performance standards similar to those provided by the AAR in response to the 1994 NPRM. *See* 63 FR 48300. These individuals assert that based upon the industry's excellent safety record there is no need for the command and control type of regulations proposed in the 1998 NPRM. Several railroad representatives also commented that the proposed training requirements for designating an individual as a qualified person are onerous and not justified in light of the industry's safety record. They contend that the industry's safety record is evidence of the sufficiency of the training currently provided to its inspection forces. (See discussion below regarding the ''Training and Qualification of Personnel.'')

Many railroad and private car owner representatives also contend that there is no justification for continuance of the 1,000-mile inspection requirement. They contend that if a car is properly inspected at its point of origin it can be safely moved to destination and that very few cars are found defective at 1000-mile inspections. As support for these contentions, they cite to various studies, which included: a 1994 study conducted by the Illinois Institute of Technology Research Institute, which concluded that brake shoes could last up to 4,000 miles; a 1993 study conducted by BNSF at Havre, Montana, which found that less than ⅓ of 1 percent of the cars inspected at 1,000 miles had any kind of brake defect; and data submitted in 1985 by the AAR related to cars operating 3,000 miles between brake inspections. These commenters also rely on the fact that Canada eliminated its intermediate brake inspection requirement in 1994. Consequently, these commenters contend that the 1,000-mile inspection serves no useful purpose from a safety standpoint, creates unnecessary delays, and should be eliminated.

Commenters representing certain labor organizations also recommended that FRA establish step-by-step procedures for conducting the proposed inspections which specifically include a requirement that both sides of a train be given a walking inspection during both the set and the release of the brakes. These commenters contend that the language proposed in the 1998 NPRM regarding the inspection of both sides of a train is unclear and creates uncertainty as to how a proper inspection is to be conducted. They further recommend that roll-by inspections of the brake release not be permitted and that a walking inspection of the release be required. They also object to the proposed requirement permitting the use of an end-of-train device in lieu of a visual inspection of the pressure at the rear car in the train or in lieu of a set and release on such car as such a practice does not ensure actual application and release of that rear car.

Representatives of railroads and private car owners also believe that FRA should clarify the method by which certain inspections are to be performed. However, these commenters seek to clarify that both sides of the equipment do not have to be inspected during either the application or release of the brakes when conducting a Class I brake test and that both sides of the equipment do not have to be inspected when conducting Class IA brake tests. They contend that there is no reason to observe both sides of the equipment during either the set or release as long as the brake rigging and equipment is inspected to ensure it is in proper condition prior to or at the same time that the application or release of the brakes is conducted. If the brakes are applied or released on one side of the equipment then, due to the design of the equipment, the brakes on the other side of the equipment will be similarly applied or released in virtually every instance. Therefore, it is contended that there is no justification to require observation of the set and release from each side of the equipment. These commenters also contend that FRA needs to clarify that both sides of the equipment do not need to be observed during the performance of a Class IA inspection. They assert that such a requirement would be contrary to the current 1,000-mile inspection requirements and would increase the burden on railroads when conducting this inspection.

The CAPUC submitted comments on the proposed inspection requirements recommending that each side of the car be inspected during both the application and release of the brakes. This commenter also recommend that FRA

require the proposed Class I brake tests to be performed by individuals designated as ''qualified mechanical inspectors'' pursuant to the proposal. The CAPUC believes that only these individuals possess sufficient knowledge and ability to adequately perform the inspection. The NTSB also submitted comments on the proposed inspection requirements suggesting that FRA modify the requirements regarding the pressure at which trains are tested to require that trains be tested at the pressure at which they will be operated. The NTSB believes that such a requirement would preclude attempts to qualify trains that have excessive leakage by testing them at a pressure that is lower than the train's operating pressure and thus, lower the amount of leakage that exists on the train.

Some labor commenters again objected to FRA's inclusion of the air flow method as an alternative to the leakage test when qualifying a train's brake system. They contend that the air flow method disguises serious leaks and allows greater leakage in a train's brake system than the currently required leakage test. The AAR and other railroad representatives endorsed the allowance of the air flow method as an alternative to the leakage test for qualifying a train's brake system. They believe that the air flow method is superior to the leakage test and is an appropriate alternative for all trains, regardless of length, provided the 15 psi brake pipe gradient is maintained.

Certain labor representatives expressed concern over the proposed provision permitting yard air tests to be conducted at a pressure that is lower than the operating pressure of the train. These commenters suggested that such a practice could permit trains to depart with excess leakage since the required leakage test would be performed at the lower pressure and thus, mask the potential leakage of the train. The AAR and some of its member railroads also expressed concern regarding the proposed requirements related to the performance of brake tests using yard air. These commenters objected to the requirement that brake tests performed with yard air be performed at 80 psi. They recommended that such test be permitted to be performed at 60 psi as currently required because the proposal permits yard and transfer trains to operate at such pressure and that to test at higher pressure creates the potential for overcharge conditions. They also argue the practical difficulties of an 80 psi requirement in that many older yard plants and rental compressors are not capable of supplying 80 psi of air pressure. These commenters further contend that FRA should permit yard air to be connected to other than the front of the consist provided that procedures are taken to prevent overcharge conditions. The commenters also provided recommended language to clarify the calibration requirements for devices and gauges used to conduct yard air brake tests.

Several labor representatives also commented on the proposed written notification requirement related to the performance of Class I brake tests. These commenters supported the written notification requirement and recommended that the information remain with the train if the motive power is changed. One labor organization also recommended that the proposed requirements related to the designation of 1,000-mile inspections are insufficient. This commenter recommended that the designation be filed with FRA and that the designations specifically identify the trains that will be inspected at each location. Representatives of rail management objected to the proposed requirement that locomotive engineers be notified in writing by a person performing the test as to the successful completion of a Class I brake test. These commenters did not object to notifying the locomotive engineer of the results of the test but believe that the notification could be provided orally or electronically by a person with knowledge of the test as long as the locomotive engineer made a record of the notification and necessary information. These commenters also sought clarification of the proposed requirements regarding the designation of locations where 1,000-mile inspections would be conducted. These commenters did not object to the designation requirement provided that it is not required on a train by train basis. They contend that to require that specific trains have 1,000-mile inspections performed at specific locations would create substantial burdens and would eliminate flexibility needed to operate trains in a timely and efficient manner.

The AAR and other railroad commenters also raised concern over the requirement that trains in captive service be required to receive a Class I brake test every 3,000 miles. They recommended that a train of this type that travels in excess of 3,000 miles between cycles be permitted to complete its cycle prior to receiving a Class I brake test. They contend that to require a Class I brake test on these types of cycle trains on a 3,000 mile basis will require the reallocation of manpower and equipment to locations not currently equipped to perform such inspections.

Several railroad representatives also objected to the definition of ''solid block of cars'' contained in the proposal. This definition is important because FRA proposed that if more than a solid block of cars is removed from or added or a train, the entire train would have to receive a Class I brake test. As the proposed definition limits a ''solid block of cars'' to a group of cars that are removed from only one other train and that remain coupled together, these commenters contend that the definition is much more restrictive than the current interpretation of the language and would significantly increase the need to perform Class I brake tests. These commenters contend that the current interpretation of the language permits a ''solid block of cars'' to be made up of cars from several different trains provided the block of cars is added to a train as one unit without triggering the requirement to perform a new initial terminal brake test on the entire train. These commenters also noted that a literal reading of the proposed provisions for when a Class I brake test would be required does not allow a railroad to remove defective equipment without triggering a Class I brake test on the entire train. They contend that this authority needs to be recognized and is currently permitted.

FRA Conclusions. After consideration of the comments submitted and based upon its experience in the enforcement of the current power brake regulations, FRA continues to believe that the general approach to brake inspections contained in the 1998 NPRM represents the most effective method of ensuring the continued safety and proper operation of brake systems currently used in the railroad industry without creating an unnecessary burden to the railroads. Therefore, the final rule is a moderate revision of the current inspection requirements, similar to that proposed, with certain minor changes made to address the comments and recommendations submitted on the NPRM.

The final rule adopts the proposed classifications identifying the various types of brake inspections based on the duties and tasks that are required to be performed. These include: Class I; Class IA; Class II; and Class III brake tests. Contrary to the contentions of some commenters, FRA does not believe that this classification of the brake inspections in any way impacts previous case law regarding the various inspections. Although the final rule changes the terminology used to describe the various brake inspections,

the underlying inspection requirements have remained generally consistent with the existing requirements, and the final rule is not intended to change or modify any of the voluminous case law that has developed over the years regarding the inspections. Furthermore, the final rule retains the monikers that have traditionally been attached to the various inspections so as to limit any confusion that may exist. For example, the section containing the requirements for conducting Class I brake tests is entitled, ''Class I brake test-initial terminal inspection.'' FRA believes that the classifications proposed in the NPRM and retained in this final rule clearly delineate what is required at each inspection, better clarify when each inspection is to be performed, and avoid the potential confusion caused by the terminology used in the present regulations.

As discussed in detail in the 1998 NPRM, FRA continues to believe that the performance standard recommended by the AAR in response to the 1994 NPRM and suggested again by some commenters does not provide a viable method for establishing the frequency of brake inspections. *See* 63 FR 48301–02. The performance standard proposed by the AAR is based upon the number of mechanically-caused accidents per million train miles. Therefore, the standard is based upon the rate of occurrence of accidents—accident history—rather than on a factor that could measure a railroad's performance prior to an accident occurring. The suggested performance standard would also be very difficult to calculate on a railroad-by-railroad basis, and the standard itself is a very subjective factor as many accidents are due to a variety of causes only a part of which may be a mechanical or brake-related cause. Thus, the determination of what constitutes a mechanically-caused accident would be difficult if not impossible to make in some circumstances and would be a determination made by the railroad; thus, opening the potential for data manipulation. FRA also notes that the AAR's performance standard contains certain provisions that are contrary to existing statutory requirements regarding the movement of defective equipment.

The final rule retains the requirement to perform 1,000-mile brake inspections as proposed with a few minor revisions discussed below and in the section-by-section analysis of that section. Although FRA agrees that many of the initial terminal brake inspections currently conducted by train crews and other personnel are not of the quality anticipated in 1982, when the inspection interval was increased from 500 miles to 1,000 miles, FRA continues to believe that properly trained and qualified train crew personnel can perform most of the inspections required by this final rule and have been performing such inspections for many years. Furthermore, FRA continues to believe that a reversion to a 500-mile inspection interval on trains inspected by train crews, as suggested by some commenters, does not address the concerns regarding the safety of these trains and would impose an economic burden on the railroads that cannot be justified. Rather than simply increasing the frequency at which inspections are performed, FRA believes that the proper approach is to enhance the quality of the inspections being performed in order to further improve safety. FRA believes that the training and designation requirements contained in this final rule will increase the quality of the brake inspections being performed by ensuring that those individuals responsible for conducting the inspections are provided adequate and continuing training to properly perform the task. The final rule contains general training provisions which include: classroom and experiential ''hands-on'' training; general testing requirements; and periodic refresher training. The final rule also mandates that training records be maintained by the railroads in order for FRA to ascertain the basis for a railroad's determination that a particular person is considered qualified to perform the inspection or test he or she is assigned. FRA believes these training requirements will provide the necessary assurances that the people conducting the required inspections and tests are qualified.

FRA recognizes that since 1982 new technologies and improved equipment have been developed that allow trains to operate longer distances with fewer defects. The data submitted by AAR, noted above, appears to support this assertion, and FRA does not dispute the potential capability of certain equipment to travel distances in excess of 1,000 miles without becoming defective. However, the capability of the equipment to travel extended distances is contingent on the condition of the equipment when it begins operation and on the nature of the operation in which it is to be engaged. FRA believes that in order for brake equipment to travel extended distances between brake inspections, the condition and planned operation of the equipment must be thoroughly assessed at the beginning of a train's journey through high quality inspections. As noted above, FRA believes that railroads are not conducting high quality initial terminal inspections at many locations because the railroads are utilizing employees who are not sufficiently qualified or trained to perform the inspections. Therefore, FRA believes that the 1,000-mile brake inspection interval continues to be necessary and important to ensure the safe operation of trains inspected by qualified personnel pursuant to this final rule. Furthermore, no trains operated in the United States are currently permitted to travel greater than 1,000 miles between brake inspections. Consequently, FRA is not willing to permit trains to travel in excess of 1,000 miles between brake inspections, except in the limited, controlled situations where data on the equipment can be gathered. (See discussion below titled ''Extended Haul Trains.'') FRA notes that Canada eliminated intermediate inspections in 1994. However, Canada has different inspection requirements than those contained in this final rule and vastly different operating conditions and environments than those prevalent on most American railroads, operating conditions and environments that are more conducive to the inspection regimen imposed by that country.

The final rule also generally retains the proposed provisions detailing the items that must be inspected during the various inspections and the minimum procedures for performing the inspections. Contrary to the assertions of some commenters, FRA believes that the proposed methods of inspection sufficiently detailed how the various inspections were to be performed while providing flexibility for railroads to conduct the inspections in a manner most conducive to their operations. The methods of inspection proposed in the 1998 NPRM incorporated current practices and technical guidance previously issued by FRA. To require that all inspections be performed by walking the train would impose a huge financial and operational burden on the railroads and would ignore the various different methods by which inspections are currently performed and have been performed for years. FRA does not intend to mandate specific methods for how the various inspections are to be performed. FRA believes that each railroad is in the best position to determine the method of inspection that best suits its operations at different locations. FRA has never mandated specific step-by-step procedures for conducting brake inspections but

merely requires that, whichever method is used, it must ensure that all of the components required to be inspected will be so inspected.

The proposed rule made clear that when performing a Class I brake test of a train the inspector must take positions on each side of each car in the train sometime during the inspection process. This provision is retained in the final rule. This is intended to mean that at a minimum both sides of the equipment must be inspected. The provision does not require that both sides be observed during the application or during the release of the brakes. However, at a minimum at least one side of the car must be inspected while the brakes on the car are applied or if the brakes do not apply, while an effort is made to apply the brakes on the car. FRA continues to believe that if the various brake components are inspected to ensure they are properly secure and in proper condition then, due to the design of the equipment, if an application or release is observed from one side it can be assumed that in virtually every case there is an application or release of the brake occurring on the other side of the equipment. The final rule also retains the proposed requirement that the piston travel on each piece of the equipment must be inspected while the brakes are applied. Furthermore, the final rule retains the provision that permits a roll-by inspection of the release of the brake but prohibits the roll-by inspection from being considered an inspection of that side of the equipment.

FRA also finds the comments of AAR and other railroad representatives contending that both sides of the equipment should not be required to be inspected at Class IA brake tests to be lacking. The Class IA brake test basically incorporates the current 1,000-mile brake inspection, which FRA believes requires an inspection of both sides of the equipment during the inspection process. The current 1,000-mile inspection requires that brake rigging be inspected to ensure it is properly secure and does not bind or foul and that the brakes apply on each car in the train. *See* 49 CFR 232.12(b). In order to make these inspections properly, FRA believes that both sides of the equipment must be observed sometime during the inspection process and, to FRA's knowledge, railroads currently conduct these inspections in this manner. Thus, the NPRM and the final rule merely clarify what is required to be performed under the current regulations to properly perform a 1,000-mile inspection. Therefore, contrary to the contentions of certain commenters, retention of this current requirement does not impose any additional burden on the railroads.

The final rule retains the provisions granting railroads the ability to utilize the air flow method (AFM) to qualify a train's brake system in lieu of the traditional leakage test. FRA believes that if a train contains a locomotive equipped with 26L freight locomotive brake equipment and the train is equipped with an EOT device, that train should be allowed to be qualified using the AFM. The AFM of qualifying train air brake systems has been allowed in Canada as an alternative to the leakage test since 1984. In addition, several railroads in the United States have been using the AFM since 1989 when FRA granted the AAR's petition for a waiver of compliance to permit the AFM as an alternative to the leakage test. FRA recognizes the concerns of several labor organization commenters opposing the adoption of the AFM; however, FRA believes these commenters' apprehension is based on their unfamiliarity with the method. As FRA pointed out in the ANPRM, the 1994 NPRM, and the 1998 NPRM, the AFM is a much more comprehensive test than the leakage test. *See* 57 FR 62551, 59 FR 47682–47683, 63 FR 48305–06. The AFM tests the entire brake system just as it is used, with the pressure-maintaining feature cut in. FRA believes the AFM is an effective and reliable alternative method of qualifying train brakes. In the 1998 NPRM, FRA expressed some concern regarding the use of the AFM on short trains. However, based on consideration of the comments received and FRA's experiences in observing the use of the AFM, FRA agrees that the AFM should be permitted as an alternative on any train provided the 15 psi gradient is maintained on the train.

The final rule changes some of the provisions related to the conduct of brake tests utilizing yard air sources that were proposed in the NPRM. Rather than requiring yard air tests to be performed at 80 psi as was proposed, the final rule reduces the required pressure to 60 psi at the end of the consist as is currently required. FRA recognizes that many yard air sources and rental compressors are not capable of producing 80 psi of air pressure. However, to address the concerns raised regarding the inadequacy of conducting a leakage or air flow test at this lower pressure, the final rule includes provisions to require those tests to be conducted at the operating pressure of the train. Thus, if the yard air is not capable of producing the pressure that the final rule requires, then the leakage or air flow test is to be conducted when the locomotives are attached. The final rule also permits the yard air test device to be connected at other than the end of the consist nearest the controlling locomotive, provided that the railroad adopts and complies with written procedures to ensure that overcharge conditions do not occur. Many yards across the country currently conduct the test in this manner, and FRA believes it is necessary to acknowledge the viability of these operations.

The final rule also modifies the notification requirement related to Class I brake tests from that proposed in the NPRM. In the NPRM, FRA proposed that the engineer be informed in writing of the successful completion of the Class I brake test. The intent of this requirement was to ensure that the locomotive engineer was adequately informed of the results of the inspection; however, FRA recognizes that a requirement to provide the information in writing ignores technological advances and operational efficiencies. Consequently, the final rule will permit the notification in whatever format the railroad deems appropriate; provided that the notification contains the proper information and a record of the notification and the requisite information is maintained in the cab of the controlling locomotive. FRA believes these changes are consistent with the intent and purpose of the proposed requirement for written notification and ensure necessary information is relayed to the operator of the train.

FRA also realizes that the proposed requirement for designating locations where Class IA inspections will be performed was somewhat unclear and may have caused confusion. The intent of the requirement was to ensure that FRA was informed of those locations where a railroad intends to perform Class IA brake inspections and that FRA had the information with which to hold the railroad responsible for conducting the inspections at those locations. FRA was not intending to require that a railroad separately identify a specific Class IA inspection location for each train it operates. Consequently, the final rule makes clear that the designation required is for locations where such inspections will be performed and permits deviance from those locations only in emergency situations.

The final rule retains the proposed requirement that unit or cycle trains receive a Class I brake test every 3,000 miles. FRA has added a definition of ''unit train'' and ''cycle train'' to the final rule in order to clarify the applicability of the requirement.

Historically, these trains operate for extended periods of time with only a series of brake inspections similar to Class IA brake inspections. FRA believes that the proposed 3,000-mile limitation is appropriate as it represents the approximate distance that a train would cover when traveling from coast to coast. In addition the 3,000 mile requirement is consistent with the interval for performing Class IA brake tests and would equate to every third inspection being a Class I brake test rather than a Class IA brake test. Furthermore, AAR does not seek a moderate extension of a couple hundred miles so a few trains could complete their cycle, but seeks to extend the distance to more than 4,500 miles in many instances. FRA is not willing to modify the proposed requirement to that extent and believes that the 3,000-mile interval for these types of trains provides sufficient flexibility to the railroads to perform periodic Class I brake tests on these trains in a cost-efficient manner.

The definition of ''solid block of cars'' has been modified from that proposed in the NPRM. Although FRA believes the definition it proposed is consistent with current interpretations and enforcement of the requirement, FRA agrees with some of the commenters that the definition may have been too narrow and does not directly address FRA's primary concern, the block of cars itself. FRA's primary concern is the condition of the block of cars being added to the train especially when the block of cars is made up of cars from more than one train. Thus, the final rule will permit a solid block of cars to be added to a train without triggering a requirement to perform a Class I brake test on the entire train. However, depending on the make-up of that block of cars, certain inspections will have to be performed on that block of cars at the location where it is added to the train.

FRA believes that limits have to be placed on the addition of blocks of cars being added to a train in order to ensure that cars are being inspected in a timely manner and in accordance with the intent of the regulations. Some commenters suggest that a block of cars should be permitted to be added to a train with no inspection other than a continuity test regardless of the number of different trains the cars making up the block came from provided all the cars received a Class I brake test at their point of origin. Other commenters suggest that any number of blocks of cars should be permitted to be added to a train at a single location. FRA believes that to accept either of these positions would be tantamount to eliminating initial terminal and intermediate inspections and would drastically reduce the safety of freight trains being operated across the country. In FRA's view, both of the positions noted above are merely means to circumvent inspections and are akin to a practice known as ''block swapping'' in the mechanical inspection context, a practice that FRA does not permit. In FRA's opinion, the ability to add multiple blocks of cars to a train at one location or add a single block of cars to a train that is composed of cars from numerous different trains without inspecting the cars in those blocks, would essentially allow railroads to assemble new trains without performing any direct inspection of any of the cars in the train. Furthermore, if cars are permitted to be moved in and out of trains at will, the ability to track when and where Class IA brake tests are to be performed on trains will be impossible.

Based on a review of the comments submitted, two other minor modifications to the proposed inspection requirements have been made in this final rule. The final rule contains an additional caveat that will permit the removal of defective equipment at locations where other cars are added or removed without triggering the requirement to perform a Class I brake test on the entire train. FRA currently permits this practice, and it is consistent with the requirements aimed at having defective equipment repaired as quickly as possible. The final rule also modifies the language used in the proposed provisions related to the air pressure at which the brake tests are to be conducted based on a comment submitted by the NTSB. The NTSB noted that the language used by FRA in the NPRM to describe the air pressure settings for conducting the required brake tests would permit some road trains to be tested at a lower pressure than that at which the train would be operated. The NTSB contends that although most road freight trains operate at 90 psi, some road freight trains are operated at 100 psi and the proposal would permit them to be tested at 90 psi. FRA agrees with NTSB's suggestion that a trains brake system should be tested at the pressure at which the train will operate and has modified the language of the final rule accordingly.

2. Extended Haul Trains

In developing the provisions regarding extended haul trains proposed in the 1998 NPRM, FRA relied on several basic beliefs developed from the information and comments submitted and upon its experience in enforcing the current regulations. FRA believed that if a train was properly and thoroughly inspected, with as many defective conditions being eliminated as possible, then the train would be capable of traveling much more than 1,000 miles between brake inspections. By this, FRA contended that not only must the brake system be in quality condition but that the mechanical components of the equipment must be in equally prime condition. FRA believed that as the distance a train is allowed to travel increases, the mechanical condition of the equipment is a key factor in ensuring the proper and safe operation of the train brake system throughout the entire trip. FRA also stated that the best place to ensure the proper conduct of these inspections and to ensure that the train's brake system and mechanical components are in the best condition possible is at a train's point of origin (initial terminal).

In the 1994 NPRM, FRA proposed a set of requirements that had to be met by a railroad in order to move a train up to 1,500 miles without performing additional brake inspections. The requirements included such features as low defect ratios, maintenance programs, and the performance of quality brake and mechanical inspections at a train's point of origin. *See* 59 FR 47735. In the 1998 NPRM, FRA agreed with several commenters that some of the 1994 proposed requirements were overly burdensome and were partially predicated on potentially subjective standards. However, FRA continued to believe that many of the inspection requirements and movement restrictions proposed in 1994 were valid conditions that should be met in order to operate trains for extended distances between brake inspections. These included: the performance of a quality, in-depth brake inspection by a highly qualified inspector; the performance of a quality mechanical inspection by a person qualified under 49 CFR 215.11; and a restriction on the number of set-outs and pick-ups occurring en route. FRA also believed that these extended haul trains had to be closely monitored to ensure that both the brake system and mechanical components remain safely intact throughout the train's journey.

In the 1998 NPRM, FRA proposed that certain designated trains be permitted to move up to 1,500 miles between brake and mechanical inspections provided the railroad met various inspection and monitoring requirements. *See* 63 FR 48343, 48364–65. As no trains were currently permitted to travel in excess of 1,000 miles between inspections, FRA was not willing to propose more than

1,500 miles between such inspections until appropriate data is developed that establish that equipment moved under the proposed criteria remains in proper condition throughout the train's trip. FRA believed that the proposed provision requiring the performance of an inbound inspection at destination or at 1,500 miles and the requirement that carriers maintain records of all defective conditions discovered on these trains would create the bases for developing such data.

In order to ensure the accuracy of the data as well as ensure the proper and safe operation of these extended haul trains, FRA also proposed that the trains have 100 percent operative brakes and contain no cars with mechanical defects at their initial terminal point and at the time of departure from the 1,500-mile point, if moving an additional 1,500 miles from that location between brake inspections. FRA further proposed that these trains not conduct any pick-ups or set-outs en route, except for the removal of defective equipment, in order to minimize the disruptions made to the integrity of the train's brake system and reduce mechanical damage that might occur during switching operations. In addition, as there was no reliable tracking system currently available to FRA to ensure that cars added to the train en route have been inspected in accordance with the proposed requirements, FRA believed that the number of cars added to these trains had to be limited.

As noted earlier in the discussion, FRA believed that in order for a train to be permitted to travel 1,500 miles between inspections, the train must receive inspections that ensure the optimum condition of both the brake system and the mechanical components at the location where the train originates. In order to ensure that quality inspections were performed, FRA proposed that they be performed by highly qualified and experienced inspectors. As FRA intended that the proposed Class I brake test performed on these trains at their initial terminal be as in-depth and comprehensive as possible, FRA believed that the inspections should be performed by individuals possessing the knowledge not only to identify and detect a defective condition in all of the brake equipment required to be inspected, but also to possess the basic knowledge to recognize the interrelational workings of the equipment and the ability to trouble-shoot and repair the equipment. Therefore, FRA proposed the term ''qualified mechanical inspector'' to identify and describe those individuals it believed would possess the necessary knowledge and experience to perform the proposed Class I brake tests on these extended haul trains.

In the 1998 NPRM, a ''qualified mechanical inspector'' was defined as a person with training or instruction in the troubleshooting, inspection, testing, maintenance, or repair of the specific train brake systems the person is assigned responsibility and whose primary responsibilities include work generally consistent with those functions. (See § 232.5 of the section-by-section analysis for a more detailed discussion of ''qualified mechanical inspector.'') FRA also proposed that these same highly qualified inspectors be the type of individuals performing the proposed inbound inspection on these extended haul trains in order to ensure that all defective conditions are identified at the train's destination or 1,500-mile location. Similarly, FRA proposed that all of the mechanical inspections required to be performed on these trains be conducted by inspectors designated pursuant to 49 CFR 215.11 in order to ensure that all mechanical components are in proper condition prior to the train's departure.

The AAR and various private car owners submitted a number of comments objecting to the proposed requirements regarding extended haul trains contained in the 1998 NPRM. These commenters believe that the 1,500-mile limitation on the movement of these trains between brake inspections is insufficient considering the restrictions placed on the trains. They recommend that these trains be permitted to operate to its destination or at a minimum be permitted 2,000 miles between brake inspections. They contend that the 1,500-mile limitation results in little or no benefit to the railroads because in order to take advantage of the flexibility provided, railroads would have to establish new facilities and add more manpower at 1,500-mile points to conduct the more stringent inspections required at those locations. They contend that a limitation at the 2,000-mile point would be logically consistent with existing inspection requirements, based on 1,000-mile increments, and would allow a greater number of trains to utilize the provisions because railroads could use existing facilities and manpower. They recommend that FRA reconsider the estimates provided regarding the benefits derived from the extended haul train provisions, claiming that the benefits estimated in the NPRM's Regulatory Impact Analysis are overstated. Several private car owners also suggested that even if FRA were not to extend the proposed distance for the entire industry, it should allow certain private car owners greater distances due to their superior safety record and maintenance practices.

Many of these same commenters also object to the proposed requirement that extended haul trains not be permitted to make any pick-ups or set-outs en route. These commenters contend that this restriction severely limits the actual flexibility of the proposal. They assert that the prohibition on pick-ups and set-outs would eliminate nearly one-half of the trains that could potentially be operated under the proposed provisions. Several commenters also objected to the proposed notification requirements for extended haul trains. These commenters state that the proposed provision requiring advance notification to FRA of the trains to be operated under the extended haul provision would seriously limit the number of trains utilizing the provisions as many trains are unscheduled with unknown train symbols and would be excluded. They recommend that the notification requirements be reduced in some manner to allow unscheduled trains to be identified as extended haul trains. One commenter also objects to the proposed requirement that extended haul trains not depart their initial terminals with any part 215 defects entrained. This commenter asserts that there was no rationale for this restriction and that it merely creates an additional burden for railroads.

Several rail labor representatives also object to the proposed provisions permitting trains to be operated as extended haul trains; however, these commenters oppose allowing any train to operate more than 1,000 miles between brake inspections. These commenters contend that when the distance between intermediate brake inspections was increased in 1982, the railroads made a commitment to conduct quality initial terminal brake inspections in exchange for the increased mileage, but that has not occurred and FRA should not provide the railroads with an increase in mileage when the previous agreement has not been honored. They contend that the proposed extension would merely allow defective equipment to be moved further distances without repair. They further contend that the proposed increase in distance between brake tests is not justified from a safety standpoint and, thus, violates 49 U.S.C. 20302(d)(2), which permits a change in the existing power brake regulations ''only for the purpose of achieving safety.'' These commenters oppose any extension in the distance between brake inspections unless stringent

requirements are placed on the trains, one such requirement being that carmen or similarly trained individuals perform all the inspections and tests required to be performed on the trains. They also contend that the proposed standard for revoking a railroad's ability to designate extended haul trains is too high.

FRA Conclusions. FRA continues to believe that if a train is properly and thoroughly inspected, with as many defective conditions being eliminated as possible, then the train is capable of traveling much greater than 1,000 miles between brake inspections. Therefore, the final rule retains the provisions permitting railroads to designate trains as extended haul trains and allowing such trains to be operated up to 1,500 miles between brake inspections. Although FRA recognizes that retention of the 1,500-mile limitation may limit the utility of the provision on some railroads, FRA is not willing to increase the proposed mileage restriction at this time. Currently, no train is permitted to travel more than 1,000 miles without receiving an intermediate brake inspection. Therefore, FRA does not believe it would be prudent to immediately double or triple the currently allowed distance without evaluating the safety and operational effects of an incremental increase in the distance. Consequently, until sufficient information and data are collected on trains operating under the provisions proposed in the NPRM and retained in this final rule, FRA is not willing to permit trains to travel the distances suggested by some commenters without additional brake inspections. FRA continues to believe that the requirement for performing inbound inspections and the requirement to maintain records of all defective conditions discovered on these trains provides the basis for developing the information and data necessary to determine the viability of allowing greater distances between brake inspections.

After consideration of the comments submitted, FRA agrees that the benefits estimated in the NPRM in association with the extended haul provisions may have been overstated. FRA realizes that the retention of the 1,500-mile limitation may eliminate certain trains from being operated pursuant to the extended haul provisions and reduce the benefits estimated at the NPRM stage of the proceeding. (See detailed discussion in the Regulatory Impact Analysis portion of the preamble below.) However, in order to increase the viability of the extended haul provisions, the final rule provides some flexibility for designating extended haul trains and allows for the limited pick-up and set-out of equipment.

Several commenters noted that the proposed provisions regarding the advance designation of extended haul trains would prohibit certain unscheduled trains from being operated as extended haul trains. In an effort to provide some flexibility in this area, the final rule has been modified to allow railroads to designate certain locations as locations where extended haul trains will be initiated and requires railroads to describe those trains that will be so operated rather than requiring specific identification of every train. FRA believes this modification will allow railroads to capture some of their unscheduled trains by identifying the trains by the locations where they are initiated.

The final rule will also permit extended haul trains to set out cars at one location or to pick up cars, or both, at the same or another location. This modification will provide railroads the flexibility to set-out a block of cars at one location and pick up a block of cars at another location. FRA believes that this limited ability provides the railroads with some flexibility to move equipment efficiently while minimizing the disruptions made to the train's brake system and ensuring that cars added to such trains can be adequately tracked and inspected. The final rule makes clear that any cars added to extended haul trains must be inspected in the same manner as the cars at the train's initial terminal. The final rule also makes clear that any car removed from the train must be inspected in the same manner as a car at the train's point of destination or 1,500-mile location.

Certain commenters have portrayed the provisions related to extended haul trains as merely being an extension of the current intermediate inspection distances. FRA objects to such a characterization. In FRA's view, the extended haul provisions contained in the NPRM and retained in this final rule constitute a completely new inspection regimen. The provisions related to the operation of extended haul trains contain stringent inspection requirements, both brake and mechanical, by highly qualified inspectors and establish stringent requirements whenever cars are added to or removed from such trains. The extended haul train requirements also contain a means to assess the safety of such operations by requiring that records be maintained of the defective conditions that develop on these trains while en route. Consequently, FRA believes that the requirements related to extended haul trains not only ensure the safe operation of the trains operated under them, but actually increase the safety of such operations over that which is provided in the current regulations.

3. Charging of Air Brake System

Present regulations for air brake testing basically require that cars that have previously been tested in accordance with the regulations either ''be kept charged until road motive power is attached'' or be retested. *See* 49 CFR 232.12(i). The current regulations also require the performance of an initial terminal brake test ''where the train consist is changed other than by adding or removing a solid block of cars, and the train brake system remains charged. * * *'' *See* 49 CFR 232.12(a)(ii). Based on longstanding administrative interpretation and practice, FRA currently presumes that a brake system is no longer adequately charged if disconnected from the charging device (supply of pressurized air) for more than two hours before coupling or recoupling of locomotives; otherwise, retesting is required.

In the 1994 NPRM, FRA proposed to permit trains to be removed from a continuous source of compressed air for up to four hours without requiring the re-performance of a comprehensive brake inspection. FRA received very few comments that directly addressed the safety implications of this proposal; thus, FRA proposed the four-hour time limitation in the 1998 NPRM. In the 1998 NPRM, FRA agreed that its longstanding administrative interpretation, that requires the retesting of cars disconnected from a charging device for longer than two hours, was established prior to the development of new equipment that has greatly reduced leakage problems, such as welded brake piping and fittings and ferrule-clamped air hoses. However, contrary to several railroads' assertions, FRA did not believe that cars should be allowed to be off air for extended periods of time without being retested. FRA believed that the longer cars sit without air attached, the greater the chances were that the integrity of the brake system would be compromised. Consequently, based on today's equipment, operating practices, and overriding safety concerns, FRA proposed that cars should not be disconnected from a continuous supply of pressurized air for longer than four hours without being retested. FRA also proposed that the source of compressed air must be sufficient to maintain the integrity of the brake system. Consequently, FRA proposed that the source of compressed

air be maintained at a minimum level of 60 psi.

The AAR and several other parties commented that there is no reason to assume that once a train is charged and tested and then left standing without being provided with a source of compressed air that the brake system would become defective. These commenters assert that leaving equipment connected to a source of compressed air does nothing to ensure proper performance of the brake system, does not prevent vandalism, and does not prevent leakage due to adverse weather conditions. These parties suggest that leakage on standing trains has been greatly reduced through the use of welded brake piping and fittings and ferrule-clamped air hoses. These commenters believe that FRA's current interpretation of allowing trains to sit without air for only two hours is from an era when this new equipment was not used. They also contend that FRA's current interpretation and the proposed four-hour limitation costs the industry money, fuel, and time and creates pollution because trains must either be reinspected or left with a locomotive attached and idling in order to avoid performing a full Class I brake test. They further contend that the proposed four-hour rule exposes employees to various safety hazards due to the employees being required to perform inspections at locations that are not designed or equipped for such activity.

The AAR recommends that the proposed four-hour limitation be eliminated for the reasons noted above. They also noted that the Canadian rules do not contain an off-air requirement and that in Canada if cars are off air for any length of time, only a set-and-release continuity test is required. As an alternative to eliminating the off-air requirement completely, the AAR suggests that FRA adopt requirements which would allow cars to be removed from a source of compressed air for up to 48 hours without a car-by-car reinspection. They recommend that cars only be required to receive a continuity test when they have been off a source of compressed air for more than fours hours but less than 48 hours and that no retesting occur if equipment is off air for less than four hours.

Representatives of rail labor objected to the proposed increase in the amount of time that equipment could be removed from a source of compressed air. These commenters believe that the existing two-hour limitation is reasonable. Most of these commenters expressed concern for the integrity of the brake system if a consist were left standing for longer than two hours. These concerns were aimed at the effect that climate might have on the equipment and the increased possibility of vandalism to the equipment if consists or equipment were left off air for longer periods.

FRA Conclusions. The final rule retains the proposed requirement that equipment removed from a source of compressed air for longer than four hours be reinspected. FRA believes that this requirement is necessary to ensure not only the integrity of the brake system on equipment but to ensure that inspections are performed on equipment in a timely and predictable manner. FRA tends to agree that the amount of time equipment is left off a source of compressed air is not directly related to the operation of the brake system on that equipment. However, FRA does believe that in certain circumstances the length of time that equipment is removed from a source of compressed air can impact the integrity and operation of the brake system on a vehicle or train. Particularly in cold weather situations where freeze-ups in train brake systems can occur or in areas where the potential for vandalism is high due to the location where equipment is left standing. Moreover, FRA believes that the four-hour limitation is consistent with the intent of the existing regulations and is intended to ensure that equipment is regularly inspected.

The commenters objecting to the four-hour limitation proposed in the NPRM and retained in this final rule have ignored the intent and purpose of the existing two-hour allowance permitted by longstanding administrative interpretation. As discussed above, the existing power brake regulations, adopted by Congress in 1958, are based on the premise that if a train or equipment does not remain charged the equipment is to be retested. There is no provision in the existing regulations for allowing equipment to be removed from a source of compressed air for any length of time, such allowance was granted only through administrative interpretation. The original intent of the currently existing two-hour interpretation, which permits equipment to remain off-air for up to two-hours without being retested, was to allow trains to pick up or remove cars from their consists while en route without requiring a retest of the entire train. The two-hour limit was based on the amount of time it would take a train to make a switching move while en route. Thus, the current application of the two-hour rule to any and all equipment left off a source of compressed air is somewhat counter to the original intent of the interpretation when it was provided.

Although FRA recognizes that it has acquiesced and endorsed the expansion of the two-hour rule to all equipment, FRA believes that the underlying intent of the existing regulations must be recognized and maintained. The doubling of the existing two-hour interpretation to four hours is based on the fact that the average time needed for many trains to perform the switching they conduct while en route has increased. Thus, FRA's intent when proposing an expansion of the two-hour rule was not to alter the basic tenet that equipment should be retested when it is removed from a source of compressed air for any lengthy period of time. FRA believes that the four-hour allowance provided by this final rule gives the railroads flexibility to perform switching operations while trains are en route and provides flexibility to efficiently move cars from one train to another when necessary, yet retains the concept that equipment be retested when left disconnected from a source of compressed air for longer periods of time.

FRA further believes that a limitation on the amount of time that equipment may be off air is necessary for ensuring that equipment is inspected in a timely and predictable manner. If no time limit were imposed or if 48 hours were permitted, as suggested by some commenters, equipment could lawfully sit for days at various locations while en route to its destination and be switched in and out of numerous trains without ever being reinspected. Such an approach would drastically reduce the number of times that the brake systems on such equipment would ever be given a visual inspection from what is currently required and, in FRA's view, would seriously degrade the safety of the trains operating with such equipment in its consist. Furthermore, if equipment were allowed to be off-air for an excessive amount of time, it would be virtually impossible for FRA to ensure that equipment is being properly retested as it would be extremely difficult for FRA to determine how long a particular piece of equipment was disconnected from a source of compressed air. In order to make such a determination, FRA would have to maintain observation of the equipment for days at a time. Consequently, the final rule retains the proposed four-hour limit on the amount of time equipment can be disconnected from a source of compressed air as it maintains current levels of safety and provides an enforceable and verifiable time limit that FRA believes provides the railroads

some additional benefit over what is currently required both in terms of operational efficiency and cost savings.

4. Retesting of Brakes

In the 1998 NPRM, FRA attempted to clarify language contained in the current regulation which requires that the brakes ''apply.'' *See* 49 CFR 232.12(b), 232.12(d), 232.13(d), and 232.13(e). The current language has been misinterpreted by some to mean that if the piston applies in response to a command from a controlling locomotive or yard test device, and releases before the release signal is given, the brake system on that car is in compliance with the regulation because the brake simply applied. The intent of the regulation has always been that the brakes apply and remain applied until the release signal is initiated from the controlling locomotive or yard test device. Therefore, clarifying language was added to the proposed inspection requirements to eliminate all doubt as to what is required. In the 1998 NPRM, FRA made clear that the brakes on a car must remain applied until the appropriate release signal is given. The proposal required that cars with brakes that fail to remain applied either be removed from the train or repaired in the train and retested, and the proposal provided specific requirements for performing a retest on such equipment.

FRA recognized that some defective train air brake conditions found when performing a train air brake test, which may cause insufficient application of the brakes on a piece of equipment, are of such a nature that they can be quickly repaired in the train. For example, a brake connection pin might be missing, a slack adjuster might be disconnected, or some other minor part of the brake system might be defective. FRA realized that to mandate that equipment with these types of obvious defective conditions be removed from the train would potentially impose a tremendous burden on the railroads. Therefore, FRA sought to provide some relief to railroads by permitting cars with obvious brake defects to be repaired and retested while remaining in the train. However, FRA also believed that some consistency and guidance had to be provided regarding the performance of a retest on a car's brake system. Consequently, FRA proposed that the retesting of a car had to be conducted from the controlling locomotive or head end of the consist if a car is repaired in a train. Furthermore, FRA proposed that if a retest is conducted the brakes on the retested car must remain applied for a minimum of five (5) minutes. The proposed five-minute requirement was based on the leakage parameters established for locomotives contained at § 229.59(c).

The AAR and several other commenters object to the parameters contained in the proposed retesting provisions. Specifically, these commenters object to three of the requirements contained in the proposed retest provision, these include: the requirement that only cars with an obvious defect be retested, the requirement that the brakes remain applied for five minutes, and the requirement that the retest be conducted from the controlling locomotive or the head of the consist. These commenters contend that there is no reason to limit the retest provision to cars with readily identifiable defects. They claim that there are a number of conditions which might cause a car's brakes not to apply that are not readily identifiable thus, the retest may identify the problem and allow it to be repaired, or the reason for a no-set is unknown but the brakes operate properly upon being retested.

These commenters also believe that the proposed requirement to have the brakes remain applied for five minutes is impractical and unnecessary. They assert that it is only necessary to have the brakes remain applied for the period of time it takes an inspector to perform an inspection of the brakes and that it is impractical to require an employee to watch each retested car for five minutes. They also contend that FRA's reliance on the five-minute requirement related to the testing of locomotive brake cylinder leakage contained in § 229.59 is misplaced. They assert that there is no parallel between determining the brake cylinder leakage on a locomotive and the testing of the brakes on a freight car. One commenter suggests that a one-minute application is a sufficient period to ensure the proper operation of a car's brakes.

These commenters also object to the proposed requirement that the retest be conducted from the controlling locomotive or the head end of the consist. They contend that there is no safety hazard in performing the test with a test device positioned at one end of the car being retested. They assert that such a procedure would replicate the natural gradient of the train and, thus, avoid the possibility of overcharging the brake system, and would better facilitate retesting.

Representatives of rail labor generally supported the proposed retest provisions. These commenters did assert that any retest should be conducted from the head end of the consist or from the controlling locomotive. They claim that to perform the test from other than that location would provide no assurance that the brakes would apply in response to a brake pipe reduction from the controlling locomotive.

FRA Conclusions. FRA agrees that the proposed provisions regarding the retesting of cars may have been overly restrictive and is modifying the final rule based on FRA's review of the comments and recommendations submitted. The final rule has been modified to permit the retesting of any car the brakes of which were found not to be applied during a required inspection. FRA agrees that there are several circumstances that could occur where the reason for the failure of the brakes to apply is not readily apparent. FRA believes that permitting a retest on any car found not applying will not adversely affect safety since the car will be required to pass the retest in order to remain in the train or be handled for necessary repair.

The final rule also modifies the proposed provision that requires a retested car's brakes to remain applied for five minutes. FRA agrees that its reliance on the five-minute requirement applicable to the testing of locomotive brake cylinder leakage is not appropriate. However, rather than insert a subjective requirement for how long the brakes should remain applied, as suggested by some commenters, FRA believes that a definite time period should be established to ensure consistency in the performance of these retests. Thus, the final rule requires that the brakes on a retested car remain applied for at least three minutes. FRA believes that three minutes is consistent with the amount of time that it would take an individual to conduct a complete inspection of the retested car's brakes. The three minutes is based on the generally accepted period of one and one-half minutes it would take to perform a walking inspection on each side of an average size freight car. Requiring the brakes to remain applied for a period of at least three minutes also provides FRA with sufficient assurances that the brakes are operating properly and will remain applied for the duration of any brake application required during the train's journey.

The final rule also modifies the proposed requirement that the retest be conducted from the controlling locomotive or the head of the consist by permitting the retest to be conducted with a suitable test device positioned at one end of the car or cars being retested. FRA agrees that there is little or no safety rationale for requiring the retest to be performed from the controlling locomotive or head of the consist. Some

commenters argue that if the retest is not conducted from the controlling locomotive, then there are no assurances that the brakes will apply in response to a brake reduction from the controlling locomotive. FRA finds that this argument ignores the various methods by which cars may be tested and assembled when air brake tests are conducted using yard air sources. FRA currently allows and this final rule continues to allow cars to be tested with yard test plants and allows such cars to be added to trains without requiring that each car be inspected to ensure it operates in response to the controlling locomotive.

One potential safety hazard with allowing cars to be retested with a device at the car is the potential for injury to the employees responsible for separating the train line between the charged cars. The train line between the car being retested and the car it is coupled to would have to be separated to perform the retest with a device. In many cases this train line will be under pressure at the time of the separation and could cause injury to the person separating the train line if caution is not used. The final rule recognizes this potential safety concern and requires that the compressed air in a car to be retested must be depleted prior to separating the air hoses and conducting the retest.

C. Movement of Equipment With Defective Brakes

The current regulations do not contain requirements pertaining to the movement of equipment with defective power brakes. The movement of equipment with these types of defects is currently controlled by a specific statutory provision originally enacted in 1910, and later amended which states:

(a) GENERAL.—A vehicle that is equipped in compliance with this chapter whose equipment becomes defective or insecure nevertheless may be moved when necessary to make repairs, without a penalty being imposed under section 21302 of this title, from the place at which the defect or insecurity was first discovered to the *nearest available place at which the repairs can be made*—

(1) On the railroad line on which the defect or insecurity was discovered; or

(2) At the option of a connecting railroad carrier, on the railroad line of the connecting carrier, if not farther than the place of repair described in clause (1) of this subsection.

49 U.S.C. 20303(a) (emphasis added).

Although there is no limit contained in 49 U.S.C. 20303 as to the number of cars with defective equipment that may be hauled in a train, FRA has a longstanding interpretation which requires that, at a minimum, 85 percent of the cars in a train have operative brakes. FRA bases this interpretation on another statutory requirement which permits a railroad to use a train only if ''at least 50 percent of the vehicles in the train are equipped with power or train brakes and the engineer is using the power or train brakes on those vehicles and on all other vehicles equipped with them that are associated with those vehicles in a train.'' 49 U.S.C. 20302(a)(5)(B). As originally enacted in 1903, section 20302 also granted the Interstate Commerce Commission (ICC) the authority to increase this percentage, and in 1910 the ICC issued an order increasing the minimum percentage to 85 percent. *See* 49 CFR 232.1, which codified the ICC order.

As virtually all freight cars are presently equipped with power brakes and are operated on an associated train line, the statutory requirement is in essence a requirement that 100 percent of the cars in a train have operative power brakes, unless being hauled for repairs pursuant to 49 U.S.C. 20303. Consequently, FRA currently requires that equipment with defective or inoperative air brakes makeup no more than 15 percent of the train and that if it is necessary to move the equipment from where the railroad first discovered it to be defective, the defective equipment be moved no farther than the nearest place on the railroad's line where the necessary repairs can be made or, at the option of the receiving carrier, to a location that is no farther than the location where the repairs could have been performed on the delivering line.

In addition to the general requirements relating to the movement of equipment with defective safety appliances, FRA currently requires 100-percent operative brakes on a train departing its initial terminal. The requirement for 100 percent at the initial terminal has been a standard by which the railroad industry has operated for decades and one which FRA and its predecessor agency, the Interstate Commerce Commission, have endorsed since the adoption of the power brake regulations. The requirement is founded on Congress' mandate that the ICC incorporate into the federal rail safety regulations the AAR's rules, standards, and instructions as of April 11, 1958, regarding the installation, inspection, maintenance, and repair of train brakes. In 1958, Congress amended a provision of the Safety Appliance Acts, then codified at 45 U.S.C. 9, by incorporating the inspection requirements of the AAR into the statute and permitting their change only for the purpose of achieving safety.[3] Based on a review of the legislative history surrounding that amendment, FRA believes it is clear that Congress interpreted the AAR standards as requiring 100 percent operative brakes on all trains prior to departure from an initial terminal. As the current regulations regarding the performance of an initial terminal inspection contained at 49 CFR 232.12(c)-(j) were basically an adoption of the AAR inspection and testing standards as they existed in 1958, FRA believes that the current regulations are intended and do require 100 percent operative brakes at initial terminals.

In developing the 1998 NPRM, FRA considered the various proposals discussed in the RSAC Working Group and the numerous comments provided subsequent to the issuance of the 1994 NPRM. A discussion of those comments and proposals was provided in the 1998 NPRM and will not be reiterated here. *See* 63 FR 48308–310. It is clear from that discussion that many of the proposals received by FRA since the issuance of the 1994 NPRM were in direct conflict with various statutory requirements related to the movement of equipment with defective brakes. As the RSAC Working Group was unable to reach a consensus on the inspection, testing, and maintenance requirements for freight train brake systems, FRA was not willing or able to propose provisions regarding the movement of equipment with defective brakes that would be contrary to existing statutory mandates. The 1998 NPRM contained proposals regarding the tagging of defective equipment, the placement of defective equipment in a train, and a method for consistently calculating the percentage of operative brakes on a train. Therefore, in addition to being consistent with the statutory requirements, the proposed requirements ensured the safe and proper movement of defective equipment and clarified the duties imposed on a railroad when moving such equipment.

FRA proposed that all cars or locomotives found with defective or inoperative brake equipment be tagged as bad ordered with a designation of the location where the necessary repairs

[3] In 1994, Congress revised, recodified, and enacted without substantive change, the federal railroad safety laws. Simultaneously, the then existing general and permanent federal railroad safety laws were repealed. 45 U.S.C. 9 of the Safety Appliance Acts is currently codified at 49 U.S.C. 20301 and 20302. The reference to the AAR rules, standards, and instructions was removed during the recodification as executed. *See* Pub. L. 103–272 (July 5, 1994) and H.R. Rep. No. 103–180, at 94 (1993).

would be effectuated. FRA attempted to expressly clarify the requirement that equipment with defective brakes not depart from, or be moved beyond, a location where the necessary repairs to the equipment could be performed. The 1998 proposal made clear that if a car or locomotive is found with defective brakes during any of the proposed brake inspections or while the piece of equipment is en route and the location where the defective equipment is discovered is a place where repairs of the type needed can be performed, then that car or locomotive may not be moved from that location until the necessary repairs are effectuated. However, if repairs to the defective condition cannot be performed at the location where the defect is discovered, or should have been discovered, the proposal made clear that the railroad is permitted to move the equipment with the defective condition only to the nearest location where the necessary repairs can be performed.

The preamble to the 1998 NPRM contained a lengthy discussion regarding FRA's views as to what constitutes the nearest location where the necessary repairs can be performed. *See* 63 FR 48309. In that discussion, FRA noted that its previous proposals regarding the use of mobile repair trucks and when locations serviced by those trucks would be considered locations where necessary repairs could be effectuated did not sufficiently address the issue and might lead to undesired consequences. Rather than attempt to develop a standard applicable to all situations, which FRA did not believe could be accomplished at the time, FRA intended to approach the issue of what constitutes the nearest location where necessary repairs could be made based on a case-by-case analysis of each situation. FRA noted that in making these determinations both the railroad as well as FRA's inspectors must conduct a multi-factor analysis based on the facts of each case. In the preamble, FRA provided a broad discussion, based on existing case law, setting out general guidelines and factors that should be considered when determining whether a particular location is a location where necessary repairs can be made or whether a location is the nearest location where the necessary repairs can be effectuated. *See* 63 FR 48309.

FRA also proposed continuation of the requirement to have 100 percent operative brakes on a train at its point of origin (initial terminal). FRA noted that this has been a requirement in the railroad industry for decades and that it was not only wise from a safety standpoint, as it ensures the proper operation of a train's brake system at least once during its life, but it also sets the proper tone for what FRA expects to be accomplished at these locations. Furthermore, requiring 100 percent operative brakes on a trains at its inception provides the railroads with a margin for failure of some brakes while the train is in transit (up to 15 percent) and tends to ensure that defective equipment is being repaired in a timely fashion. In addition, FRA stated that the 100-percent requirement is consistent not only with Congress' understanding of the AAR inspection standards that were adopted in 1958, but also with the intent of FRA, rail management, and rail labor as to what was to occur at initial terminals when the inspection interval was increased from 500 miles to 1,000 miles in 1982. At that time, carrier representatives committed to the performance of quality initial terminal inspections in exchange for an extension in the inspection interval, for which FRA intended to hold them accountable. Moreover, FRA believed that retention of the 100-percent requirement is consistent with the statutory requirements regarding the movement of defective equipment because a majority of the locations where trains are initiated have the capability of conducting virtually any brake system repair, and thus, under 49 U.S.C. 20303(a) the defective equipment may not be moved from those locations anyway.

In the preamble to the 1998 NPRM, FRA recognized that the 100-percent requirement at points of origin tends to be somewhat burdensome for some railroads at certain locations. *See* 63 FR 48309–10. However, FRA noted that the number of locations where the requirement is quite burdensome appears to be fairly low as FRA had made clear that railroads are free to petition for a waiver of this requirement, but as of the issuance of the NPRM no railroad had filed such a petition. Although FRA recognized that the requirement creates somewhat illogical scenarios at some locations, FRA was not willing to propose provisions permitting trains to depart locations with less than 100 percent operative brakes without fully considering the safety hazards or potential abuses which may accompany such an approach. Therefore, FRA sought comment from interested parties regarding the potential for permitting very limited flexibility in moving defective equipment from outlying initial terminals which lack the capability of effectuating brake system repairs. FRA also discussed various alternative approaches, with attendant restrictions, which might provide some flexibility at these outlying locations and sought comment on those approaches as well. *See* 63 FR 48310.

The AAR and several other railroad representative submitted a number of comments on the proposed requirements regarding the movement of defective equipment. The majority of the comments received from these parties addressed the proposed requirements regarding 100 percent operative brakes at a train's initial terminal, the identification of locations where brake repairs should be required, and the tagging of defective equipment.

These commenters recommend that FRA permit trains to operate from any location with a minimum percentage of its brakes inoperative. At a minimum, they recommend that this flexibility be provided at locations where repairs can not be performed. They suggest adoption of a 95-percent minimum operative brake requirement from such locations. They contend that the 100-percent requirement at initial terminals is outdated and does not take into consideration the numerous technological improvements made to brake systems over the last several decades. They also contend that it makes no sense to require 100-percent operative brakes on trains originating at a location yet allow a train originating at another location to pick-up defective equipment at the same location and haul it to the same place that it could have been hauled by the originating train. They further contend that the 100-percent requirement results in the unnecessary switching of cars and exposes employees to greater safety risks than if the equipment were permitted to depart in originating trains. Several commenters note that Canada has permitted trains to operate to destination with 95 percent operative brakes since June of 1994 and has experienced no compromise in safety. The AAR commented that railroads could live with a 95-percent operative brake requirement out of initial terminals provided that there were no mileage restrictions placed on the movement of such defective equipment as discussed in the NPRM. *See* 63 FR 48310. The ASLRA sought clarification as to the applicability of the 100-percent requirement to transfer trains. They contend that the language used in the NPRM suggests that all transfer trains must have 100-percent operative brakes from their initial terminal which is not what is required under the current regulations and would have a huge impact on small railroads.

A number of railroad representatives also provided comments and

recommendations on how FRA addressed the issue of what constitutes a location where brake repairs are required to be performed. These commenters recommend that FRA clarify what constitutes the nearest location where repairs can be made. These parties do not believe that this determination should be left to the discretion of individual FRA inspectors. They claim that such an approach creates inconsistent enforcement from one region to another and makes it very difficult for railroads to comply as FRA is continually second guessing their good faith determinations.

The AAR and other commenters contend that Congress intended that only fixed repair facilities be considered locations where brake system repairs must be conducted and that such facilities provide safer working conditions than those encountered when using a mobile repair truck. They further contend that it is not in the public interest to require repair trucks to make repairs at every location where they can be moved. The AAR and several railroads recommend that FRA permit railroads to designate repair locations to FRA and permit modification of those designations each quarter.

The AAR and its member railroads also objected to some to the proposed tagging requirements associated with the movement of equipment with defective brakes. They objected to the requirement that any automated tracking system be approved by FRA prior to its implementation. These commenters suggested that such review and approval process would be very time consuming and that FRA would not easily grant the use of such systems. They also objected to the proposed requirement that the tag or card be retained for 90 days, contending that the requirement was merely to aid in FRA's enforcement and served no other purpose.

The AAR also recommended that FRA modify the proposed requirement regarding the placement of equipment with defective brakes. The AAR contends that FRA should permit the use of multi-unit articulated equipment provided that it has no more than two consecutive control valves cut out or inoperative rather than the proposed limitation prohibiting the use of such equipment with consecutive inoperative or cut-out control valves. They contend this is the current practice of many railroads in the United States and is currently allowed on trains operated in Canada.

A number of rail labor representatives also provided comments on the proposed provisions regarding the movement of equipment with defective brakes. These commenters as well as the CAPUC support the requirement that trains have 100-percent operative brakes at their initial terminals. They believe that any flexibility granted to railroads in this regard would reduce the incentive to conduct quality inspections and would result in railroads eliminating even more personnel at other outlying locations. These commenters also suggest that any inability of railroads to conduct repairs at outlying locations is due to their own actions in eliminating repair equipment and personnel from these locations. They also contend that properly equipped mobile repair trucks have the capability of conducting any repair that would be required at virtually any of the outlying locations operated by a railroad.

Several labor representatives also object to granting the railroads the ability to designate locations where brake system repairs will be conducted. They contend that this is merely an attempt by the railroads to eliminate existing locations where repairs can be conducted. They further object to the AAR's contention that only fixed repair facilities should be considered in determining where brake system repairs must be conducted. They claim that such an approach would lead to the closure of even more fixed repair shops so that railroads could further circumvent the requirement to make timely repairs at the nearest location. They assert that allowing railroads to designate locations where repairs will be made would violate 49 U.S.C. 20303(a) which requires repairs to be conducted at the nearest location where the necessary repairs can be made.

Parties representing rail labor generally support the proposed tagging requirements for moving defective equipment but noted their objection to the use of an automated tracking system. These commenters believe that an automated tracking system reduces the awareness of ground inspection forces as to the presence of defective equipment and would not ensure proper handling of such equipment. The required tag provides carmen and yard crews with the ability to visually identify defective equipment and take appropriate action. Furthermore, it is contended that automated tracking systems lack ready accessibility and do not provide sufficient accountability or security to prevent potential abuse by the railroads. Many of these commenters also recommend that the tags be retained for a period of at least one year rather than the proposed 90 days and that they be made available to FRA immediately rather than within the proposed 15 days. Allowing railroads 15 days to produce the document would merely frustrate FRA enforcement activity due to information delay.

Several labor commenters as well as the CAPUC also recommend that FRA modify the proposed requirements regarding the person responsible for making the determinations regarding the movement of defective brake equipment. They suggest that the rule require the person to be a carman or at a minimum a person meeting the proposed definition of a qualified mechanical inspector. They contend that only these individuals have the experience and knowledge to adequately assess the impact that a defective piece of equipment might have on a train's operation.

Several labor representatives also raised concerns regarding the proposed method for calculating the percentage of operative brakes. These commenters along with the NTSB recommend that the proposed method for calculating the percentage of operative brakes, based on the number of cut-out control valves, be modified because a control valve can be cut in but the brakes which it controls can be inoperative. Thus, the proposed method does not provide an accurate count of the number of defective brakes. Some labor representatives suggest that the computation be based on car count as it provides a much more simple, reliable, and enforceable method than the proposed control-valve method. Certain labor representatives also object to the proposed list of conditions that would not be considered an inoperative brake for purposes of calculating the percentage of operative brakes. They contend that cars containing any of the listed conditions should be considered to have inoperative brakes.

FRA Conclusions. The final rule generally retains the requirements regarding the movement of defective equipment proposed in the 1998 NPRM with minor modification in response to the comments submitted. The final rule modifies the language used in the proposed general provisions to accurately reflect the language contained in the existing statutory provisions pertaining to the movement of equipment with defective brakes. The final rule replaces the term ''repair location'' with the phrase ''location where necessary repairs can be performed.'' FRA agrees that the proposed language could have been interpreted as being somewhat contrary to the language used in the existing statute, which was not FRA's intent.

The final rule also clarifies that the person required to make the determinations regarding the safe movement of defective equipment is to be a ''qualified person'' as defined in the final rule. The intent of FRA when issuing the NPRM was to require the determinations to be made by these individuals. FRA believes that the training requirements contained in the final rule for designating a person qualified to perform a specific task will ensure that the individual possesses the appropriate knowledge and skills to perform the assigned task. The determinations that are required to be made in the final rule are currently made by individuals which FRA believes will be trained and designated under the final rule as qualified persons.

The final rule also modifies the proposed method for calculating the percentage of operative brakes. The final rule retains the general method of calculating the percentage based on a control-valve basis. FRA believes that basing the calculation on control valves provides a much more accurate measurement than using a car basis because many types of freight equipment in use today can have the brakes cut out on a per-truck basis, and FRA expects this trend to continue as the technology is applied to new equipment. Thus, the method retained in this final rule more accurately reflects the true braking ability of a train as a whole and recognizes existing technology. However, FRA agrees with the comments of the NTSB and certain labor representatives that the method proposed in the NPRM did not take into consideration the possibility of a control valve being cut in when the brakes it controls are inoperative. Consequently, the final rule clarifies that a control valve will not be considered cut in if the brakes controlled by that valve are inoperative.

The final rule also retains the proposed list of conditions that are not to be considered inoperative power brakes for purposes of calculating the percentage of operative brakes. Contrary to the assertions of some commenters, the conditions listed do not render the brakes inoperative nor are the listed conditions ones that are outside the scope of the movement-for-repair provisions. Furthermore, many of the listed conditions are of such a nature that if found, they would constitute a violation under other provisions contained in the final rule and separate penalties are provided.

The final rule also modifies the proposed requirement regarding the placement of multi-unit articulated equipment with inoperative brakes. The final rule requires that such equipment shall not be placed in a train if it has more than two consecutive individual control valves cut out or if the brakes controlled by the valve are inoperative. FRA recognizes that the proposed requirement prohibiting the placement of such equipment with consecutive control valves cut out is more restrictive than current practice on many railroads. When proposing the requirement in the NPRM, FRA believed that the current practice on most railroads was to prohibit the placement of such equipment if it had consecutive control valves cut-out. Based on the comments received, it appears that the standard practice on most railroads prohibits placement of this equipment only if more than two consecutive control valves are cut-out. As it was FRA's intent to incorporate the current practices of railroads with regard to the placement of this equipment, the final rule has been modified accordingly.

The final rule retains FRA's position on the use of automated tracking systems in lieu of the required tagging of defective equipment. As an adequate automated system for tracking defective equipment does not currently exist on most railroads, FRA is not willing to permit the implementation of such a system without its approval. Furthermore, FRA does not believe it is prudent, from a safety perspective, to allow implementation of a tracking system for which FRA would not have a prior opportunity to assess to ensure the system's accessibility, security, and accuracy. Moreover, FRA agrees that the physical tagging of defective equipment provides a railroad's ground and operational forces the ability to visually locate and identify defective equipment at the time they see it rather than referring to an electronic database for such information. It should be noted that FRA is not intending to discourage the development of a viable automated tracking system, but believes that FRA must be provided the ability to review and approve any such system prior to its implementation. In fact, the final rule contains some new language regarding FRA's oversight of any automated tracking system that is approved by FRA to ensure the agency's ability to monitor such systems and potentially prohibit the use of the system if it is found deficient.

The final rule also retains the proposed requirement that a record or copy of each tag removed from a defective piece of equipment be retained for 90 days and made available to FRA within 15 days of request. FRA does not believe that the proposed time frames need to be expanded as suggested by some commenters. The provisions are identical to those contained in part 215 regarding freight car defects, and they have proven to be sufficient to meet the needs of FRA. FRA admits that the record keeping requirements are intended to aid FRA in its enforcement of the regulations. However, as the agency is able to inspect and oversee only a small portion of the railroad operations taking place across the country at any one time, the need for railroads to maintain records is essential for FRA carry out its mission of ensuring that all railroads are operating in the safest possible manner and comply with those regulatory provisions designed to ensure that safety.

After consideration of the comments provided, FRA believes it is essential to further clarify to the regulated community its position for determining whether a location is a place where brake repairs can be made. FRA does not agree that railroads should be permitted to unilaterally determine the locations FRA will consider capable of making brake system repairs. History shows that many railroads and FRA have widely different views on what should be considered a location where brake repairs can and should be effectuated. Furthermore, it is apparent to FRA that some railroads attempt to minimize or circumvent the requirements for conducting repairs for convenience or efficiency. However, FRA also recognizes that the emergence of mobile repair trucks creates an ability to perform repairs that did not exist when Congress enacted the statutory requirements related to the movement of defective equipment. FRA acknowledges that every location where a mobile repair truck is capable of making repairs should not be considered a location where repairs must be conducted. However, FRA also disagrees with the contentions of some commenters that Congress intended for only fixed repair facilities to be considered when determining locations where brake repairs are to be performed and that mobile repair trucks should not be considered. FRA is aware of numerous locations where mobile repair trucks are being used in lieu of a fixed facility or where a fixed facility was eliminated and the same repairs, that were being performed by the fixed facility, are now being performed at the same location by a fully equipped repair truck. Thus, FRA believes that locations where repair trucks are used in the same manner as a fixed facility should be considered when determining where the necessary repairs can be made.

As noted in the NPRM, the determination as to what constitutes the

nearest location where necessary repairs can be performed is an issue that FRA has grappled with for decades. FRA continues to believe that the determination must be made on a case-by-case basis after conducting a multi-factor analysis. However, in an effort to better detail the items that will be considered by FRA in making a determination, the final rule contains general guidelines that FRA will consider when determining whether a location is one where at least some brake system repairs must be made. FRA would expect railroads to consider the guidance contained in the final rule when making their decisions on where equipment containing brake defects will be repaired. The guidance contained in the final rule is based upon the voluminous case law that establishes the guiding principles for determining whether a location constitutes the nearest location where the necessary repairs can be made, previous enforcement actions taken, and guidance provided by FRA regarding identification of repair locations. The final rule guidance incorporates the principles contained in the following discussion previously set out in the NPRM.

In determining whether a particular location is a location where necessary repairs can be made or whether a location is the nearest repair location, the accessibility of the location and the ability to safely make the repairs at that location are the two overriding factors that must be considered in any analysis. These two factors have a multitude of sub-factors which must be considered, such as: the type of repair required; the safety of employees responsible for conducting the repairs; the safety of employees responsible for getting the equipment to or from a particular location; the switching operations necessary to effectuate the move; the railroad's recent history and current practice of making repairs (brake and non-brake) at a particular location; and relevant weather conditions. Although the distance to a repair location is a key factor, distance alone is not the determining factor concerning whether a particular location is the nearest location for purposes of effectuating repairs and must be considered in conjunction with the factors noted above. Existing case law states that neither the congestion of work at a particular location or convenience to the railroad are to be considered when conducting this analysis.

Although FRA does not believe that railroads should be permitted to unilaterally designate locations where brake system repair will be conducted, FRA does believe that safety could be served and disputes avoided if a railroad in cooperation with its employees could develop a plan, subject to FRA's approval, which designates locations where brake system repairs will be effectuated. FRA believes such a plan would have to be consistent with the guidelines discussed above and contained in this final rule and that such plans would have to be approved by FRA prior to being implemented. Such a plan could serve safety well by making clear to all where repairs are to be made and by assuring in advance that the criteria set forth in the final rule are appropriately applied. Consequently, the final rule permits railroads and representatives of their employees to submit a joint proposal containing a plan which designates locations where brake system repairs will be conducted. The final rule makes clear that such proposals would have to be approved by FRA prior to being implemented.

The final rule also retains the proposed and current requirement that a train have 100-percent operative brakes when departing from a location where an initial terminal brake test is required to be performed on the train. This has been a requirement in the railroad industry for decades, and FRA is not willing to provide an exception on an industry-wide basis at this time. Contrary to the assertions made by some commenters, FRA believes there is adequate justification for retaining the 100-percent requirement. In the NPRM and in the preceding discussion, FRA provided a number of reasons why it believes there is a need for the 100-percent requirement and will not reiterate them here. *See* 63 FR 48309. Some commenters suggested that FRA should permit any and all trains that have 95-percent operative brakes to operate from their points of origin to destination and that Canada currently allows such operation. FRA believes that such an approach would be completely contrary to, and would violate, the existing statutory mandate regarding the movement of equipment with defective brakes. The existing statutory provisions regarding the movement of equipment require that such equipment be repaired at the nearest location where the necessary repairs can be performed. *See* 49 U.S.C. 20303(a). Consequently, trains that originate at or that operate through locations where the necessary brake repairs can be effectuated clearly are required by the statute to have 100-percent operative brakes prior to departing those locations and may not haul a car with inoperative brakes under the statutory hauling-for-repair provision.

Although FRA recognizes that the 100-percent requirement may be somewhat burdensome for some railroads at certain locations, FRA believes that the number of locations involved is relatively low and should be handled on a case-by-case basis through the existing waiver process. FRA agrees that many railroads have created their own problems by eliminating repair facilities and personnel at many of the outlying locations where the railroads now claim they lack the ability to make appropriate repairs. Furthermore, FRA believes that the best method of assessing the safety implications of permitting a location to operate trains with less than 100-percent operative brakes is for the railroad to provide information on how the railroad will handle the defective equipment based on the specific needs and operating characteristics of the railroad involved.

In the NPRM, FRA provided various approaches under which it would potentially consider allowing a railroad to operate a train from their initial terminal with less than 100-percent operative brakes. *See* 63 FR 48310. The methods suggested by FRA were rejected as being overly burdensome by several commenters noted in the preceding discussion. Therefore, FRA believes the burden falls on each railroad seeking relief from the 100-percent requirement at certain outlying locations to provide FRA with an operating plan that will ensure the safe operation of such trains and provide for the timely and certain repair of any defective equipment moved from those locations. Consequently, FRA believes that there are a few existing locations that may be candidates for receiving a waiver from the 100-percent requirement, and FRA is willing to consider waivers for such locations, however; the railroads applying for such waivers must be able to establish a true need for the exemption and must be willing to provide alternative operating procedures that ensure the safety of the trains being operated from those locations.

The final rule also clarifies that the 100-percent operative brake requirement is not intended to apply to transfer trains that originate at location where the necessary brake repairs cannot be effectuated. FRA agrees that the 100-percent requirement does not currently apply to such trains, and it was not FRA's intention when issuing the NPRM to extend its application to such trains. However, it should be noted that if a transfer train originates at a location where repairs to the equipment

containing defective brakes can be effectuated, then the train would be required to have 100-percent operative brakes prior to departing that location.

D. Dynamic Brakes

The issue of dynamic brakes, and the extent to which FRA should impose regulatory requirements governing their use, if at all, is one which has prompted lengthy and animated debate among all affected parties since the issuance of the ANPRM in December 1992. Coincident with the drafting of the ANPRM, the Rail Safety Enforcement and Review Act amended section 202 of the Federal Railroad Safety Act of 1970 (recodified at 49 U.S.C. 20141), and mandated, in part, that FRA, ''where applicable, prescribe regulations that establish standards on dynamic braking equipment.'' This specific mandate is derived largely from two NTSB recommendations to FRA concerning dynamic brakes following the Southern Pacific Transportation Company (SP) accident at San Bernardino, California on May 25, 1989.

In this accident, excessive tonnage and excessive speed cresting a 2.2-percent grade, complicated by the fact that the train crew had been provided erroneous information regarding available and operative dynamic brakes, led to a train that was out of control and was ultimately unable to stop before derailing. While the NTSB determined the primary cause of the accident to be the excessive weight of the train as compared to that reported to the train crew, a secondary cause was determined to be the fact that the engineer had far less operable dynamic braking available for use than expected. The combination of these two conditions likely led to flawed decision making by the train crew in developing train handling strategies for negotiating the grade safely. In its final report, the Safety Board issued the following recommendations to the FRA regarding dynamic brakes:

1. Study, in conjunction with the AAR, the feasibility of developing a positive method to indicate to the operating engineer in the cab of the controlling locomotive unit the condition of the dynamic brakes on all units in the train.

2. Revise regulations to require that if a locomotive unit is equipped with dynamic brakes that the dynamic brakes function. NTSB Recommendation R–90–24 (1990).

To reiterate the general explanation of the principles of dynamic braking, as provided in the ANPRM (57 FR 62546), the 1994 NPRM (59 FR 47676), and the 1998 NPRM (63 FR 48311), dynamic brakes were developed as a ''free'' by-product of the diesel-electric drive train. By engaging the dynamic brake, the normally powered traction motors on each axle are changed to generators, and the power generated is dissipated through resistance grids. The effect is similar to that of shifting an automobile to a lower gear when descending a steep grade. The additional hardware needed to outfit a locomotive with dynamic brakes includes the grids and the controls and switches.

The primary selling point of dynamic brakes has been the ability to reduce freight car brake shoe wear. The dynamic brake is also useful in controlling train slack in lieu of using the locomotive independent brake. Furthermore, use of the dynamic brake in controlling train speed in lieu of power braking, where the train brake is applied with the locomotive under power, is a major factor in fuel savings. Due to these benefits, railroads currently emphasize and encourage the use of dynamic brakes as evidenced through examination of numerous carriers' operating rules which dictate the use of dynamic braking as the preferred method of slowing or controlling a train, or both, especially in heavy-grade territory. Historically, dynamic brakes have been applied to locomotives at the individual railroad's option, primarily based on economic considerations. It is important to note that, at present, the vast majority of new locomotives procured by the railroads are equipped with dynamic brakes.

A wealth of information was gathered regarding the operation, testing, and maintenance of dynamic brakes prior to the issuance of the 1998 NPRM. In the 1998 NPRM, FRA provided an in-depth discussion of the various proposals and comments related to the operation and maintenance of dynamic brakes as well as potential technologies for providing information to the locomotive engineer regarding the operational status of the dynamic brakes in a train consist. *See* 63 FR 48310–313. After consideration of all the information submitted and developed, FRA proposed a set of standards for dynamic brakes that it believed were consistent with the statutory mandate, took into consideration NTSB recommendations, promoted progressive improvements in dynamic brake information systems through the phased introduction of technology, while avoiding excessive regulation that might discourage the use of dynamic brakes.

In the 1998 NPRM, FRA noted that RSAC Working Group and task force deliberations provided no rationale to warrant a reconsideration of FRA's stated position that dynamic brakes do not offer the technical capability to serve as a primary train braking system since: (i) They provide braking force only on powered locomotive axles and are incapable of controlling in-train forces in the same manner as the automatic braking system; (ii) they are effective only within a narrow speed range and have no capability to actually stop a train; (iii) they can fail without prior warning; and (iv) their failure mode is characterized by loss of braking force (as opposed to the automatic brake, which, properly employed, initiates an emergency brake application upon loss of system integrity and therefore is failsafe). Similarly, however, FRA asserted that the RSAC Working Group and task force deliberations reinforced FRA's belief that dynamic brakes have become, *de facto,* a second-order safety system where employed. Although from the point of view of logical priorities, dynamic brakes ''back up'' the automatic train brake system, in sequence of operational procedures the priority is reversed. Stated differently, either the proper functioning of these systems, or the provision of reliable information concerning degraded functioning of these systems, should prevent locomotive engineers from operating trains in a manner that might make recovery through use of the automatic brake impossible.

In considering all of the information available, FRA concluded that it was imperative for the locomotive engineer to be informed in writing as to the operational status of the dynamic brakes on all locomotives in the consist at the initial terminal or point of origin for a train or at other locations where a locomotive engineer first takes charge of a train. Therefore, FRA proposed that locomotive engineers be provided this information at these locations. This proposed provision directly addressed the foremost concern articulated by the NTSB following the San Bernardino accident. FRA also proposed provisions requiring visible identification of locomotive units with inoperative dynamic brakes. FRA also agreed that when locomotives are equipped with dynamic brakes, they should be in proper operating condition and be maintained on a regular basis. Therefore, FRA proposed that defective dynamic brakes be repaired within 30 days of being found defective or at the locomotive's next periodic inspection. FRA recognized that these maintenance requirements might be overly burdensome in some instances for railroads (primarily short lines) that do not utilize dynamic brakes in their

respective operations, but yet own and operate locomotives equipped with dynamic brakes. Consequently, FRA proposed provisions for deactivating a locomotive's dynamic brakes without physically removing the components.

In addition to the information and maintenance requirements, FRA also proposed the development of operating rules and training programs to ensure the proper and safe use of dynamic brakes. For example, FRA proposed that railroads operating trains with brake systems that include dynamic brakes, develop and implement written operating rules governing safe train handling procedures for using these dynamic brakes under all operating conditions that are tailored to the specific equipment and territory of the railroad. The NPRM also proposed that the railroads provide training to their locomotive engineers on the prescribed operating rules, that at a minimum includes classroom, hands-on, and annual refresher training. More importantly, FRA also proposed a requirement that a railroad's operating rules be *based on the ability of friction brakes alone to safely stop the train under all operating conditions.* FRA believed that the establishment of these comprehensive operating rules and training plans was the most effective means by which to minimize the possibility of future incidents caused by excessive reliance on dynamic brakes by a train crew.

In the ANPRM (57 FR 62555), the 1994 NPRM (59 FR 47687), and the 1998 NPRM (63 FR 48314), FRA requested comments from the industry on possible methods of providing information regarding the status of dynamic brakes to the engineer in the cab of the controlling locomotive. The 1998 NPRM also contained a detailed discussion of various technologies available for providing information on the status of the dynamic brakes to the locomotive engineer. *See* 63 FR 48312–13. Although FRA recognized that the technology for dynamic brake displays with the ability to provide the type of information sought by FRA in the 1994 NPRM was not readily available at the time the 1998 NPRM was issued, several commenters suggested that the technology was under development. Consequently, FRA was not ready or willing to require the use of such indicators at that time. However, FRA noted that the benefit of such an indicator would be to alert engineers that they have diminished or excessive dynamic braking capabilities, thus permitting the engineers to control the braking of their trains in the safest possible manner. FRA indicated that it would continue to monitor the development of the technology and consider its application to locomotives used in the industry.

The AAR and its members, the NTSB, the CAPUC, and several representatives of rail labor provided numerous comments on the provisions related to dynamic brakes proposed in the 1998 NPRM. The AAR contends that the proposed requirement to provide written notification of the operational status of the dynamic brakes is overly burdensome. They recommend that the information be permitted to be transmitted in any manner, provided a record of the notification is maintained in the cab of the controlling locomotive. They also suggest that the notification only be required on an exception basis, when the dynamic brakes are inoperative. Conversely, representatives of rail labor contend that no locomotive with inoperative dynamic brakes should be permitted to be dispatched from a location with mechanical facilities capable of making the repairs. They further contend that if the locomotive's dynamic brakes cannot be repaired at the train's point of origin it should be allowed to be operated only as a trailing unit. These commenters support the requirement that the locomotive engineer be informed in writing as to the operational status of the dynamic brakes on all units in the consist and recommend that the lead locomotive of the consist be tagged to notify the engineer of the presence of a defective unit.

The AAR also objects to the proposed requirement that defective dynamic brakes be repaired within 30 days of being found defective. It claims that due to the reliability of dynamic brake systems they should be permitted to operate until the next periodic inspection. AAR asserts that a shorter repair cycle will reduce motive power availability and may result in shortages of motive power on some railroads. AAR also requests clarification of the term ''ineffective'' dynamic brake. The organization recommends that the term be eliminated, that the term ''inoperative'' dynamic brake be retained, and that a dynamic brake be considered ''inoperative'' when it is no longer capable of providing its designed retarding force on the train, similar to the proposed definition of ''effective'' brake.

Representatives of rail labor contend that locomotives with defective dynamic brakes should be required to be repaired within 15 days of being discovered. They contend that this is a more than sufficient time period for railroads to arrange for alternative power and get the locomotive to a location where it can be repaired. These commenters also recommend that a record of the repairs made to a locomotives dynamic brakes be retained for a period of one year rather than the 92 days proposed in the NPRM. These commenters also recommend that provisions be added to ensure that all dynamic brakes operate as intended and that the equipment not be altered or cut back in any manner.

The AAR also seeks clarification of the proposed training requirements contending that they should not be included in this rule unless FRA is willing to specify the knowledge, skills, and ability criteria needed pursuant to part 240. They also contend that the proposed requirement regarding the development of operating rules is unclear and should be eliminated if not clarified. The BLE asserted that the problem is not in the training of engineers on the use of dynamic brakes but in the prohibition on the use of the automatic brake in normal train operation, not just when the dynamic brakes fail. They assert that locomotive engineers should be permitted to use the automatic brake to control the train on a periodic basis to become familiar with its operation.

The AAR also objects to the requirement to stencil locomotives operating with deactivated dynamic brakes. The AAR asserts that defacing such locomotives is unnecessary and that a less intrusive means of identification should be used. The organization recommends that a locomotive with a deactivated dynamic brake should be treated no differently than a locomotive with an inoperative dynamic brake, in that the locomotive engineer should be notified of its presence. The AAR also recommends that railroads be permitted to use existing tags to identify locomotives with inoperative dynamic brakes.

The AAR and several locomotive manufacturers provided comments on the availability and use of dynamic brake indicators. These commenters make clear that there is currently no easy method of providing the available dynamic brake retarding force to the locomotive engineer. They also contend that the technology does not exist to show dynamic brake performance on distributed power units and that they should, therefore, be excluded from any indicator requirements. These commenters indicated that technology is not available to have most existing locomotives retrofitted with an indicator of some sort. They also assert that it is impossible to develop a device that will tell an engineer whether the dynamic

brakes will operate prior to the engineer actually applying the brakes due to the unknown risk of failure. The AAR also recommends that if FRA adopts an indicator requirement then the proposed requirements related to the notification of the locomotive engineer of dynamic brake status and for repairing inoperative dynamic brakes should not be adopted since real-time information will be available to the locomotive engineer.

Numerous labor representatives, the NTSB, and the CAPUC contend that the technology does exist, at least for new locomotives, to provide locomotive engineers with real-time indicators of the operating status of the dynamic brakes on trailing units. These commenters believe that the information these indicators provide to an engineer is extremely important and would allow engineers to control and operate their trains in the safest manner possible. All of these commenters appear to support a requirement to require these indicators in new locomotives, and some recommend some sort of retrofit requirement for existing equipment.

Several parties responded to FRA's request regarding technical reasons for prohibiting a locomotive with inoperative dynamic brakes from functioning as the lead or controlling locomotive in a locomotive consist. The AAR responded that it found no technical reason to prohibit such use, provided the locomotive has the ability to control the dynamic brakes on trailing locomotives. The AAR contends that railroads currently operate in this manner and will use a non-equipped locomotive when the other locomotives in the consist are cabless. Several labor representatives asserted that a locomotive with inoperative dynamic brakes should not be permitted to operate as the controlling locomotive regardless of whether it can operate the dynamic brakes on trailing units. These commenters contend that the engineer is better able to feel the dynamic brakes operate if the controlling unit has operative dynamic brakes and that the engineer will at least know whether that unit has operable dynamic brakes. The CAPUC cites similar human factor reasons for contending that a locomotive with inoperative dynamic brakes should not be used as a controlling unit. Several labor representatives also contended that if a defective locomotive were in the controlling position, then the speed of the train should be limited to 30 mph and the train should not be permitted to operate over grades of one percent or greater until a locomotive with operative dynamic brakes is placed in the lead position.

The NTSB and the CAPUC recommend that FRA include a ''mile-per-hour-overspeed-stop'' rule into the final rule to ensure that the speed of a train does not exceed its braking capacity. Such a rule would require a train that exceeds an established speed limit by a specified amount to be placed in emergency. The NTSB recommends that the overspeed limit be 5 mph or less over the designated speed limit. The CAPUC claims that California uses a 5 mph rule but that the limit may vary for different operations and should be established through validated simulations that include brake fade and field tests and must be related to a safe base speed. Both commenters contend that although the overspeed rule is simple, it accomplishes a critical safety function and reduces the chances of a runaway occurring as it removes any discretion from the operator. The CAPUC also recommends that railroads be required to validate their operating rules to ensure that friction brakes alone are sufficient to stop a train on all grades operated by the railroad. The CAPUC recommends that this be accomplished through validated simulations and field test that take into account brake heat-fade.

FRA Conclusions. The intent of the proposed requirement to notify the locomotive engineer in writing as to the operational status of the dynamic brakes on the locomotives in a train's consist was to ensure that the engineer had timely information on the condition of the locomotives so he could operate the train in the safest possible manner based upon that information. Thus, the manner in which the information is provided to the engineer is not a major concern to FRA, provided the information is accurate and up-to-date. Therefore, the final rule will allow railroads to provide locomotive engineers with the required information by any means they deem appropriate. However, the final rule will require that a written or electronic record of the information provided be maintained in the cab of the controlling locomotive. This will ensure that on-coming engineers will have the information provided to the previous operator of the train. The final rule also clarifies that the information is to be provided to the locomotive engineer at the train's initial terminal and at other locations where an engineer ''first begins operation'' of the train rather than where the engineer ''takes charge of the train.'' This clarification is in response to certain labor commenters to prevent possible misinterpretation or abuse of the requirement.

The final rule retains the proposed requirement to repair locomotives with inoperative dynamic brakes within 30 days of being found inoperative or at the locomotive's next periodic inspection, whichever occurs first. Due to the industry's reliance on these braking systems, as noted in the discussion above, FRA continues to believe they should be repaired as soon as possible after being found inoperative. FRA believes that a period of 30 days provides the railroads with sufficient time to get a locomotive to a location where the dynamic brakes can be repaired and allows for the reallocation of motive power when necessary so as to cause minimal disruption to a railroad's operation. FRA is not willing decrease the time period allowed to make repairs, as recommended by some commenters, because such a reduction could jeopardize a railroad's access to available motive power and could cause delay in the movement of freight which may create safety hazards themselves.

The final rule also eliminates the use of the term ''ineffective'' dynamic brakes and uses the term ''inoperative'' dynamic brake to include any dynamic brake that no longer provides its designed retarding force on the train, for whatever reason. FRA agrees that the use of only this term clarifies the applicability of the requirements related to dynamic brakes and prevents potential misunderstandings. The final rule also retains the proposed requirements related to the tagging of a locomotive found with inoperative dynamic brakes. Contrary to the comments of some parties, FRA does not believe that the tagging provisions require the development of new tags. The rule would allow the use of any type of tag, provided it is placed in a conspicuous location and contains the required information. The final rule also eliminates the requirement to stencil the outside of a locomotive declared to have deactivated dynamic brakes. FRA agrees that defacing the exterior of the locomotive is unnecessary and would do little to inform the locomotive engineer of the presence of the locomotive. FRA believes that the requirements to notify the locomotive engineer of the operational status of the locomotives and to have the cab of the locomotive clearly marked that the locomotive's dynamic brakes are deactivated provide sufficient notice to the locomotive engineer as to the status of that locomotive.

The final rule contains a requirement that an electronic or written record of repairs made to a locomotive's dynamic brakes be maintained and retained for a period of 92 days. Although this

requirement was not proposed in the NPRM, FRA believes these records fall within the scope of the notice and are necessary to ensure that necessary repairs are conducted on a locomotive's dynamic brakes in a timely fashion. FRA also believes that such a record will provide a railroad with information regarding the operation of the dynamic brakes and will potentially permit railroads to identify a repeated problem with a locomotive's dynamic brakes to prevent future reoccurrences and, thus, increase the utilization of a locomotive's dynamic brakes.

The final rule also contains specific requirements related to the use of a locomotive with inoperative or deactivated dynamic brakes as a controlling locomotive. These requirements are based on FRA's review of the comments submitted in response to FRA's request regarding the positioning of such a locomotive made in the NPRM. *See* 63 FR 48314. FRA tends to agree that there are no technical reasons why a locomotive with inoperative dynamic brakes cannot function as the controlling locomotive provided it can control the dynamic brakes on trailing units in the locomotive consist. However, FRA also agrees that a locomotive engineer loses the physical sensation of the operation of the dynamic brakes when the unit where the engineer is riding loses dynamic brake capability, which, if present, provides the engineer with at least some assurance that the dynamic brakes on some of the units in the consist are operating. Thus, in addition to requiring that locomotives with inoperative or deactivated dynamic brakes have the capability of controlling the dynamic brakes on trailing units when operating as the controlling locomotive, the final rule also requires that such locomotives also have the capability of displaying to the locomotive engineer the deceleration rate of the train or the total train dynamic brake retarding force. This requirement will ensure that locomotive engineers have at least some information as to the operation of the dynamic brakes in the locomotive consist they are controlling. FRA intends that the information required by this provision be provided either by a device known as an ''accelerometer'' or a similar device or by a dynamic brake indicator capable of providing total train dynamic brake retarding force to the locomotive engineer.

The final rule also contains provisions requiring new and rebuilt locomotives to be equipped with some sort of dynamic brake indicator. Although FRA agrees that the technology does not currently exist to equip existing locomotives with dynamic brake indicators economically, FRA does believe that the technology exists or is sufficiently developed to provide new locomotives with the ability to test the electrical integrity of the dynamic brakes at rest and to display the total train dynamic brake retarding force at various speed increments in the cab of the controlling locomotive. FRA recognizes that the industry will require a little time to incorporate the existing technology into new locomotives. Therefore, the requirements related to dynamic brake indicators will only apply to locomotives ordered one and one-half years after the issuance of this final rule and to locomotives placed in service for the first time three years after the effective date of the final rule. FRA also recognizes that not all locomotives being rebuilt are designed, or have the capability of being redesigned, to have the capability to display the total train dynamic brake retarding force in the cab of the controlling locomotive. Thus, the final rule allows rebuilt locomotives to be designed to display the train deceleration rate (i.e., equipped with an accelerometer or similar device as discussed above) in lieu of being equipped with the dynamic brake indicator required on new locomotives. FRA believes that the information provided by these indicators is extremely useful to an engineer and will provide locomotive engineers with ready access to real-time information on the operation of the dynamic brakes in a locomotive consist and permit engineers to control and operate trains in the safest manner possible.

FRA also acknowledges that the information provided by dynamic brake indicators would eliminate the need to provide the locomotive engineers with information regarding the operational status of the dynamic brakes when the engineer first begins operation of a train. As the indicators would provide real-time information to the engineer on the operation of the dynamic brakes brake in the train consist, the information received by the engine when beginning operation would be unnecessary. Therefore, the final rule alleviates the need to inform locomotive engineers of the status of the dynamic brakes when all of the locomotives in the lead consist are equipped with dynamic brake indicators required for new locomotives. FRA believes that this allowance makes sense from a practical perspective but also provides some incentive for railroads to equip existing equipment with such indicators when the technology for doing so becomes economically feasible. It should be noted that there is no requirement that the dynamic brake status of distributed power units be provided in order to eliminate the need to provide dynamic brake information to the engineer. FRA agrees that the technology for transmitting that information to the engineer is not currently available in a cost effective and reliable manner.

The final rule retains the proposed provisions requiring railroads to develop and implement written operating rules governing the use of dynamic brakes and to incorporate training on those operating rules into the locomotive engineer certification program pursuant to 49 CFR part 240. Contrary to the assertions of some commenters, FRA does not believe these requirements are unclear. FRA intends for each railroad to develop appropriate operating rules regarding train handling procedures when utilizing dynamic brakes that cover the equipment and territory operated by the railroad. Many railroads already have these procedures in place and already provide training to their employees that adequately cover the requirements. FRA continues to believe that training on proper train handling procedures is essential to ensuring that locomotive engineers can properly handle their trains with or without dynamic brakes and in the event that these brake systems fail while the train is being operated. FRA also disagrees that the agency should specify the knowledge, skill, and ability criteria that a railroad must incorporate in its training program. FRA believes that each railroad is in the best position to determine what these criteria should be, given the railroad's equipment, physical characteristics and operating rules, and what training is necessary to provide that knowledge, skill, and ability to its employees.

The final rule also requires that the operating rules developed by railroads include a ''miles-per-hour-overspeed-stop'' requirement that requires a train to be immediately stopped if it exceeds the maximum authorized speed by more than 5 mph when descending a grade of one percent or greater. FRA agrees with both the NTSB and the CAPUC that this requirement accomplishes a critical safety function and reduces the potential for a runaway train as it establishes a clear rule for stopping a train and removes any discretion from the operator to continue operation of a train. FRA believes that the five-mph limitation is a good base limitation that should be reduced if so indicated by validated research and should be increased only with FRA approval. Moreover, the operating rules of most

Class I railroads already include a five-mph-overspeed-stop provision; thus, FRA's inclusion of the requirement in this final rule should impose little or no burden on the operations of most railroads.

E. Training and Qualifications of Personnel

Currently, the regulations contain no specific training requirements or standards for personnel who conduct brake system inspections. The regulations merely require that a ''qualified person'' perform certain inspections or tasks. *See* 49 CFR 232.12(a). Furthermore, the current regulations do not require that a railroad maintain any type of records or information regarding the training or instruction it provides to its employees to ensure that they are capable of performing the brake inspections or tests for which they are assigned responsibility. In several cases, FRA has found that a railroad's list of ''qualified persons'' is merely a roster of all of its operating and mechanical forces.

In the 1994 NPRM, FRA proposed a series of broad qualification standards addressing various types of personnel engaged in the inspection, testing, and maintenance of brake equipment. *See* 59 FR 47731–47732. These broad qualifications were separated into distinct subgroups that identified various types of personnel based on the type of work those individuals would be required to perform under the proposal. These included supervisors, train crew members, mechanical inspectors, and electronic inspectors. Although not proposed in the rule text of the 1994 NPRM, the preamble contained various guidelines regarding specific hours of classroom and ''hands-on'' training as well as guidelines regard the level of experience each of these types of employees would be required to possess or be provided. *See* 59 FR 47702–47703. The proposal also contained various requirements regarding the development and retention of records and information used by a railroad in determining the qualifications of such employees. See 59 FR 47732.

In the 1998 NPRM, FRA acknowledged that many railroads continue to improve the training they provide to individuals charged with performing brake system inspections, tests, and maintenance; however, FRA also acknowledged that it continued to believe that this training could be greatly improved and enhanced. The agency noted that although there had been a decline in the number of train incidents, derailments, fatalities, and injuries over the previous ten years, FRA believed that the number of these incidents could be further reduced if maintenance, inspections, and tests of the brake system were performed by individuals who have received proper training specifically targeting the activities for which the individual is assigned responsibility. FRA believed that one of the major factors in ensuring the quality of brake inspections and the proper operation of that equipment is the adequate training of those persons responsible for inspecting and maintaining that equipment.

In the 1998 NPRM, FRA proposed broad performance-based training and qualification requirements that would permit a railroad to develop programs specifically tailored to the type of equipment it operates and the employees designated by the railroad to perform the inspection, testing, and maintenance duties required in this proposal. FRA agreed that there is no reason for an individual who solely performs pre-departure air brake tests and inspections to be as highly trained as a carman since a carman performs many other duties which involve the maintenance and repair of equipment in addition to brake inspections. Therefore, FRA proposed training and qualification requirements which permit a railroad to tailor its training programs to ensure the capability of its employees to perform the tasks to which they are assigned. FRA also made clear that the proposed training and qualification requirements applied not only to railroad personnel but also to the personnel of railroad contractors and personnel in plants that build cars and locomotives that are responsible for brake system inspections, maintenance, or tests covered by this part.

Contrary to the 1994 NPRM, FRA did not issue specific guidelines on experience, classroom training, or ''hands-on'' training. FRA agreed that many of the guidelines contained in the preamble to that proposal were overly restrictive and might have impeded the implementation of certain training protocols capable of achieving similar results with less emphasis on solely the time spent in the training process. Furthermore, the 1994 proposed guidelines failed to consider the potentially narrow scope of training that might be required for some employees, particularly some train crew personnel, that perform very limited inspection functions on very limited types of equipment. Consequently, although the training and qualification requirements proposed in the 1998 NPRM continued to require that any training provided include classroom and ''hands-on'' training as well as verbal or written examinations and ''hands-on'' proficiency, they did not mandate a specific number of hours that the training must encompass as FRA realized that the time period should vary depending on the employee or employees involved. The 1998 proposal also contained provisions for conducting periodic refresher training and supervisor oversight of an employee's performance once training is provided.

FRA believed that the recordkeeping and notification requirements contained in the 1998 proposal were the cornerstone of the training and qualification provisions. As FRA was not proposing specific training curricula or specific experience thresholds, FRA believed that the recordkeeping provisions were vital to ensuring that proper training was being provided to railroad personnel. FRA intended the record keeping requirements to provide the means by which FRA would judge the effectiveness and appropriateness of a railroad's training and qualification program. The proposed recordkeeping provisions also provided FRA with the ability to independently assess whether the training provided to a specific individual adequately addresses the tasks that the individual is deemed capable of performing. Finally the proposed training mandates seemed most likely to prevent railroads from using insufficiently trained individuals to perform the necessary inspections, tests, and maintenance required by the proposal.

In the 1998 NPRM, FRA proposed to require that railroads maintain specific personnel qualification records for all personnel (including their contractors' personnel) responsible for the inspection, testing, and maintenance of train brake systems. FRA proposed that the records contain detailed information regarding the training provided as well as detailed information on the types of equipment the individual is qualified to inspect, test, or maintain and the duties the individual is qualified to perform. As an additional means of ensuring that only properly qualified individuals are performing only those tasks for which they are qualified, FRA proposed that railroads be required to promptly notify personnel of changes in their qualification status and specifically identify the date that the employee's qualification ends unless refresher training is provided.

FRA recognized that some railroads would be forced to place a greater emphasis on training and qualifications than they had in the past, and as a result would incur additional costs. However, FRA believed that the proposed rule

allowed railroads the flexibility to provide only the training that an employee needs in order to perform a specific job. The 1998 proposed rule did not require an employee who performs only brake inspections while the train is en route (*i.e.,* Class II brake tests) to receive the intensive training needed for an employee who performs Class I brake tests or one who is charged with the maintenance or repair of the equipment. The training might be tailored to the specific needs of the railroad. Across the industry as a whole, the 1998 proposal would not have required extensive changes in the way most railroads currently operate, but it would have required some railroads to invest more time in the training of their personnel.

FRA recognized that the costs of the proposed training requirements were fairly substantial; however, FRA believed that most Class I railroads had already invested in training, routinely scheduled training for their employees, and offered training to other interested parties. On the other hand, FRA noted that most railroads did not engage in the ''hands-on'' training and testing contained in the proposal nor did most railroads maintain the records required in the proposal. FRA noted that many Class I railroads have participated in initiatives under the Safety Assurance and Compliance Program (SACP) with FRA and labor and that many of the proposed training requirements would already be met by those railroads that have completed the training required under the SACP.

In the 1998 NPRM, FRA recognized that the proposed training requirements would likely cause some impact to smaller railroads but believed that the impact of the requirements on these smaller operations would be somewhat reduced due to the training already provided by the railroads and due to the nature of the operations themselves. FRA noted that many smaller railroads, particularly Class II railroads, send their employees to other railroads for training, participate in ASLRA and FRA training, and have some form of on-the job training. Furthermore, Class III railroad employees are not likely to require extensive training on different types of brake equipment since most of the equipment used by Class III railroads have only one type of brake valve. Furthermore, the employees of these small railroads would likely not be required to receive any training in the areas of EPIC brakes, dynamic brakes, two-way EOT devices, or on some of the brake tests and maintenance mandated in the proposal due to the limited distances traveled by these trains, the low tonnages hauled, and because many of the maintenance functions are contracted out to larger railroads.

The AAR and its members, the ASLRA, and various private car owners submitted numerous comments regarding the proposed training requirements. Generally, these commenters believe that the significant costs being imposed by the proposed training requirements are not justified based on the industry's safety record over the last two decades. They contend that the industry's safety record is evidence that the current training provided by the railroads is sufficient. At a minimum, these commenters recommend that railroads be provided three years to implement any training requirements imposed. Such an approach would be consistent with the proposed three-year refresher training requirements and would prevent manpower shortages and ease the financial impact.

Several railroad representatives recommend that railroads not be responsible for the training of the contract personnel they employ as was proposed. They contend that railroads do not maintain records of the training or experience of these individuals and that the contractor should bear the burden of training its own employees. These commenters admit that railroads would work with contractors to help them train their employees but that the contractor should be held responsible for providing the necessary training. They assert that the contractor is in the best position to determine the training needs of its employees and that the proposed approach potentially intrudes and alters the employment relationship of contractors and railroads.

Representatives of various railroads also object to some of the administrative burdens imposed by the proposed training requirements. They contend that the requirement to identify all tasks related to the inspection, testing, and maintenance of brake systems and develop procedures for performing each task, is overly burdensome and unnecessary. They also object to the proposed requirement that the railroad's Chief Mechanical or Chief Operating Officer sign a statement for each employee attesting that the employee meets the minimum requirements. They contend that the requirement would inhibit the use of electronic records and that there is no benefit obtained by requiring such a signature. These commenters further object to the requirement that railroads implement formal internal audit programs, contending that these programs would waste scarce resources and that the effectiveness of a training program can be assessed through efficiency tests, supervisory spot checks, and other less burdensome methods.

The AAR also objects to the potential requirement that all existing employees be completely retrained. The AAR recommends that existing employees not be required to receive any new training because it is unnecessary and there has been no showing that current training is inadequate. They also suggest that there is no need for refresher training of these employees unless a new brake system is introduced. At a minimum, they recommend that the ''hands-on'' refresher training be eliminated as virtually every railroad conducts periodic efficiency testing or audits of its employees to ensure ''hands-on'' proficiency of personnel. They also contend that refresher training should only be required for those employees that repeatedly demonstrate a failure to properly perform their required duties.

Several railroad representatives also object to the proposed requirement that employees receive training and testing on each task they will be required to perform and that they be trained and tested on each type of equipment operated by the railroad. These commenters contend that these proposed requirements would be cost-prohibitive and time-consuming. They claim that it is impossible for a railroad to have every type of vehicle it operates available to train all of its employees. They recommend that the training be limited to the different brake systems operated by the railroad and that the training be required to impart the necessary skills and abilities to perform the required tasks.

The AAR and the ASLRA also object to the proposed record keeping provisions, claiming they are overly detailed and unnecessary. These commenters recommend that the record keeping burdens be reduced and that FRA should only require a list of qualified employees, the training courses completed by an employee, and the date that training was completed. They contend that each railroad is in the best position to determine the level of detail that their records should contain and that the level of detail proposed by FRA will have a significant cost burden on railroads.

Representatives of rail labor reiterate that the need for any training provisions could be greatly reduced if FRA would simply require many of the proposed inspections and tests to be conducted by qualified carmen. At a minimum, these commenters contend that any training provisions must include a requirement

for FRA approval. They assert that any training program developed by a railroad should be approved by FRA. Several labor representatives also contend that the proposed training requirements fail to adequately address supervisors charged with oversight and training instructors. They believe that specific qualifications of both supervisors and instructors should be included in any final rule developed. They further contend that the proposed requirements do not include a dispute resolution procedure which they believe is necessary to avoid potential abuses by railroads when designating qualified employees. Certain labor representatives recommend that the proposed language regarding the training on new equipment needs to be clarified to ensure that the training is provided before the new equipment is placed in service.

FRA Conclusions. FRA recognizes that there has been a significant decline in the number of brake-related derailments and other train accidents and incidents, and resulting property damage, fatalities, and injuries over the last ten years; however, FRA continues to believe these numbers can be even further reduced if the inspections and tests of brake systems are performed by individuals who have received training that specifically targets the activities which the individual is assigned responsibility to perform. FRA's experience in enforcing the existing power brake regulations supports the conclusion that the better trained a person is on how to perform a brake inspection the better that person can perform the inspection when required to do so. Many FRA field inspectors have discovered equipment with brake conditions having the potential of causing a derailment or accident that are not identified by railroad personnel because those persons responsible for finding the conditions are not sufficiently trained or equipped to conduct the inspections they are required to perform. FRA's field forces consistently find that the most comprehensive brake inspections are performed by those individuals who have received detailed training specifically related to the inspection being performed and who conduct such inspections on a consistent basis. Based on this experience, FRA believes that the training required in this final rule will enhance the quality of brake inspections, which will increase the discovery of brake conditions that have the potential of causing a derailment or other accident. Because an increased number of brake conditions having the potential of causing a derailment or other accident will be discovered prior to being used in a train, FRA expects that the training required by this rule will reduce the number of incidents caused by brake-related problems.

Furthermore, as discussed in the 1998 NPRM, railroads continue to consolidate mechanical work to fewer and fewer locations on their systems. This trend places an increasing premium on the ability of mechanical and operating forces to conduct meaningful inspections and tests of the power brake system. Increases in train speeds and increased pressure on operating personnel due to growing traffic density will continue to make it critical for operating and mechanical forces to discharge their duties with respect to the power brake system both diligently and effectively even under the most optimistic of scenarios. Technological change presents an additional reason for placing a strong emphasis on the training and qualifications of inspection personnel. Both operating and mechanical personnel are confronted with an increasing variety of power brake arrangements and features. Consequently, these trends and changes make the training required in this final rule a necessity in order to ensure and enhance the quality of brake inspections.

In addition to the safety benefits, both quantified and non-quantified, there are certain operational benefits derived from the training required by this final rule. This final rule allows an increase in the distance some trains may travel between brake inspections. These increases are premised on the condition that all of the inspection functions performed on these trains are conducted by highly trained and qualified personnel. The latitude provided to these trains will result in fewer inspections per miles traveled and will reduce the number of opportunities that exist for a serious defect to be found before it could result in a train incident. It is imperative, therefore, that each inspection performed on these trains be of uniformly high quality. FRA believes that the training required by this final rule is a key factor for ensuring such high quality inspections. FRA also believes that certain non-quantifiable operational benefits will be derived from the training required by this final rule, particularly in the areas of equipment utilization, reduced train delays, and repair costs.

FRA agrees that railroads have made significant improvements in the quality of training provided to their employees but believes that this training can be further improved. Furthermore, FRA believes that a number of railroads participating in the SACP process have already developed, or are in the process of developing, comprehensive training programs that meet many of the requirements proposed in the NPRM. Therefore, the final rule retains the basic structure and concepts that were proposed in the NPRM regarding the training of individuals responsible for conducting the inspections and tests required by the final rule. The proposed training requirements have been slightly revised in this final rule in order to clarify FRA's intent, to recognize existing training, and to reduce any unnecessary burden that may have been inadvertently created by the proposed requirements.

The final rule modifies the proposed provision that required a railroad to provide training to the personnel of a contractor to the railroad whom the railroad uses to perform the various tasks required by the rule. The final rule makes clear that the contractor is responsible for providing appropriate training to its employees. FRA agrees that railroads should not bear the burden of training the employees of a contractor. However, FRA notes that this change does not relieve the railroad from potential civil penalties for, *e.g.,* failure to perform a proper Class I brake test, if the employees of a contractor were found not to be qualified to perform the task for which they are assigned responsibility. As a contractor's employees are acting as an agent for the railroad when performing a task required by this regulation, both the railroad and the contractor would remain liable for potential civil penalties if the employees used to perform a particular task were not trained and qualified in accordance with the training requirements contained in this final rule.

The final rule retains the proposed requirement that railroads and contractors identify the tasks related to the inspection, testing, and maintenance of the brake system required to be performed by the railroad or contractor and identify the skills and knowledge necessary to perform each task. FRA believes that it is essential to developing a comprehensive training program for a railroad or contractor to go through the process of identifying the tasks they will be required to perform and determining the skills and knowledge that must be provided to perform those tasks. FRA believes that most railroads have already engaged in this activity and would merely need to revise existing data with changes made to existing requirements by this final rule. The final rule eliminates the requirement to

develop written procedures for performing each task identified. Although FRA believes that each railroad or contractor should and will develop such procedures, FRA does not believe it is necessary to require their development as FRA believes they will either be developed in the required training curricula or are sufficiently detailed in the regulation itself.

The final rule also clarifies that the required training is intended to provide employees with the skills and knowledge necessary to perform the tasks required by this final rule. FRA does not believe it is necessary to train an employee on every different type of equipment that a railroad operates or on each and every task an employee will be required to perform. FRA's intent when issuing the NPRM was to ensure that the training received by an employee provided that individual with the knowledge and skills needed to perform the tasks he or she was assigned on the various types of equipment the railroad operated. Therefore, the final rule clarifies this intent by specifically stating that the training curriculum, the examinations, and the ''hands-on'' capability should address the skills and knowledge needed to perform the various required tasks rather than focusing strictly on the tasks themselves or on the specific types of equipment operated by the railroad. The final rule also clarifies that the training that an employee is required to receive need only address the specific skills and knowledge related to the tasks that the person will be required to perform under this part. Thus, a railroad or contractor may tailor its training programs to the needs of each of its employees based on the tasks that each of its employee will be required to perform. FRA tends to agree with several commenters that there is no reason for an individual who performs strictly brake inspections and tests to be as highly trained as a carman since carmen perform many other duties related to the maintenance and repair of equipment in addition to brake inspections.

The final rule also clarifies that previous training and testing received by an employee may be considered by the railroad. FRA did not intend to require the complete retraining of every employee performing a task required in this final rule. When proposing the training requirements, FRA intended for railroads to incorporate existing training regimens and curricula into the proposed training programs. Therefore, in order to clarify this intent, the final rule contains a specific provision which permits railroads to consider previous training and testing received by an employee when determining whether an employee is qualified to perform a particular task. However, the final rule also makes clear that any previous training or testing considered by a railroad or contractor must be documented as required in the final rule. Thus, previous training or testing which has not been properly documented cannot be considered. The final rule also makes clear that employees must be trained on the specific regulatory requirements contained in this final rule related to the tasks that the employee will be required to perform. Therefore, all employees performing tasks covered by this part will require at least some training which covers the specific requirements detailed in this final rule.

The final rule retains the proposed requirement regarding the performance of periodic refresher training and testing. The final rule retains the requirement that refresher training be provided at least once every three years and that it include both classroom and experiential ''hands-on'' training and testing. FRA continues to believe that periodic refresher training is essential to ensuring the continued ability of an employee to perform a particular task. FRA does not intend for such training to be as lengthy or as formal as the initial training originally provided, but believes that the training should reemphasize key elements of various tasks and focus on items or tasks that have been identified as being problematic or of poor quality by the railroad, contractor, or its employees through the periodic assessment of the training program. The final rule also makes clear that a railroad or contractor may use efficiency testing to meet the hands-on portion of the required refresher training provided such testing is properly documented. FRA agrees that such testing provides the necessary assurances that the individual continues to have the knowledge and skills necessary to perform the task for which the employee is being tested.

The final rule also modifies the proposed requirement that railroads develop an internal audit process to evaluate the effectiveness of their training. Although FRA agrees that a formal audit process may not be necessary, FRA continues to believe that railroads and contractors should periodically assess the effectiveness of their training programs. However, rather than require a formal internal audit, FRA believes that periodic assessments may be conducted through a number of different means and each railroad or contractor may have a need to conduct the assessment in a different manner. The final rule requires that a railroad or contractor develop a plan to periodically assess its training program and, as suggested by some commenters, permits the use of efficiency tests or periodic review of employee performance as methods for conducting such review. FRA agrees that many railroads, due to their small size, are capable of assessing the quality of the training their employees receive by conducting periodic supervisory spot checks or efficiency tests of their employees' performance.

The final rule also retains the record keeping requirements proposed in the NPRM with slight modification for consistency with the changes noted above regarding the application of the skills and knowledge necessary to perform a particular task. FRA continues to believe that the record keeping and designation requirements contained in this final rule are the cornerstone of the training requirements. Contrary to the views of some commenters, FRA believes that something more than mere lists of qualified employees is needed. Because the rule allows each railroad and contractor the flexibility to develop a training program that best fits its operation and does not impose specific curriculum or experience requirements, FRA continues to believe it is vital for railroads and contractors to maintain detailed records on the training they do provide. Such documentation will allow FRA to judge the effectiveness of the training provided and will provide FRA with the ability to independently assess whether the training provided to a specific individual adequately addresses the skills and knowledge required to perform the tasks that the person is deemed qualified to perform. Moreover, requiring these records will prevent railroads and contractors from circumventing the training requirements and prevent them from attempting to utilize insufficiently trained personnel to perform the inspections and tests required by this rule.

The final rule makes clear that the required records may be maintained either electronically or in writing. Many railroads currently maintain their training records in an electronic format, and FRA sees no reason not to permit such a practice if as the information can be provided to FRA in a timely manner upon request. The proposed provision requiring the railroad's chief mechanical or chief operating officer to sign a statement regarding each employee's qualifications has been modified in the final rule to merely require identification of the person or persons

making the determination that the employee has completed the necessary training. This modification will permit the information to be maintained electronically and will still provide the accountability which FRA intended by the provision in the NPRM. FRA believes it is absolutely essential that those individuals making the determinations regarding an employee's qualification be identified in order to ensure the integrity of the training programs developed and prevent potential abuses by a railroad or contractor.

FRA also objects to the portrayal by some commenters that the records required to be maintained are overly burdensome. Virtually all of the items required to be recorded are currently maintained by most railroads in some fashion or another. Contrary to the concerns raised by some commenters, the rule does not require that the contents of each training program be maintained in each employee's file. Railroads are free to develop whatever type of cross-referencing system they desire, provided the contents of the training program are maintained in some fashion and can be readily retrieved. Furthermore, railroads currently maintain lists of individuals they deem to be qualified persons and inform those individuals as to their status to perform particular tasks. FRA believes this is a good practice and is necessary to ensure that individual employees do not attempt to perform, or are not asked to perform, tasks for which they have not been trained.

The final rule contains two provisions that were not specifically included in the NPRM but which were intended by FRA to be covered by the established training programs. The final rule requires that new brake systems be added to training programs prior to their introduction into revenue service. FRA believes this requirement is only logical and makes sense. FRA believes that prior to the introduction of any new brake system the employees responsible for inspecting and maintaining the equipment need to be specifically trained on the systems in order to adequately perform their required tasks. The final rule also requires railroads that operate trains under conditions that require their employees to set retaining valves to develop training programs which specifically address the use of retainers and provide such training to those employees responsible for using or setting retainers. This provision has been added in response to an NTSB recommendation which FRA supports. *See* NTSB Recommendation R–98–7.

FRA has not included provisions requiring FRA approval of the training programs developed by railroads or contractors as suggested by some commenters. FRA does not have the resources to implement such an approval process and does not believe such approval is necessary, given the records that will be required to be maintained. Furthermore, FRA believes that such a process would slow the implementation of training programs and, thus, slow the implementation of this final rule. An approval process would also seriously impede the ability of a railroad or contractor to make necessary and timely changes to its training program, which is necessary to ensure its currency. The final rule also does not contain a dispute-resolution provision regarding such programs. FRA believes that such matters are within the province of employee-employer relationships and are better addressed by established processes. The final rule also does not specifically address the training that must be provided to supervisors. Although some commenters recommended specific requirements, FRA believes that supervisors are sufficiently covered by the final rule requirements. FRA believes that in order for a supervisor to properly exercise oversight of an employee's work, the supervisor must be qualified to perform the tasks for which they have oversight responsibilities.

FRA realizes that many railroads will need time to bring their existing training programs up to the level required by this final rule. FRA also recognizes that the cost of the proposed training requirements is somewhat substantial and may prevent railroads from completing the necessary training in a short period of time. Moreover, FRA recognizes that railroads need time to provide the necessary training to their employees without causing manpower shortages in their operations. Therefore, the final rule allows railroads three years in which to develop and complete the required training. This period is consistent with the time requested by the AAR and other railroad commenters. It is also consistent with the requirement to provide refresher training at least every three years and will allow a railroad to have one-third of its inspection forces receive the necessary refresher training each year after the initial training is complete.

F. Air Source Requirements

In the 1998 NPRM, FRA again proposed a ban on the use of anti-freeze chemicals in train air brake systems, reiterating the position stated in the 1994 NPRM, in order to prevent untimely damage and wear to brake system components. *See* 59 FR 47728. At that time, FRA had not received any adverse comments on this issue in response to the 1994 NPRM, in which a similar requirement was proposed. Furthermore, statements and discussions provided at various RSAC Working Group meetings appeared to establish that both rail labor and rail management representatives believed that such a provision would be acceptable.

Based on information gathered throughout the RSAC process, previous comments by industry parties, and agency experience, FRA firmly believes that the presence of moisture in the train air brake system poses potential safety, operational, and maintenance issues that require attention in this rulemaking. After completion of detailed, instrumented testing on both locomotives and yard test plants performed as part of the task force activities, FRA determined that locomotives rarely contribute to moisture in the trainline. Consequently, FRA did not propose that air dryers be installed on new locomotives, as was proposed in the 1994 NPRM (59 FR 47729). A detailed discussion of the testing conducted by the RSAC Working Group members and recommendations regarding air dryers appears in the preamble of the 1998 NPRM. *See* 63 FR 48317–19.

In contrast, the results of the same testing clearly indicated to FRA that yard air plants often provide unacceptably high levels of moisture while charging the train air brake system due to the age of the system, improper design, inadequate maintenance, or a combination thereof. Working Group task force efforts also estimated that upwards of 80 percent of train air brake systems are charged using yard/ground air plants. However, FRA did not believe that simply requiring yard air sources to be equipped with air dryers would solve or address the problem. In order for air dryers to be effective on yard air sources, the air dryers must be properly placed to sufficiently condition the air source. FRA determined that many yard air sources are configured such that a single air compressor services several branch lines used to charge train air brake systems; therefore, multiple air dryers would be required to eliminate the introduction of moisture into the brake system. Consequently, FRA determined that requiring yard air sources to be equipped with air dryers would impose a significant and unnecessary cost burden on the railroads.

Based on its determination that air dryers would not provide a cost effective or suitable solution, FRA considered other viable alternatives. In the 1998 NPRM, FRA proposed that each railroad develop and implement a system by which it would monitor all yard air sources to ensure that the air sources operate as intended and do not introduce contaminates into the brake system. FRA believed that the proposed monitoring program provided a method by which the industry might maximize the benefits to be realized through air dryer technology, which all parties acknowledge has been proven to reduce the level of moisture introduced into the trainline, at a cost that was commensurate with the potential benefits. The proposed monitoring program required railroads to take remedial action with respect to any yard air sources that were found not operating as intended, and established a retention requirement for records of the deficient units to facilitate the tracking and resolution of continuing problem areas. FRA also proposed that yard air reservoirs either be equipped with an operative automatic drain system or be manually drained at least once each day that the devices were used or when moisture was detected in the system. FRA believed that these proposed provisions, in concert with assurances that condensation is blown from the pipe or hose from which compressed air is taken prior to connecting the yard air line or motive power to the train, as currently prescribed in § 232.11(d), would significantly minimize the possibility of moisture being introduced into the train air brake system.

In the 1998 NPRM, FRA noted the recent issuance of a final rule mandating the incorporation of two-way end-of-train telemetry devices (two-way EOTs) on a variety of freight trains, specifically those operating at speeds of 30 mph or greater or in heavy grade territories. *See* 62 FR 278. Two-way EOTs provide locomotive engineers with the capability of initiating an emergency brake application that commences at the rear of the train in the event of a blockage or separation in the train's brake pipe that would prevent the pneumatic transmission of the emergency brake application throughout the entire train. FRA noted that the issuance of a final rule mandating the use of these devices was significant particularly in the context of air source requirements and air dryers. In the unlikely event that the proposed requirements regarding air sources fail to sufficiently eliminate moisture from the trainline, and a restriction or obstruction in the form of ice forms as the result of the freezing of this moisture during cold weather operations, the two-way EOT device becomes a first order safety device and will initiate an emergency application of the brakes from the rear of train. Therefore, many of the concerns associated with moisture in the trainline freezing in cold weather operations have been alleviated through the incorporation of this technology in most freight operations, thus reducing the need or desire to specifically require air dryers on air sources.

The AAR and its member railroads submitted various comments related to the proposed air source requirements. Although various railroads had previously indicated support for a requirement banning the use of alcohol in train brake system and stated that their railroad no longer used alcohol in its operation, they now object to the proposed requirement prohibiting the use of the such chemicals. These commenters now assert that there are instances in the industry where alcohol is used to unfreeze frozen trainlines. They contend that railroads should be permitted to continue this practice in order to move trains in certain circumstances and that the need to use alcohol would be rare but necessary. The AAR contends that the use of the term ''chemical'' is inappropriate, and, unless there is an alternative, the requirement should be deleted. They contend that frozen trainlines are a reality and railroads must be provided some method to deal with such occurrences other than waiting for warm weather which could take months.

These commenters also discussed the proposed requirements related the development and implementation of monitoring plans for yard air sources. The AAR contends that the railroads would need at least five years to comply with the proposed requirements and would incur costs of $41 million. These commenters object to the requirement for remedial action when a yard air source is found to have the ''potential'' of introducing contaminants into the equipment it services. They contend that such remedial action should be required only if the yard air source actually introduces such contaminants. These commenters also object to the requirement for a detailed assessment of the remedial actions taken as unnecessary and believe that the recordkeeping requirements merely increase a railroad's administrative burden and are merely included as enforcement traps.

Several representatives of rail labor and the NTSB support the proposed prohibition on the use of alcohol and object to any allowance of its use. Some labor representatives suggested that, if FRA were to allow the use of alcohol, then it needed to reinstate the requirements to perform periodic clean, oil, test, and stencilling (COT&S). These commenters recommend that the prohibition be extended to any device providing air to a train's brake system. The BRC again asserts that FRA should require that locomotives and air sources be equipped with air dryers, contending that they are the only way to ensure that moisture is not introduced into a train's brake system. Labor representatives also object to the proposed yard air monitoring plan requirements, contending that the proposed requirements fail to specify the frequency with which yard air sources are to be inspected. They recommend that such inspections should be more frequent at locations in cold climates. They also suggest that the monitoring plans should be subject to FRA approval prior to implementation.

FRA Conclusions. The final rule retains the basic requirements regarding yard air sources and cold weather operations that were proposed in the 1998 NPRM. The final rule generally retains the proposed requirement prohibiting the use of chemicals in a train air brake system. However, FRA agrees that the proposed prohibition of all chemicals may have been somewhat overbroad and contrary to FRA's actual intent. In proposing the prohibition, FRA intended to eliminate the use of chemicals, such as alcohol, which are known to degrade the rubber of a train's brake system. FRA agrees that there are chemicals that are currently available or that are in the process of being developed that do not cause the problems associated with the use of alcohol. In fact, FRA believes there are products currently available that do not degrade a brake system's rubber components like alcohol does. FRA believes that several railroads are currently testing or using these chemical alternatives. Consequently, the final rule slightly modifies the prohibition on the use of chemicals by imposing the prohibition on chemicals that are known to degrade or harm brake system components, such as alcohol.

The final rule also modifies some of the requirements related to the proposed yard air source monitoring plans. FRA agrees that the proposed requirements did not establish a frequency with which inspections of yard air sources should be conducted. In proposing the requirement, FRA hoped that various commenters would recommend frequencies for conducting these

inspections. This did not occur. FRA agrees that a set frequency needs to be established that will ensure that yard air sources are inspected in a timely manner during various climatic conditions. Therefore, the final rule requires the that yard air sources be inspected at least twice each calendar year and that two of the inspections be no less than five months apart. FRA intends for this requirement to result in yard air sources being inspected each year during two different seasonal periods.

The final rule also clarifies that remedial action under the monitoring plans is required only on those yard air sources that are not operating as intended or that are found introducing contaminants into brake systems. Thus, the final rule removes the word ''potential'' as FRA agrees that the proposed language was unclear and may have been over-inclusive. The final rule also eliminates the requirement for railroads to conduct a detailed assessment of the remedial actions taken. FRA agrees that this requirement is unnecessary because railroads will be conducting regular inspections of the yard air sources on which they have conducted repairs or taken other remedial action and will be able to determine if the repairs were effective through those inspections. The final rule retains the other proposed record keeping requirements related to yard air monitoring plans but clarifies that the records may be maintained either electronically or in writing. FRA continues to believe that these records are necessary to ensure that railroads are properly conducting the required inspections and are taking timely and appropriate remedial action when a problem air source is detected.

The final rule does not contain provisions requiring FRA approval of the yard air source monitoring plans prior to their implementation as suggested by some commenters. FRA does not have the manpower or resources to review and approve the plan of each railroad and does not believe such approval is necessary given the specific requirements contained in the final rule and the records that are required to be maintained. The final rule also does not contain requirements regarding the use of air dryers on either locomotives or yard air sources. For the reasons noted in the discussion above and in the NPRM, FRA believes that requiring the use of air dryers on either locomotives or yard air sources would impose a significant cost burden on railroads and would not necessarily address the problem sought to be resolved. *See* 63 FR 48317–19. It should be noted that FRA advocates the use of air dryers when possible and agrees that they have proven effective in reducing the level of moisture introduced into the brake system; however, FRA believes that the railroad is in the best position to determine where these devices will provide the greatest benefit based on the railroad's operation.

FRA is somewhat skeptical of the AAR's contentions regarding both the time and the cost necessary to implement the required yard air source monitoring plans. FRA sees no reason why a railroad would need five years to implement a plan to inspect each of its yard air sources twice a year. These devices are used on a fairly regular, if not daily, basis and should not be that difficult to inspect. Therefore, FRA believes that railroads should easily be able to implement these monitoring plans within the three years allowed under the applicable date provided in this final rule.

G. Maintenance Requirements

Based on comments received in response to the 1994 NPRM, deliberations of the RSAC Working Group and task force, and field experience, FRA proposed a comprehensive set of maintenance requirements which were intended to be a codification of current best practices occurring within the industry. The preamble to the 1998 NPRM contains a detailed discussion of the issues raised, discussed, and considered prior to the issuance of the NPRM. *See* 63 FR 48320–22.

After consideration of all the information and comments submitted prior to the issuance of the 1998 NPRM, FRA remained confident that the ''new'' repair track test and single car test, which have been used industry-wide since January of 1992, are a much better and more comprehensive method of detecting and eliminating defective brake equipment and components than the old, time-based COT&S requirements. FRA continued to believe that performance of the repair track and single car test significantly reduces the number of defective components and dramatically increases the reliability of brake equipment. Accordingly, FRA proposed the incorporation of AAR Interchange Rule 3 and Chart A into the 1998 NPRM, thus codifying the repair track air test requirements per Chart A, such that a railroad would be required to perform a repair track brake test on freight cars in any of the following six circumstances: (i) When a freight car is removed from a train due to an air brake related defect; (ii) when a freight car has its brakes cut out when removed from a train or when placed on a shop or repair track; (iii) when a freight car is on a repair or shop track for any reason and has not received a repair track brake test within the previous 12 month period; (iv) when a freight car is found with missing or incomplete repair track brake test information; (v) when the brake reservoir(s), the control valve mounting gasket, and the pipe bracket stud are removed, repaired, or replaced; or (vi) when a freight car is found with a wheel with a built-up tread, a slid flat, or a thermal crack. FRA also proposed that each freight car receive a repair track air test no less frequently than every 5 years, and not less than 8 years from the date the car was built or rebuilt. Similarly, it was proposed that the single car test requirements of Chart A be codified, such that a railroad would perform a single car test on a freight car when the service portion, the emergency portion, or the pipe bracket or a combination of such components is removed, repaired, or replaced.

In the 1998 NPRM, FRA recognized that circumstances arise where the proposed repair track brake tests or single car tests could not always be performed at the point where repairs can be made that necessitate performance of the test. To address these circumstances, FRA proposed that a car would be allowed to be moved to the next forward location where the test could be performed after the necessary repairs were conducted. FRA attempted to make clear that the inability to perform a repair track brake test or a single car test did not constitute an inability to effectuate the necessary repairs. At the same time, however, FRA recognized rail labor's contention that some carriers often attempt to circumvent the requirements for single car and repair track testing through the elimination of repair tracks, by moving cars to ''expediter'' tracks for repair, or simply by making the repairs in the field. As a means to curtail these practices, FRA decided to impose extensive tagging requirements on freight cars that, due to the nature of the defective condition(s) detected, require a repair track brake test or single car test but that are moved from the location where repairs are performed prior to receiving the required test. As an alternative to the tagging requirements, FRA proposed that railroads be permitted to utilize an automated tracking system to monitor these cars and ensure they receive the requisite tests provided the automated system has been approved by FRA. FRA also proposed to require stencilling of cars with the location and date of the last

repair track or single car test. Alternatively, FRA proposed that railroads could utilize an electronic record keeping system to accomplish this stencilling requirement, provided the system has been approved by FRA. FRA believed that the proposed tagging and stencilling requirements were necessary to ensure the timely performance of the tests. Without such information, there would be virtually no way for FRA to verify a railroad's compliance with the proposed repair track and single car test requirements.

FRA also proposed various requirements related to the testing of the devices used to perform the single car tests. Similar to the 1994 NPRM, the 1998 NPRM again proposed that single car testing devices be tested at least once a day and receive routine maintenance at least every 92 days. FRA also proposed that the mechanical and electronic test devices be regularly calibrated.

In the 1998 NPRM, FRA determined that any changes to the AAR standards incorporated into regulation should be reviewed and approved by all affected parties, including FRA and rail labor. Consequently, FRA proposed a special approval process, whereby the AAR would be required to submit any proposed changes to the FRA. FRA would review the proposed change to determine whether the change is ''safety-critical.'' Such proposed changes include, but are not limited to the following: (i) Any changes to Chart A, (ii) changes to established maintenance intervals, and (iii) changes to UMLER reporting requirements. If the proposed change was deemed by FRA to be ''non safety-critical,'' FRA would permit the change to be implemented immediately. If the proposed change was deemed ''safety-critical,'' FRA would be required to publish a **Federal Register** notice, conduct a public hearing if necessary, and act based on the information developed and submitted in regard to these proceedings.

FRA proposed the special approval process in response to comments from several railroads and manufacturers that FRA needed to devise some sort of quick approval process in order to permit the industry to make modifications to existing standards or equipment based on the development of new technology. Thus, FRA attempted to propose an approval process it believed would speed the process for taking advantage of new technologies over that which is currently available under the waiver process. However, in order to provide an opportunity for all interested parties to provide input for use by FRA in its decision-making process as required by the Administrative Procedure Act, FRA determined that any special approval provision must, at a minimum, provide proper notice to the public of any significant change or action being considered by the agency with regard to existing regulations.

The AAR, its members, and various private car owners and brake manufacturers submitted numerous comments regarding the maintenance requirements proposed in the NPRM. The commenters object to the proposed incorporation of AAR's Rule 3, Chart A, and the incorporation of specific AAR standards for performing single car and repair track air brake tests. They contend that such incorporation would inhibit the ability of the industry to develop and implement new rules and procedures that would improve safety and hinder the ability of the industry to implement changes that improve brake performance. They contend that the current reference to AAR rules is sufficient and that oversight by FRA is not necessary. The AAR notes that there have been over 25 changes to the AAR maintenance requirements and test procedures over the last ten years and that many of these may not have been accomplished under the provisions proposed in the NPRM. The AAR also notes that the single car and repair track standards cited in the NPRM were changed in July of 1998 and were being revised again in 1999. These commenters recommend that any provisions requiring FRA approval of AAR standards should be eliminated. Alternatively, they recommend that AAR be permitted to implement changes subject to FRA revocation based on a finding that the change does not promote safety.

In addition to their general objections to any incorporation of AAR maintenance standards, these commenters provide several recommendations in the event that FRA should decide to retain the proposed requirements. They recommend that FRA eliminate the requirement to stencil equipment with the date of the last single car or repair track air brake test and allow the industry to use the UMLER tracking system to record and monitor such information. They believe that the industry should be permitted to implement an automated or electronic tracking system without prior FRA approval. They contend that the industry has been using the UMLER system to track this information for years and it has proven effective. They contend that the automated system currently used is no less secure or capable of manipulation than a manual stenciling requirement. They contend that there has been no evidence of falsification on the part of railroads using the UMLER system and that it should be permitted without FRA approval.

Several railroad representatives also object to the proposed requirement for performing a repair track air brake test whenever a car is removed from a train for a brake-related defect. They contend that the way the provision is proposed it would require repair track air brake tests whenever minor brake defects occur that have no relation to the actual operation of the brakes. They recommend that the requirement be tied to cars removed from trains for inoperative brakes as this is the intent of AAR's Rule 3, Chart A. These commenters also object to the proposed requirement to perform a set and release of the brakes and to check piston travel when a car is on a shop or repair track. They contend that AAR no longer requires this to be performed and assert that the brake tests required in the proposal are sufficient to determine piston travel and proper operation of the brakes. These commenters also contend that there is no need to retain the bad order tags required for moving equipment for testing because a record of the repair is maintained for a year pursuant to AAR rules. They also recommend that FRA should not require brake repairs at locations where single car or repair track tests cannot be performed. They contend that the test is necessary to determine the sufficiency of the repair. They believe that the inability to conduct these test should be considered an inability to conduct brake repairs.

The AAR and certain manufacturers of brake equipment also raise concerns over the proposed requirements related to the testing and calibration of devices used to perform single car and repair track air tests. These commenters generally object to the inclusion of these requirements in the proposal as they have always been part of AAR standard S–486 and feel they do not belong in federal regulations. These parties also contend that the proposed requirements regarding the testing and calibration of single car test devices are more restrictive than are currently required. The current existing industry requirements for testing single car test devices are based on the date on which the device is placed in service. Thus, the time for conducting the 92-day test does not begin to run until the device is placed in service. They contend that the ''in service'' date allows railroads flexibility in having spare devices when

a primary device is being serviced as such a device is generally sent to a special location for calibration and cleaning. At a minimum, they recommend that the rule permit testing and calibration of single car test devices based on the in-service date of the device rather than a strict 92-day requirement.

Representatives of rail labor support the incorporation of AAR standards and contend that AAR should not be allowed unilateral discretion to change the incorporated standards. These commenters assert that railroads do not currently follow existing AAR standards and will not do so unless they are made part of a federal regulation. These commenters recommend that FRA develop specific, detailed maintenance requirements rather than reference AAR standards. They further contend that all maintenance should be required to be performed by a carman or at least by a QMI as defined in the NPRM. These commenters object to any type of automated tracking system as it is susceptible to abuse and manipulation by railroads.

Certain labor representatives provided specific comments on the proposed requirements related to conducting single car and repair track air brake tests. They recommend that FRA identify locations where single car and repair track air brake tests can be performed to prevent manipulation and circumvention of the requirements by railroads. These commenters contend that only a carman or a QMI should be permitted to perform a single car or repair track air brake test. They also contend that, since periodic COT&S has been eliminated, the need to conduct frequent repair track and single car tests is much greater in order to ensure the proper operation of the brake equipment. They assert that the intervals for conducting these tests need to be increased over those proposed and recommend that each car receive a repair track air brake every year and a single car test every four years.

FRA Conclusions. Although the final rule retains many of the proposed maintenance requirements, several modifications have been made in this final rule in response to comments received and based upon the current best practices occurring within the industry. FRA agrees that the proposed incorporation of AAR Rule 3, Chart A, is unnecessary as it would remove the determination of when certain maintenance is performed from the discretion of the railroads, and would make it difficult for railroads to change the requirements related to the performance of that maintenance. FRA believes that a railroad is in the best position to determine when and where it will perform various maintenance on its equipment and should not have its hands tied in this area by overly prescriptive federal requirements. Furthermore, FRA's primary intent when proposing incorporation of AAR Rule 3, Chart A, was to codify the existing requirements for performing single car and repair track air brake tests and eliminate the right of the industry to unilaterally change the frequency and method of performing these tests. As the final rule retains the requirements for when and how these tests are to be completed and retains certain inspections that are to be performed when equipment is on a shop or repair track, FRA believes that it is unnecessary to incorporate every maintenance procedure covered in AAR's Rule 3, Chart A. Consequently, the final rule does not incorporate AAR's Rule 3, Chart A, and continues to allow railroads some flexibility in determining appropriate maintenance practices.

Contrary to the assertions of some commenters, FRA continues to believe that certain maintenance procedures are critical to ensuring the safe and proper operation of the brake equipment on the nation's fleet of freight cars. FRA does not believe that the determination of what maintenance should be performed should be left solely to the discretion of the railroads operating the equipment in all circumstances. As periodic COT&S maintenance has been eliminated and replaced with the performance of single car and repair track tests, which FRA agrees is a better and more comprehensive method of detecting defective brake equipment and components, FRA believes that specific and determinable limits must be placed on the manner and frequency in which these tests are performed. Therefore, the final rule retains the proposed requirements regarding the performance of single car and repair track tests.

FRA recognizes that the procedures for performing single car and repair track tests proposed in the NPRM have been modified by the AAR since the issuance of the proposal. As it is FRA's intent to incorporate the most recent version of the single car and repair track air brake test procedures, the final rule incorporates the test procedures that were issued by the AAR in April of 1999. FRA recognizes that the industry may find it necessary to modify the test procedures from time to time in order to address new equipment or utilize new technology. Thus, the final rule permits railroads to seek approval of alternative procedures through the special approval process contained in the final rule. The special approval process is intended to speed FRA's consideration of a party's request to utilize an alternative procedure from the one identified in the rule itself. FRA believes that it is essential for FRA to approve any change made in the procedures for conducting these safety-critical tests in order to prevent unilateral changes and to ensure consistency in the method in which the tests are performed.

It should be noted that the incorporated procedures for performing single car and repair track air brake tests are the minimum requirements for performing such tests. The special approval process is required to be used only if the incorporated procedures are to be changed in some manner. For instance, if the industry were to elect to add a new test protocol to the incorporated procedures, there would be no need to seek approval of such an addition as long as the procedures contained in the incorporated standard are still maintained. This final rule is not intended to prevent railroads from voluntarily adopting additional or more stringent maintenance standards provided they are consistent with the standards incorporated.

The final rule also modifies one of the proposed conditions for when a repair track air brake test would be required to be performed. FRA agrees that the proposed requirement to perform a repair track air brake test on any car removed from a train for a brake-related defect is overly restrictive and inconsistent with the requirements of AAR's Rule 3, Chart A. FRA agrees that the proposed requirement would require the performance of the test when minor brake system repairs are conducted, which is not the intent of the AAR's rule. Therefore, the final rule modifies the proposed condition to require the performance of a repair track test on cars that have inoperative or cut-out air brakes when removed from a train.

The final rule also modifies the proposed requirements regarding the use of an automated tracking system in lieu of stenciling equipment with the date and location of the last single car or repair track test received. Since 1992, the industry has utilized the AAR's UMLER reporting system to electronically track the performance of single car and repair track air brake test as well as other repair information. Based on the performance and use of this system over the last seven years, FRA believes that the AAR's UMLER system has proven itself effective for tracking the information required in this final rule and ensuring the timely performance of single car and repair

track air brake tests. Furthermore, FRA continues to believe that the information required to be tracked with regard to these tests is easily maintained through an electronic medium. Moreover, FRA has found no substantiated instances of railroads falsifying or altering the information monitored and tracked by AAR's UMLER system. Thus, the final rule permits railroad to utilize an electronic record keeping system to track single car and repair track air brake tests without obtaining prior FRA approval of the system. The final rule makes clear that FRA will monitor the performance of such systems and retains the right to revoke a railroad's authority to utilize the system if FRA finds that it is not properly secure, inaccessible to FRA or a railroad's employees, or fails to properly or adequately track and monitor the equipment.

The final rule does not increase the proposed frequency at which the single car or repair track air brake tests are to be performed as recommended by some commenters. As noted above, the primary intent of the proposed provisions was to codify the existing requirements regarding the performance of single car and repair track air brake tests and prevent any unilateral changes to those requirements. FRA believes that the frequency at which these tests are currently required to be performed under industry standards has proven to be sufficient and a substantial economic burden would be imposed if the frequency were increased. The final rule also retains the requirement that these tests be conducted by a qualified person. FRA believes that the person performing these tests must be specifically trained and tested on how the test is to be performed and be able to determine the appropriate actions that must be taken based on the results of the test. FRA does not believe that the mere fact that a person is a carman or a QMI is sufficient to consider that person qualified to perform single car or repair track air brake tests. FRA believes that the training requirements contained in this final rule ensure that a person deemed qualified to perform these tests has been specifically trained and tested on the performance of the tests prior to being considered qualified.

The final rule also retains the proposed provisions permitting cars to be moved from a location where necessary repairs are made to a location where a single car or repair track air brake test can be performed if it cannot be performed at the same location where the repairs are conducted. FRA disagrees with the assertion that air brake repairs should not be required at locations that lack the ability to perform single car or repair track air brake tests. FRA believes that position is not only contrary to the statutory mandates regarding the movement of equipment with defective brakes but would open the door to potential abuse by railroads. Furthermore, the operation of a car's brake system can generally be tested after a repair without performing a complete repair track air brake test. For the most part, single car and repair track air brake tests are intended to be maintenance requirements that attach based on a condition in which a car is found or on a repair that is required to be performed. If the condition of a car is such that a repair track air brake test is necessary to determine the defect, then the final rule would permit movement of the car to the nearest location where a repair track air brake test can be performed. However, FRA believes that most defective conditions can be easily determined without performing a repair track air brake test. Moreover, for years FRA has required the performance of repairs where they can be performed and has allowed such equipment to be moved to the next forward location for performance of a single car or repair track air brake test and has not found that such a practice has created any potential safety hazard.

The final rule retains the proposed requirements for tagging equipment which is being hauled for the performance of a single car or repair track air brake test after the appropriate repairs have been conducted. FRA believes that the tags are necessary not only to provide notice to a railroad's ground forces as to the presence of the car but to ensure that railroads are properly performing the tests at appropriate locations. Furthermore, many railroads currently move equipment in this fashion, and there has been no indication that safety has been compromised. The final rule also retains the requirement that a copy or record of the tag be retained for 90 days and made available to FRA upon request. Contrary to the objections of some commenters, FRA continues to believe that the record keeping requirements are necessary so that there is accountability on the part of the railroads to conduct these tests at the proper locations and that equipment is not moved for extended periods without receiving its required maintenance. It should be noted that the final rule clarifies that the record or copy of the tag may be maintained either electronically or in writing provided all the required information is recorded. The final rule does not define or require identification of locations that can or will perform single car or repair track air brake tests as suggested by some commenters. FRA does not believe that such a requirement is necessary as the rule specifically establishes when the tests are to be performed and it is in the railroad's best interests to perform the tests in a timely manner.

The final rule retains the proposed provisions requiring certain tests and inspections to be performed whenever a car is on a shop or repair track. Although the AAR asserts that it did away with the requirements to perform a set and release of the brakes and adjust piston travel on all cars on repair or shop tracks, the requirements are currently contained in power brake regulations separate and apart from any AAR requirements. *See* 49 CFR 232.17(a)(2)(ii), (iv). FRA believes that repair and shop tracks provide an ideal setting for railroads to conduct an individualized inspection on a car's brake system to ensure its proper operation and that such an inspection is necessary to reduce the potential of cars with excessive piston travel being overlooked when employees are performing the ordinary brake inspections required by this final rule. If any problems are detected at that location, the personnel needed to make any necessary corrections are already present. Furthermore, performing these inspections at this time ensures proper operation of the cars' brakes and eliminates the potential of having to cut cars out of an assembled train and, thus, should reduce inspection times and make for more efficient operations.

The final rule adds two items to the inspections that are to be conducted when a car is on a shop or repair track. They are an inspection of a car's hand brake and an inspection of the accuracy and operation of any brake indicators on cars so equipped. The final rule does not provide for the specific inspection of these items during any of the other required brake tests. Consequently, FRA believes this is an ideal time for the railroad to inspect these items while imposing the least burden on the railroad's inspection and repair forces.

As the final rule requires that certain inspections and tests be performed when a car is on a shop or repair track and because a repair track air brake test is required to be performed when a car is on a repair track and such a test has not been performed within the last twelve months, FRA believes it is necessary to clarify what constitutes a shop or repair track. This issue has become more prevalent over the last few years due to the growing use of mobile repair trucks and due to the requirements for conducting repair track

air brake tests. For years, many railroads have conducted minor repairs on tracks called ''expedite tracks.'' Generally, the types of repairs that were performed on these tracks were minor repairs that could be made quickly with a limited amount of equipment, and neither the railroads or FRA considered the tracks to be repair tracks. However, recently railroads have started performing virtually every type of repair on these expedite tracks. These tracks are no longer limited to minor repairs but are being used to perform heavy, complex repairs that require the jacking of entire cars or the disassembly and replacement of major portions of a car's truck or brake system. At many locations these expedite tracks are positioned next to operative repair shops. Furthermore, several railroads have closed previously existing repair shop facilities and are now using fully equipped mobile repair trucks to perform the same type of repairs that were previously performed in the shop or on established repair tracks and are attempting to call the tracks serviced by these mobile repair trucks ''expedite tracks.'' Thus, the line between what constitutes a repair or shop track and what constitutes an ''expedite track'' has become unclear, if not, nonexistent.

FRA believes that the operational changes, noted above, are partly an attempt by the railroads to circumvent the requirements that currently apply when a car is on a shop or repair track. Currently, if a car is on a shop or repair track, it must have its brakes inspected, under 49 CFR 232.17(a)(2)(ii), (iv), and the car is to receive a repair track air brake test if it has not received one in the last twelve months under AAR Rule 3, Chart A. Some railroads contend that an expedite track is not a repair or shop track; therefore, the requirements of § 232.17(a)(2)(ii), (iv) do not apply. FRA finds this interpretation to be unacceptable and believes that railroads are abusing the concept of expedite tracks to avoid performing required maintenance. Therefore, the industry's own actions have caused the need for FRA to clarify what constitutes a shop or repair track. Consequently, the final rule includes a definition of what FRA will consider to be repair or shop tracks requiring the performance of certain tests and inspections.

The final rule makes clear that FRA will consider certain tracks to be repair or shop tracks based on the types of repairs that are made on the tracks, not necessarily the designation given by a railroad. The definition in the final rule also makes clear that it is the nature of the repairs being conducted on a certain track that is the determining factor not whether a mobile repair truck is being used to make the repairs. Due to the ability of mobile repair trucks to make virtually any type of repair necessary and due to their growing use, FRA does not believe that tracks regularly and continually serviced by these types of vehicles should be excepted from the definition of a repair track. FRA believes that if a track is designated by the railroad as an ''expedite'' track (*i.e.,* one where minor repairs will be conducted) then the railroad should ensure that only cars needing minor repairs be directed to that track for repair. The final rule does not eliminate the concept of expedite tracks but limits the use of such tracks to those types of repairs that are truly minor in nature and that require a limited amount of equipment to perform. At locations where a railroad conducts repairs of all types, either with fixed facilities or with mobile repair trucks, FRA would expect the railroad to designate certain trackage at the location as repair tracks and certain trackage as ''expedite tracks'' where only minor repairs would be conducted. In such circumstances, FRA would expect railroads to direct cars in need of heavier repairs, the kind that have been traditionally performed on a shop or repair track, to be directed to trackage designated at the location as a repair track.

The final rule places the burden on the railroad to designate those tracks it will consider repair tracks at locations where it performs both minor and heavy repairs, and makes the railroad responsible for directing the equipment in need of repair to the appropriate trackage. If the railroad determines that repairs of a heavy nature will be performed on certain trackage, then the track should be treated as a repair track, and any car repaired on that trackage should be provided the attention required by this final rule for cars on a shop or repair track. Further, if a railroad determines that minor repairs will be performed on certain trackage, then the railroad bears the burden of ensuring that only cars needing minor repairs are directed to that trackage. If the railroad fails to adequately distinguish the tracks performing minor repairs from those tracks performing heavy repairs or improperly performs heavy repairs on a track designated as an ''expedite track,'' then the railroad will be required to treat all cars on the trackage at the time that the heavy repairs are being conducted as though they are on a repair or shop track.

It should be noted that the issue of what constitutes a repair or shop track for the purposes of 49 CFR 232.17(a)(2)(ii) and (iv) is completely separate and distinct from the issue of whether a location is a location where necessary repairs can be performed for purposes of 49 U.S.C. 20303. Although an outlying location might be considered a location where certain brake repairs can be conducted, that does not mean the track where those repairs are performed should be considered a repair track. FRA does not intend for trackage located at outlying locations or sidings which are occasionally or even regularly serviced by mobile repair trucks to be considered repair tracks. FRA believes that repair or shop tracks should exist at locations that have fixed repair facilities and at locations where repairs of all types are performed on a regular and consistent basis regardless of whether the repairs are performed in fixed facilities or by mobile repair vehicles.

The final rule also modifies some of the proposed provisions regarding the testing and calibration of single car test devices and other mechanical devices used to perform single car and repair track air brake tests. FRA's intent when proposing the requirements was to codify the current best practices of the industry. Thus, FRA did not intend to propose testing and calibration requirements that were more stringent that those currently imposed by AAR standards. Therefore, FRA agrees that the testing and calibration requirements for single car test devices should not be imposed until the devices are actually placed in service, which is consistent with current AAR requirements. FRA recognizes that the proposed calibration and testing requirements may have resulted the unnecessary acquisition of single car testing devices. Consequently, the final rule makes clear that the 92-day and the 365-day requirements related to single car test devices are to be calculated from the day on which the device is first placed in service.

III. Section-by-Section Analysis

Amendments to 49 CFR Part 229

The amendments to part 229 contained in this final rule concern the testing of electronic gauges commonly used in electronically controlled locomotive brake systems. Currently, there are two electronically controlled locomotive brake systems in use on the nation's railroads, the Electro-Pneumatic Integrated Control (EPIC) system supplied by Westinghouse Air Brake Company and the Computer Controlled Brake (CCB) system developed by New York Air Brake Company. At this time, there are thousands of locomotives in service that

are equipped with either the CCB system or the EPIC system.

The final rule retains the proposed requirements extending the testing cycles for the electronic gauges used in these types of locomotive brake systems. The final rule retains the proposed increase of the testing interval for these electronic gauges from 92 days to one year. Although certain labor representatives objected to the proposed increase in the testing interval, contending that the interval should be reduced due to problems encountered by numerous locomotive engineers, FRA continues to believe that technology incorporated into the electronic gauges used in these locomotive brake systems has significantly increased their reliability over standard mechanical gauges. Furthermore, the objections raised were not based on the proper operation or performance of the electronic gauges.

The lengthening of the testing interval for these gauges is based on recommendations made by a committee formed to address issues related to the operation of electronically controlled locomotive brake systems as well as the training of those individuals using this new technology. In May of 1996, the RSAC Working Group decided to form a task force to consider issues related to electronically controlled locomotive brake systems. Rather than create an entirely new task force, the Working Group assigned the task to a group of individuals who were members of the previously established ''New Technology Joint Information Committee.'' This task force, comprised of representatives from the railroad industry, rail labor, air brake manufacturers, and locomotive manufacturers, addressed several issues related to these braking systems including: design; training; inspection and testing; and maintenance. The task force concluded that additional regulation of these types of locomotive braking systems was unnecessary since the current regulations or waivers sufficiently address the training, inspection, and maintenance of these systems and any additional design requirement would most likely not enhance safety and would probably restrict the advancement of new technology. The task force recommended that part 229 be revised to increase the testing interval for these electronic gauges from 92 days to an annual cycle. The task force based this recommendation on its finding that the electronic gauges used in these brake system are much more reliable than standard mechanical gauges due to the following: the electronic components have longer life cycles than those in mechanical gauges; the accuracy and durability of the transducer have been extended; and internal computer diagnostics detect inaccuracies before gauges becoming defective under federal regulations. FRA continues to agree with these findings and has retained the proposed extension in this final rule.

The final rule does not include the proposed requirement that locomotive compressors be tested for capacity by orifice test during the annual test required by § 229.27. FRA agrees that the requirement for orifice testing of locomotive air compressors was eliminated from part 229 in 1980. See 45 FR 21097. At that time, FRA found that such a test was not useful in detecting a bad compressor and, thus, found no reason to retain the requirement. Although the requirement to perform orifice testing remained in § 232.10(c), FRA's elimination of the requirement from part 229 rendered the provision in part 232 meaningless. As no railroad has performed orifice testing since 1980 and because FRA is not aware of any safety hazard being created due to the elimination of such testing, FRA agrees that there is no justification for reinstating the requirement to perform such testing.

Amendments to 49 CFR Part 231

The final rule retains the proposed clarifying changes in the applicability section of this part. FRA received no comments objecting to the proposed modifications. The changes are intended to make the regulatory exceptions consistent with the exceptions contained in the statute. The added exceptions are taken directly from 49 U.S.C. 20301 (previously codified at 45 U.S.C. 6). It is noted that the words ''freight and other non-passenger'' have been added to the exceptions in order to remain consistent with Congress' intent when the statutory exceptions were created. At the time that Congress provided an exception from the requirements of the Safety Appliance Acts, Congress did not and could not envision that the equipment used in these operations would be modified for the purposes of hauling passengers, which FRA has discovered with regard to four-wheel coal cars. Consequently, the final rule makes clear that FRA will except only freight operations or other non-passenger operations that employ the types of equipment contained in these amendments.

The final rule also retains the proposed movement of the provisions related to drawbars from part 232, where they are currently contained, to this part. FRA believes that part 231 is a more logical place for the drawbar provisions to be located as they are not a brake system component but a generic safety appliance. Although the final rule adopts the drawbar provisions as proposed, the changes made to the language of those provisions when proposed in the NPRM were for clarity and readability and were not intended to change any of the basic drawbar requirements contained in part 232.

49 CFR Part 232

Subpart A—General

Section 232.1 Purpose and Scope

Paragraph (a) contains a formal statement of the final rule's purpose and scope. FRA intends the final rule to cover all brake systems and brake components used in all freight train operations and all other non-passenger train operations.

Paragraph (b) contains the dates upon which railroads covered by this part will be required to comply with the requirements contained in this final rule. FRA recognizes the interrelationship between the proper training of railroad personnel and implementation of many of the inspection, testing, and maintenance requirements contained in the final rule. FRA realizes that in order for railroads to comply with many of the requirements related to the inspection, testing, and maintenance of equipment and the requirements regarding the movement of defective equipment, the railroad and its contractors must first be provided sufficient time to assess its current training program and develop and implement a training program consistent with the requirements of this part. The railroad or contractor then needs time to provide the necessary training to its employees without causing manpower shortages in its operations. FRA also recognizes that the costs of the training requirements are somewhat substantial and may prevent a railroad or contractor from completing the necessary training in a short period of time. Therefore, this final rule provides railroads and contractors with three years to develop and implement the required training. This period is consistent with the time requested by the AAR and other railroads. It is also consistent with the requirement to provide refresher training at least every three years and will allow a railroad or contractor to have one-third of its inspection forces receive the necessary refresher training each year after the initial training period is complete. Consequently, FRA will require compliance with all the requirements contained in § 232.15, subpart B,

subpart C, and subpart F of this final rule at the conclusion of the three-year period provided for conducting the required training.

This paragraph makes clear that the maintenance requirements contained in subpart D will become applicable to all railroads to which this part applies approximately six months after the issuance of this final rule. Virtually all of the requirements contained in this subpart are existing regulatory requirements or prevailing industry practice, and FRA sees no reason to significantly delay their implementation. FRA notes that this subpart requires certain tasks to be performed by a ''qualified person'; however, FRA will not subject railroads to the qualification and training requirements contained in this final rule for individuals performing these tasks until the conclusion of the three-year period provided for conducting the required training.

This paragraph also clarifies that the general provisions contained in subpart A of this final rule regarding applicability, definitions, waivers, responsibility for compliance, penalties, preemptive effect, special approval procedures, availability of records, and information collection will become applicable approximately sixty days after the issuance of this final rule. Due to the enforcement implications connected with these provisions, it is both necessary and desirable to have the provisions become applicable as quickly as possible.

This paragraph also makes clear that the requirements related to end-of-train devices contained in subpart E become applicable to all trains operating on track which is part of the general system of transportation approximately sixty days after issuance of the final rule. As the requirements related to these devices have existed for a number of years and because this final rule modifies those requirement to a very limited extent, FRA believes that railroads should have no problem complying with the requirements in this subpart in the period of time provided. Furthermore, the requirements contained in this subpart apply to both freight and passenger trains that operate on the general system of transportation and are not contingent on the performance of additional training.

FRA also recognizes that there are certain aspects of this final rule that provide operational flexibility to the railroads. Due to this flexibility, FRA believes that some railroads will desire the authority to comply with the final rule as soon as their employees have been properly trained. Therefore, paragraph (c) contains a provision which allows a railroad to notify FRA in writing that it is willing to begin compliance with the requirements of the final rule sometime earlier than the three years provided. However, FRA wishes to make clear that it does not intend for railroads to take advantage of the flexibility provided under some of the provisions of the final rule unless the railroad is willing to comply with all the requirements contained in the final rule.

Paragraph (d) of this section clarifies that any railroad that operates on the general railroad system of transportation that is not operating pursuant to the requirements contained in this final rule or the requirements contained in the Passenger Equipment Safety Standards at 49 CFR part 238, shall continue to comply with the requirements contained in part 232 as it existed prior to the issuance of this final rule, which have been moved to Appendix B of the new part 232. Thus, a railroad will continue to be subject to the existing inspection, testing, and maintenance provisions contained in part 232 until the railroad is required to operate under the provisions of this final rule (*i.e.* three years for most requirements) or until the railroad voluntarily commits to operate under the provisions of this final rule, whichever comes first. FRA also intends for operations and trains which currently operate under the existing part 232 to continue to operate pursuant to those provisions if the operation is not addressed by either this final rule or part 238. It should be noted that FRA does not intend to extend the coverage of part 232 beyond the types of operations that are currently subject to the requirements of part 232. Thus, FRA has explicitly excluded railroads that operate only on track inside an installation that is not part of the general railroad system of transportation, rapid transit operations that are not connected with the general system, and operations specifically excluded by statute.

Section 232.3 Applicability

As a general matter, paragraph (a) of this section establishes that this final rule applies to all railroads that operate freight or other non-passenger train service on standard gage track which is part of the general railroad system of transportation. In paragraph (b) of this section, FRA makes clear that subpart E of this final rule applies to all trains that operate on the general system regardless of whether the train is a freight or passenger train, unless it is specifically excepted by the provisions contained in subpart E. Subpart E contains the requirements regarding the use of two-way end-of-train devices which were issued on January 2, 1997 and became effective on July 1, 1997. Although the final rule contains some minor changes to these requirements, principally for clarification, the provisions contained in Subpart E are very similar to the existing requirements.

Paragraph (c) of this section contains a listing of those operations and equipment to which FRA does not intend this final rule to apply. These include: rapid transit operations not connected to the general system; commuter, intercity, and other short-haul passenger operations; and tourist, scenic, historic, or excursion operations. In 1994, FRA issued a power brake NPRM in which FRA attempted to draft a proposal covering all railroad operations. FRA received a multitude of comments suggesting that similar treatment of passenger and freight operations was not a viable approach due to the significant differences in the operating environment and equipment used in these operations. Based on these comments, FRA decided to separate passenger and freight operations and FRA recently addressed the power brake issues related to passenger and commuter operations in a separate final rule specifically tailored to those types of operations. *See* 64 FR 25540. Similarly, the Federal Railroad Safety Authorization Act of 1994 directs FRA to examine the unique circumstances of tourist and historic railroads when establishing safety regulations. The Act, which amended 49 U.S.C. 20103, states that:

> In prescribing regulations that pertain to railroad safety that affect tourist, historic, scenic, or excursion railroad carriers, the Secretary of Transportation shall take into consideration any financial, operational, or other factors that may be unique to such railroad carriers. The Secretary shall submit a report to Congress not later than September 30, 1995, on actions taken under this subsection.

Pub. L. 103–440, § 217, 108 Stat. 4619, 4624, November 2, 1994.

In response to this mandate, FRA submitted a report to Congress on June 11, 1996, outlining FRA's efforts to tailor its rail safety requirements to tourist, historic, scenic, and excursion railroads. Notably, FRA has established a Tourist and Historic Railroads Working Group formed under RSAC to specifically address the applicability of FRA's regulations to these unique types of operations. Consequently, any requirements issued by FRA for these types of operations will be part of a separate rulemaking proceeding. However, this final rule makes clear that

the provisions of part 232 as they existed prior to this issuance of this rule will continue to apply to such operations that are currently required to comply with the requirements in order to avoid regulatory gaps while power brake provisions for such service are finalized. Part 232 as it existed prior to the issuance of this final rule is contained as appendix B to this new part 232.

Similar to the amendments made to part 231, paragraphs (c)(6)–(c)(8) of this section also contain the express exceptions currently contained in the statute for certain coal cars and logging cars. These provisions are intended to make the regulatory exceptions consistent with the exceptions contained in the statute. The exceptions are taken directly from 49 U.S.C. 20301 (previously codified at 45 U.S.C. 6). As was done in these amendments to part 231, the words ''freight and other non-passenger trains'' have been added to the exceptions in order to remain consistent with Congress' intent when the statutory exceptions were created. At the time that Congress created an exception from the requirements of the Safety Appliance Acts, Congress did not and could not envision that the equipment used in these operations would be modified for the purposes of hauling passengers, which FRA has discovered with regard to four-wheel coal cars. Consequently, FRA will only except freight and other non-passenger operations which employ the types of equipment contained in these amendments.

Paragraph (d) of this section revokes the Interstate Commerce Commission Order 13528, of May 30, 1945, as amended (codified in existing § 232.3 and appendix B to part 232), and codifies some of the relevant provisions of that Order. Thus, paragraph (d) of this section contains a list of pieces of equipment that were excepted from the Order's specifications and requirements for operating power-brake systems for freight service. FRA believes that the Order is no longer completely relevant or necessary and believes that the relevant provisions should be incorporated into this section. In addition, FRA references current industry standards containing performance specifications for freight power brakes in other portions of this final rule which mirror the provisions contained in the Order. FRA notes that locomotives were removed from the listing as this final rule contains various requirements which address locomotives.

It should be noted that paragraph (a) of this section contains a specific reference to private cars and circus trains. As private cars are designed to carry passengers and are generally hauled in both freight and passenger trains, FRA intends that these types of cars be covered by both the recently issued Passenger Equipment Safety Standards and this final rule. For example, these types of cars will be subject to the maintenance and equipment standards applicable to passenger equipment but will be covered by the inspection requirements contained in this final rule when hauled in a freight train. With regard to circus trains, FRA intends for these operations to be covered by this final rule due to the unique nature of this equipment and operations. Although a circus train carries some employees, the majority of the train is composed of freight-type equipment and is operated in a manner similar to a freight train. Thus, for consistency purposes, FRA intends that this final rule apply to circus train operations.

Section 232.5 Definitions

This section contains an extensive set of definitions. FRA intends these definitions to clarify the meaning of important terms as they are used in the text of the final rule. The definitions are carefully worded in an attempt to minimize the potential for misinterpretation of the rule. The final rule retains most of the definitions proposed in the NPRM; however, based on the comments received a few new definitions have been added and other definitions previously included in the NPRM have been slightly modified for clarity. Several of the definitions introduce new concepts or new terminologies which require further discussion. The following discussion is arranged in the order in which the definitions appear in the rule text.

''Brake indicator'' means a device, actuated by brake cylinder pressure, which indicates whether brakes are applied or released on a car. The use of brake indicators in the performance of brake tests is a controversial subject. Rail labor organizations correctly maintain that brake indicators are not fully reliable indicators of brake application and release on each car in the train. Further, railroads correctly maintain that reliance on brake indicators is necessary because inspectors cannot always safely observe brake application and release. FRA believes that brake indicators can serve an important role in the performance of brake tests, particularly in those instances where the design of the equipment requires inspectors to place themselves in potentially dangerous position in order to observe the brake actuation or release.

The definition of ''effective brake'' has been slightly modified from the definition proposed in the NPRM. The modification clarifies that a car's air brake will not be considered effective if its piston travel exceeds the specified limits or if it is not capable of producing its designed retarding force. FRA believes this clarifying language is necessary to address the concerns raised by certain commenters regarding the definitions of ''bind'' and ''foul'' contained in this final rule. The definitions of ''bind'' and ''foul'' have been retained as proposed in the NPRM. Contrary to the assertions made by some commenters, FRA believes that the definitions are sufficiently clear. Certain commenters contend that the definitions of these terms fail to address every possible condition that could affect the proper operation of a brake system. FRA believes that the conditions noted by several commenters as not being covered by these definitions are sufficiently covered by the clarified definition of ''effective brake'' contained in this final rule. Thus, even though a condition may not cause a brake to ''bind'' or ''foul'' the condition would cause the brake not to be an ''effective brake'' as defined in the final rule. Furthermore, FRA does not believe that the definitions of ''bind'' or ''foul'' are overly broad, as suggested by some commenters, since the restrictions addressed are ones which affect the intended movement of a component. Therefore, if the restriction is one that does not restrict the component's intended movement, then it should not be considered to ''bind'' or ''foul.''

The final rule also includes a definition of ''inoperative dynamic brake'' which was not specifically contained in the NPRM. This definition has been added in response to comments that the term ''ineffective dynamic brake'' contained in the NPRM was unclear and could lead to potential misunderstandings. These commenters contended that the rule should use the term ''inoperative dynamic brake'' and that its definition should be consistent with the definition of ''inoperative brake.'' FRA agrees with these comments and thus, the final rule replaces the term ''ineffective dynamic brakes'' with the term ''inoperative dynamic brake.'' The term ''inoperative dynamic brake'' means any dynamic brake that no longer provides its designed retarding force on the train, for whatever reason. FRA agrees that the use of only this term clarifies the applicability of the requirements related

to dynamic brakes and prevents potential misunderstandings.

The final rule also defines the term ''initial terminal'' to mean the location where a train is originally assembled. This definition is consistent with the definition contained in the existing power brake regulations. Furthermore, the final rule eliminates the term ''point of origin'' proposed in the NPRM. FRA agrees that the proposed definition of this term was duplicative of the term ''initial terminal'' and merely created potential misunderstandings. Moreover, FRA agrees that the problems attempted to be addressed by the use of this term are sufficiently addressed by the various inspections required in this final rule when adding cars to a train.

The concept of ''ordered date'' or ''date ordered'' is vital to the correct application of this final rule. The terms mean the date on which notice to proceed is given by a procuring railroad to a contractor or supplier for new equipment. Some of the provisions of the final rule apply only to newly constructed equipment. When FRA applies a requirement only to equipment ordered on or after a specified date or placed in service for the first time on or after a specified date, FRA intends to exempt from the requirement, or ''grandfather'' any piece of equipment that is both ordered and placed in service for the first time before that date. FRA believes this approach will allow railroads to minimize, or avoid altogether, any costs associated with changing existing purchase orders and yet limit the delay in realizing the safety benefits of the requirements contained in this final rule.

The definitions of ''qualified person'' and ''qualified mechanical inspector'' are vital to understanding the inspection, testing, and maintenance provisions contained in this final rule. In order to ensure a proper understanding of these terms, the final rule clarifies FRA's intent regarding the necessary training these individuals are to receive and further clarifies the designation of such individuals. Although FRA disagrees with the assertions of some commenters that a ''qualified person'' should only be able to perform a limited number of tasks required by this final rule, FRA does agree that the definition of ''qualified person'' contained in the NPRM was overly vague and was susceptible to abuse and misunderstanding. Therefore, this final rule modifies the definition of a ''qualified person'' in order to more fully develop what is required by a railroad when designating a person as qualified to perform a particular task.

The definition of ''qualified person'' contained in this final rule makes clear that the person is to receive training pursuant to the training, qualification, and designation program required under § 232.203. The definition also makes clear that although a person may be deemed a ''qualified person'' for the performance of one task, that same person may or may not be considered a ''qualified person'' for the performance of another task. The rule requires that various tasks be performed by a ''qualified person.'' For example, these tasks include the performance of brake inspections, the handling of defective equipment, and the performance of single car tests. FRA would expect employees performing these various tasks to have different levels of training. For example, a person receiving appropriate training to be deemed a ''qualified person'' for the purpose of performing Class II brake tests should not be deemed a ''qualified person'' for the purpose of moving defective equipment or performing single car or repair track air brake tests, unless specific training is provided that individual which specifically covers those tasks. The final rule stresses that the individual must have received appropriate training to perform the task for which the railroad is assigning the person responsibility.

Contrary to the assertions of certain commenters, FRA does not intend for term ''qualified person'' to be synonymous with the term train crew member. Although the NPRM discussed the fact that a train crew member could be considered a ''qualified person'' for performing many of the brake inspections required by the rule, FRA does not intend for a train crew member to be deemed a ''qualified person'' for performing every task covered by this final rule which is to be performed by a ''qualified person.'' There are various tasks covered by this final rule (*i.e.,* single car and repair track air brake test) that must be performed by a ''qualified person'' which would require an individual to receive more specialized and in-depth training than that received by a person strictly performing brake inspections. For some tasks a ''qualified person'' may have to be an individual in the railroad's repair or mechanical department. The final rule makes clear that the railroad is responsible for determining that the person has the knowledge and skills necessary to perform the required function for which the person is assigned responsibility and for maintaining sufficient records documenting this knowledge and skill.

The final rule also retains the proposed definition of ''qualified mechanical inspector'' (QMI) with slight modification to ensure clarity and avoid potential misunderstanding. The final rule defines a QMI as a ''qualified person'' who as a part of the training, qualification, and designation program required under § 232.203 has received instruction and training that includes ''hands-on'' experience (under appropriate supervision or apprenticeship) in one or more of the following functions: trouble-shooting, inspection, testing, maintenance, or repair of the specific train brake components and systems for which the inspector is assigned responsibility. This person shall also possess a current understanding of what is required to properly repair and maintain the safety-critical brake components for which the person is assigned responsibility. Further, a QMI shall be a person whose primary responsibility includes work generally consistent with the above-referenced functions.

The definition contained in this final rule clarifies the intent of the NPRM by specifically stating that a QMI must be properly trained and have a primary responsibility in the function of trouble-shooting, inspection, testing, maintenance, or repair of the specific train brake systems for which the inspector is assigned responsibility. The definition also clarifies that a QMI must possess a current understanding of what is required to properly repair and maintain the safety-critical brake or mechanical components for which the person is assigned responsibility. The concept of QMI is premised on the idea that railroads will be permitted to move trains extended distances between brake inspections if the trains are inspected by highly qualified individuals. As no trains are currently permitted to move the distances between brake inspections permitted by this rule, FRA believes that the inspections these trains receive must be of very high quality and must be performed by individuals who can not only identify a particular defective condition but who have the knowledge and experience to know how the particular defective condition affects other parts of the brake system or mechanical components and who have an understanding of what might have caused a particular defective condition. FRA also believes that in order for a person to become highly proficient in the performance of a particular task that person must perform the task on a repeated and consistent basis. As it is almost impossible to develop and impose specific experience requirements, FRA believes that a requirement that the person's primary

responsibility be in one or more of the specifically identified work areas and that the person have a basic understanding of what is required to properly repair and maintain safety-critical brake components is necessary to ensure the high quality inspections envisioned by the rule.

In order to clarify the meaning of ''primary responsibility'' as used in the definition of QMI, the final rule contains a definition of the term. As a rule of thumb FRA will consider a person's ''primary responsibility'' to be the task that the person performs at least 50 percent of the time. Therefore, a person who spends at least 50 percent of the time engaged in the duty of either inspecting, testing, maintaining, troubleshooting, or repairing train brakes systems may be designated as a QMI; provided, the person is properly trained to perform the tasks assigned and possesses a current understanding of what is required to properly repair and maintain the safety-critical brake components for which he or she is assigned responsibility. However, FRA will consider the totality of the circumstances surrounding an employee's duties in determining a person's ''primary responsibility.'' For example, a person may not spend 50 percent of their day engaged in any one readily identifiable type of activity; in those situations FRA will have to look at the circumstances involved on a case-by-case basis.

The definition of QMI largely rules out the possibility of train crew members being designated as these highly qualified inspectors since the primary responsibility, as defined above, of virtually all current train crew personnel is the operation of trains and for the most part train crew personnel do not possess a current understanding of what is required to properly repair and maintain the safety-critical brake components that are inspected during the various required brake tests. FRA provides a clear definition of qualified mechanical inspector so that a differentiation can be made between the comprehensive knowledge and training possessed by a professional mechanical employee, and the more specialized training and general knowledge possessed by train crews. FRA intends the definition to allow the members of the trades associated with the testing and maintenance of equipment such as carmen, machinists, and electricians to become qualified mechanical inspectors. However, membership in labor organizations or completion of apprenticeship programs associated with these crafts is not required to be a qualified mechanical inspector. The two primary qualifications are possession of the knowledge required to do the job and a primary work assignment inspecting, testing, maintaining, troubleshooting, or repairing the equipment.

The definition of ''solid block of cars'' has been modified from that proposed in the NPRM. Although FRA believes the definition it proposed is consistent with current interpretations and enforcement of the existing requirement, FRA agrees with some of the commenters that the definition may have been too narrow and did not directly address FRA's primary concern, the block of cars itself. Rather than attempt to limit the addition of certain blocks of cars to a train by requiring that the entire train be reinspected if the block of cars is not composed of cars from only one other train, the final rule specifically addresses the inspection of a ''solid block of cars'' in the various inspection provisions based on the composition of the block. Thus, the final rule defines a ''solid block of cars'' as two or more freight cars consecutively coupled together and added to a train as a single unit. As FRA's primary concern is the condition of the block of cars being added to the train especially when the block of cars is made up of cars from more than one train, the final rule will permit a solid block of cars to be added to a train without triggering a requirement to perform a Class I brake test on the entire train. However, depending on the make-up of that block of cars, certain inspections will have to be performed on that block of cars at the location where it is added to the train. Therefore, the final rule places the emphasis on the inspection of the cars being added to the train rather than requiring a complete reinspection of the entire train.

The final rule also adds a definition of ''unit train'' and ''cycle train'' in order to clarify the requirement regarding the performance of a Class I brake test on such a train every 3,000 miles. Although the preamble to the NPRM made clear that this requirement was intended to apply to trains that are operated in captive service, the proposed rule text failed to specifically identify which trains were required to receive such attention. Thus, in order to remain consistent with FRA's intent, the final rule text has been modified to include the term ''unit or cycle train.'' ''Unit train'' or ''cycle train'' means a train that, except for the changing of locomotive power and the removal or replacement of defective equipment, remains coupled as a consist and continuously operates from location A to location B and back to location A. These trains are also referred to as captive service trains as they basically operate in one continuous loop. Currently, trains which operate in this fashion can operate almost indefinitely on one initial terminal inspection and then a continuing series of 1,000-mile inspections. FRA believes that it is necessary for these trains to receive comprehensive brake inspections on a periodic basis in order to ensure their safe and proper operation.

The definitions of ''transfer train'' and ''switching service'' are somewhat interrelated since the determination as to whether, at a minimum, a transfer train brake test is required is based on whether the movement is a switching movement or a train movement. It is noted that the definition of ''yard train'' contained in the NPRM has been eliminated from this final rule. As the term was not used in the NPRM and has not been used in this final rule, FRA finds no need to retain the definition. Furthermore, the determination as to whether or not a yard train is required to be inspected and tested as a transfer train is based on whether the train is engaged in a train movement.

The final rule slightly modifies the proposed definition of ''transfer train'' to clarify that such a train may pick up and deliver freight equipment while en route to its destination. Such activity is currently conducted by these trains, and it was not FRA's intent when issuing the NPRM to prohibit these trains from being used in this fashion. The final rule also retains the definition of ''switching service,'' which is defined as the classification of cars according to commodity or destination; assembling of cars for train movements; changing the position of cars for purposes of loading, unloading, or weighing; placing of locomotives or cars for repair or storage; or moving of rail equipment in connection with work service that does not constitute a train movement. Thus, a train engaged in switching service carries the potential of becoming a transfer train, subject to a transfer train's testing requirements, if the movement it will be engaged in is considered a ''train movement'' rather than a ''switching movement.'' FRA's determination of whether the movement of cars is a ''train movement,'' subject to the requirements of this section, or a ''switching movement'' is and will be based on the voluminous case law developed by various courts of the United States.

FRA's general rule of thumb as to whether a trip constitutes a ''train movement'' requires five or more cars coupled together that are hauled a distance of at least one mile without a

stop to set off or pick up a car and not moving for the purpose of assembling or disassembling a train. However, FRA may consider movements of less than one mile ''train movements'' if various circumstances exist. In determining whether a particular movement constitutes a ''train movement,'' FRA conducts a multi-factor analysis based upon the discussions contained in various court decisions on the subject. *See e.g. United States* v. *Seaboard Air Line R. R. Co.,* 361 U.S. 78 (1959); *Louisville & Jeffersonville Bridge Co.* v. *United States,* 249 U.S. 543 (1919). The following factors are taken into consideration by FRA: The purpose of the movement; the distance traveled without a stop to set out or pick up cars; the number of cars hauled; and the hazards associated with the particular route traveled (*e.g.,* the existence of public or private crossings with or without crossing protection, the steepness of the grade, the existence of curves, any other conditions that minimize the locomotive engineer's sight distance, and any other conditions that may create a greater need for power brakes during the movement). The existence of any of these hazards would tend to weigh towards the finding of a ''train movement,'' since these are the types of hazards against which the power brake provisions of the Federal rail safety laws were designed to give protection.

Section 232.7 Waivers

This section sets forth the procedures for seeking waivers of compliance with the requirements of this rule. Requests for such waivers may be filed by any interested party. In reviewing such requests, FRA conducts investigations to determine if a deviation from the general criteria can be made without compromising or diminishing rail safety.

Section 232.9 Responsibility for Compliance

General compliance requirements are contained in this section. In accordance with the ''use'' or ''haul'' language previously contained in the Safety Appliance Acts (49 U.S.C. chapter 203), and with FRA's general rulemaking authority under the Federal railroad safety laws, the final rule retains the proposed requirement that any train, railroad car, or locomotive covered by this part will be considered ''in use'' prior to departure but after it receives or should have received the necessary tests and inspections required for movement. FRA will no longer necessarily wait for a piece of equipment with a power brake defect to be hauled before issuing a violation report and recommending a civil penalty, a practice frequently criticized by the railroads. FRA believes that this approach will increase FRA's ability to prevent the movement of defective equipment that creates a potential safety hazard to both the public and railroad employees. FRA does not feel that this approach increases the railroads' burden since equipment should not be operated if it is found in defective condition in the pre-departure tests and inspections, unless permitted by the regulations. In fact, this modification of FRA's perspectives as to when a piece of equipment will be considered ''in use'' was fully discussed by members of the Working Group and representatives of both rail labor and rail management supported this approach, agreeing that the current practice of waiting for a defective piece of equipment to depart from a location does very little to promote or ensure the safety of trains. FRA received no comments objecting to this approach in response to the NPRM.

FRA currently interprets the ''use'' or ''haul'' language previously contained in the Safety Appliance Acts narrowly to require that a train or car not in compliance with the power brake regulations actually engage in a train movement before a violation under the power brake regulations could be assessed against a railroad. Although this interpretation is in accordance with existing case law, FRA believes that a broader interpretation is possible based upon the case law interpreting the ''use'' language contained in the Safety Appliance Acts and based upon FRA's general rulemaking authority under the Federal railroad safety laws. Based upon both these authorities, FRA finds that it is not necessary to require that a train or car engaged in a train movement prior to FRA assessing a violation under the power brake regulations. The fact that the train or car is being used by a railroad, has been or should have been inspected by the railroad, and will be engaged in a train movement while in non-compliance with the requirements contained in this part is sufficient to allow a violation to be assessed.

This section also clarifies FRA's position that the requirements contained in these rules are applicable to any ''person,'' as broadly defined in § 232.11, that performs any function required by the proposed rules. Although various sections of the final rule address the duties of a railroad, FRA intends that any person who performs any action on behalf of a railroad or any person who performs any action covered by the final rule is required to perform that action in the same manner as required of a railroad or be subject to FRA enforcement action. For example, private car owners and contract shippers that perform duties covered by these regulations would be required to perform those duties in the same manner as required of a railroad.

Paragraph (c) states that any ''person'' as broadly defined in § 232.11, that performs any function or task required by this part will be deemed to have consented to FRA inspection of the person's operation to the extent necessary to ensure that the function or task is being performed in accordance with the requirements of this part. This provision was contained in the NPRM, and FRA received no comments opposing the position. This provision is intended to put railroads, contractors, and manufacturers that elect to perform tasks required by this part on notice that they are consenting to FRA's inspection for rail safety purposes of that portion of their operation that is performing the function or task required by this part. In most cases, this function or task involves a contractor's performance of certain required brake inspections or the performance of specified maintenance on cars, such as conducting single car or repair track tests on behalf of a railroad. FRA believes that if a person is going to perform a task required by this part, FRA must have the ability to view the performance of such a task to ensure that it is conducted in compliance with federal regulations. Without such oversight, FRA believes that the requirements contained in this the regulation would become illusory and could be easily circumvented by some railroads. FRA believes that it has the statutory authority pursuant to 49 U.S.C. 20107 to inspect any facility or operation that performs functions or tasks required under this part, and this provision is merely intended to make that authority clear to all persons performing such tasks or functions.

Section 232.11 Penalties

This section identifies the penalties that may be imposed upon a person, including a railroad or an independent contractor providing goods or services to a railroad, that violates any requirement of this part. These penalties are authorized by 49 U.S.C. 21301, 21302, and 21304. The penalty provision parallels penalty provisions included in numerous other safety regulations issued by FRA. Essentially, any person who violates any requirement of this part or causes the violation of any such requirement will be subject to a civil penalty of at least $500 and not more than $11,000 per violation. Civil penalties may be

assessed against individuals only for willful violations, and where a grossly negligent violation or a pattern of repeated violations creates an imminent hazard of death or injury to persons, or causes death or injury, a penalty not to exceed $22,000 per violation may be assessed. In addition, each day a violation continues will constitute a separate offense. It should be noted that, the Federal Civil Penalties Inflation Adjustment Act of 1990, Pub. L. 101–410 Stat. 890, 28 U.S.C. 2461 note, as amended by the Debt Collection Improvement Act of 1996 Pub. L. 104–134, April 26, 1996 required agencies to adjust for inflation the maximum civil monetary penalties within the agencies jurisdiction. See 63 FR 11623. The resulting $11,000 and $22,000 maximum penalties noted in this section were determined by applying the criteria set forth in sections 4 and 5 of the statute to the maximum penalties otherwise provided for in the Federal railroad safety laws. Finally, paragraph (b) makes clear that a person may be subject to criminal penalties under 49 U.S.C. 21311 for knowingly and willfully falsifying reports required by these regulations. FRA believes that the inclusion of penalty provisions for failure to comply with the regulations is important in ensuring that compliance is achieved.

The final rule includes a schedule of civil penalties in appendix A to this part. Because such penalty schedules are statements of policy, notice and comment were not required prior to its issuance. See 5 U.S.C. 553(b)(3)(A).

Section 232.13 Preemptive Effect

This section informs the public as to FRA's intention regarding the preemptive effect of the final rule. While the presence or absence of such a section does not conclusively establish the preemptive effect of a final rule, it informs the public concerning the statutory provisions which govern the preemptive effect of the rule and FRA's intentions concerning preemption. Paragraph (a) points out the preemptive provision contained in 49 U.S.C. 20106, which provides that all regulations prescribed by the Secretary relating to railroad safety preempt any State law, regulation, or order covering the same subject matter, except a provision necessary to eliminate or reduce an essentially local safety hazard that is not incompatible with a Federal law, regulation, or order and that does not unreasonably burden interstate commerce. With the exception of a provision directed at an essentially local safety hazard that is not inconsistent with Federal law, regulation, or order and that does not unreasonably burden interstate commerce, 49 U.S.C. 20106 will preempt any State regulatory agency rule covering the same subject matter as the regulations contained in this final rule.

Paragraph (b) of this section also informs the public of the potential for preemption under various other statutory and constitutional provisions. These include: the Locomotive Inspection Act (now codified at 49 U.S.C. 20701–20703), the Safety Appliance Acts (now codified at 49 U.S.C. 20301–20304), and the Commerce Clause. FRA is not expressing positions as to whether or to what extent preemption exists with regard to any of the provisions noted above because doing so requires a lengthy analysis for each component which, in the aggregate, would be so long as to impair the usefulness of this document for most readers. As FRA lacks the authority to make binding preemption determinations, FRA's purpose in identifying these provisions is merely to inform the public of the existence of these provisions and that voluminous case law exists regarding preemption under each of the provisions.

Paragraph (c) further informs the public that FRA does not intend to preempt provisions of State criminal law that impose sanctions for reckless conduct that leads to actual loss of life, injury, or damage to property, whether such provisions apply specifically to railroad employees or generally to the public at large.

Section 232.15 Movement of Defective Equipment

This section contains the provisions regarding the movement of equipment with defective brakes without civil penalty liability. Except as noted in the discussion below, the provisions contained in this section are almost identical to the provisions proposed in the 1998 NPRM and incorporate the stringent conditions currently contained in 49 U.S.C. 20302, 20303, 21302, and 21304 (previously codified at 45 U.S.C. 13). The language used in some of the provisions has been slightly modified to ensure consistency with existing statutory requirements. As pointed out in the previous discussion, most of the alternative proposals received by FRA in response to the 1994 NPRM, the subsequent RSAC Working Group meetings, and the 1998 NPRM all contained provisions regarding the movement of equipment with defective brakes which are in direct conflict with the statutory requirements. *See* ''Overview of Comments and General FRA Conclusions'' portion of the preamble under the heading ''Movement of Equipment with Defective Brakes.'' FRA continues to believe that the requirements related to the movement of equipment with defective brakes retained in this final rule are not only consistent with the statutory requirements, but also ensure the safe and proper movement of defective equipment and clarify the duties imposed on a railroad when moving such equipment.

Paragraph (a) of this section contains various parameters which must exist in order for a railroad to be deemed to be hauling a piece of equipment with defective brakes for repairs without civil penalty liability. The final rule modifies the language used in some of the proposed general provisions contained in this paragraph to accurately reflect the language contained in the existing statutory provisions pertaining to the movement of equipment with defective brakes. The final rule replaces the term ''repair location'' with the phrase ''location where necessary repairs can be performed.'' FRA agrees with the comments of certain labor representatives that the proposed language could have been interpreted as being somewhat contrary to the language used in the existing statute, which was not FRA's intent.

The vast majority of the requirements contained in this paragraph should pose absolutely no additional burden to railroads as they are merely a codification of existing statutory requirements. The only requirement being retained from the 1998 NPRM in this paragraph that is not currently mandated is the requirement that all cars or locomotives found with defective or inoperative braking equipment be tagged as bad ordered with a designation of the location where the necessary repairs can and will be effectuated and that a qualified person determine the safety parameters for moving a piece of defective equipment. Although these are new requirements, most railroads already tag defective brake equipment upon discovery of the defect. It should be noted that the final rule clarifies that the person required to make the determinations regarding the safe movement of defective equipment is to be a ''qualified person'' as defined in the final rule. The intent of FRA when issuing the NPRM was to require the determinations to be made by these individuals. FRA believes that the training requirements contained in the final rule for designating a person qualified to perform a specific task will ensure that the individual possesses the appropriate knowledge and skills to

perform the assigned task. Furthermore, the determinations that are required to be made in the final rule are currently made by individuals who FRA believes will be trained and designated under the final rule as qualified persons.

In paragraph (a), FRA retains the existing and proposed requirement that equipment with defective brakes shall not depart from or be moved beyond a location where the necessary repairs to the equipment can be performed. Therefore, if a car or locomotive is found with defective brakes during any of the proposed brake inspections or while the piece of equipment is en route and the location where the defective equipment is discovered is a place where repairs of the type needed can be performed, that car or locomotive shall not be moved from that location until the necessary repairs are effectuated. However, if repairs to the defective condition cannot be performed at the location where the defect is discovered, or should have been discovered, the final rule makes clear that the railroad is permitted to move the equipment with the defective condition only to the nearest location where the necessary repairs can be performed.

Paragraph (a) also retains the proposed codification and clarification of the statutory restrictions on the movement of equipment with defective brakes onto the line of a connecting railroad. Hence, the delivery of defective equipment in interchange is covered by these restrictions. In addition to fulfilling the other requirements set out in this section, a railroad seeking relief from civil penalty liability must show that the connecting railroad has elected to accept the non-complying equipment and that the point of repair on the connecting railroad's line, where the equipment will be repaired, is no further than the point where the repairs could have been made on the line where the equipment was first found to be defective.

Paragraph (b) of this section contains the specific requirements regarding the tagging of equipment found with defective brake components. The requirements contained in this paragraph are very similar to the tagging requirements proposed in the NPRM and those currently contained in part 215, regarding the movement of equipment not in compliance with the Freight Car Safety Standards, and are generally consistent with how most railroads currently tag equipment found with defective brakes. The final rule retains the proposed requirement that a record or copy of each tag removed from a defective piece of equipment be retained for 90 days and made available to FRA within 15 days of request. FRA does not believe that the proposed time frames need to be expanded as suggested by some commenters. The provisions are identical to those contained in part 215, regarding freight car defects and they have proven to be sufficient to meet the needs of FRA. The record keeping requirements are intended to aid FRA in its enforcement of the regulations. As the agency is able to inspect and oversee only a small portion of the railroad operations taking place across the country at any one time, the need for railroads to maintain records of such operations is essential for FRA to carry out its mission of ensuring that all railroads are operating in the safest possible manner and that they comply with those minimum Federal standards designed to ensure that safety.

Paragraph (b) also recognizes that the industry may attempt to develop some type of automated tracking system capable of retaining the information required by this section and tracking defective equipment electronically. Thus, this paragraph permits the use of an automated tracking system in lieu of directly tagging the equipment if the automated system is approved for use by FRA. Contrary to the recommendations of some commenters, FRA is not willing to permit the implementation of an automated tracking system without its approval. As an adequate automated system for tracking defective equipment does not currently exist on most railroads, FRA does not believe it is prudent, from a safety perspective, to allow implementation of a tracking system for which FRA would not have a prior opportunity to assess to ensure the system's accessibility, security, and accuracy. Furthermore, FRA tends to agree with the assertion of various labor representatives that the physical tagging of defective equipment provides a railroad's ground and operational forces the ability to visually locate and identify defective equipment at the time they see it rather than referring to an electronic database for such information.

This paragraph also contains language not previously included in the NPRM regarding FRA's oversight of an automated tracking system that is approved by FRA. FRA believes these provisions as necessary to ensure the agency's ability to monitor such systems and potentially prohibit the use of the system if it is found deficient. The provisions make clear that an automated tracking system approved for use by FRA be capable of being reviewed and monitored by FRA at any time. This paragraph also notifies the railroads that FRA reserves the right to prohibit the use of a previously approved automated tracking system if FRA subsequently finds it to be insecure, inaccessible, or inadequate. Such a determination would have to be in writing and include the basis for taking such action.

Paragraph (c) retains the proposed provision restricting the movement of a vehicle with defective brakes for the purpose of unloading or purging only if it is necessary for the safe repair of the car. This restriction is fully consistent with the statutory provisions regarding the movement of equipment with defective safety appliances.

Paragraph (d) retains with slight modification the method of calculating the percentage of operative power brakes (operative primary brakes) in a train that was proposed in the NPRM. This paragraph retains the general method of calculating the percentage on a control valve basis. However, FRA agrees with the comments of the NTSB and certain labor representatives that the method proposed in the NPRM did not take into consideration the possibility of a control valve being cut in when the brakes it controls are inoperative. Therefore, this final rule clarifies that a control valve will not be considered cut-in if the brakes controlled by that valve are inoperative. Although the statute discusses the percentage of operative brakes in terms of a percentage of vehicles, the statute was written nearly a century ago, and at that time the only way to cut out the brakes on a car or locomotive was to cut out the entire unit. *See* 49 U.S.C. 20302(a)(5)(B). Today, many types of freight equipment can have their brakes cut out on a per-truck basis, and FRA expects this trend to increase as the technology is applied to newly acquired equipment. This final rule merely adopts a method of calculating the percentage of operative brakes in a train based on the design of equipment used today and, thus, a means to more accurately reflect the true braking ability of the train as a whole. FRA believes that this method of calculation is consistent with the intent of Congress when it drafted the statutory requirement and simply recognizes the technological advancements made in braking systems over the last century.

Paragraph (d) also retains the proposed list of conditions that are not to be considered inoperative power brakes for purposes of calculating the percentage of operative brakes. Certain commenters recommended that FRA eliminate the proposed listing of conditions that would not be considered as rendering the brakes inoperative, contending that the listed conditions

should not be excluded from consideration. FRA disagrees with these commenters. The purpose of the calculation is to determine the percentage of operative brakes, and the conditions listed in the proposal and retained in this final rule do not render the power brakes inoperative. Many of the listed conditions constitute a violation under other provisions contained in the final rule or another regulatory provision for which separate penalties are provided.

A cut-out or ineffective power brake is an inoperative power brake, but the failure or cutting out of a secondary brake system does not result in inoperative power brakes; for example, failure of the dynamic brake does not render the power brake inoperative. Furthermore, inoperative handbrakes or power brakes overdue for maintenance or stenciling do not render the power brakes inoperative on the car and should not be deemed inoperative power brakes for purposes of the calculation. The final rule and other regulations contain separate penalties for operating a car that has an inoperative handbrake, is overdue for maintenance, or lacks the proper stenciling or marking if not being properly hauled for repairs. In addition, although a car may be found with piston travel that exceeds the Class I brake test limits, such excess travel does not render the brakes inoperative until the piston travel exceeds the outside limits established for that particular type of piston design. However, piston travel that exceeds the applicable Class I brake test limits would be considered a defective condition if the piston travel were not adjusted at the time that a Class I brake test were performed, and the final rule contains an appropriate penalty for such a condition.

Paragraph (e) contains the requirements regarding the placement of cars in a train that have inoperative brakes. The requirements contained in this final rule are virtually identical to the requirements proposed in the NPRM. The restrictions contained in this paragraph are consistent with current industry practice and are part of almost every major railroad's operating rules. This paragraph prohibits the placing of a vehicle with inoperative brakes at the rear of the train. In addition, this paragraph retains the prohibition on the consecutive placing of more than two vehicles with inoperative brakes, as test track demonstrations have indicated that when three consecutive cars have their brakes cut-out it is not always possible to obtain an emergency brake application on trailing cars. However, as it was FRA's intent to incorporate current industry practice when proposing the requirements, the final rule slightly modifies the requirement regarding the placement of multi-unit articulated equipment. When proposing the restrictions regarding multi-unit articulated equipment, FRA extrapolated the restriction based on the requirements regarding the consecutive placing of defective cars. Based on its consideration of the comments, FRA has determined that the proposed requirement prohibiting the placement of such equipment with consecutive control valves cut out is more restrictive than current practice on many railroads, which was not FRA's intent when drafting the proposal. Consequently, in order to remain consistent with existing industry practice, the final rule requires that such equipment shall not be placed in a train if it has more than two consecutive individual control valves cut out or if the brakes controlled by the valve are inoperative.

Paragraph (f) contains guidelines that FRA will consider when determining whether a location is one where necessary brake repairs can be performed and whether a location is the nearest location where such repairs can be effectuated. The preamble to the NPRM contained an extensive discussion regarding what factors should be considered when determining whether a particular location is one where brake system repairs should be performed and discussed the difficulties and pitfalls associated developing a standard applicable to all situations. *See* 63 FR 48309. In the NPRM, FRA stated that the determinations as to what constitutes a location where necessary repairs can be performed had to be conducted on a case-by-case basis utilizing the criteria established in existing case law. A number of railroad representatives commented on this issue and recommended that FRA further clarify what constitutes a location where brake repairs must be conducted. These commenters claimed that leaving the determination solely to individual FRA inspectors creates inconsistent enforcement and makes it virtually impossible for railroads to comply. AAR and its members recommended that FRA allow railroads to designate locations where brake system repairs would be conducted. Conversely, representatives of rail labor objected to any approach that would permit railroads to designate repair locations, claiming that such an allowance would violate the statutory conditions regarding the movement of defective equipment.

After consideration of these comments, FRA believes it is essential to further clarify to the regulated community what the agency's position will be for determining whether a location is a place where brake repairs are to be conducted. FRA does not agree that a railroad should be permitted to independently determine the locations it will consider capable of making brake system repairs. History shows that many railroads and FRA have widely different views on what should be considered a location where brake repairs can and should be effectuated. Furthermore, it is apparent to FRA that some railroads attempt to minimize or circumvent the requirements for conducting repairs in the name of convenience or efficiency. However, FRA also recognizes that the emergence of mobile repair trucks creates an ability to perform repairs that did not exist when Congress originally enacted the statutory requirements related to the movement of defective equipment. FRA acknowledges that every location where a mobile repair truck is capable of making repairs should not be considered a location where repairs must be conducted. However, FRA also disagrees with the contentions of some commenters that Congress only intended for fixed repair facilities to be considered when determining locations where brake repairs are to be performed and that mobile repair trucks should not be considered. FRA is aware of numerous locations where mobile repair trucks are being used in lieu of a fixed facility or where a fixed facility was eliminated and the repairs that were being performed by the fixed facility are now being performed at the same location with a fully equipped repair truck. Thus, FRA believes that locations where repair trucks are used in virtually the same manner as a fixed facility should be considered when determining whether the location is capable of making the necessary repairs.

As noted in the NPRM, the determination as to what constitutes a location where necessary repairs can be performed is an issue that FRA has grappled with for decades. FRA continues to believe that the determination must be made on a case-by-case basis after conducting a multi-factor analysis. However, in an effort to better detail the items that will be considered by FRA in making a determination, paragraph (f) contains general guidelines that FRA will consider when determining whether a location is one which should be considered a location where at least some brake system repairs must be

made. FRA would expect a railroad to consider the guidance contained in this paragraph when making its decisions on where equipment containing brake defects will be repaired. The guidance contained in this paragraph is based upon, and consistent with, the voluminous case law which exists that establishes the guiding principles for determining whether a location constitutes a location where the necessary repairs can be made as well as previous enforcement actions taken and guidance provided by FRA regarding such locations. The final rule guidance incorporates the principles discussed in the ''Overview of Comments and General FRA Conclusions'' portion of the preamble under the heading ''Movement of Equipment with Defective Brakes.''

Paragraph (g) provides a method by which a railroad may designate locations where various brake system repairs will be conducted. Although FRA does not believe that railroads should be permitted to unilaterally designate locations where brake system repair will be conducted, FRA does believe that a railroad in cooperation with its employees could potentially develop a plan that designates locations where brake system repairs will be effectuated. This paragraph makes clear that such a plan would have to be consistent with the guidelines contained in paragraph (f) and that such plans would have to be approved by FRA prior to being implemented. This paragraph also makes clear that for FRA to entertain a proposal containing a plan which designates locations where brake system repairs will be conducted a railroad and representatives of its employees must submit the proposal jointly . FRA does not intend to consider proposals nominally submitted pursuant to this provision that are not supported by a railroad's employees and their representatives.

Section 223.17 Special Approval Process

This section contains the procedures to be followed when seeking to obtain FRA approval of a pre-revenue service acceptance plan under § 232.505 for completely new brake system technologies or major upgrades to existing systems or when seeking approval of an alternative to the test standard incorporated in §§ 232.305 or 232.307. Several railroads and manufacturers contended, both in response to the 1994 NPRM and at the RSAC Working Group meetings, that FRA needed to devise some sort of quick approval process in order to permit the industry to make modifications to incorporated standards or existing equipment based on the emergence of new technology. Thus, FRA proposed an approval process it believed should speed the process for taking advantage of new technologies over that which is currently available under the waiver process. However, in order to provide an opportunity for all interested parties to provide input for use by FRA in its decision making process, as required by the Administrative Procedure Act, FRA believes that any special approval provision must, at a minimum, provide proper notice to the public of any significant change or action being considered by the agency with regard to existing regulations.

This section essentially retains the proposed special approval process. One private car owner commented that the procedures should require FRA to publish any petition received within 30 days of receipt and to rule on the petition within 30 days of receipt of the last comment. Certain representatives of rail labor asserted that the special approval procedures should be tightened to be consistent with the requirements for granting a waiver and that the comment period should be extended and expanded to provide adequate time for parties to prepare. As the special approval process only applies to pre-revenue testing plans and the procedures for conducting single car and repair track air brake tests and because the purpose of the process is to speed the decision making process, FRA does not believe it is necessary to further lengthen the comment periods proposed in the NPRM, and FRA thinks that the procedures provide an adequate opportunity for interested parties to comment. Furthermore, if the procedures for these special approvals are made overly burdensome then the speed intended to be gained through the process would be lost. However, FRA also does not believe that the proposed time frames provided for FRA's consideration of a petition should be reduced. FRA believes that the time frames included in the proposal for FRA consideration are necessary for FRA to fully consider all comments and information received.

Section 232.19 Availability of Records

This section makes clear that unless otherwise provided by this part, the records and plans required to be developed and maintained by this part shall be made available to representatives of FRA and States participating under part 212 of this chapter for inspection and copying upon request. FRA has added this section to the final rule in order to specifically clarify the availability of such records while increasing the readability of the rule and reducing the unnecessary repetition of the requirement throughout the text of the rule.

Section 232.21 Information Collection

This section indicates the provisions of this part that have been approved by the Office of Management and Budget for compliance with the Paperwork Reduction Act of 1995. *See* 44 U.S.C. 3501 *et seq.* A more detailed discussion of the information collection requirements contained in this part is provided in the ''Regulatory Impact'' portion of this preamble.

Subpart B—General Requirements

Section 232.101 Scope

This section contains a formal statement of the scope of this specific subpart of the final rule. This subpart is intended to establish general operating, performance, and design standards for railroads that operate freight or other non-passenger trains and further contains specific requirements for equipment used in these types of operations.

Section 232.103 General Requirements for All Train Brake Systems

This section contains general requirements that are applicable to all freight and non-passenger train brake systems. This section specifically includes certain basic train brake system practices and procedures that form the foundation for the safe operation of all types of trains. Some of these basic principles are so obvious that they have not been specifically included in past rules. For example, paragraphs (a)-(c) state the most basic safety requirements for all train brake systems, which include having the ability to stop a train within the existing signal spacing, maintaining and monitoring the integrity of the train brake communication line, and having the train brake system respond as intended to signals from the brake communication line. These basic requirements were proposed in the NPRM and have been retained in this final rule without change.

Paragraph (d) contains the provision requiring trains to have 100 percent operative and effective power brakes prior to use at, or departure, from certain locations and prohibiting the hauling of a car with inoperative or ineffective power brakes from certain under 49 U.S.C. 20303. Paragraph (d) has been slightly modified from that

proposed in the NPRM in order to clarify that the requirement applies only to trains that are required to receive a Class I brake test at the location. This modification was made in order to specifically clarify that the 100 percent operative brake requirement is not intended to apply to transfer trains that originate at a location where the necessary brake repairs cannot be effectuated. FRA agrees with the concerns raised by various commenters that the proposed language could have been interpreted as applying to transfer trains. FRA agrees that the 100 percent requirement does not currently apply to such trains, and it was not FRA's intention when issuing the NPRM to extend its application to such trains. However, it should be noted that if a transfer train originates at a location where repairs to the equipment containing defective brakes can be effectuated, then the train would be required to have 100 percent operative brakes prior to being used or departing that location.

Contrary to the contentions of certain commenters, FRA continues to believe that there is adequate justification for retaining the 100 percent requirement. The requirement to have 100 percent operative brakes prior to departing a location where an initial terminal brake test is required to be performed has existed in the railroad industry for decades. FRA believes it is not only wise from a safety standpoint, as it ensures the proper operation of a train's brake system at least once during its existence, but the requirement sets the proper tone for what FRA expects to be accomplished at these locations. FRA believes that requiring 100 percent operative brakes on trains at their origin provides the railroads with a margin for failure of some brakes while the train is in transit (up to 15 percent) and tends to ensure that defective equipment is being repaired in a timely fashion. In addition, FRA believes that the 100 percent requirement is consistent not only with Congress' understanding of the AAR inspection standards that were adopted in 1958, but also with the intent of FRA, rail management, and rail labor as to what was to occur at initial terminals when the inspection interval was increased from 500 miles to 1,000 miles in 1982. At that time, carrier representatives committed to the performance of quality initial terminal inspections in exchange for an extension in the inspection interval, for which FRA intends to hold them accountable.

Some commenters recommended that FRA permit any and all trains that have 95 percent operative brakes to operate from their point of origin to destination and noted that Canada currently allows such operation. FRA believes that such an approach would be completely contrary to the existing statutory mandate regarding the movement of equipment with defective brakes. The existing statutory provision regarding the movement of equipment with defective brakes requires that such equipment be repaired at the nearest location where the necessary repairs can be performed. *See* 49 U.S.C. 20303. Consequently, trains that originate at or that operate through locations where the necessary brake repairs can be effectuated are clearly required by the statute to have 100 percent operative brakes prior to departing those locations.

FRA realizes that the 100 percent requirement creates a somewhat illogical situation at some locations by requiring certain trains to have 100 percent operative brakes prior to departing the location and yet allowing other trains to pick up defective equipment at the same location. However, FRA believes that various safety benefits are created by retaining the 100 percent requirement. The public is assured that a train's brake system is in near perfect condition at the beginning of its journey, train crews are more cognizant of the presence of defective cars in the train when they are picked up en route, railroads are more likely to perform repairs at a location where trains are initiated in order to avoid breaking up trains to set out defective cars once the trains are assembled, and FRA retains a clear and consistent enforcement standard that can be easily understood by its inspectors and railroad industry employees.

Although FRA recognizes that the 100 percent requirement may be somewhat burdensome for some railroads at certain locations, FRA believes that the number of locations involved is relatively low and should be handled on a case-by-case basis through the existing waiver process. FRA believes that many railroads have created their own problems by eliminating repair facilities and personnel at many of the outlying locations that the railroads now claim they lack the ability to make appropriate repairs. Furthermore, FRA believes that the best method of assessing the safety implications of permitting a location to operate trains with less than 100 percent operative brakes is for the railroad to provide information on how the railroad will handle the defective equipment based on the specific needs and operating characteristics of the railroad involved.

In the NPRM, FRA provided various approaches under which it would potentially consider allowing a railroad to operate trains from their initial terminals with less than 100 percent operative brakes. *See* 63 FR 48310. The methods suggested by FRA were rejected as being overly burdensome by several commenters. Therefore, FRA believes the burden falls on each railroad seeking relief from the 100 percent requirement at certain outlying locations to provide FRA with an operating plan that will ensure the safe operation of such trains and provide for the timely and certain repair of any defective equipment moved from those locations. Consequently, FRA believes that there are a few existing locations that may be candidates for receiving a waiver from the 100 percent requirement, and FRA is willing to consider waivers for such locations; however the railroads applying for such waivers must be able to establish a true need for the exception and must be willing to provide alternative operating procedures that ensure the safety of the trains being operated from those locations.

Paragraph (e) contains a clear and absolute prohibition on train movement if more than 15 percent of the cars in a train have their brakes cut out or have otherwise inoperative brakes. Although there is no explicit limit contained in the statute regarding the number of cars with inoperative brake equipment that may be hauled in a train, the 15-percent limitation is a longstanding industry and agency interpretation of the hauling-for-repair provision currently codified at 49 U.S.C. 20303, and has withstood the test of time. This interpretation is extrapolated from another statutory requirement which permits a railroad to use a train only if ''at least 50 percent of the vehicles in the train are equipped with power or train brakes and the engineer is using the power or train brakes on those vehicles and on all other vehicles equipped with them that are associated with those vehicles in a train.'' 49 U.S.C. 20302(a)(5)(B). As originally enacted in 1903, section 20302 also granted the Interstate Commerce Commission (ICC) the authority to increase this percentage, and in 1910 the ICC issued an order increasing the minimum percentage to 85 percent. *See* 49 CFR 232.1, which codified the ICC order. One labor representative recommended that this requirement be eliminated as it creates confusion regarding the movement of defective equipment. FRA believes that if the rule is read in its entirety there should be no

confusion as to the movement of defective equipment, and that this provision merely sets an outside limit on the percentage of cars that may be hauled in any train with inoperative brakes. Consequently, FRA believes the express prohibition is necessary and will continue to require that equipment with inoperative air brakes make up no more than 15 percent of any train.

As virtually all freight cars are presently equipped with power brakes and are operated on an associated trainline, the statutory requirement cited above is in essence a requirement that 100 percent of the cars in a train have operative power brakes, unless being hauled for repairs pursuant to 49 U.S.C. 20303. Therefore, paragraph (f) makes clear that a train's air brakes shall be in effective and operable condition unless a car is being hauled for repairs pursuant to the conditions contained in § 232.15. This section retains the proposed standard for determining when a freight car's air brakes are not in effective operating condition based on piston travel. The piston travel limits for standard 12-inch stroke brake cylinders are the same as currently required under § 232.11(c). Certain labor representatives asserted that the permissible piston travel for these brake cylinders should be reduced to 10 inches rather than the currently allowed 10½ inches. These commenters provided no technical data to support such a change, and FRA is not aware of any problems or unsafe conditions resulting from the current 10½ inch piston travel allowance on such brake cylinders. Consequently, the final rule retains the existing piston travel limits for standard 12-inch stroke brake cylinders.

Due to the proliferation of equipment with other than standard 12-inch stroke brake cylinders, FRA has found that mechanical forces and train crew members performing brake system inspections often do not know the acceptable range of brake piston travel for this non-standard equipment. In an attempt to improve this situation and to ensure the proper operation of a car's brakes after being inspected, FRA proposed that vehicles equipped with other than standard 12-inch stroke brake cylinders have either the badge plate for the vehicle or a stencil, sticker, or marker indicate the acceptable range of piston travel for the brake equipment on that vehicle. FRA also proposed that the information on the badge plate, sticker, stencil, or marker include both the permissible brake cylinder piston travel range for the vehicle at Class I brake tests and the lengths at which the piston travel renders the brake ineffective. Paragraph (g) generally retains these proposed requirements. FRA continues to believe that this information is essential in order for a person to properly perform the brake inspections contained in this final due to the growing number of cars with other than standard brake designs. The requirement has been slightly modified from that proposed to require that the outside piston travel limit need only be provided if it is different from the Class I brake test limit. FRA agrees with the contentions of certain commenters that such information would be unnecessarily redundant if the limits are the same. Thus, if there is no outside limit indicated on the badge plate, stencil, sticker, or marker the piston travel limits indicated for the Class I/ initial terminal brake test for the vehicle will be considered the outside piston travel limits for that vehicle.

The AAR recommends that, in addition to vehicles equipped with standard 12-inch stroke brake cylinders, FRA should also except vehicles equipped with WABCOPAC or NYCOPAC truck-mounted brake cylinders from the marking requirements contained in paragraph (g). The AAR contends that the stenciling or marking of the piston travel limits on these vehicles is unnecessary because the piston travel limits for these brake systems are well-known and nearly 30 percent of the fleet is equipped with them. FRA disagrees with this contention. Based on FRA's experience in monitoring the performance of various brake tests, FRA believes that many employees are not aware of the piston travel limits for the brake systems noted above. Furthermore, there are numerous truck-mounted brake cylinders currently in use that have piston travel limits which are different from those of the WABCOPAC and NYCOPAC truck-mounted systems. Thus, FRA believes all vehicles equipped with these brake systems need to be marked in order to avoid confusion by individuals inspecting the equipment and thus ensure the proper operation of the brakes on such cars. Moreover, FRA is aware that many vehicles equipped with the type of truck-mounted brake systems sought to be excepted by AAR, particularly privately owned vehicles, already have decals, stickers, or stencils containing the information required by this paragraph.

The AAR also recommends that railroads be provided eight years in which to implement the marking requirements contained in this paragraph in order to perform the work during the required periodic single car or repair track air brake tests. FRA believes such an allowance of time is unnecessary and excessive. The reason FRA is permitting the information to be marked on the car with either a decal, stencil, or sticker is to provide the railroads with relatively simple and easy methods for bring cars into compliance without requiring them to be placed in a maintenance facility or on a repair track to have the information affixed. FRA believes that the three-year applicability period provided by this final rule provides railroads with sufficient time to mark cars as required. Furthermore, many cars are already properly marked with the necessary information as noted in the previous discussion.

Paragraph (h) requires that all equipment ordered or placed in service for the first time on or after the specified dates, be designed not to require an inspector to place himself or herself on, under, or between components of the equipment to observe brake actuation or release. This paragraph allows railroads the flexibility of using a reliable indicator in place of requiring direct observation of the brake application or piston travel because the designs of some freight car brake systems make direct observation extremely difficult unless the inspector places himself or herself underneath the equipment. Indicators of brake system piston travel or piston cylinder pressure have been used with satisfactory results for many years. Although indicators do not provide 100 percent certainty that the brakes are effective, FRA believes that they have proven themselves effective enough to be preferable to requiring an inspector to assume a dangerous position. Some commenters recommended that the indicator alternative be eliminated and that railroads should not be allowed to rely on indicators. FRA believes that these commenters fail to recognize the need to provide some alternative to direct observation of the piston travel on certain equipment and fail to acknowledge the existence of new technologies available to the industry. Further, although the rule permits the use of an indicator for purposes of determining piston travel, the individual inspecting such equipment would be required to inspect all components of the brake system for proper operation.

This requirement stems primarily from the brake system design of double-stack equipment currently used by several larger freight operations. Several commenters have indicated that the functioning of the brakes on this type of equipment cannot be observed without

inspectors placing themselves in potentially dangerous positions. In addition, a complete inspection of the brake equipment and systems used on double-stack equipment is time consuming. Consequently, inspectors are reluctant to conduct a complete brake inspection test on departing trains that contain this type of equipment. FRA thinks that double-stack equipment is becoming a mainstay of the freight railroad industry and that this design deficiency must be corrected. Thus, FRA has attempted to make this a performance requirement by simply specifying how the equipment must function and allowing the industry to determine the method of compliance.

Paragraph (i) retains the proposed requirement that an emergency brake application feature be available at any time and that it produce an irretrievable stop. This section merely codifies current industry practice and ensures that all equipment will continue to be designed with an emergency brake application feature. In the 1994 NPRM on power brakes, FRA proposed a requirement that all trains be equipped with an emergency application feature capable of increasing the train's deceleration rate a minimum of 15 percent. *See* 59 FR 47729. This proposed requirement merely restated the emergency specification currently contained in Appendix B to part 232. Comments received in response to that proposal indicated that some brake equipment currently in use or being developed could provide a deceleration rate with a full service application that is close to the emergency brake rate and that the proposed requirement would require the lowering of full service brake rates, thereby compromising safety and lowering train speeds. Consequently, the requirement proposed in the 1998 and retained in this final rule removes the 15-percent differential.

Paragraphs (j) and (k), which were proposed as paragraphs (k) and (l), impose on the railroads the responsibility for determining maximum air brake system working pressure and maximum brake pipe pressure. These provisions were contained in both the 1994 and 1998 NPRM, and FRA received no comments objecting to their inclusion. *See* 59 FR 47743. Thus, FRA intends to continue to allow individual railroads the wide latitude currently permitted in determining these pressures.

Paragraph (l), previously proposed as paragraph (m), provides that except as provided by other provisions of this part, all equipment used in freight or other non-passenger trains shall, at a minimum, meet the performance specification for freight brakes in AAR standard S–469–47. The AAR standard incorporated by reference in this paragraph contains all the provisions currently referenced in § 232.3 and contained in existing Appendix B to part 232. In the NPRM, FRA sought comments from interested parties as to the necessity of referencing these standards as well as any information on any updated standards related to the performance of freight equipment that is currently being used throughout the industry. Although one commenter generally asserted that the standards should merely be included as a reference and that their inclusion would require retroactive validation of proven designs, FRA finds little merit in this contention since any existing equipment should already be designed to the specifications as they are currently part of the existing regulations. Except as noted below, FRA received no comments seeking specific changes to the referenced specifications or other objections to their inclusion.

It should be noted that the provision previously proposed in paragraph (j) of this section requiring that the air brake components that control brake application and release be adequately sealed to prevent contamination by foreign material (63 FR 48359) has been removed due to its incorporation in another provision contained in this final rule. As the proposed requirement is contained in AAR standard S–469–47 as one of the general specification requirements, there is no reason to retain the specific requirement in this final rule. Thus, although the requirement has been specifically removed from the rule text, it is retained by its inclusion in the referenced AAR standard. Furthermore, FRA finds AAR's objection to this requirement somewhat hard to understand. FRA is not imposing a new requirement but merely sets forth an existing requirement contained in an AAR standard. Contrary to the concerns raised by AAR, FRA does not intend to change the existing standard of compliance for this requirement.

Paragraph (m), previously proposed as paragraph (n), retains the proposed requirement that if an en route train qualified by the Air Flow Method experiences a brake pipe air flow of greater than 60 CFM or brake pipe gradient of greater than 15 psi and the movable pointer does not return to those limits within a reasonable time the train must be stopped at the next available location and inspected for leaks in the brake system. This requirement one of the conditions of the general waiver granted to the AAR allowing the use of the air flow method to qualify train air brakes. FRA believes that this requirement is necessary to prevent trains with excessive leakage from continuing to operate. If a train has excessive leakage, the engineer may lack the ability to stop the train using the air brake system. Other than the general contention raised by certain labor representatives that the Air Flow Method not be allowed, FRA received no specific comments on the requirements contained in this paragraph.

Paragraph (n), previously proposed as paragraph (o), contains requirements regarding the setting and releasing of hand brakes on equipment that is left unattended. The requirements contained in this paragraph differ from those previously proposed in the NPRM. In the NPRM, FRA proposed various requirements for securing standing equipment. The requirements proposed in the NPRM were basically a reiteration of the guidance issued by FRA in Safety Advisory 97–2 on September 15, 1997. *See* 62 FR 49046. The securement guidance contained in Safety Advisory 97–2 was based upon FRA's review of an incident that occurred on August 20, 1997 near Fort Worth, Texas, and its awareness of other incidents involving the improper securement of rolling equipment. The Safety Advisory was issued in order to provide the industry with some assistance and guidance regarding securement procedures and to provide information on current practices of the industry related to the securement of rolling stock. Id.

The requirements proposed in the NPRM where also intended to address the practice known as ''bottling the air'' in a standing cut of cars, an issue related to improperly secured rail equipment. The practice of ''bottling the air'' occurs when a train crew sets out cars from a train with the air brakes applied and the angle cocks on both ends of the train closed, thus trapping the existing compressed air and conserving the brake pipe pressure in the cut of cars they intend to leave behind. This practice has the potential of causing, first, an unintentional release of the brakes on these cars and, ultimately, a runaway. Many railroad operating rules require that a 20-pound reduction in brake pipe pressure be made when stopping a train to remove a cut of cars from the train. Thus, if the trainman closes the angle cock where the cut is to be made before pressure equalizes in the trainline, an air wave action may form that can be of sufficient amplitude to initiate an unintentional release of the brakes.

Brake pipe gradient is another factor that makes bottling the air dangerous. ''Normal gradient'' is a term used to express the difference between the higher pressure on the front end of the train and the lower pressure on the rear end of the train, which is dependent upon brake pipe leakage and train length. Each train establishes its own normal gradient value. ''Inverse gradients'' and ''False gradients'' are temporary gradients that are a result of brake operations. Inverse gradients occur when a brake pipe reduction is made, temporarily making the brake pipe pressure higher on the rear of the train. The false gradient is created anytime the train brakes are set and released, thus temporarily resulting in a higher than normal pressure differential between the front and rear end of the train as the brake pipe charges. Therefore, if the engineer sets and releases a train's brakes a sufficient number of times prior to stopping to remove a cut of cars, a false gradient could be established. Even if the engineer made a 20-pound brake pipe reduction and listened for the air to stop exhausting at the automatic brake valve before giving the signal to the trainman to cut off the cars, the potential exists for an unintentional release of air brakes if the air on the cars is bottled. The false gradient could be of such magnitude that, as the trainline attempts to equalize, the higher pressure on the front end flowing to the rear will exceed the 1½ pound differential across the service piston and cause a release of air brakes. An inverse gradient can also create an unintentional release of brakes. As brake pipe pressure is reduced at the front of the train, the rear end temporarily has a higher pressure. As the trainline attempts to equalize, the pressure on the front end will rise. In some circumstances, this rise could be enough to initiate a release of air brakes.

On June 5, 1998, the NTSB issued the following recommendation to FRA:

> Issue a regulation that requires the brake pipe pressure to be depleted to zero and an angle cock to remain open on standing railroad equipment that is detached from a locomotive controlling the brake pipe pressure.

(R–98–17). This recommendation was the result of NTSB's investigation of an incident that occurred on January 27, 1997, on the Apache Railway near Holbrook, Arizona. The incident involved the runaway of 77 cars down a 1.7 percent grade for 14 miles resulting in the eventual derailment of 46 cars and the release of hazardous materials. Although there were no fatalities, 150 people were evacuated from nearby residential areas. The NTSB determined that the 77 cars rolled away unattended because the conductor of the train had trapped the air in the brake system, i.e., ''bottled the air,'' which resulted in an undesired release of the brakes on the standing cars. In its recommendation the NTSB correctly noted that FRA statistics show that ten accidents occurred between 1994 and 1995 which were attributable to the practice of ''bottling the air.''

FRA received numerous comments from the AAR and various other representatives of the railroads objecting to the proposed provisions regarding the securement of standing equipment. Although these commenters generally agreed with the intended purpose of the proposed requirements, they believed that the proposed provisions were overbroad, increased certain safety hazards, and exposed railroad employees to higher risk of injury. These commenters contend that the goals of FRA could be accomplished in a less burdensome fashion while increasing safety and reducing the potential for employee injuries. After reviewing the comments submitted by these parties, FRA agrees with most of the recommendations provided. Consequently, the provisions contained in this paragraph have been modified to reflect those recommendations.

FRA agrees with the recommendation that the requirements contained in this paragraph should be applied only to unattended equipment rather than to standing equipment generally. FRA agrees that, if the train is attended, the setting of handbrakes serves no useful purpose and would result in an enormous cost to the industry. Therefore, paragraph (n) contains a definition of ''unattended equipment'' to clarify the applicability of the requirements contained in this paragraph. The term covers equipment left standing and unmanned in such a manner that the brake system of the equipment cannot be readily controlled by a qualified person.

FRA also agrees that the proposed requirement that railroads develop a matrix to determine the number of hand brakes that are to be applied may not be the best approach to ensure that a sufficient number of hand brakes have been applied to a specific cut of unattended equipment. FRA agrees that the number of hand brakes required to be applied depends on a wide variety of factors not easily captured in a matrix format and that a matrix approach might result in either too few or too many hand brakes being applied. Thus, paragraph (n)(1) eliminates the requirement for developing a matrix and is modified to include a performance-based requirement that a sufficient number of hand brakes be applied to hold the equipment and a requirement that railroads develop and implement a process or procedure to verify that the applied hand brakes will sufficiently hold the equipment when the air brakes are released. This requirement will permit a railroad to develop appropriate operating rules to verify the sufficiency of the handbrakes applied which can be tailored to the specific territory and equipment operated by the railroad. On some railroads and at some locations, these operating rules may include the use of a matrix or some other type of set calculation.

Paragraph (n)(2) addresses the issue of ''bottling air'' on unattended equipment. This paragraph requires that an emergency brake application be initiated on all equipment prior to its being left unattended. This paragraph no longer requires that the locomotive be detached to effectuate the emergency application as was proposed. FRA agrees with the concerns raised by certain parties that the proposed requirement to detach locomotives to allow an emergency application of the brakes is not appropriate or desirable in many circumstances. FRA agrees that it is not necessary to detach locomotives to initiate an emergency application, that it is safer to leave the locomotives attached due to redundant securement features on a locomotive, that an emergency application should not be made until it is known that the number of hand brakes set is sufficient, and that it would be very burdensome to detach locomotives every time a train is left unattended.

Paragraphs (n)(3) and (n)(4) contain the requirements for securing unattended locomotives. FRA agrees with the recommendations made by various commenters that the proposed requirements regarding locomotive securement were over broad by failing to distinguish among (i) locomotives in the lead consist of a train, (ii) distributed power locomotives, and (iii) locomotives within yard limits. FRA agrees that these securement requirements contained in this final rule should not apply to distributed power locomotives. Consequently, these paragraphs establish specific securement requirements that apply only to locomotives in the lead consist of a train and are based on the location of the locomotive or locomotive consist when it is being left unattended.

Paragraph (n)(5) retains the proposed and existing requirement that any hand brakes applied to secure unattended equipment not be released until it is

known that the air brake system is properly charged.

It should be noted that paragraph (n) reflects FRA's agreement with the various concerns raised regarding the proposed requirements to use derails to secure unattended equipment and to chock and chain locomotives when left unattended on certain grades. FRA agrees that the use of derails, as proposed in the NPRM, could potentially create safety hazards if not properly removed and might expose employees to a greater potential for injury by increasing the handling and movement of derails. FRA also agrees that if handbrakes are properly applied on unattended locomotives there is little need to chock and chain locomotive wheels in most instances and such a requirement merely creates the potential of exposing railroad employees to unnecessary risks. Furthermore, FRA believes that the alternative approach submitted by the CAPUC regarding when and where derails should be applied is too complicated, requires further research, and might require unnecessary securement in many instances. Thus, the approach taken in this final rule is to provide requirements for the setting of hand brakes and require railroads to ensure the capability of those hand brakes to hold the equipment. If the applied hand brakes do not adequately hold the equipment, FRA would expect the railroad to utilize other methods of securement such as derails, skates, chains, and chocks.

Paragraph (o), previously proposed as paragraph (p), requires that air pressure regulating devices be adjusted in accordance with the air pressures contained in the chart contained in this paragraph. The chart is very similar to that proposed in the NPRM, but has been slightly modified in response to the comments received. The references to equipment used in passenger operations has been eliminated, and the pressure of the self-lapping portion for independent air brake has been modified to read ''30 psi or less'' rather than the proposed ''30–72 psi.''

Paragraph (p) contains the proposed provision regarding the joint responsibility of supervisors and inspectors to ensure the proper condition and functioning of train brake systems. The provision contained in this paragraph has been slightly modified in order to remain consistent with the existing requirement regarding such joint responsibility contained at § 232.11(a). These modifications clarify that joint responsibility exists to the extent that it is possible to detect defective equipment by the inspections and tests required by this part.

Section 232.105 General Requirements for Locomotives

For the most part, this section contains general provisions related to locomotives that are either currently contained in § 232.10 or that were previously proposed in the NPRM. As discussed in detail in the NPRM, FRA does not intend to include provisions in this final rule related to the inspection and maintenance of locomotive braking systems. FRA believes that these requirements are adequately addressed in part 229 and would only add to the complexity of this rule and potentially cause confusion or misunderstanding by members of the regulated community. Therefore, while many of the requirements currently contained in § 232.10 are no longer necessary as they are adequately addressed in part 229, paragraphs (a) and (c) are provisions currently contained in § 232.10 which FRA believes need to be retained. See 49 CFR 232.10(b) and (f)(2).

Paragraph (c) retains the proposed requirement that the hand or parking brake on a locomotive be inspected and repaired, if necessary, at least every 368 days. It should be noted that paragraph (c) has been slightly modified from that proposed in order to allow the date of the last inspection of the hand brake to be entered on Form FRA F 6180–49A in lieu of stenciling such information on the car. As the current regulation permits either the stenciling or tagging of a locomotive with this information and because many railroads currently record the information on the form noted above, FRA believes it is appropriate to continue to allow such a practice. FRA continues to believe that this inspection requirement will have little or no impact on railroads as this inspection is intended to coincide with the annual locomotive inspection required under § 229.27 and many railroads currently inspect these devices at this annual inspection. FRA also continues to believe that a thorough inspection of these devices on an annual basis is sufficient to ensure the proper and safe functioning of the devices.

Paragraph (b) retains the proposed requirement that locomotives ordered or placed in service for the first time after the specified dates be equipped with a hand or parking brake. Although the final rule retains the requirements that the hand or parking brake be capable of being set and released manually, the final rule modifies the requirement regarding the holding capability of such brakes. Rather than requiring that the brake be capable of holding the equipment on the maximum grade anticipated by the operating railroad, the final rule requires that the brake be capable of holding the equipment on a three-percent grade. Based on information provided by several locomotive manufacturers, FRA agrees that current locomotive hand and parking brakes are designed to achieve a three-percent holding capacity and that current operating practices are based on this capacity. Several manufacturers assert that if the holding capacity of these brakes had to be increased, then the cost of a locomotive would increase significantly as such an increase would require redesign of the foundation brake rigging. As the current designs have provided adequate safety and the enhanced design would be very expensive relative to the improvement in safety, this paragraph has been amended to require that the hand or parking brake be capable of holding the unit on a three percent grade.

A hand or parking brake is an important safety feature that prevents the rolling or runaway of parked locomotives. The requirements contained in this paragraph represent current industry practice. In the 1994 NPRM on power brakes, FRA proposed requiring that a hand brake be equipped on locomotives. See 59 FR 47729. FRA received several comments to that proposal suggesting that the term ''parking brake'' be added to the requirement since that is what is used on many newly built locomotives. A parking brake generally can be applied other than by hand, such as by spring pressure, by air pressure when the brake pipe air is depleted, or by an electrical motor. Parking brakes usually incorporate some type of manual application or release feature, although these features are generally more difficult to operate. FRA believes that parking brakes are the functional equivalent of a traditional hand brake and are capable of providing a similar level of security to stationary equipment. Consequently, FRA added the term ''parking brake'' to the 1998 NPRM and has retained the term in this final rule.

In paragraph (d), FRA requires that the leakage of air from equalizing reservoirs on locomotives and related piping be zero. The equalizing reservoir contains the controlling volume of air pressure, which is set to a desired pressure by the locomotive engineer by setting the regulating valve (also known as the ''feed valve'') on the automatic air brake system. When the automatic brake valve handle is moved to the release position, air supplied from the locomotive air compressor and the main air reservoirs is supplied to the equalizing reservoir through the

regulating valve. The brake pipe pressure will then be charged to the level of the air pressure contained in the equalizing reservoir. When an application of the train brakes is desired, the engineer moves the automatic brake valve handle into the application zone. The movement of the brake valve handle into the application zone shuts off the supply of air from the regulating valve to the equalizing reservoir, leaving the volume of air contained in the equalizing reservoir trapped in the equalizing reservoir. The pressure of the trapped air can then be reduced to a desired amount by movement of the automatic brake valve handle. This will result in the brake pipe pressure responding and being reduced to a pressure equal to the pressure contained in the equalizing reservoir. Furthermore, the air pressure in the brake pipe on most freight equipment will be maintained at the pressure in the equalizing reservoir due to the maintaining features of the brake system. Consequently, any leakage from the equalizing reservoir will affect the maintaining feature of the automatic air brake, causing the engineer to lose the ability to effectively maintain control of the brake pipe pressure and, thus, affecting the ability of the engineer to safely control the train in some circumstances.

One manufacturer of locomotives commented on the requirement contained in this paragraph, contending that the requirement should not be applied to locomotives utilizing electronic braking systems because such leakage is not detectable by the locomotive engineer. This commenter contends that on these types of braking systems a continuous demand is made on the compressor to offset any leakage and if the compressor cannot offset the leakage the engineer is notified and the train is automatically stopped if necessary. Thus, the systems are designed to be fail-safe in the event of excessive leakage. This commenter believes that FRA should recognize these types of designs and except them from the requirement contained in this paragraph.

FRA agrees that the electronic brake systems currently in use on some locomotives are designed to maintain equalizing reservoir pressure at a set limit. Because these systems are designed to offset equalizing reservoir leakage, the locomotive engineer would not experience any problem with the operation of the train's brakes if a minor leak occurs. However, if the leakage exceeds the ability of the system to maintain the pressure, a fault message would be displayed to the locomotive engineer and the train's brakes would be automatically applied, if necessary. Therefore, this section has been slightly modified from that proposed in the NPRM to allow locomotives that are equipped with these types of maintaining features to continue to operate with some leakage in the equalizing reservoir. However, this section makes clear that when such systems identify an equalizing reservoir leak, the railroad is to perform the repairs necessary to eliminate the leakage at the nearest forward location where such repairs can be made. Generally a leakage on these electronic braking systems will be discovered when maintenance personnel review the fault screen during routine inspections and tests. Therefore, if a locomotive is equipped with a braking system that has the ability to maintain equalizing reservoir pressure, with the automatic brake valve set in the freight position or direct release, an equalizing reservoir leak will generally not be required to be repaired until it is either identified by the inspection forces or until the locomotive engineer identifies the condition during the normal operation of the train.

In paragraph (e), FRA retains the proposed prohibition on the use of ''feed or regulating valve braking,'' in which reductions and increases in the brake pipe pressure are effected by manually adjusting the feed valve. ''Feed valve braking'' has been recognized by both the railroad industry and FRA as an unsafe practice. Most railroads already have some type of operating rule prohibiting this type of braking. No comments were received objecting to the inclusion of this prohibition in response to the NPRM.

In paragraph (f), FRA also retains the proposed prohibition on the use of the ''passenger'' position on the locomotive brake control stand on conventional freight trains when the trailing equipment is not designed for graduated brake release. The ''passenger'' position was intended only for use with equipment designed for graduated brake release. Therefore, use of the ''passenger'' position with other equipment can lead to potentially dangerous situations where undesired release of the brakes can easily occur due to the slightest movement of the automatic brake valve. In FRA's view, the only situation when the use of the passenger position might become necessary to safely control a train is when equalizing reservoir leakage occurs en route. If such a situation arises, this paragraph makes clear that the train may move only to the nearest forward location where the equalizing reservoir leakage can be corrected. No objections were received by FRA in response to the NPRM with regard to these requirements.

Paragraph (g) contains an existing requirement which was inadvertently excluded from the NPRM. This paragraph makes clear that engineers must know that the brakes on locomotives of which they are taking charge are in operative condition. This requirement is currently contained at § 232.10(l). Thus, FRA is not imposing a new burden by incorporating this requirement into the final rule. Furthermore, FRA does not intend to create a new inspection requirement by including this provision, but intends for it to be applied and enforced in the same manner as the existing requirement. If a locomotive engineer relieves another engineer, the condition of the brakes could be determined, based on a conversation or report from the engineer being relieved. The railroad may also elect to have mechanical forces inspect the locomotive for proper operation of the brakes and have the locomotive engineer accept the locomotives based on the mechanical department's inspection. However, a locomotive engineer may have to conduct a cursory inspection and perform a running test of the brake system to satisfy this requirement, if a prior inspection has not been performed.

Section 232.107 Air Source Requirements

This section contains requirements directed at ensuring that freight brake systems are devoid, to the maximum extent practical, of water and other contaminates which could conceivably deteriorate components of the brake system and, thus, negatively impact the ability of the brake system to function as intended. The general preamble section of this rule provides a detailed discussion as to why FRA proposed many of the items contained in this paragraph. *See* discussion contained in ''Overview of Comments and General FRA Conclusions'' portion of the preamble under the heading ''Air Source Requirements.'' Based on the work performed by and information gathered by the RSAC Working Group and based on FRA field experience, FRA continues to believe that requiring locomotives to be equipped with air dryers would provide minimal safety benefits and would impose an enormous and unwarranted cost burden on the railroads. Further, FRA continues to believe that simply requiring that yard air sources be equipped with air dryers may not necessarily effectuate the

desired results unless the air dryers are appropriately placed to sufficiently condition the air source. Many yard air sources are configured such that a single air compressor services several branch lines used to charge train air brake systems and, therefore, multiple air dryers may be required to eliminate the introduction of wet air into the brake system. FRA believes that, as with locomotives, requiring yard air sources to be equipped with air dryers would likely impose a significant and unnecessary cost burden on the railroads.

This section retains the basic requirements regarding yard air sources and cold weather operations that were proposed in the NPRM with minor modification based on the comments submitted in response to the proposal. Paragraph (a) retains the provisions requiring railroads to adopt and comply with a plan to monitor all yard air sources to ensure that the yard air sources operate as intended, are in proper condition, and do not introduce contaminants into the brake system of freight equipment. FRA intends to make clear that the inspections required under this paragraph are to be thorough inspections of the entire yard air source. This inspection would include all compressors, piping, hoses, valves, and any other component or part of the yard air source to ensure it is in proper condition and operates as intended.

Paragraph (a) modifies some of the proposed requirements related to the yard air source monitoring plans. FRA agrees with the comments provided by several labor representatives that the proposed requirements did not establish a frequency with which inspections of yard air sources should be conducted. In proposing the requirement, FRA hoped that various commenters would recommend frequencies for conducting these inspections. This did not occur. FRA agrees that a set frequency needs to be established which will ensure that yard air sources are inspected in a timely manner during various climatic conditions. Therefore, paragraph (a)(2)(i) requires that the monitoring plan developed by a railroad ensure that each yard air source be inspected at least twice each calendar year and that two of the inspections be no less than five months apart. FRA intends for this requirement to result in yard air sources being inspected each year during two different seasonal periods.

Paragraph (a)(2)(ii) clarifies that remedial action under the monitoring plans is required only on those yard air sources that are not operating as intended or that are found introducing contaminants into brake systems. Thus, the final rule removes the word ''potential'' from the proposed language as FRA agrees that the proposed language was unclear and may have been over-inclusive. The final rule also eliminates the proposed requirement for railroads to conduct a detailed assessment of the remedial actions taken. FRA agrees with the assertions of AAR that this proposed requirement is unnecessary because railroads will be conducting regular inspections of the yard air sources on which they have conducted repairs or taken other remedial action and will be able to determine if the repair were effective through those inspections. Paragraph (a)(3) retains the other proposed record keeping requirements related to yard air monitoring plans but clarifies that the records can be maintained either electronically or in writing. FRA continues to believe that these records are necessary to ensure that railroads are properly conducting the required inspections and are taking timely and appropriate remedial action when a problem air source is detected.

The final rule does not contain provisions requiring FRA approval of the yard air source monitoring plans prior to their implementation as suggested by some commenters. FRA does not have the personnel or resources to review and approve the plan of each railroad and does not believe such approval is necessary given the specific requirements contained in the final rule and the records that are required to be maintained. Although the final rule does not contain requirements regarding the use of air dryers on either locomotives or yard air sources, FRA advocates the use of air dryers when possible and agrees that they have proven effective in reducing the level of moisture introduced into the brake system. However, FRA believes that a railroad is in the best position to determine where these devices will provide the greatest benefit based on the railroad's operation. FRA notes its disagreement with AAR's contentions regarding both the time and the cost necessary to implement the required yard air source monitoring plans. FRA sees no reason why a railroad would need five years to implement a plan to inspect each of its yard air sources twice a year. These devices are used on a fairly regular, if not daily, basis and should not be that difficult to inspect. Consequently, FRA believes that railroads should easily be able to implement these monitoring plans by the three-year effective date provided in this final rule.

Paragraphs (b) and (d) contain additional measures to minimize the possibility of moisture being introduced into the trainline. Paragraph (b) of this section reiterates the proposed and current requirement contained at § 232.11(d), which requires that condensation be blown from the pipe or hose from which compressed air is taken prior to connecting the yard air line or motive power to the train. As an additional precaution, paragraph (d) of this section retains the proposed requirement that yard air reservoirs be equipped with an operable automatic drain system, or be manually drained at least once each day that the devices are used or more often when moisture is detected in the system.

Paragraph (c) generally retains the proposed ban on the use of chemicals in a train air brake system. However, FRA agrees with the position asserted by several commenters that the proposed prohibition of all chemicals may have been somewhat overbroad and contrary to FRA's actual intent. In proposing the prohibition FRA intended to eliminate the use of chemicals, such as alcohol, which are known to degrade the rubber of a train's brake system. FRA agrees that there may be chemicals which are currently available or which are in the process of being developed which do not cause the problems associated with the use of alcohol. In fact, FRA believes there are products currently available which do not degrade a brake system's rubber components. FRA believes that several railroads are currently testing or using these chemical alternatives. Therefore, FRA believes that there are alternatives to using alcohol which currently exist or can be developed which would provide railroads the ability to address the rare instances where trainlines become frozen. Consequently, this paragraph slightly modifies the prohibition on the use of chemicals by imposing the prohibition on chemicals that are known to degrade or harm brake system components, such as alcohol.

It should be noted that FRA recently published a final rule mandating the incorporation of two-way EOTs on a variety of freight trains, specifically those operating at speeds of 30 mph or greater or in heavy grade territories. *See* 62 FR 278. Two-way EOTs provide locomotive engineers with the capability of initiating an emergency brake application that commences at the rear of the train in the event of a blockage or separation in the train's brake pipe that would prevent the pneumatic transmission of the emergency brake application from the front of the train through the rest of the train. These devices consist of a front unit, located in the cab of the

controlling locomotive, and a rear unit, located in the rear of the train and attached to the brake pipe. Radio communication between the front and rear units is continually monitored and confirmed at regular intervals, and the rear unit is only activated when continuity of these radio transmissions is not maintained over a specified time interval. This discussion of two-way EOTs is particularly appropriate within the context of the air source requirements. In the unlikely event that compliance with the requirements contained in this section regarding dry air fails to sufficiently eliminate moisture from the trainline, and a restriction or obstruction in the form of ice develops as the result of freezing of this moisture during cold weather operations, the two-way EOT device becomes a first-order safety device and will initiate an emergency application of the brakes from the rear of train. As such, the vast majority of concerns associated with moisture in the trainline freezing during cold weather operations have been alleviated through the incorporation of this technology in most freight operations.

Paragraph (e) retains the proposed requirement that a railroad adopt and comply with detailed written operating procedures tailored to the equipment and territory of the railroad to promote safe train operations during cold weather situations. In 1990, the NTSB, in response to an accident which occurred in Helena, Montana, recommended that FRA amend the power brake regulations to require additional testing of air brake systems when operating in extreme cold, especially when operated in mountain grade territory. *See* NTSB Recommendation R–89–081 (February 12, 1990). In response to this recommendation and to various petitions for rulemaking requesting similar action, FRA in the 1994 NPRM proposed various requirements regarding cold weather operations, which included: use of two-way EOTs; prohibition on the use of alcohol in trainlines; air dryers on locomotives; and requirements for railroads to develop procedures for operating during cold weather and in mountain grade territories. As noted previously, a final rule regarding the use of two-way EOTs has been issued and is in effect. This final rule also prohibits the use of certain anti-freeze chemicals, contains other requirements to ensure that dry air is being added to brake systems, and retains the previously proposed requirement that railroads adopt and comply with operating requirements for cold weather and heavy-grade operations.

FRA recognizes that in the past there has been little support for mandating additional brake system testing during cold weather. FRA agrees that the development and use of welded pipe fittings, wide-lip hose couplings, and ferrule clamps have greatly reduced the effects of cold weather on the air brake system. However, FRA continues to believe that cold weather situations do involve added safety risks and need to be further addressed. FRA believes that requiring the development of written operating procedures will require railroads to go through the thought process necessary to analyze their operations during cold weather conditions in order to determine the inherent safety hazards involved and develop procedures to minimize those hazards. Due to the unique nature of each railroad and the difficulty in developing specific requirements that are applicable to all operations, FRA does not intend to mandate specific operating requirements at this time. However, FRA might consider mandating specific operating requirements that should be included in a railroad's cold weather operating practices if it is found that railroads do not develop sufficient requirements to address safe cold weather operations.

FRA recognizes that some railroads have already developed certain cold weather operating procedures which might be useful as models on other similarly situated railroads. For example, BNSF has unilaterally instituted a cold weather operating plan for certain trains at specific locations in Montana. This plan requires trains with greater than 100 tons per operative brake to be inspected or operated in a certain manner when temperatures fall below zero degrees. Part of the plan requires that after the performance of a 1,000-mile or initial terminal brake test on such trains, the brakes be reset and held for 30 minutes after which time the train is to be reinspected to ensure that 100 percent of the brakes remained applied. Brakes found not to have remained applied must be set out of the train or repaired. FRA believes that procedures such as these could greatly enhance the safety of the trains operated in cold weather conditions. FRA recognizes that there may be other types of operating or inspection criteria that could be implemented in extreme cold weather instead of, or in addition to, that noted above; such as, limits on the length or tonnage of such trains, limits on the use of yard air sources, or other enhanced inspection criteria. At this time, FRA continues to believe that railroads are in the best position to determine what procedures are best suited to their operations.

Section 232.109 Dynamic Brake Requirements

This section contains the operating requirements for trains equipped with dynamic brakes. Most, if not all, of the railroads participating in and commenting on this rulemaking have asserted that they do not consider dynamic brakes to be a safety device. However, these same commenters admit that they promote and encourage the use of dynamic brakes for purposes of fuel efficiency and to avoid wear to brake components. Due to this encouragement, dynamic brakes are relied on to control train speed and to provide assistance in controlling trains on heavy grades. Contrary to continued comments of several labor representatives, FRA does not feel that locomotives should be required to be equipped with dynamic brakes. FRA believes that the decision to equip a locomotive with dynamic brakes is mainly an economic one, best determined by each individual railroad. However, in order to prevent accidents and injuries that may result from an over-reliance on the dynamic brake, which may fail at any time, FRA believes that if the devices are available, engineers should be informed on their safe and proper use and be provided with information regarding the amount of dynamic braking power actually available on their respective trains. FRA continues to believe that by providing an engineer with as much information as possible on the status of the dynamic brakes on a train, a railroad better enables that engineer to operate the train in the safest and most efficient manner.

Paragraph (a) generally retains the proposed requirement that a locomotive engineer be informed of the operational status of the dynamic brakes on the locomotives the engineer will be required to operate. This paragraph makes clear that the information is to be provided to the locomotive engineer at a train's initial terminal and at other locations where a locomotive engineer first begins operation of a train. This paragraph slightly modifies the proposed method for providing this information to the locomotive engineer. The NPRM proposed that the locomotive engineer be provided the required information in writing. The intent of the proposed requirement to notify the locomotive engineer in writing as to the operational status of the dynamic brakes was to ensure that the engineer had timely information on

the condition of the locomotives so he or she could operate the train in the safest possible manner based upon that information. Thus, FRA tends to agree with the comments of several railroads and their representatives that the manner in which the information is provided to the engineer should not be a major concern provided the information is accurate and up-to-date. Therefore, this paragraph allows railroads to provide a locomotive engineer with the required information by any means they deem appropriate. However, this paragraph also makes clear that a written or electronic record of the information provided shall be maintained in the cab of the controlling locomotive. This will ensure that relief or other oncoming engineer will have the information provided to the previous operator of the train.

This paragraph also clarifies that the information is to be provided to the locomotive engineer at the train's initial terminal and at other locations where an engineer ''first begins operation'' of the train rather than where the engineer ''takes charge of the train.'' This clarification is in response to comments provided by certain labor representatives to prevent possible misinterpretation or abuse of the requirement since most railroads consider the conductor to be in charge of a train.

Paragraph (b) retains the proposed requirement to repair a locomotive with inoperative dynamic brakes within 30 days of its being found inoperative or at the locomotive's next periodic inspection, whichever occurs first. There are currently no requirements governing the maintenance and repair of dynamic brakes. Experience has shown that, since railroads do not consider dynamic brakes to be a critical safety item, repairs are typically effectuated when it is convenient and economical for the railroad, with little regard for timeliness. FRA believes that, as railroads have become increasingly dependent on the use of dynamic brakes as an integral part of their published safe train handling procedures, it is a reasonable expectation on behalf of locomotive engineers to have operable dynamic brakes on those locomotive units which are so equipped. Due to the industry's reliance on these braking systems, as noted in the discussion above, FRA continues to believe they should be repaired as soon as possible after being found inoperative. FRA agrees that there must be an appropriate balance between the operational considerations important to the locomotive engineer and the logistical and repair considerations that will be imposed on the railroads. FRA continues to believe that 30 days provides a railroad with sufficient time to get a locomotive to a location where the dynamic brakes can be repaired and allows for the reallocation of motive power when necessary so as to cause minimal disruption to a railroad's operation. Although certain commenters requested that the period allowed for repair be reduced to 15 days or less, FRA believes such a reduction is unwise as it might jeopardize a railroad's access to available motive power and could cause delay in the movement of freight, consequences that may create safety hazards themselves.

This paragraph also eliminates the use of the term ''ineffective dynamic brake'' and replaces it with the term ''inoperative dynamic brake.'' The term ''inoperative dynamic brake'' is defined in § 232.5 of the final rule to mean any dynamic brake which no longer provides its designed retarding force on the train, for whatever reason. FRA agrees with the comment of the AAR that the use and meaning of the term ''ineffective dynamic brake'' in the proposal was unclear and had the potential of creating misunderstandings. Consequently, for clarity this section uses only the term ''inoperative dynamic brake'' to describe a defective dynamic brake.

Paragraph (c) retains the proposed requirements related to the tagging of a locomotive found with inoperative dynamic brakes. FRA believes that the tags required by this paragraph are necessary to ensure the prompt and timely repair of locomotives found with defective dynamic brakes and also provide locomotive engineers and a railroad's ground forces with specific knowledge of the presence of such a locomotive. Contrary to the comments of some parties, FRA does not believe that the tagging provisions contained in this paragraph would require the development of new tags. This paragraph would allow the use of any type of tag provided it is placed in a conspicuous location on the cab of the locomotive and contains the required information.

Paragraph (d) contains a requirement that an electronic or written record of repairs made to a locomotive's dynamic brakes be maintained and retained for a period of 92 days. Although this requirement was not proposed in the NPRM, FRA believes these records fall within the scope of the notice and are necessary to ensure that repairs are conducted on a locomotive's dynamic brakes in a timely fashion. FRA also believes that such a record will provide a railroad with information regarding the operation of the dynamic brakes and will potentially permit railroads to identify a repeated problem with a locomotive's dynamic brakes to prevent recurrences of the problem and thus, increase the utilization of a locomotive's dynamic brakes.

The final rule continues to acknowledge that some railroads, primarily short lines, may own locomotives that are equipped with dynamic brakes but due to the physical terrain over which the railroad operates or the operating assignments of the particular locomotive, the railroad rarely, if ever, has the need to employ the dynamic braking capabilities of the individual locomotive. In these instances, the maintenance requirements discussed above become unnecessarily burdensome. Therefore, FRA continues to believe that relief is warranted in these situations provided a specified set of parameters is developed and adhered to that prevents direct and intentional circumvention of the proposed repair requirements. Therefore, paragraph (e) retains the proposed provision permitting a railroad to declare a locomotive's dynamic brakes ''deactivated'' if the following requirements are met: (i) The locomotive is clearly marked with the words ''dynamic brake deactivated'' in a conspicuous location in the cab of the locomotive; and (ii) the railroad has taken appropriate action to ensure that the deactivated locomotive is incapable of utilizing dynamic braking effort to retard or control train speed. It should be noted that the final rule eliminates the requirement to stencil the outside of a locomotive declared to have deactivated dynamic brakes. FRA agrees with the comments submitted by the AAR and other railroad representatives that defacing the exterior of the locomotive is unnecessary and would do little to inform the locomotive engineer of the deactivation of the dynamic brake. FRA believes that the requirements to notify the locomotive engineer of the operational status of the locomotives and to have the cab of the locomotive clearly marked that the locomotive's dynamic brakes are deactivated provide sufficient notice to the locomotive engineer as to the status of that locomotive.

This paragraph does not prescribe the specific manner in which a locomotive is to be deactivated, so long as the unit is not physically capable of employing its dynamic brakes to aid in train handling. Although FRA does not envision a significant number of instances where a locomotive which has been declared ''deactivated'' would need to be ''reactivated,'' FRA does

recognize that some railroads may need to reactivate the dynamic brakes in some circumstances, such as changes in a locomotive's operating environment or situations where a locomotive with previously ''deactivated'' dynamic brakes is purchased by another railroad. However, FRA intends to interpret the provision for ''*deactivating*'' a locomotive's dynamic brakes rather literally to minimize contentions that railroads are merely playing a cat and mouse game with the required maintenance interval to avoid repairing the units. Furthermore, FRA would expect the dynamic brakes on a locomotive to be fully functional at the time the locomotive is considered reactivated.

Paragraph (f) contains specific requirements related to the use of a locomotive with inoperative, deactivated, or no dynamic brakes as a controlling locomotive. These requirements are based on FRA's review of the comments submitted in response to FRA's request regarding the positioning of such locomotives contained in the NPRM. *See* 63 FR 48314. FRA tends to agree that there are no technical reasons why a locomotive with inoperative dynamic brakes cannot function as the controlling locomotive provided it can control the dynamic brakes on trailing units in the locomotive consist. However, FRA also agrees that a locomotive engineer loses the physical sensation of the operation of the dynamic brakes when the unit the engineer is riding loses dynamic brake capability because the physical sensation of operating dynamic brakes provides the engineer with at least some assurance that the dynamic brakes on some of the units in the consist are operating. Thus, this paragraph makes clear that locomotives with inoperative, deactivated, or no dynamic brakes have the capability of controlling the dynamic brakes on trailing units when operating as the controlling locomotive, and that such locomotives also have the capability of displaying to the locomotive engineer the deceleration rate of the train or the total train dynamic brake retarding force. FRA believes this requirement will ensure that locomotive engineers have at least some information as to the operation of the dynamic brakes in the locomotive consist they are controlling. FRA intends that the information required by this provision be provided by a device known as an ''accelerometer'', ''predictor'', or a similar type of device; or by a dynamic brake indicator capable of providing total train dynamic brake retarding force to the locomotive engineer. An ''accelerometer'' or ''predictor'' is a device currently used in the industry that indicates the predicted speed in miles per hour of the locomotive 60 seconds from the present, based on the computed acceleration or deceleration rate. This would provide the engineer with an indication of the retarding performance of the dynamic brakes and the train.

Paragraph (g) contains provisions requiring new locomotives to be equipped with some sort of dynamic brake indicator. In the NPRM, FRA sought information and comments regarding the feasibility of dynamic brake indicators which continually monitor the operation of dynamic brakes in a train consist. *See* 63 FR 48334. The NTSB noted that the NPRM failed to address its recommendation resulting from its investigation of the January 12, 1997, freight train derailment near Kelso, California, that all locomotives equipped with dynamic brakes be equipped with a device in the cab of the controlling locomotive to indicate real-time condition of the dynamic brakes on each trailing unit. *See* NTSB Recommendation R–98–6. Based on a review of the comments and information provided, FRA continues to believe that the technology does not currently exist to economically equip existing locomotives with dynamic brake indicators. However, FRA does believe that the technology exists or is sufficiently developed to provide new locomotives with the ability to test the electrical integrity of the dynamic brakes at rest and to display the total train dynamic brake retarding force at various speed increments in the cab of the controlling locomotive. Consequently, this paragraph requires new locomotives to be equipped with such indicators. FRA recognizes that the industry will require a little time to incorporate the existing and developing technology into new locomotives. Therefore, the requirements contained in this paragraph will apply only to locomotives ordered one and one-half years after the issuance of this final rule and to locomotives placed in service for the first time three years after the effective date of the final rule.

Paragraph (h) contains requirements for equipping rebuilt locomotives with devices to provide locomotive engineers with additional information on the operation of dynamic brakes on other locomotives in the train consist. This paragraph recognizes that not all locomotives being rebuilt are designed, or have the capability of being redesigned to have the capability to display the total train dynamic brake retarding force in the cab of the controlling locomotive. Thus, this paragraph allows rebuilt locomotives to be designed to display the train deceleration rate (i.e., to be equipped with an accelerometer, predictor, or similar device as described above) in lieu of being equipped with the dynamic brake indicator required on new locomotives. FRA believes that the information provided by these indicators is extremely useful to an engineer, will provide the engineer with ready access to real-time information on the operation of the dynamic brakes in a locomotive consist, and will permit the engineer to control and operate trains in the safest manner possible.

Paragraph (i) acknowledges that the information provided to a locomotive engineer by a dynamic brake indicator would satisfy the need to provide the locomotive engineer with information regarding the operational status of the dynamic brakes when the engineer first begins operation of a train. As the indicators would provide real-time information to the engineer on the operation of the dynamic brakes in the train consist, a separate set of information received by the engineer when beginning operation would be unnecessary. Therefore, this paragraph carves out an exception to the requirement to inform locomotive engineers of the status of the dynamic brakes for situations when all of the locomotives in the lead consist are equipped with dynamic brake indicators of the type required for new locomotives. FRA believes that this exception makes sense from a practical perspective and also provides some incentive for railroads to equip existing equipment with such indicators where possible when the technology for doing so becomes economically feasible. It should be noted that there is no requirement that the dynamic brake status of distributed power units be provided in order to eliminate the need to provide dynamic brake information to the engineer. FRA agrees that the technology for transmitting that information to the engineer is not currently available in a cost effective and reliable manner.

Paragraphs (j) and (k) retain the proposed provisions requiring railroads to adopt and comply with written operating rules governing the use of dynamic brakes and to incorporate training on those operating rules into the locomotive engineer certification program pursuant to 49 CFR part 240. Contrary to the assertions of some commenters FRA does not believe these requirements are unclear. FRA intends for each railroad to develop appropriate operating rules regarding train handling

procedures when utilizing dynamic brakes that cover the equipment and territory operated by the railroad. Many railroads already have these procedures in place and already provide training to their employees which adequately cover the requirements. FRA continues to believe that training on proper train handling procedures is essential to ensuring that locomotive engineers can properly handle their trains with or without dynamic brakes and in the event that these brake systems fail while the train is being operated. FRA also disagrees that it must specify the knowledge, skill, and ability criteria that a railroad must adopt into its training program. FRA believes that each railroad is in the best position to determine what these criteria should be and what training is necessary to provide that knowledge, skill, and ability to its employees.

FRA continues to believe that the establishment of these comprehensive operating rules and their incorporation into a railroad's training plans is the most effective means by which to minimize the possibility of future accidents caused by excessive reliance on dynamic brakes by a train crew as a method of controlling the speed of a train in its descent through a difficult grade, as was the case in the San Bernardino incident. FRA views as unfortunate the number of existing train handling and power brake instructions issued by freight railroads that emphasize the use of dynamic brakes but do not include prominent warnings that such systems may not be relied upon to provide the margin of safety necessary to stop short of obstructions and control points or to avoid overspeed conditions. FRA believes that such instructions, while not misleading to seasoned locomotive engineers, could lead to an excessive reliance on these systems. Given the ever-increasing weight and length of freight trains, and the severe grades that they are often required to negotiate en route, the need for locomotive engineers who are thoroughly trained and knowledgeable in all aspects of train handling is paramount for continued safety in the rail industry.

Paragraph (j)(2) requires that the operating rules developed by railroads under this section include a ''miles-per-hour-overspeed'' requirement that requires trains to be immediately stopped if they exceed the maximum authorized speed by more than 5 mph when descending grades of one percent or greater. The NTSB recommended that FRA adopt such a requirement as a result of its investigation of the freight train derailment near Kelso, California noted above. *See* NTSB Recommendation R–98–4. FRA agrees with NTSB's recommendation and also agrees with the comments provided by both the NTSB and the CAPUC that this requirement accomplishes a critical safety function and reduces the potential for runaways because it establishes a clear rule for stopping a train and removes any discretion from the operator to continue operation of a train. This paragraph makes clear that the five-mph limitation is a good base limitation which should be reduced by a railroad if it so desires or if a reduction is indicated by validated research. The five-mph limitation may only be increased with FRA approval. FRA notes that the operating rules of virtually every Class I railroad already include a five-mph-overspeed provision similar to that contained in this paragraph. Consequently, FRA's inclusion of the requirement in this final rule should impose little or no burden on the operations of most railroads.

Section 232.111 Train Information Handling

This section retains the proposed requirements regarding the handling of train information, with slight modification in response to the comments submitted by interested parties. The purpose of the train-information handling requirements contained in this section is to ensure that a train crew is provided accurate information on the condition of a train's brake system and other factors that affect the performance of a train's brake system when the crew assumes responsibility for a train. This section contains a list of the specific information railroads are to furnish train crew members about the train and the train's brake system at the time they take charge of the train. FRA continues to believe that train crews need this information in order to avoid potentially dangerous train handling situations and to be able to comply with various Federal safety standards. Many railroads already provide their train crews with most of the information required in this section or have a process set up that can transmit such information; thus, the impact of these requirements should be relatively minor.

Paragraph (a) has been slightly modified to clarify that the information required to be provided in this section may be provided by any means determined appropriate by the railroad, provided, that a record of the information is maintained in the cab of the controlling locomotive. This requirement does not constitute a change from what was proposed in the NPRM but is merely a clarification to resolve an apparent misunderstanding of some parties. In the NPRM, FRA noted that it intended to leave the method in which the required information would be conveyed to train crews to the discretion of each railroad. FRA believed that each individual railroad is in the best position to determine the method in which to dispense the required information based on the individual characteristics of its operations. However, FRA noted that the means for conveying the required information would have to be part of the written operating requirements, and railroads would be required to follow their own requirements.

Paragraphs (b)(1) and (b)(2) have also been slightly modified, for purpose of clarity, from what was proposed in the NPRM. Paragraph (b)(1) clarifies that train crews are to be provided the required information when ''taking charge of a train'' rather than when ''coming on duty'' as was proposed. FRA agrees with the comments of the AAR that the modified language better clarifies when the required information is to be provided. Paragraph (b)(2) has been modified to clarify that the weight and length information to be provided should be based on the best information available to the railroad. FRA agrees with the comments of the AAR and several railroads that it is impossible to provide the exact weight of each car in a train because the facilities to weigh each car do not exist. FRA also agrees that it would be cost prohibitive and unrealistic to require that each car be weighed prior to being moved in a train. Consequently, the final rule makes clear that the weight of the train can be estimated based on the best information available to the railroad. It should be noted that FRA has eliminated the proposed requirement that train crews be provided a record of train configuration changes since performance of the last Class I brake test. FRA agrees that such information is not necessary based on the other information that is required to be provided and has the potential of creating information overload for the train crews.

Subpart C—Inspection and Testing Requirements

Section 232.201 Scope

This section contains the general statement regarding the scope of this subpart, indicating that it contains the inspection and testing requirements for brake systems used in freight and other non-passenger trains. This section also

indicates that this subpart contains the general training requirements for railroad and contract personnel who perform the inspections and tests required by this part.

Section 232.203 Training Requirements

This section contains the general training requirements for railroad employees and contractor employees that are used to perform the inspections required by this part. (See ''Overview of Comments and General FRA Conclusions'' portion of the preamble under the heading ''V. Training and Qualifications of Personnel'' for a detailed discussion pertaining to the provisions contained in this section.) This section retains the basic structure and concepts regarding the training and qualification of individuals performing inspections and tests required by this part that were proposed in the NPRM. The training requirements contained in this final rule have been slightly revised from those proposed in the NPRM in order to clarify FRA's intent, to recognize existing training, and to reduce some of the burden that may have been inadvertently created by the proposed requirements.

Paragraph (a) requires that each railroad and each contractor adopt and comply with a training, qualification, and designation program for railroad employees and contractor employees who perform air brake system tests, inspections and maintenance. This paragraph modifies the proposed provision that would have required a railroad to provide training to the personnel of a contractor whom the railroad uses to perform the various tasks required by the rule. This paragraph makes clear that the contractor is responsible for providing appropriate training to its employees and maintaining the required records and information. FRA agrees with the comments submitted on behalf of numerous railroads that asserted that railroads should not bear the burden of training the employees of a contractor. However, FRA notes that this change does not relieve the railroad from potential civil penalties for, e.g., failure to perform a proper Class I brake test, if the employees of a contractor are found not to be qualified to perform the task for which they are assigned responsibility. Both the railroad and the contractor would remain liable for potential civil penalties if the employees used to perform a particular task were not trained and qualified in accordance with the training requirements contained in this final rule.

For purposes of this section, a ''contractor'' is defined as a person under contract with a railroad or a car owner or an employee of a person under contract with a railroad or a car owner. FRA intends for the training and qualification requirements to apply not only to railroad personnel but also to contract personnel that are responsible for performing brake system inspections, maintenance, or tests required by this part. FRA believes that railroads and contractors are in the best position to determine the precise method of training that is required for the personnel they use to conduct required brake system inspections, tests, and maintenance. Although FRA provides railroads and contractors with broad discretion to develop training programs specifically tailored to their operations and personnel, FRA will expect railroads and contractors to fully comply with the training and qualification plans they adopt. A critical component of this training will be making employees aware of specific Federal requirements that govern their work. Currently, many railroad training programs fail to distinguish Federal requirements from company policy.

Paragraph (b) contains general requirements or elements which must be part of any training and qualification plan adopted by a railroad or contractor. FRA believes that the elements contained in this section are specific enough to ensure high quality training and broad enough to permit a railroad or contractor to adopt a training plan that is best suited to its particular operation. This paragraph retains the proposed requirement that the plan identify the tasks related to the inspection, testing, and maintenance of the brake system required to be performed by the railroad or contractor and identify the skills and knowledge necessary to perform each task. FRA believes that most railroads already have a training plan and would merely need to revise it to reflect changes made to existing requirements by this final rule. The final rule eliminates the proposed requirement to develop written procedures for performing each task identified. Although FRA believes that each railroad or contractor should and will develop such procedures, FRA does not believe it is necessary to require their development as FRA believes they will either be developed in the required training curricula or are sufficiently detailed in the regulation itself.

This paragraph also clarifies that the required training is intended to provide employees with the skills and knowledge necessary to perform the tasks required by this final rule. FRA does not believe it is necessary to train an employee on every different type of equipment that a railroad operates or on each and every task an employees will be required to perform. FRA's intent when issuing the NPRM was to ensure that the training received by an employee provides that individual with the knowledge and skills needed to perform the tasks he or she is assigned on the various types of brake systems on the equipment the railroad operates. Therefore, this paragraph clarifies this intent by specifically stating that the training curriculum, the examinations, and the ''hands-on'' capability should address the skills and knowledge needed to perform the various required tasks rather than focusing strictly on the tasks themselves or on the specific types of equipment operated by the railroad. However, FRA does intend for the training developed by the railroad or contractor to address the various types of brake systems the employee will be required to inspect, test, or maintain. For example, if an employee were trained on how to perform a Class I brake test and demonstrated hands-on capability to perform that task, FRA would not expect the employee to demonstrate hands-on capability to perform a Class IA or Class II brake test since the components of a Class I brake test cover these other inspections. However, FRA would expect the employee to receive classroom training on when these other inspections are required and the tasks that are involved in each.

This paragraph also clarifies that the training that an employee is required to receive need only address the specific skills and knowledge related to the tasks that the person will be required to perform under this part. Thus, a railroad or contractor may tailor its training programs to the needs of each of its employees based on the tasks that each of its employees will be required to perform. FRA tends to agree with several commenters that there is no reason for an individual who performs strictly brake inspections and tests to be as highly trained as a carman since carmen perform many other duties related to the maintenance and repair of equipment in addition to brake inspections.

This paragraph also clarifies that previous training and testing received by an employee may be considered by the railroad. FRA did not intend to require the complete retraining of every employee performing a task required in this final rule. When proposing the training requirements, FRA intended for railroads to incorporate existing training

regimens and curricula into the proposed training programs. In order to clarify this intent, this paragraph permits railroads and contractors to incorporate an already existing training program, such as an apprenticeship program, and contains a specific provision which permits railroads and contractors to consider previous training and testing received by an employee when determining whether an employee is qualified to perform a particular task. Thus, railroads and contractors would most likely not need to provide much additional training, except training specifically addressing the new requirements contained in this part and possibly refresher training, to its carmen forces that have completed an apprentice program for their craft. However, the final rule also makes clear that any previous training or testing considered by a railroad or contractor must be documented as required in the final rule. Thus, previous training or testing which has not been properly documented cannot be considered. The final rule also makes clear that employees must be trained on the specific regulatory requirements contained in this final rule related to the tasks that the employee will be required to perform. Therefore, all employees will require at least some training which covers the specific requirements detailed in this final rule.

This paragraph retains the proposed requirements that any program developed must include experiential or ''hands-on'' training as well as classroom instruction. FRA believes that classroom training by itself is not sufficient to ensure that an individual has retained or grasped the concepts and duties explained in a classroom setting. In order to adequately ensure that an individual actually understands the training provided in the classroom, some sort of ''hands-on'' capability must be demonstrated. FRA believes that the ''hands-on'' portion of the training program would be an ideal place for a railroad to fully involve its labor force in the training process. Appropriately trained and skilled employees would be perfectly suited to provide much of the ''hands-on'' training envisioned by FRA. Consequently, FRA strongly suggests that railroads work in partnership with their employees to develop a training program which utilizes the knowledge, skills, and experience of the employees to the greatest extent possible.

This paragraph also retains, with modification for clarity, the proposed requirement that employees pass either a written or oral examination and demonstrate ''hands-on'' capability. This paragraph clarifies that the tests and demonstration of ''hands-on'' capability cover the skills and knowledge the employee will need to possess in order to perform the tasks required by this part that the employee will be responsible for performing rather than focusing strictly on the tasks themselves or on the specific types of equipment operated by the railroad. However, FRA does intend for the testing and ''hands-on'' demonstration to cover the various types of brake systems the employee will be required to inspect, test, or maintain. FRA continues to believe that in order for a person to be adequately trained to perform a task, the individual must not only possess the knowledge of what is required to be performed but also must possess the capability of applying that knowledge.

This paragraph also retains the proposed requirement regarding the performance of periodic refresher training and testing. The final rule retains the requirement that refresher training be provided at least once every three years and that it include both classroom and experiential ''hands-on'' training and testing. FRA continues to believe that periodic refresher training is essential to ensuring the continued ability of an employee to perform a particular task. FRA does not intend for such training to be as lengthy or as formal as the initial training originally provided, but believes that the training should reemphasize key elements of various tasks and focus on items or tasks that have been identified as being problematic or of poor quality by the railroad, contractor, or its employees through the periodic assessment of the training program. This paragraph makes clear that a railroad or contractor may use efficiency testing to meet the hands-on portion of the required refresher training provided such testing is properly documented and covers the necessary tasks to ensure retention of the knowledge and skill required to perform the employee's duties required by this part. FRA agrees that such testing provides the necessary assurances that the individual continues to have the knowledge and skills necessary to perform the task for which the employee is being tested.

This paragraph contains a provision that was not specifically included in the NPRM but which was intended by FRA to be covered by the established training programs. This paragraph requires that new brake systems be added to training programs prior to their introduction into revenue service. Several labor representatives recommended that this provision be explicitly added to the training provisions, and FRA believes this requirement is only logical and makes sense. FRA believes that, prior to the introduction of any new brake system, the employees responsible for inspecting and maintaining the equipment need to be specifically trained on the systems in order to adequately perform their required tasks.

This paragraph also retains the proposed requirement that supervisors exercise oversight to ensure that all identified tasks are performed in accordance with the railroad's procedures and the specific Federal regulatory requirements contained in this part. Although the final rule also does not specifically address the training that must be provided to supervisors as suggested by some commenters, FRA believes that supervisors are sufficiently covered by the requirements contained in this section. FRA believes that in order for a supervisor to properly exercise oversight of an employee's work, the supervisor must be trained and qualified to perform the tasks for which they have oversight responsibilities.

Paragraph (c) requires each railroad that operates trains required to be equipped with two-way EOTs and each contractor that maintains such devices adopt and comply with a training program which specifically addresses the testing, operation, and maintenance of the devices. The final rule requiring the use of two-way EOTs became effective on July 1, 1997. Since that time, FRA has discovered numerous operating and mechanical employees who do not fully understand when the devices are required or how the inspection and testing of the devices are to be accomplished. Furthermore, FRA believes that it is vital for those employees responsible for the use of the devices (e.g. engineers and conductors) to be intimately familiar with the use and operation of the devices to ensure that the full safety potential of the devices is utilized and available. Consequently, FRA believes that adequate training must be provided to those employees responsible for the inspection, testing, operation and use of two-way EOTs.

Paragraph (d) requires railroads that operate trains under conditions that require their employees to set retaining valves to develop training programs which specifically address the use of retainers and provide such training to those employees responsible for using or setting retainers. This provision has been added in response to an NTSB recommendation which FRA supports. *See* NTSB Recommendation R–98–7. The NTSB specifically suggested that an explicit requirement to provide this

training be contained in the final rule. The NTSB had previously recommended such a requirement in early 1998 based on its investigation of the 1997 derailment of a freight train near Kelso, California. Many railroads are currently providing such training based on that recommendation and FRA believes that a specific requirement to provide such training will ensure that all railroads that require their employees to set retainers adequately train their employees responsible for performing the task on the use of retainers.

Paragraph (e) retains the record keeping requirements proposed in the NPRM with slight modification for consistency with the changes noted above regarding the application of the skills and knowledge necessary to perform a particular task. FRA continues to believe that the record keeping and designation requirements contained in this final rule are the cornerstone of the training requirements. Contrary to the views of some commenters, FRA believes that something more than mere lists of qualified employees is needed. Because the rule allows each railroad and contractor the flexibility to develop a training program that best fits its operation and does not impose specific curriculum or experience requirements, FRA continues to believe it is vital for railroads and contractors to maintain detailed records on the training they do provide. Such documentation will allow FRA to judge the effectiveness of the training provided and will provide FRA with the ability to independently assess whether the training provided to a specific individual adequately addresses the skills and knowledge required to perform the tasks that the person is deemed qualified to perform. Moreover, requiring these records will deter railroads and contractors from circumventing the training requirements and discourage them from attempting to utilize insufficiently trained personnel to perform the inspections and tests required by this rule.

This paragraph makes clear that the required records may be maintained either electronically or on paper. Many railroads currently maintain their training records in an electronic format, and FRA sees no reason not to permit such a practice if the information can be provided to FRA in a timely manner upon request. The proposed provision requiring the railroad's chief mechanical or chief operating officer to sign a statement regarding each employee's qualifications has been modified in the final rule to merely require identification of the person or persons making the determination that the employee has completed the necessary training. This modification will permit the information to be maintained electronically and will still provide the accountability which FRA intended by the provision in the NPRM. FRA believes it is absolutely essential that those individuals making the determinations regarding an employee's qualification be identified in order to ensure the integrity of the training programs developed and to prevent potential abuses by a railroad or contractor.

FRA also objects to the portrayal by some commenters that the requirement to maintain training records is overly burdensome. Virtually all of the items required to be recorded are currently maintained by most railroads in some fashion or another. Contrary to the concerns raised by some commenters, the rule does not require that the contents of each training program be maintained in each employee's file. Railroads are free to develop whatever type of cross-referencing system they desire, provided the contents of the training program are maintained in some fashion and can be readily retrieved. Furthermore, railroads currently maintain lists of individuals they deem to be qualified persons, and the companies inform those individuals as to their status to perform particular tasks. FRA believes this is a good practice and is necessary to ensure that individual employees do not attempt to perform, or are not asked to perform, tasks for which they have not been trained.

Paragraph (e) requires that each railroad or contractor adopt and comply with a plan to periodically assess the effectiveness of its training program. This paragraph modifies the proposed requirement that railroads develop an internal audit process to evaluate the effectiveness of their training. Although FRA agrees that a formal audit process may not be necessary, FRA continues to believe that railroads and contractors should periodically assess the effectiveness of their training programs. However, rather than require a formal internal audit, FRA believes that periodic assessments may be conducted through a number of different means and each railroad or contractor may have a need to conduct the assessment in a different manner. This paragraph requires that a railroad or contractor institute a plan to periodically assess its training program and, as suggested by some commenters, the paragraph permits the use of efficiency tests or periodic review of employee performance as methods for conducting such review. FRA agrees that many railroads, due to their small size, are capable of assessing the quality of the training their employees receive by conducting periodic supervisory spot checks or efficiency tests of their employees' performance. However, FRA continues to believe that on larger railroads the periodic assessment of a training program should involve all segments of the workforce involved in the training. FRA believes it is vital that labor be intrinsically involved in the assessment process, from beginning to end. For example, evaluation of training techniques might best be approached through a ''team'' method, where several observers, including labor representatives, periodically evaluate course or ''hands-on'' training content and presentation.

Section 232.205 Class I Brake Test-Initial Terminal Inspection

This section describes the circumstances that would mandate the performance of a Class I brake test and outlines the tasks that must be performed when performing this inspection. Most of the provisions contained in this section are currently contained in § 232.12(a) and (c)–(h) or were proposed in the 1998 NPRM in order to clarify existing requirements, to eliminate potential abuses, and to standardize certain provisions. Basically a Class I brake test is intended to be the functional equivalent to what is currently referred to as an ''initial terminal brake inspection.''

Paragraph (a) identifies those trains that are required to receive a Class I brake test prior to movement from a location. The provisions contained in this paragraph are virtually identical to those proposed in the NPRM, with slight modification for clarity. Paragraph (a)(1) requires that a train receive a Class I brake test at the location where it is originally assembled. It should be noted that the final rule eliminates the term ''point of origin'' proposed in the NPRM. FRA agrees that the proposed definition of this term was duplicative of the term ''initial terminal'' and merely created potential misunderstandings. Moreover, FRA agrees that the problems attempted to be addressed by the use of this term are sufficiently addressed by the various inspections required in this final rule when cars are added to a train.

Paragraph (a)(2) requires the performance of a Class I brake test when the train consist is changed other than by adding or removing a solid block of cars. Currently, there appears to be some confusion over what constitutes a ''solid block of cars.'' In order to clarify the

issue, FRA proposed a definition of ''solid block of cars'' in the NPRM. In response to numerous comments regarding the proposed definition and to further clarify the issue, FRA has modified the definition in this final rule and referenced that definition in this paragraph. Although FRA believes that the definition it proposed is consistent with current interpretations and enforcement of the requirement, FRA agrees with some of the commenters that the proposed definition may have been too narrow and did not directly address FRA's primary concern, the block of cars itself. FRA's primary concern is the condition of the block of cars being added to the train, especially when the block of cars is made up of cars from more than one train. Thus, the final rule will permit a solid block of cars to be added to a train without triggering a requirement to perform a Class I brake test on the entire train. However, depending on the make-up of that block of cars, certain inspections will have to be performed on that block of cars at the location where it is added to the train.

FRA believes that limits have to be placed on the number of blocks of cars being added to a train in order to ensure that cars are being inspected in a timely manner and in accordance with the intent of the regulations. Some commenters suggest that a block of cars should be permitted to be added to a train with no inspection other than a continuity test regardless of the number of different trains the cars making up the block came from provided all the cars received a Class I brake test at their point of origin. Other commenters suggest that any number of blocks of cars should be permitted to be added to a train at a single location. FRA believes that to accept either of these positions would be tantamount to eliminating initial terminal and intermediate inspections and would drastically reduce the safety of freight trains being operated across the country. In FRA's view, both of the positions noted above are merely means to circumvent inspections and are akin to a practice known as ''block swapping'' in the mechanical inspection context, a practice that FRA does not permit. In FRA's opinion, the authority to add multiple blocks of cars to a train at one location or add a single block of cars to a train that is composed of cars from numerous different trains without inspecting the cars in those blocks, would essentially allow railroads to assemble new trains without performing any direct inspection of any of the cars in the train. Furthermore, if cars are permitted to be moved in and out of a train at will, determining when and where a Class IA brake test must be performed on the train will be impossible.

This paragraph requires the performance of a Class I brake test at locations where more than one ''solid block of cars'' is added to or removed from a train. It should be noted that the final rule permits both the addition and the removal of a ''solid block of cars'' at a location without requiring the performance of a Class I brake test on the entire train. Although this practice is not permitted under the existing regulations, FRA believes that the inspection requirements contained in this final rule ensure the safety of cars being added and removed in this fashion. This paragraph also contains an additional caveat that will permit the removal of defective equipment at locations where other cars are added or removed without triggering the requirement to perform a Class I brake test on the entire train. FRA currently permits this practice, and it is consistent with the requirements aimed at having defective equipment repaired as quickly as possible.

Paragraph (a)(3) incorporates FRA's longstanding administrative interpretation which permits trains to remain disconnected from a source of compressed air (''off air'') for a short length of time without having to be retested. Currently, FRA permits trains to remain ''off air'' only for a period of approximately two hours before an initial terminal brake inspection must be performed. This paragraph retains the proposed extension of the permissible time ''off air'' to four hours. A detailed discussion regarding FRA's retention of the proposed extension of the permissible time cars may be left ''off-air'' is contained in the preceding ''Overview of Comments and General FRA Conclusions'' portion of the preamble under the heading ''II. C. Charging of Air Brake System.''

Paragraph (a)(4) retains the proposed requirement that unit or cycle trains receive a Class I brake test every 3,000 miles. The final rule has been slightly modified from the provision contained in the NPRM to clarify that this requirement applies to unit or cycle trains. FRA has also added a definition of ''unit train'' and ''cycle train'' to the final rule in order to clarify the applicability of the requirement. Historically, these trains operate for extended periods of time with only a series of brake inspections similar to Class IA brake inspections. FRA believes that the proposed 3,000-mile limitation is appropriate as it represents the approximate distance that a train would cover when traveling from coast to coast. In addition, the 3,000-mile requirement is consistent with the interval for performing Class IA brake tests and would equate to every third inspection on these trains being a Class I brake test rather than a Class IA brake test. Furthermore, AAR does not seek a moderate extension of a couple hundred miles so a few trains could complete their cycle, but seeks to extend the distance to more than 4,500 miles in many instances. FRA is not willing to modify the proposed requirement to that extent and believes that a 3,000-mile interval for these types of trains provides sufficient flexibility to the railroads to perform periodic Class I brake tests on these train in a cost-effective manner.

Paragraph (a)(5) retains the proposed provisions for when trains received in interchange must receive a Class I brake test. These are similar to what is currently contained in § 232.12(a)(1)(iii); however, this paragraph retains two proposed provisions that are not contained in the existing regulations. The final rule will permit trains received in interchange to have a previously tested solid block of cars added to the train without requiring the performance of a Class I brake test. Currently, the addition of these types of cars to a train received in interchange would require the performance of an initial terminal inspection. As long as the added block of cars has been previously tested, FRA sees no safety hazard in permitting the cars to be added to a train at an interchange location. Furthermore, the final rule will permit a train that is received in interchange, and that will travel no more than 20 miles from the interchange location, to have its consist changed other than as provided in paragraph (a)(5) without being required to receive a Class I brake test; provided that, any cars added to the consist at the interchange location receive at least a Class II brake test pursuant to § 232.209. Historically, FRA has not had a problem with these shorter distance trains and believes that a Class II brake test on those cars added to the train is sufficient to ensure the safety of these operations.

Paragraph (b) details the required tasks comprising a Class I brake test. A proper Class I brake test ensures that a train is in proper working condition and is capable of traveling to its destination with minimal problems en route. The final rule retains virtually all of the provisions proposed in the NPRM regarding the specific tasks that are to be part of the Class I brake test, which include most of the tasks currently

required by § 232.12(c)-(h) for an initial terminal brake test, with some modification in the interest of standardization and clarity.

The final rule retains a standardized brake-pipe reduction of 20 psi for virtually all brake inspections and tests as was proposed in the 1994 and 1998 NPRMs. FRA agrees with both labor and management commenters that a standard brake-pipe reduction will simplify train brake tests and will make it easier to train workers. The 20-psi standardized reduction was suggested by both labor and management representatives.

The brake-pipe leakage test will continue to be a valid method of qualifying brake systems. However, the final rule retains the air flow method of testing the condition of the brake pipe as an acceptable alternate to the brake-pipe leakage test. The air flow method (AFM) would be an alternative only for trains having a lead locomotive equipped with a 26-L brake valve or equivalent and outfitted with an EOT device. The maximum allowable flow would be 60 CFM. The AFM of qualifying train air brake systems has been allowed in Canada as an alternative to the leakage test since 1984. In addition, several railroads in the United States have been using the AFM since 1989 when FRA granted the AAR's petition for a waiver of compliance to permit the AFM as an alternative to the leakage test. FRA recognizes the concerns of several labor organization commenters opposing the adoption of the AFM; however, FRA believes these commenters' apprehension is based on their unfamiliarity with the method. As FRA pointed out in the ANPRM, the 1994 NPRM, and the 1998 NPRM, the AFM is a much more comprehensive test than the leakage test. *See* 57 FR 62551, 59 FR 47682–47683, 63 FR 48305–06. The AFM tests the entire brake system just as it is used, with the pressure-maintaining feature cut in. FRA believes the AFM is an effective and reliable alternative method of qualifying train brakes. In the 1998 NPRM, FRA expressed some concern regarding the use of the AFM on short trains. However, based on consideration of the comments received and FRA's experiences in observing the use of the AFM, FRA agrees that the AFM should be permitted as an alternative on any train provided the 15 psi gradient is maintained on the train.

The brake-pipe gradient of 15 psi has been retained for both the leakage and air flow method of train brake testing; however, the minimum rear-car pressure has been increased to at least 75 psi, which will require a locomotive brake-pipe pressure of at least 90 psi. FRA feels that the added margin of braking power justifies the increase in pressure. The final rule modifies the language used in the proposed provisions related to the air pressure at which the brake tests are to be conducted based on comments submitted by the NTSB. The NTSB noted that the language used by FRA in the NPRM to describe the air pressure settings for conducting the required brake tests would permit some road trains to be tested at a lower pressure than that at which the train would be operated. The NTSB contends that although most road freight trains operate at 90 psi, some road freight trains are operated at 100 psi and the proposal would permit them to be tested at 90 psi. FRA agrees with NTSB's suggestion that a train's brake system should be tested at the pressure at which the train will operate and has modified the language of the final rule accordingly. Consequently, the final rule requires that the brake system be charged to the pressure at which the train will be operated and that the rear car pressure be within 15 psi of that pressure and not less than 75 psi when conducting the required brake tests and inspections.

Based on FRA's experience over the last several years and based on numerous comments received by FRA verifying the high reliability of the rear-car pressure transducers used in reporting brake-pipe pressure by an end-of-train (EOT) device, FRA now feels comfortable and justified in allowing the use of EOT devices in establishing the rear car pressure for Class I brake tests. FRA currently has requirements in place for the inspection and testing of EOT devices at the time of installation, which have been incorporated into subpart E of this proposal. However, in using an EOT to verify rear car pressure during a Class I brake test, the reading of the rear car air pressure is only permitted from the controlling or hauling locomotive of the train. Under no circumstances may train air brake pressure be read from a remote highway vehicle, another locomotive not attached to the train, or at any other location such as a remote unit installed in an office or shop.

Paragraph (b)(2) retains the proposed language regarding the duties of individuals performing brake inspections contained in this final rule. The language in this paragraph is reiterated in the final rule provisions on both the Class IA and Class II brake tests in order to ensure the proper performance of brake inspections. Contrary to the assertions of some commenters, FRA believes that the proposed provisions sufficiently detailed how the various inspections were to be performed while providing flexibility for railroads to conduct the inspections in a manner most conducive to their operations. The methods of inspection proposed in the 1998 NPRM incorporated current practices and technical guidance previously issued by FRA.

Over the last few years there has been extensive debate concerning what constitutes a proper train air brake test under the current provisions contained in part 232, particularly relating to the positioning of the person performing the brake inspection. In early 1997, FRA issued a technical bulletin to its field inspectors in an attempt to clarify what must be done in order to properly perform a brake test. This technical bulletin stated that inspectors must position themselves in such a manner so as to be able to observe all of the movable parts of the brake system on each car. At a minimum, this requires that the inspector observe both sides of the equipment sometime during the inspection process. FRA continues to believe that both sides of the equipment must be observed sometime after the occurrence of activities that have the likelihood of compromising the integrity of the brake components of the equipment, such as: hump switching; multiple switching; loading; or unloading. FRA also agrees with the comments submitted by several railroad representatives that if one side of the equipment is inspected to ensure the proper attachment and condition of brake components and the proper condition of brake shoes on that side and the application of the brakes is observed from the other side of the equipment, then based on the design of brake systems today it can be safely assumed that in virtually every case an application of the brakes is occurring on the other side of the equipment. Consequently, FRA would like to again make clear that both sides of the equipment do not necessarily have to be inspected while the brakes are applied if an adequate inspection of the brake components was conducted on both sides of the equipment sometime during the inspection process. However, FRA also intends to make clear that the piston travel on each car must be inspected while the brakes are applied; thus, an inspector must take appropriate steps to make this observation.

As indicated in the NPRM, FRA does not intend to mandate specific methods for how the various inspections are to be performed. FRA believes that each

railroad is in the best position to determine the method of inspection that best suits its operations at different locations. To require that all inspections be performed by walking the train, as suggested by several labor representatives, would impose a huge financial and operational burden on the railroads and would ignore the various different methods by which inspections are currently performed and have been performed for years. FRA has never mandated specific step-by-step procedures for conducting brake inspections but merely requires that, whichever method is used, it must ensure that all of the components required to be inspected will be so inspected.

Paragraph (b)(4) contains the requirements for ensuring that a proper application of a car's brakes is made during the performance of brake inspections and provides the procedures for retesting a car found not to be properly applied during the initial performance of a brake inspection. In proposing the requirements contained in this paragraph, FRA attempted to clarify language contained in the current regulation which requires that the brakes ''apply.'' The existing language has been misinterpreted by some to mean that if the piston applies in response to a command from a controlling locomotive or yard test device, and releases before the release signal is given, the brake system on that car is in compliance with the regulation because the brake simply applied. The intent of the regulation has always been that the brakes apply and remain applied until the release signal is initiated from the controlling locomotive or yard test device. In order to eliminate any confusion, this paragraph requires that the brakes on a car must remain applied until the appropriate release signal is given. If the brakes on a car fail to do so, the car must either be removed from the train or repaired in the train and retested as discussed below.

This paragraph retains the general concepts for retesting cars with brakes that are found not to apply or not to remain applied that were proposed in the NPRM. However, some of the specific requirements for performing a retest have been modified from those proposed in the NPRM based on FRA's consideration of the comments submitted and its determination that the proposed retesting provisions may have been overly restrictive. This paragraph modifies the proposed retest requirements by permitting any car found with brakes not applied during a required inspections to be retested rather than just cars with obvious defective conditions. FRA agrees with the assertions of several commenters that there are a number of circumstances where the reason for the failure of the brakes to apply is not readily apparent. This paragraph reduces the amount of time that the brakes on a retested car must remain applied to three minutes from the proposed five minutes. The final rule makes clear that the brakes on a retested car remain applied until the release is initiated and that the release be initiated no less than three minutes after the application of the brakes. FRA believes three minutes is consistent with the amount of time it would take a person to conduct a complete inspection of the retested car's brakes. This paragraph also permits a car to be retested with the use of a suitable device positioned at the car being retested rather than from the head of the consist or from the controlling locomotive. When a retest is performed in this fashion, the final rule requires that the compressed air be depleted from the car being retested prior to separating the train line to perform the retest in order to prevent potential injury to employees conducting the retest. This paragraph also makes clear that any retest performed must be conducted at the air pressure at which the train will be operated. The modifications made to the retesting requirements in this paragraph are reiterated or referenced in the other types of brake inspections required in this subpart. A detailed discussion regarding the modifications made to the retesting provision is contained in the preceding ''Overview of Comments and General FRA Conclusions'' portion of the preamble under the heading ''II. D. Retesting of Brakes.''

Paragraph (b)(5) retains the proposed and current requirement that piston travel be adjusted during the performance of a Class I brake test if it is found outside the nominal limits established for standard 8½ inch and 10-inch diameter brake cylinder or outside the limits established for other types, which will be contained on a stencil, sticker, or badge plate. This provision is identical to that proposed in the NPRM and is similar to the provision currently contained at § 232.12(f). The major difference is that FRA has modified the existing provision to require that piston travel found to be less than 7 inches or more than 9 inches must be adjusted nominally to 7½ inches. This change is based on a request by AAR to change the adjustment to 7½ inches from 7 inches as its member railroads were finding it extremely difficult to adjust the piston travel to precisely 7 inches and that in some cases the adjustment would be marginally less than 7 inches, thus requiring a readjustment. Thus, AAR sought the extra ½ inch in order to provide a small measure for error when the piston travel is adjusted. As FRA believes that AAR's concerns are validly placed and would have no impact on safety, FRA has accommodated the request.

Paragraph (b)(7) retains the proposed provision which clarified that brake connection bottom rod supports will no longer be required on bottom connection rods secured with locking cotter keys. FRA recognizes that there is no need for bottom rod safety supports in these circumstances and intends to relieve railroads of this unnecessary expense, which will provide the industry a cost savings without compromising safety.

Paragraph (b)(8) retains the proposed provisions relating to the performance of ''roll-by'' inspections of the release of the brakes on the cars of the train. This method of inspection has been used for years even though there is nothing in the current regulation which specifically addresses the method. The authority to use this method of inspection of the brake release permits railroads to expedite the movement of trains and has not proven to create a safety hazard. Therefore, this paragraph is intended to clarify the authority of railroads to use such a method and to ensure that the inspection is performed properly. This paragraph makes clear that when a railroad is performing a ''roll-by'' inspection of the brake release the train's speed shall not exceed 10 mph, that the qualified person performing the ''roll-by'' inspection shall notify the engineer when and if the ''roll-by'' has been successfully completed, and that the operator of the train shall note successful completion of the release portion of the inspection on the written or electronic notification required by this final rule. FRA intends to make clear that the notification to the engineer may be made through a hand held radio, a cellular telephone, or communication with a train dispatcher but that such information must be provided to the engineer prior to the train's departure. Based on the rationale provided for permitting only one side of a train to be inspected during the application of the brakes, FRA intends to make clear that only one side of the train must be inspected during the release portion of a brake test. However, paragraph (b)(2) makes clear that a ''roll-by'' inspection of the brake release shall not constitute an inspection of that side

for purposes of inspecting both sides during the inspection.

Paragraph (c) generally retains the provision as it was proposed in the NPRM and as currently contained in § 232.12(a), with slight modification for clarity, stating that a carman alone will be considered a qualified person if a railroad's collective bargaining agreement (CBA) provides that carmen are to perform the inspections and tests required by this section. FRA received a number of comments from various labor representatives objecting to FRA's proposed modification of the provision that currently exists in § 232.12(a). These commenters contended that the proposed language would alter the meaning of the existing provision and effectively eliminate its enforceability. Particularly, they objected to the proposed addition of the word ''only'' in the first sentence of the provision and the proposed elimination of the phrase ''existing or future collective bargaining agreement.'' They contend that no CBA provides that only a carman may perform the inspections and that it is unclear whether the provision will apply to future CBAs due to the elimination of the specific language to that effect. They also asserted that it is unnecessary to require that carmen be trained as a qualified person or a QMI since carmen were recognized as the craft qualified to perform the inspection in 1982.

FRA's intent in proposing this provision was to clarify the meaning of the provision and explain FRA's ability to enforce the existing provision. FRA's intent was neither to expand nor reduce the applicability of the provision. FRA recognizes that its proposed addition of the word ''only'' could have the effect of altering the provision in a way that was not intended as FRA agrees that many existing CBAs do not require that only a carman perform the inspections. Thus, the language of the provision in this final rule eliminates the word ''only'' from the proposed clause, ''Where a railroad's collective bargaining agreement provides that only a carman is to perform the inspections and tests required by this section. * * *'' However, FRA does not agree that it is necessary to include the phrase ''existing or future collective bargaining agreement,'' as suggested by some commenters. FRA intends for the reference to a collective bargaining agreement to include any existing or future CBA. FRA believes that the inclusion of the suggested phrase is unnecessary because the plain meaning of the text is the CBA that applies at the time the issue arises. FRA sees no way to read the provision contained in this final rule as not to include both existing and future CBAs.

FRA also believes that it is essential for railroads to ensure that the individuals required to perform the inspections covered by this provision are properly trained and qualified to perform the inspections. As the requirements contained in this final rule for performing these inspections differ somewhat from the existing regulation, FRA believes it is necessary for employees performing the inspections to be trained on these new requirements. This paragraph merely makes clear that, in circumstances where a collective bargaining agreement requires that a carman is to perform the inspections and tests required by this section, the railroad shall bear the responsibility of ensuring that the carman responsible for performing this task is properly trained and designated as qualified to perform the task. In these circumstances, FRA believes that the railroad must ensure that the employees with whom they have collectively bargained to perform the inspections and tests required by this section are properly trained and designated to perform the task. Furthermore, FRA believes that on virtually all railroads carmen will be sufficiently trained and experienced to be considered ''qualified persons'' and ''qualified mechanical inspectors'' as defined in this proposal, provided they receive some additional training on the specific requirements contained in this final rule.

The original provision was added to the regulations in 1982 when the distance between brake inspections was increased from 500 miles to 1,000 miles. The provision was included as part of an agreement between the railroads and rail labor for permitting the maximum distance between brake tests to be increased and was presented to FRA at the time. The language contained in that agreement was included in the 1982 regulatory revisions without change by FRA. Consequently, due to the circumstances under which this provision was added to the regulations and because it has existed for over 16 years, FRA feels compelled to retain the language in this final rule. FRA will continue to interpret the provision as it has always interpreted the provision. In circumstances where a railroad's collective bargaining agreement requires that a carman perform the inspections and tests required by this section, a carman alone will be considered a qualified person. This has been FRA's approach to the provision since its inception.

As FRA lacks the authority to issue binding interpretations of collective bargaining agreements, FRA lacks the authority to settle a dispute between a railroad and its employees as to which group of its employees is to perform what work. FRA intends to make clear, that in order for FRA to proceed with an enforcement action under the provision contained in this paragraph, one of the parties to the collective bargaining agreement would first have to obtain a decision from a duly authorized body interpreting the relevant agreement, specifically identifying the involved location, and adequately resolving all of the interpretative issues necessary for FRA to conclude that the work belongs to a particular group of employees.

Paragraph (d) contains the requirement regarding the notification to the locomotive engineer and train crew of the successful completion of a Class I brake test by a qualified person. This paragraph slightly modifies the notification requirement from that proposed in the NPRM. In the NPRM, FRA proposed that the engineer be informed in writing of the successful completion of the Class I brake test. The intent of this proposed requirement was to ensure that the locomotive engineer was adequately informed of the results of the inspection; however, FRA recognizes that a requirement to provide the information in writing ignores technological advances and operational efficiencies. Consequently, this paragraph permits the notification to be made in whatever format the railroad deems appropriate; provided that the notification contains the proper information and a record of the notification and the requisite information is maintained in the cab of the controlling locomotive. FRA believes these changes are consistent with the intent and purpose of the proposed requirement for written notification and ensure necessary information is relayed to the operator of the train.

Paragraph (f) retains the proposed and existing requirements relating to the adding of cars or blocks of cars while a train is en route. This paragraph informs railroads that cars picked up en route that have not been previously tested and kept connected to a source of compressed air are to receive a Class I brake test when added to the train. Alternatively, a railroad may elect to perform only a Class II brake test at the time that a car is added to the train en route, but FRA intends to make clear that if this option is elected then the cars added in this fashion must be given a Class I brake test at the next forward location where facilities are available for providing such attention.

Section 232.207 Class IA Brake Tests—1,000-Mile Inspection

This section retains the proposed requirements related to the performance of a Class IA brake test. Many of the provisions contained in this section are currently contained at § 232.12(b) regarding the performance of 1,000-mile inspections. FRA has modified some of the existing requirements for purposes of clarity and has added a few additional requirements in order to make the inspection requirement more enforceable and to prevent some of the current abuses which FRA field inspectors have observed in their enforcement activities.

FRA recognizes that since 1982 new technologies and improved equipment have been developed that allow trains to operate longer distances with fewer defects. The data submitted by AAR appear to support this assertion, and FRA does not dispute the potential capability of certain equipment to travel distances in excess of 1,000 miles without becoming defective. However, the capability of the equipment to travel extended distances safely is contingent on the condition of the equipment when it begins operation and on the nature of the operation in which it is to be engaged. FRA believes that in order for brake equipment to travel extended distances between brake inspections, the condition and planned operation of the equipment must be thoroughly assessed at the beginning of a train's journey through high quality inspections. As noted in the general preamble discussion above, FRA believes that railroads are not conducting high quality initial terminal inspections at many locations because the railroads are utilizing employees who are not sufficiently qualified or trained to perform the inspections. Therefore, FRA believes that the 1,000-mile brake inspection interval continues to be necessary and important to ensure the safe operation of trains inspected by qualified personnel pursuant to this final rule. Furthermore, no trains operated in the United States are currently permitted to travel greater than 1,000 miles between brake inspections. Consequently, FRA is not willing to permit trains to travel in excess of 1,000 miles between brake inspections, except in the limited, controlled situations where data on the equipment can be gathered. (See discussion and provisions related to ''Extended Haul Trains.'') FRA notes that Canada eliminated intermediate inspections in 1994. However, Canada has different inspection requirements than those contained in this final rule and vastly different operating conditions and environments than those prevalent on most American railroads, operating conditions and environments that are more conducive to the inspection regimen imposed by that country.

Paragraph (a) provides that each train shall receive a Class IA brake test at a location that is not more than 1,000 miles from the point where any car in the train last received a Class I or Class IA brake test. FRA intends to make clear that the most restrictive car or block of cars in the train will determine the location where this test must be performed. For example, if a train departs point A and travels 500 miles to point B where it picks up a previously tested block of cars en route which has travelled 800 miles since its last Class I brake test and the crew does not perform a Class I brake test when entraining the cars, then the entire train must receive a Class IA brake test within 200 miles from point B even though that location is only 700 miles from point A.

Paragraph (b) contains the tasks which must be performed when conducting a Class IA brake test. These task are virtually identical to some of the tasks required to be performed during a Class I brake test. A leakage or air flow test must be performed. Thus, when locomotives are equipped with a 26–L brake valve or equivalent, FRA will permit the use of the air flow method as an alternative to the brake pipe leakage test. This paragraph makes clear that the brakes shall apply on each car in the train in response to a 20-psi brake pipe reduction and shall remain applied until a release is initiated. In addition, the paragraph reiterates the parameters for performing a retest of the brakes on those cars found not to have sufficiently applied, which are contained in the Class I brake test requirements. It should be noted that, defective equipment may be moved from or past a location where a Class IA brake test is performed only if all of the requirements contained in § 232.15 have been satisfied. The only change to the tasks contained in this paragraph from those proposed in the NPRM is the clarification that the brake system be charged to the pressure at which the train will be operated and that the rear car pressure be within 15 psi of that pressure and not less than 75 psi when conducting the required brake tests and inspections. This change is identical to the change made in the Class I brake test and is discussed in detail in that section.

This paragraph also makes clear that in order to properly perform a Class IA brake test under this section both sides of the equipment must be observed sometime during the inspection process. FRA finds the comments of AAR and other railroad representatives contending that both sides of the equipment should not be required to be inspected at Class IA brake tests to lack merit. The Class IA brake test basically incorporates the current 1,000-mile brake inspection, which FRA believes requires an inspection of both sides of the equipment during the inspection process. The current 1,000-mile inspection requires that brake rigging be inspected to ensure it is properly secure and does not bind or foul and that the brakes apply on each car in the train. *See* 49 CFR 232.12(b). In order to make these inspections properly, FRA believes that both sides of the equipment must be observed sometime during the inspection process and, to FRA's knowledge, railroads currently conduct these inspections in this manner. Thus, the NPRM and the final rule merely clarify what is required to be performed under the current regulations to properly perform a 1,000-mile inspection. Therefore, contrary to the contentions of certain commenters, retention of this current requirement does not impose any additional burden on the railroads.

Paragraph (c) retains the proposed provision which would require railroads to maintain a list of locations where Class IA inspections will be performed and that FRA be notified at least 30 days in advance of any change to that list of locations. Based on a review of the comments submitted, FRA recognizes that the proposed requirement for designating locations where Class IA inspections will be performed was somewhat unclear and may have caused confusion. The intent of the proposed requirement was to ensure that FRA was informed of those locations where a railroad intends to perform Class IA brake inspections and that FRA had the information with which to hold the railroad responsible for conducting the inspections at those locations. FRA was not intending to require that railroad separately identify a specific Class IA inspection location for each train it operates. Consequently, this paragraph has been slightly modified from that proposed in order to make clear that the designation required is for locations where such inspections will be performed and permits deviance from those locations only in emergency situations.

The current regulations merely require that railroads designate locations where intermediate 1,000-mile brake inspections will be performed but place no limitation on changing the locations. Therefore, FRA has found

some railroads changing the locations where these intermediate inspections are to occur on a daily basis which prevents FRA from observing these inspections being performed or avoids full performance of the required inspection by mechanical forces. In order to ensure that these types of inspections are being properly performed, FRA must be able to determine where the railroad plans to conduct these types of inspections. This paragraph recognizes that there may be occurrences or emergencies, such as derailments, that make it impossible or unsafe for a train to reach a location that the railroad has designated as a Class IA inspection site. Consequently, this paragraph permits railroads to bypass the 30-day written notification requirement in these instances provided FRA is notified within 24 hours after a designation has been changed. This paragraph also makes clear that failure to perform a Class IA brake test at a designated location will constitute a failure to properly perform the inspection.

Section 232.209 Class II Brake Tests—Intermediate Inspection

This section contains the requirements related to the performance of Class II brake tests. The requirements contained in this section are similar to the proposed requirements and the requirements currently contained in § 232.13(d) but have been slightly modified for clarity and to address situations where solid blocks of cars are added to an en route train. Paragraph (a) identifies those cars that are required to receive a Class II brake test when added to a train. This paragraph has been modified to address situations when certain ''solid blocks of cars'' are added to a train. As discussed previously, the final rule modifies the definition of ''solid block of cars'' from that proposed in the NPRM. (See section-by-section analysis of § 232.5.) Although FRA believes the definition it proposed was consistent with current interpretations and enforcement of the requirement, FRA agrees with some of the commenters that the definition may have been too narrow and did not directly address FRA's primary concern, the block of cars itself. FRA's primary concern is the condition of the block of cars being added to the train especially when the block of cars is made up of cars from more than one train. Thus, the final rule permits a ''solid block of cars'' to be added to a train without triggering a requirement to perform a Class I brake test on the entire train. However, this paragraph identifies the situations when ''solid blocks of cars'' must be inspected when added to a train.

This paragraph makes clear that a car or a solid block of cars that has not previously received a Class I brake test or that has been off a source of compressed air for longer than four hours must, at a minimum, receive a Class II brake test when added to an en route train. This paragraph also makes clear that a Class II brake test is required to be performed on each ''solid block of cars'' added to a train which is composed of cars from more than one other train or that is composed of cars from only one other train but that have not remained continuously and consecutively coupled together. It should be noted that this paragraph specifically acknowledges that the removal of defective equipment from a solid block of cars will not result in the solid block of cars being considered not to be continuously and consecutively coupled together. FRA believes this approach is consistent with the intent of both FRA and Congress to have defective equipment repaired as quickly as possible.

Paragraph (b) retains the proposed tasks which must be performed when conducting a Class II brake test. The only changes to the tasks contained in this paragraph from those proposed in the NPRM is the clarification that the brake system be charged to the pressure at which the train will be operated and that the rear car pressure be within 15 psi of that pressure and not less than 75 psi when conducting the required brake tests and inspections and the procedures for performing retests on cars. These changes are identical to the changes made in the Class I and Class IA brake tests and are discussed in detail in those sections.

A Class II brake test is intended to ensure that the brakes on those cars added apply and release and that the added cars do not compromise the integrity of the train's brake system. Therefore, a leakage or air flow test must be performed when the cars are added to the train to ensure the integrity of the train's brake system. This paragraph makes clear that in order to properly perform an inspection under this section both sides of the equipment must be observed sometime during the inspection process. This paragraph also makes clear that the brakes shall apply on each car added to the train and remain applied until a release is initiated and reiterates the parameters that are contained in the Class I brake test requirements for performing a retest on those cars whose brakes were found not to have sufficiently applied. It should be noted that, defective equipment may be moved from or past a location where a Class II brake test is performed only if all of the requirements contained in § 232.15 have been satisfied. Paragraph (b) also requires that the release of the brakes on those cars added to the train and on the rear car of the train be verified and allows railroads to conduct ''roll-by'' inspections for this purpose.

Paragraph (c) continues to permit the proposed and existing alternative to the rear car application and release portion of this test. This alternative permits the locomotive engineer to rely on a rear car gauge or end-of-train device to determine that the train's brake pipe pressure is being reduced by at least 5 psi and then restored by at least 5 psi in lieu of direct observation of the rear car application and release. Although certain labor representatives contended that this practice should not be allowed and that it is in violation of the existing regulations, this alternative has been permitted for years under the current regulations (§ 232.13(c)(1), (d)(1)) without any degradation of safety, and thus, FRA intends to permit the practice to continue.

Paragraph (d) retains the proposed and existing requirements relating to the inspection of cars or blocks of cars added to a train while a train is en route. This paragraph makes clear that if cars are given a Class II brake test when added to a train then the cars added must receive a Class I brake test at the next forward location where the facilities are available for performing such an inspection.

Section 232.211 Class III Brake Tests—Trainline Continuity Inspection

This section contains the requirements related to the performance of Class III brake tests. The requirements contained in this section are generally the same as those proposed, which incorporated the requirements currently contained in § 232.13(c), but have been slightly modified for clarity and standardization with the changes made in other inspection requirements contained in this final rule. Some of the changes made in this section from that proposed clarify the need to perform a Class III brake test when a solid block of cars is added to a train which does not require the performance of either a Class I or Class II brake test. Paragraph (b) of this section has been modified to incorporate the clarification that the brake system be charged to the pressure at which the train will be operated and that the rear car pressure be within 15 psi of that pressure and not less than 75 psi when conducting the required inspection.

The purpose of a Class III brake test is to ensure the integrity of the trainline when minor changes in the train consist occur. Basically, a Class III brake test ensures that the train brake pipe is properly delivering air to the rear of the train. FRA intends to make clear that this inspection is designed to be performed whenever the continuity of the brake system is broken or interrupted. For example, if a railroad disconnects a locomotive from a train consist to perform switching duties for a short period and then reattaches the locomotive to the consist, without any other change being made in the consist, the railroad would be required to perform a Class III brake test prior to the train's departure. Similarly, a Class III brake test would be required if a railroad disconnects a locomotive from the train and adds a different locomotive to the train, only to discover that the added locomotive is not operating properly, and thus, adds the original locomotive back into the consist. Because the continuity of the trainline was interrupted when the locomotive was removed and then placed back in the train, even though the same cars and locomotives remained in the consist, a Class III brake test must be performed.

Paragraphs (b) and (c) contain the tasks related to the performance of a Class III brake test. These paragraphs require that the brakes on the rear car of the train apply in response to a 20-psi brake pipe reduction and that the brakes subsequently release on the rear car of the train when the release is initiated. Similar to a Class II brake test, paragraph (c) permits an alternative to direct observation of the application and release of the rear car's brakes by permitting the operator to rely on a rear car gauge or end-of-train device to determine that the brake pipe pressure is being reduced and restored in response to the controlling locomotive.

Section 232.213 Extended Haul Trains

This section generally retains the proposed provisions, which permit an extension of the allowable maximum distance a train may travel between train brake system tests. After consideration of all the comments submitted on this matter, FRA continues to believe that if a train is properly and thoroughly inspected, with as many defective conditions being eliminated as possible, then the train is capable of traveling much greater than 1,000 miles between brake inspections. (A detailed discussion of the comments submitted on this issue is contained in the preceding ''Overview of Comments and General FRA Conclusions'' portion of the preamble under the heading ''II. B. Extended Haul Trains.'') Therefore, the final rule retains the provisions permitting railroads to designate trains as extended haul trains and allowing such trains to be operated up to 1,500 miles between brake inspections. Although FRA recognizes that retention of the 1,500-mile limitation may limit the utility of the provision on some railroads, FRA is not willing to increase the proposed mileage restriction at this time. Currently, no train is permitted to travel more than 1,000 miles without receiving an intermediate brake inspection. Therefore, FRA does not believe it would be prudent to immediately double or triple the currently allowed distance without evaluating the safety and operational effects of an incremental increase in the distance. Consequently, until sufficient information and data are collected on trains operating under the provisions contained in this final rule, FRA is not willing to permit trains to travel the distances suggested by some commenters without additional brake inspections. FRA continues to believe that the requirement for performing inbound inspections and the requirement to maintain records of all defective conditions discovered on these trains provides the basis for developing the information and data necessary to determine the viability of allowing greater distances between brake inspections.

After consideration of the comments submitted, FRA agrees that the benefits estimated in the NPRM in association with the extended haul provisions may have been overstated. FRA realizes that the retention of the 1,500-mile limitation may eliminate certain trains from being operated pursuant to the extended haul provisions and reduce the benefits estimated at the NPRM stage of the proceeding. (See detailed discussion in the Regulatory Impact Analysis portion of the preamble below.) In order to increase the viability of the extended haul provisions, the final rule provides some flexibility for designating extended haul trains and allows for the limited pick-up and set-out of equipment as discussed below.

Certain commenters have portrayed the provisions related to extended haul trains as merely being an extension of the current intermediate inspection distances. FRA objects to such a characterization. In FRA's view, the extended haul provisions contained in this section constitute a completely new inspection regimen. This section contains stringent inspection requirements, both brake and mechanical, by highly qualified inspectors and establishes stringent requirements whenever cars are added to or removed from such trains. This section also contains a means to assess the safety of such operations by requiring that records be maintained of the defective conditions that develop on these trains while en route. Consequently, FRA believes that the requirements related to extended haul trains not only ensure the safe operation of the trains operated under them, but actually increase the safety of such operations over that which is provided in the current regulations.

In paragraph (a), FRA generally retains the proposed provisions permitting railroads to designate specific trains that will move up to 1,500 miles between brake and mechanical inspections provided the railroad meets various stringent inspection and monitoring requirements, which FRA believes will ensure the safe and proper operation of these trains. FRA intends to make clear that a railroad must meet all of the requirements contained in this paragraph in order to designate a train as an extended haul train. Paragraph (a)(1) contains the requirements for designating trains a railroad intends to move in accordance with this section. Several commenters contended that the proposed provisions regarding the advance designation of extended haul trains would prohibit certain unscheduled trains from being operated as extended haul trains. In an effort to provided some flexibility in this area, this paragraph has been modified to allow railroads to designate certain locations as locations where extended haul trains will be initiated and requires railroads to describe those trains that will be so operated rather than requiring specific identification of every train. FRA believes this modification will allow railroads to capture some of their unscheduled trains by identifying the trains by the locations where they originate. This paragraph sets forth the information that must be provided to FRA in writing when designating a train or a location for such operation. The information required to be submitted is necessary to facilitate FRA's ability to independently monitor a railroad's operation of these extended haul trains.

FRA continues to believe that in order for a train to be permitted to travel 1,500 miles between inspections, the train must receive inspections that ensure the optimum condition of both the brake system and the mechanical components. In paragraphs (a)(2), (a)(3), and (a)(8), FRA retains the proposed requirement that these inspections be performed by highly qualified and experienced

inspectors in order to ensure that quality inspections are being performed. As FRA intends the Class I brake tests that are required to be performed on these trains to be as in-depth and comprehensive as possible, FRA continues to believe that these inspections must be performed by individuals possessing not only the knowledge to identify and detect a defective condition in all of the brake equipment required to be inspected but also the knowledge to recognize the interrelational workings of the equipment as well as a general knowledge of what is required to repair the equipment. Therefore, paragraphs (a)(2) and (a)(8) retain the use of the term ''qualified mechanical inspector'' to identify and describe those individuals it believes possess the necessary knowledge and experience to perform the required Class I brake tests on these trains. A ''qualified mechanical inspector'' is a person with training or instruction in the troubleshooting, inspection, testing, maintenance, or repair of the specific train brake systems for which the person is assigned responsibility and whose primary responsibilities include work generally consistent with those functions. (See § 232.5 of this section-by-section analysis for a more detailed discussion of ''qualified mechanical inspector.'') FRA also continues to believe these same highly qualified inspectors must be the individuals performing the required inbound inspection, contained in paragraph (a)(6) of this section, on these extended haul trains in order to ensure that all defective conditions are identified at the train's destination or 1,500 mile location. Similarly, in paragraph (a)(3), FRA requires that all of the mechanical inspections required to be performed on these trains be conducted by inspectors designated pursuant to 49 CFR 215.11, rather than train crew members, in order to ensure that all mechanical components are in proper condition prior to the trains departure.

As discussed in detail above, FRA is not willing to allow more than 1,500 miles between brake inspections until appropriate data are developed which establish that equipment moved under the criteria contained in this final rule remains in proper condition throughout the train's journey. FRA believes that the provisions contained in paragraphs (a)(6) and (a)(7), requiring the performance of an inbound inspection at destination or at 1,500 miles and requiring carriers to maintain records of all defective conditions discovered on these trains for a period of one year, create the basis for developing such data. FRA believes the information generated from these inbound inspections will be extremely useful in assessing the quality of a railroad's inspection practices and will help FRA identify any systematic brake or mechanical problems that may result in these types of operations. It should be noted that paragraph (a)(7) has been slightly modified from what was proposed in order to clarify that the required records may be maintained either electronically or on paper.

Paragraphs (a)(4) and (a)(8) retain the proposed requirements that these trains have 100 percent operative brakes and contain no cars with mechanical defects under part 215 at either the train's initial terminal or at the time of departure from a 1,500-mile point, if moving in excess of 1,000 miles from that location. FRA has modified the provision proposed in paragraph (a)(5) that restricted extended haul trains from conducting any pick-ups or set-outs en route, except for the removal of defective equipment. Paragraph (a)(5) is modified to permit extended haul trains the limited ability make one pick-up and one set-out while en route. This modification will provide railroads the flexibility to set out a block of cars at one location and pick up a block of cars at the same or another location. FRA believes that this limited ability provides the railroads with some flexibility to move equipment efficiently while minimizing the disruptions made to the train's brake system and ensuring that cars added to such trains can be adequately tracked and inspected. Paragraph (a)(5) makes clear that any cars added to extended haul trains must be inspected in the same manner as the cars at the train's initial terminal. This paragraph also makes clear that any car removed from the train must be inspected in the same manner as a car at the train's point of destination or 1,500-mile location.

Paragraph (b) is retained as proposed and makes clear that failure to comply with any of the restrictions contained in this section will be considered an improper movement of a designated extended haul train for which appropriate civil penalties may be assessed. FRA has included specific civil penalties in appendix A to this final rule pertaining to the improper movement of these types of trains. In addition to the imposition of civil penalties, this paragraph makes clear that FRA reserves the right to revoke a railroad's authority to designate any or all trains for repeated or willful noncompliance with any of the provisions contained in this section.

Section 232.215 Transfer Train Brake Tests

This section generally retains the proposed requirements related to the performance of transfer train brake tests. The final rule requirements have been slightly modified for consistency with other inspection requirements and to clarify when a transfer train brake test is to be performed. The requirements contained in this section generally incorporate the requirements currently contained in § 232.13(e). ''Transfer train'' is defined in § 232.5 of this final rule as a train that travels between a point of origin and a point of destination, located not more than 20 miles apart. The definition makes clear a transfer train may pick up or deliver freight equipment while en route to its destination. This final rule makes clear that the decision as to whether a particular consist is subject to the transfer train inspection requirements is primarily based on a determination that the movement the train is engaged in is considered a ''train movement'' rather than a ''switching movement.'' FRA's determination of whether the movement of cars is a ''train movement,'' subject to the requirements of this section, or a ''switching movement'' is and will be based on the voluminous case law developed by various courts of the United States. (See section-by-section analysis for § 232.5 for a detailed discussion of the terms ''train movement'' and ''switching movement.'')

FRA intends to make clear that a train will be considered a transfer train only if the train moves no more than 20 miles between its point of origin and its point of final destination. If the train will move greater than 20 miles between the point of origin and point of final destination, it cannot be considered a transfer train, and a Class I brake test must be performed on the train prior to departure from its point of origin. Although cars may be added to a transfer train while the train is en route, as discussed below, with a transfer train brake test being performed on the cars added, the train is limited to a total of 20 miles from its point of origin, not from the location where new cars are added. The distance the entire train will move between its point of origin and point of final destination is the determinative factor in determining whether the train is a transfer train, cars dropped-off or picked-up en route do not affect this distance.

Paragraph (a) retains the proposed tasks that are required to be performed when conducting a transfer train brake test. Due to the short distance these

types of trains will travel, FRA will continue to permit the brake system to be charged to only 60 psi but will make clear that this must be verified by an accurate gauge or end-of-train device. Although the current regulations do not require the use of a gauge or device, FRA is at a loss to understand how an inspector can know the pressure in the brake system without getting a reading from the rear of the train. This paragraph also retains the requirement that the brakes apply in response to a 15-psi brake pipe reduction. FRA continues to believe that the reduced pressure at which this test is performed (i.e., 60 psi rather than 75 psi) requires that an application be obtained with a smaller pressure reduction than that required for other brake tests. This paragraph also makes clear that the brakes shall apply on each car added to the train and remain applied until a release is initiated and reiterates the parameters for performing a retest on those cars found not to have sufficiently applied that are contained in the Class I brake test requirements.

Paragraph (b) clarifies that cars may be added to a transfer train while it is en route to its destination. This activity is currently conducted by these trains, and it was not FRA's intent when issuing the NPRM to propose prohibiting these trains from being used in this fashion. This paragraph makes clear that when cars are added to a transfer train the added cars are to be inspected pursuant to the requirements contained in paragraph (a) of this section. This is generally consistent with what FRA currently requires when cars are added to a transfer train, and this paragraph has been added to clarify FRA's retention of the existing practice.

Section 232.217 Train Brake System Tests Conducted Using Yard Air

This section contains the requirements for performing train brake system tests when using yard air. The requirements contained in this section have been modified from those proposed in the NPRM in response to the comments and recommendations received. Paragraph (a) retains the proposed requirements regarding the use of an engineer's brake valve or a suitable test device capable of making any increase or decrease of brake pipe air pressure at the same, or slower, rate as an engineer's brake valve when conducting brake tests utilizing yard air. The requirement to use such a device also applies when retesting cars during Class I, Class IA, Class II, and transfer train brake tests.

Paragraph (b) generally retains the requirement to connect the air test device to the end of the cut of cars that will be nearest to the controlling locomotive. However, this paragraph permits the test device to be connected to other than the end nearest the controlling locomotive if a railroad has appropriate procedures in place to ensure the safety of such a practice. FRA recognizes that some currently existing yards are designed in such a manner so that performance of a test from the front of the consist is extremely difficult or impossible. FRA also recognizes that the safety concerns that arise when cars are charged from other than the head-end of the consist can be eliminated if proper procedures are in place to ensure that overcharge conditions do not occur. An ''overcharge condition'' describes a situation in which the brake equipment of cars, or locomotives, or both is charged to a higher pressure than the maximum brake pipe pressure that can normally be achieved in that part of the train; this may result in the locomotive engineer's lacking the ability to control the application or release of the brakes at the rear of the train. This paragraph recognizes that there are a number of operating or testing procedures which may be used to eliminate the existence of potential overcharge conditions. Rather than specify a procedure, this paragraph permits a railroad to adopt and comply with whatever procedure it determines is best suited to its operation. However, this paragraph makes clear that the procedure must be in writing and that the procedure must be followed by the railroad. Consequently, FRA will hold a railroad responsible for complying with whatever procedure it adopts.

Paragraph (c) modifies some of the provisions related to conducting brake tests utilizing yard air sources that were proposed in the NPRM. Rather than requiring yard air tests to be performed at 80 psi as was proposed, this paragraph reduces the required pressure to 60 psi at the end of the consist as is currently required. FRA recognizes that many yard air sources and rental compressors are not capable of producing 80 psi of air pressure. In order to address the concerns raised regarding the inadequacy of conducting a leakage or air flow test at this lower pressure, this paragraph includes a requirement that leakage and air flow tests be conducted at the operating pressure of the train. Thus, if the yard air is not capable of producing the air pressure at which the train will be operated, then the leakage or air flow test must be conducted when the locomotives are attached. This paragraph also retains the proposed requirement that a Class III brake test as proposed in § 232.211 must be performed on cars tested with yard air at the time that the road locomotive is attached. This paragraph also retains the proposed requirement for retesting cars that remain disconnected from a source of compressed air for more than four hours.

Paragraph (c) and (d) retain the proposed requirements regarding the calibration and accuracy of yard test devices and gauges with slight modification for clarity. Paragraph (c) requires that mechanical yard test devices and gauges be calibrated every 92 days and that electronic yard test devices and gauges be calibrated annually. Based on observations made by FRA's field inspectors, FRA has some concerns regarding the condition of many yard test devices and gauges. FRA has found numerous mechanical gauges the condition of which creates serious doubt as to the accuracy of the gauge. Mechanical gauges have been found with broken or missing glass which would allow moisture and other contaminates to be present in the gauge. As many of the yard test plants being used today are portable, they are exposed to a wide array of handling and environmental hazards while being transported from location to location. Therefore, this paragraph requires that mechanical devices and gauges be tested and calibrated every 92 days. On the other hand, electronic gauges and devices appear to have much less exposure to many of the hazards encountered by mechanical devices and gauges and tend to be much more reliable and accurate for a longer period of time. Consequently, this paragraph requires electronic yard test devices and gauges to be tested or calibrated, or both, on an annual basis. Paragraph (d) retains the proposed requirement that any yard air test device and any yard air test equipment used to test a train be accurate and function as intended. FRA will consider a device or gauge to be accurate if it is within the calibration parameters contained in paragraph (c) of this section.

Section 232.219 Double Heading and Helper Service

This section contains the requirements related to double heading and helper service. This section has been modified from that proposed in order to clarify that the requirements contained in this section do not apply to distributed power units and to remove unnecessary provisions. Thus, the second sentence of proposed paragraph (a) has been removed as the brake valve on distributed power units

are left cut in to accelerate response time. In addition, proposed paragraph (b) has been eliminated as it was originally intended to apply to passenger equipment and is not applicable to freight operations. Paragraph (a) retains the proposed clarification regarding the inspection that is to be performed when a controlling locomotive is changed. Paragraph (a) clearly identifies that a Class III brake test pursuant to § 232.211 must be performed when a new locomotive is placed in control of the train. FRA believes that the provisions retained in paragraph (a) are necessary and have been in place for years in order to ensure that locomotives taking control of a train have the ability to actually control the brakes on the train.

Paragraph (b), previously proposed as paragraph (c), retains the proposed requirement aimed at ensuring that the brake systems on helper locomotives respond as intended to brake commands from the controlling locomotive at the time it is placed in the train. Although the brake system on locomotives are required to be inspected on a daily basis, FRA continues to believe that a visual confirmation of the proper operation of a helper locomotive's brakes should be made at the time the locomotive is added to a train. Failure of a helper locomotive to respond to the command of the controlling locomotive could result in a very serious safety hazard in that a helper locomotive may continue to push the rear of the train while the brakes are applied, potentially resulting in a derailment or other incident. FRA intends to make clear in this paragraph that a helper locomotive found with inoperative or ineffective brakes is to be repaired prior to use or else removed from the train.

Paragraph (c) contains basic design and testing requirements for helper locomotives utilizing a Helper Link device or similar technology. The Helper Link device is an electronic device, mounted on the front end of the lead helper locomotive and is used to control the automatic air brakes on helper locomotive consists. When this device is used, the train's brake pipe is not connected between the rear car of the train being pushed and the helper locomotives. The end-of-train device, attached to the rear car of the train, sends a radio signal which is received by the Helper link device. The Helper Link device is connected to the brake pipe of the helper locomotives, and electronic commands from the EOT device cause the air pressure in the helper locomotive brake pipe to be reduced or increased, thus applying or releasing the brakes on the helper locomotives. A signal is transmitted from the EOT device to the Helper Link device at 10-second intervals to ensure communication. The Helper Link is also used to operate the uncoupling lever to detach the helper locomotives from the rear of the train without stopping the train.

Based on information currently available to FRA, it appears that when there is a loss of communication between the EOT device and the Helper Link device, the engineer of the helper locomotive consist is not immediately aware of the failure. If the communication between the EOT device and the Helper Link is not reestablished within the next 40-second communication cycle, the Helper Link device will automatically disable itself. Consequently, if the train experiences an emergency application of the air brakes while the Helper Link device is disabled, the brakes on the helper locomotives would not apply and would result in the helper locomotives continuing to push under power. Furthermore, in order for communications to be reestablished between the EOT and Helper Link, the engineer must leave the locomotive controls, exit the locomotive cab, and proceed to the front of the locomotive to manually press the reset buttons located on the Helper Link device itself. In addition, there are currently no regulations which address the use, testing, or calibration of these Helper Link devices.

On August 22, 1996, the UTU submitted a petition for rulemaking with FRA regarding Helper Link devices raising many of the concerns noted above. *See* Petition for Proposed Rulemaking, Docket 96–1. In order to address the UTU petition in this rulemaking and to address the concerns of FRA noted above, FRA sought information and comment from persons interested in the NPRM. *See* 63 FR 48345. A presentation and discussion regarding the use, operation, and design of Helper Link devices was engaged in at the technical conference conducted in Walnut Creek, California, on November 23 and 24, 1998. Written comments regarding the device were also submitted by the manufacturer of the device. Based on consideration of this information, FRA has determined that certain minimum design and testing requirements should be included in this final rule to ensure the safety of those trains utilizing Helper Link technology.

Paragraph (c) contains the design and testing requirements that FRA believes are appropriate when railroads utilize Helper Link devices or similar technology. This paragraph ensures that a locomotive engineer is notified by a distinctive alarm of any loss of communication for more than 25 seconds between the device and the two-way EOT. This paragraph also requires that the engineer be provided a method of resetting the device in the cab of the helper locomotive and that the device be tested and calibrated on an annual basis. Due to the limited number of Helper Link devices currently being used, FRA believes that the manufacturer of these devices can easily provide railroads utilizing the devices with the information and hardware to meet the requirements contained in this paragraph at a minimal cost to the railroad.

Subpart D—Periodic Maintenance and Testing Requirements

This subpart provides the periodic brake system maintenance and testing requirements for equipment used in freight and other non-passenger trains. As stated in the 1994 NPRM and 1998 NPRM, FRA firmly believes that the new repair track test and single car test, which have been used industry-wide since January of 1992, are a much better and more comprehensive method of detecting and eliminating defective brake equipment and components than the old, time-based COT&S requirements. FRA believes that performance of these tests has significantly reduced the number of defective components found and has dramatically increased the reliability of brake equipment. Through the implementation of the repair track and single car tests, the safety of both railroad employees and the public has greatly improved due to brake equipment being in better and safer condition. At the same time, however, FRA is cognizant that contentions by rail labor regarding the carrier's direct and intentional circumvention of these revised requirements through the elimination of repair tracks, by moving cars to expediter tracks for repair, or simply by making repairs in the field raise a legitimate concern that needs to be addressed to ensure that the industry fully benefits from the advantages of the improved tests.

Although this subpart retains many of the proposed maintenance requirements, several modifications have been made in this final rule in response to comments received and based upon the current best practices occurring within the industry. FRA agrees that the proposed incorporation of AAR Rule 3, Chart A, is unnecessary as it would remove the determination of when certain maintenance is performed from the discretion of the railroads, and

would make it difficult for railroads to change the requirements related to the performance of that maintenance. FRA believes that a railroad is in the best position to determine when and where it will perform various maintenance on its equipment and should not have its hands tied in this area by overly prescriptive federal requirements. Furthermore, FRA's primary intent when proposing incorporation of AAR Rule 3, Chart A, was to codify the existing requirements for performing single car and repair track air brake tests and eliminate the ability of the industry to unilaterally change the frequency and method of performing these tests. As this subpart retains the requirements for when and how these tests are to be completed and retains certain inspections that are to be performed when equipment is on a shop or repair track, FRA believes that it is unnecessary to incorporate every maintenance procedure covered in AAR's Rule 3, Chart A. Consequently, the final rule does not incorporate AAR's Rule 3, Chart A, and continues to allow railroads some flexibility in determining appropriate maintenance practices. (A detailed discussion of the comments and recommendations submitted on the maintenance requirements contained in this subpart is contained in the preceding ''Overview of Comments and General FRA Conclusions'' portion of the preamble under the heading ''VII. Maintenance Requirements.'')

Section 232.303 General Requirements

This section contains the general requirements regarding the maintenance, repair, and testing of freight cars. Paragraph (a) contains various definitions for determining whether a particular track or facility constitutes a shop or repair track. The definitions contained in this paragraph were not previously proposed in the NPRM but are consistent with current FRA enforcement policies and are necessary to clarify when various tests and inspections required in this section are to be performed.

As the current regulations and this subpart require that certain inspections and tests are to be performed when a car is on a shop or repair track and because a repair track air brake test is required to be performed when a car is on a repair track and such a test has not been performed within the last twelve months, FRA believes it is necessary to clarify what constitutes a shop or repair track. This issue has become more prevalent over the last few years due to the growing use of mobile repair trucks and due to the requirements for conducting repair track air brake tests. For years, many railroads have conducted minor repairs on tracks called ''expedite tracks.'' Generally, the types of repairs that were performed on these tracks were minor repairs that could be made quickly with a limited amount of equipment, and neither the railroads or FRA considered the tracks to be repair tracks. However, recently railroads have started performing virtually every type of repair on these expedite tracks. These tracks are no longer limited to minor repairs but are being used to perform heavy, complex repairs that require the jacking of entire cars or the disassembly and replacement of major portions of a car's truck or brake system. At many locations these expedite tracks are positioned next to operative repair shops. Furthermore, several railroads have closed previously existing repair shop facilities and are now using fully equipped mobile repair trucks to perform the same type of repairs that were previously performed in the shop or on established repair tracks and are attempting to call the tracks serviced by these mobile repair trucks ''expedite'' or ''light repair'' tracks. Thus, the line between what constitutes a repair or shop track and what constitutes an ''expedite'' or ''light repair'' track has become unclear or nonexistent.

Appendix A of AAR's Field Manual of Interchange Rules provides a definition of both ''shop or repair track'' and ''expedite track.'' Although FRA does not consider these definitions to be controlling with regard to what constitutes a repair track under the current regulations, FRA does believe that AAR's definitions of the above terms have created confusion within the industry regarding what constitutes a repair track. If the AAR's definitions are read together they appear to exclude repairs made by mobile repair trucks, regardless of where they are made or the nature of the repairs conducted, from ever being considered as being performed on a repair track. FRA believes it is both illogical and inconsistent with the intent and meaning of the existing regulations and with the provisions proposed in the NPRM to exclude from the definition of ''shop or repair track'' tracks at locations where repairs of all types are regularly and consistently performed from merely because they are serviced by a mobile repair vehicle. Furthermore, it would be inconsistent with previous technical bulletins and enforcement guidance issued by FRA to allow major repair work to be performed on ''expedite'' or ''light repair'' tracks merely because the repairs are performed by a mobile repair vehicle.

FRA believes that the operational changes, noted above, are partly an attempt by the railroads to circumvent the requirements that currently apply when a car is on a shop or repair track. Currently, if a car is on a shop or repair track, it must have its brakes inspected, under 49 CFR 232.17(a)(2)(ii), (iv), and the car is to receive a repair track air brake test if it has not received one in the last twelve months under AAR Rule 3, Chart A. Some railroads contend that an expedite track is not a repair or shop track; therefore, the requirements of § 232.17(a)(2)(ii), (iv) and AAR Rule 3, Chart A, do not apply. FRA finds this practice and interpretation to be unacceptable and believes that railroads are abusing the concept of expedite tracks to avoid performing required maintenance. Therefore, the industry's own actions have caused the need for FRA to clarify what constitutes a shop or repair track. Consequently, paragraph (a) includes a definition of what FRA will consider to be repair or shop tracks requiring the performance of certain tests and inspections.

Paragraph (a) makes clear that FRA will consider certain tracks to be repair or shop tracks based on the frequency and types of repairs that are made on the tracks, not necessarily the designation given by a railroad. The definitions in this paragraph also make clear that it is the nature of the repairs being conducted on a certain track that is the determining factor not whether a mobile repair truck is being used to make the repairs. Due to the ability of mobile repair trucks to make virtually any type of repair necessary and due to their growing use, FRA does not believe that tracks regularly and continually serviced by these types of vehicles should be excepted from the definition of ''repair track.'' FRA believes that if a track is designated by the railroad as an ''expedite'' track (i.e., one where minor repairs will be conducted) then the railroad should ensure that only cars needing minor repairs are directed to that track for repair. FRA does not intend to eliminate the concept of expedite tracks but limits the use of such tracks to those types of repairs that are truly minor in nature and that require a limited amount of equipment to perform. At locations where a railroad conducts repairs of all types on a regular and consistent basis, either with fixed facilities or with mobile repair trucks, FRA would expect the railroad to designate certain trackage at the location as repair tracks and certain trackage as ''expedite tracks'' where only minor repairs would be conducted.

In such circumstances, FRA would expect railroads to direct cars in need of heavier repairs, the kind that have been traditionally performed on a shop or repair track, to be directed to trackage designated at the location as a repair track.

Paragraph (a) places the burden on the railroad to designate those tracks it will consider repair tracks at locations where it performs both minor and heavy repairs on a regular and consistent basis, and makes the railroad responsible for directing the equipment in need of repair to the appropriate trackage. If the railroad determines that repairs of a heavy nature will be performed on certain trackage, then the track should be treated as a repair track, and any car repaired on that trackage should be provided the attention required by this final rule for cars on a shop or repair track. Further, if a railroad determines that minor repairs will be performed on certain trackage, then the railroad bears the burden of ensuring that only cars needing minor repairs are directed to that trackage. If the railroad fails to adequately distinguish the tracks performing minor repairs from those tracks performing heavy repairs or improperly performs heavy repairs on a track designated as an ''expedite track,'' then the railroad will be required to treat all cars on the trackage at the time that the heavy repairs are being conducted as though they are on a repair or shop track.

It should be noted that the issue of what constitutes a repair or shop track for the purposes of this subpart is completely separate and distinct from the issue of whether a location is a location where necessary repairs can be performed for purposes of 49 U.S.C. 20303 and § 232.15 of this final rule. Although an outlying location might be considered a location where certain brake repairs can be conducted, that does not mean the track where those repairs are performed should be considered a repair track. FRA does not intend for trackage located at outlying locations or sidings which are occasionally or even regularly serviced by mobile repair trucks to be considered repair tracks. FRA believes that repair or shop tracks should exist at locations that have fixed repair facilities and at locations where repairs of all types are performed on a regular and consistent basis regardless of whether the repairs are performed in fixed facilities or by mobile repair vehicles.

Paragraphs (b)–(d) retain the proposed provisions requiring certain tests and inspections to be performed whenever a car is on a shop or repair track. Although the AAR asserts that it did away with the requirements to perform a set and release of the brakes and adjust piston travel on all cars on repair or shop tracks, the requirements are currently contained in power brake regulations separate and apart from any AAR requirements. *See* 49 CFR 232.17(a)(2)(ii), (iv). FRA believes that repair and shop tracks provide an ideal setting for railroads to conduct an individualized inspection on a car's brake system to ensure its proper operation and that such an inspection is necessary to reduce the potential of cars with excessive piston travel being overlooked when employees are performing the ordinary brake inspections required by this final rule. If any problems are detected at that location, the personnel needed to make any necessary corrections are already present. Furthermore, performing these inspections at this time ensures proper operation of the cars' brakes and eliminates the potential of having to cut cars out of an assembled train and, thus, should reduce inspection times and make for more efficient operations.

Paragraph (b) retains the proposed requirement that a car on a shop or repair track be tested to determine that its air brakes apply and remain applied until a release is initiated. This paragraph requires that the air brakes remain applied until the release signal is initiated and is intended to maintain consistency with the requirement contained in § 232.205(b)(4). Paragraph (b)(4) is an attempt to clarify language contained in the current regulation which require that the brakes ''apply.'' This language has been misinterpreted by some to mean that if the piston applies in response to a command from a controlling locomotive or yard test device, and releases before the release signal is given, the brake system on that car is in compliance with the regulation because the brake simply applied. The intent of the regulation has always been that the brakes apply and remain applied until the release signal is initiated from the controlling locomotive or yard test device. Therefore, clarifying language was proposed in this paragraph to eliminate all doubt as to what is required. Consequently, this paragraph makes clear that the brakes on a car must remain applied until the appropriate release signal is given. If it fails to do so, the car must be repaired and retested.

Paragraph (c) retains the proposed requirement that if piston travel is found to be less than 7 inches or more than 9 inches, it must be adjusted to nominally 7½ inches, which is a change from the 7 inches as currently required, in order to maintain consistency with the requirement proposed at § 232.205(b)(5). This change was proposed in the NPRM and is based on a request by AAR to change the adjustment to 7½ inches from 7 inches as its member railroads were finding it extremely difficult to adjust the piston travel to precisely 7 inches and that in some cases the adjustment would be marginally less than 7 inches, thus requiring a readjustment. Therefore, AAR sought the extra ½ inch in order to provide a small margin for error when the piston travel is adjusted. As FRA believes that AAR's concerns are validly placed and would have no impact on safety, FRA has accommodated the request.

Paragraph (d) retains the proposed listing of brake system components that are to be inspected prior to a car being released from a shop or repair track. Many of the items contained in this paragraph are currently required to be inspected pursuant to § 232.17(a)(2)(iv). It should be noted that the proposed requirement, retained in this final rule, regarding the proper functioning of angle cocks was modified in the NPRM from the existing requirement by clarifying that angle cocks must be inspected to ensure that they are properly positioned to allow maximum air flow. This is a clarification regarding the normal functioning of the angle cock, and should pose little, if any, additional inspection burden on the railroads. This paragraph adds two items to the inspections that are to be conducted when a car is on a shop or repair track. They are an inspection of a car's hand brake and an inspection of the accuracy and operation of any brake indicators on cars so equipped. As the final rule does not provide for the specific inspection of these items during any of the other required brake tests, FRA believes this is an ideal time for the railroad to inspect these items while imposing the least burden on the railroad's inspection and repair forces.

Paragraph (e) retains the proposed provisions permitting cars to be moved from a location where necessary repairs are made to a location where a single car or repair track air brake test can be performed if it cannot be performed at the same location where the repairs are conducted. FRA disagrees with the assertions of some commenters that air brake repairs should not be required at locations that lack the ability to perform single car or repair track air brake tests. FRA believes that position is not only contrary to the statutory mandates regarding the movement of equipment with defective brakes but would open the door to potential abuse by railroads.

Furthermore, the operation of a car's brake system can generally be tested after a repair without performing a complete repair track air brake test. For the most part, single car and repair track air brake tests are intended to be maintenance requirements that attach based on a condition in which a car is found or on a repair that is required to be performed. If the condition of a car is such that a repair track air brake test is necessary to determine the defect, then the final rule would permit movement of the car to the nearest location where a repair track air brake test can be performed. However, FRA believes that most defective conditions can be easily determined without performing a repair track air brake test. Moreover, for years FRA has required the performance of repairs where they can be performed and has allowed such equipment to be moved to the next forward location for performance of a single car or repair track air brake test and has not found that such a practice has created any potential safety hazard.

Paragraph (e) also retains the proposed requirements for tagging equipment which is being hauled for the performance of a single car or repair track air brake test after the appropriate repairs have been conducted. FRA believes that the tagging requirements are necessary not only to provide notice to a railroad's ground forces as to the presence of the car but also to ensure that railroads are properly performing the tests at appropriate locations. Furthermore, many railroads currently move equipment in this fashion, and there has been no indication that safety has been compromised. The final rule also retains the requirement that a copy or record of the tag be retained for 90 days and made available to FRA upon request. Contrary to the objections of some commenters, FRA continues to believe that the record keeping requirements are necessary so that there is accountability on the part of the railroads to conduct these tests at the proper locations and that equipment is not moved for extended periods without receiving its required maintenance. It should be noted that the final rule clarifies that the record or copy of the tag may be maintained either electronically or in writing provided all the required information is recorded. This paragraph retains the proposed alternative to the tagging requirements, which permits a railroad to utilize an automated tracking system to monitor these cars and ensure they receive the requisite tests as prescribed in this section provided the automated system is approved by FRA. It should be noted that the final rule does not define or require identification of locations that can or will perform single car or repair track air brake tests as suggested by some commenters. FRA does not believe that such a requirement is necessary because the rule specifically establishes when the tests are to be performed and it is in the railroad's best interests to perform the tests in a timely manner.

Paragraph (f) contains the requirements for railroads to adequately track when single car or repair track air brake tests were last performed on a piece of equipment. This paragraph modifies the proposed requirements regarding the use of an automated tracking system in lieu of stenciling equipment with the date and location of the last single car or repair track test received. Since 1992, the industry has utilized the AAR's UMLER reporting system to electronically track the performance of single car and repair track air brake test as well as other repair information. Based on the performance and use of this system over the last seven years, FRA believes that the AAR's UMLER system has proven itself effective for tracking the information required in this paragraph and ensuring the timely performance of single car and repair track air brake tests. Furthermore, FRA continues to believe that the information required to be tracked in this paragraph with regard to these tests is easily maintained through an electronic medium. Moreover, FRA has found no substantiated instances of railroads falsifying or altering the information monitored and tracked by AAR's UMLER system. Thus, this paragraph permits railroads to utilize an electronic record keeping system to track single car and repair track air brake tests without obtaining prior FRA approval of the system. The final rule makes clear that FRA will monitor the performance of such systems and retains the right to revoke a railroad's authority to utilize the system if FRA finds that it is not properly secure, inaccessible to FRA or a railroad's employees, or fails to properly or adequately track and monitor the equipment.

Section 232.305 Repair Track Air Brake Tests and Section 232.307 Single Car Tests

These sections generally retain the proposed requirements related to the performance of single car and repair track air brake tests. Contrary to the assertions of some commenters, FRA continues to believe that certain maintenance procedures are critical to ensuring the safe and proper operation of the brake equipment on the nation's fleet of freight cars. FRA does not believe that the determination of what maintenance should be performed should be left solely to the discretion of the railroads operating the equipment in all circumstances. As periodic COT&S maintenance has been eliminated and replaced with the performance of single car and repair track tests, which FRA agrees is a better and more comprehensive method of detecting defective brake equipment and components, FRA believes that specific and determinable limits must be placed on the manner and frequency of performing these tests. Therefore, these sections generally retain the proposed requirements regarding the performance of single car and repair track brake tests.

FRA recognizes that the procedures for performing single car and repair track tests proposed in the NPRM have been modified by the AAR since the issuance of the proposal. As it is FRA's intent to incorporate the most recent version of the single car and repair track air brake test procedures, paragraph (a) of each section incorporates by reference the test procedures that were issued by the AAR in April of 1999. These test procedures are contained in AAR standard S–486–99, Sections 3.0 and 4.0, which are located in the AAR's ''Manual of Standards and Recommended Practices, Section E'' (April 1999). Both these sections recognize that the industry may find it necessary to modify the test procedures from time to time in order to address new equipment or utilize new technology. Thus, paragraph (a) of each section permits railroads to seek approval of alternative procedures through the special approval process contained in § 232.17 of this final rule. The special approval process is intended to speed FRA's consideration of a party's request to utilize an alternative procedure from the ones identified in the rule itself. FRA believes that it is essential for FRA to approve any change made in the procedures for conducting these safety-critical tests in order to prevent unilateral changes and to ensure consistency in the method in which the tests are performed.

It should be noted that the incorporated procedures for performing single car and repair track air brake tests are the minimum requirements for performing such tests. The special approval process is required to be used only if the incorporated procedures are to be changed in some manner. For instance, if the industry were to elect to add a new test protocol to the incorporated procedures, there would be no need to seek approval of such an

addition as long as the procedures contained in the incorporated standard are still maintained. This final rule is not intended to prevent railroads from voluntarily adopting additional or more stringent maintenance standards provided they are consistent with the standards incorporated.

Both sections retain the proposed frequency at which single car and repair track air brake tests are to be performed. As noted in the preceding discussion, the primary intent of the proposed provisions was to codify the existing requirements regarding the performance of single car and repair track air brake tests and prevent any unilateral changes to those requirements. FRA believes that the frequency at which these tests are currently required to be performed under industry standards has proven to be sufficient and a substantial economic burden would be imposed if the frequency were increased. Both sections also retain the requirement that these tests be conducted by a qualified person. FRA continues to believe that the person performing these tests must be specifically trained and tested on how the test is to be performed and be able to determine the appropriate actions that must be taken based on the results of the test. FRA does not believe that the mere fact that a person is a carman or a QMI is sufficient to make that person qualified to perform single car or repair track air brake tests. FRA believes that the training and testing requirements required by this final rule ensures that a person is qualified to perform these tests.

Section 232.305(b) generally retains the proposed list of conditions that would require the performance of a repair track air brake test. However, two of the proposed conditions for when a repair track air brake test would be required to be performed have been slightly modified in order to make them consistent with the currently existing AAR requirements for performing these tests. FRA agrees that the proposed requirement to perform a repair track air brake test on any car removed from a train for a brake-related defect is overly restrictive and inconsistent with the requirements of AAR's Rule 3, Chart A. FRA agrees that the proposed requirement would require the performance of the test when minor brake system repairs are conducted, which is not the intent of the AAR's rule. Therefore, this paragraph modifies the proposed condition to require the performance of a repair track test on cars that have inoperative or cut-out air brakes when removed from a train. Furthermore, the proposed provisions requiring the performance of a repair track air brake test whenever a car is found with a wheel with built-up tread or slid flat have been slightly modified. Under the final rule, the test will not be required if the built-up tread or slid flat wheel is known to have been caused by a hand brake that was left applied. These modifications are consistent with what is currently required under AAR Rule 3, Chart A.

Paragraphs (c) and (d) of § 232.305 retain the proposed requirements that each freight car receive a repair track air test within eight years from the date the car was built or rebuilt, and within every five years thereafter. FRA strongly believes that these minimum attention periods are sufficient to ensure the safety of the freight car fleet when considered in conjunction with the increased attention that freight cars receive when these types of tests are performed.

Paragraph (c) of § 232.307 retains the proposed requirement that a single car test be conducted by a qualified person prior to a new or rebuilt car being placed in or returned to revenue service. FRA believes that it is essential for new and rebuilt cars to receive this test prior to being placed in revenue service in order to ensure the proper operation of the brake system on the vehicle. Most railroads already require this attention to be given to new and rebuilt cars; thus, the cost of this requirement is minimal and merely incorporates the best practices currently in place in the industry.

Section 232.309 Repair Track Test and Single Car Test Equipment and Devices

This section generally retains the proposed requirements for maintaining the equipment and devices used in performing repair track and single car air brake tests. This section modifies some of the proposed provisions regarding the testing and calibration of single car test devices and other mechanical devices used to perform single car and repair track air brake tests. FRA's intent when proposing the requirements contained in this section was to codify the current best practices of the industry. Thus, FRA did not intend to propose testing and calibration requirements that were more stringent that those currently imposed by AAR standards. Therefore, FRA agrees with the comments submitted by AAR that the testing and calibration requirements for single car test devices should not be imposed until the devices are actually placed in service, which is consistent with current AAR requirements. FRA recognizes that the proposed calibration and testing requirements may have resulted in the unnecessary acquisition of single car testing devices. Consequently, this section has been modified to clarify that the 92-day and the 365-day calibration and testing requirements related to single car test devices are to be calculated from the day on which the device is first placed in service. FRA continues to believes that the devices and equipment used to perform these single car and repair track air brake tests are safety-critical items. Consequently, FRA believes that these devices must be kept accurate and functioning properly in order to ensure that repair track and single car tests are properly performed.

Subpart E—End-of-Train Devices

This subpart incorporates the design, performance, and testing requirements relating to end-of-train devices (EOTs) that were issued on January 2, 1997, which became effective for all railroads on July 1, 1997, except for those for which the effective date was extended to December 1, 1997 by notice issued on June 4, 1997. *See* 62 FR 278 and 62 FR 30461. This subpart also incorporates the recent modifications made to the two-way EOT requirements to clarify the applicability of the requirements to certain passenger train operations where multiple units of freight-type equipment, material handling cars, or express cars are part of a passenger train's consist. *See* 63 FR 24130.

As noted in the discussion of the applicability provisions contained in § 232.3 of this final rule, this subpart applies to all trains unless specifically excepted by the provisions contained in this subpart. As the provisions contained in this subpart were just recently issued, there is little need to discuss these requirements in detail as they were fully discussed in the publications noted above. However, after their issuance, FRA discovered that a few of the provisions were in need of minor modification for clarification purposes and to address some valid concerns that have been raised both internally by FRA inspectors and by outside parties. Consequently, in the NPRM FRA proposed various changes to the provisions related to end-of-train devices and discussed other issues which might require modification of the existing provisions. *See* 63 FR 48347–49. This discussion is intended to focus on the proposed changes and address those issues discussed in the preamble to the NPRM as well as address the issues raised at the public hearings and in written comments.

Section 232.405 Design and Performance Standards for Two-Way End-of-Train Devices

Paragraph (d) retains the proposed modification of the requirement relating to the diameter of the valve opening and hose on two-way EOTs, which is currently contained in § 232.21(d). The current regulation requires that the valve opening and hose have a minimum diameter of ¾ inch to effect an emergency application. FRA has discovered that sometime prior to the issuance of the final rule on two-way EOTs, Pulse Electronics began manufacturing its two-way EOT with the internal diameter of the hose being ⅝ inch. Testing of the devices manufactured with these smaller diameter hoses showed that they met all criteria for emergency application capability based on standards and guidelines set forth by the AAR. Furthermore, testing of the devices at the Westinghouse facility in Wilmerding, Pennsylvania, demonstrated that the ⅝ inch diameter hose permitted 14 consecutive 50-foot cars with cut-out control valves or 750 feet of brake pipe to be jumped. This is more than double the AAR standard for control valve requirements. Moreover, FRA's intent when issuing the two-way EOT design requirements was to incorporate designs that existed at the time the rule became effective. Consequently, paragraph (d) of this section is modified to permit the use of a ⅝ inch internal diameter hose in the design of the devices.

Paragraph (e) has been slightly modified, from what is currently required in § 232.21(e), to permit the manually operated switch capable of initiating an emergency brake command to the rear unit to be located either on the front unit itself or on the engineer control stand. Several railroads and a manufacturer of locomotives recommended that the provision regarding the placement of the manually operated switch be modified to recognize existing designs of the devices and the locomotives on which they are placed. These commenters stated that many front units do not have the switch located directly on the front unit itself but that the switch is located on the engineer's control stand. FRA agrees with this recommendation and currently does not take exception to locomotives designed in the manner described above. Consequently, this paragraph permits the manually operated switch to be located either on the front unit itself or on the engineer's control stand.

A new paragraph (f) has been added to this section which incorporates a recommendation from AAR and its member railroads that new locomotives be equipped with a means to automatically activate an emergency brake application from the rear unit whenever the locomotive engineer places the train air brakes in emergency. On June 1, 1998, FRA issued Safety Advisory 98–2, which recommended that railroads adopt a procedure to require activation of the rear unit to effectuate an emergency brake application either by using the manual toggle switch or through automatic activation, whenever it becomes necessary for a locomotive engineer to place the train air brakes in emergency using either the automatic brake valve or the conductor's emergency brake valve or whenever an undesired emergency application of the train air brakes occurs. *See* 63 FR 30808. FRA applauds the industry for taking the initiative to incorporate available technology on new locomotives and agrees with the representatives of the railroads that it is not economically feasible to require existing equipment to be retrofitted with this capability at this time. Furthermore, existing equipment is addressed in § 232.407(f)(3), which retains the proposed requirement for the engineer to manually activate an emergency application from the rear unit when the engineer initiates an emergency application in the controlling locomotive if the locomotive is not equipped to do so automatically.

FRA issued Safety Advisory 98–2 in response to several recent freight train incidents potentially involving the improper use of a train's air brakes, events that caused FRA to focus on railroad air brake and train handling procedures related to the initiation of an emergency air brake application, particularly as they pertain to the activation of the two-way EOT from the locomotive. The NPRM discussed four accidents in which a train was placed into emergency braking by use of the normal emergency brake valve handles on the locomotive, and although the train in each instance was equipped with an armed and operable two-way EOT, the device was not activated by the locomotive engineer. *See* 63 FR 48348. Preliminary findings indicate that in all of the incidents noted above, there was evidence of an obstruction somewhere in the train line, caused by either a closed or partially closed angle cock or a kinked air hose. This obstruction prevented an emergency brake application from being propagated throughout the entire train, front to rear, after such an application was initiated from the locomotive using either the engineer's automatic brake valve handle or the conductor's emergency brake valve. Furthermore, the locomotive engineers in each of the incidents stated that they did not think to use the two-way EOT, when asked why they failed to activate the device.

Section 232.407 Operations Requiring Use of Two-Way End-of-Train Devices; Prohibition on Purchase of Nonconforming Devices

Paragraph (e) generally retains the proposed modification of the provision, currently contained in § 232.23(e)(1), which excepts from the two-way EOT requirements trains operating with a locomotive capable of effectuating an emergency application located in the rear third of the train. In the NPRM, FRA proposed to modify this exception so that it would be applicable only to trains operating with a locomotive on the rear of the train. Data supplied by VOLPE demonstrates that stopping distances are greatly increased, and could potentially result in a runaway train or derailment depending on the length of the train, if an obstruction of the brake pipe were to occur directly behind a locomotive located in the rear third of the train. Therefore, FRA proposed that a train with a locomotive located in the rear third of the consist no longer be excepted from the two-way EOT requirements, unless the train qualifies for relief under one of the other specific exceptions contained in § 232.407(e). Although FRA received no objections to this specific change, several commenters did recommend that the exception contained in paragraph (e)(1) be modified to include locomotive consists at the rear of a train. These commenters asserted that the existing rule needed to recognize that some locomotives have fuel tenders attached. FRA finds this requested modification to be sensible and logical. Consequently, paragraph (e)(1) has been retained as proposed, with a slight modification to clarify that the exception extends to trains with either a locomotive or a locomotive consist located at the rear of the train.

A new exception to the two-way EOT requirements has been added at paragraph (e)(9) to address the practice of ''doubling a hill.'' The practice of ''doubling a hill'' occurs in situations where a train must be divided in two in order to traverse a particularly heavy grade due to the lack of sufficient motive power to haul the entire train up the grade. This issue was discussed in the NPRM and at the public technical conference conducted subsequent to the issuance of the NPRM. Initially, FRA believed that the two-way EOT should

be connected to that portion of the train traversing the grade. However, such an approach creates a multitude of operational as well as safety concerns. Such an approach would require train crews to repeatedly switch the rear unit from one portion of the train to another, which would require these individuals to repeatedly walk sections of the train at locations where it may not be safe to do so. Alternatively, such an approach might require some trains to carry extra devices while in transit. At the public technical conference, there was universal agreement between all representatives at the conference that the device should remain on the rear unit of the train in these circumstances. Consequently, paragraph (e)(9) has been added to except trains from the two-way EOT requirements that must be divided into two sections in order to traverse a grade. This paragraph makes clear that the exception only applies to the extent necessary to traverse the grade and only while the train is divided into two to conduct that movement.

Paragraph (f)(1) has been slightly modified from what is currently contained § 232.23(f)(1) in order to clarify and address an issue related to the ability of a railroad to dispatch a train with an inoperative two-way EOT from a location where the device is installed. Section 232.23(f)(1) of the current regulations, § 232.407(f)(1) of the NPRM, requires that ''the device shall be armed and operable from the time the train departs from the point where the device is installed until the train reaches its destination.'' Therefore, the existing regulations clearly require a train to be equipped with an armed and operable two-way EOT when dispatched from a location where the device is installed. When issuing this requirement, FRA intended railroads to install repeater stations at locations where communication problems are prevalent.

Several commenters, both at the public hearings and in written comments, assert that this requirement is impossible to meet at some locations regardless of whether repeater stations are installed. These commenters contend that certain locations have dead spots where it is impossible to establish communication between the front and rear unit. These parties recommend that some allowance be provided to permit trains at these locations to be moved a short distance to restore communication. FRA agrees that there are a few locations where dead spots exist which make it difficult if not impossible to establish communication between the two units when they are installed. Therefore, paragraph (f)(1) has been modified to allow a train that experiences a loss of communication or that fails to establish communication between the two units at the location where the device is installed to move up to one mile from that location in order to establish communication. FRA believes that this allowance should be sufficient at most locations to establish the required communication. Furthermore, if communication cannot be established within these limits, then FRA believes the railroad needs to install additional repeater stations. If additional repeater stations still fail to address the issue, then FRA believes that a railroad should be required to apply for a waiver of the requirement at a particular location, pursuant to the requirements of 49 CFR part 211. This approach will allow FRA to address the unique circumstances of each location on a case-by-case basis and ensure that the railroad implements other operational safeguards to ensure the safety of those trains dispatched without armed and operable devices.

Paragraph (f)(3) generally retains the proposed provision requiring the two-way EOT to be activated to effectuate an emergency brake application either by using the manual toggle switch or through automatic activation, whenever it becomes necessary for the locomotive engineer to initiate an emergency application of the train's air brakes using either the automatic brake valve or the conductor's emergency brake valve. As discussed previously in regard to the addition of § 232.405(f), the proposed requirement incorporates the recommendations contained in FRA's Safety Advisory 98–2, issued on June 1, 1998. *See* 63 FR 30808. FRA believes that the operational requirement contained in this paragraph must be stressed by the railroads when conducting the two-way EOT training required in § 232.203 of this final rule. FRA continues to believe that the likelihood of future incidents, such as the ones described in the NPRM, will be greatly reduced if the train handling procedure contained in this paragraph is made part of a train crew's training and followed by members of the crew in emergency situations. FRA believes that this additional procedure, together with the required training, will not only ensure that an emergency brake application is commenced from both the front and rear of the train in emergency situations, but will familiarize the engineer with the activation and operation of the devices and will educate the engineer to react in the safest possible manner whenever circumstances require the initiation of an emergency brake application.

FRA recognizes that a number of railroads have already adopted procedures similar to those required in this paragraph and commends such actions. Although this paragraph allows the device to be activated either manually or automatically, FRA intends to make clear that the front unit of the device or the engineer's control stand must be equipped with a manually operated switch. *See* § 232.405(e). Although some railroads have developed, and this final rule requires, new locomotives to be equipped with a means by which the rear unit is automatically activated when an engineer makes an emergency application with the brake handle, FRA believes that an engineer must also be provided a separate, manually operated switch which is independent of any automatic system in order to ensure the activation of the rear unit in the event that the automatic system fails.

It should be noted that the provision contained in paragraph (f)(3) has been slightly modified from that proposed in the NPRM. This final rule has eliminated the requirement to activate the rear unit when an undesired emergency brake application occurs to a train. FRA agrees with the assertions of various commenters that such a requirement might distract a locomotive engineer from performing other critical duties required to bring a train to a stop when an undesired emergency brake application occurs. As an undesired emergency brake application is not initiated by the locomotive engineer, such an event will usually take the engineer by surprise, and FRA agrees that the engineer's attention would be best focused on the activity of bringing the train to a stop in such circumstances. Furthermore, all of the instances where an engineer failed to activate the rear device that were discussed in the NPRM occurred in conjunction with an emergency brake application knowingly initiated by the engineer.

Based on the above discussion regarding paragraph (e)(1) of this section, paragraph (g)(1) retains the proposed modification of the requirements for operating a train that experiences an en route failure of the two-way EOT over a section of track with an average grade of two percent or greater over a distance of two continuous miles. In the NPRM, FRA proposed modification of the alternative measure, currently contained at § 232.23(g)(1)(iii), which permits the operation over such a grade if a radio-controlled locomotive is placed in the

rear third of the train consist and under the continuous control of the engineer in the head end of the train. FRA proposed modification of this alternative measure to permit such operation only if the radio-controlled locomotive is placed at the rear of the train consist. This modification is retained in this final rule in order that the alternative methods of operation over a heavy grade remain consistent with the exception from the two-way EOT requirements contained in § 232.407(e)(1) as discussed in the preceding paragraph. Although some commenters suggested elimination of all of the requirements related to operating a train experiencing an en route failure of its two-way EOT over heavy grades, FRA believes that the alternative methods are necessary to ensure the safety of such a train when descending a heavy grade and ensure that railroads properly maintain the required devices.

Paragraphs (g)(1)(i)(A) and (B) have also been slightly modified to clarify the requirements that a train be stopped in certain situations where communication is lost between a helper locomotive and the controlling locomotive. The final rule makes clear that the stopping of trains in such circumstances should be in accordance with the railroad's operating rules. When issuing the two-way EOT requirements, FRA did not intend for engineers to place themselves in unsafe situations when they encounter an en route failure of the device when traversing a heavy grade. Although the existing rule prohibits the operation of a train over certain heavy grades when a failure of the device occurs en route, FRA did not intend that the train be immediately stopped when a failure of the device occurs while operating on a heavy grade. Rather, FRA intended for the locomotive engineer to conduct the movement in accordance with the railroad's operating rules for bringing the train safely to a stop at the first available location. Therefore, safety may require that the train continue down the grade or to a specific siding rather than come to an immediate halt. Consequently, the modifications contained in these paragraphs are intended to reflect FRA's expectations when issuing the two-way EOT regulations.

Paragraph (g) has also been slightly modified in order to clarify what constitutes a loss of communication between the front and the rear units on two-way EOTs. The 16 minutes 30 seconds time period for determining when a loss of communication between the front and the rear unit was adopted based on the design of the devices, which automatically checks communication between the front and rear units every ten minutes. If no response is received, the front unit automatically requests communication from the rear unit 15 seconds later; if no response is received to that request, another request is made six minutes later; and if there is still no response, the front unit makes another request 15 seconds later. If there is still no response, a message is displayed to the locomotive engineer that there is a communication failure. This has caused some confusion in the industry, in that many people believe the 16 minutes and 30 seconds time frame should start when the message is first displayed on the front unit. This is incorrect. Based on the design of the currently operating devices, the 16 minutes and 30 seconds has elapsed when the failure message is broadcast. This paragraph has been modified to explain this design feature. Thus, appropriate action should be taken immediately upon receiving the failure message on the front unit. FRA also realizes that there may be some time lapse when the requests are made and the message is displayed, therefore the manufacturers of the devices should take care to factor any time lag into the 16 minute and 30 second time frame designed into the devices.

Section 232.409 Inspection and Testing of End-of-Train Devices

Paragraph (c) of this section regarding the notification of the locomotive engineer when the device is tested by someone other than a train crew member has been slightly modified from that proposed in the NPRM. In the NPRM, FRA proposed that the locomotive engineer be notified in writing in such circumstances. FRA agrees that this proposed requirement may have been overly burdensome and believes that the intent of the proposed requirement can be met without specifically requiring written notification. FRA's intent in proposing the written requirement was to ensure that locomotive engineers are provided sufficient information to confirm that the devices are properly inspected and tested and to provide locomotive engineers with a measure of confidence that the devices will work as intended. FRA believes these goals can be accomplished by permitting the required information to be provided by any means a railroad deems appropriate. FRA believes that the information required to be provided to an engineer (the date and time of the test, the location where the test was performed, and the name of the person performing the test) will ensure that the proper tests and inspections are performed. The modifications made in this paragraph make clear that a written or electronic record of the required information must be maintained in the cab of the controlling locomotive.

Paragraph (d) retains the proposed changes to the language related to the annual calibration and testing of EOT devices currently contained at § 232.25(d). The regulation currently states that the devices shall be ''calibrated'' annually. FRA intends to make clear that it intended for railroads to perform whatever tests or checks are necessary to ensure that the devices are operating within the parameters established by the manufacturers of the devices. Several railroads have attempted to ''sharp shoot,'' or narrowly interpret, the language currently contained in the regulation, claiming that the manufacturer states that front units do not need to be calibrated on an annual basis, in order to avoid doing any testing of the devices. Although FRA agrees that the front units may not have to be calibrated every year, the devices must be tested in some fashion to verify that they are operating within the manufacturer's specification with regard to radio frequency, signal strength, and modulation and do not require recalibration. FRA has been provided written instructions from the manufacturers of the devices which contain procedures for testing both the front and rear units. Furthermore, railroads using the devices in Canada acknowledge that the radio functions of the front and rear units are tested periodically. Consequently, this paragraph retains the proposed clarifying language in order to avoid any misconceptions as to what actions are required to be performed on these devices on an annual basis.

Paragraph (d) has also been slightly modified to require the ready accessibility of the information regarding the calibration and testing of a front unit, which the current regulation requires to be placed on a sticker or other marking device affixed to the exterior of the front unit. Recently, FRA has discovered that some railroads have locked the cabinets that house the front units and that there is no way for either FRA or railroad operating crews to inspect the marking devices and verify the information required to be maintained. In order for the marking device to serve its intended purpose, it must be readily capable of being inspected by both FRA and railroad operating crews. FRA intends to make clear that the required information regarding the date and location that the unit was last calibrated is to be easily accessible to both FRA and train crews

for inspection either on the marking device attached to the outside of the front unit or, if the front unit is inaccessible, in a readily accessible location in the cab of the locomotive.

In the NPRM, FRA discussed the potential need to amend paragraph (c) of this section by including specific provisions in this final rule to address the performance of bench testing on the front and rear units of two-way EOTs. *See* 63 FR 48322. After consideration of the comments received, FRA believes that specific regulatory requirements for performing these tests are unnecessary. FRA believes that its existing guidance, FRA Technical Bulletin MP&E 97–8, regarding the performance of bench tests on two-way EOTs is sufficient at this time. Since the issuance of this guidance on July 28, 1997, FRA has discovered very few instances where the issued guidance was not being followed and has found no evidence indicating that bench tests have compromised the proper operation of the devices. Consequently, FRA will not issue specific regulations regarding the performance of bench test at this time. However, FRA will continue to monitor the performance of these tests and will continue to expect railroads to perform the tests in accordance with the guidance previously issued by FRA.

FRA issued Technical Bulletin MP&E 97–8 to its inspectors to clarify what is required when a railroad performs a bench test. In this guidance, FRA made clear that a bench test may be performed on both the front and rear units, independent of each other, if the test is performed within the yard limits or location where the unit will be installed on the train. In FRA's view, bench testing the rear unit requires applying air pressure to the device and then transmitting an emergency brake application from a front unit using the front unit manual switch; the individual performing the test would determine that the emergency valve functions properly either by observing the emergency indicator pop out or by observing brake pipe pressure at the rear device go to zero while hearing the exhaust of air from the device. On the other hand, bench testing the front unit would entail transmitting an emergency brake application from the front unit, using the front unit manual switch, and observing that a rear unit successfully receives the signal and activates the emergency air valve.

The guidance also indicated that both tests must be performed within a reasonable time period prior to the device being armed and placed on the train. To determine a reasonable time period, the environment where the device is stored and the conditions the device is subjected to after completing a successful bench test have to be considered. If the device is tested and stored in a controlled environment that is free from weather elements, excessive dust, grease, and dirt prior to the immediate installation on a train, then four to eight hours would be acceptable. If the device is tested and haphazardly thrown into a corner of a shop or are placed in the rear of a truck to be bounced around a yard, one hour would likely be considered reasonable before installation. The guidance also made clear that bench tests must be performed at the location or yard where the device will be installed on a train.

Subpart F—Introduction of New Brake System Technology

This subpart retains, without change, the proposed tests and procedures required to introduce new train brake system technology into revenue service. The technology necessary for the introduction of advanced braking systems is quickly developing. The new technology includes various forms of electronic braking systems, a variety of braking sensors, and computer-controlled braking systems. In order to allow and encourage the development of new technology, this subpart establishes tests and procedures for introducing new brake system technology. These provisions require the submission to FRA of a pre-revenue service acceptance testing plan.

FRA intends to make clear that this subpart applies only to new train brake system technology that complies with the statutory mandates contained in 49 U.S.C. 20102, 20301–20304, 20701–20703, 21302, and 21304, but that is not specifically covered by this final rule. Any type of new train brake system that requires an exemption from the Federal railroad safety laws in order to be operated in revenue service may not be introduced into service pursuant to this section. In order to grant a waiver of the Federal railroad safety laws, FRA is limited by the specific statutory provisions contained in 49 U.S.C. 20306 as well as any FRA procedural requirements contained in this chapter.

Section 232.503 Process to Introduce New Brake System Technology

This section retains the proposed procedural requirements which must be met when a railroad intends to introduce new brake system technology into its system. This section makes clear that the approval of FRA's Associate Administrator for Safety must be obtained by a railroad prior to the railroad's implementation of a pre-revenue service acceptance test plan and before introduction of new brake system technology into revenue service. This section requires that such approval be obtained pursuant to the special approval process contained in § 232.17 of this final rule. FRA believes the special approval process should speed the process for taking advantage of new technologies over that which is currently available under the waiver process. However, in order to provide an opportunity for all interested parties to provide comment for use by FRA in its decision making process, as required by the Administrative Procedure Act, FRA believes that any special approval provision must, at a minimum, provide proper notice to the public of any significant change or action being considered by the agency with regard to existing regulations.

Section 232.505 Pre-Revenue Service Acceptance Testing Plan

This section retains the proposed requirements for pre-revenue service testing of new brake system technology. These tests are extremely important in that they are intended to prove that the new brake system can be operated safely in its intended environment. For equipment that has not previously been used in revenue service in the United States, paragraph (a) requires the operating railroad to develop a pre-revenue service acceptance testing plan and obtain FRA approval of the plan under the procedures stated in § 238.17 before beginning testing. Previous testing of the equipment at the Transportation Test Center, on another railroad, or elsewhere will be considered by FRA in approving the test plan. Paragraph (b) requires the railroad to fully execute the tests required by the plan, to correct any safety deficiencies identified by FRA, and to obtain FRA's approval to place the equipment in revenue service prior to introducing the equipment in revenue service. Paragraph (c) requires the railroad to comply with any operational limitations imposed by FRA. Paragraph (d) requires the railroad to make the plan available to FRA for inspection and copying. Paragraph (e) enumerates the elements that must be included in the plan. FRA believes this set of steps and the documentation required by this section are necessary to ensure that all safety risks have been reduced to a level that permits the new brake system technology to be used in revenue service. In lieu of the requirements of paragraphs (a) through (e), paragraph (f) provides for an abbreviated testing procedure for new brake system technology that has previously been

used in revenue service in the United States. The railroad need not submit a test plan to FRA; however, a description of the testing shall be maintained by the railroad and made available to FRA for inspection and copying.

IV. Regulatory Evaluation

A. Executive Order 12866 and DOT Regulatory Policies and Procedures

This final rule has been evaluated in accordance with existing policies and procedures and is considered to be significant under both Executive Order 12866 and DOT policies and procedures (44 FR 11034; Feb. 26, 1979). FRA has prepared and placed in the docket a regulatory evaluation of this final rule. This evaluation estimates the costs and consequences of this final rule as well as its anticipated economic and safety benefits. It may be inspected and photocopied during normal business hours by visiting the FRA Docket Clerk at the Office of Chief Counsel, FRA, Seventh Floor, 1120 Vermont Avenue, NW., in Washington, DC. Photocopies may also be obtained by submitting a written request by mail to the FRA Docket Clerk at the Office of Chief Counsel, Federal Railroad Administration, 1120 Vermont Avenue, NW., Mail Stop 10, Washington, DC 20590.

FRA believes that this rule will produce net benefits to society. The estimated Net Present Value (NPV) of the total 20-year costs associated with this final rule is approximately $109 million. The total 20-year benefits (safety and economic) consist of quantified benefits estimated at between approximately $112 and $130 million and various non-quantified benefits discussed in detail below. The following tables contain the estimated 20-year quantified costs and quantified benefits associated with this final rule.

TABLE 3.—ESTIMATED COSTS

Category	NPV costs
Training	$61,221,156
Retest	8,276,574
Piston Travel Stickers	3,385,681
Air Quality	1,819,214
Dynamic Brake	11,657,846
Cycle Trains	16,012,217
Class I Brake Test Notification	4,414,173
Helper Locomotive Inspection	1,929,071
Helper Link	164,933
Total	108,880,865

TABLE 4.—ESTIMATED BENEFITS

Category	NPV benefits
Extended Haul	$29,590,556—$46,735,494
Safety Improvements	57,460,452
EOT Use at Class I Brake Test	22,070,863
Bottom Rod Safety Supports	3,239,650
Total	112,361,521—129,506,459

Although the quantified benefits of this final rule exceed the quantified costs of the rule, FRA believes that the quantified benefits significantly underestimate the total benefits of this rule for several reasons. The information available to FRA on the value of property damage significantly understates the true value of the damage in railroad accidents. The property damage estimate provided by the railroad(s) in the aftermath of an accident are only for ''railroad property damage'' (equipment, track, and structures). Although the numbers provided by the railroads regarding railroad property damage have been enhanced to account for chronic underestimation of these damages, the figures used by FRA do not include the costs of evacuations, individual (non-railroad employee) or community health expenses, environmental cleanup, the closure of adjacent roads, or any of the other potential costs which are borne by society after a railroad accident.

A review of recent incidents that involve a train that loses its ability to stop or decrease speed show that there is a significant risk that such an occurrence could result in the release of large amounts of hazardous materials which, if the incident occurred in a densely populated or environmentally sensitive area, could produce truly catastrophic results. The costs of evacuation and medical treatment for those near the accident site could be substantial, and associated road closures could also produce significant economic impact to travelers and the communities nearby. Should a hazardous material release impact a river or stream, the consequences to wildlife in the area could also be severe and lasting. Furthermore, because derailments or collisions of trains which lose the ability to stop or decrease speed often occur due to overturning on curves or entering congested areas, third party casualties and property damage can also be substantial. As the inspection, testing, and maintenance provisions of this final rule are intended to ensure that the brakes on a train are effective and operable and because this final rule will ensure that a locomotive engineer is provided information regarding the condition of the brakes on the train they are operating, FRA believes that this final rule will reduce the number of instances where a train loses its ability to stop or decrease speed that create the potential for catastrophic consequences.

An example of the catastrophic consequences that could result when a freight train loses the ability to stop or decrease speed occurred on February 1, 1996, in Cajon Pass in California. This accident resulted in two fatalities, 32 injuries (32 emergency responders required medical treatment due to inhalation of toxic chemicals), the release of hazardous materials, and the subsequent evacuation of the surrounding area. In addition, a 20 mile segment of Interstate 15, the main route between Los Angeles and Las Vegas, was closed for 5 days as a result of the hazardous materials release. The road closure forced 89,000 vehicles a day to use detours. This added approximately 2 hours to the travel time between Las Vegas and Los Angeles. The losses to the surface transportation sector due to road and track closure, revenue losses to businesses and tourism, and the costs of emergency response related to this incident were not included in the estimated $15 million damage figure used by FRA when including this incident in the regulatory impact analysis of the two-way end-of-train device final rule. *See* 62 FR 291. FRA recognizes that an exact figure cannot be placed on these costs, but believes that the figure would be in the tens, if not hundreds, of millions of dollars. As devastating and costly as this incident was, it is probable that the results of this particular incident could have been much more disastrous. An Amtrak passenger train passed 17 minutes ahead of the train involved in the incident. Had the Amtrak train been stopped on the tracks or otherwise delayed, the consequences of the incident would have been much more severe, with the potential for scores of fatalities. (As illustration of potential consequences, a freight-to-passenger train collision at Hinton, Alberta, on February 8, 1986, resulted in 29 fatalities.)

Other power-brake related accidents illustrate the potential for high severity when a heavy-tonnage freight train loses braking control. On May 12, 1989, a Southern Pacific Transportation Company train accelerated out of control descending a 2.2 percent grade into San Bernardino, California. Two employees were killed and three injured. The entire train was effectively

destroyed. The incident destroyed seven residences adjacent to the right-of-way, killing two residents and injuring a third. A 14-inch gasoline pipeline which may have been damaged in either the incident or the ensuing clean-up, ruptured 13 days later, resulting in the death of two additional residents, serious injuries to two residents, and minor injuries to 16 others. Eleven additional homes were destroyed, along with 21 motor vehicles.

On February 2, 1989, near Helena, Montana, freight cars from a Montana Rail Link train rolled eastward down a mountain grade and struck a helper locomotive consist, slightly injuring two crewmembers. Hazardous materials in the consist which included hydrogen peroxide, isopropyl alcohol, and acetone were later released. The release of these hazardous materials resulted in a fire and explosions necessitating the evacuation of approximately 3,500 residents of Helena for over two days. According to the National Transportation Safety Board, railroad and other property damage alone exceeded $6 million, and all of the buildings of Carroll College sustained damage. Furthermore, the City of Helena received 154 reports of property damage from residents within a three-mile radius of the incident. Consequently, FRA believes that the potential unquantified benefits derived from the prevention of just one accident similar to the Cajon Pass incident or the other incidents noted above would most likely outweigh the potential costs of this final rule.

In addition to the potential underestimation of the quantified safety benefits, there may also be significant non-quantified business benefits that may be available as a consequence of this rule. The quantified benefits from the extended haul provisions may be significantly understated. FRA's estimates for the number of trains eligible for this benefit, and the cost saving that it produces, were much higher in the NPRM than those supplied by AAR in response to the NPRM. While we have used the figures provided by AAR to develop a range for the benefits related to the extended haul provisions, FRA continues to believe that more potential benefits are available to the industry than have been quantified in the Regulatory Impact Analysis.

Another business benefit for which FRA has insufficient information to form a credible estimate relates to the provision permitting previously tested cars to be added to trains received in interchange and the allowance to conduct a Class II brakes test on only those cars added to trains received in interchange that will move less than 20 miles from the interchange location. Under the existing regulations the addition of cars to such trains would require the performance of either an initial terminal brake test or a transfer train brake test on the entire train. The industry may realize substantial cost savings by being permitted to add cars to such trains without inspection of the entire train. By permitting the addition of cars to trains received in interchange, FRA allows the railroads to save significant time (labor and train delay costs) by not having to inspect the entire train consist when such cars are added to these trains. Because FRA does not have information on the number of interchanged trains engaging in such activity (and none were provided in response to the NPRM), we have not estimated the extent of this potential benefit. Actual business benefits to be realized due to this rule, therefore, may be significantly understated.

Moreover, Congress mandated that FRA review and revise the existing power brake regulations where necessary and specifically required that FRA prescribe standards regarding dynamic brakes, where applicable. Consequently, FRA believes that this final rule produces a net benefit to society. The costs that have been quantified represent the maximum that this rule is expected to cost, and the quantified projected benefits are the minimum which should be realized.

B. Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) requires an assessment of the impacts of proposed and final rules on small entities. FRA has conducted a regulatory flexibility analysis of this rule's impact on small entities, and the assessment has been placed in the public docket for this rulemaking.

1. Why Action By the Agency Is Being Considered

In 1992, Congress amended the Federal rail safety laws by adding certain statutory mandates related to power brake safety. *See* 49 U.S.C. 20141. These amendments specifically address the revision of the power brake regulations by adding a new subsection which states:

(r) POWER BRAKE SAFETY.—(1) The Secretary shall conduct a review of the Department of Transportation's rules with respect to railroad power brakes, and not later than December 31, 1993, shall revise such rules based on such safety data as may be presented during that review.

(2) In carrying out paragraph (1), the Secretary shall, where applicable, prescribe standards regarding dynamic brake equipment. * * * Pub. L. No. 102–365, section 7; codified at 49 U.S.C. 20141, superseding 45 U.S.C. 431(r).

In addition to this statutory mandate, FRA received various recommendations and petitions for rulemaking, and determined on its own that the power brake regulations were in need of revision. FRA has been in the process of revising the power brake regulations since 1992. An ANPRM and two NPRMs revising the power brake regulations were previously issued on December 31, 1992, September 16, 1994, and September 9, 1998, respectively. *See* 57 FR 62546, 59 FR 47676, and 63 FR 48294. A detailed discussion of the history leading up to this final rule is contained in the preamble. The reasons for the actual provisions of the action considered by the agency are explained in the body of the preamble and the section-by-section analysis.

2. The Objectives and Legal Basis for the Rule

The objective of the rule is to enhance the safety of rail transportation, protecting both those people traveling and working on the system, and those people off the system who might be affected by a rail incident by revising the regulations related to the braking systems used and operated in freight and other non-passenger trains to address potential deficiencies in the existing regulations, better address the needs of contemporary railroad operations, and facilitate the use of advanced technologies. The legal basis for this action is reflected in the response to 1. above and in the preamble.

3. A Description of and an Estimate of the Number of Small Entities to Which the Final Rule Would Apply

The Small Business Administration (SBA) uses an industry wide definition of ''small entity'' based on employment. Railroads are considered small by SBA definition if they employ fewer than 1,500 people for line haul railroads, and 500 for switching and terminal railroads. An agency may establish one or more other definitions of this term, in consultation with the SBA and after an opportunity for public comment, that are appropriate to the agency's activities.

The classification system used in this analysis is that of the FRA. Prior to the SBA regulations establishing size categories, the Interstate Commerce Commission (ICC) developed a classification system for freight railroads as Class I, II, or III, based on annual operating revenue. A Class I railroad has

operating revenue of $250 million or more, a Class II railroad has operating revenue greater than $20 million dollars but less than $250 million and a Class III railroad has operating revenue of $20 million or less. The Department of Transportation's Surface Transportation Board, which succeeded the ICC, has not changed these classifications. The ICC/STB classification system has been used pervasively by FRA and the railroad industry to identify entities by size. In the NPRM, FRA discussed these revenue thresholds in terms of the revenue levels actually achieved by these different classes of railroads rather than by the specific limits established in the Surface Transportation Board's regulations. See 49 CFR part 1201 1–1.

After consultation with the Office of Advocacy of the SBA and as explained in detail in the ''Interim Policy Statement Concerning Small Entities Subject to the Railroad Safety Laws,'' published August 11, 1997 at 62 FR 43024, FRA has decided to define ''small entity,'' on an interim basis, to include only those entities whose revenues would bring them within the Class III definition. In response to FRA's request for comments on its alternate definition, the American Short Line and Regional Railroad Association (ASLRRA) suggested that the definition include all Class II and Class III railroads. However, the ASLRRA offered no support for this request nor provided any rationale for why such a large number of railroads should be considered ''small entities.'' Consequently, this final rule retains the alternate definition of ''small entity'' which includes only Class III railroads.

All of the small entities directly affected by this rule are Class III railroads. FRA certifies that this final rule is expected to have a significant impact on a substantial number of Class III railroads. Although FRA did not quantify the estimated annual cost or benefit to the average Class III railroad (of which there are approximately 600–650 at any given time), the Regulatory Impact Analysis contains discussions and cost estimates for certain specific provisions where the impact could be estimated for non-Class I and Class III railroads.

The only significant costs to Class III railroads imposed by this final rule are related to the training of employees. In the NPRM, FRA estimated that Class III railroads would absorb approximately 15 percent of the training costs being imposed on non-Class I railroads. This estimate was based on the fact that Class III railroads employ approximately 15 percent of the employees on non-Class I railroads and because virtually all of the training costs are related to the number and types of employees employed by a railroad. FRA received no specific comment from any interested party objecting to this estimate. The final rule has been modified to reduce the potential impact of the training requirements on these small railroads based on comments received, by eliminating the need to develop internal audit programs and by allowing efficiency tests to be utilized to assess the effectiveness of a railroad's training program. Moreover, as discussed above and below, the training that employees of Class III railroads will be required to receive is significantly less than the required training of many employees on Class I and Class II railroads. Thus, although FRA believes that the actual cost to Class III railroads will be much less than the 15 percent originally assigned, FRA will retain the very conservative cost estimate related to training for Class III railroads of 15 percent of the training costs for non-Class I railroads which results in an estimated impact of approximately $740,579, or less than $1,200 for the average Class III railroad. These cost will be apportioned among the 600 to 650 Class III railroads, and will vary according to the number of employees each railroad must train. This is a rough estimate based on the number of Class III employees as a percentage of total employees. Actual impact should be less, as discussed below.

4. A Description of the Projected Reporting, Recordkeeping and Other Compliance Requirements of the Final Rule, Including an Estimate of the Classes of Small Entities Which Will Be Subject to the Requirements and the Type of Professional Skills Necessary for Preparation of the Report or Record

Other than the training requirements discussed above, this rule will have a *de minimus* impact on small entities. Most of the final rule provisions will not effect small railroad costs because of the nature and limits to their operations, or the small railroad costs are inseparable from the industry-wide costs. For example, small railroads do not generally operate helper locomotives, so they will not be subject to the costs associated with that new rule provision. In the case of provisions such as those requiring piston travel stickers, FRA has no basis for assigning to any particular segment of the industry the costs for equipping the entire fleet of non-standard piston travel cars with piston travel stickers. But in reality, it is unlikely that these costs will fall on the smaller railroads.

In various places in the Regulatory Impact Analysis, FRA has attempted to assign burdens to the smaller members of the industry based on some measure of their size relative to the rest of the industry. In those cases, FRA has probably overestimated the burden for the smaller carriers. A good example is the requirement regarding the repair and documentation of dynamic brake failures. While FRA has assigned these costs based on the total number of locomotives operated by each segment of the industry, the reality is that few small railroads operate locomotives equipped with operative dynamic brakes and they will not actually be subject to these costs. The costs shown in the Regulatory Impact Analysis should be viewed as a maximum. Similarly, smaller railroads perform a limited number of Class I brake tests, do not generally own and operate yard air sources, and do not usually perform the type of maintenance that will trigger the new record keeping requirements, thus the reporting and record keeping requirements related to those activities will be minimal or non-existent for these smaller carriers.

5. Federal Rules Which May Duplicate, Overlap, or Conflict With the Rule

None.

Significant Alternatives:

1. Differing compliance or reporting requirements or timetables which take into account the resources available to small entities:

2. Clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities:

3. Exemption from coverage of the rule, or any part thereof, for such small entities:

FRA considered the role that non-Class I railroads (Class II and III railroads) have in today's freight industry. FRA believes that the current marketplace requires Class I railroads and these smaller railroads to operate as an integrated system. Many of today's smaller railroads rely on Class I railroads for the training of their employees and the maintenance of their equipment. In addition, many non-Class I railroads and Class I railroads interchange and operate each other's equipment. Therefore, except in limited circumstances, it is impossible, from a regulatory standpoint, to separate these smaller railroads from the larger Class I railroads. Therefore, in order to ensure the safety and quality of train and locomotive power braking systems throughout the entire freight industry, this final rule generally imposes a consistent set of requirements on Class

I, II, and III railroads as a group. Although FRA recognizes that many of the operational benefits created by this final rule are not available to many of the smaller operations, FRA feels that the integrated nature of the freight industry requires that universally consistent requirements be imposed on both Class I and non-Class I railroads.

Where possible, efforts were taken in this final rule to minimize the impact on non-Class I railroads. The dynamic brake provisions of this final rule provide railroads with the option of declaring the dynamic brake portion of a locomotive deactivated. Thus, smaller railroads which do not choose to utilize dynamic brakes are not required to incur the cost of maintaining the equipment. The final rule also eliminates the proposed requirement to stencil a locomotive with deactivated dynamic brakes which further reduces the cost to smaller railroads. The final rule permits railroads to perform Class II brake tests on cars added to a train received in interchange, if the train will travel a distance not to exceed 20 miles from the point at which it was received in interchange. The current regulations require the performance of at least a transfer train brake test on the entire train, rather than testing only those cars added. FRA believes this will provide a cost savings to smaller railroads as they generally move short distances from interchange points to destination. Furthermore, virtually all of the inspection and testing requirements imposed by this final rule on Class III railroads reflect current practices on those operations.

The final rule also modifies some of the proposed training requirements in order to reduce the costs to smaller railroads based on comments received by the ASLRRA. The final rule eliminates the requirement that railroads develop an internal audit program to assess the effectiveness of their training programs and allows efficiency tests to be utilized to assess the effectiveness of such programs. This was a change requested by the ASLRRA and will reduce the impact of the training requirements by permitting smaller railroads to utilize existing supervisory oversight to assess the effectiveness of training. The final rule also clarifies that each employee need only be trained on the knowledge and skills necessary to perform the tasks they are required to perform. Because employees of Class III railroads generally are not required to perform many of the tasks covered by this final rule, these employees would not be required to be trained on those tasks. For example, Class III railroads generally do not operate a large variety of brake systems on their lines thus, their employees would only have to be trained on a limited number of different brake systems. In addition, the employees of Class III railroads generally will not be required to receive any training in the areas of EPIC brakes, dynamic brakes, two-way EOT devices, or on some of the brake tests and maintenance mandated in this final rule due to the limited distances traveled by trains on these operations, the low tonnages hauled, and because many of the maintenance functions on these smaller railroads are contracted out to larger railroads. Thus, the final rule has attempted to narrow the training requirements for employees of smaller railroads to only those tasks they are required to perform and thus, reduce the economic impact of the requirements.

4. Use of performance, rather than design standards:

Where possible, especially with regard to advanced technologies and certain brake system components, an attempt was made to tie the proposed requirements to performance.

C. Paperwork Reduction Act

The information collection requirements in this final rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 *et seq*. The sections that contain the new information collection requirements and the estimated time to fulfill each requirement are as follows:

CFR section	Respondent universe	Total annual responses	Average time per response	Total annual burden hours	Total annual burden cost (dollars)
229.27—Annual tests	20,000 locomotives	18,000 tests	15 minutes	4,500 hours	157,500
231.31—Drawbars for freight cars—approval to operate on track with non-standard gage.	545 railroads	0 letters	N/A	N/A	N/A
232.1—Purpose and Scope—Requests for Earlier Application to comply with Subparts D through F.	545 railroads	4 requests/letters	60 minutes	4 hours	180
232.3—Applicability— Export, industrial, & other cars not owned by railroads-identification.	545 railroads	8 cards	10 minutes	1 hour	45
232.7—Waivers	545 railroads	10 petitions	40 hours	400 hours	18,000
232.11—Penalties—Knowing falsifying a record/report.	545 railroads	1 falsified recd/rpt	10 minutes	.20 hour	9
232.15—Movement of Defective Equipment:					
—Tags	1,620,000 cars	128,400 tags	2.5 minutes	5,350 hours	187,250
— Written Notification	1,620,000 cars	21,200 notices	3 minutes	1,060 hours	37,100
232.17—Special Approval Procedure:					
—Petitions for special approval of safety-critical revision.	545 railroads	4 petition	100 hours	400 hours	18,000
—Petitions for special approval of pre-revenue service acceptance plan.	545 railroads	2 petitions	100 hours	200 hours	9,000
—Service of petitions	545 railroads	6 petitions	40 hours	240 hours	10,800
—Statement of interest.	Public/railroads	20 statements	8 hours	160 hours	7,200
—Comments	Public/railroads	15 comments	4 hours	60 hours	2,700

CFR section	Respondent universe	Total annual responses	Average time per response	Total annual burden hours	Total annual burden cost (dollars)
232.103—Gen'l requirements—all train brake systems:	1,600,000 cars	246,866 stickers	10 minutes	41,144 hours	835,156
—Locomotives—1st Year—Procedures.	545 railroads	50 procedures	4 hours	200 hours	9,000
—Locomotives—Subsequent Years—Procedures.	25 new railroads	1 procedure	4 hours	4 hours	180
232.105—Gen'l requirements for locomotives-Inspection.	545 railroads	20,000 insp. forms	5 minutes	1,667 hours	58,345
232.107—Air source requirements:.					
—1st Year	545 railroads	50 plans	40 hours	2,000 hours	90,000
—Subsequent Years	25 new railroads	1 plan	40 plans	40 hours	1,800
—Amendments to Plan.	50 existing plans	10 amendments	20 hours	200 hours	9,000
—Recordkeeping	50 existing plans	1,150 records	20 hours	23,000 hours	1,035,000
—Cold weather situations.	545 railroads	37 plans	20 hours	740 hours	33,300
232.109—Dynamic brake requirements:.					
—status	545 railroads	1,656,000 records	4 minutes	110,400 hours	3,864,000
—Inoperative dynamic brakes.	20,000 locomotives	6,358 repair recds	4 minutes	424 hours	14,840
—Tag bearing words ''inoperative dynamic brakes''.	20,000 locomotives	6,358 tags	30 seconds	53 hours	1,855
—Deactivated dynamic brakes—1st Year.	8,000 locomotives	2,800 stencilings	5 minutes	233 hours	8,155
—Subsequent Years	8,000 locomotives	20 stencilings	5 minutes	2 hours	70
—Displays to Locomotive Engineer-Deceleration rate.	8,000 locomotives	2,800,000 Disp.	.50 second	400 hours	0
—Operating rules—1st Year.	545 railroads	300 oper. rules	4 hours	1,200 hours	54,000
—Subsequent Years	5 new railroads	5 operating rules	4 hours	20 hours	900
—Amendments	545 railroads	15 amendments	1 hour	15 hours	675
—Miles-per-hour-overspeed-top rule in operating proc..	545 railroads	545 rules	60 minutes	545 hours	24,525
—Requests to increase 5 mph overspeed restriction.	545 railroads	5 requests/lttrs.	30 min. + 20 hrs.	103 hours	4,635
—Knowledge criteria—locomotive engineers—1st Year.	545 railroads	300 amendments	16 hours	4,800 hours	216,000
—Subsequent Years	5 new railroads	5 amendments	16 hours	80 hours	3,600
232.111—Train information handling:					
—1st Year	545 railroads	545 procedures	50 hours	27,250 hours	1,226,250
—Subsequent Years	10 new railroads	10 procedures	40 hours	400 hours	18,000
—Amendments	100 railroads	100 amendments	20 hours	2,000 hours	90,000
—Report requirements to train crew.	545 railroads	2,112,000 reports	10 minutes	352,000 hours	12,320,000
232.203—Training requirements—Tr. Prog.:					
—1st Year	545 railroads	300 programs	100 hours	30,000 hours	1,350,000
—Subsequent years	15 railroads	1 program	100 hours	100 hours	4,500
—Amendments to written program.	545 railroads	545 amendments	8 hours	4,360 hours	196,200
—Training records	545 railroads	67,000 records	8 minutes	8,933 hours	312,655
—Training notifications.	545 railroads	67,000 notific.	3 minutes	3,350 hours	117,250
—Audit program	545 railroads	545 plans	40 hours	21,800 hours	981,000
—Amendment to audit program.	545 railroads	50 amendments	20 hours	1,000 hours	45,000
232.205—Class 1 brake test—Notifications.	545 railroads	1,656,000 notific.	45 seconds	20,700 hours	724,500
232.207—Class 1A brake tests:	545 railroads	25 lists	30 minutes	13 hours	585
—1st Year	545 railroads	1 list	1 hour	1 hour	45
—subsequent years					
—Notification	545 railroads	5 amendments	1 hour	5 hours	225
232.209—Class II brake tests-intermediate inspection.	545 railroads	1,600,000 comnnt	3 seconds	1,333 hours	46,655
—Operator of train	545 railroads	1,600,000 comm.	2 seconds	889 hours	31,115
—Electronic communication link.	545 railroads	32,000 messages	2 seconds	18 hours	630

CFR section	Respondent universe	Total annual responses	Average time per response	Total annual burden hours	Total annual burden cost (dollars)
232.211—Class II brake test-trainline continuity insp..	545 railroads	500,000 commun.	5 seconds	694 hours	24,290
—Electronic communication link.	545 railroads	5,000 messages	5 seconds	7 hours	245
232.213—Extended haul trains.	84,000 long dist. mvmts.	70 letters	15 minutes	18 hours	810
—Record of all defective/inoperative brakes.	84,000 long dist. mvmts.	25,200 records	20 minutes	8,400 hours	294,000
232.303—Gen'l requirements—single car test.	1,600,000 frgt. cars	5,600 tags	5 minutes	467 hours	16,345
—Last repair track brake test/single car test.	1,600,000 frgt. cars	320,000 stncl.	5 minutes	26,667 hours	993,345
232.307—Single Car	545 railroads	Inc. under 232.17	Inc. under 232.17	Inc. under 232.17	Inc. under 232.17
232.309—Repair track brake test.	640 shops	5,000 tests	30 minutes	2,500 hours	87,500
232.403—Design stds—1 way end-of-train (EOTs) dev..	545 railroads	4 billion mess.	1/186,000 sec.	6 hours	0
—Unique Code	545 railroads	12 requests	5 minutes	1 hour	35
232.405—Design + Performance stds.—2 way EOTs.	545 railroads	8 billion mess.	1/186,000 sec.	12 hours	0
232.407—Operations 2-way EOTs.	545 railroads	50,000 comm.	30 seconds	417 hours	14,595
232.409—Insp. and Testing of EOTs.	245 railroads	450,000 comm.	30 seconds	3,750 hours	168,750
—Telemetry Equipment—Testing and Calibration.	245 railroads	32,708 units	1 minute	545 hours	24,525
232.503—Process to introduce new brake technology.	545 railroads	1 letter	1 hour	1 hour	45
—Special approval	545 railroads	1 request	3 hours	3 hours	135
232.505—Pre-revenue service accept. test plan:					
—1st Yr.	545 railroads	1 main. procedure	160 hours	160 hours	7,200
—Subsequent years	545 railroads	1 main. procedure	160 hours	160 hours	7,200
—Amendments	545 railroads	1 main. procedure	40 hours	40 hours	1,800
—Design description	545 railroads	1 petition	67 hours	67 hours	3,015
—Report to FRA Assoc. Admin.. for Safety.	545 railroads	1 report	13 hours	13 Hours	585
—Brake system technology testing.	545 railroads	5 descriptions	40 hours	200 hours	9,000

All estimates include the time for reviewing instructions; searching existing data sources; gathering or maintaining the needed data; and reviewing the information. For information or a copy of the paperwork package submitted to OMB contact Robert Brogan at 202–493–6292.

OMB is required to make a decision concerning the collection of information requirements contained in this final rule between 30 and 60 days after publication of this document in the **Federal Register**.

FRA cannot impose a penalty on persons for violating information collection requirements which do not display a current OMB control number, if required. This final rule has been assigned OMB control number 2130–0008.

D. Environmental Impact

FRA has evaluated this final rule in accordance with its ''Procedures for Considering Environmental Impacts'' (FRA Procedures)(64 FR 28545, May 26, 1999) as required by the National Environmental Policy Act (42 U.S.C. 4321 *et seq.*), other environmental statutes, Executive Orders, and related regulatory requirements. FRA has determined that this final rule is not a major FRA action (requiring the preparation of an environmental impact statement or environmental assessment) because it is categorically excluded from detailed environmental review pursuant to section 4(c) of FRA's Procedures. Section 4(c) of FRA's Procedures identifies twenty classes of FRA actions that are categorically excluded from the requirements for conducting a detailed environmental review. FRA further considered this final rule in accordance with section 4(c) and (e) of FRA's Procedures to determine if extraordinary circumstances exist with respect to this final rule that might trigger the need for a more detailed environmental review. After conducting this review, FRA has determined that extraordinary circumstances do not exist because this final rule: Is not judged to be environmentally controversial; is not inconsistent with Federal, State, or local laws, regulations, ordinances, or judicial or administrative determinations relating to environmental protection; will not have any significant adverse impact on any natural, cultural, recreational, or scenic environments; will not use protected properties, involve new construction in wetlands, or affect a base floodplain; and will not cause a significant short- or long-term increase in traffic congestion or other adverse environmental impact on any mode of transportation. As a result, FRA finds that this regulation is not a major Federal action significantly effecting the quality of the human environment.

E. Federalism Implications

FRA believes it is in compliance with Executive Order 13132. This final rule will not have a substantial effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. This final rule will not have federalism implications that impose substantial direct compliance costs on State and local governments. FRA notes that States involved in the State Participation Program, pursuant to 49 CFR part 212, may incur minimal costs associated with the training of their inspectors involved in the enforcement of this final rule. Meanwhile, State officials were consulted to a practicable extent through their participation in the RSAC, a federal advisory committee discussed earlier in the preamble. Although this rule was removed from the RSAC process prior to the issuance of the 1998 NPRM, representatives of state officials were represented in the RSAC Power Brake Working Group and the concerns and comments raised by these representatives during that process were fully considered during the development of both the 1998 NPRM and this final rule. Specifically, the National Association of Regulatory Commissioners, the American Association of State Highway and Transportation Officials, and the California Public Utilities Commission (CAPUC) were all represented when this rule was being considered by the RSAC Power Brake Working Group. The CAPUC submitted extensive comments in response to the 1998 NPRM which are detailed and addressed in the preamble to this final rule.

In any event, Federal preemption of a State or local law occurs automatically as a result of the statutory provision contained at 49 U.S.C. 20106 when FRA issues a regulation covering the same subject matter as a State or local law unless the State or local law is designed to reduce an essentially local safety hazard, is not incompatible with Federal law, and does not place an unreasonable burden on interstate commerce (see discussion in the section-by-section analysis of § 232.13). It should be noted that the potential for preemption also exists under various other statutory and constitutional provisions. These include: the Locomotive Inspection Act (now codified at 49 U.S.C. 20701–20703), the Safety Appliance Acts (now codified at 49 U.S.C. 20301–20304), and the Commerce Clause of the United States Constitution.

List of Subjects

49 CFR Part 229

Railroad locomotive safety, Railroad safety.

49 CFR Part 231

Railroad safety, Railroad safety appliances.

49 CFR Part 232

Incorporation by reference, Railroad power brakes, Railroad safety, Two-way end-of-train devices.

The Rule

In consideration of the following, FRA amends chapter II, subtitle B of title 49, Code of Federal Regulations as follows:

Part 229—[AMENDED]

1. The authority citation for part 229 is revised to read as follows:

Authority: 49 U.S.C. 20102–20103, 20107, 20133, 20137–20138, 20143, 20701–20703, 21301–21302, 21304; 49 CFR 1.49(c), (m).

2. Section 229.5 is amended by adding a new paragraph (p) to read as follows:

§ 229.5 Definitions.

* * * * *

(p) *Electronic air brake* means a brake system controlled by a computer which provides the means for control of the locomotive brakes or train brakes or both.

3. Section 229.25 is amended by revising paragraph (a) to read as follows:

§ 229.25 Tests: Every periodic inspection.

* * * * *

(a) All mechanical gauges used by the engineer to aid in the control or braking of the train or locomotive, except load meters used in conjunction with an auxiliary brake system, shall be tested by comparison with a dead-weight tester or a test gauge designed for this purpose.

* * * * *

4. Section 229.27 is amended by revising paragraph (b) to read as follows:

§ 229.27 Annual tests.

* * * * *

(b) The load meter shall be tested. Each device used by the engineer to aid in the control or braking of the train or locomotive that provides an indication of air pressure electronically shall be tested by comparison with a test gauge or self-test designed for this purpose. An error of greater than five percent or three pounds per square inch shall be corrected. The date and place of the test shall be recorded on Form FRA F 6180–49A, and the person conducting the test and that person's supervisor shall sign the form.

* * * * *

5. Section 229.53 is revised to read as follows:

§ 229.53 Brake gauges.

All mechanical gauges and all devices providing indication of air pressure electronically that are used by the engineer to aid in the control or braking of the train or locomotive shall be located so that they may be conveniently read from the engineer's usual position during operation of the locomotive. A gauge or device shall not be more than five percent or three pounds per square inch in error, whichever is less.

Part 231—[AMENDED]

6. The authority citation for part 231 is revised to read as follows:

Authority: 49 U.S.C. 20102–20103, 20107, 20131, 20301–20303, 21301–21302, 21304; 49 CFR 1.49(c), (m).

7. Section 231.0 is amended by adding paragraphs (b)(3) through (5) and paragraph (g) to read as follows:

§ 231.0 Applicability and penalties.

* * * * *

(b) * * *

(3) Freight and other non-passenger trains of four-wheel coal cars.

(4) Freight and other non-passenger trains of eight-wheel standard logging cars if the height of each car from the top of the rail to the center of the coupling is not more than 25 inches.

(5) A locomotive used in hauling a train referred to in paragraph (b)(4) of this section when the locomotive and cars of the train are used only to transport logs.

* * * * *

(g) Except as provided in paragraph (b) of this section, § 231.31 also applies to an operation on a 24-inch, 36-inch, or other narrow gage railroad.

8. Part 231 is further amended by adding § 231.31 to read as follows:

§ 231.31 Drawbars for freight cars; standard height.

(a) Except on cars specified in paragraph (b) of this section—

(1) On standard gage (56½-inch gage) railroads, the maximum height of drawbars for freight cars (measured perpendicularly from the level of the tops of the rails to the centers of the drawbars) shall be 34½ inches, and the minimum height of drawbars for freight cars on such standard gage railroads (measured in the same manner) shall be 31½ inches.

(2) On 36-inch gage railroads, the maximum height of drawbars for freight cars (measured perpendicularly from the level of the tops of the rails to the centers of the drawbars) shall be 26 inches, and the minimum height of drawbars for freight cars on such 36-inch gage railroads (measured in the same manner) shall be 23 inches.

(3) On 24-inch gage railroads, the maximum height of drawbars for freight cars (measured perpendicularly from the level of the tops of the rails to the centers of the drawbars) shall be 17½ inches, and the minimum height of drawbars for freight cars on 24-inch gage railroads (measured in the same manner) shall be 14½ inches.

(4) On railroads operating on track with a gage other than those contained in paragraphs (a)(1) through (a)(3) of this section, the maximum and minimum height of drawbars for freight cars operating on those railroads shall be established upon written approval of FRA.

(b) This section shall not apply to a railroad all of whose track is less than 24 inches in gage.

9. Appendix A of Part 231 is amended by adding an entry for § 231.31 to the end of the Schedule of Civil Penalties to read as follows:

Appendix A to Part 231—Schedule of Civil Penalties

FRA safety appliance defect code section	Violation	Willful violation
* * *	*	*
231.31 Drawbars, standard height	2,500	5,000
* * *	*	*

10. Part 232 is revised to read as follows:

PART 232—BRAKE SYSTEM SAFETY STANDARDS for FREIGHT and OTHER NON-PASSENGER TRAINS and EQUIPMENT; END-of-TRAIN DEVICES

Subpart A—General

Sec.
232.1 Scope.
232.3 Applicability.
232.5 Definitions.
232.7 Waivers.
232.9 Responsibility for compliance.
232.11 Penalties.
232.13 Preemptive effect.
232.15 Movement of defective equipment.
232.17 Special approval procedure.
232.19 Availability of records.
232.21 Information collection.

Subpart B—General Requirements

232.101 Scope.
232.103 General requirements for all train brake systems.
232.105 General requirements for locomotives.
232.107 Air source requirements and cold weather operations.
232.109 Dynamic brake requirements.
232.111 Train handling information.

Subpart C—Inspection and Testing Requirements

232.201 Scope.
232.203 Training requirements.
232.205 Class I brake tests—initial terminal inspection.
232.207 Class IA brake tests—1,000-mile inspection.
232.209 Class II brake tests—intermediate inspection.
232.211 Class III brake tests—trainline continuity inspection.
232.213 Extended haul trains.
232.215 Transfer train brake tests.
232.217 Train brake tests conducted using yard air.
232.219 Double heading and helper service.

Subpart D—Periodic Maintenance and Testing Requirements

232.301 Scope.
232.303 General requirements.
232.305 Repair track air brake tests.
232.307 Single car tests.
232.309 Repair track air brake test and single car test equipment and devices.

Subpart E—End-of-Train Devices

232.401 Scope.
232.403 Design standards for one-way end-of-train devices.
232.405 Design and performance standards for two-way end-of-train devices.
232.407 Operations requiring use of two-way end-of-train devices; prohibition on purchase of nonconforming devices.
232.409 Inspection and testing of end-of-train devices.

Subpart F—Introduction of New Brake System Technology

232.501 Scope.
232.503 Process to introduce new brake system technology.
232.505 Pre-revenue service acceptance testing plan.

Appendix A—Schedule of Civil Penalties

Appendix B—49 CFR part 232 prior to April 1, 2001

Authority: 49 U.S.C. 20102–20103, 20107, 20133, 20141, 20301–20303, 20306, 21301–21302, 21304; 49 CFR 1.49(c), (m).

Subpart A—General

§ 232.1 Scope.

(a) This part prescribes Federal safety standards for freight and other non-passenger train brake systems and equipment. Subpart E of this part prescribes Federal safety standards not only for freight and other non-passenger train brake systems and equipment, but also for passenger train brake systems. This part does not restrict a railroad from adopting or enforcing additional or more stringent requirements not inconsistent with this part.

(b) Except as otherwise specifically provided in this paragraph or in this part, railroads to which this part applies shall comply with all the requirements contained in subparts A through C and subpart F of this part beginning on April 1, 2004. Sections 232.1 through 232.13 and 232.17 through 232.21 of this part will become applicable to all railroads to which this part applies beginning on April 1, 2001. Subpart D of this part will become applicable to all railroads to which this part applies beginning on August 1, 2001. Subpart E of this part will become applicable to all trains operating on track which is part of the general railroad system of transportation beginning on April 1, 2001.

(c) A railroad may request earlier application of the requirements contained in subparts A through C and subpart F of this part upon written notification to FRA's Associate Administrator for Safety. Such a request shall indicate the railroad's readiness and ability to comply with all of the requirements contained in those subparts.

(d) Except for operations identified in § 232.3(c)(1), (c)(4), and (c)(6) through (c)(8), all railroads which are part of the general railroad system of transportation shall operate pursuant to the requirements contained in this part 232 as it existed on April 1, 2001 and included as Appendix B to this part until they are either required to operate pursuant to the requirements contained in this part or the requirements contained in part 238 of this chapter or they elect to comply earlier than otherwise required with the requirements contained in this part or the requirements contained in part 238 of this chapter.

§ 232.3 Applicability.

(a) Except as provided in paragraphs (b) and (c) of this section, this part applies to all railroads that operate freight or other non-passenger train service on standard gage track which is part of the general railroad system of transportation. This includes the operation of circus trains and private cars when hauled on such railroads.

(b) Subpart E of this part, ''End-of-Train Devices,'' applies to all trains operating on track which is part of the general railroad system of transportation unless specifically excepted in that subpart.

(c) Except as provided in § 232.1(d) and paragraph (b) of this section, this part does *not* apply to:

(1) A railroad that operates only on track inside an installation that is not part of the general railroad system of transportation.

(2) Intercity or commuter passenger train operations on standard gage track which is part of the general railroad system of transportation;

(3) Commuter or other short-haul rail passenger train operations in a metropolitan or suburban area (as described by 49 U.S.C. 20102(1)), including public authorities operating passenger train service;

(4) Rapid transit operations in an urban area that are not connected with the general railroad system of transportation;

(5) Tourist, scenic, historic, or excursion operations, whether on or off the general railroad system;

(6) Freight and other non-passenger trains of four-wheel coal cars;

(7) Freight and other non-passenger trains of eight-wheel standard logging cars if the height of each car from the top of the rail to the center of the coupling is not more than 25 inches; or

(8) A locomotive used in hauling a train referred to in paragraph (c)(7) of this subsection when the locomotive and cars of the train are used only to transport logs.

(d) The provisions formerly contained in Interstate Commerce Commission Order 13528, of May 30, 1945, as amended, now revoked, are codified in this paragraph. This part is not applicable to the following equipment:

(1) Scale test weight cars.

(2) Locomotive cranes, steam shovels, pile drivers, and machines of similar construction, and maintenance machines built prior to September 21, 1945.

(3) Export, industrial, and other cars not owned by a railroad which are not to be used in service, except for movement as shipments on their own wheels to given destinations. Such cars shall be properly identified by a card attached to each side of the car, signed by the shipper, stating that such movement is being made under the authority of this paragraph.

(4) Industrial and other than railroad-owned cars which are not to be used in service except for movement within the limits of a single switching district (i.e., within the limits of an industrial facility).

(5) Narrow-gage cars.

(6) Cars used exclusively in switching operations and not used in train movements within the meaning of the Federal safety appliance laws (49 U.S.C. 20301–20306).

§ 232.5 Definitions.

For purposes of this part—

AAR means the Association of American Railroads.

Air brake means a combination of devices operated by compressed air, arranged in a system, and controlled manually, electrically, electronically, or pneumatically, by means of which the motion of a railroad car or locomotive is retarded or arrested.

Air Flow Indicator, AFM means a specific air flow indicator required by the air flow method of qualifying train air brakes (AFM). The AFM Air Flow Indicator is a calibrated air flow measuring device which is clearly visible and legible in daylight and darkness from the engineer's normal operating position. The indicator face displays:

(1) Markings from 10 cubic feet per minute (CFM) to 80 CFM, in increments of 10 CFM or less; and

(2) Numerals indicating 20, 40, 60, and 80 CFM for continuous monitoring of air flow.

Bind means restrict the intended movement of one or more brake system components by reduced clearance, by obstruction, or by increased friction.

Brake, dynamic means a train braking system whereby the kinetic energy of a moving train is used to generate electric current at the locomotive traction motors, which is then dissipated through resistor grids or into the catenary or third rail system.

Brake, effective means a brake that is capable of producing its required designed retarding force on the train. A car's air brake is not considered effective if it is not capable of producing its designed retarding force or if its piston travel exceeds:

(1) 10½ inches for cars equipped with nominal 12-inch stroke brake cylinders; or

(2) the piston travel limits indicated on the stencil, sticker, or badge plate for that brake cylinder.

Brake, hand means a brake that can be applied and released by hand to prevent or retard the movement of a locomotive.

Brake indicator means a device which indicates the brake application range and indicates whether brakes are applied and released.

Brake, inoperative means a primary brake that, for any reason, no longer applies or releases as intended.

Brake, inoperative dynamic means a dynamic brake that, for any reason, no longer provides its designed retarding force on the train.

Brake, parking means a brake that can be applied by means other than by hand, such as spring, hydraulic, or air pressure when the brake pipe air is depleted, or by an electrical motor.

Brake pipe means the system of piping (including branch pipes, angle cocks, cutout cocks, dirt collectors, hoses, and hose couplings) used for connecting locomotives and all railroad cars for the passage of compressed air.

Brake, primary means those components of the train brake system necessary to stop the train within the signal spacing distance without thermal damage to friction braking surfaces.

Brake, secondary means those components of the train brake system which develop supplemental brake retarding force that is not needed to stop the train within signal spacing distances or to prevent thermal damage to wheels.

Emergency application means an irretrievable brake application resulting in the maximum retarding force available from the train brake system.

End-of-train device, one-way means two pieces of equipment linked by radio that meet the requirements of § 232.403.

End-of-train device, two-way means two pieces of equipment linked by radio that meet the requirements of §§ 232.403 and 232.405.

Foul means any condition which restricts the intended movement of one or more brake system components because the component is snagged, entangled, or twisted.

Freight car means a vehicle designed to carry freight, or railroad personnel, by rail and a vehicle designed for use in a work or wreck train or other non-passenger train.

Initial terminal means the location where a train is originally assembled.

Locomotive means a piece of railroad on-track equipment, other than hi-rail, specialized maintenance, or other similar equipment, which may consist of one or more units operated from a single control stand—

(1) With one or more propelling motors designed for moving other railroad equipment;

(2) With one or more propelling motors designed to transport freight or passenger traffic or both; or

(3) Without propelling motors but with one or more control stands.

Locomotive cab means that portion of the superstructure designed to be occupied by the crew operating the locomotive.

Locomotive, controlling means the locomotive from which the engineer exercises control over the train.

Off air means not connected to a continuous source of compressed air of at least 60 pounds per square inch (psi).

Ordered date or date ordered means the date on which notice to proceed is given by a procuring railroad to a contractor or supplier for new equipment.

Piston travel means the amount of linear movement of the air brake hollow rod (or equivalent) or piston rod when forced outward by movement of the piston in the brake cylinder or actuator and limited by the brake shoes being forced against the wheel or disc.

Pre-revenue service acceptance testing plan means a document, as further specified in § 232.505, prepared by a railroad that explains in detail how pre-revenue service tests of certain equipment demonstrate that the equipment meets Federal safety standards and the railroad's own safety design requirements.

Previously tested equipment means equipment that has received a Class I brake test pursuant to § 232.205 and has not been off air for more than four hours.

Primary responsibility means the task that a person performs at least 50 percent of the time. The totality of the circumstances will be considered on a case-by-case basis in circumstances where an individual does not spend 50 percent of the day engaged in any one readily identifiable type of activity.

Qualified mechanical inspector means a qualified person who has received, as a part of the training, qualification, and designation program required under § 232.203, instruction and training that includes ''hands-on'' experience (under appropriate supervision or apprenticeship) in one or more of the following functions: troubleshooting, inspection, testing, maintenance or repair of the specific train brake components and systems for which the person is assigned responsibility. This person shall also possess a current understanding of what is required to properly repair and maintain the safety-critical brake components for which the person is assigned responsibility. Further, the qualified mechanical inspector shall be a person whose primary responsibility includes work generally consistent with the functions listed in this definition.

Qualified person means a person who has received, as a part of the training, qualification, and designation program required under § 232.203, instruction and training necessary to perform one or more functions required under this part. The railroad is responsible for determining that the person has the knowledge and skills necessary to perform the required function for which the person is assigned responsibility. The railroad determines the qualifications and competencies for employees designated to perform various functions in the manner set forth in this part. Although the rule uses the term ''qualified person'' to describe a person responsible for performing various functions required under this part, a person may be deemed qualified to perform some functions but not qualified to perform other functions. For example, although a person may be deemed qualified to perform the Class II/intermediate brake test required by this part, that same person may or may not be deemed qualified to perform the Class I/initial Terminal brake test or authorize the movement of defective equipment under this part. The railroad will determine the required functions for which an individual will be deemed a ''qualified person'' based upon the instruction and training the individual has received pursuant to § 232.203 concerning a particular function.

Railroad means any form of non-highway ground transportation that runs on rails or electromagnetic guideways, including:

(1) Commuter or short-haul railroad passenger service in a metropolitan or suburban area and commuter railroad service that was operated by the Consolidated Rail Corporation on January 1, 1979; and

(2) High speed ground transportation systems that connect metropolitan areas, without regard to whether those systems use new technologies not associated with traditional railroads. The term ''railroad'' is also intended to mean a person that provides transportation by railroad, whether directly or by contracting out operation of the railroad to another person. The term does not include rapid transit operations in an urban area that are not connected to the general railroad system of transportation.

Rebuilt equipment means equipment that has undergone overhaul identified by the railroad as a capital expense under the Surface Transportation Board's accounting standards.

Refresher training means periodic retraining required for employees or contractors to remain qualified to perform specific equipment troubleshooting, inspection, testing, maintenance, or repair functions.

Respond as intended means to produce the result that a device or system is designed to produce.

''Roll-by'' inspection means an inspection performed while equipment is moving.

Service application means a brake application that results from one or more service reductions or the equivalent.

Service reduction means a decrease in brake pipe pressure, usually from 5 to 25 psi at a rate sufficiently rapid to move the operating valve to service position, but at a rate not rapid enough to move the operating valve to emergency position.

Solid block of cars means two or more freight cars consecutively coupled together and added to or removed from a train as a single unit.

State inspector means an inspector of a participating State rail safety program under part 212 of this chapter.

Switching service means the classification of freight cars according to commodity or destination; assembling of cars for train movements; changing the position of cars for purposes of loading, unloading, or weighing; placing of locomotives and cars for repair or storage; or moving of rail equipment in connection with work service that does not constitute a train movement.

Tourist, scenic, historic, or excursion operations are railroad operations that carry passengers, often using antiquated equipment, with the conveyance of the passengers to a particular destination not being the principal purpose.

Train means one or more locomotives coupled with one or more freight cars, except during switching service.

Train line means the brake pipe or any non-pneumatic system used to transmit the signal that controls the locomotive and freight car brakes.

Train, unit or *train, cycle* means a train that, except for the changing of locomotive power and the removal or replacement of defective equipment, remains coupled as a consist and continuously operates from location A to location B and back to location A.

Transfer train means a train that travels between a point of origin and a point of final destination not exceeding 20 miles. Such trains may pick up or deliver freight equipment while en route to destination.

Yard air means a source of compressed air other than from a locomotive.

§ 232.7 Waivers.

(a) Any person subject to a requirement of this part may petition the Administrator for a waiver of compliance with such requirement. The filing of such a petition does not affect that person's responsibility for compliance with that requirement while the petition is being considered.

(b) Each petition for waiver must be filed in the manner and contain the information required by part 211 of this chapter.

(c) If the Administrator finds that a waiver of compliance is in the public interest and is consistent with railroad safety, the Administrator may grant the waiver subject to any conditions the Administrator deems necessary. If a waiver is granted, the Administrator

publishes a notice in the **Federal Register** containing the reasons for granting the waiver.

§ 232.9 Responsibility for compliance.

(a) A railroad subject to this part shall not use, haul, permit to be used or hauled on its line, offer in interchange, or accept in interchange any train, railroad car, or locomotive with one or more conditions not in compliance with this part; however, a railroad shall not be liable for a civil penalty for such action if such action is in accordance with § 232.15. For purposes of this part, a train, railroad car, or locomotive will be considered in use prior to departure but after it has received, or should have received, the inspection required for movement and is deemed ready for service.

(b) Although many of the requirements of this part are stated in terms of the duties of a railroad, when any person performs any function required by this part, that person (whether or not a railroad) is required to perform that function in accordance with this part.

(c) Any person performing any function or task required by this part shall be deemed to have consented to FRA inspection of the person's operation to the extent necessary to determine whether the function or task is being performed in accordance with the requirements of this part.

§ 232.11 Penalties.

(a) Any person (including but not limited to a railroad; any manager, supervisor, official, or other employee or agent of a railroad; any owner, manufacturer, lessor, or lessee of railroad equipment, track, or facilities; any employee of such owner, manufacturer, lessor, lessee, or independent contractor) who violates any requirement of this part or causes the violation of any such requirement is subject to a civil penalty of at least $500, but not more than $11,000 per violation, except that: Penalties may be assessed against individuals only for willful violations, and, where a grossly negligent violation or a pattern of repeated violations has created an imminent hazard of death or injury to persons, or has caused death or injury, a penalty not to exceed $22,000 per violation may be assessed. Each day a violation continues shall constitute a separate offense. Appendix A to this part contains a schedule of civil penalty amounts used in connection with this rule.

(b) Any person who knowingly and willfully falsifies a record or report required by this part is subject to criminal penalties under 49 U.S.C. 21311.

§ 232.13 Preemptive effect.

(a) Under 49 U.S.C. 20106, issuance of the regulations in this part preempts any State law, rule, regulation, order, or standard covering the same subject matter, except for a provision necessary to eliminate or reduce a local safety hazard if that provision is not incompatible with this part and does not impose an undue burden on interstate commerce.

(b) Preemption should also be considered pursuant to the Locomotive Boiler Inspection Act (now codified at 49 U.S.C. 20701–20703), the Safety Appliance Acts (now codified at 49 U.S.C. 20301–20304), and the Commerce Clause based on the relevant case law pertaining to preemption under those provisions.

(c) FRA does not intend by issuance of the regulations in this part to preempt provisions of State criminal law that impose sanctions for reckless conduct that leads to actual loss of life, injury, or damage to property, whether such provisions apply specifically to railroad employees or generally to the public at large.

§ 232.15 Movement of defective equipment.

(a) *General provision.* Except as provided in paragraph (c) of this section, a railroad car or locomotive with one or more conditions not in compliance with this part may be used or hauled without civil penalty liability under this part only if *all* of the following conditions are met:

(1) The defective car or locomotive is properly equipped in accordance with the applicable provisions of 49 U.S.C. chapter 203 and the requirements of this part.

(2) The car or locomotive becomes defective while it is being used by the railroad on its line or becomes defective on the line of a connecting railroad and is properly accepted in interchange for repairs in accordance with paragraph (a)(7) of this section.

(3) The railroad first discovers the defective condition of the car or locomotive prior to moving it for repairs.

(4) The movement of the defective car or locomotive for repairs is from the location where the car or locomotive is first discovered defective by the railroad.

(5) The defective car or locomotive cannot be repaired at the location where the railroad first discovers it to be defective.

(6) The movement of the car or locomotive is necessary to make repairs to the defective condition.

(7) The location to which the car or locomotive is being taken for repair is the nearest available location where necessary repairs can be performed on the line of the railroad where the car or locomotive was first found to be defective or is the nearest available location where necessary repairs can be performed on the line of a connecting railroad if:

(i) The connecting railroad elects to accept the defective car or locomotive for such repair; and

(ii) The nearest available location where necessary repairs can be performed on the line of the connecting railroad is no farther than the nearest available location where necessary repairs can be performed on the line of the railroad where the car or locomotive was found defective.

(8) The movement of the defective car or locomotive for repairs is not by a train required to receive a Class I brake test at that location pursuant to § 232.205.

(9) The movement of the defective car or locomotive for repairs is not in a train in which less than 85 percent of the cars have operative and effective brakes.

(10) The defective car or locomotive is tagged, or information is recorded, as prescribed in paragraph (b) of this section.

(11) Except for cars or locomotives with brakes cut out en route, the following additional requirements are met:

(i) A qualified person shall determine—

(A) That it is safe to move the car or locomotive; and

(B) The maximum safe speed and other restrictions necessary for safely conducting the movement.

(ii) The person in charge of the train in which the car or locomotive is to be moved shall be notified in writing and inform all other crew members of the presence of the defective car or locomotive and the maximum speed and other restrictions determined under paragraph (a)(11)(i)(B) of this section. A copy of the tag or card described in paragraph (b) of this section may be used to provide the notification required by this paragraph.

(iii) The defective car or locomotive is moved in compliance with the maximum speed and other restrictions determined under paragraph (a)(11)(i)(B) of this section.

(12) The defective car or locomotive is not subject to a Special Notice for Repair under part 216 of this chapter, unless the movement of the defective

car is made in accordance with the restrictions contained in the Special Notice.

(b) *Tagging of defective equipment.*

(1) At the place where the railroad first discovers the defect, a tag or card shall be placed on both sides of the defective equipment or locomotive and in the cab of the locomotive, or an automated tracking system approved for use by FRA shall be provided with the following information about the defective equipment:

(i) The reporting mark and car or locomotive number;

(ii) The name of the inspecting railroad;

(iii) The name and job title of the inspector;

(iv) The inspection location and date;

(v) The nature of each defect;

(vi) A description of any movement restrictions;

(vii) The destination of the equipment where it will be repaired; and

(viii) The signature, or electronic identification, of the person reporting the defective condition.

(2) The tag or card required by paragraph (b)(1) of this section shall remain affixed to the defective equipment until the necessary repairs have been performed.

(3) An electronic or written record or a copy of each tag or card attached to or removed from a car or locomotive shall be retained for 90 days and, upon request, shall be made available within 15 calendar days for inspection by FRA or State inspectors.

(4) Each tag or card removed from a car or locomotive shall contain the date, location, reason for its removal, and the signature of the person who removed it from the piece of equipment.

(5) Any automated tracking system approved by FRA to meet the tagging requirements contained in paragraph (b)(1) of this section shall be capable of being reviewed and monitored by FRA at any time to ensure the integrity of the system. FRA's Associate Administrator for Safety may prohibit or revoke a railroad's authority to utilize an approved automated tracking system in lieu of tagging if FRA finds that the automated tracking system is not properly secure, is inaccessible to FRA or a railroad's employees, or fails to adequately track and monitor the movement of defective equipment. FRA will record such a determination in writing, include a statement of the basis for such action, and provide a copy of the document to the railroad.

(c) *Movement for unloading or purging of defective cars.* If a defective car is loaded with a hazardous material or contains residue of a hazardous material, the car may not be placed for unloading or purging unless unloading or purging is consistent with determinations made and restrictions imposed under paragraph (a)(11)(i) of this section and the unloading or purging is necessary for the safe repair of the car.

(d) *Computation of percent operative power brakes.*

(1) The percentage of operative power brakes in a train shall be based on the number of control valves in the train. The percentage shall be determined by dividing the number of control valves that are cut-in by the total number of control valves in the train. A control valve shall not be considered cut-in if the brakes controlled by that valve are inoperative. Both cars and locomotives shall be considered when making this calculation.

(2) The following brake conditions not in compliance with this part are not considered inoperative power brakes for purposes of this section:

(i) Failure or cutting out of secondary brake systems;

(ii) Inoperative or otherwise defective handbrakes or parking brakes;

(iii) Piston travel that is in excess of the Class I brake test limits required in § 232.205 but that does not exceed the outside limits contained on the stencil, sticker, or badge plate required by § 232.103(g) for considering the power brakes to be effective; and

(iv) Power brakes overdue for inspection, testing, maintenance, or stenciling under this part.

(e) *Placement of equipment with inoperative brakes.*

(1) A freight car or locomotive with inoperative brakes shall not be placed as the rear car of the train.

(2) No more than two freight cars with either inoperative brakes or not equipped with power brakes shall be consecutively placed in the same train.

(3) Multi-unit articulated equipment shall not be placed in a train if the equipment has more than two consecutive individual control valves cut-out or if the brakes controlled by the valves are inoperative.

(f) *Guidelines for determining locations where necessary repairs can be performed.* The following guidelines will be considered by FRA when determining whether a location is a location where repairs to a car's brake system or components can be performed and whether a location is the nearest location where the needed repairs can be effectuated.

(1) The following general factors and guidelines will be considered when making determinations as to whether a location is a location where brake repairs can be performed:

(i) The accessibility of the location to persons responsible for making repairs;

(ii) The presence of hazardous conditions that affect the ability to safely make repairs of the type needed at the location;

(iii) The nature of the repair necessary to bring the car into compliance;

(iv) The need for railroads to have in place an effective means to ensure the safe and timely repair of equipment;

(v) The relevant weather conditions at the location that affect accessibility or create hazardous conditions;

(vi) A location need not have the ability to effectuate every type of brake system repair in order to be considered a location where some brake repairs can be performed;

(vii) A location need not be staffed continuously in order to be considered a location where brake repairs can be performed;

(viii) The ability of a railroad to perform repair track brake tests or single car tests at a location shall not be considered; and

(ix) The congestion of work at a location shall not be considered

(2) The general factors and guidelines outlined in paragraph (f)(1) of this section should be applied to the following locations:

(i) A location where a mobile repair truck is used on a regular basis;

(ii) A location where a mobile repair truck originates or is permanently stationed;

(iii) A location at which a railroad performs mechanical repairs other than brake system repairs; and

(iv) A location that has an operative repair track or repair shop;

(3) In determining whether a location is the nearest location where the necessary brake repairs can be made, the distance to the location is a key factor but should not be considered the determining factor. The distance to a location must be considered in conjunction with the factors and guidance outlined in paragraphs (f)(1) and (f)(2) of this section. In addition, the following safety factors must be considered in order to optimize safety:

(i) The safety of the employees responsible for getting the equipment to or from a particular location; and

(ii) The potential safety hazards involved with moving the equipment in the direction of travel necessary to get the equipment to a particular location.

(g) Based on the guidance detailed in paragraph (f) of this section and consistent with other requirements contained in this part, a railroad and the representatives of the railroad's

employees may submit, for FRA approval, a joint proposal containing a plan designating locations where brake system repairs will be performed. Approval of such plans shall be made in writing by FRA's Associate Administrator for Safety and shall be subject to any modifications or changes determined by FRA to be necessary to ensure consistency with the requirements and guidance contained in this part.

§ 232.17 Special approval procedure.

(a) *General.* The following procedures govern consideration and action upon requests for special approval of an alternative standard under §§ 232.305 and 232.307; and for special approval of pre-revenue service acceptance testing plans under subpart F of this part.

(b) *Petitions for special approval of an alternative standard.* Each petition for special approval of an alternative standard shall contain:

(1) The name, title, address, and telephone number of the primary person to be contacted with regard to review of the petition;

(2) The alternative proposed, in detail, to be substituted for the particular requirement of this part;

(3) Appropriate data or analysis, or both, for FRA to consider in determining whether the alternative will provide at least an equivalent level of safety; and

(4) A statement affirming that the railroad has served a copy of the petition on designated representatives of its employees, together with a list of the names and addresses of the persons served.

(c) *Petitions for special approval of pre-revenue service acceptance testing plan.* Each petition for special approval of a pre-revenue service acceptance testing plan shall contain:

(1) The name, title, address, and telephone number of the primary person to be contacted with regard to review of the petition; and

(2) The elements prescribed in § 232.505.

(d) *Service.*

(1) Each petition for special approval under paragraph (b) or (c) of this section shall be submitted in triplicate to the Associate Administrator for Safety, Federal Railroad Administration, 400 7th Street, SW., Washington, DC 20590.

(2) Service of each petition for special approval of an alternative standard under paragraph (b) of this section shall be made on the following:

(i) Designated employee representatives responsible for the equipment's operation, inspection, testing, and maintenance under this part;

(ii) Any organizations or bodies that either issued the standard incorporated in the section(s) of the rule to which the special approval pertains or issued the alternative standard that is proposed in the petition; and

(iii) Any other person who has filed with FRA a current statement of interest in reviewing special approvals under the particular requirement of this part at least 30 days but not more than 5 years prior to the filing of the petition. If filed, a statement of interest shall be filed with FRA's Associate Administrator for Safety and shall reference the specific section(s) of this part in which the person has an interest.

(e) ***Federal Register*** *notice.* FRA will publish a notice in the **Federal Register** concerning each petition under paragraph (b) of this section.

(f) *Comment.* Not later than 30 days from the date of publication of the notice in the **Federal Register** concerning a petition under paragraph (b) of this section, any person may comment on the petition.

(1) A comment shall set forth specifically the basis upon which it is made, and contain a concise statement of the interest of the commenter in the proceeding.

(2) The comment shall be submitted in triplicate to the Associate Administrator for Safety, Federal Railroad Administration, 400 7th Street, SW., Washington, DC 20590.

(3) The commenter shall certify that a copy of the comment was served on each petitioner.

(g) *Disposition of petitions.*

(1) If FRA finds that the petition complies with the requirements of this section and that the proposed alternative standard or pre-revenue service plan is acceptable and justified, the petition will be granted, normally within 90 days of its receipt. If the petition is neither granted nor denied within 90 days, the petition remains pending for decision. FRA may attach special conditions to the approval of any petition. Following the approval of a petition, FRA may reopen consideration of the petition for cause.

(2) If FRA finds that the petition does not comply with the requirements of this section and that the alternative standard or pre-revenue service plan is not acceptable or justified, the petition will be denied, normally within 90 days of its receipt.

(3) When FRA grants or denies a petition, or reopens consideration of the petition, written notice is sent to the petitioner and other interested parties.

§ 232.19 Availability of records.

Except as otherwise provided, the records and plans required by this part shall be made available to representatives of FRA and States participating under part 212 of this chapter for inspection and copying upon request.

§ 232.21 Information Collection.

(a) The information collection requirements of this part were reviewed by the Office of Management and Budget pursuant to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.) and are assigned OMB control number 2130–0008.

(b) The information collection requirements are found in the following sections: §§ 229.27, 231.31, 232.1, 232.3, 232.7, 232.11, 232.15, 232.17, 232.103, 232.105, 232.107, 232.109, 232.111, 232.203, 232.205, 232.207, 232.209, 232.211, 232.213, 232.303, 232.307, 232.309, 232.403, 232.405, 232.407, 232.409, 232.503, 232.505.

Subpart B—General Requirements

§ 232.101 Scope.

This subpart contains general operating, performance, and design requirements for each railroad that operates freight or other non-passenger trains and for specific equipment used in those operations.

§ 232.103 General requirements for all train brake systems.

(a) The primary brake system of a train shall be capable of stopping the train with a service application from its maximum operating speed within the signal spacing existing on the track over which the train is operating.

(b) If the integrity of the train line of a train brake system is broken, the train shall be stopped. If a train line uses other than solely pneumatic technology, the integrity of the train line shall be monitored by the brake control system.

(c) A train brake system shall respond as intended to signals from the train line.

(d) One hundred percent of the brakes on a train shall be effective and operative brakes prior to use or departure from any location where a Class I brake test is required to be performed on the train pursuant to § 232.205.

(e) A train shall not move if less than 85 percent of the cars in that train have operative and effective brakes.

(f) Each car in a train shall have its air brakes in effective operating condition unless the car is being moved for repairs in accordance with § 232.15. The air brakes on a car are not in effective

operating condition if its brakes are cut-out or otherwise inoperative or if the piston travel exceeds:

(1) 10½ inches for cars equipped with nominal 12-inch stroke brake cylinders; or

(2) The piston travel limits indicated on the stencil, sticker, or badge plate for the brake cylinder with which the car is equipped.

(g) Except for cars equipped with nominal 12-inch stroke (8½ and 10-inch diameters) brake cylinders, all cars shall have a legible decal, stencil, or sticker affixed to the car or shall be equipped with a badge plate displaying the permissible brake cylinder piston travel range for the car at Class I brake tests and the length at which the piston travel renders the brake ineffective, if different from Class I brake test limits. The decal, stencil, sticker, or badge plate shall be located so that it may be easily read and understood by a person positioned safely beside the car.

(h) All equipment ordered on or after August 1, 2002, or placed in service for the first time on or after April 1, 2004, shall have train brake systems designed so that an inspector can observe from a safe position either the piston travel, an accurate indicator which shows piston travel, or any other means by which the brake system is actuated. The design shall not require the inspector to place himself or herself on, under, or between components of the equipment to observe brake actuation or release.

(i) All trains shall be equipped with an emergency application feature that produces an irretrievable stop, using a brake rate consistent with prevailing adhesion, train safety, and brake system thermal capacity. An emergency application shall be available at all times, and shall be initiated by an unintentional parting of the train line or loss of train brake communication.

(j) A railroad shall set the maximum main reservoir working pressure.

(k) The maximum brake pipe pressure shall not be greater than 15 psi less than the air compressor governor starting or loading pressure.

(l) Except as otherwise provided in this part, all equipment used in freight or other non-passenger trains shall, at a minimum, meet the Association of American Railroads (AAR) Standard S–469–47, ''Performance Specification for Freight Brakes,'' contained in the AAR *Manual of Standards and Recommended Practices, Section E* (April 1, 1999). The incorporation by reference of this AAR standard was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of the incorporated document from the Association of American Railroads, 50 F Street, NW, Washington, DC. 20001. You may inspect a copy of the document at the Federal Railroad Administration, Docket Clerk, 1120 Vermont Avenue, NW, Suite 7000, Washington, DC or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC 20408.

(m) If a train qualified by the Air Flow Method as provided for in subpart C of this part experiences a brake pipe air flow of greater than 60 CFM or brake pipe gradient of greater than 15 psi while en route and the movable pointer does not return to those limits within a reasonable time, the train shall be stopped at the next available location and be inspected for leaks in the brake system.

(n) *Securement of unattended equipment.* A train's air brake shall not be depended upon to hold equipment standing unattended on a grade (including a locomotive, a car, or a train whether or not locomotive is attached). For purposes of this section, ''unattended equipment'' means equipment left standing and unmanned in such a manner that the brake system of the equipment cannot be readily controlled by a qualified person. Unattended equipment shall be secured in accordance with the following requirements:

(1) A sufficient number of hand brakes shall be applied to hold the equipment. Railroads shall develop and implement a process or procedure to verify that the applied hand brakes will sufficiently hold the equipment with the air brakes released.

(2) Where possible, an emergency brake application of the air brakes shall be initiated prior to leaving equipment unattended.

(3) The following requirements apply to the use of hand brakes on unattended locomotives:

(i) All hand brakes shall be fully applied on all locomotives in the lead consist of an unattended train.

(ii) All hand brakes shall be fully applied on all locomotives in an unattended locomotive consist outside of yard limits.

(iii) At a minimum, the hand brake shall be fully applied on the lead locomotive in an unattended locomotive consist within yard limits.

(4) A railroad shall adopt and comply with a process or procedures to verify that the applied hand brakes will sufficiently hold an unattended locomotive consist. A railroad shall also adopt and comply with instructions to address throttle position, status of the reverse lever, position of the generator field switch, status of the independent brakes, position of the isolation switch, and position of the automatic brake valve on all unattended locomotives. The procedures and instruction required in this paragraph shall take into account winter weather conditions as they relate to throttle position and reverser handle.

(5) Any hand brakes applied to hold unattended equipment shall not be released until it is known that the air brake system is properly charged.

(o) Air pressure regulating devices shall be adjusted for the following pressures:

Locomotives	PSI
(1) Minimum brake pipe air pressure:	
Road Service	90
Switch Service	60
(2) Minimum differential between brake pipe and main reservoir air pressures, with brake valve in running position	15
(3) Safety valve for straight air brake	30–55
(4) Safety valve for LT, ET, No. 8–EL, No. 14 El, No. 6–DS, No. 6–BL and No. 6–SL equipment	30–68
(5) Safety valve for HSC and No. 24–RL equipment	30–75
(6) Reducing valve for independent or straight air brake	30–50
(7) Self-lapping portion for electro-pneumatic brake (minimum full application pressure)	50
(8) Self-lapping portion for independent air brake (full application pressure)	30 or less
(9) Reducing valve for high-speed brake (minimum)	50

(p) Railroad or contract supervisors shall be held jointly responsible with the inspectors and train crew members they supervise for the condition and proper functioning of train brake systems to the extent that it is possible

to detect defective equipment by the inspections and tests required by this part.

§ 232.105 General requirements for locomotives.

(a) The air brake equipment on a locomotive shall be in safe and suitable condition for service.

(b) All locomotives ordered on or after August 1, 2002, or placed in service for the first time on or after April 1, 2004, shall be equipped with a hand or parking brake that is:

(1) Capable of application or activation by hand;

(2) Capable of release by hand; and

(3) Capable of holding the unit on a three (3) percent grade.

(c) On locomotives so equipped, the hand or parking brake as well as its parts and connections shall be inspected, and necessary repairs made, as often as service requires but no less frequently than every 368 days. The date of the last inspection shall be either entered on Form FRA F 6180–49A or suitably stenciled or tagged on the locomotive.

(d) The amount of leakage from the equalizing reservoir on locomotives and related piping shall be zero, unless the system is capable of maintaining the set pressure at any service application with the brakes control valve in the freight position. If such leakage is detected en route, the train may be moved only to the nearest forward location where the equalizing-reservoir leakage can be corrected. On locomotives equipped with electronic brakes, if the system logs or displays a fault related to equalizing reservoir leakage, the train may be moved only to the nearest forward location where the necessary repairs can be made.

(e) Use of the feed or regulating valve to control braking is prohibited.

(f) The passenger position on the locomotive brake control stand shall be used only if the trailing equipment is designed for graduated brake release or if equalizing reservoir leakage occurs en route and its use is necessary to safely control the movement of the train until it reaches the next forward location where the reservoir leakage can be corrected.

(g) When taking charge of a locomotive or locomotive consist, an engineer must know that the brakes are in operative condition.

§ 232.107 Air source requirements and cold weather operations.

(a) *Monitoring plans for yard air sources.*

(1) A railroad shall adopt and comply with a written plan to monitor all yard air sources, other than locomotives, to determine that they operate as intended and do not introduce contaminants into the brake system of freight equipment.

(2) This plan shall require the railroad to:

(i) Inspect each yard air source at least two times per calendar year, no less than five months apart, to determine it operates as intended and does not introduce contaminants into the brake system of the equipment it services.

(ii) Identify yard air sources found not to be operating as intended or found introducing contaminants into the brake system of the equipment it services.

(iii) Repair or take other remedial action regarding any yard air source identified under paragraph (a)(2)(ii) of this section.

(3) A railroad shall maintain records of the information and actions required by paragraph (a)(2). These records shall be maintained for a period of at least one year from the date of creation and may be maintained either electronically or in writing.

(b) Condensation and other contaminants shall be blown from the pipe or hose from which compressed air is taken prior to connecting the yard air line or motive power to the train.

(c) No chemicals which are known to degrade or harm brake system components shall be placed in the train air brake system.

(d) Yard air reservoirs shall either be equipped with an operable automatic drain system or be manually drained at least once each day that the devices are used or more often if moisture is detected in the system.

(e) A railroad shall adopt and comply with detailed written operating procedures tailored to the equipment and territory of that railroad to cover safe train operations during cold weather. For purposes of this provision, ''cold weather'' means when the ambient temperature drops below 10 degrees Fahrenheit (F) (minus 12.2 degrees Celsius).

§ 232.109 Dynamic brake requirements.

(a) Except as provided in paragraph (i) of this section, a locomotive engineer shall be informed of the operational status of the dynamic brakes on all locomotive units in the consist at the initial terminal or point of origin for a train and at other locations where a locomotive engineer first begins operation of a train. The information required by this paragraph may be provided to the locomotive engineer by any means determined appropriate by the railroad; however, a written or electronic record of the information shall be maintained in the cab of the controlling locomotive.

(b) Except as provided in paragraph (e) of this section, all inoperative dynamic brakes shall be repaired within 30 calendar days of becoming inoperative or at the locomotive's next periodic inspection pursuant to § 229.23 of this chapter, whichever occurs first.

(c) Except as provided in paragraph (e) of this section, a locomotive discovered with inoperative dynamic brakes shall have a tag bearing the words ''inoperative dynamic brake'' securely attached and displayed in a conspicuous location in the cab of the locomotive. This tag shall contain the following information:

(1) The locomotive number;

(2) The name of the discovering carrier;

(3) The location and date where condition was discovered; and

(4) The signature of the person discovering the condition.

(d) An electronic or written record of repairs made to a locomotive's dynamic brakes shall be retained for 92 days.

(e) A railroad may elect to declare the dynamic brakes on a locomotive deactivated without removing the dynamic brake components from the locomotive, only if all of the following conditions are met:

(1) The locomotive is clearly marked with the words ''dynamic brake deactivated'' in a conspicuous location in the cab of the locomotive; and

(2) The railroad has taken appropriate action to ensure that the deactivated locomotive is incapable of utilizing dynamic brake effort to retard or control train speed.

(f) If a locomotive consist is intended to have its dynamic brakes used while in transit, a locomotive with inoperative or deactivated dynamic brakes or a locomotive not equipped with dynamic brakes shall not be placed in the controlling (lead) position of a consist unless the locomotive has the capability of:

(1) Controlling the dynamic braking effort in trailing locomotives in the consist that are so equipped; and

(2) Displaying to the locomotive engineer the deceleration rate of the train or the total train dynamic brake retarding force.

(g) All locomotives equipped with dynamic brakes and ordered on or after August 1, 2002, or placed in service for the first time on or after April 1, 2004, shall be designed to:

(1) Test the electrical integrity of the dynamic brake at rest; and

(2) Display the available total train dynamic brake retarding force at various speed increments in the cab of the controlling (lead) locomotive.

(h) All rebuilt locomotives equipped with dynamic brakes and placed in service on or after April 1, 2004, shall be designed to:

(1) Test the electrical integrity of the dynamic brake at rest; and

(2) Display either the train deceleration rate or the available total train dynamic brake retarding force at various speed increments in the cab of the controlling (lead) locomotive.

(i) The information required by paragraph (a) of this section is not required to be provided to the locomotive engineer if all of the locomotives in the lead consist of a train are equipped in accordance with paragraph (g) of this section.

(j) A railroad operating a train with a brake system that includes dynamic brakes shall adopt and comply with written operating rules governing safe train handling procedures using these dynamic brakes under all operating conditions, which shall be tailored to the specific equipment and territory of the railroad. The railroad's operating rules shall:

(1) Ensure that the friction brakes are sufficient by themselves, without the aid of dynamic brakes, to stop the train safely under all operating conditions.

(2) Include a ''miles-per-hour-overspeed-stop'' rule. At a minimum, this rule shall require that any train, when descending a grade of 1 percent or greater, shall be immediately brought to a stop, by an emergency brake application if necessary, when the train's speed exceeds the maximum authorized speed for that train by more than 5 miles per hour. A railroad shall reduce the 5 mile per hour overspeed restriction if validated research indicates the need for such a reduction. A railroad may increase the 5 mile per hour overspeed restriction only with approval of FRA and based upon verifiable data and research.

(k) A railroad operating a train with a brake system that includes dynamic brakes shall adopt and comply with specific knowledge, skill, and ability criteria to ensure that its locomotive engineers are fully trained in the operating rules prescribed by paragraph (j) of this section. The railroad shall incorporate such criteria into its locomotive engineer certification program pursuant to Part 240 of this chapter,

§ 232.111 Train handling information.

(a) A railroad shall adopt and comply with written procedures to ensure that a train crew employed by the railroad is given accurate information on the condition of the train brake system and train factors affecting brake system performance and testing when the crew takes over responsibility for the train. The information required by this paragraph may be provided to the locomotive engineer by any means determined appropriate by the railroad; however, a written or electronic record of the information shall be maintained in the cab of the controlling locomotive.

(b) The procedures shall require that each train crew taking charge of a train be informed of:

(1) The total weight and length of the train, based on the best information available to the railroad;

(2) Any special weight distribution that would require special train handling procedures;

(3) The number and location of cars with cut-out or otherwise inoperative brakes and the location where they will be repaired;

(4) If a Class I or Class IA brake test is required prior to the next crew change point, the location at which that test shall be performed; and

(5) Any train brake system problems encountered by the previous crew of the train.

Subpart C—Inspection and Testing Requirements

§ 232.201 Scope.

This subpart contains the inspection and testing requirements for brake systems used in freight and other non-passenger trains. This subpart also contains general training requirements for railroad and contract personnel used to perform the required inspections and tests.

§ 232.203 Training requirements.

(a) Each railroad and each contractor shall adopt and comply with a training, qualification, and designation program for its employees that perform brake system inspections, tests, or maintenance. For purposes of this section, a ''contractor'' is defined as a person under contract with the railroad or car owner. The records required by this section may be maintained either electronically or in writing.

(b) As part of this program, the railroad or contractor shall:

(1) Identify the tasks related to the inspection, testing, and maintenance of the brake system required by this part that must be performed by the railroad or contractor and identify the skills and knowledge necessary to perform each task.

(2) Develop or incorporate a training curriculum that includes both classroom and ''hands-on'' lessons designed to impart the skills and knowledge identified as necessary to perform each task. The developed or incorporated training curriculum shall specifically address the Federal regulatory requirements contained in this part that are related to the performance of the tasks identified.

(3) Require all employees to successfully complete a training curriculum that covers the skills and knowledge the employee will need to possess in order to perform the tasks required by this part that the employee will be responsible for performing, including the specific Federal regulatory requirements contained in this part related to the performance of a task for which the employee will be responsible;

(4) Require all employees to pass a written or oral examination covering the skills and knowledge the employee will need to possess in order to perform the tasks required by this part that the employee will be responsible for performing, including the specific Federal regulatory requirements contained in this part related to the performance of a task for which the employee will be responsible for performing;

(5) Require all employees to individually demonstrate ''hands-on'' capability by successfully applying the skills and knowledge the employee will need to possess in order to perform the tasks required by this part that the employee will be responsible for performing to the satisfaction of the employee's supervisor or designated instructor;

(6) Consider training and testing, including efficiency testing, previously received by an employee in order to meet the requirements contained in paragraphs (b)(3) through (b)(5) of this section; provided, such training and testing can be documented as required in paragraph (e) of this section;

(7) Require supervisors to exercise oversight to ensure that all the identified tasks are performed in accordance with the railroad's written procedures and the specific Federal regulatory requirements contained in this part;

(8) Require periodic refresher training at an interval not to exceed three years that includes classroom and ''hands-on'' training, as well as testing. Efficiency testing may be used to meet the ''hands-on'' portion of this requirement; provided, such testing is documented as required in paragraph (e) of this section; and

(9) Add new brake systems to the training, qualification and designation program prior to its introduction to revenue service.

(c) A railroad that operates trains required to be equipped with a two-way

end-of-train telemetry device pursuant to Subpart E of this part, and each contractor that maintains such devices shall adopt and comply with a training program which specifically addresses the testing, operation, and maintenance of two-way end-of-train devices for employees who are responsible for the testing, operation, and maintenance of the devices.

(d) A railroad that operates trains under conditions that require the setting of air brake pressure retaining valves shall adopt and comply with a training program which specifically addresses the proper use of retainers for employees who are responsible for using or setting retainers.

(e) A railroad or contractor shall maintain adequate records to demonstrate the current qualification status of all of its personnel assigned to inspect, test, or maintain a train brake system. The records required by this paragraph may be maintained either electronically or in writing and shall be provided to FRA upon request. These records shall include the following information concerning each such employee:

(1) The name of the employee;

(2) The dates that each training course was completed;

(3) The content of each training course successfully completed;

(4) The employee's scores on each test taken to demonstrate proficiency;

(5) A description of the employee's ''hands-on'' performance applying the skills and knowledge the employee needs to possess in order to perform the tasks required by this part that the employee will be responsible for performing and the basis for finding that the skills and knowledge were successfully demonstrated;

(6) A record that the employee was notified of his or her current qualification status and of any subsequent changes to that status;

(7) The tasks required to be performed under this part which the employee is deemed qualified to perform; and

(8) Identification of the person(s) determining that the employee has successfully completed the training necessary to be considered qualified to perform the tasks identified in paragraph (e)(7) of this section.

(9) The date that the employee's status as qualified to perform the tasks identified in paragraph (e)(7) of this section expires due to the need for refresher training.

(f) A railroad or contractor shall adopt and comply with a plan to periodically assess the effectiveness of its training program. One method of validation and assessment could be through the use of efficiency tests or periodic review of employee performance.

§ 232.205 Class I brake test-initial terminal inspection.

(a) Each train and each car in the train shall receive a Class I brake test as described in paragraph (b) of this section by a qualified person, as defined in § 232.5, at the following points:

(1) The location where the train is originally assembled (''initial terminal'');

(2) A location where the train consist is changed other than by:

(i) Adding a single car or a solid block of cars;

(ii) Removing a single car or a solid block of cars;

(iii) Removing cars determined to be defective under this chapter; or

(iv) A combination of the changes listed in paragraphs (a)(2)(i) through (a)(2)(iii) of this section (See §§ 232.209 and 232.211 for requirements related to the pick-up of cars and solid blocks of cars en route.);

(3) A location where the train is off air for a period of more than four hours;

(4) A location where a unit or cycle train has traveled 3,000 miles since its last Class I brake test; and

(5) A location where the train is received in interchange if the train consist is changed other than by:

(i) Removing a car or a solid block of cars from the train;

(ii) Adding a previously tested car or a previously tested solid block of cars to the train;

(iii) Changing motive power;

(iv) Removing or changing the caboose; or

(v) Any combination of the changes listed in paragraphs (a)(5) of this section.

(A) If changes other than those contained in paragraph (a)(5)(i)–(a)(5)(v) of this section are made to the train consist when it is received in interchange and the train will move 20 miles or less, then the railroad may conduct a brake test pursuant to § 232.209 on those cars added to the train.

(B) Reserved.

(b) A Class I brake test of a train shall consist of the following tasks and requirements:

(1) Brake pipe leakage shall not exceed 5 psi per minute or air flow shall not exceed 60 cubic feet per minute (CFM).

(i) *Leakage Test.* The brake pipe leakage test shall be conducted as follows:

(A) Charge the air brake system to the pressure at which the train will be operated, and the pressure at the rear of the train shall be within 15 psi of the pressure at which the train will be operated, but not less than 75 psi, as indicated by an accurate gauge or end-of-train device at the rear end of train;

(B) Upon receiving the signal to apply brakes for test, make a 20-psi brake pipe service reduction;

(C) If the locomotive used to perform the leakage test is equipped with a means for maintaining brake pipe pressure at a constant level during a 20-psi brake pipe service reduction, this feature shall be cut out during the leakage test; and

(D) With the brake valve lapped and the pressure maintaining feature cut out (if so equipped) and after waiting 45–60 seconds, note the brake pipe leakage as indicated by the brake-pipe gauge in the locomotive, which shall not exceed 5 psi per minute.

(ii) *Air Flow Method Test.* When a locomotive is equipped with a 26-L brake valve or equivalent pressure maintaining locomotive brake valve, a railroad may use the Air Flow Method Test as an alternate to the brake pipe leakage test. The Air Flow Method (AFM) Test shall be performed as follows:

(A) Charge the air brake system to the pressure at which the train will be operated, and the pressure at the rear of the train shall be within 15 psi of the pressure at which the train will be operated, but not less than 75 psi, as indicated by an accurate gauge or end-of-train device at the rear end of train; and

(B) Measure air flow as indicated by a calibrated AFM indicator, which shall not exceed 60 cubic feet per minute (CFM).

(iii) The AFM indicator shall be calibrated for accuracy at periodic intervals not to exceed 92 days. The AFM indicator calibration test orifices shall be calibrated at temperatures of not less than 20 degrees Fahrenheit. AFM indicators shall be accurate to within ± 3 standard cubic feet per minute (CFM).

(2) The inspector shall position himself/herself, taking positions on each side of each car sometime during the inspection process, so as to be able to examine and observe the functioning of all moving parts of the brake system on each car in order to make the determinations and inspections required by this section. A ''roll-by'' inspection of the brake release as provided for in paragraph (b)(8) of this section shall not constitute an inspection of that side of the train for purposes of this requirement;

(3) The train brake system shall be charged to the pressure at which the

train will be operated, and the pressure at the rear of the train shall be within 15 psi of the pressure at which the train will be operated, but not less than 75 psi, angle cocks and cutout cocks shall be properly positioned, air hoses shall be properly coupled and shall not kink, bind, or foul or be in any other condition that restricts air flow. An examination must be made for leaks and necessary repairs made to reduce leakage to the required minimum. Retaining valves and retaining valve pipes shall be inspected and known to be in proper condition for service;

(4) The brakes on each car and shall apply in response to a 20-psi brake pipe service reduction and shall remain applied until a release of the air brakes has been initiated by the controlling locomotive or yard test device. The brakes shall not be applied or released until the proper signal is given. A car found with brakes that fail to apply or remain applied may be retested and remain in the train if the retest is conducted at the pressure the train will be operated from the controlling locomotive, head end of the consist, or a suitable test device, as described in § 232.217(a) of this part, positioned at one end of the car(s) being retested and the brakes remain applied until a release is initiated after a period which is no less than three minutes. If the retest is performed at the car(s) being retested with a suitable device, the compressed air in the car(s) shall be depleted prior to disconnecting the hoses between the car(s) to perform the retest;

(5) For cars equipped with 8½-inch or 10-inch diameter brake cylinders, piston travel shall be within 7 to 9 inches. If piston travel is found to be less than 7 inches or more than 9 inches, it must be adjusted to nominally 7½ inches. For cars not equipped with 8½-inch or 10-inch diameter brake cylinders, piston travel shall be within the piston travel stenciled or marked on the car or badge plate. Minimum brake cylinder piston travel of truck-mounted brake cylinders must be sufficient to provide proper brake shoe clearance when the brakes are released. Piston travel must be inspected on each freight car while the brakes are applied;

(6) Brake rigging shall be properly secured and shall not bind or foul or otherwise adversely affect the operation of the brake system;

(7) All parts of the brake equipment shall be properly secured. On cars where the bottom rod passes through the truck bolster or is secured with cotter keys equipped with a locking device to prevent their accidental removal, bottom rod safety supports are not required; and

(8) When the release is initiated by the controlling locomotive or yard test device, the brakes on each freight car shall be inspected to verify that it did release; this may be performed by a ''roll-by'' inspection. If a ''roll-by'' inspection of the brake release is performed, train speed shall not exceed 10 MPH and the qualified person performing the ''roll-by'' inspection shall communicate the results of the inspection to the operator of the train. The operator of the train shall note successful completion of the release portion of the inspection on the record required in paragraph (d) of this section.

(c) Where a railroad's collective bargaining agreement provides that a carman is to perform the inspections and tests required by this section, a carman alone will be considered a qualified person. In these circumstances, the railroad shall ensure that the carman is properly trained and designated as a qualified person or qualified mechanical inspector pursuant to the requirements of this part.

(d) A railroad shall notify the locomotive engineer that the Class I brake test was satisfactorily performed and provide the information required in this paragraph to the locomotive engineer or place the information in the cab of the controlling locomotive following the test. The information required by this paragraph may be provided to the locomotive engineer by any means determined appropriate by the railroad; however, a written or electronic record of the information shall be retained in the cab of the controlling locomotive until the train reaches its destination. The written or electronic record shall contain the date, time, number of freight cars inspected, and identify the qualified person(s) performing the test and the location where the Class I brake test was performed.

(e) Before adjusting piston travel or working on brake rigging, cutout cock in brake pipe branch must be closed and air reservoirs must be voided of all compressed air. When cutout cocks are provided in brake cylinder pipes, these cutout cocks only may be closed and air reservoirs need not be voided of all compressed air.

(f) Except as provided in § 232.209, each car or solid block of cars, as defined in § 232.5, that has not received a Class I brake test or that has been off air for more than four hours and that is added to a train shall receive a Class I test when added to a train. A Class III brake test as described in § 232.211 shall then be performed on the entire new train.

§ 232.207 Class IA brake tests—1,000-mile inspection.

(a) Except as provided in § 232.213, each train shall receive a Class IA brake test performed by a qualified person, as defined in § 232.5, at a location that is not more than 1,000 miles from the point where any car in the train last received a Class I or Class IA brake test. The most restrictive car or block of cars in the train shall determine the location of this test.

(b) A Class IA brake test of a train shall consist of the following tasks and requirements:

(1) Brake pipe leakage shall not exceed 5 psi per minute or air flow shall not exceed 60 cubic feet per minute (CFM). The brake pipe leakage test or air flow method test shall be conducted pursuant to the requirements contained in § 232.205(b)(1);

(2) The inspector shall position himself/herself, taking positions on each side of each car sometime during the inspection process, so as to be able to examine and observe the functioning of all moving parts of the brake system on each car in order to make the determinations and inspections required by this section;

(3) The air brake system shall be charged to the pressure at which the train will be operated, and the pressure at the rear of the train shall be within 15 psi of the pressure at which the train will be operated, but not less than 75 psi, as indicated by an accurate gauge or end-of-train device at rear end of train;

(4) The brakes on each car shall apply in response to a 20-psi brake pipe service reduction and shall remain applied until the release is initiated by the controlling locomotive. A car found with brakes that fail to apply or remain applied may be retested and remain in the train if the retest is conducted as prescribed in § 232.205(b)(4); otherwise, the defective equipment may only be moved pursuant to the provisions contained in § 232.15, if applicable;

(5) Brake rigging shall be properly secured and shall not bind or foul or otherwise adversely affect the operation of the brake system; and

(6) All parts of the brake equipment shall be properly secured.

(c) A railroad shall designate the locations where Class IA brake tests will be performed, and the railroad shall furnish to the Federal Railroad Administration upon request a description of each location designated. A railroad shall notify FRA's Associate Administrator for Safety in writing 30 days prior to any change in the locations designated for such tests and inspections.

(1) Failure to perform a Class IA brake test on a train at a location designated pursuant to this paragraph constitutes a failure to perform a proper Class IA brake test if the train is due for such a test at that location.

(2) In the event of an emergency that alters normal train operations, such as a derailment or other unusual circumstance that adversely affects the safe operation of the train, the railroad is not required to provide prior written notification of a change in the location where a Class IA brake test is performed to a location not on the railroad's list of designated locations for performing Class IA brake tests, provided that the railroad notifies FRA's Associate Administrator for Safety and the pertinent FRA Regional Administrator within 24 hours after the designation has been changed and the reason for that change.

§ 232.209 Class II brake tests—intermediate inspection.

(a) At a location other than the initial terminal of a train, a Class II brake test shall be performed by a qualified person, as defined in § 232.5, on the following equipment when added to a train:

(1) Each car or solid block of cars, as defined in § 232.5, that has not previously received a Class I brake test or that has been off air for more than four hours;

(2) Each solid block of cars, as defined in § 232.5, that is comprised of cars from more than one previous train; and

(3) Each solid block of cars that is comprised of cars from only one previous train but the cars of which have not remained continuously and consecutively coupled together with the train line remaining connected, other than for removing defective equipment, since being removed from its previous train.

(b) A Class II brake test shall consist of the following tasks and requirements:

(1) Brake pipe leakage shall not exceed 5 psi per minute or air flow shall not exceed 60 cubic feet per minute (CFM). The brake pipe leakage test or air flow method test shall be conducted on the entire train pursuant to the requirements contained in § 232.205(b)(1);

(2) The air brake system shall be charged to the pressure at which the train will be operated, and the pressure at the rear of the train shall be within 15 psi of the pressure at which the train will be operated, but not less than 75 psi, as indicated by an accurate gauge or end-of-train device at the rear end of train;

(3) The brakes on each car added to the train and on the rear car of the train shall be inspected to ensure that they apply in response to a 20-psi brake pipe service reduction and remain applied until the release is initiated from the controlling locomotive. A car found with brakes that fail to apply or remain applied may be retested and remain in the train if the retest is conducted as prescribed in § 232.205(b)(4); otherwise, the defective equipment may only be moved pursuant to the provisions contained in § 232.15, if applicable;

(4) When the release is initiated, the brakes on each car added to the train and on the rear car of the train shall be inspected to verify that they did release; this may be performed by a ''roll-by'' inspection. If a ''roll-by'' inspection of the brake release is performed, train speed shall not exceed 10 MPH, and the qualified person performing the ''roll-by'' inspection shall communicate the results of the inspection to the operator of the train; and

(5) Before the train proceeds the operator of the train shall know that the brake pipe pressure at the rear of the train is being restored.

(c) As an alternative to the rear car brake application and release portion of the test, the operator of the train shall determine that brake pipe pressure of the train is being reduced, as indicated by a rear car gauge or end-of-train telemetry device, and then that the brake pipe pressure of the train is being restored, as indicated by a rear car gauge or end-of-train telemetry device. (When an end-of-train telemetry device is used to comply with any test requirement in this part, the phrase ''brake pipe pressure of the train is being reduced'' means a pressure reduction of at least 5 psi, and the phrase ''brake pipe pressure of the train is being restored'' means a pressure increase of at least 5 psi). If an electronic communication link between a controlling locomotive and a remotely controlled locomotive attached to the rear end of a train is utilized to determine that brake pipe pressure is being restored, the operator of the train shall know that the air brakes function as intended on the remotely controlled locomotive.

(d) Each car or solid block of cars that receives a Class II brake test pursuant to this section when added to the train shall receive a Class I brake test at the next forward location where facilities are available for performing such a test. A Class III brake test as described in § 232.211 shall then be performed on the entire train.

§ 232.211 Class III brake tests-trainline continuity inspection.

(a) A Class III brake test shall be performed on a train by a qualified person, as defined in § 232.5, to test the train brake system when the configuration of the train has changed in certain ways. In particular, a Class III brake test shall be performed at the location where any of the following changes in the configuration of the train occur:

(1) Where a locomotive or a caboose is changed;

(2) Where a car or a block of cars is removed from the train with the consist otherwise remaining intact;

(3) At a point other than the initial terminal for the train, where a car or a solid block of cars that is comprised of cars from only one previous train the cars of which have remained continuously and consecutively coupled together with the trainline remaining connected, other than for removing defective equipment, since being removed from its previous train that has previously received a Class I brake test and that has not been off air for more than four hours is added to a train;

(4) At a point other than the initial terminal for the train, where a car or a solid block of cars that has received a Class I or Class II brake test at that location, prior to being added to the train, and that has not been off air for more than four hours is added to a train; or

(5) Whenever the continuity of the brake pipe is broken or interrupted.

(b) A Class III brake test shall consist of the following tasks and requirements:

(1) The train brake system shall be charged to the pressure at which the train will be operated, and the pressure at the rear of the train shall be within 15 psi of the pressure at which the train will be operated, but not less than 75 psi, or 60 psi for transfer trains, as indicated at the rear of the train by an accurate gauge or end-of-train device;

(2) The brakes on the rear car of the train shall apply in response to a 20-psi brake pipe service reduction and shall remain applied until the release is initiated by the controlling locomotive;

(3) When the release is initiated, the brakes on the rear car of the train shall be inspected to verify that it did release; and

(4) Before proceeding the operator of the train shall know that the brake pipe pressure at the rear of freight train is being restored.

(c) As an alternative to the rear car brake application and release portion of the test, it shall be determined that the brake pipe pressure of the train is being reduced, as indicated by a rear car gauge

or end-of-train telemetry device, and then that the brake pipe pressure of the train is being restored, as indicated by a rear car gauge or end-of-train telemetry device. If an electronic or radio communication link between a controlling locomotive and a remotely controlled locomotive attached to the rear end of a train is utilized to determine that brake pipe pressure is being restored, the operator of the train shall know that the air brakes function as intended on the remotely controlled locomotive.

§ 232.213 Extended haul trains.

(a) A railroad may be permitted to move a train up to, but not exceeding, 1,500 miles between brake tests and inspections if the railroad designates a train as an extended haul train. In order for a railroad to designate a train as an extended haul train, all of the following requirements must be met:

(1) The railroad must designate the train in writing to FRA's Associate Administrator for Safety. This designation must include the following:

(i) The train identification symbol or identification of the location where extended haul trains will originate and a description of the trains that will be operated as extended haul trains from those locations;

(ii) The origination and destination points for the train;

(iii) The type or types of equipment the train will haul; and

(iv) The locations where all train brake and mechanical inspections and tests will be performed.

(2) A Class I brake test pursuant to § 232.205 shall be performed at the initial terminal for the train by a qualified mechanical inspector as defined in § 232.5.

(3) A freight car inspection pursuant to part 215 of this chapter shall be performed at the initial terminal for the train and shall be performed by an inspector designated under § 215.11 of this chapter.

(4) All cars having conditions not in compliance with part 215 of this chapter at the initial terminal for the train shall be either repaired or removed from the train. Except for a car developing such a condition en route, no car shall be moved pursuant to the provisions of § 215.9 of this chapter in the train.

(5) The train shall have no more than one pick-up and one set-out en route, except for the set-out of defective equipment pursuant to the requirements of this chapter.

(i) Cars added to the train en route shall be inspected pursuant to the requirements contained in paragraphs (a)(2) through (a)(5) of this section at the location where they are added to the train.

(ii) Cars set out of the train en route shall be inspected pursuant to the requirements contained in paragraph (a)(6) of this section at the location where they are set out of the train.

(6) At the point of destination, if less than 1,500 miles from the train's initial terminal, or at the point designated by the railroad pursuant to paragraph (a)(1)(iv) of this section, not to exceed 1,500 miles, an inbound inspection of the train shall be conducted by a qualified mechanical inspector to identify any defective, inoperative, or ineffective brakes or any other condition not in compliance with this part as well as any conditions not in compliance with part 215 and part 231 of this chapter.

(7) The railroad shall maintain a record of all defective, inoperative, or ineffective brakes as well as any conditions not in compliance with part 215 and part 231 of this chapter discovered at anytime during the movement of the train. These records shall be retained for a period of one year and made available to FRA upon request. The records required by this section may be maintained either electronically or in writing.

(8) In order for an extended haul train to proceed beyond 1,500 miles, the following requirements shall be met:

(i) If the train will move 1,000 miles or less from that location before receiving a Class IA brake test or reaching destination, a Class I brake test shall be conducted pursuant to § 232.205 to ensure 100 percent effective and operative brakes. The inbound inspection required by paragraph (a)(6) of this section may be used to meet this requirement provided it encompasses all the inspection elements contained in § 232.205.

(ii) If the train will move greater than 1,000 miles from that location without another brake inspection, the train must be identified as an extended haul train for that movement and shall meet all the requirements contained in paragraphs (a)(1) through (a)(7) of this section. Such trains shall receive a Class I brake test pursuant to § 232.205 by a qualified mechanical inspector to ensure 100 percent effective and operative brakes, a freight car inspection pursuant to part 215 of this chapter by an inspector designated under § 215.11 of this chapter, and all cars containing non-complying conditions under part 215 of this chapter shall either be repaired or removed from the train. The inbound inspection required by paragraph (a)(6) of this section may be used to meet these inspection requirements provided it encompasses all the inspection elements contained paragraphs (a)(2) through (a)(4) of this section.

(9) FRA inspectors shall have physical access to visually observe all brake and freight car inspections and tests required by this section.

(b) Failure to comply with any of the requirements contained in paragraph (a) of this section will be considered an improper movement of a designated priority train for which appropriate civil penalties may be assessed as outlined in Appendix A to this part. Furthermore, FRA's Associate Administrator for Safety may revoke a railroad's ability to designate any or all trains as extended haul trains for repeated or willful noncompliance with any of the requirements contained in this section. Such a determination will be made in writing and will state the basis for such action.

§ 232.215 Transfer train brake tests.

(a) A transfer train, as defined in § 232.5, shall receive a brake test performed by a qualified person, as defined in § 232.5, that includes the following:

(1) The air brake hoses shall be coupled between all freight cars;

(2) After the brake system is charged to not less than 60 psi as indicated by an accurate gauge or end-of-train device at the rear of the train, a 15-psi service brake pipe reduction shall be made; and

(3) An inspection shall be made to determine that the brakes on each car apply and remain applied until the release is initiated by the controlling locomotive. A car found with brakes that fail to apply or remain applied may be retested and remain in the train if the retest is conducted as prescribed in § 232.205(b)(4); otherwise, the defective equipment may only be moved pursuant to the provisions contained in § 232.15, if applicable.

(b) Cars added to transfer trains en route shall be inspected pursuant to the requirements contained in paragraph (a) of this section at the location where the cars are added to the train.

(c) If a train's movement will exceed 20 miles or is not a transfer train as defined in § 232.5, the train shall receive a Class I brake test in accordance with § 232.205 prior to departure.

§ 232.217 Train brake tests conducted using yard air.

(a) When a train air brake system is tested from a yard air source, an engineer's brake valve or a suitable test device shall be used to provide any increase or reduction of brake pipe air pressure at the same, or slower, rate as an engineer's brake valve.

(b) The yard air test device must be connected to the end of the train or block of cars that will be nearest to the controlling locomotive. However, if the railroad adopts and complies with written procedures to ensure that potential overcharge conditions to the train brake system are avoided, the yard air test device may be connected to other than the end nearest to the controlling locomotive.

(c) Except as provided in this section, when a yard air is used the train air brake system must be charged and tested as prescribed by § 232.205(b) and when practicable should be kept charged until road motive power is coupled to train, after which, a Class III brake test shall be performed as prescribed by § 232.211.

(1) If the cars are off air for more than four hours, these cars shall be retested in accordance with § 232.205(b) through (e).

(2) At a minimum, yard air pressure shall be 60 psi at the end of the consist or block of cars opposite from the yard test device and shall be within 15 psi of the regulator valve setting on yard test device.

(3) If the air pressure of the yard test device is less than the pressure at which the train will be operated, then a leakage or air flow test shall be conducted at the operating pressure of the train when the locomotives are attached in accordance with § 232.205(b)(1).

(d) Mechanical yard air test devices and gauges shall be calibrated every 92 days. Electronic yard test devices and gauges shall be calibrated annually. Mechanical and electronic yard air test devices and gauges shall be calibrated so that they are accurate to within ± 3 psi.

(e) If used to test a train, a yard air test device and any yard air test equipment shall be accurate and function as intended.

§ 232.219 Double heading and helper service.

(a) When more than one locomotive is attached to a train, the engineer of the controlling locomotive shall operate the brakes. In case it becomes necessary for the controlling locomotive to give up control of the train short of the destination of the train, a Class III brake test pursuant to § 232.211 shall be made to ensure that the brakes are operative from the automatic brake valve of the locomotive taking control of the train.

(b) When one or more helper locomotives are placed in a train, a visual inspection shall be made of each helper locomotive brake system to determine that the brake system operates as intended in response to a 20-psi reduction initiated from the controlling locomotive of the train. A helper locomotive with inoperative or ineffective brakes shall be repaired prior to use or removed from the train.

(c) If a helper locomotive utilizes a Helper Link device or a similar technology, the locomotive and device shall be equipped, designed, and maintained as follows:

(1) The locomotive engineer shall be notified by a distinctive alarm of any loss of communication between the device and the two-way end-of-train device of more than 25 seconds;

(2) A method to reset the device shall be provided in the cab of the helper locomotive that can be operated from the engineer's usual position during operation of the locomotive;

(3) The device shall be tested for accuracy and calibrated if necessary according to the manufacturer's specifications and procedures every 365 days. This shall include testing radio frequencies and modulation of the device. A legible record of the date and location of the last test or calibration shall be maintained with the device.

Subpart D—Periodic Maintenance and Testing Requirements

§ 232.301 Scope.

This subpart contains the periodic brake system maintenance and testing requirements for equipment used in freight and other non-passenger trains.

§ 232.303 General requirements.

(a) *Definitions.* The following definitions are intended solely for the purpose of identifying what constitutes a shop or repair track under this subpart.

(1) *Shop or repair track* means:

(i) A fixed repair facility or track designated by the railroad as a shop or repair track;

(ii) A fixed repair facility or track which is regularly and consistently used to perform major repairs;

(iii) track which is used at a location to regularly and consistently perform both minor and major repairs where the railroad has not designated a certain portion of that trackage as a repair track;

(iv) A track designated or used by a railroad to regularly and consistently perform minor repairs during the period when major repairs are being conducted on such a track; and

(v) The facilities and tracks identified in paragraphs (a)(1)(i) through (a)(1)(iv) shall be considered shop or repair tracks regardless of whether a mobile repair vehicle is used to conduct the repairs.

(2) *Major repair* means a repair of such a nature that it would normally require greater than four man-hours to accomplish or would involve the use of specialized tools and equipment. Major repairs would include such things as coupler replacement, draft gear repair, and repairs requiring the use of an air jack.

(3) *Minor repair* means repairs, other than major repairs, that can be accomplished in a short period of time with limited tools and equipment. Minor repairs would include such things as safety appliance straightening, handhold replacement, air hose replacement, lading adjustment, and coupler knuckle or knuckle pin replacement.

(b) A car on a shop or repair track shall be tested to determine that the air brakes apply and remain applied until a release is initiated.

(c) A car on a shop or repair track shall have its piston travel inspected. For cars equipped with 8½-inch or 10-inch diameter brake cylinders, piston travel shall be within 7 to 9 inches. If piston travel is found to be less than 7 inches or more than 9 inches, it must be adjusted to nominally 7½ inches. For cars not equipped with 8½-inch or 10-inch diameter brake cylinders, piston travel shall be within the piston travel stenciled or marked on the car or badge plate.

(d) Before a car is released from a shop or repair track, a qualified person shall ensure:

(1) The brake pipe is securely clamped;

(2) Angle cocks are properly located with suitable clearance and properly positioned to allow maximum air flow;

(3) Valves, reservoirs, and cylinders are tight on supports and the supports are securely attached to the car;

(4) Hand brakes are tested, inspected, and operate as intended; and

(5) Brake indicators, on cars so equipped, are accurate and operate as intended.

(e) If the repair track air brake test or single car test required in §§ 232.305 and 232.307 cannot be conducted at the point where repairs can be made to the car, the car may be moved after the repairs are effectuated to the next forward location where the test can be performed. Inability to perform a repair track air brake test or single car test does not constitute an inability to effectuate the necessary repairs.

(1) If it is necessary to move a car from the location where the repairs are performed in order to perform a repair track air brake test or a single car test required by this part, a tag or card shall be placed on both sides of the equipment, or an automated tracking system approved for use by FRA, with

the following information about the equipment:

(i) The reporting mark and car number;

(ii) The name of the inspecting railroad;

(iii) The location where repairs were performed and date;

(iv) Indication whether the car requires a repair track brake test or single car test;

(v) The location where the appropriate test is to be performed; and

(vi) The name, signature, if possible, and job title of the qualified person approving the move.

(2) The tag or card required by paragraph (e)(1) of this section shall remain affixed to the equipment until the necessary test has been performed.

(3) An electronic or written record or copy of each tag or card attached to or removed from a car or locomotive shall be retained for 90 days and, upon request, shall be made available within 15 calendar days for inspection by FRA or State inspectors.

(4) The record or copy of each tag or card removed from a car or locomotive shall contain the date, location, and the signature or identification of the qualified person removing it from the piece of equipment.

(f) The location and date of the last repair track brake test or single car test required by §§ 232.305 and 232.307 of this part shall be clearly stenciled, marked, or labeled in two-inch high letters or numerals on the side of the equipment. Alternatively, the railroad industry may use an electronic or automated tracking system to track the required information and the performance of the tests required by §§ 232.305 and 232.307 of this part.

(1) Electronic or automated tracking systems used to meet the requirement contained in this paragraph shall be capable of being reviewed and monitored by FRA at any time to ensure the integrity of the system. FRA's Associate Administrator for Safety may prohibit or revoke the railroad industry's authority to utilize an electronic or automated tracking system in lieu of stenciling or marking if FRA finds that the electronic or automated tracking system is not properly secure, is inaccessible to FRA or railroad employees, or fails to adequately track and monitor the equipment. FRA will record such a determination in writing, include a statement of the basis for such action, and will provide a copy of the document to the affected railroads.

(2) [Reserved.]

§ 232.305 Repair track air brake tests.

(a) Repair track brake tests shall be performed by a qualified person in accordance with either Section 3.0, ''Procedures for Repair Track Test for Air Brake Equipment,'' of the Association of American Railroads Standard S–486–99, ''Code of Air Brake System Tests for Freight Equipment,'' contained in the AAR *Manual of Standards and Recommended Practices, Section E* (April 1, 1999) or an alternative procedure approved by FRA pursuant to § 232.17. The incorporation by reference of this AAR standard was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of the incorporated document from the Association of American Railroads, 50 F Street, NW., Washington, DC 20001. You may inspect a copy of the document at the Federal Railroad Administration, Docket Clerk, 1120 Vermont Avenue, NW., Suite 7000, Washington, DC or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.

(b) Except as provided in § 232.303(e), a railroad shall perform a repair track brake test on a car when:

(1) A car has its brakes cut-out or inoperative when removed from a train or when placed on a shop or repair track;

(2) A car is on a repair or shop track, as defined in § 232.303(a), for any reason and has not received a repair track brake test within the previous 12 month period;

(3) A car is found with missing or incomplete repair track brake test information;

(4) One or more of the following conventional air brake equipment items is removed, repaired, or replaced:

(i) Brake reservoir;

(ii) Control valve mounting gasket; or

(iii) Pipe bracket stud.

(5) A car is found with one or more of the following wheel defects:

(i) Built-up tread, unless known to be caused by hand brake left applied;

(ii) Slid flat wheel, unless known to be caused by hand brake left applied; or

(iii) Thermal cracks.

(c) Except as provided in paragraph (d) of this section, each car shall receive a repair track brake test no less than every 5 years.

(d) Each car shall receive a repair track brake test no less than 8 years from the date the car was built or rebuilt.

§ 232.307 Single car tests.

(a) Single car tests shall be performed by a qualified person in accordance with either Section 4.0, ''Tests-Standard Single Capacity Freight Brake Equipment (Single Car Test),'' of the Association of American Railroads Standard S–486–99, ''Code of Air Brake System Tests for Freight Equipment,'' contained in the AAR *Manual of Standards and Recommended Practices, Section E* (April 1, 1999) or an alternative procedure approved by FRA pursuant to § 232.17. The incorporation by reference of this AAR standard was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of the incorporated document from the Association of American Railroads, 50 F Street, NW., Washington, DC 20001. You may inspect a copy of the document at the Federal Railroad Administration, Docket Clerk, 1120 Vermont Avenue, NW., Suite 7000, Washington, DC or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.

(b) Except as provided in § 232.303(e), a railroad shall perform a single car test on a car when one or more of the following conventional air brake equipment items is removed, repaired or replaced:

(1) Service portion;

(2) Emergency portion; or

(3) Pipe bracket.

(c) A single car test pursuant to paragraph (a) of this section shall be performed on a new or rebuilt car prior to placing or using the car in revenue service.

§ 232.309 Repair track air brake test and single car test equipment and devices.

(a) Test equipment and devices used to perform repair track air brake tests or single car tests shall be tested for correct operation at least once each calendar day of use.

(b) Except for single car test devices, mechanical test devices such as pressure gauges, flow meters, orifices, etc. shall be calibrated once every 92 days.

(c) Electronic test devices shall be calibrated at least once every 365 days.

(d) Test equipment and single car test devices placed in service shall be tagged or labeled with the date its next calibration is due.

(e) Each single car test device shall be tested not less frequently than every 92 days after being placed in service and may not continue in service if more than one year has passed since its last 92-day test.

(f) Each single car test device shall be disassembled and cleaned not less frequently than every 365 days after being placed in service.

Subpart E—End-of-Train Devices

§ 232.401 Scope.

This subpart contains the requirements related to the performance, operation, and testing of end-of-train devices. Unless expressly excepted in this subpart, the requirements of this subpart apply to all trains operating on track which is part of the general railroad system of transportation.

§ 232.403 Design standards for one-way end-of-train devices.

(a) *General.* A one-way end-of-train device shall be comprised of a rear-of-train unit (rear unit) located on the last car of a train and a front-of-train unit (front unit) located in the cab of the locomotive controlling the train.

(b) *Rear unit.* The rear unit shall be capable of determining the brake pipe pressure on the rear car and transmitting that information to the front unit for display to the locomotive engineer. The rear unit shall be—

(1) Capable of measuring the brake pipe pressure on the rear car with an accuracy of ±3 pounds per square inch (psig) and brake pipe pressure variations of ±1 psig;

(2) Equipped with a ''bleeder valve'' that permits the release of any air under pressure from the rear of train unit or the associated air hoses prior to detaching the rear unit from the brake pipe;

(3) Designed so that an internal failure will not cause an undesired emergency brake application;

(4) Equipped with either an air gauge or a means of visually displaying the rear unit's brake pipe pressure measurement; and

(5) Equipped with a pressure relief safety valve to prevent explosion from a high pressure air leak inside the rear unit.

(c) *Reporting rate.* Multiple data transmissions from the rear unit shall occur immediately after a variation in the rear car brake pipe pressure of ±2 psig and at intervals of not greater than 70 seconds when the variation in the rear car brake pipe pressure over the 70-second interval is less than ±2 psig.

(d) *Operating environment.* The rear unit shall be designed to meet the performance requirements of paragraphs (b) and (c) of this section under the following environmental conditions:

(1) At temperatures from −40°C to 60°C;

(2) At a relative humidity of 95% noncondensing at 50°C;

(3) At altitudes of zero to 12,000 feet mean sea level;

(4) During vertical and lateral vibrations of 1 to 15 Hz., with 0.5 g. peak to peak, and 15 to 500 Hz., with 5 g. peak to peak;

(5) During the longitudinal vibrations of 1 to 15 Hz., with 3 g. peak to peak, and 15 to 500 Hz., with 5 g. peak to peak; and

(6) During a shock of 10 g. peak for 0.1 second in any axis.

(e) *Unique code.* Each rear unit shall have a unique and permanent identification code that is transmitted along with the pressure message to the front-of-train unit. A code obtained from the Association of American Railroads, 50 F Street, NW., Washington, DC 20036 shall be deemed to be a unique code for purposes of this section. A unique code also may be obtained from the Office of Safety Assurance and Compliance (RRS–10), Federal Railroad Administration, Washington, DC 20590.

(f) *Front unit.* (1) The front unit shall be designed to receive data messages from the rear unit and shall be capable of displaying the rear car brake pipe pressure in increments not to exceed one pound.

(2) The display shall be clearly visible and legible in daylight and darkness from the engineer's normal operating position.

(3) The front device shall have a means for entry of the unique identification code of the rear unit being used. The front unit shall be designed so that it will display a message only from the rear unit with the same code as entered into the front unit.

(4) The front unit shall be designed to meet the requirements of paragraphs (d)(2), (3), (4), and (5) of this section. It shall also be designed to meet the performance requirements in this paragraph under the following environmental conditions:

(i) At temperatures from 0°C to 60°C;

(ii) During a vertical or lateral shock of 2 g. peak for 0.1 second; and

(iii) During a longitudinal shock of 5 g. peak for 0.1 second.

(g) *Radio equipment.* (1) The radio transmitter in the rear unit and the radio receiver in the front unit shall comply with the applicable regulatory requirements of the Federal Communications Commission (FCC) and use of a transmission format acceptable to the FCC.

(2) If power is supplied by one or more batteries, the operating life shall be a minimum of 36 hours at 0°C.

§ 232.405 Design and performance standards for two-way end-of-train devices.

Two-way end-of-train devices shall be designed and perform with the features applicable to one-way end-of-train devices described in § 232.403, except those included in § 232.403(b)(3). In addition, a two-way end-of-train device shall be designed and perform with the following features:

(a) An emergency brake application command from the front unit of the device shall activate the emergency air valve at the rear of the train within one second.

(b) The rear unit of the device shall send an acknowledgment message to the front unit immediately upon receipt of an emergency brake application command. The front unit shall listen for this acknowledgment and repeat the brake application command if the acknowledgment is not correctly received.

(c) The rear unit, on receipt of a properly coded command, shall open a valve in the brake line and hold it open for a minimum of 15 seconds. This opening of the valve shall cause the brake line to vent to the exterior.

(d) The valve opening shall have a minimum diameter of ¾ inch and the internal diameter of the hose shall be ⅝ inch to effect an emergency brake application.

(e) The front unit shall have a manually operated switch which, when activated, shall initiate an emergency brake transmission command to the rear unit or the locomotive shall be equipped with a manually operated switch on the engineer control stand designed to perform the equivalent function. The switch shall be labeled ''Emergency'' and shall be protected so that there will exist no possibility of accidental activation.

(f) All locomotives ordered on or after August 1, 2001, or placed in service for the first time on or after August 1, 2003, shall be designed to automatically activate the two-way end-of-train device to effectuate an emergency brake application whenever it becomes necessary for the locomotive engineer to place the train air brakes in emergency.

(g) The availability of the front-to-rear communications link shall be checked automatically at least every 10 minutes.

(h) Means shall be provided to confirm the availability and proper functioning of the emergency valve.

(i) Means shall be provided to arm the front and rear units to ensure the rear unit responds to an emergency command only from a properly associated front unit.

§ 232.407 Operations requiring use of two-way end-of-train devices; prohibition on purchase of nonconforming devices.

(a) *Definitions.* The following definitions are intended solely for the purpose of identifying those operations subject to the requirements for the use of two-way end-of-train devices.

(1) *Heavy grade* means:

(i) For a train operating with 4,000 trailing tons or less, a section of track with an average grade of two percent or greater over a distance of two continuous miles; and

(ii) For a train operating with greater than 4,000 trailing tons, a section of track with an average grade of one percent or greater over a distance of three continuous miles.

(2) *Train* means one or more locomotives coupled with one or more rail cars, except during switching operations or where the operation is that of classifying cars within a railroad yard for the purpose of making or breaking up trains.

(3) *Local train* means a train assigned to perform switching en route which operates with 4,000 trailing tons or less and travels between a point of origin and a point of final destination, for a distance that is no greater than that which can normally be operated by a single crew in a single tour of duty.

(4) *Work train* means a non-revenue service train of 4,000 trailing tons or less used for the administration and upkeep service of the railroad.

(5) *Trailing tons* means the sum of the gross weights—expressed in tons—of the cars and the locomotives in a train that are not providing propelling power to the train.

(b) *General.* All trains not specifically excepted in paragraph (e) of this section shall be equipped with and shall use either a two-way end-of-train device meeting the design and performance requirements contained in § 232.405 or a device using an alternative technology to perform the same function.

(c) *New devices.* Each newly manufactured end-of-train device purchased by a railroad after January 2, 1998 shall be a two-way end-of-train device meeting the design and performance requirements contained in § 232.405 or a device using an alternative technology to perform the same function.

(d) *Grandfathering.* Each two-way end-of-train device purchased by any person prior to July 1, 1997 shall be deemed to meet the design and performance requirements contained in § 232.405.

(e) *Exceptions.* The following types of trains are excepted from the requirement for the use of a two-way end-of-train device:

(1) Trains with a locomotive or locomotive consist located at the rear of the train that is capable of making an emergency brake application, through a command effected by telemetry or by a crew member in radio contact with the controlling locomotive;

(2) Trains operating in the push mode with the ability to effectuate an emergency brake application from the rear of the train;

(3) Trains with an operational caboose placed at the rear of the train, carrying one or more crew members in radio contact with the controlling locomotive, that is equipped with an emergency brake valve;

(4) Trains operating with a secondary, fully independent braking system capable of safely stopping the train in the event of failure of the primary system;

(5) Trains that do not operate over heavy grades and do not exceed 30 mph;

(6) Local trains, as defined in paragraph (a)(3) of this section, that do not operate over heavy grades;

(7) Work trains, as defined in paragraph (a)(4) of this section, that do not operate over heavy grades;

(8) Trains that operate exclusively on track that is not part of the general railroad system;

(9) Trains that must be divided into two sections in order to traverse a grade (*e.g.,* doubling a hill). This exception applies only to the extent necessary to traverse the grade and only while the train is divided in two for such purpose;

(10) Passenger trains in which all of the cars in the train are equipped with an emergency brake valve readily accessible to a crew member;

(11) Passenger trains that have a car at the rear of the train, readily accessible to one or more crew members in radio contact with the engineer, that is equipped with an emergency brake valve readily accessible to such a crew member; and

(12) Passenger trains that have twenty-four (24) or fewer cars (not including locomotives) in the consist and that are equipped and operated in accordance with the following train-configuration and operating requirements:

(i) If the total number of cars in a passenger train consist is twelve (12) or fewer, a car located no less than halfway through the consist (counting from the first car in the train) must be equipped with an emergency brake valve readily accessible to a crew member;

(ii) If the total number of cars in a passenger train consist is thirteen (13) to twenty-four (24), a car located no less than two-thirds (⅔) of the way through the consist (counting from the first car in the train) must be equipped with an emergency brake valve readily accessible to a crew member;

(iii) Prior to descending a section of track with an average grade of two percent or greater over a distance of two continuous miles, the engineer of the train shall communicate with the conductor, to ensure that a member of the crew with a working two-way radio is stationed in the car with the rearmost readily accessible emergency brake valve on the train when the train begins its descent; and

(iv) While the train is descending a section of track with an average grade of two percent or greater over a distance of two continuous miles, a member of the train crew shall occupy the car that contains the rearmost readily accessible emergency brake valve on the train and be in constant radio communication with the locomotive engineer. The crew member shall remain in this car until the train has completely traversed the heavy grade.

(f) *Specific requirements for use.* If a train is required to use a two-way end-of-train device:

(1) That device shall be armed and operable from the time the train departs from the point where the device is installed until the train reaches its destination. If a loss of communication occurs at the location where the device is installed, the train may depart the location at restricted speed for a distance of no more than one mile in order to establish communication. When communication is established, the quantitative values of the head and rear unit shall be compared pursuant to § 232.409(b) and the device tested pursuant to § 232.409(c), unless the test was performed prior to installation.

(2) The rear unit batteries shall be sufficiently charged at the initial terminal or other point where the device is installed and throughout the train's trip to ensure that the end-of-train device will remain operative until the train reaches its destination.

(3) The device shall be activated to effectuate an emergency brake application either by using the manual toggle switch or through automatic activation, whenever it becomes necessary for the locomotive engineer to initiate an emergency application of the air brakes using either the automatic brake valve or the conductor's emergency brake valve.

(g) *En route failure of device on a freight or other non-passenger train.* Except on passenger trains required to be equipped with a two-way end-of-train device (which are provided for in paragraph (h) of this section), en route failures of a two-way end-of-train device shall be handled in accordance with this paragraph. If a two-way end-of-train device or equivalent device fails en route (*i.e.,* is unable to initiate an emergency brake application from the rear of the train due to certain losses of communication (front to rear) or due to

other reasons, the speed of the train on which it is installed shall be limited to 30 mph until the ability of the device to initiate an emergency brake application from the rear of the train is restored. This limitation shall apply to a train using a device that uses an alternative technology to serve the purpose of a two-way end-of-train device. With regard to two-way end-of-train devices, a loss of communication between the front and rear units is an en route failure only if the loss of communication is for a period greater than 16 minutes and 30 seconds. Based on the existing design of the devices, the display to an engineer of a message that there is a communication failure indicates that communication has been lost for 16 minutes and 30 seconds or more.

(1) If a two-way end-of-train device fails en route, the train on which it is installed, in addition to observing the 30-mph speed limitation, shall not operate over a section of track with an average grade of two percent or greater for a distance of two continuous miles, unless one of the following alternative measures is provided:

(i) Use of an occupied helper locomotive at the end of the train. This alternative may be used only if the following requirements are met:

(A) The helper locomotive engineer shall initiate and maintain two-way voice radio communication with the engineer on the head end of the train; this contact shall be verified just prior to passing the crest of the grade.

(B) If there is a loss of communication prior to passing the crest of the grade, the helper locomotive engineer and the head-end engineer shall act immediately to stop the train until voice communication is resumed, in accordance with the railroad's operating rules.

(C) If there is a loss of communication once the descent has begun, the helper locomotive engineer and the head-end engineer shall act to stop the train, in accordance with the railroad's operating rules, if the train has reached a predetermined rate of speed that indicates the need for emergency braking.

(D) The brake pipe of the helper locomotive shall be connected and cut into the train line and tested to ensure operation.

(ii) Use of an occupied caboose at the end of the train with a tested, functioning brake valve capable of initiating an emergency brake application from the caboose. This alternative may be used only if the train service employee in the caboose and the engineer on the head end of the train establish and maintain two-way voice radio communication and respond appropriately to the loss of such communication in the same manner as prescribed for helper locomotives in paragraph (g)(1)(i) of this section.

(iii) Use of a radio-controlled locomotive at the rear of the train under continuous control of the engineer in the head end by means of telemetry, but only if such radio-controlled locomotive is capable of initiating an emergency application on command from the lead (controlling) locomotive.

(2) [Reserved.]

(h) *En route failure of device on a passenger train.*

(1) A passenger train required to be equipped with a two-way end-of-train device that develops an en route failure of the device (as explained in paragraph (g) of this section) shall not operate over a section of track with an average grade of two percent or greater over a distance of two continuous miles until an operable two-way end-of-train device is installed on the train or an alternative method of initiating an emergency brake application from the rear of the train is achieved.

(2) Except as provided in paragraph (h)(1) of this section, a passenger train required to be equipped with a two-way end-of-train device that develops an en route failure of the device (as explained in paragraph (g) of this section) shall be operated in accordance with the following:

(i) A member of the train crew shall be immediately positioned in the car which contains the rearmost readily accessible emergency brake valve on the train and shall be equipped with an operable two-way radio that communicates with the locomotive engineer; and

(ii) The locomotive engineer shall periodically make running tests of the train's air brakes until the failure is corrected; and

(3) Each en route failure shall be corrected at the next location where the necessary repairs can be conducted or at the next location where a required brake test is to be performed, whichever is reached first.

§ 232.409 Inspection and testing of end-of-train devices.

(a) After each installation of either the front or rear unit of an end-of-train device, or both, on a train and before the train departs, the railroad shall determine that the identification code entered into the front unit is identical to the unique identification code on the rear unit.

(b) After each installation of either the front or rear unit of an end-of-train device, or both, on a train and before the train departs, the functional capability of the device shall be determined, after charging the train, by comparing the quantitative value of the air pressure displayed on the front unit with the quantitative value of the air pressure displayed on the rear unit or on a properly calibrated air gauge. The end-of-train device shall not be used if the difference between the two readings exceeds three pounds per square inch.

(c) A two-way end-of-train device shall be tested at the initial terminal or other point of installation to ensure that the device is capable of initiating an emergency power brake application from the rear of the train. If this test is conducted by a person other than a member of the train crew, the locomotive engineer shall be notified that a successful test was performed. The notification required by this paragraph may be provided to the locomotive engineer by any means determined appropriate by the railroad; however, a written or electronic record of the notification shall be maintained in the cab of the controlling locomotive and shall include the date and time of the test, the location where the test was performed, and the name of person conducting the test.

(d) The telemetry equipment shall be tested for accuracy and calibrated if necessary according to the manufacturer's specifications and procedures at least every 365 days. This shall include testing radio frequencies and modulation of the device. The date and location of the last calibration or test as well as the name of the person performing the calibration or test shall be legibly displayed on a weather-resistant sticker or other marking device affixed to the outside of both the front unit and the rear unit; however, if the front unit is an integral part of the locomotive or is inaccessible, then the information may be recorded on Form FRA F6180–49A instead, provided the serial number of the unit is recorded.

Subpart F—Introduction of New Brake System Technology

§ 232.501 Scope.

This subpart contains general requirements for introducing new brake system technologies. This subpart is intended to facilitate the introduction of new complete brake system technologies or major upgrades to existing systems which the current regulations do not adequately address (*i.e.,* electronic brake systems). This subpart is not intended for use in the introduction of a new brake component or material.

§ 232.503 Process to introduce new brake system technology.

(a) Pursuant to the procedures contained in § 232.17, each railroad shall obtain special approval from the FRA Associate Administrator for Safety of a pre-revenue service acceptance testing plan, developed pursuant to § 232.505, for the new brake system technology, prior to implementing the plan.

(b) Each railroad shall complete a pre-revenue service demonstration of the new brake system technology in accordance with the approved plan, shall fulfill all of the other requirements prescribed in § 232.505, and shall obtain special approval from the FRA Associate Administrator for Safety under the procedures of § 232.17 prior to using such brake system technology in revenue service.

§ 232.505 Pre-revenue service acceptance testing plan.

(a) *General; submission of plan.* Except as provided in paragraph (f) of this section, before using a new brake system technology for the first time on its system the operating railroad or railroads shall submit a pre-revenue service acceptance testing plan containing the information required by paragraph (e) of this section and obtain the approval of the FRA Associate Administrator for Safety, under the procedures specified in § 232.17.

(b) *Compliance with plan.* After receiving FRA approval of the pre-revenue service testing plan and before introducing the new brake system technology into revenue service, the operating railroad or railroads shall:

(1) Adopt and comply with such FRA-approved plan, including fully executing the tests required by the plan;

(2) Report to the FRA Associate Administrator for Safety the results of the pre-revenue service acceptance tests;

(3) Correct any safety deficiencies identified by FRA in the design of the equipment or in the inspection, testing, and maintenance procedures or, if safety deficiencies cannot be corrected by design or procedural changes, agree to comply with any operational limitations that may be imposed by the Associate Administrator for Safety on the revenue service operation of the equipment; and

(4) Obtain FRA approval to place the new brake system technology in revenue service.

(c) *Compliance with limitations.* The operating railroad shall comply with each operational limitation, if any, imposed by the Associate Administrator for Safety.

(d) *Availability of plan.* The plan shall be made available to FRA for inspection and copying upon request.

(e) *Elements of plan.* The plan shall include all of the following elements:

(1) An identification of each waiver, if any, of FRA or other Federal safety regulations required for the tests or for revenue service operation of the equipment.

(2) A clear statement of the test objectives. One of the principal test objectives shall be to demonstrate that the equipment meets the safety design and performance requirements specified in this part when operated in the environment in which it is to be used.

(3) A planned schedule for conducting the tests.

(4) A description of the railroad property or facilities to be used to conduct the tests.

(5) A detailed description of how the tests are to be conducted. This description shall include:

(i) An identification of the equipment to be tested;

(ii) The method by which the equipment is to be tested;

(iii) The criteria to be used to evaluate the equipment's performance; and

(iv) The means by which the test results are to be reported to FRA.

(6) A description of any special instrumentation to be used during the tests.

(7) A description of the information or data to be obtained.

(8) A description of how the information or data obtained is to be analyzed or used.

(9) A description of any criteria to be used as safety limits during the testing.

(10) A description of the criteria to be used to measure or determine the success or failure of the tests. If acceptance is to be based on extrapolation of less than full level testing results, the analysis to be done to justify the validity of the extrapolation shall be described.

(11) A description of any special safety precautions to be observed during the testing.

(12) A written set of standard operating procedures to be used to ensure that the testing is done safely.

(13) Quality control procedures to ensure that the inspection, testing, and maintenance procedures are followed.

(14) Criteria to be used for the revenue service operation of the equipment.

(15) A description of all testing of the equipment that has previously been performed, if any.

(f) *Exception.* For brake system technologies that have previously been used in revenue service in the United States, the railroad shall test the equipment on its system, prior to placing it in revenue service, to ensure the compatibility of the equipment with the operating system (track, signals, etc.) of the railroad. A description of such testing shall be retained by the railroad and made available to FRA for inspection and copying upon request.

Appendix A to Part 232—Schedule of Civil Penalties [1]

Section	Violation	Willful violation
Subpart A—General		
232.15 Movement of power brake defects:		
(a) Improper movement, general	([1])	([1])
(11) Failure to make determinations and provide notification of en route defect	$2,500	$5,000
(b) Complete failure to tag	2,500	5,000
(1) Insufficient tag or record	1,000	2,000
(2), (4) Improper removal of tag	2,000	4,000
(3) Failure to retain record of tag	2,000	4,000
(c) Improper loading or purging	2,500	5,000
(e) Improper placement of defective equipment	2,500	5,000
232.19 Availability of records	([1])	([1])
Subpart B—General Requirements		
232.103 All train brake systems:		
(a)–(c), (h)–(i) Failure to meet general design requirements	2,500	5,000
(d) Failure to have proper percentage of operative brakes from Class I brake test	5,000	7,500
(e) Operating with less than 85 percent operative brakes	5,000	7,500
(f) Improper use of car with inoperative or ineffective brakes	2,500	5,000
(g) Improper display of piston travel	2,500	5,000

Section	Violation	Willful violation
(m) Failure to stop train with excess air flow or gradient	2,500	5,000
(n) Securement of unattended equipment:.		
(1) Failure to apply sufficient number of hand brakes; failure to develop or implement procedure to verify number applied	5,000	7,500
(2) Failure to initiate emergency	2,500	5,000
(3) Failure to apply hand brakes on locomotives	2,500	5,000
(4) Failure to adopt or comply with procedures for securing unattended locomotive	5,000	7,500
(o) Improper adjustment of air regulating devices	2,500	5,000
(p) Failure to hold supervisors jointly responsible	2,500	5,000
232.105 Locomotives:		
(a) Air brakes not in safe and suitable condition	1,000-5,000	2,000-7,500
(b) Not equipped with proper hand or parking brake	5,000	7,500
(c)(1) Failure to inspect/repair hand or parking brake	2,500	5,000
(2) Failure to properly stencil, tag, or record	2,000	4,000
(d) Excess leakage from equalizing reservoir	2,500	5,000
(e) Improper use of feed or regulating valve braking	2,500	5,000
(f) Improper use of passenger position	2,500	5,000
(g) Brakes in operative condition	2,500	5,000
232.107 Air sources/cold weather operations:		
(a)(1), (2) Failure to adopt or comply with monitoring program for yard air sources	5,000	7,500
(3) Failure to maintain records	2,500	5,000
(b) Failure to blow condensation	2,500	5,000
(c) Use of improper chemicals	5,000	7,500
(d) Failure to equip or drain yard air reservoirs	2,500	5,000
(e) Failure to adopt or comply cold weather operating procedures	5,000	7,500
232.109 Dynamic brakes:		
(a) Failure to provide information	5,000	7,500
(b) Failure to make repairs	5,000	7,500
(c) Failure to properly tag	2,500	5,000
(d) Failure to maintain record of repair	2,000	4,000
(e) Improper deactivation	2,500	5,000
(f) Improper use of locomotive as controlling unit	2,500	5,000
(g) Locomotive not properly equipped with indicator	2,500	5,000
(h) Rebuilt locomotive not properly equipped	2,500	5,000
(j) Failure to adopt or comply with dynamic brake operating rules	5,000	7,500
(k) Failure to adopt or comply with training on operating procedures	5,000	7,500
232.111 Train handling information:		
(a) Failure to adopt and comply with procedures	5,000	7,500
(b) Failure to provide specific information	2,500	5,000
Subpart C—Inspection and Testing Requirements		
232.203 Training requirements:		
(a) Failure to develop or adopt program	7,500	11,000
(b)(1)–(9) Failure to address or comply with specific required item or provision of program	5,000	7,500
(c) Failure to adopt or comply with two-way EOT program	5,000	7,500
(d) Failure to adopt or comply with retaining valve program	5,000	7,500
(e) Failure to maintain adequate records	5,000	7,500
(f) Failure to adopt and comply with periodic assessment plan	7,500	11,000
232.205 Class I brake test—initial terminal inspection:		
(a) Complete failure to perform inspection	[1] 10,000	15,000
(b)(1)–(4), (6)–(8) Partial failure to perform inspection	5,000	7,500
(b)(5) Failure to properly adjust piston travel (per car)	2,500	5,000
(c) Failure to use carman when required	5,000	7,500
(d) Failure to provide proper notification	2,500	5,000
(e) Failure to void compressed air	2,500	5,000
(f) Failure to perform inspection on cars added	5,000	7,500
232.207 Class IA brake tests—1,000-mile inspection:		
(a) Complete failure to perform inspection	[1] 15,000	7,500
(b)(1)–(6) Partial failure to perform inspection	2,500	5,000
(c) Failure to properly designate location	5,000	7,500
(c)(1) Failure to perform at designated location	5,000	7,500
(c)(2) Failure to provide notification	2,500	5,000
232.209 Class II brake tests—intermediate inspection:		
(a) Complete failure to perform inspection	[1] 5,000	7,500
(b)(1)–(5), (c) Partial failure to perform inspection	2,500	5,000
232.211 Class III brake tests—trainline continuity inspection:		
(a) Complete failure to perform inspection	5,000	7,500
(b)(1)–(4), (c) Partial failure to perform inspection	2,500	5,000
232.213 Extended haul trains:		
(a)(1) Failure to properly designate an extended haul train	5,000	7,500
(a)(2)–(3), (5)(i), (8) Failure to perform inspections	(2)	(2)
(a)(4) Failure to remove defective car (per car)	2,000	4,000
(a)(5)(ii), (6) Failure to conduct inbound inspection	5,000	7,500
(a)(7) Failure to maintain record of defects (per car)	2,000	4,000

Section	Violation	Willful violation
232.215 Transfer train brake tests:		
(a) Failure to perform inspection	5,000	7,500
(b) Failure to perform on cars added	2,500	5,000
232.217 Train brake system tests conducted using yard air:		
(a) Failure to use suitable device	2,500	5,000
(b) Improper connection of air test device	5,000	7,500
(c) Failure to properly perform inspection	([2])	([2])
(d) Failure to calibrate test device	2,500	5,000
(e) Failure to use accurate device	2,500	5,000
232.219 Double heading and helper service:		
(a) Failure to perform inspection or inability to control brakes	2,500	5,000
(b) Failure to make visual inspection	2,500	5,000
(c) Use of improper helper link device	2,500	5,000
Subpart D—Periodic Maintenance and Testing Requirements		
232.303 General requirements:		
(b)–(d) Failure to conduct inspection or test when car on repair track	2,500	5,000
(e) Improper movement of equipment for testing	2,500	5,000
(e)(1) Failure to properly tag equipment for movement	2,000	5,000
(e)(2)–(4) Failure to retain record or improper removal of tag or card	2,000	4,000
(f) Failure to stencil or track test information	2,500	5,000
232.305 Repair track air brake tests:		
(a) Failure to test in accord with required procedure	2,500	5,000
(b)–(d) Failure to perform test	2,500	5,000
232.307 Single car tests:		
(a) Failure to test in accord with required procedure	2,500	5,000
(b)–(c) Failure to perform test	2,500	5,000
232.309 Repair track air brake test and single car test equipment and devices:		
(a)–(f) Failure to properly test or calibrate	2,500	5,000
Subpart E—End-of-Train Devices		
232.403 Design standards for one-way devices:		
(a)–(g) Failure to meet standards	2,500	5,000
232.405 Design standards for two-way devices:		
(a)–(i) Failure to meet standards	2,500	5,000
232.407 Operating requirements for two-way devices:		
(b) Failure to equip a train	5,000	7,500
(c) Improper purchase	2,500	5,000
(f)(1) Failure of device to be armed and operable	5,000	7,500
(f)(2) Insufficient battery charge	2,500	5,000
(f)(3) Failure to activate the device	2,500	5,000
(g) Improper handling of en route failure, freight or other non-passenger	5,000	7,500
(h) Improper handling of en route failure, passenger	5,000	7,500
232.409 Inspection and testing of devices:		
(a) Failure to have unique code	2,500	5,000
(b) Failure to compare quantitative values	2,500	5,000
(c) Failure to test emergency capability	5,000	7,500
(d) Failure to properly calibrate	2,500	5,000
Subpart F—Introduction of New Brake System Technology		
232.503 Process to introduce new technology:		
(b) Failure to obtain FRA approval	10,000	15,000
232.505 Pre-revenue service acceptance testing plan:		
(a) Failure to obtain FRA approval	5,000	7,500
(b) Failure to comply with plan	2,500	5,000
(f) Failure to test previously used technology	5,000	7,500

[1] A penalty may be assessed against an individual only for a willful violation. Generally when two or more violations of these regulations are discovered with respect to a single unit of equipment that is placed or continued in service by a railroad, the appropriate penalties set forth above are aggregated up to a maximum of $11,000 per day. An exception to this rule is the $15,000 penalty for willful violation of § 232.503 (failure to get FRA approval before introducing new technology) with respect to a single unit of equipment; if the unit has additional violative conditions, the penalty may routinely be aggregated to $15,000. Although the penalties listed for failure to perform the brake inspections and tests under § 232.205 through § 232.209 may be assessed for each train that is not properly inspected, failure to perform any of the inspections and tests required under those sections will be treated as a violation separate and distinct from, and in addition to, any substantive violative conditions found on the equipment contained in the train consist. Moreover, the Administrator reserves the right to assess a penalty of up to $22,000 for any violation where circumstances warrant. *See* 49 CFR part 209, appendix A.

Failure to observe any condition for movement of defective equipment set forth in § 232.15(a) will deprive the railroad of the benefit of the movement-for-repair provision and make the railroad and any responsible individuals liable for penalty under the particular regulatory section(s) concerning the substantive defect(s) present on the equipment at the time of movement.

Failure to provide any of the records or plans required by this part pursuant to § 232.19 will be considered a failure to maintain or develop the record or plan and will make the railroad liable for penalty under the particular regulatory section(s) concerning the retention or creation of the document involved.

Failure to properly perform any of the inspections specifically referenced in § 232.213 and § 232.217 may be assessed under each section of this part or this chapter, or both, that contains the requirements for performing the referenced inspection.

Appendix B to Part 232—Part 232 Prior to April 1, 2001

PART 232—RAILROAD POWER BRAKES AND DRAWBARS

Sec.
232.0 Applicability and penalties.
232.1 Power brakes; minimum percentage.
232.2 Drawbars; standard height.
232.3 Power brakes and appliances for operating power-brake systems.
232.10 General rules; locomotives.
232.11 Train air brake system tests.
232.12 Initial terminal road train airbrake tests.
232.13 Road train and intermediate terminal train air brake tests.
232.14 Inbound brake equipment inspection.
232.15 Double heading and helper service.
232.16 Running tests.
232.17 Freight and passenger train car brakes.
232.19 End of train device.
232 App A Appendix A to Part 232
232 App B Appendix B to Part 232

Authority: 45 U.S.C. 1, 3, 5, 6, 8–12, and 16, as amended; 45 U.S.C. 431, 438, as amended; 49 app. U.S.C. 1655(e), as amended; Pub. L. 100–342; and 49 CFR 1.49(c), (g), and (m).

§ 232.0 Applicability and penalties.

(a) Except as provided in paragraph (b), this part applies to all standard gage railroads.

(b) This part does not apply to:

(1) A railroad that operates only on track inside an installation which is not part of the general railroad system of transportation; or

(2) Rapid transit operations in an urban area that are not connected with the general railroad system of transportation.

(c) As used in this part, carrier means ''railroad,'' as that term is defined below.

(d) Railroad means all forms of non-highway ground transportation that run on rails or electromagnetic guideways, including (1) commuter or other short-haul rail passenger service in a metropolitan or suburban area, and (2) high speed ground transportation systems that connect metropolitan areas, without regard to whether they use new technologies not associated with traditional railroads. Such term does not include rapid transit operations within an urban area that are not connected to the general railroad system of transportation.

(e) Any person (including a railroad and any manager, supervisor, official, or other employee or agent of a railroad) who violates any requirement of this part or causes the violation of any such requirement is subject to a civil penalty of at least $250 and not more than $10,000 per violation, except that: Penalties may be assessed against individuals only for willful violations, and, where a grossly negligent violation or a pattern of repeated violations has created an imminent hazard of death or injury to persons, or has caused death or injury, a penalty not to exceed $20,000 per violation may be assessed. Each day a violation continues shall constitute a separate offense.

§ 232.1 Power brakes; minimum percentage.

On and after September 1, 1910, on all railroads used in interstate commerce, whenever, as required by the Safety Appliance Act as amended March 2, 1903, any train is operated with power or train brakes, not less than 85 percent of the cars of such train shall have their brakes used and operated by the engineer of the locomotive drawing such train, and all power-brake cars in every such train which are associated together with the 85 percent shall have their brakes so used and operated.

§ 232.2 Drawbars; standard Height.

Not included in this Appendix. Moved to 49 CFR part 231.

§ 232.3 Power brakes and appliances for operating power-brake systems.

(a) The specifications and requirement for power brakes and appliances for operating power-brake systems for freight service set forth in the appendix to the report on further hearing, of May 30, 1945, are hereby adopted and prescribed. (See appendix to this part for order in Docket 13528.)

Rules for Inspection, Testing and Maintenance of Air Brake Equipment

§ 232.10 General rules; locomotives.

(a) Air brake and hand brake equipment on locomotives including tender must be inspected and maintained in accordance with the requirements of the Locomotive Inspection and United States Safety Appliance Acts and related orders and regulations of the Federal Railroad Administrator (FRA).

(b) It must be known that air brake equipment on locomotives is in a safe and suitable condition for service.

(c) Compressor or compressors must be tested for capacity by orifice test as often as conditions require but not less frequently than required by law and orders of the FRA.

(d) Main reservoirs shall be subjected to tests periodically as required by law and orders of the FRA.

(e) Air gauges must be tested periodically as required by law and orders of the FRA, and whenever any irregularity is reported. They shall be compared with an accurate deadweight tester, or test gauge. Gauges found inaccurate or defective must be repaired or replaced.

(f)(1) All operating portions of air brake equipment together with dirt collectors and filters must be cleaned, repaired and tested as often as conditions require to maintain them in a safe and suitable condition for service, and not less frequently than required by law and orders of the FRA.

(2) On locomotives so equipped, hand brakes, parts, and connections must be inspected, and necessary repairs made as often as the service requires, with date being suitably stenciled or tagged.

(g) The date of testing or cleaning of air brake equipment and the initials of the shop or station at which the work was done shall be placed on a card displayed under transparent covering in the cab of each locomotive unit.

(h)(1) Minimum brake cylinder piston travel must be sufficient to provide proper brake shoe clearance when brakes are released.

(2) Maximum brake cylinder piston travel when locomotive is standing must not exceed the following:

	Inches
Steam locomotives:	
Cam type of driving wheel brake	3½
Other types of driving wheel brakes	6
Engine truck brake	8
Engine trailer truck brake	8
Tender brake (truck mounted and tender bed mounted)	8
Tender brake (body mounted)	9
Locomotives other than steam:	
Driving wheel brake	6
Swivel type truck brake with brakes on more than one truck operated by one brake cylinder	7
Swivel type truck brake equipped with one brake cylinder	8
Swivel type truck brake equipped with two or more brake cylinders	6

(i)(1) Foundation brake rigging, and safety supports, where used, must be maintained in a safe and suitable condition for service. Levers, rods, brake beams, hangars and pins must be of ample strength and must not bind or foul in any way that will affect proper operation of brakes. All pins must be properly applied and secured in place with suitable locking devices. Brake shoes must be properly applied and kept approximately in line with treads of wheels or other braking surfaces.

(2) No part of the foundation brake rigging and safety supports shall be closer to the rails than specified by law and orders of the FRA.

(j)(1) Main reservoir leakage: Leakage from main air reservoir and related piping shall not exceed an average of 3 pounds per minute in a test of three minutes' duration, made after the pressure has been reduced 40 percent below maximum pressure.

(2) Brake pipe leakage: Brake pipe leakage must not exceed 5 pounds per minute after a reduction of 10 pounds has been made from brake pipe air pressure of not less than 70 pounds.

(3) Brake cylinder leakage: With a full service application of brakes, and with communication to the brake cylinders closed, brakes must remain applied not less than five minutes.

(4) The main reservoir system of each unit shall be equipped with at least one safety valve, the capacity of which shall be sufficient to prevent an accumulation of pressure of more than 10 pounds per square inch above the maximum setting of the compressor governor fixed by the chief mechanical officer of the carrier operating the locomotive.

(5) A suitable governor shall be provided that will stop and start the air compressor within 5 pounds above or below the pressures fixed.

(6) Compressor governor when used in connection with the automatic air brake system shall be so adjusted that the compressor will start when the main reservoir pressure is not less than 15 pounds above the maximum brake-pipe pressure fixed by the rules of the carrier and will not stop the compressor until the reservoir pressure has increased not less than 10 pounds.

(k) The communicating signal system on locomotives when used in passenger service must be tested and known to be in a safe and suitable condition for service before each trip.

(l) Enginemen when taking charge of locomotives must know that the brakes are in operative condition.

(m) In freezing weather drain cocks on air compressors of steam locomotives must be left open while compressors are shut off.

(n) Air pressure regulating devices must be adjusted for the following pressures:

	Pounds
Locomotives:	
(1) Minimum brake pipe air pressure:	
Road Service	70
Switch Service	60
(2) Minimum differential between brake pipe and main reservoir air pressures, with brake valve in running position	15
(3) Safety valve for straight air brake	30–55
(4) Safety valve for LT, ET, No. 8–EL, No. 14 El, No. 6–DS, No. 6–BL and No. 6–SL equipment	30–68
(5) Safety valve for HSC and No. 24–RL equipment	30–75
(6) Reducing valve for independent or straight air brake	30–50
(7) Self-lapping portion for electro-pneumatic brake (minimum full application pressure)	50
(8) Self-lapping portion for independent air brake (full application pressure)	30–50
(9) Reducing valve for air signal	40–60
(10) Reducing valve for high-speed brake (minimum)	50
Cars:	
(11) Reducing valve for high-speed brake	58–62
(12) Safety valve for PS, LN, UC, AML, AMU and AB–1–B air brakes	58–62
(13) Safety valve for HSC air brake	58–77
(14) Governor valve for water raising system	60
(15) Reducing valve for water raising system	20–30

§ 232.11 Train Air Brake System Tests.

(a) Supervisors are jointly responsible with inspectors, enginemen and trainmen for condition of train air brake and air signal equipment on motive power and cars to the extent that it is possible to detect defective equipment by required air tests.

(b) Communicating signal system on passenger equipment trains must be tested and known to be in a suitable condition for service before leaving terminal.

(c) Each train must have the air brakes in effective operating condition, and at no time shall the number and location of operative air brakes be less than permitted by Federal requirements. When piston travel is in excess of 10½ inches, the air brakes cannot be considered in effective operating condition.

(d) Condensation must be blown from the pipe from which air is taken before connecting yard line or motive power to train.

§ 232.12 Initial Terminal Road Train Airbrake Tests.

(a)(1) Each train must be inspected and tested as specified in this section by a qualified person at points—

(i) Where the train is originally made up (initial terminal);

(ii) Where train consist is changed, other than by adding or removing a solid block of cars, and the train brake system remains charged; and

(iii) Where the train is received in interchange if the train consist is changed other than by—

(A) Removing a solid block of cars from the head end or rear end of train;

(B) Changing motive power;

(C) Removing or changing the caboose; or

(D) Any combination of the changes listed in (A), (B), and (C) of this subparagraph.

Where a carman is to perform the inspection and test under existing or future collective bargaining agreement, in those circumstances a carman alone will be considered a qualified person.

(2) A qualified person participating in the test and inspection or who has knowledge that it was made shall notify the engineer that the initial terminal road train air brake test has been satisfactorily performed. The qualified person shall provide the notification in writing if the road crew will report for duty after the qualified person goes off duty. The qualified person also shall provide the notification in writing if the train that has been inspected is to be moved in excess of 500 miles without being subjected to another test pursuant to either this section or § 232.13 of this part.

(b) Each carrier shall designate additional inspection points not more than 1,000 miles apart where intermediate inspection will be made to determine that—

(1) Brake pipe pressure leakage does not exceed five pounds per minute;

(2) Brakes apply on each car in response to a 20-pound service brake pipe pressure reduction; and

(3) Brake rigging is properly secured and does not bind or foul.

(c) Train airbrake system must be charged to required air pressure, angle cocks and cutout cocks must be properly positioned, air hose must be properly coupled and must be in condition for service. An examination must be made for leaks and necessary repairs made to reduce leakage to a minimum. Retaining valves and retaining valve pipes must be inspected and known to be in condition for service. If train is to be operated in electro-pneumatic brake operation, brake circuit cables must be properly connected.

(d)(1) After the airbrake system on a freight train is charged to within 15 pounds of the setting of the feed valve on the locomotive, but to not less than 60 pounds, as indicated by an accurate gauge at rear end of train, and on a passenger train when charged to not less than 70 pounds, and upon receiving the signal to apply brakes for test, a 15-pound brake pipe service reduction must be made in automatic brake operations, the brake valve lapped, and the number of pounds of brake pipe leakage per minute noted as

indicated by brake pipe guage, after which brake pipe reduction must be increased to full service. Inspection of the train brakes must be made to determine that angle cocks are properly positioned, that the brakes are applied on each car, that piston travel is correct, that brake rigging does not bind or foul, and that all parts of the brake equipment are properly secured. When this inspection has been completed, the release signal must be given and brakes released and each brake inspected to see that all have released.

(2) When a passenger train is to be operated in electro-pneumatic brake operation and after completion of test of brakes as prescribed by paragraph (d)(1) of this section the brake system must be recharged to not less than 90 pounds air pressure, and upon receiving the signal to apply brakes for test, a minimum 20 pounds electro-pneumatic brake application must be made as indicated by the brake cylinder gage. Inspection of the train brakes must then be made to determine if brakes are applied on each car. When this inspection has been completed, the release signal must be given and brakes released and each brake inspected to see that all have released.

(3) When the locomotive used to haul the train is provided with means for maintaining brake pipe pressure at a constant level during service application of the train brakes, this feature must be cut out during train airbrake tests.

(e) Brake pipe leakage must not exceed 5 pounds per minute.

(f)(1) At initial terminal piston travel of body-mounted brake cylinders which is less than 7 inches or more than 9 inches must be adjusted to nominally 7 inches.

(2) Minimum brake cylinder piston travel of truck-mounted brake cylinders must be sufficient to provide proper brake shoe clearance when brakes are released. Maximum piston travel must not exceed 6 inches.

(3) Piston travel of brake cylinders on freight cars equipped with other than standard single capacity brake, must be adjusted as indicated on badge plate or stenciling on car located in a conspicuous place near the brake cylinder.

(g) When test of airbrakes has been completed the engineman and conductor must be advised that train is in proper condition to proceed.

(h) During standing test, brakes must not be applied or released until proper signal is given.

(i)(1) When train airbrake system is tested from a yard test plant, an engineer's brake valve or an appropriate test device shall be used to provide increase and reduction of brake pipe air pressure or electro-pneumatic brake application and release at the same or a slower rate as with engineer's brake valve and yard test plant must be connected to the end which will be nearest to the hauling road locomotive.

(2) When yard test plant is used, the train airbrakes system must be charged and tested as prescribed by paragraphs (c) to (g) of this section inclusive, and when practicable should be kept charged until road motive power is coupled to train, after which, an automatic brake application and release test of airbrakes on rear car must be made. If train is to be operated in electro-pneumatic brake operation, this test must also be made in electro-pneumatic brake operation before proceeding.

(3) If after testing the brakes as prescribed in paragraph (i)(2) of this section the train is not kept charged until road motive power is attached, the brakes must be tested as prescribed by paragraph (d)(1) of this section and if train is to be operated in electro-pneumatic brake operation as prescribed by paragraph (d)(2) of this section.

(j) Before adjusting piston travel or working on brake rigging, cutout cock in brake pipe branch must be closed and air reservoirs must be drained. When cutout cocks are provided in brake cylinder pipes, these cutout cocks only may be closed and air reservoirs need not be drained.

§ 232.13 Road train and intermediate terminal train air brake tests.

(a) *Passenger trains.* Before motive power is detached or angle cocks are closed on a passenger train operated in either automatic or electro-pneumatic brake operation, except when closing angle cocks for cutting off one or more cars from the rear end of train, automatic air brake must be applied. After recouping, brake system must be recharged to required air pressure and before proceeding and upon receipt of proper request or signal, application and release tests of brakes on rear car must be made from locomotive in automatic brake operation. If train is to be operated in electro-pneumatic brake operation, this test must also be made in electro-pneumatic brake operation before proceeding. Inspector or trainman must determine if brakes on rear car of train properly apply and release.

(b) *Freight trains.* Before motive power is detached or angle cocks are closed on a freight train, brakes must be applied with not less than a 20-pound brake pipe reduction. After recoupling, and after angle cocks are opened, it must be known that brake pipe air pressure is being restored as indicated by a rear car gauge or device. In the absence of a rear car gauge or device, an air brake test must be made to determine that the brakes on the rear car apply and release.

(c)(1)At a point other than an initial terminal where a locomotive or caboose is changed, or where one or more consecutive cars are cut off from the rear end or head end of a train with the consist otherwise remaining intact, after the train brake system is charged to within 15 pounds of the feed valve setting on the locomotive, but not less than 60 pounds as indicated at the rear of a freight train and 70 pounds on a passenger train, a 20-pound brake pipe reduction must be made and it must be determined that the brakes on the rear car apply and release. As an alternative to the rear car brake application and release test, it shall be determined that brake pipe pressure of the train is being reduced as indicated by a rear car gauge or device and then that brake pipe pressure of the train is being restored as indicated by a rear car gauge or device.

(2) Before proceeding it must be known that brake pipe pressure as indicated at rear of freight train is being restored.

(3) On trains operating with electro-pneumatic brakes, with brake system charged to not less than 70 pounds, test must be made to determine that rear brakes apply and release properly from a minimum 20 pounds electro-pneumatic brake application as indicated by brake cylinder gauge.

(d)(1) At a point other than a terminal where one or more cars are added to a train, after the train brake system is charged to not less than 60 pounds as indicated by a gauge or device at the rear of a freight train and 70 pounds on a passenger train. A brake test must be made by a designated person as described in § 232.12 (a)(1) to determine that brake pipe leakage does not exceed five (5) pounds per minute as indicated by the brake pipe gauge after a 20-pound brake pipe reduction has been made. After the test is completed, it must be determined that piston travel is correct, and the train airbrakes of these cars and on the rear car of the train apply and remain applied, until the release signal is given. As an alternative to the rear car brake application and release portion of the test, it shall be determined that brake pipe pressure of the train is being reduced as indicated by a rear car gauge or device and then that brake pipe pressure of the train is being restored as indicated by a rear car gauge or device. Cars added to a train that have not been inspected in accordance with § 232.12 (c) through (j) must be so inspected and tested at the next terminal where facilities are available for such attention.

(d)(2)(i) At a terminal where a solid block of cars, which has been previously charged and tested as prescribed by § 232.13 (c) through (j), is added to a train, it must be determined that the brakes on the rear car of the train apply and release. As an alternative to the rear car application and release test, it shall be determined that brake pipe pressure of the train is being reduced as indicated by a rear car gauge or device and then that brake pipe pressure of the train is being restored as indicated by a rear car gauge or device.

(d)(2)(ii) When cars which have not been previously charged and tested as prescribed by § 232.12 (c) through (j) are added to a train, such cars may either be given inspection and tests in accordance with § 232.12 (c) through (j), or tested as prescribed by paragraph (d)(1) of this section prior to departure in which case these cars must be inspected and tested in accordance with § 232.12 (c) through (j) at next terminal.

(3) Before proceeding it must be known that the brake pipe pressure at the rear of freight train is being restored.

(e)(1) Transfer train and yard train movements not exceeding 20 miles, must have the air brake hose coupled between all cars, and after the brake system is charged to not less than 60 pounds, a 15 pound service brake pipe reduction must be made to determine that the brakes are applied on each car before releasing and proceeding.

(2) Transfer train and yard train movements exceeding 20 miles must have brake inspection in accordance with § 232.12 (c)–(j).

(f) The automatic air brake must not be depended upon to hold a locomotive, cars or train, when standing on a grade, whether locomotive is attached or detached from cars

or train. When required, a sufficient number of hand brakes must be applied to hold train, before air brakes are released. When ready to start, hand brakes must not be released until it is known that the air brake system is properly charged.

(g) As used in this section, device means a system of components designed and inspected in accordance with § 232.19.

(h) When a device is used to comply with any test requirement in this section, the phrase brake pipe pressure of the train is being reduced means a pressure reduction of at least five pounds and the phrase brake pipe pressure of the train is being restored means a pressure increase of at least five pounds.

§ 232.14 Inbound Brake Equipment Inspection.

(a) At points where inspectors are employed to make a general inspection of trains upon arrival at terminals, visual inspection must be made of retaining valves and retaining valve pipes, release valves and rods, brake rigging, safety supports, hand brakes, hose and position of angle cocks and make necessary repairs or mark for repair tracks any cars to which yard repairs cannot be promptly made.

(b) Freight trains arriving at terminals where facilities are available and at which special instructions provide for immediate brake inspection and repairs, trains shall be left with air brakes applied by a service brake pipe reduction of 20 pounds so that inspectors can obtain a proper check of the piston travel. Trainmen will not close any angle cock or cut the locomotive off until the 20 pound service reduction has been made. Inspection of the brakes and needed repairs should be made as soon thereafter as practicable.

§ 232.15 Double Heading and Helper Service.

(a) When more than one locomotive is attached to a train, the engineman of the leading locomotive shall operate the brakes. On all other motive power units in the train the brake pipe cutout cock to the brake valve must be closed, the maximum main reservoir pressure maintained and brake valve handles kept in the prescribed position. In case it becomes necessary for the leading locomotive to give up control of the train short of the destination of the train, a test of the brakes must be made to see that the brakes are operative from the automatic brake valve of the locomotive taking control of the train.

(b) The electro-pneumatic brake valve on all motive power units other than that which is handling the train must be cut out, handle of brake valve kept in the prescribed position, and air compressors kept running if practicable.

§ 232.16 Running Tests.

When motive power, engine crew or train crew has been changed, angle cocks have been closed except for cutting off one or more cars from the rear end of train or electro-pneumatic brake circuit cables between power units and/or cars have been disconnected, running test of train air brakes on passenger train must be made, as soon as speed of train permits, by use of automatic brake if operating in automatic brake operation or by use of electro-pneumatic brake if operating in electro-pneumatic brake operation. Steam or power must not be shut off unless required and running test must be made by applying train air brakes with sufficient force to ascertain whether or not brakes are operating properly. If air brakes do not properly operate, train must be stopped, cause of failure ascertained and corrected and running test repeated.

§ 232.17 Freight and passenger train car brakes

(a) *Testing and repairing brakes on cars while on shop or repair tracks.* (1) When a freight car having brake equipment due for periodic attention is on shop or repair tracks where facilities are available for making air brake repairs, brake equipment must be given attention in accordance with the requirements of the currently effective AAR Code of Rules for cars in interchange. Brake equipment shall then be tested by use of a single car testing device as prescribed by the currently effective AAR Code of Tests.

(2)(i) When a freight car having an air brake defect is on a shop or repair track, brake equipment must be tested by use of a single car testing device as prescribed by currently effective AAR Code of Tests.

(ii) All freight cars on shop or repair tracks shall be tested to determine that the air brakes apply and release. Piston travel on a standard body mounted brake cylinder which is less than 7 inches or more than 9 inches must be adjusted to nominally 7 inches. Piston travel of brake cylinders on all freight cars equipped with other than standard single capacity brake, must be adjusted as indicated on badge plate or stenciling on car located in a conspicuous place near brake cylinder. After piston travel has been adjusted and with brakes released, sufficient brake shoe clearance must be provided.

(iii) When a car is equipped for use in passenger train service not due for periodical air brake repairs, as indicated by stenciled or recorded cleaning dates, is on shop or repair tracks, brake equipment must be tested by use of single car testing device as prescribed by currently effective AAR Code of Tests. Piston travel of brake cylinders must be adjusted if required, to the standard travel for that type of brake cylinder. After piston travel has been adjusted and with brakes released, sufficient brake shoe clearance must be provided.

(iv) Before a car is released from a shop or repair track, it must be known that brake pipe is securely clamped, angle cocks in proper position with suitable clearance, valves, reservoirs and cylinders tight on supports and supports securely attached to car.

(b)(1) Brake equipment on cars other than passenger cars must be cleaned, repaired, lubricated and tested as often as required to maintain it in a safe and suitable condition for service but not less frequently than as required by currently effective AAR Code of Rules for cars in interchange.

(2) Brake equipment on passenger cars must be clean, repaired, lubricated and tested as often as necessary to maintain it in a safe and suitable condition for service but not less frequently than as required in Standard S–045 in the Manual of Standards and Recommended Practices of the AAR.

(3) Copies of the materials referred to in this section can be obtained from the Association of American Railroads, 1920 L Street, NW., Washington, DC 20036.

§ 232.19 through § 232.25 Provisions related to end-of-train devices.

Not included in this Appendix as they are contained in Subpart E of this rule.

Issued in Washington, DC, on January 4, 2001.

John V. Wells,

Acting Administrator, Federal Railroad Administration.

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