DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

49 CFR Parts 218, 221, and 232

[Docket No. FRA–2018–0093, Notice No. 2]

RIN 2130–AC67

Miscellaneous Amendments to Brake System Safety Standards and Codification of Waivers

AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: FRA is revising its regulations governing brake inspections, tests, and equipment. The changes include the incorporation of relief from various provisions provided in long-standing waivers related to single car air brake tests, end-of-train devices, helper service, and brake maintenance. FRA is also extending the time that freight rail equipment can be ''off-air'' before requiring a new brake inspection. In addition, FRA is making various modifications to the existing brake-related regulations to improve clarity and remove outdated or unnecessary provisions. FRA expects the revisions will benefit railroads and the public by reducing unnecessary costs, creating consistency between U.S. and Canadian regulations, and incorporating the use of newer technologies demonstrated to maintain or increase safety. The rule will reduce the overall regulatory burden on railroads.

DATES: This final rule is effective December 11, 2020.

Justification for Immediate Effective Date. FRA finds that this rule relieves current regulatory restrictions, thus in accordance with 5 U.S.C. 553(d)(1), FRA has determined it is appropriate to make the rule effective upon publication.

Incorporation by Reference. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of December 11, 2020. The incorporation by reference of certain other publications listed in the rule was approved by the Director of the Federal Register as of December 15, 2008.

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SUPPLEMENTARY INFORMATION:

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I. Executive Summary

A. Purpose of the Regulatory Action

In a letter dated July 12, 2018, which is included in the public docket to this rulemaking proceeding, the Association of American Railroads (AAR) submitted a petition for rulemaking (Petition) requesting FRA relax the requirement to conduct a Class I brake test prior to operation if a train is off-air for a period of more than four hours, by extending the off-air period to twenty-four hours. On January 15, 2020, FRA issued a Notice of Proposed Rulemaking (NPRM) responding to AAR's petition, proposing codification of existing waivers related to brake systems, and making technical amendments to reduce regulatory burdens while maintaining or improving safety. 85 FR 2494, Jan. 15, 2020. This rulemaking is a result of FRA's effort to streamline and update its regulations to reflect technological advances and lessons learned through feedback from all stakeholders. AAR submitted a separate rulemaking petition in March 2019 proposing amendments to part 232 related to the industry's development of a rail car electronic air brake slip (eABS) system. FRA will address the recommendations in that petition in a separate rulemaking proceeding in Docket No. FRA–2019–0072 (the ''eABS Rule'').

B. Summary of the Major Provisions of the Regulatory Action

In this final rule, FRA is incorporating into the regulations various long-standing waivers providing conditional exceptions to existing rules concerning air brake testing, end-of-train (EOT) devices, and helper service. FRA is also extending to 24 hours the time that freight rail equipment can be ''off-air'' before requiring a new brake inspection and is making various modifications to the existing brake-related regulations for clarity and is removing outdated or unnecessary provisions.

C. Costs and Benefits of the Regulatory Action

FRA analyzed the economic impacts of this final rule over a 10-year period, and estimated its costs, cost savings, and benefits. For the final rule, FRA estimates net cost savings of $503.0 million (using a 7% discount rate), and $594.6 million (using a 3% discount rate). The results of this analysis are displayed in the table below.

TABLE E–1—TOTAL COSTS AND COST SAVINGS OVER 10 YEARS

[2017 Dollars in millions]

Section	Present value 7%	Present value 3%	Annualized 7%	Annualized 3%
Costs: Training	(*)	(*)	(*)	(*)
Cost Savings:				
Helper Link	$3.9	$4.5	$0.6	$0.5
26–C Brake Valve	0.4	0.5	0.06	0.06
D–22 Brake Valve	1.0	1.1	0.1	0.1
24 Hours Off-air	325.6	386.2	46.4	45.3
90 CFM	1.8	2.1	0.3	0.2

TABLE E–1—TOTAL COSTS AND COST SAVINGS OVER 10 YEARS—Continued

[2017 Dollars in millions]

Section	Present value 7%	Present value 3%	Annualized 7%	Annualized 3%
Single Car Air Brake Test (SCT) 24 month	150.7	176.1	21.5	20.6
SCT 48 month	19.5	23.8	2.8	2.8
Waiver Cost Savings	0.1	0.1	0.01	0.01
Government Administrative Cost Savings	0.1	0.1	0.01	0.01
Total Cost Savings	503.0	594.6	71.6	69.7
Net Cost Savings	503.0	594.6	71.6	69.7

Note: Figures may not sum in this and subsequent tables due to rounding. Net Cost Savings = Cost Savings − Costs.
* De minimis.

This final rule generally increases flexibility for the regulated entities by codifying waivers. It does not impose any new substantive requirements. This final rule will not negatively impact safety in any aspect of railroad operations and FRA does not expect any increase in end-of-train device or brake failures as a result of this rule. As noted in the Regulatory Impact Analysis (RIA) accompanying this rule, safety may be improved due to railroad employees experiencing less risk of common injuries such as slips, trips, and falls by having to perform fewer physical inspections, which would produce positive safety benefits, though these have not been quantified.

II. Background

A. Existing Regulations

FRA regulations require the air brake systems of trains, and the air brakes of individual freight cars, to be inspected and tested in certain circumstances. The regulations provide for five primary types of brake system inspections: Class I (initial terminal inspection), Class IA (1,000-mile inspection), Class II (intermediate inspection), Class III (trainline continuity inspection), and the SCT.

A Class I air brake test, also referred to as an initial terminal inspection, is a comprehensive inspection of the brake equipment on each car in an assembled train that is required to be performed at the location where a train is originally assembled, when the consist is changed pursuant to 49 CFR 232.205(a)(2) (*e.g.,* other than by adding or removing a single car or solid block of cars, removing a defective car, or picking up multiple blocks of cars under the space or trackage constraints referenced by paragraph (b)(2)), and when a train is off-air for a defined number of hours. Class I brake tests help ensure that a train is in proper working condition and capable of traveling to its destination with minimal problems en route. A Class I brake test requires the performance of a leakage test and in-depth inspection of the brake equipment (on both sides of the freight car) to ensure that each car's brake system is properly secure, does not bind or foul, and responds by applying or releasing in accordance with a specified brake pipe pressure signal. Piston travel must also be inspected and adjusted to a specified length if found not to be within a certain range of movement.[1]

A Class IA brake test—required every 1,000 miles—includes all the same elements of a Class I test, but with less stringent piston travel requirements. The most restrictive car or block of cars in a train determines the location where Class IA tests must be performed. For example, if a train travels 500 miles from its point of origination to a location where it picks up a block of cars that has travelled 800 miles since its last Class I brake test, and the crew does not perform a Class I brake test when adding the cars, then the entire train must receive a Class IA brake test within 200 miles, even though that location is only 700 miles from the train's origination.

Class II brake tests are less detailed inspections used for cars that do not have a compliant Class I inspection record that are picked up by a train at locations other than the initial terminal of the train, and where a Class I test cannot be performed. A railroad may utilize a Class II brake test where it is physically impossible to perform safely all of the requirements of the Class I brake tests; for example, where there is insufficient room to walk along both sides of the train. The Class II brake test includes a test for excessive brake pipe leakage, charging the air brakes to within 15 pounds per square inch (psi) of working pressure, making a 20-psi reduction in the brake pipe to actuate the brake, restoring pressure to working psi, releasing all brakes, and restoring full brake pipe pressure to the rear of the train. While a railroad may perform a Class II brake test, the rule requires a Class I brake test to be performed at the next available location in the car's line of travel in order to continue operating past that point. Due to the inefficiencies of this procedure, railroads generally perform the Class I brake tests in most instances where a Class II would be permitted as an alternative.

A Class III brake test must be performed any time the brake pipe is opened on an operating train. The test includes charging the air brakes to working pressure (no less than 60 psi at rear of train), making a 20-psi reduction in the brake pipe to actuate the brake on the rear car of the train, releasing the brake, and ensuring that pressure at the rear of the train is restored.

In addition to the types of air brake tests noted above, the regulations require the brakes of individual cars to be maintained periodically and tested in certain circumstances. This test is known as an SCT and is used to validate individual air brake effectiveness. An SCT is required: At least every 8 years for new or rebuilt freight cars, at least every 5 years for all other freight cars, and any time a freight car is on a shop track or repair track, if the car has not had an SCT in the previous 12 months.

A more in-depth summary, history, and analysis of the regulations affecting Class I, Class IA, Class II, and Class III brake tests, SCTs, and the operation and testing of end-of-train devices, are provided in the FRA final rule ''Freight and other non-passenger trains and equipment; brake system safety standards; end-of-train devices,'' 66 FR 4104, Jan. 17, 2001; and two subsequent modifications to that final rule that FRA promulgated in response to petitions for reconsideration, 66 FR 39683, Aug. 1, 2001, and 67 FR 17555, Apr. 10, 2002.

[1] When a car's brakes are applied, a piston in the brake cylinder travels (*i.e.,* moves), causing the brake shoe to push against the wheel to create the braking action. Piston travel must be within specified limits to be capable of producing its designed retarding force in order for FRA to consider a car's brakes to be effective.

B. FRA Waiver Authority and Process

When the existing rules do not adequately address or apply to the use of new and novel transportation technologies, industry stakeholders have often sought waiver of those rules through FRA's authorized process under subpart C to 49 CFR part 211. 49 U.S.C. 20103 (''The Secretary [of Transportation] may waive compliance with any parts of a regulation prescribed or order issued under this chapter if the waiver is in the public interest and consistent with railroad safety.''); 49 CFR 1.89(a). Each properly filed petition for a permanent or temporary waiver of a safety rule, regulation, or standard is referred to the Safety Board for decision. 49 CFR 211.41(a). The FRA Railroad Safety Board's (Safety Board) decision is typically rendered after a notice is published in the **Federal Register** and an opportunity for public comment is provided. 49 CFR 211.41(b). If a waiver petition is granted, the Safety Board may impose conditions on the grant of relief to ensure the decision is in the public interest and consistent with railroad safety. 49 CFR 211.41(c).

Activity under a waiver of regulatory compliance may generate sufficient data and experience to support an expansion of its scope, applicability, and duration. For instance, in many cases FRA has expanded the scope of certain waivers or issued the same or similar waivers to additional applicants. FRA has also extended various waivers' expiration dates. A waiver's success and its continued expansion warrant consideration of regulatory codification. Codifying a waiver, and thereby making its exemptions and requirements universally applicable, allows the entire industry to benefit from the regulatory relief the waiver provides without incurring the costs associated with seeking a waiver.

C. Petition for Rulemaking and Review of Existing Waivers

In December 2017, AAR filed a petition for waiver, on behalf of its members, from FRA's regulation requiring a Class I brake test prior to operation if a train is off-air for a period of more than four hours, contending it is too restrictive. Docket No. FRA–2017–0130. The Safety Board denied the waiver petition, finding that there was a lack of supporting data submitted with the waiver request, and that with the appropriate data, the relief requested was more appropriately addressed through the rulemaking process. Subsequently, in a letter dated July 12, 2018—included in the public docket to this rulemaking proceeding—AAR submitted a petition for rulemaking (Petition) requesting that FRA relax the requirement to conduct a Class I brake test prior to operation if a train is off-air for a period of more than four hours, by extending the off-air period to twenty-four hours. On January 15, 2020, FRA issued an NPRM responding to AAR's petition, proposing codification of existing waivers related to brake systems, and making technical amendments to reduce regulatory burdens while maintaining or improving safety. This rulemaking is a result of FRA's effort to streamline and update its regulations to reflect technological advances and lessons learned through feedback from all stakeholders.

In this final rule, FRA is also codifying waivers of compliance from rules affecting motive power and equipment (MP&E), including the aforementioned brake inspection requirements. Specifically, FRA is implementing changes to the regulations affecting: The use of EOT devices and *Helper Link* devices or similar technologies; higher air-flow on distributed powered (DP) trains; and the performance of Class I air brake tests and SCTs. FRA is also making technical corrections to existing regulations.

The waiver subject matters considered for codification are explained further below. FRA attempted to capture and identify the dockets for all substantially similar waivers affected by this rulemaking.

There may be some substantially similar waivers not identified in the NPRM and this final rule, but still affected by this rulemaking. Each affected waiver, whether specifically referenced or not, remains in force for the time being unless it expires without extension or a direct beneficiary explicitly requests and receives termination of the waiver in accordance with part 211. FRA does not intend to terminate any waivers upon the effective date of a final rule, as it is possible that there are exceptions or conditions in some existing waivers that are not specifically codified in the final rule. Terminating waivers immediately upon the effective date of a final rule may unnecessarily complicate matters, especially considering many of the waivers will simply expire soon thereafter. If a regulated entity wishes to continue a waiver's provision not captured by this final rule beyond the expiration date of that waiver, that entity can petition the Safety Board for an extension of that provision.

D. Identified Waivers

Below is a list of waiver petition dockets, organized by subject matter, which FRA has identified as potentially being affected by this final rule. The public docket for each listed waiver may be accessed at *www.regulations.gov*.

Air Flow Method

- Extending air flow limits (49 CFR 232.205(c)(1)(ii))
  - BNSF Railway (BNSF), Canadian National Railway (CN), Canadian Pacific Railway (CP), and Union Pacific Railroad (UP) Docket No. FRA–2012–0091

End-of-Train (EOT) Device

- Power source (49 CFR 232.403(f)(2))
  - Wabtec Corporation (Wabtec), Docket No. FRA–2001–9270
  - Quantum Engineering, Inc (Quantum) (now known as Siemens Industry, Inc. (Siemens)), Docket No. FRA–2006–25794
- Calibration (49 CFR 232.409(d))
  - Wabtec, Docket No. FRA–2004–18895
  - Ritron, Inc. (Ritron), Docket No. FRA–2009–0015
  - DPS Electronics, Inc. (DPS), Docket No. FRA–2012–0096
  - Siemens, Docket No. FRA–2015–0044
- Helper service (49 CFR 232.219(c))
  - BNSF, Docket No. FRA–2006–26435
  - Montana Rail Link (MRL), Docket No. FRA–2014–0013
- Marker lamp height (49 CFR 221.13(d))
  - DPS, Docket No. FRA–2015–0023
  - Siemens, Docket No. FRA–2017–0093
- Utility employee duties (49 CFR 218.22(c)(5))
  - BNSF, Docket No. FRA–2001–10660
  - Canadian Pacific Railway (CP), Docket No. FRA–2004–17989

Single Car Test

- Update to AAR Standard S–486–18 (49 CFR 232.305(a))
  - AAR, Docket No. FRA–2018–0011
- Add AAR Standard S–4027–18 (49 CFR 232.305(a))
  - BNSF and Union Pacific Railroad (UP), Docket No. FRA–2013–0030

Automated Single Car Test

- Testing periodicity (49 CFR 232.305(b)(2))
  - BNSF and UP, Docket No. FRA–2013–0030

Brake Systems for Covered Non-Freight Operations

- Add AAR Standard S–4045–13 (49 CFR 232.717(b)(2), formerly appx B, I, § 232.17(b)(2))
  - AAR, Docket No. FRA–2013–0063

E. Incorporating by Reference New and Updated Standards Under 1 CFR 51.5

As required by 1 CFR 51.5, FRA has summarized the standards it is incorporating by reference in the section-by-section analysis to this preamble. The AAR standards summarized herein, and listed in the table directly below for convenience, are reasonably available to all interested parties for inspection. The standards can be obtained from the Association of American Railroads, 425 Third Street SW, Washington, DC 20024, telephone: (202) 639–2345, email: *publications@aar.com,* website: *https://aarpublications.com.*

AAR STANDARDS INCORPORATED BY REFERENCE IN 49 CFR PART 232

Identification No.	Title	Year or edition	Section affected in 49 CFR
S–469–01	Performance Specification for Freight Brakes	2006	§ 232.103(l).
S–486–18	Code of Air Brake System Tests for Freight Equipment	2018	§ 232.305(a).
S–4027–18	Automated Single-Car Test Equipment, Conventional Brake Equipment-Design and Performance Requirements.	2018	§ 232.305(a).
S–4045–13	Passenger Equipment Maintenance Requirements	2013	§ 232.717(e)(1).
S–4200	Electronically Controlled Pneumatic (ECP) Cable-Based Brake Systems—Performance Requirements.	2014	§ 232.603(f)(1).
S–4210	ECP Cable-Based Brake System Cable, Connectors, and Junction Boxes—Performance Specifications.	2014	§ 232.603(f)(1).
S–4230	Intratrain Communication (ITC) Specification for Cable-Based Freight Train Control System.	2014	§ 232.603(f)(1).
S–4250	Performance Requirements for ITC Controlled Cable-Based Distributed Power Systems	2014	§ 232.603(f)(1).
S–4260	ECP Brake and Wire Distributed Power Interoperability Test Procedures	2008	§ 232.603(f)(1).
N/A	2020 Field Manual of the AAR Interchange Rules	2020	§ 232.717(e)(1).

The rule text already incorporates by reference the latest versions of the following AAR standards, so no updates are currently necessary: S–4220, ECP Cable-Based Brake DC Power Supply—Performance Specification (2002); S–4240, ECP Brake Equipment—Approval Procedure (2007); and S–4270, ECP Brake System Configuration Management (2008).

F. Railroad Safety Advisory Committee (RSAC) Advice and Input

FRA received substantial advice and feedback from the RSAC on the contents of this rule prior to its initiation. FRA first established the RSAC in March 1996 under Section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92–463) to provide a forum for stakeholder groups to provide advice and recommendations to the FRA on railroad safety matters. In April 1996, the RSAC formed the Tourist and Historic Railroads and Private Passenger Car Working Group (THRWG). Since that time, the THRWG had considered numerous issues affecting tourist and historic rail operations and in August 2013, the THRWG accepted Task No. 13–01 to consider the applicability of FRA's regulations to historical or antiquated equipment that is used only for excursion, educational, recreational, or private transportation purposes. The THRWG met in Washington, DC on April 9–10, 2014, and reviewed, among other things, the safety glazing standards (49 CFR part 223) regarding the treatment of certain equipment; regulatory treatment under the freight car safety standards (49 CFR part 215) of non-commercial freight cars over 50 years old; and the scope and application of appendix B of 49 CFR part 232 (freight power brake standards). The THRWG also identified other issues involving FRA's regulatory treatment of tourist, scenic, historic, excursion, educational or recreational rail operations or private passenger rail car operations and equipment in other chapters of title 49, which FRA anticipates will be addressed in subsequent rulemakings. On December 4, 2014, the full RSAC accepted the THRWG's report. *See* RSAC Meeting Minutes, p. 12, *https://rsac.fra.dot.gov/radcms.rsac/File/DownloadFile?id=44.* Subsequently, in a July 24, 2019, meeting the THRWG reviewed and concurred with the proposed appendix B updates, which FRA is adopting, with minor revision, as new subpart H in this final rule.

G. Comments Filed

In response to the NPRM, comments were filed by: AAR and the American Short Line and Regional Railroad Association (ASLRRA) (collectively, the ''Railroads''); the American Train Dispatchers Association, the Brotherhood of Locomotive Engineers and Trainmen (BLET), the Brotherhood of Railroad Signalmen, the Brotherhood Railway Carmen Division TCU/IAM, and the International Association of Sheet Metal, Air, Rail and Transportation Workers—Transportation Division (collectively, ''Labor''); the Transport Workers Union of America (TWU); Wabtec and New York Air Brake (collectively, the ''Suppliers''); the National Transportation Safety Board (NTSB); and various individuals.

Comments related to specific proposals in the NPRM are addressed in the section-by-section analysis below (*see* part III of this preamble). FRA addresses the more general comments received directly below.

An anonymous commenter generally contests the proposal, stating that safety regulation seems to be needed and that equipment should be placed out of service until brought up to ''these standards.'' TWU states the proposed changes would reduce the current safety standards for single car air brake tests, EOT devices, helper service, and brake maintenance and inspections. While there could be significant value in creating consistency between U.S. and Canadian regulations, and in incorporating newer safety technologies, TWU said the proposals downplay the cumulative magnitude of the changes and exclusively benefit the railroads' profit margins at the expense of safety. Labor alleged that FRA is ''cherry picking'' Canadian regulations to adopt. Labor further notes that, while FRA acknowledges its obligation to regulate ''in the public interest and consistent with railroad safety,'' the NPRM appears

(according to Labor) ''in the economic interests of the railroad and consistent with carrier convenience and higher profits.''

While there are many similarities between the Canadian and U.S. railroad regulations, and further harmonization could benefit seamless international operations, it is not necessarily optimal for the two sets of regulations to mirror each other precisely. Each country's regulators have ample opportunity to observe and study one another's experiences, and take regulatory action to implement lessons learned. This measured approach allows for greater harmonization when appropriate. While there is merit in TWU's general position that any changes should be considered in the context of related regulations, TWU did not identify any particular related regulation for consideration. Similarly, the anonymous commenter generally critiques the safety measures proposed in the NPRM, but does not identify any specific measures and does not explain how any of the proposals would result in less safe rail operations.

In response to the Labor concern that the proposed rule is in railroads' economic interest, FRA's first priority is safety. Further, this rule is based on safety data from U.S. and Canadian operations performed under regulations and longstanding FRA waivers. Labor has had multiple opportunities to provide input on these waivers and this rulemaking, has been an active participant on all test waivers, and has provided comments considered by FRA during those proceedings.

Labor also commented and requested clarification on the applicability of waivers after issuance of this final rule, questioning what relief the rule would provide if railroads are still governed by the existing waivers as indicated in the NPRM and discussed above. As noted above, the purpose of this rulemaking is to extend the relief provided by the identified waivers to the entire railroad industry. While each waiver applies only to the petitioning entity or entities in defined situations, and only for a limited duration of time, this rule applies universally and eliminates the inefficiencies and uncertainties that result from having to periodically review and renew individual existing waivers. This final rule does not supersede the associated and affected waivers. While the final rule may have provisions mirroring and redundant of certain waivers, the waivers are still active and applicable. Unless this final rule differs from a particular waiver, very little should change for each entity benefiting from that waiver. However, any relief or condition remaining in an existing waiver that has not been codified by this final rule remains in force. For instance, there may be certain local conditions or extra information in the waiver not captured by this rule. It is up to each railroad or other waiver holder to decide whether it still wants or requires a waiver (or a modification to a waiver) after the final rule becomes effective.

III. Section-by-Section Analysis

Unless otherwise noted, all section references below refer to sections in title 49 of the Code of Federal Regulations (CFR).

Amendments to 49 CFR Part 218

Section 218.22 *Utility Employee*

As stated in the 1993 final rule initially adopting § 218.22, ''Protection of Utility Employees,'' this section defines the circumstances under which a utility employee may be permitted to function as a member of a train or yard crew without the benefit of blue signal protection. 58 FR 43287, 43290, Aug. 16, 1993 (1993 final rule). FRA's blue signal regulations (found at 49 CFR part 218, subpart B) generally require that when ''workers'' are on, under, or between rolling equipment: (1) Blue signals be displayed in accordance with the requirements of part 218; and (2) the rolling equipment may not be coupled to, moved, or have equipment placed to obscure the blue signal protecting the protected track. 49 CFR 218.23. The regulations define a ''worker'' as ''any railroad employee assigned to inspect, test, repair, or service railroad rolling equipment, or their components, including brake systems,'' but specifically exclude members of train and yard crews, except when they are assigned to inspect, test, repair, or service ''railroad rolling equipment that is not part of the train or yard movement they have been called to operate.'' 49 CFR 218.5.

In the NPRM, FRA proposed two modifications to § 218.22 related to blue signal protection. First, FRA proposed to replace the incorrect reference to ''subpart D'' in paragraph (c) to reflect the correct reference to the blue signal regulations in subpart B. Second, to incorporate longstanding waivers, FRA proposed to amend the list of functions in paragraph (c)(5) that a utility employee properly attached to a train or yard crew could perform without establishing blue signal protection to include the changing of a battery on a rear-end marking or EOT device, provided the battery can be changed ''without the use of tools.'' In the NPRM, FRA also invited commenters to identify other tasks that may justify being added to the list of exceptions from the blue signal requirements in the paragraph and to address the utility and feasibility of establishing a performance-based requirement as an alternative to listing specific tasks excluded from the blue signal requirements.

FRA received no comments responding to its proposal to correct the erroneous reference to subpart D in paragraph (c). Accordingly, in this final rule, FRA is adopting this proposed amendment.

In response to FRA's request for comments on the proposed revised list of functions in paragraph (c)(5), TWU commented that ''utility employees'' are often ''different employees each day or each hour, creating confusion and raising safety concerns.'' TWU suggests that this final rule permit designation of only one utility employee ''per shift/per day'' provided they are working under the 3-point protection [2] of the train crew (currently § 218.22 permits up to three utility employees to be attached to one train or yard crew at any given time).

Labor generally asserts that exempting utility employees from blue-flag protection when replacing an EOT device's battery would create an unnecessary risk because ''[i]f the switch behind the train isn't locked and another crew is free to line the switch, they could inadvertently line a switch into the train being worked upon, exposing the utility employee to unnecessary risk.'' Labor did not, however, explain why the alleged risk associated with a utility employee replacing an EOT device's battery is any different from the risks associated with a utility employee performing any of the existing functions listed in paragraph (c)(5). In addition, Labor provided no comment on the feasibility of establishing a performance-based requirement.

The Railroads support FRA's proposal to codify the longstanding waivers permitting utility employees to replace batteries on EOT devices under § 218.22. Further, the Railroads suggest that FRA delete the ''prescriptive list'' of functions applicable to utility employees and revise the rule instead to state that a properly attached utility employee working as a train crew member can perform all functions that

[2] ''3-point protection'' is a railroad operating rule that provides protection for workers who are not required to use blue signal when fouling equipment. Exact language varies by railroad (some refer to the procedure as ''set and centered''); however, the most common steps are (1) placing the locomotive generator field switch in ''off'' position, (2) centering the reverser (*i.e.,* placing the forward/reverse control in neutral), and (3) fully applying locomotive and train brakes.

a train or yard crew member can perform. Referencing the preamble of the 1993 final rule, the Railroads assert that the list represents FRA's understanding at that time ''of all the functions train or yard crew members typically performed without blue signal protection.'' Railroads Comments at p. 2. The Railroads state that the ''use of a utility employee who is a member of a train crew is now ubiquitous across the entire industry'' and that after a utility employee properly attaches to a train or yard crew, he or she becomes a member of that train crew, functions in the same manner as a train crew member, and is a part of the constant communication that occurs between members of the train crew working as a team. The Railroads also assert that allowing a properly attached utility employee working as a train crew member to perform all functions that members of the train or yard crew can perform will ''likely improve safety by reducing unnecessary accident/incident injury exposure to railroad employees caused by the physical act of establishing blue signal protection for utility employee activities that are not on the list.''

FRA finds that the Railroads' comments may have merit and more substantial updates to § 218.22 may be justified because the section has not been updated since its initial implementation almost 30 years ago. Accordingly, FRA concludes that although a more substantial update to § 218.22 may be justified, to allow appropriate notice and comment on any such update, FRA will address both the Railroads' comments and TWU's comments on § 218.22 in a subsequent rulemaking.

FRA is, however, adopting the revision to paragraph (c)(5) as proposed in the NPRM by amending the list of functions provided in that paragraph that do not require blue signal protection to include battery change-out on rear-end marking devices or end-of-train devices without tools. As noted in the NPRM, this revision effectively incorporates two longstanding waivers granted by FRA over a decade ago and under which each Class I railroad has operated successfully, with no reports of related injuries or incidents. This successful record demonstrates that the relief provided by waiver and adopted in this final rule is safe.[3]

[3] *See* Docket No. FRA–2001–10660; Docket No. FRA–2004–17989.

Amendments to 49 CFR part 221

Section 221.13 Marking Device Display

Section 221.13 includes EOT marking device display requirements. Paragraph (d) requires each marking device's centroid to be located at a minimum of 48 inches above the top of the rail. In the NPRM, FRA proposed to revise this requirement to 40 inches above the top of the rail based on two longstanding waivers that allowed the marker height measurement to be reduced to 41 and 42 inches, respectively. *See* Docket No. FRA–2015–0023; Docket No. FRA–2017–0093.

Since FRA granted the waiver petitions, no accidents attributed to the lowered marker lamp height permitted have been reported through the FRA accident reporting system. As discussed in the NPRM, FRA proposed the change to allow the use of lighter weight and newer types of EOT devices that do not use heavy batteries. FRA expects the use of these devices, which can be mounted lower than the larger devices with heavy batteries, will improve safety by lowering the risk of injury to personnel handling the devices.[4] FRA proposed a minimum height of 40 inches above the top of the rail, so as not to interfere with the top of couplers (which are typically 38″ from the top of the rail) or other safety appliances, such as end sill handholds. FRA also proposed a minimum height of 40 inches above the top of the rail to ensure that the ergonomic advantages of the newer types of EOT devices are consistently realized (*i.e.,* to avoid employees installing or maintaining the devices having to reach high or stoop low to access the devices). In proposing this change, FRA noted that the parties to the waivers had provided data showing no discernable visibility difference up to one mile away.

TWU, Labor, and the Railroads filed comments. TWU states the change in permissible height is unnecessary and should be rejected because it is not based on any safety metric. Labor has ''no quarrel'' with any EOT weight or height, but questions the viewing distance metrics of 0.5–1.0 mile. Labor asserts that FRA should measure from at least 1.5 miles away, given the increased train lengths and the additional space need to come to a safe stop without incident. The Railroads propose allowing centroids to be as low as 36″ from the top of the rail to allow for design flexibility. According to the Railroads, the testing performed in support of the waivers at 36″ , with LED-equipped lamps, provides for adequate visibility from varying angles.

FRA notes that under its waiver, DPS performed visibility field testing of marker lights placed at heights of 48 inches and 36 inches up to 2 miles away on flat, tangent track. In addition, FRA used its own experience and testing over distances up to a mile away to test and review the visibility of marker lights. Based on this testing, the data developed through the waivers, and FRA's experience, the previous threshold height of 48 inches and the new threshold height of 40 inches each permit EOT device marker light visibility from over one mile away if there are no obstructing curves or hills. In other words, on flat, tangent track, EOT marker lights at 48 inches and 40 inches are visible from 1.5 miles away. The range of 0.5–1.0 miles was cited by FRA as, oftentimes, there can to be some vertical undulation in the track or curves that could reduce the visibility below 1.5 miles. Due to the variability of light visibility, and without any comments proposing a specific safety metric, FRA was unable to develop a more reliable methodology.

FRA notes that in its requests for waivers, the manufacturers requested that the marking device's centroid be permitted to measure 41.3″ to 44.3″ from the top of rail. FRA also notes that although data submitted in the course of the waiver proceedings generally supported a 36″ marker light height, only a 40″ height has actually been tested under the waivers. In addition, a minimum marker light height of 36″ would potentially expose the device to damage from a neighboring coupler and risks fouling other safety appliances, including end sill handholds compliant with § 231.1(i)(3)(ii). Also, the lower a marker's height, the more susceptible it is to mud spray from the track bed or to damage caused by low flying ballast rock, which may adversely affect the visibility of the marker light.

In addition to changes to permissible marker light height, FRA also sought comment on the effects of using LED bulbs and the utility and feasibility of establishing a performance-based standard in lieu of the specific height requirements of this section. While FRA received no comments on bulb types or

[4] *See* DPS, ''FRA Waiver Request—49 CFR 232.221.13(d)—Marking Device Display, p. 2, Docket No. FRA–2015–0023, dated Mar. 9, 2015 (posted Mar. 12, 2015) (''A 15 lb or less End of Train Device will enhance railroad safety for all North American Railways by reducing the risk of injuries.''); DPS, ''Incoming Waiver Extension-DPS—Marking Light Centroid 2020,'' p. 2, Docket No. FRA–2015–0023, dated April 14, 2020 (posted April 24, 2020) (''A smaller lighter End of Train Device will enhance railroad safety for all North American railroads by reducing the risk of injuries.'').

the effects of using LED bulbs, the Railroads expressed support for replacing the technical height requirement with a performance-based standard addressing minimum distance and visibility requirements, claiming markers may become obsolete as train separation technologies continue to advance. The Railroads, however, provided no meaningful suggestion for such a standard.

After considering all available waiver and testing data, and all comments received in response to the NPRM's proposal to revise paragraph (d) of § 221.13, FRA concluded that additional flexibility in marker height could be allowed without adversely affecting marker visibility. Accordingly, in this final rule, FRA is revising paragraph (d) to require the centroid of any marking device to be located above the coupler, where its visibility is not obscured and it does not interfere with an employee's access to, or use of, any other safety appliance on the car.

Appendix A to Part 221 Procedures for Approval of Rear End Marking Devices

As proposed in the NPRM, to correct typographical errors, FRA is modifying ''perscribed'' to ''prescribed'' in paragraph (a)(1)(2)(ii) and ''peformed'' to ''performed'' in paragraph (b)(3)(ii).

Amendments to 49 CFR Part 232

Section 232.1 Scope

Paragraph (b) of § 232.1 describes how the scope of Part 232 would change in phases after the January 2001 publication of the final rule that created Part 232. Paragraph (c) and the final phrase of paragraph (d) include similarly antiquated instructions. Because the dates in these paragraphs have passed and are no longer relevant, as proposed in the NPRM, FRA is removing paragraph (b)'s historical schedule, paragraph (c) in its entirety, and the final phrase in paragraph (d) providing for earlier optional compliance. FRA is also moving paragraph (d) to paragraph (c).

Section 232.5 Definitions

Section 232.5 defines certain terms as they are used in Part 232. The existing rule text refers to certain provisions of § 232.1 to account for varying effective dates and its inapplicability to appendix B. Since those dates have passed, and appendix B is being moved to Subpart H, these cross-references are no longer necessary and are therefore being deleted from the introductory paragraph of § 232.5.

In the NPRM, FRA proposed to update the definition of ''Air flow method indicator, AFM'' to clarify that the definition includes digital, as well as analog, AFM indicators, and to specify that a digital version must have markings of equivalent or finer resolution to that specified by FRA for an analog device.

FRA also proposed to add definitions for the terms ''Air repeater unit, ARU'' and ''APTA.'' FRA's proposed definition of ARU recognized that a specialized car, other rolling equipment, or containers in well cars could be used as an ARU by providing an additional brake pipe source responding to air control instructions from a controlling locomotive using a communication system such as a distributed power system. For an item to be considered an ARU under this definition, the communications must be akin to a distributed power system to ensure accurate and sufficient responses. The purpose and use of the technology, not its physical description, determines whether an item is an ARU. FRA purposefully recognizes this distinction to avoid limiting innovation and future options.

Commenters concurred with FRA's proposal to update the ''Air flow method indicator, AFM'' definition and add the new definitions for the terms ''Air repeater unit, ARU'' and ''APTA.'' Accordingly, FRA is adopting the revisions to this section as proposed.

In this final rule FRA is also adding a definition of the term ''brake pipe gradient.'' In the existing rules (*e.g.,* §§ 232.103(m) and 232.205(c)) and as discussed in the NPRM, FRA often describes the readily measured change in psi of air pressure between the front and rear of the train. This differential is often referred to as a ''brake pipe gradient'' or ''taper'' due to the shape of the graph line of the pressure as it reduces from source of air to rear of train. In certain circumstances, the brake pipe gradient also measures the pressure between additional air sources such as an ARU or distributed power unit (DPU). To ensure a common understanding of this term, FRA is defining ''Gradient, brake pipe'' in this final rule.

Section 232.11 Penalties

This section contains provisions regarding penalties. As noted in the NPRM, the section contains references to specific penalty amounts that change over time as a result of the statutory requirement to periodically update penalties for inflation. Accordingly, in the NPRM, FRA proposed to replace the references to specific penalty amounts with general references to the minimum civil monetary penalty, ordinary maximum civil monetary penalty, and aggravated maximum civil monetary penalty. FRA also proposed additional language referring readers to 49 CFR part 209, appendix A, where FRA specifies statutorily provided civil penalty amounts updated for inflation and to FRA's website (*www.fra.dot.gov)* which contains a schedule of civil penalty amounts used in connection with this part.

As the Railroads note in their comments, the *www.fra.dot.gov* website address now defaults to FRA's new website address at *www.railroads.dot.gov*. FRA has updated the regulatory text accordingly. Interested parties may check FRA's website for any future changes to its civil penalty schedules.

Section 232.17 Special Approval Procedure

In comments responding to proposed § 232.407, the Railroads asked for language permitting the use of new and innovative technologies that could enhance or replace EOT devices or their capabilities. While § 232.407 already provides for the use of an alternative technology to perform the same function, this concern is best addressed and clarified by including an opportunity for interested parties to seek and potentially receive special approval of such alternatives under § 232.17. Accordingly, FRA has included § 232.407 in the list of sections affected by § 232.17.

Section 232.103 General Requirements for All Train Brake Systems

This section sets forth general requirements for brake systems of trains and incorporates the 1999 version of AAR's ''Performance Specification for Freight Brakes'' (AAR Standard S–469–47) at § 232.103(l). In the NPRM, FRA provided a regulatory history of the applicable regulations, orders, and standards (*see* 85 FR 2494, 2499, Jan. 17, 2020) and proposed to update this reference to incorporate the presently-available version of this AAR standard. AAR Standard S–469–01 defines and prescribes requirements for power brakes and appliances for operating power brake systems. Accordingly, FRA is updating the citation to the presently available S–469, and to reflect AAR's correct address.

The Railroads submitted comments concurring with FRA's proposal to update the incorporation by reference, but encouraged amendments to the incorporation by reference regulations to provide for more timely codifications of updated industry standards. The incorporation by reference regulations,

found at 1 CFR part 51, are under the purview of the Director of the Federal Register. Because FRA has no authority to amend those regulations, we cannot address the Railroads' concerns.

Labor expressed concern under this section regarding high air flow rates and the reduction of 8 psi regarding pressure taper limits. FRA discusses those concerns below in the section-by-section discussion of § *232.205—Class I brake test-initial terminal inspection.*

Although not proposed in the NPRM, in reviewing comments to this section, FRA determined a need to revise § 232.103(m) to make clear that if a train experiences a brake pipe gradient greater than 15 psi, it must be stopped at the next available location and inspected for leaks. This is not a substantive revision, but merely conforms paragraph (m) of this section to paragraph (c) of § 232.205 to remove any confusion. As currently written, the ''15-psi gradient for trains en route'' provision in that paragraph could be read to apply only to trains tested with an AFM indicator. Such a reading, however, is incorrect and directly conflicts with § 232.205(c), which requires a train's gradient to be no more than 15 psi, regardless of whether brake pipe pressure is measured using the leakage test or with an AFM indicator. *See also* 66 FR 4104, 4169, Jan. 17, 2001 (''[T]he 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.''). Accordingly, FRA is revising § 232.103(m) to conform the ''15-psi gradient for trains en route'' provision to the corresponding provision in § 232.205(c).

Section 232.203 Training Requirements

Section 232.203 contains training requirements for operators, and for employees who perform brake system inspections, tests, or maintenance. Specifically, paragraph (c) requires railroads to adopt and comply with a training program specifically addressing the testing, operation, and maintenance of two-way EOT devices for employees who are responsible for testing, operation, and maintenance of the devices. In the NPRM, FRA expressed concern with the safety risks associated with the loss of communication events between the controlling locomotive and the EOT device. As discussed in the NPRM, radio communication between the controlling locomotive and the EOT device is critical to proper brake functioning. If communications are interrupted, an EOT device will not be able to initiate emergency braking when requested. Under existing § 232.407(g), communication between the EOT device and the controlling locomotive can be lost for up to 16 minutes and 30 seconds before the engineer is notified. If an engineer encounters a situation necessitating an emergency brake application during a loss of communication, the engineer may have to request an emergency brake application multiple times before the system responds.

Accordingly, in the NPRM, FRA sought comments on the frequency and duration of communication losses; what operational and technological solutions for communication loss the industry has considered and implemented; what should be done to ensure an emergency signal is sent and received by the system when needed even in the event of a temporary communications loss; and what has and should be done to alert the locomotive engineer that a loss of communication has occurred.

The Railroads' response listed factors that may affect the frequency and duration of communication losses and some ''comprehensive solutions'' they have implemented and will continue to implement—including repeaters; high-gain EOT antennas; event, fault, and data-logging technologies; and the design and installation of multicast repeating capabilities and more robust hardware—to help mitigate such losses. The Railroads are also looking at the next generation of EOT devices currently under development, which are expected to utilize advanced communications strategies and more robust hardware design. The Railroads, however, offered no truly comprehensive solutions to address the risk of extended losses of communications in the interim.

The NTSB filed public comments suggesting that FRA revise § 232.405 to require a shorter duration between failed communication checks before the engineer is notified. Until the EOT device receives a head-end confirmation of having received a message regarding a communication loss, NTSB recommends that FRA require each telemetry system (*i.e.,* the communication system between an EOT device and the controlling locomotive) to initiate continuously an emergency brake command transmission until a confirmation message or a decrease in brake pipe pressure message is received. Labor similarly recommended that FRA require telemetry systems to continuously initiate an emergency brake until the subject train comes to a complete stop. In addition, Labor recommended that telemetry systems enforce a complete safe stop upon loss of communications lasting longer than 4 minutes and 59 seconds.

FRA appreciates the Railroads' explanation of technologies and efforts it uses, or plans to use, to mitigate concerns relating to telemetry communications loss. While most of those identified have yet to materialize, FRA looks forward to considering them in the future.

FRA agrees in principle with the desire of NTSB and Labor to minimize the potential impact of communication losses. However, neither NTSB nor Labor provided any evaluation of the anticipated impacts of the recommended actions (that FRA require each telemetry system to initiate continuously an emergency brake command transmission until a confirmation message or a decrease in brake pipe pressure message is received, or that FRA require that telemetry systems enforce a complete safe stop upon loss of communications lasting longer than 4 minutes and 59 seconds), estimate of the resulting costs to the railroads and the public, or quantified the safety benefits of the recommended actions. Given that there are thousands of telemetry systems in use throughout the railroad industry today, FRA finds that the costs of requiring such a change would be significant and FRA does not currently have sufficient data to determine the likely resulting benefits. Accordingly, it is premature at this time to adopt either of the recommended solutions because the potential impacts of the recommended solutions are not yet understood.

Instead, to address the safety risks involved with potential losses of communication, FRA is revising the training requirements at § 232.203(c) to ensure that employees who operate EOT equipment are trained in the limitations and proper use of the equipment's emergency application signal and loss of communications indicator.

Section 232.205 Class I Brake Test-Initial Terminal Inspection

Section 232.205 contains the requirements for conducting Class I brake tests-initial terminal inspections. Pursuant to § 232.205, a Class I brake test must be performed when a train is initially assembled, the consist is changed in certain ways (by adding or removing cars), or a train is off-air for more than four hours. Section 232.205 provides two methods for conducting Class I brake tests on standard pressure-maintaining brake valves: (1) A leakage test; or (2) an air flow test method.

Based on data submitted by AAR in support of their Petition, including data garnered from Canadian rail operations, FRA (in the NPRM) proposed extending the duration of the off-air limitation.[5] FRA also proposed revisions to the brake pipe leakage requirements during certain Class I air brake tests, and requirements associated with the calibration of AFM indicators used to conduct Class I brake tests using the air flow test method.

In the NPRM, FRA also sought comments on its analysis leading to the proposal, including the accuracy and sufficiency of the data on which it based the NPRM. FRA requested comment on the reasons underlying Canada's lower rates of air-brake-related failures that would better inform FRA of the off-air requirement's impact. In addition, FRA requested comment on whether a time off-air tracking system is necessary or if there are other means for FRA to determine the amount of time equipment is left off a source of compressed air. FRA also requested comment on potential regulatory alternatives to a time off-air limit that would address the same safety risks and ensure that, despite equipment being off-air for any length of time, the equipment's air brakes are in proper working order.

Generally, the Railroads, Suppliers, and at least two individual commenters, submitted comments in support of the proposed revisions, while Labor and other commenters expressed concern about the proposed revisions. For the reasons explained below, in this final rule FRA is adopting revisions to this section as proposed and, in response to comments received, FRA is clarifying certain requirements related to the use of ARUs.

Off-Air Requirement

As noted above, and as discussed in more detail in the preamble to the NPRM (*see* 85 FR 2499), under the existing regulation, if a train or other equipment (*e.g.,* individual cars) is left unattached to any air source (*e.g.,* locomotive, yard air) for more than four hours, it must receive a Class I brake test prior to further operation of the train. 49 CFR 232.205(a)(3). Moreover, to ensure that an air brake system did not degrade, and to allow a railroad to delay a full-train Class I test in many circumstances, under the existing regulation equipment off-air for more than four hours may require a Class I or II test prior to being added to an en route train, and will require a Class III brake test prior to being operated in revenue service. 49 CFR 232.209(a)(1) and 232.211(a)(3)–(a)(5). This requirement also affects yard air applications. 49 CFR 232.217(c)(1). For a more detailed discussion of requirements related to Class I brake tests and a substantial history and analysis of the off-air requirement, *see* 66 FR 4103, 4122, Jan. 17, 2001.

In the NPRM, FRA proposed to extend the four-hour off-air requirement to 24 hours. The Railroads and Suppliers submitted comments supporting FRA's proposal to increase the off-air requirement from 4 to 24 hours. The Railroads assert that the data provided by AAR cited in the NPRM shows that ''time off-air is now not relevant to safe air brake functioning'' and that improvements in air brake components have ''greatly reduced'' brake pipe leakage. Citing Canada's experience, and supplying TTCI test data as further support, the Railroads state that there is no safety detriment to cars being off-air for 24 or 48 hours or more. Further, the Railroads assert that although FRA revised the air brake regulations in 2001, those revisions did not reflect the safety enhancements that had been gained since the 1950's and that further brake system improvements have been made since 2001 concerning brake pipe leakage-mitigation and moisture and contaminate removal. In response to FRA's request for comment on the data on which the NPRM was based, the Railroads expressed their confidence in the accuracy and sufficiency of the data.

The Railroads also contend that extending the amount of time that equipment may be left off-air without requiring another Class I brake inspection would result in positive financial, environmental, and operational benefits. A larger time window for equipment to remain off-air would reduce the amount of time locomotives would stand idling, which may disturb communities with noise, vibration, and emissions. In addition, the larger time window could result in trains clearing highway-rail grade crossings more expeditiously in certain circumstances by allowing trains to be cut at crossings while awaiting a crew change. According to the Railroads, permitting 24-hours off-air would reduce idling that results in an annual $2 million in fuel savings and a 3,600-ton reduction of carbon dioxide emissions.

A separate comment filed by an individual asserted that a primary benefit of the proposal would be to help decrease each railroad's fuel consumption and carbon footprints. This commenter notes that extending the time off-air limitation would allow railroads to shut down locomotives rather than leave them idling to keep air in cars' brake lines.[6]

In its comments, TWU contends AAR's supporting factors for this proposal—the ''alleged'' technological advancements and the interest in aligning U.S. and Canadian regulations—were the same used by AAR, and rejected by FRA, in the final rule published January 17, 2001. Quoting extensively from that rule, TWU posits that ''while some technology has progressed, none of [that final rule's] logic has been undermined.'' Specifically, TWU states that although air dryers or other moisture-mitigating systems may indicate progress, not all locomotives are equipped with these systems and these systems do not eliminate the freeze-up problems caused by moisture. Moreover, noting that AAR's tests with these technologies were performed on a consist of only 20 hopper and gondola cars, TWU asserts that the testing conditions fell ''well short'' of replicating actual conditions in the industry and do not consider trains consisting of 80 to 100 or more cars, each car's age and condition, extreme climates, or old and water-saturated yard air plants.

TWU also contends that aligning U.S. regulations with the off-air hours permitted by Canada ignores each country's differing safety structures and other factors. Labor also objects to FRA's attempt to harmonize with Canadian regulations, alleging that FRA is ''cherry picking'' Canadian standards without holistically considering Canada's much more stringent standards. Neither TWU or Labor provide any substantive information or comment on Canada's alleged differing safety structure or more stringent standards.

In addition, Labor commented that extensions to the off-air requirement should be handled collaboratively through the RSAC process. Labor asserts that in 2001, FRA supported a four-hour off-air requirement partially out of concern about the potential for vandalism to affect braking systems negatively. Labor contends there is no data suggesting anything has changed. Labor also asserts that, instead of extending the off-air requirement, and thus reducing the number of inspections performed, FRA should require better walking conditions at inspection locations to mitigate employee risk. Labor argues AAR's position describing

[5] *See also* amendments to §§ 232.209, 232.211 and 232.217 in this final rule.

[6] Environmental issues, like those referenced by the comments summarized in this paragraph, are considered in section IV.D, *infra,* and in this final rule's Regulatory Impact Analysis.

the four-hour off-air limit as ''too restrictive'' is merely subjective. According to Labor, the four-hour off-air rule should remain because four hours is necessary in cold weather conditions where freeze-ups can occur and vandalism continues to exist. Labor also contends that the time and costs associated with brake tests are less than any potential damages resulting from a defect. Like TWU, Labor believes that FRA should develop its own data, and not rely on AAR data, regarding the number of slips, trips, and falls.[7]

One individual commenter—an employee and mechanical officer of multiple freight and passenger railroads—expressed support for the proposal to extend the off-air limitation to 24 hours. This commenter asserted that reinspection of cars adds significant risk to employees, citing the requirements for employees to establish blue signal protection, setting necessary switches and derails, and walking the train two complete times to observe the set and release.

Another individual commenter, a freight conductor, suggests that FRA analyze the impact of the proposed extension of the off-air requirement on brake cylinder piston extension timing, rather than on the rate of line-of-road failures (expressed as emergency brake applications), for which a specific mechanical cause was not found. The commenter states that in his experience he has found that typically between 2%–5% of the car brakes will not initially apply during a test of a fully charged system.[8]

After consideration of all comments submitted to the docket and all available data, FRA concludes that extending the existing 4-hour off-air limitation to 24-hours is justified. The technological improvements to the air brake systems, introduced and proliferated both before and subsequent to FRA's 2001 rule, have been beneficial in improving the overall health of brake systems. Moreover, the supporting information comparing Canadian and U.S. operations provided in Appendix 7 to AAR's Petition clearly demonstrates the safety of extending the permitted off-air limit to 24 hours. In favor of the reliability of these data is the fact that they include same-railroad results (based on CN and CP data) showing fewer undesired and unintended emergency brake applications occurring in Canada than in the U.S. *See* AAR Petition for Rulemaking, July 12, 2018, Appendix 7, Slide 4. While the TTCI technology test data submitted by AAR are based on a sound premise, FRA did not rely on the TTCI technical test data alone to support this rule given the small sample size (*i.e.,* 20 cars tested over the course of 5 days) and the much more relevant safety information from the Canadian railroads' operational data that spanned a full year.

FRA expects that a reduced number of brake inspections based on a 24-hour off-air limit will lead to a reduced number of injuries that can occur during those inspections (*e.g.,* slips, trips, and falls), though FRA does not have sufficient data to determine quantifiable safety benefits. FRA finds Labor's argument that the data AAR submitted quantifying slips, trips, and falls incurred during brake tests to be misplaced because the data is based on data submitted by Labor's own constituents to their employing railroads. The railroads, in turn, compile and submit the data each month to FRA as required by FRA's accident/incident reporting regulations (49 CFR part 225). FRA then aggregates the submitted data and such aggregated data is then available on FRA's public database located at *https://safetydata.fra.dot.gov.* Thus, FRA considers these data to be of the type the agency routinely relies upon to inform its rulemakings, as is done here.

FRA does not share Labor's concerns about vandalism of air brakes. FRA's accident database contains no information indicating that vandalism of air brakes has had any significant relationship to air brake-caused accidents. Labor has not submitted any data to support its concerns and no other commenters provided any information on vandalism.

FRA further notes that Labor provided no data to support its belief that the costs of more frequent Class I brake tests, as presently performed, are significantly less than the costs resulting from accidents that could have been avoided by the performance of such tests. Regarding Labor's recommendation that FRA mandate ''better walking conditions,'' FRA notes this is outside of the scope of this rule. Finally, despite Labor's desire to involve the RSAC process, FRA does not anticipate that asking RSAC to address this matter would provide any additional meaningful insight into the technical validity of extending the off-air limitation period.

With regard to the individual commenter's concern that he has to apply brakes a second time for 2–5% of the freight cars he inspects, he does not correlate this experience with the length of time the affected cars have been off-air. FRA notes that regardless of whether equipment is off-air for four or 24 hours, 100% of the brakes must apply for a Class I brake test to be successful.

A multitude of variables affect brake system integrity (*e.g.,* environmental factors such as temperature and humidity, operational factors,[9] age, and overall condition of the equipment). The longer equipment remains off air, the greater opportunity these factors have to affect brake system integrity. Moreover, despite the many technical advancements in air brake technology, the structure of conventional air brake systems on rail equipment involves many car-to-car connections, which by nature cause the systems to experience gradual leaks once removed from an air source. For example, as noted in the NPRM, in its 2013 report on the Lac-Mégantic, Quebec accident, the Transportation Safety Board of Canada (TSB) cited two previous instances of air brake failures concerning rail equipment that, when left off-air, leaked and unintentionally released. Accordingly, absent universal installation, use, and regulatory oversight of acceptable brake health effectiveness and monitoring technologies (*e.g.,* wheel temperature detectors, electronic brake valves, eABS),[10] besides triggers such as mileage or reclassification, time off air remains the only metric for ensuring brake system integrity. While FRA intends to address some of these technologies in future proceedings, no commenter has identified an alternative to a time off-air limit that would address the same safety risks.

The Railroads commented that FRA's discussion of the TSB report ''does not promote public confidence in the agency's objective and fact-based approach to rulemaking.'' However, FRA believes that considering an objective, fact-based report, from Canada's equivalent of the NTSB, to be the exact type of action that would inspire public confidence in the

[7] Labor also objects to AAR's request (in its separate eABS rulemaking petition) to consider increasing the allowed mileage between brake inspections when railroads use an eABS system. Labor's comments are outside the scope of this rulemaking and FRA will address Labor's comments on this issue in the appropriate rulemaking proceeding (*i.e.,* the eABS rule).

[8] The commenter also questions why FRA restricts block swapping and seeks clarification on Class I test requirements for cars added to trains en route. Because those issues appear to be beyond the scope of this rulemaking, FRA declines to discuss them here. For an explanation of the block swapping limitations under § 232.205, please refer to the preamble of the 2001 final rule. *See, e.g.,* 66 FR 4104, 4119 and 4168, Jan. 17, 2001.

[9] Examples of operational factors may include the use of power braking, train length, time taken to inspect equipment, and quality of compressed air from locomotives or yard air plants.

[10] *See, e.g.,* Docket Nos. FRA–2005–21613, FRA–2016–0018, FRA–2018–0049, FRA–2019–0072.

transparency and thoroughness of the agency's rulemaking process.

Recognizing that Canada permits equipment to remain off-air without a brake inspection for up to 48 hours upon notification to Transport Canada (TC),[11] as noted in the NPRM, FRA requested comment on potentially extending the off-air limit to 48 hours in certain circumstances. FRA also sought comment on how often this provision is utilized in Canada and under what circumstances it is used. FRA received no comments or information in response to the extent of this provision's use in Canada. Citing the technological improvements in air brakes discussed above, the Railroads, however, suggest that FRA should universally extend the off-air limitation to 48 hours. The Railroads assert that equipment is ''routinely permitted to be off-air for 48 hours'' without approval from TC. Alternatively, if FRA chooses to adopt a universal 24-hour off-air rule, with a 48-hour limit only applicable in certain circumstances, the Railroads state they should be permitted to designate a list of ''extended off-air locations'' where equipment may remain off-air for up to 48 hours without requiring a new Class I air brake test.

The Suppliers fully support allowing a 48-hour off-air restriction, believing it is appropriate to align these regulations with the Canadian Rule that demonstrates the successful implementation of increased off-air time.

While the Railroads and Suppliers expressed support for allowing a 48-hour off-air restriction, FRA received no comments in response to requests for comment on the Canadian experience with such an allowance, nor any comments on the potential applicability of the notification procedures in §§ 232.207(c)(2) and 232.213(a)(1). FRA understands TC receives only a small number of 48-hour off-air notifications per year (no more than 12), primarily from two locations during three-day holiday weekends or special situations such as labor strikes. Such sparse use of Canada's 48-hour provision does not make it routine, as the Railroads suggest.

Because there is not sufficient data demonstrating the safety impact of extending the off-air limit beyond 24 hours, in this final rule, FRA is not extending the limit beyond 24 hours.

As noted in the NPRM, FRA remains concerned with its ability to provide oversight concerning cars left off-air for extended periods of time. While FRA has historically used train and car movement records, the presence of any ground air sources, and witness interviews to verify equipment's time off-air, those tools will likely prove insufficient over 24 hours. In the NPRM, FRA did not propose a specific solution to this concern, but sought comment on whether a requirement for tracking off-air time is necessary or whether there are other means by which FRA could determine the amount of time equipment is left off a source of compressed air. FRA asked for comment on what types of tracking systems are available and how tracking data should be maintained. FRA also sought comment on the potential burden or benefit of a tracking requirement.

In their comments, the Railroads do not support an off-air time tracking requirement, claiming that railroads already track off-air time and there is no one-size-fits all solution. The Railroads, however, do not explain or provide any information as to how industry currently tracks each equipment's time-off-air. The Railroads also do not provide any insight into how, if the off-air limit is extended to 24 hours, FRA could determine the amount of time specific equipment is left off-air. Instead, the Railroads point to FRA's rule allowing the use of ECP brakes (§ 232.607(b)(4)(i)). The ECP brake rule permits trains operating in ECP brake mode to remain off-air for 24 hours between Class I brake tests and also does not include any method for tracking equipment's time off-air.

ECP brakes are fundamentally different than traditional air brakes. ECP brake systems have self-diagnostic capabilities (*i.e.,* ECP brake systems self-report system health in real time to the operator). Therefore, § 232.607's allowance for freight trains operating in ECP brake mode to remain off-air for 24 hours is not an appropriate indicator of whether a time off-air tracking system is needed for traditional freight equipment.

Despite the above concerns, FRA is not establishing a time-tracking requirement in this final rule. Such a requirement is more appropriately considered in the eABS Rule. FRA notes, however, that railroads remain legally obligated to comply with the off-air requirement adopted in this final rule. As such, railroads will need to adopt and comply with a methodology to determine that the equipment in its trains comply with the new off-air rule. FRA will continue to monitor each railroad's implementation of the off-air requirement and appropriately utilize its available oversight and enforcement tools (including civil penalties) to enforce its compliance.

Brake Pipe Leakage Limit

As explained in the NPRM, § 232.205, as currently written, provides two methods for conducting Class I brake tests on pressure-maintaining brake valves such as the standard 26–L brake valve: (1) A leakage test; or (2) an air flow method test. *See* § 232.205(c)(1)(i), (ii). It is physically impossible to prevent all leakage from a train's brake pipe given the mechanical connections between cars' air hoses (*i.e.,* a certain amount of air will always leak through the mechanical connections) and each method of testing measures the pressure drop in a train's brake pipe in different ways. The leakage test measures the amount of compressed air that leaks from the brake pipe, while the air flow test method measures the amount of compressed air the pressure maintaining valve puts back into the brake pipe to maintain the line's pressure. Regardless of the test method employed, § 232.205 requires the pressure at the rear of the train to be within 15 psi of the pressure that the train will be operated at (known as the ''gradient'' or ''pressure taper'').

When conducting a Class I test using the air flow method, paragraph (c)(1)(ii)(B) prohibits brake pipe leakage from exceeding 60 cubic feet per minute (CFM). In the NPRM, FRA proposed increasing the limit to 90 CFM when a DPU or an ARU is utilized.

The traditional air flow test is measured from a single point of air flow, at the controlling locomotive of the train. In other words, the traditional air flow test measures the amount of air the controlling locomotive's brake system is putting back into the train's brake pipe. Because the air originates at a single source (the controlling locomotive) and travels sequentially through each car's air brake system, each connected via a mechanical air hose, gradually the pressure in the train's brake pipe tapers off. DP trains have locomotives located at two or more locations in the train, providing a more uniform distribution of power to reduce in-train forces and provide multiple supplies of air brake pressure and control. Similarly, air brake repeater boxcars or containers mounted in well cars, and other equipment serving the same purpose as these ARUs, have been used to provide multiple sources of air brake pressure and control. Because use of DP locomotives and ARUs provide multiple

[11] *See* Railway Freight and Passenger Train Brake Inspection and Safety Rule (''Canadian Rule''), section 11.2(b), Transport Canada, Oct. 27, 2014, available at *https://www.tc.gc.ca/eng/railsafety/rules-tco0184-139.htm#section11* (''A No.1 brake test is not required on: A block swap of cars that have been off-air for no more than 24 hours or 48 hours after notifying the department.''). A copy of this rule is included in Appendix 3 of AAR's Petition.

sources of air, the total leakage from the brake pipe can be greater than 60 CFM, as long as each individual source of air is controlling a portion of the brake pipe that leaks less than 60 CFM, causing the overall average brake pipe pressure to be better controlled than it would be with a single source of air.

As explained in more detail in the NPRM, since 2011, Canadian railroads have operated with the higher air flow limit of 90 CFM on DP trains. Under a waiver issued by FRA in Docket No. FRA–2012–0091 (test waiver), several Class 1 railroads in the U.S. have tested and operated with air flow limits of 90 CFM on DP trains. With the exception of one unintentional brake release that occurred during testing, all trains tested in the U.S. were operated safely and without incident. Of the one train that experienced an unintentional brake release, the test committee overseeing the operations concluded that the occurrence was an anomaly and not related to the test.

In the NPRM, FRA proposed to revise § 232.205(c)(ii)(B) to allow the use of a combined 90 CFM air flow limit on DP and ARU-equipped trains, provided railroads implement operating rules to ensure compliant operation of a train if air flow exceeds these parameters after the Class I brake test is completed. The combined air flow is derived by the sum of the air flow from all air sources in the train. Comments were filed by the Railroads, Labor, and an individual commenter.

The Railroads concur with FRA's proposal to permit the use of 90 CFM and a requirement to update each railroad's operating rules to address its use. An individual commenter expressed a high level of confidence in the safe use of 90 CFM during a leakage test with additional air sources. According to the commenter, adding air sources, especially during cold weather conditions, could mitigate risk and even allow the safe use of a 160 CFM limit.

Labor expressed concern regarding high air flow rates and the reduction of 8 psi regarding pressure taper limits.[12] Labor believes 90 CFM is too high a limit, because ''greater air compressor power should mean need less effort expended and less overall airflow due to having more compressors working to maintain pressure [sic].'' Labor seeks additional information on the unintentional release that occurred during the test waiver in the U.S. Labor also notes that the NPRM is silent regarding how an ARU, as defined, will be inspected, tested and maintained. According to Labor, an ARU is a locomotive appurtenance and its operation should comply with part 229, including the daily inspection requirements, because it functions as a part of the controls of a train's air brake system.

It appears that Labor misinterprets the effect of the 8-psi reduction in brake pipe pressure. FRA notes that a conventional end-of-train brake pipe supply is permitted a pressure taper of up to 15 psi. *See* § 232.103(m). In the test waiver issued by FRA in Docket No. FRA–2012–0091, the test committee found that the amount of leakage that would cause a 15-psi pressure taper on a conventional end-of-train air source (*i.e.,* where brake pipe gradient is measured from the rear of the train) only creates an 8-psi pressure ''sag'' between two DP locomotives.[13] This condition not only provides more available braking power than a compliant conventional train with a permitted 15-psi pressure taper, but provides a train that responds to brake control signals in approximately one-half the time, arguably resulting in a safer train.

Labor further states concerns that its crews are being required to operate trains with AFM indicator readings over ''100 psi.'' This is a misunderstanding of the AFM indicator. The AFM indicator tells the engineer the leakage of his brake pipe in CFM, not in psi. Nonetheless, if Labor is concerned that railroads are instructing employees to operate trains in non-compliance with these regulations, FRA encourages Labor to contact an appropriate representative of FRA's Office of Railroad Safety to investigate the specific matter.

In response to Labor's comment seeking information about the unintentional release during the test waiver, FRA notes that Labor was fully involved in the test waiver on which FRA based its proposal. *See* Docket No. FRA–2012–0091. Individual engineers completed test reports for each train operated and three BLET members were part of the test committee where they ultimately supported a 90 CFM limit. Each test report required the operating engineer to report information related to the train's operations (*e.g.,* equipment identification, route, temperature, air flow at origination and en-route, brake system performance and whether any unintentional release occurred). Ultimately, the entire test committee came to a consensus that the single unintentional brake release was an anomaly and insignificant to the test.[14]

With regard to Labor's assertion that use of 90 CFM is unsafe, FRA notes that Labor's comment does not consider the use of additional air sources such as a DP or ARU, which is the fundamental basis of FRA's proposal. As FRA explained above, the additional air sources provided by a DPU or ARU reduces the gradient within the brake pipe, maintains a higher overall pressure, and provides a quicker response to air brake reductions; resulting in faster brake applications. Each additional compressor from a DP locomotive or an ARU reduces the stress on any one compressor, likely making the system more safe. FRA does not agree with Labor's characterization of an ARU as an appurtenance automatically subject to the requirements of part 229. Under the Locomotive Inspection Act (the ''Act,'' 49 U.S.C. 20701), a locomotive and its ''appurtenances'' must be ''in proper condition and safe to operate'' before it can be placed in service. FRA's Locomotive Safety Standards (49 CFR part 229) implement the Act. Under the Act, if a locomotive or appurtenance of a locomotive does not meet the ''in proper condition and safe to operate'' standard, it may not be placed in service. *See* 49 CFR 229.7.

Because the use of an ARU is optional and not necessary for a locomotive to be ''in proper condition and safe to operate,'' an ARU is not an appurtenance to the locomotive under the Act. While Labor argues an ARU is an appurtenance, ''because it functions

[12] Labor noted its comments regarding the proposed allowance for higher air flow under *Section 232.103–General requirements for all train brake systems,* but FRA is discussing them in the context of § 232.205 as this is where FRA proposed to codify the requirements.

[13] On a DPU-equipped train, the gradient can be a ''sag,'' as the graph line of the pressure will assume a catenary curve between the air sources. The depth of the sag is not readily measured (without ECP or similar technology) and is not presently regulated. In this particular example, the 8-psi pressure was rounded up from 7.5 psi, representing the nadir midpoint of a 15-psi pressure taper.

[14] According to the test report, the relevant unintentional release resulted from a mechanical problem concerning the mid-train DPU's main reservoir compressor governor, which caused the main reservoir's air pressure to fluctuate outside its normal range. More specifically, the affected equipment included an 8,902 foot, 12,248-ton manifest train operated January 8, 2015. The DPU was in 2x1x0 configuration (mid-train unit), and the train was operating at temperatures between −2 °F and −8 °F. The engineer reported that ''DP main reservoir would drop when standing and lower brake pipe below equalizing reservoir pressure. [He] would have to take deeper sets greater than 15 psi to hold the train due to fluctuation in main reservoir pressure on the DP.'' The railroad commented that brake pipe flow on the lead locomotive remained in the low 20 CFMs, but acknowledged the engineer was having issues with the main reservoir pressure on the DPU. The railroad concluded that the main reservoir problems could have resulted in the reported unintentional release. The test committee concurred with the railroad's findings. The problem with the main reservoir of the DP unit was mechanical, and not related to the subject study of the test.

as a part of the controls of a train's air brake system,'' it is more akin to an EOT device in its relationship to a locomotive; it receives commands but is not a component of a locomotive. Moreover, an ARU differs from a locomotive in that it does not have motive traction power. Without a propelling motor or control stand, an ARU cannot be considered a locomotive per §§ 229.5 or 232.5. Accordingly, an ARU is not automatically subject to part 229.

With respect to Labor's concern about the inspection, safety, and maintenance of each ARU, FRA notes that ARUs are subject to the applicable requirements in parts 215 and 232. Indeed, an ARU shares many features and operations of a locomotive that is subject to part 229. For example, an ARU may contain a locomotive air brake system (automatic function, but not independent), a diesel generator, an air compressor, and a DP control unit. Most ARUs also likely include electrical wiring, internal walkways, rotating equipment, and main reservoir pressure air tanks, which could expose employees to the same hazards as a locomotive, if poorly maintained.

In the NPRM, FRA proposed a definition for, and considered the use of, ARUs. In response to Labor's comments on that proposed definition, FRA is clarifying how, under the existing regulations, each ARU must be properly maintained and functional for its safe operation. Because each ARU shares features with both locomotives and freight cars, each such element must comply with the appropriate regulatory requirement.

The components of an ARU that are the same as those for a freight car must continue to be inspected in compliance with parts 215 and 232 and the components that are similar to a locomotive must be inspected in accordance with part 229. Accordingly, in paragraph (c)(9), FRA is specifying that each ARU operating in accordance with part 232 must comply with parts 215 and 232, and, as appropriate, the relevant sections of part 229. While an ARU may share many features of a locomotive, it does not have a propelling motor, or a control stand for employees. *See* § 229.5 for the definition of ''locomotive.'' Thus, an ARU is not a locomotive. FRA recognizes, however, that certain elements of ARUs provide the same functionality as locomotives (*e.g.,* they compress air, modulate the brake pipe, or otherwise control the train's movement). Accordingly, to help ensure those features are functioning properly (as Labor notes in their comments), they must be inspected. New paragraph (c)(9) specifies that an ARU's locomotive-like features must receive a pre-trip inspection in accordance with § 229.21 each time the train receives a Class I air brake test at its initial terminal. For example, depending on the construction and functionality of specific ARUs, applicable part 229 rules may include those concerning periodic air brake maintenance (§§ 229.29–33), general requirements (§§ 229.41–45), brake systems (§§ 229.46, 229.49–53, 229.59), electrical systems (§§ 229.83–87, 229.91), internal combustion equipment (§§ 229.95–97, 229.101), and cabs, floors, and passageways (§ 229.119(c)).

Similar to how FRA treats passenger equipment (*see* § 238.309(f)), because an ARU is not a locomotive, FRA is not requiring the inspection to be documented on form FRA F 6180–49A. Instead, FRA is requiring the inspection to be recorded on a form with substantially the same information and that otherwise complies with § 229.21.

In light of the proven safety and efficacy of the test waiver, and after consideration of the comments filed in this rulemaking, FRA is adopting the proposed new § 232.205(c)(1)(ii)(B), which permits the use of a 90 CFM air flow limit on each train equipped with a DPU or ARU. To ensure the same level of safety intended by FRA during the waiver, but to allow for continued flexibility, FRA is requiring each railroad to implement operating rules intended to ensure compliant operation of a train if air flow exceeds the required parameters after the Class I brake test is completed. A railroad may consider using the test waiver's conditions as a template or starting point when drafting their operating rules on this subject. While FRA appreciates the Railroads' and the individual commenter's comments in support of a higher CFM limit and notes that additional research is being performed to look at longer trains and higher air flow, currently, FRA's experience and data only supports a 90 CFM limit with additional air sources.

AFM Indicator Calibration

Current § 232.205(c)(1)(iii) requires air flow indicator calibration at least every 92 days and prohibits the calibration of air flow test orifices at temperatures below 20 °F. As noted in the NPRM, to calibrate each device accurately, the entire AFM system—not just the test orifices—must be calibrated at not less than 20 °F. In the NPRM, FRA proposed clarifying within the regulation that the temperature of the AFM indicator and the test orifices must be considered during calibration to ensure accuracy.

The Railroads concur that AFM indicator temperature should be considered during calibration. In addition, the railroads state that the quarterly reports required under the waiver referenced in the NPRM are no longer necessary. Further, while the Railroads support codification of FRA guidance regarding the handling of an inoperative or out-of-calibration AFM indicator, they urge FRA to adopt the 184-day periodic maintenance schedule for certain systems.

In their comments, Labor did not contest the proposal, but raised related concerns. Labor states that, ''a traditional form of leakage test method should also be used in temperatures less than 20 °F. Moreover, if an AFM cannot be calibrated without taking temperature into account, temperature also should be taken into account to verify the instrument's readings.'' Labor also believes that AFM indicators are appurtenances that should be regulated under part 229, because once installed they are no longer optional.

The Railroads' comment regarding adopting the 184-day periodic maintenance schedule is outside the scope of this rulemaking. In addition, while quarterly reports are required as part of the ongoing test waiver's conditions, FRA did not propose to codify that requirement.[15] Moreover, that particular test waiver remains under consideration. Any conclusions based on its early findings would be premature. FRA's purpose of referring to this waiver in the NPRM was solely to identify the AFM indicator temperature issue in support of the proposed requirement that the AFM indicator temperature must also be considered.

If the AFM indicator is calibrated at a temperature above 20 °F, its use will still be acceptable at lower temperatures. Using ideal gas law calculations, the permitted variation of ±3 CFM can be expressed as a variation of approximately 100 °F. Therefore, if an AFM indicator is precisely calibrated at 70 °F, its calibration should be in tolerance from 20° to 120 °F. Theoretically (by calculation), at 20 °F, an AFM reading of 60 CFM would be an air flow of 57.2 CFM. Where V = volumetric flow in CFM, and T = temperature of air into the AFM (absolute units in °R), with $V_1 = 60$ CFM, $T_1 = 70$ °F, $T_2 = 20$ °F we calculate V_2 from equation

$$\frac{(V_2 - V_1)}{V_1} = \frac{1}{2} \cdot \frac{(T_2 - T_1)}{T_{1\,(\text{absolute})}}$$

[15] If a railroad believes certain waiver conditions, including quarterly reports, are no longer necessary, then the railroad is welcome to request revision or rescission of that waiver.

(Note $T_1 = 460 + 70 = 530$): $V_2 = 57.2$ CFM. Because this error is on the ''safe'' side of the air flow rule (*i.e.,* in colder temperatures the AFM indicator will display more air leakage than is actually occurring), FRA is confident in the safe use of an AFM indicator at lower temperatures.

In response to the Labor comment that an AFM indicator is an appurtenance to the locomotive, FRA disagrees because its use is optional under § 232.205(c) and unnecessary for a locomotive to be ''in proper condition and safe to operate.'' Accordingly, the daily inspection requirements of part 229 do not apply to an AFM indicator. However, as proposed in the NPRM, FRA is adopting new paragraph (c)(1)(iv) which requires the recording of the last date of calibration on Form FRA F6180–49A (locomotive ''blue card''). While that Form applies to locomotives, the field provided for AFM indicator calibration has been included as a matter of convenience for compliance with and enforcement of new § 232.205(c)(1)(iv) instead of requiring a second form for non-appurtenances.

To clarify the rules applicable to noncompliant or out-of-calibration AFM indicators, as proposed, FRA is adding a new paragraph (c)(1)(v). This new paragraph prohibits the use of an AFM indicator not in compliance with part 232 and requires tagging a noncompliant AFM indicator in accordance with § 232.15(b), with the tag to be placed in a conspicuous location of the controlling locomotive cab.

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

Although not proposed in the NPRM, due to an internal agency reorganization, FRA is removing references to the FRA Regional Administrator in § 232.207(c)(2).

Section 232.209 Class II Brake Tests—Intermediate Inspection

FRA is amending the off-air requirements of this section without change from the NPRM. Please refer to the off-air requirements analysis provided for § 232.205.

Section 232.211 Class III Brake Tests-Trainline Continuity Inspection

FRA is amending the off-air requirements of this section without change from the NPRM. Please refer to the off-air requirements analysis provided for § 232.205.

Section 232.213 Extended Haul Trains

Under existing § 232.213, 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 and the train meets certain requirements.[16] For a train to qualify as an extended haul train, paragraph (a)(1) requires the railroad to, in writing, designate the train as an extended haul train and provide certain information to FRA, including ''[t]he type or types of equipment the train will haul.'' *See* 49 CFR 232.213(a)(1)(iii). Railroads have complied with § 232.213(a)(1)(iii) by periodically supplying FRA with spreadsheets identifying their extended haul trains and providing the required information.

In the NPRM, FRA reminded railroads of the need to identify, with sufficient clarity, the type of equipment being hauled in extended haul trains. FRA also sought comments and information on how to achieve such clarity, what level of description FRA should expect, and how to otherwise differentiate extended haul trains for oversight purposes. Noting that § 232.213 no longer provides for an inbound inspection of all extended haul trains, and paragraphs (a)(5) and (a)(6) contain certain requirements related to that previous inbound inspection requirement, FRA proposed to modify those paragraphs to remove the outdated references to inbound inspections.

In response to FRA's request for comments on types of equipment, the Railroads expressed the view that the type of equipment used in an extended haul train has no bearing on the safe operation of that train or its brakes and that the requirement to report the information to FRA is outdated. Accordingly, the Railroads recommended that § 232.213(a)(1)(iii) be deleted.

While the information required under § 232.213(a)(1)(iii) is useful to FRA for focusing inspection resources, FRA agrees with the Railroads comments that it is not otherwise necessary. Accordingly, in this final rule, FRA is deleting paragraph (a)(1)(iii) and redesignating paragraph (a)(1)(iv) as paragraph (a)(1)(iii).[17]

In the NPRM, FRA proposed to add a new paragraph (8) to this section that would provide railroads the flexibility to designate different inspection and test locations for extended haul trains in certain circumstances. FRA mirrored proposed new paragraph (8) on the notification procedures of § 232.207(c)(2), which allow railroads to change the location of Class IA brake tests without prior notice to FRA in certain emergency situations. Codification of this practice would provide the railroads a flexible reporting procedure, and ultimately regulatory certainty, to address emergency circumstances involving extended haul operations. Due to an internal reorganization, FRA is also removing the reference to the Regional Administrator in paragraph (8).

While the Railroads concur with FRA's proposed new paragraph (8), TWU objects to the paragraph, asserting that § 232.213 should not be altered in any way. TWU states that sufficient flexibility already exists and that the proposal would allow railroads ''more latitude to close more yards and further reduce the number of Carmen available to perform'' Class I inspections.[18] TWU also notes that, if FRA did not codify the proposed flexibility, a railroad could still modify its designated inspection locations by submitting an updated extended haul train list complying with § 232.213(a).

However, requiring such a process could frustrate railroads' ability to respond to emergency situations and the process would provide no safety benefit. Accordingly, FRA is adopting new paragraph (a)(8) as proposed in the NPRM.

With respect to paragraphs (a)(5) and (6), the Railroads concurred with FRA's proposed removal of the outdated references to inbound inspections in those paragraphs and there were no other comments. FRA is, therefore, adopting the revisions to paragraphs (a)(5) and (a)(6) as proposed.

In the NPRM, FRA also requested comments on potential regulatory alternatives to the existing extended haul provisions of § 232.213, potential improvements that could be made to the section to clarify or expand the provision, or whether this provision

[16] On March 1, 2019, AAR submitted a petition for rulemaking that, if granted, would allow rail cars with a valid eABS record to travel up to 2,500 miles between brake tests and inspections. In this proceeding, FRA is addressing only foundational requirements, such as the 24-hour off-air proposal, that could support the full implementation of eABS. However, FRA expects to address this issue in the eABS Rule.

[17] FRA notes that paragraph (a)(1)(iv), which is being redesignated as paragraph (a)(1)(iii), requires each railroad to provide to FRA ''the locations where all train brake and mechanical inspections and tests will be performed'' for each designated extended haul train. *See* 49 CFR 232.213(a)(1)(iv). In other words, the submission must include the location of *every* expected brake and mechanical inspection, not only the Class I inspections performed by a qualified mechanical inspector, on the designated train.

[18] In its comments, TWU purports to offer alternative rule text, but merely restates the existing text of § 232.213(a)(6). Accordingly, FRA was unable to consider any particular revisions to the rule text that TWU may have contemplated.

could be eliminated by the adoption of certain alternative standards or requirements. For example, the section currently distinguishes between an inspection conducted by a qualified mechanical inspector (QMI) and a qualified person (QP) (both of which are defined in § 232.5). FRA requested comments and data on whether this distinction is still justified and necessary.

In response to this request for comment, the Railroads assert that the distinction between QMIs and QPs is no longer justified. According to the Railroads, ''there is no difference between the safety of trains that receive a QMI test as compared to those tested by a QP.'' However, the Railroads did not provide any data to support this assertion. Although the issue of distinguishing between QMI and QP inspections is relevant to any discussion of extending the mileage trains may travel between brake inspections, without sufficient data, FRA is unable to eliminate the distinction between QMIs and QPs at this time. However, FRA intends to consider this issue further in the eABS Rule. FRA encourages railroads to provide any data relevant to the safety distinctions and synergies between QMI and QP inspections in that rulemaking proceeding.

In its comments, the Railroads also recommended that FRA permit all trains receiving an initial terminal Class I brake test by a: (1) QP to operate up to 1,500 miles, and (2) by a QMI to operate up to 2,000 miles, without requiring an intermediate (*e.g.,* Class IA) brake test and with an unrestricted number of pick-ups and set-offs. To have the benefit of public comment on this recommendation, FRA expects to fully consider this recommendation in the eABS Rule.

Section 232.217 Train Brake Tests Conducted Using Yard Air

FRA is amending the off-air requirements of this section without change from the NPRM. Please refer to the off-air requirements analysis provided for § 232.205.

Section 232.219 Double-Heading and Helper Service

Section 232.219 provides regulations for the operation of double-headed and helper locomotives in a train including when *Helper Link* or a similar technology is used to control the emergency brake function on helper locomotive consists. As explained in the NPRM, the section, as written, is appropriate for a train with an EOT device; however, the section is incompatible with trains that are not equipped with traditional EOT devices, including ECP-brake operated trains and trains with DP units in lieu of an EOT device. To address this issue, in response to requests from two railroads, FRA issued waivers from this requirement for ECP brake-configured train consists and DP consists with one or more DP (non-helper) locomotives on the rear. *See* Docket Nos. FRA–2006–26435 and FRA–2014–0013. Since granting these waivers, there has been no known negative impact on safety involving these operations.

In the NPRM, FRA proposed to codify these waivers by adding a new paragraph (d) to § 232.219 to permit the use of a properly installed and tested EOT device on the helper locomotive that is cut-in to the train line air supply, provided railroads develop and implement associated operating rules consistent with parts 221 (concerning marker light display) and 232 (concerning EOT device installation and testing) and the conditions established in the waivers discussed above.

Both the Railroads and Labor support codifying these waivers, but Labor urges FRA not to eliminate paragraph (c)(3). In response to Labor's comment, FRA notes that it did not intend to eliminate paragraph (c)(3), which includes a maintenance requirement for *Helper Link* devices used on DP- or ECP-equipped trains. To enhance clarity in light of Labor's comment, FRA is adopting the substance of proposed paragraph (d) as new paragraph (c)(3) and existing paragraph (c)(3), which requires periodic testing and calibration of devices subject to § 232.219, is being redesignated as paragraph (c)(4).

A usage under new (c)(3) must still meet the requirements of (c)(1) and (c)(2). All usages must meet the requirements of the new (c)(4).

Section 232.305 Single Car Air Brake Tests

Section 232.305(a) requires each SCT to be performed in accordance with the Sections 3.0 (''Tests-Standard Freight Brake Equipment'') and 4.0 (''Special Tests'') of AAR Standard S–486–04 (2004) (''Code of Air Brake System Tests for Freight Equipment''), Section E of the AAR Manual of Standards and Recommended Practices (Jan. 1, 2004), or an alternative standard approved by FRA in accordance with § 232.307. Under the processes outlined in § 232.307, which allows the industry to request FRA approval of modifications to a currently acceptable SCT procedure, FRA approved the use of AAR Standard S–486–18 in May 2018. *See* Docket No. FRA–2018–0011. The purpose of S–486 is to provide a means of making a general check on the condition of the brake equipment on cars as called for in the Filed Manual of the AAR Interchange Rules. Only Sections 4 and 5 are codified, as these are the tests that ensure safe operation of individual freight car brakes to comply with the Safety Appliance Act. Other sections of the Standard contain supplemental information that are not codified to provide flexibility to be updated without meeting Federal requirements. These include troubleshooting guidance and information on the maintenance and construction of the physical testing devices. Accordingly, in the NPRM, FRA proposed to update AAR Standard S–486–04 to AAR Standard S–486–18.[19] FRA received no comments in response to its proposal to incorporate the updated AAR Standard S–486 and is incorporating the updated standard as proposed.

FRA also proposed to incorporate in paragraph (a), AAR Standard S–4027, which provides an automated process to perform a SCT with an automated single car test device (ASCTD). As explained in the NPRM, AAR Standard S–4027 provides for two types of automated single cars tests: (1) An automated test using an ASCTD connected to the end of a freight car; and (2) an automated test performed from the side of a car using the four-pressure manifold. FRA had conditionally approved a test waiver permitting BNSF and UP to perform SCTs with an ASCTD using AAR Standard S–4027 in lieu of AAR Standard S–486–4. *See* Docket No. FRA–2013–0030. In the NPRM, FRA detailed the test committee consensus process and its positive results and findings under that test waiver for 800,000 SCTs performed on freight cars over 4.5 years. No opposing comments were filed on the process, results, findings, or the standard itself and FRA is incorporating the standard as proposed.

Paragraph (b) identifies the events triggering a required single car air brake test. For instance, under paragraph (b)(2), ''a railroad shall perform a single car air brake test on a car when a car is on a shop or repair track . . . for any reason and has not received a single car air brake test within the previous 12-month period.'' Based on the results performed by the tests under Docket No. FRA–2013–0030, and the ability of the subject technology to provide a more comprehensive testing of the braking

[19] FRA notes that in the NPRM's preamble, FRA erroneously referred to Sections 4 and 5 of AAR Standard S–486, when the appropriate references were Sections 3 and 4. 85 FR at 2503.

system, FRA proposed requiring a SCT on each car on a shop or repair track for any reason that has not received a SCT with an end-of-car ASCTD within the previous 24-month period or with a four-pressure ASCTD within the previous 48-month period.

As FRA noted in the preamble to the NPRM, FRA based this proposal on the test waiver's findings that, after 4.5 years, cars tested with end-of-car ASCTDs experienced an 18% reduction in the rate of repeat brake failures, while a four-pressure test experienced a 58% reduction. ASCTDs generally identify more air brake system defects than other tests in the categories of air components, control valves and pipe brackets, valves and subsystems. Data from the test waiver has also shown that a car tested with an end-of-car ASCTD is 26% less likely to have an AAR-condemnable wheel impact load detector indication, and ASCTD tests with four-pressure showed a 70% reduction.

TWU opposes lengthening the minimum testing requirement from 12-months to 24–48 months, arguing that carriers ''could be missing deficiencies that will turn into a major incident or derailment.'' Noting FRA's assertion in the NPRM's preamble that, on a daily basis, thousands of individual freight cars are overdue for their SCT, TWU notes that there is an ''overabundance'' of furloughed mechanical employees. As such, TWU suggests that, ''[r]ather than lowering the standards,'' FRA should penalize railroads for ''intentionally undermining safety.'' Labor states that FRA should enforce the existing requirements on the thousands of overdue cars rather than ''move the goalposts.'' TWU and Labor also object to removing the ''repair yard provision'' for SCTs.

The Railroads support the ASCTD rules as proposed, but contest FRA's concern regarding the number cars overdue their SCTs.

In response to TWU and Labor's comments, FRA notes that it did not propose to change the rules as they concern application of a conventional SCT. To the contrary, FRA continues to require a SCT on each car appearing on a repair track at more than 12 months since its previous test using conventional testing equipment and would not remove the repair yard provision as it currently exists for any tests.

Instead, FRA's proposal would only extend the time allowed between each SCT conducted using an ASCTD under AAR Standard S–4027. Because AAR Standard S–4027 provides a highly repeatable test methodology with more accurate results, railroads can make more effective repairs, which may help reduce the backlog referenced in TWU's concerns.

In addition to the repair track provision of paragraph (b)(2), paragraphs (c) and (d) require a SCT on each car no less than 8 years after it was built or rebuilt, and no less than every 5 years thereafter. In the NPRM, FRA requested comments on the need to maintain these requirements.

In response, the Railroads urge FRA to delete any time-based test cycles and to instead adopt ''performance-based triggers (*e.g.,* identified via the study of data on actual line-of-road issues).''

While FRA understands the Railroads' request to replace the time-based test triggers required under paragraphs (b)(2), (c), and (d) with a performance standard relying on ''line-of-road'' capabilities, the request is unsupported by any specific performance standard, analysis, or data. Accordingly, FRA cannot implement the Railroad's request at this time.

For the reasons outlined above, in this final rule FRA is adopting the changes proposed to paragraph (b)(2), but not paragraphs (c) and (d).

Section 232.307 Modification of the Single Car Air Brake Test Procedures

Existing § 232.307 provides a procedure for industry to seek modification of the single car air brake test procedures in § 232.305(e). As discussed in the section-by section analysis for § 232.603 below, in response to FRA's NPRM proposal to modify § 232.603, the Railroads commented that proposed paragraph (g) of that section was confusing because it referred to the existing procedures in § 232.307, which in turn only referred to § 232.305(a). In this final rule, FRA is revising § 232.307, so that incorporated industry standards for air brake maintenance and testing may be updated utilizing the procedures of that section. When utilizing § 232.307, a petitioner will be required to specify the part, section, and paragraph for which modification is requested. Presently, §§ 232.305 and 232.603 refer to § 232.307. This final rule adds references to §§ 232.717 (addressing tourist, scenic, historic, and excursion operations braking systems) and 232.409 (addressing inspection and testing of EOT devices). Consistent with these revisions, FRA is also updating the title of § 232.307 to eliminate the specific reference to single car air brake test procedures and to refer more generally to ''brake test procedures.''

Section 232.403 Design Standards for One-Way End-of-Train Devices

Section 232.403 includes design standards for one-way EOT devices. In the NPRM, FRA proposed to modify paragraphs (d)(6) and (f)(4), which include shock requirements for rear and front units, referring to a 0.1 second window. In the NPRM, FRA indicated that the 0.1 second interval in paragraphs (d)(6) and (f)(4) is too large for maintaining a peak shock threshold and is likely a typographical or other error from a previous rulemaking. Accordingly, FRA proposed to make the shock requirements in these paragraphs the same as the 0.01 second peak shock threshold in AAR Standards S–9152 and S–9401. The only comment received supported correcting this typographical error, and therefore, FRA is adopting the proposed revisions to paragraphs (d)(6) and (f)(4).

Paragraph (g)(2) currently requires a minimum EOT device battery life of 36 hours at 0 °C. As noted in the NPRM, manufacturers have developed EOT devices that rely less on batteries and more on an internal, air-powered generator, which converts mechanical energy—created by the brake pipe air pressure—into electricity used to power the EOT device.

In the NPRM, FRA proposed codifying two long-standing waivers providing relief from this requirement for EOT devices using an air-powered generator as a power source. *See* Docket Nos. FRA–2006–25794 and FRA–2001–9270. In these waivers, FRA required each subject EOT device to include a back-up battery with a minimum operating life of 12 hours at 0 °C and the railroads to submit reports on the devices' usage and performance.

As noted in the NPRM, to date, FRA has not received any reports of accidents due to EOT device operations under these waivers. Accordingly, FRA proposed a new paragraph (g)(3) to provide for use of an air-powered generator as a primary power source as long as it operates with a backup battery with a minimum of 12 hours of continuous power at 0 °C. This change will improve efficiency and is consistent with railroad safety.

The Railroads agree with FRA's proposal to require that each back-up battery to an EOT device's air-powered generator be capable of providing 12 hours of continuous power at 0 °C. The Railroads also suggest FRA adopt a flexible, performance-based provision addressing EOTs generally and provide alternative language to accommodate future developments, such as the use of

other power sources or EOT devices becoming obsolete.

Labor supports requiring a back-up battery to each EOT device's air-powered generator, but believes it should include more than 12 hours of energy and provide subsequent crews with power-level notifications.

Various manufacturers and railroads have already, under the waivers, built and installed 12-hour back-up batteries. Labor has not provided any data, examples, or other information showing why 12 hours would be insufficient. To require a number higher than 12 hours would create a potentially unnecessary yet substantial burden on manufacturers and railroads to remove existing batteries and purchase and install new batteries. While a longer back-up battery life may provide a convenience to users, it would result in no new safety benefits. Moreover, current manufactured units may not be able to accept batteries with different specifications. Similarly, to require power notifications such as a percentage or other spectrum of available power would require modification of all affected EOT systems and batteries. With approximately 27,000 EOT devices registered in Umler, Labor has provided no data on the impact on the railroads and the public of such a requirement.

Although FRA is open to a performance-based approach to powering EOT devices, no performance standard was proposed or otherwise offered in this proceeding. FRA notes the Railroads' prediction that EOT devices may be rendered obsolete, but the Railroads provided no evidence, alternatives, or timelines showing such a possibility. While a suitable performance standard is not currently feasible, FRA is modifying the language of §§ 232.17(a) and (b), and 232.407(c) to provide special approval procedure consideration for the introduction of new and novel alternative technologies that serve the same or similar purposes as EOT devices in the interest of maintaining regulatory flexibility for future innovation.

For the reasons discussed above, in this final rule FRA is modifying paragraph (g)(2) and adding new paragraph (g)(3) as proposed.

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

Section 232.407 addresses operations requiring the use of two-way EOT devices.

Although not specifically proposed in the NPRM, FRA is modifying paragraph (e)(1) to clarify that because an ARU (as defined in this final rule) is equipped with telemetry as defined for EOT devices in existing subpart E, an ARU may be used under the (e)(1) exception for the requirement for the use of a two-way EOT device. At least one Class I railroad operating in Canada uses an ARU in this manner and as long as an ARU performs the same function as an EOT device or DPU, and is operated and regulated in the same manner, such an allowance is warranted. As discussed in more detail in the analysis of the new definition of ''ARU'' in § 232.5 above, similar to the use of a DP locomotive currently contemplated under (e)(1), an ARU may communicate with, and receive wireless commands from a controlling locomotive to help regulate the brake system's air supply and pressure.

In the NPRM, FRA proposed to modify paragraph (f)(2), which addresses battery charging requirements for two-way EOT devices. Specifically, FRA proposed adding language to the end of the paragraph to require the testing of air-powered, generator-equipped devices to determine the ''residual charge'' of the back-up battery before initiating operation. As FRA explained in the NPRM, this requirement is ''meant to ensure that the generator back-up battery has a minimal residual charge, which will ensure that it is working properly and is capable of temporarily powering the EOT device should the air-powered generator fail.'' 85 FR 2505.

In their comments, Labor supports mandatory testing of each EOT device's back-up batteries, but asserts that FRA should use the term ''sufficient charge.''

The Railroads concur with FRA's proposed language in paragraph (f)(2) requiring the testing of air-powered-generator-equipped devices to determine the charge of the back-up battery before initiating operation. However, the Railroads urge FRA to adopt language to accommodate power sources other than batteries.

While FRA requires a primary battery to be sufficiently charged under paragraph (f)(2), under the waiver allowing the use of an air-powered generator, FRA prohibited the use of a dead battery. To comply with that condition, the suppliers manufactured EOT devices with a ''minimum charge'' indication showing that the battery has enough residual charge to accept charging from the air-powered generator. Labor has not provided any data or information showing why either a ''residual charge'' or ''minimum charge'' indication is insufficient and FRA is reluctant to require manufacturers to incur costs to change the indication without a sufficient safety justification.

Thus, in this final rule, FRA is using the term ''minimum charge.'' FRA understands a minimal charge of a back-up power source to mean it has a sufficient residual charge to accept charging from the air-powered generator. Passing the initiation test is evidence that the back-up power source has the required minimum charge.

While FRA agrees that other power sources may be considered, existing paragraphs (b) and (c) already provide for ''alternative technology to perform the same function.'' In response to the Railroads' comment, FRA is clarifying these paragraphs and providing for the consideration of such alternative technologies under the special approval procedure defined under § 232.17. *See also* the discussion of §§ 232.17 above.

Paragraph (f)(2) also requires that each EOT device's battery be sufficiently charged at its initial terminal or other installation point and throughout the train's trip to ensure that it will remain operative until the train reaches its destination. Although this is not a new requirement, the Railroads also request that FRA clarify the meaning of the phrase ''until the train reaches its destination.''

FRA addressed this issue in the preamble of the 1997 final rule. *See* 62 FR 278, 289, 294–95, Jan. 2, 1997. FRA recognizes that the amount of a battery's charge differs based on several variables, including the trip length. The railroad has the initial responsibility for determining how to comply with this performance standard, which can be based on manufacturer recommendations, scientific or mathematical studies, or experience. If an EOT device's battery dies before destination, that is evidence that the railroad did not comply with this requirement. This requirement, however, would not necessarily apply to air-power generators or back-up power sources. Air-powered generators are not expected to hold a full trip's worth of energy at the initial terminal of a train, because they are designed to charge continually during the train's operation. FRA has set a different charge standard for back-up power sources.

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

Section 232.409 includes requirements for EOT device inspection and testing. More specifically, existing paragraph (d) requires each EOT device's telemetry equipment be tested at least every 368 days for accuracy and calibrated, if necessary, in accordance with the manufacturer's specifications

and procedures. In the NPRM, FRA proposed instead to require telemetry equipment be tested and calibrated in accordance with its manufacturer's specifications and procedures, without requiring a maximum time interval between tests. FRA also proposed to add a new paragraph (e) to address comparison testing requirements for EOT device air pressure sensors.

FRA based its proposed revision to paragraph (d) on the reduced need for periodic telemetric equipment calibration due to technological advances that include continuous feedback such as phase-lock loop (PLL). A PLL feedback system consists generally of a reference oscillator in addition to radio telemetry components. The reference oscillator sets the communications frequency for the radio telemetry components. If the radio telemetry components are not able to achieve the communications frequency set by the reference oscillator, then the radio will go into a fail-safe mode and will not operate.

As explained in the NPRM, for EOT devices using PLL or a similar feedback loop technology, FRA granted multiple waivers from the 368-day calibration requirement for the radio portion only under the conditions that vendors apply a weather-resistant label on each applicable EOT device and manufacturers file annual reports on the rate of inoperable devices. *See, e.g.,* Docket Nos. FRA–2015–0044; FRA–2012–0096; FRA–2009–0015; and FRA–2004–18895. FRA required manufacturers to file annual reports on the rate of inoperable devices to ensure the devices continued to operate safely over time without a calibration requirement. Based on the relatively long-term experience under the above-noted waivers, and the data supplied in the annual reports, the continuous self-check circuitry of PLL technology ensures better overall safety given the potential for human error during periodic calibration. FRA's proposed revision to paragraph (d) was based on data garnered from the required annual reporting on these waivers, summarized in the renewal applications contained in the applicable waiver dockets. However, this does not include the pressure sensor components of EOT devices.

The Railroads agree with the proposed revision to paragraph (d). However, TWU believes FRA should continue to require calibration every 368 days for all non-PLL units. According to TWU, not providing for FRA verification of EOT device calibration would incentivize carriers to underreport communication losses. Labor concurs that PLL technology reduces the need for telemetry calibration and supports continued application of the maximum calibration period under § 232.409 to EOT devices not yet PLL-equipped.

FRA understands TWU's concern. However, FRA expects that manufacturers will continue to set appropriate calibration intervals for non-PLL radios. Given the level of safety attained with calibrations performed at least every 368-days and that any change could create operational or legal exposure on a technology the industry no longer produces, FRA does not expect manufacturers to change such intervals significantly. In addition, as proposed in the NPRM and adopted in this final rule, if a manufacturer does not set a periodic calibration interval for any unit (including legacy non-PLL units), the manufacturer will be required to report under paragraph (f)(2).

While TWU states that incorporating this allowance into regulations may incentivize underreporting of communications losses, it provides no analysis or data to support that prediction. Nevertheless, as further discussed below, under new paragraph (f) a manufacturer must describe in its annual report to FRA each time it repairs or reconditions a radio for an EOT device if it does not establish a calibration period for the device. Any underreporting would be a violation of this requirement. Accordingly, in this final rule, FRA is adopting its proposed revision to paragraph (d).

Despite the waivers, and their codification in paragraph (d), each EOT device and its operation still must comply with the applicable requirements of part 229. Specifically, paragraphs (a) and (b) of § 229.27 require comparison testing at least every 368 days with a test gauge, or self-test designed for this purpose, for each device that: (1) Engineers use to aid in the control or braking of a train or locomotive; and (2) provides an indication of air pressure electronically. Because the air pressure sensor in the EOT device is used by the locomotive engineer to control the train, it is similar to the gauges in the cab and must comply with parts 229 and 232. Although § 229.27 applies to the air pressure sensor in an EOT device, because the air pressure reading at the EOT device is used to control the train, FRA proposed a cross-reference to § 229.27 in proposed new paragraph (e) of § 232.409 for clarification purposes.

Under existing § 229.27, an annual test must be performed on 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 (pressure sensors). For instance, each EOT-device-equipped train relies on the pressure sensor to ensure compliant train handling, and in accordance with the pressure gradient requirements of §§ 232.103(m) and 232.205(c) and the Class III brake test performance requirements of § 232.211(c). Unlike the PLL radio portion of each EOT device, a pressure sensor does not self-test and react to pressure calibration drift.

Labor submitted comments agreeing that all EOT devices must comply with § 229.27. On the other hand, the Railroads commented that proposed paragraph (e) is not necessary. Instead, the Railroads recommended that FRA adopt alternative language requiring comparison testing in accordance with manufacturer's specifications similar to that proposed in § 232.403.

Although commenters provided no data, technology, or other specific risk-mitigating alternative that would justify modifying the generally-applicable requirements related to comparison testing of EOT device pressure sensors, FRA finds that device manufacturers should have the required expertise to evaluate their own devices and determine if such devices could be successfully comparison tested on an alternative schedule or by an alternative process. Accordingly, to allow manufacturers the flexibility to develop alternative comparison testing standards for EOT device pressure sensors, FRA is revising proposed paragraph (e) to specify that the air pressure sensor contained in the EOT device must be tested by the processes and frequency identified in § 229.27 or by manufacturer specifications approved under § 232.307. If approved under § 232.307, railroads using the applicable EOT device may apply the testing standard accordingly.

Despite the positive experience under the waivers and FRA's confidence in PLL technology, the frequency of the reference oscillator in an EOT device may, over time, ''drift'' outside of its accepted frequency range, which may affect a device remaining in communication with the front- or head-of-train device. In electrical engineering, and particularly in telecommunications, ''frequency drift'' is the unintended and generally arbitrary offset of an oscillator from its nominal frequency. Frequency drift that is not recognized during device initiation or otherwise by the EOT device's self-check circuitry, may prevent the device from failing in a safe manner, and can only be corrected during calibration. Until recently, FRA had not received any reports of PLL-

equipped radios experiencing frequency drift. However, since publication of the NPRM, FRA has been made aware of potential frequency drift in a very small percentage (less than 0.1%) of PLL transceivers covered under waiver FRA–2009–0015. Given this new information, FRA seeks to ensure this problem does not become more widespread, and is therefore codifying the waiver's annual reporting requirement for devices without calibration intervals specified by the manufacturer. This additional requirement will enable FRA and radio manufacturers to track any potential increase in frequency drift occurrences and ensure proper calibration intervals. These reports could also provide information that is useful to formulate a future performance standard. Paragraph (f) requires manufacturers to submit annual reports regarding certain transceivers to provide a means for FRA to monitor transceiver performance periodically, if they choose not to set a calibration period. If a manufacturer of telemetry transceiver equipment has multiple transceiver model types without recommended finite calibration periods, then the information required must be provided by model type in their reporting. This will not be a new burden to the manufacturers as they have already been providing this information to FRA pursuant to the waivers.

As noted in the NPRM, and in the discussion of § 232.203 above, FRA remains concerned with the safety risks associated with the reported and unreported loss of communications events between the controlling locomotive and the EOT device. As noted above, FRA understands that railroads are working to develop and implement solutions, but it does not appear that a feasible technological solution is yet available. Accordingly, as noted above, to address the safety risks involved with potential losses of communication, FRA is revising the training requirements at § 232.203(c) to ensure that employees that operate EOT equipment are trained in the limitations and proper use of the emergency application signal and the loss of communications indicator of the equipment to enable them to take effective action in the event of a communications loss.[20]

Section 232.603 Design, Interoperability, and Configuration Management Requirements

Section 232.603 contains the design, interoperability, and configuration management requirements for ECP brakes. In the NPRM, FRA proposed to revise paragraphs (a) and (d), move paragraph (f) to (g), and add a new paragraph (f) to meet the formatting and structure requirements for incorporation by reference under 1 CFR part 51. FRA also proposed to update the standards incorporated by reference in in paragraphs (a)(1), (a)(2), (a)(4), (a)(6), and (a)(7). For a discussion of the purposes of these standards, please see the NPRM.

FRA did not receive comments on the revisions and updates to paragraphs (a), (d), and (f). The purposes of the standards are as follows: S–4200 ensures uniform and consistent functionality and performance of ECP freight brake systems from different manufacturers; S–4210 provides the qualification test procedure to verify that the designed components have high reliability, will withstand harsh environmental conditions, and have a minimum 8-year operating life; S–4230 facilitates freight car and locomotive interoperability without limiting the proprietary design approaches used by individual suppliers and defines the requirements for an intratrain communications (ITC) system for freight equipment in revenue interchange service; S–4250 ensures uniform, consistent, and interoperable functionality and performance between devices developed by different manufacturers, by defining the high-level performance requirements to operate multiple locomotives via an ITC network; and S–4260 identifies the test procedure that individual suppliers would complete to establish the interoperability baseline among ECP/WDP (wire distributed power) systems that comply with the AAR S–4200 series of standards. Accordingly, FRA adopts those changes as proposed.

The Railroads commented that proposed paragraph (g) is confusing, because it refers to existing procedures to update an incorporated by reference standard in § 232.307, which in turn references § 232.305(a). In this final rule, FRA is clarifying § 232.307, so that incorporated industry standards for air brake maintenance may be updated in a consistent and efficient manner. When utilizing § 232.307, a petitioner will be required to specify the part, section, and paragraph for which modification is requested. Presently, §§ 232.305, 232.603, and 232.717 refer to § 232.307.

Subpart H Tourist, Scenic, Historic, and Excursion Operations Braking Systems

Appendix B was created to preserve part 232 as it existed prior to the 2001 final rule, and was intended to apply to tourist, scenic, historic, and excursion operations.[21] As proposed in the NPRM, this final rule is moving appendix B, with some revisions, to a new subpart H (§§ 232.700–232.719). FRA is only discussing those provisions of new subpart H that received public comments or have changed from the NPRM. The remaining provisions are being finalized as proposed, and not discussed here again.

In § 232.717 of the NPRM, FRA proposed to reference Rule 4 of the ''2020 Field Manual of the AAR Interchange Rules'' (''AAR Field Manual''). However, FRA has since realized that AAR Standard S–4045–13, which was referenced in proposed paragraph 232.717(b)(2), makes clear that the use of Rule 3 of the AAR Field Manual is also required for the maintenance of freight valves used on passenger equipment. Thus, to pinpoint the applicable rules more accurately for the convenience of the reader, all references to the AAR Field Manual in § 232.717 will include both Rules 3 and 4, which are concerned with the testing of railroad air brakes and with the maintenance of air brake valves and parts, respectively.[22]

In the NPRM, FRA indicated it was adding a paragraph (b)(2) to § 232.717. However, FRA notes that § 232.17 in appendix B, which became § 232.717 in proposed subpart H, already included a paragraph (b)(2). Accordingly, FRA notes that it is not ''adding'' a paragraph (b)(2), but rather just revising the paragraph as it existed previously in appendix B.

Labor commented about the proposed ''significant relaxation'' of current maintenance practices and operating requirements in 232.717(b), including the ''cleaned, repaired, lubricated, and tested'' periodic inspection requirements for 26–C and D–22 brake valves. According to Labor, while a relaxed periodicity of these practices may be appropriate to apply to the state-of-the-art locomotives used in pilot programs by the Class I railroads, extending the same relief to the ''motive power fleet that is the oldest in the

[20] *See* section-by-section analysis of § 232.203 above.

[21] On May 31, 2001, FRA issued an update to part 232. Some of the prior rule text was preserved in section I of appendix B to part 232, which remained applicable to tourist, scenic, historic, or excursion railroads on the general system of transportation, who have not been required to operate under present parts 232 or 238. *See* §§ 232.1(d) and 232.3(c)(5); 66 FR 4104, 4145–46, 4214, Jan. 17, 2001.

[22] FRA notes that this final rule incorporates by reference the January 1, 2020, version of AAR Rules 3 and 4. Prior to publication of this final rule, however, AAR issued updated versions of each of these Rules and FRA anticipates incorporating the updated AAR rules in a future rulemaking proceeding.

nation'' is not justified.[23] TWU's comments were similar to Labor's.

As proposed, paragraph (b)(2) changed brake inspection requirements from referencing AAR Standard S–045 to referencing AAR Standard S–4045–13, which establishes, for passenger equipment cars operating in the U.S. and Canada, standard maintenance practices and operating requirements, including the periodic inspection requirements for air brake cleaning, repairing, lubricating, and testing (known in the industry as ''clean, oil, test, and stencil'' or ''COT&S''). AAR Standard S–4045–13, would extend the timeline related to periodic brake valve inspections, and is based upon the safety experience of the waiver at Docket No. FRA–2013–0063 [24] and experience with the extended period for inspections at 49 CFR 238.309(d)(2) and (3) for conventional passenger equipment. As a result, railroads using 26–C type valves would now be required to test those valves every 48 months (instead of 36 months). Similarly, railroads using D–22 type valves would now be required to test those valves every 36 months (instead of 24 months).

Labor appears to incorrectly believe the relief provided in the waiver was the same as that provided under Docket No. FRA–2005–21613, which extended the service life of locomotive electronic brake valves (EBVs). This is the only recent docket that meets the description of Labor's concern. FRA notes that Amtrak has operated 26–C passenger car control valves for 48 months between inspections under the PB–94–3 waiver since July 1995 (codified at § 238.309 in May 1999), while railroads not subject to part 238 have operated under the subsequent waivers since April 2012. Passenger railroads have operated D–22 passenger car control valves for 1,104 days between inspections under § 238.309(d)(3) since 1999. In all cases, these waivers extended the periodic inspection interval for only 12 months and were based on over fifty years of operating experience,[25] plus confirming testing performed as part of the waiver investigations. The railroads have not reported any safety problems while under those waivers. By contrast, the locomotive EBV waiver that extended periodic inspection intervals for up to 5 years involves novel designs, requiring continuous product upgrades during the course of the waiver, and required a test committee to witness inspection and tear-down of several brake unit types on a biannual basis. Passenger car control valves with a long and successful service history do not require the same scrutiny and oversight.

The safety case provided, and the lack of negative safety data arising from the aforementioned control valve waivers, justifies the 12-month extension for each periodic inspection of a 26–C or D–22 valve provided by updated AAR Standard S–4045–13. Such an extension also aligns the inspection periods for 26–C and D–22 control valves on all railroads, thus reducing confusion. Accordingly, this final rule updates paragraph (b)(2) to reference AAR Standard S–4045–13.

Currently, appendix B does not require tourist, scenic, historic, and excursion railroads to develop a plan for servicing obsolete brake equipment. Accordingly, in the NPRM, FRA proposed § 232.717(c) within the new subpart H to allow tourist, scenic, historic, and excursion railroads to develop a compliant plan for servicing obsolete brake equipment. Under paragraph (c), these railroads—when utilizing equipment not covered by an applicable, available, and incorporated AAR standard—would have to maintain the equipment in a safe and suitable condition for service according to a railroad's written maintenance plan. A compliant maintenance plan, including its COT&S component and a periodic attention schedule, must be based upon a standard appropriate to the equipment. For example, a compliant plan might utilize a recognized industry standard or a former AAR interchange standard, to the extent it is modified to account for the unique operating conditions of the particular tourist railroad operation. The railroad must make its written maintenance plan available to FRA upon request.

While FRA expects some individual railroads may develop their own written maintenance plans, FRA understands that an industry organization (HeritageRail Alliance) may develop a consensus standard for the periodic maintenance of this brake equipment. FRA did not propose a formal approval process for each tourist, scenic, historic, and excursion railroad plan, as this would not be feasible from a regulatory standpoint, for both the railroads and FRA, and such a requirement would not enhance safety under subpart H. However, when evaluating maintenance plans during the course of regular inspections, FRA will consider the appropriate AAR-published valve standard in the last version (*e.g.,* 1992 for the ''AB'' control valve) of the AAR Code of Rules or the AAR Field Manual before a valve type was made obsolete, the usage of the equipment, and the railroad's voluntarily scheduled SCTs.[26]

Labor and TWU object to proposed paragraph (c), claiming it releases FRA from its regulatory responsibilities and allows affected railroads to self-regulate with their own inspection plans. According to Labor, paragraph (c) attempts to fix a problem that does not exist and would place a burden on those railroads with few resources.

In discussions between FRA and various tourist and historic railway industry associations, the railroads governed under former appendix B, now subpart H, have requested regulatory guidance on the applicability of those rules on discontinued brake valves. Moreover, under Section 415 of the Rail Safety Improvement Act of 2008, Congress directed FRA to study air brake maintenance regulatory compliance on diesel locomotives for tourist and historic railroads. The NPRM proposed changes consistent with Congress' direction and the railroads' requests to provide regulatory certainty and to reduce their compliance burdens. For instance, under the previous language of § 232.17 of appendix B, affected railroads were left without compliance guidance or regulatory protection each time AAR removed a brake type (*e.g.,* the ''AB'' brake) from the AAR Field Manual. FRA recognizes these ''obsolete'' brake valves may continue to be operated on older equipment while remaining compliant with § 232.103(l) (formerly § 232.3 of appendix B), and finds that each railroad is in a better position to determine how to maintain its (generally non-interchanged) equipment for its own operating environment. The

[23] Labor appears to believe incorrectly that the D–22 and 26–C brake valves are locomotive brake valves. As explained further below, there is a 25-year waiver history of extending these passenger car valves by 12 months.

[24] The waiver issued in Docket No. FRA–2013–0063 allowed railroads to utilize AAR Standard S–4045–13 in lieu of the obsolete AAR S–045. That waiver was the third waiver FRA issued related to inspection and testing frequency of passenger air brake control valves. *See also* Docket Nos. PB 94–3 (July 26, 1995) and FRA–2011–0070. The 1995 waiver was replaced by § 238.309, established by the final rule published at 64 FR 25660, May 12, 1999. The 2011 and 2013 waivers extended the flexibility afforded by § 238.309 to certain passenger equipment cars.

[25] The D–22 valve has been in use since the mid-1930s and the 26–C valve has been in use since the early 1950s.

[26] FRA notes that many of the former AAR Standards are presently available within *Annex A—Equipment-Dependent Instructions* of APTA Standard PR–M–S–005–98, Rev.4—*Code of Tests for Passenger Car Equipment Using Single Car Testing,* which is incorporated by reference in part 238. *See* Docket No. FRA–2018–0097. A copy of *Annex A* is also available in the docket of this rulemaking for review.

purpose of the new § 232.717(c) is to provide those railroads with a regulatory path going forward. Given the increasing quantity of obsolete equipment, and that the current rules in subparts A–G of part 232 reflect more modern technologies, these railroads require some level of flexibility to address their own equipment and operations. Without this change, railroads will be left to determine, at their own discretion, what rules apply to brake valves once they are no longer addressed in the applicable industry standard.

The new § 232.717(c) provides flexibility, while ensuring that railroads subject to § 232.717 remain under FRA oversight. Given these railroads' low accident or incident rate,[27] their limited (seasonal) operations, and FRA's experienced inspectors familiar with local conditions performing oversight, FRA is confident that paragraph (c) will provide regulatory clarity and improve safety.

FRA sought comments on how to manage future changes to industry standards while ensuring future compliance with 1 CFR part 51 (incorporation by reference). FRA did not receive comments on how to better manage this process. However, the Railroads encourage amendments to **Federal Register** incorporation by reference regulations to generally allow for more timely regulatory updates to standards incorporated by reference. FRA notes that the Railroads' comments regarding the incorporation by reference of standards under 1 CFR 51 is an issue under the authority of the Office of the Federal Register, not FRA.

IV. Regulatory Impact and Notices

A. E.O. 12866 and 13771, Congressional Review Act, and DOT Regulatory Policies and Procedures

This final rule is a significant regulatory action within the meaning of Executive Order 12866 (E.O. 12866) and DOT's Administrative Rulemaking, Guidance, and Enforcement Procedures in 49 CFR part 5. Pursuant to the Congressional Review Act (5 U.S.C. 801 *et seq.*), the Office of Information and Regulatory Affairs designated this rule as not a 'major rule', as defined by 5 U.S.C. 804(2). In addition, this rule is considered an E.O. 13771 deregulatory action. Details on the estimated cost savings of this rule can be found in the rule's Regulatory Impact Analysis, which FRA has prepared and placed in the docket (docket number FRA–2018–0093). The analysis details estimated costs and cost savings that those regulated by the rule are likely to see over a 10-year period.

In this final rule, FRA is codifying several motive power and equipment waivers providing conditional exceptions to existing rules concerning air brake testing (including Class I air brake tests and SCTs), EOT devices, brake valves, and helper service. In particular, FRA is extending the time freight rail equipment can be off-air before requiring a new brake inspection. Furthermore, FRA is making technical corrections to existing brake-related regulations.

FRA estimated the impacts of this final rule. The results of this analysis are presented in the table below.

TOTAL COSTS AND COST SAVINGS OVER 10 YEARS

[2017 Dollars in millions]

Section	Present value 7%	Present value 3%	Annualized 7%	Annualized 3%
Costs: Training	(*)	(*)	(*)	(*)
Cost Savings:				
Helper Link	$3.9	$4.5	$0.6	$0.5
26–C Brake Valve	0.4	0.5	0.06	0.06
D–22 Brake Valve	1.0	1.1	0.1	0.1
24 Hours Off-air	325.6	386.2	46.4	45.3
90 CFM	1.8	2.1	0.3	0.2
SCT 24 month	150.7	176.1	21.5	20.6
SCT 48 month	19.5	23.8	2.8	2.8
Waiver Cost Savings	0.1	0.1	0.01	0.01
Government Administrative Cost Savings	0.1	0.1	0.01	0.01
Total Cost Savings	503.0	594.6	71.6	69.7
Net Cost Savings	503.0	594.6	71.6	69.7

Net Cost Savings = Cost Savings − Costs.
* De minimis.

Over a 10-year period of analysis, the present value of net cost savings are $503.0 million (using a 7% discount rate), and $594.6 million (using a 3% discount rate). The annualized cost savings are $71.6 million (using a 7% discount rate) and $69.7 million (using a 3% discount rate).

By way of explaining the above table, in response to comments from the NTSB and labor organizations, FRA is adding a requirement for railroads to train employees on loss of communication and limitations of the emergency brake signal. This provision is a new requirement and will add slightly to the training employees receive already on using EOT devices. FRA estimates the cost at $1,566 primarily for the railroads using two-way end-of-train devices to update their existing training plans.

Turning to cost savings, among the EOT device waivers incorporated into the final rule, the waiver allowing a train equipped with *Helper Link* (or similar technology) to use an alternative air brake test procedure will benefit railroads using this system. The *Helper Link* technology reduces employees' time in uncoupling the helper locomotive from the train so that it may be turned around to help other trains ascend steep grades. FRA bases its estimate of cost savings on this reduced labor time. For the 26–C and D–22 type brake valves, FRA is extending the time before these types of valves need to be inspected and cleaned, resulting in fewer tests and labor savings. FRA is also extending, from 4 hours to 24 hours, the time before a Class I brake

[27] Since 2010, tourist, historic, and excursion railroads have had no brake-caused train fatalities and 21 motive power and equipment-related accidents.

test must be conducted on rail equipment that is not connected to a source of compressed air prior to being operated in a train again. FRA estimates railroads will accrue savings from performing fewer brake tests, less locomotive idling time to keep rail cars on compressed air (including reduced fuel consumption), and less use of yard air sources. This provision will result in annualized cost savings of $46 million (using a 7% discount rate), the largest category of cost savings. Furthermore, in an EPA comment to the NPRM, it was noted that reduced locomotive idling time will also reduce emissions and pollutants therein. FRA has estimated these potential benefits will total approximately $14.2 million (annualized using a 7% discount rate), and $16.8 million (annualized using a 3% discount rate). However, due to uncertainty regarding these benefits, FRA has not accounted for them in the primary analysis.

Similar to the flexibility provided by other waivers, permitting an increase in brake pipe leakage to 90 CFM under certain conditions will allow railroads to conduct air brake tests without having to wait for additional crews (to test in higher daytime temperatures), or run shorter trains. The efficiencies gained through codifying the 90 CFM waiver are monetized in the table above. FRA found the maintenance requirements for air repeater units are already standard industry practice. In addition, for situations where a railroad can substitute an air repeater unit for a DP locomotive or EOT device, the railroad will save the opportunity cost of that equipment by employing it elsewhere. Finally, FRA expects large cost savings by increasing the time between single car air brake tests from 12 to 24 months for automated tests, and to 48 months for automated tests using a four-pressure receiver. FRA estimates the longer interval between tests for rail cars using automated tests (about 1.1 million freight cars out of 1.6 million freight cars in service) will result in the monetized time savings shown in the table.

Separately, FRA expects the regulated community to submit fewer waiver requests, and requests for waiver extensions, to FRA for the regulatory parts subject to this final rule. FRA generally approves waivers for five years and may extend them upon request. Given the final rule codifies these waivers, railroads and suppliers will save the cost of applying and re-applying for these waivers. These collective savings are represented in the Waiver Cost Savings category in the table, with a comparable savings in terms of government time to review these waivers and renewals.

FRA estimates this final rule will only impose minimal costs on the industry. This final rule generally increases flexibility for the regulated entities by codifying waivers and in certain circumstances, providing additional flexibility in meeting some regulatory requirements. The rule does not impose any new substantive requirements. Railroads and suppliers may choose voluntarily to take advantage of the flexibilities under this final rule. However, under proposed § 232.409(e), FRA is providing EOT device manufacturers additional flexibility in conducting the required testing by reiterating the existing requirement that EOT device air pressure sensors need to be tested annually, or in accordance with alternative test procedures developed by the EOT device manufacturer and approved by FRA. FRA is not accounting for these costs in the overall analysis for this rulemaking, but acknowledges railroads may incur a burden to calibrate the air pressure sensor on the EOT device, as they do under the existing regulation. The burdens are further described in the regulatory evaluation accompanying this final rule.

As is discussed in the preamble above, FRA does not believe that these provisions will have a negative impact on the safety of railroad operations. In fact, codifying several of the waivers may result in positive safety benefits for railroad employees. In general, the EOT device waivers, appendix B updates, 24-hour off-air, and automated single car tests will all reduce the frequency of air brake tests and inspections. Fewer brake tests and inspections will reduce the time employees are walking on potentially uneven ground such as track ballast (typically crushed stone), and reduce their chances of slipping, tripping, or falling. Also, railroad employees may reduce their chances of injury because they would spend less time moving in and around rail cars while connecting and disconnecting equipment for the brake test and checking equipment such as the brake pipe. For air brake tests conducted in yards, less frequent brake tests would likely result in employees reducing their exposure to adjacent train traffic. FRA has not quantified these safety benefits because it does not have injury data specifically from conducting brake tests, but has described the parameters that may reasonably reduce the risk of injury.

B. Regulatory Flexibility Act and E.O. 13272

The Regulatory Flexibility Act of 1980 ((RFA) 5 U.S.C. 601 *et seq.*) and Executive Order 13272 (67 FR 53461, Aug. 16, 2002) require agency review of proposed and final rules to assess their impacts on small entities. Regulations issued by the U.S. Small Business Administration (SBA) generally require agencies to prepare an initial regulatory flexibility analysis (IRFA) describing the impact of the proposed rule on small entities when issuing a proposed rule. (5 U.S.C. 603(a)). Section 605 of the RFA allows an agency to certify a rule, in lieu of preparing an analysis, if the proposed rulemaking is not expected to have a significant economic impact on a substantial number of small entities.'' [28] To help the public comment on the potential small business impacts of the rulemaking, FRA prepared an IRFA to accompany the NPRM.

In this final rule, FRA is codifying various long-standing waivers that provide conditional exceptions to the existing rules concerning air brake testing and inspection, end-of-train (EOT) devices, brake valves, and helper service (*i.e., Helper Link* devices or similar technologies). In addition, FRA is extending the length of time freight rail equipment can be disconnected from a source of compressed air, or ''off-air,'' before needing a new brake inspection to be placed back in operation. FRA is also using this opportunity to clarify certain provisions of the brake regulations and to remove outdated or unnecessary provisions. FRA estimates this final rule provides the opportunity for small entities to use their employees and railroad equipment more efficiently, resulting in cost savings.

FRA did not receive any comments directly related to the IRFA. In consideration of comments received to the rulemaking, FRA made changes to the final rule that will affect small entities, but not to a significant degree. FRA is requiring manufacturers of telemetry equipment installed in the EOT device to continue to file an annual report to FRA if they do not specify a calibration period for their devices. This provision will enable FRA to monitor instances of frequency drift in a small percentage of this equipment. This report is a continuation of a report filed as a condition of a previous waiver. FRA

[28] *See* U.S. Small Business Office of Advocacy, *A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act,* p. 25, August 2017, available at *https://advocacy.sba.gov/resources/the-regulatory-flexibility-act/a-guide-for-government-agencies-how-to-comply-with-the-regulatory-flexibility-act/.*

is also adding a requirement for employee training to reduce possible accidents from communication loss from the front of the train to the rear of the train, applicable to railroads that use two-way EOT devices.

Description of Small Entities Impacted by the Final Rule

In consultation with the SBA, FRA has published a final statement of agency policy that formally establishes ''small entities'' or ''small businesses'' as railroads, contractors, and hazardous materials shippers that meet the revenue requirements of a Class III railroad as set forth in 49 CFR 1201.1–1, which is $20 million or less in inflation-adjusted annual revenues, and commuter railroads or small governmental jurisdictions that serve populations of 50,000 or less. *See* 68 FR 24891, May 9, 2003 (codified at Appendix C to 49 CFR part 209). FRA is using this definition for the final rule. For other entities, the same dollar limit in revenues governs whether a railroad, contractor, rail equipment supplier, or other respondent is a small entity.

This final rule will be applicable to all railroads, although not all changes will be relevant to all railroads. Based on the railroads required to report accident/incidents to FRA under 49 CFR part 225, out of 751 railroads (excluding passenger service railroads that are subject to their own brake standards), FRA estimates there are approximately 735 Class III railroads; with 692 of them operating on the general system. These are of varying size, with some a part of larger holding companies. Therefore, this rule will impact a substantial number of small railroads.

FRA is aware of four firms manufacturing EOT devices for sale in the United States, and a firm that supplies the radio used for telemetry in EOT devices. Of the EOT device manufacturers, only DPS Electronics, Inc. is a small entity with about $5 million to $10 million in annual revenues and about 15 employees. The other firms, Siemens Industry Inc., Wabtec Railway Electronics, and Progressive Rail are larger companies with access to their larger parent companies' resources. Ritron, Inc. manufacturers the radio used in many firms' EOT devices and is a small entity with about $16 million in annual revenue and 90 employees.[29] Therefore, this rule will impact a substantial percentage of suppliers (40 percent).

Economic Impacts on Small Entities

FRA has determined that the impact on small entities will not be significant. In particular, the extension of time that freight rail equipment can be off-air before requiring a new brake test and inspection will result in significant cost savings from conducting fewer tests. FRA expects another important benefit will be better crew management. On a small railroad, employees often ''wear several hats,'' that is, perform several types of jobs, ranging from office work to train operations. Under the final rule, these railroads will be able to make available for other railroad jobs the time an employee would have spent conducting a brake test. The provision will likely increase the efficiency of labor resources, to some degree. Small railroads that do not operate newer types of equipment, such as EOT devices with air powered generators, can continue to perform tests in substantially the same manner as before this final rule.

In a change from the NPRM, Ritron may choose to continue to file an annual report to FRA if it does not specify a calibration period. If Ritron chooses the report option, FRA estimates this report will take 12 hours to do and cost about $800 per year, or $854 when annualized using a 7 percent discount rate.[30] FRA estimates this cost, or reduction in cost savings, as a percent of Ritron's annual revenues (about $16 million) to be minimal at 0.006 percent.[31] The safety reason for these reports is to enable FRA to ascertain the performance of the PLL radios (*i.e.,* transceivers) over time.

FRA estimates the new training requirement will affect about 10 percent of Class III railroads that operate trains with the two-way EOT devices subject to this requirement, or 69 small railroads. Analogous to estimating these costs in the primary RIA analysis for all railroads, the cost for Class III railroads is estimated as primarily the cost for railroads to modify their training plans. Specifically, FRA estimates 15 minutes to revise training plans (done at the same time when training plans are reviewed generally). Railroads already train their train crews how to initiate an emergency brake application in a locomotive, so the marginal time to add this requirement will be minimal. FRA estimates this total cost is $1,242, or only $18 per railroad.[32] FRA determines this cost is not significant. Furthermore, this cost is only accounted for in the first year of the rule. (ASLRRA reports the average freight revenue per Class III railroad is $4.8 million per year.[33])

In addition, suppliers that make railroad EOT devices will be positively affected. In the past, they have applied to FRA for waivers for technological improvements to their devices, and their waivers are incorporated in this final rule, saving the cost to file a waiver renewal.

Certification

Consistent with the findings of FRA's IRFA, and the lack of any comments received on it, I certify that this rule will not have a significant economic impact on a substantial number of small entities.

C. Paperwork Reduction Act

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

[29] These suppliers would also be considered small entities under SBA size standards based on NAICS codes. FRA determined that these firms can be categorized under NAICS code 336999 All other transportation equipment manufacturing, with a corresponding size standard of 1,000 employees. *See* 13 CFR 121.201.

[30] Cost = 1 manufacturer * 12 hours * $66.51 per hour = $798. Wage rate sourced from the Bureau of Labor Statistics pay for Electrical and Electronics Engineers at *https://www.bls.gov/ooh/architecture-and-engineering/electrical-and-electronics-engineers.htm* as accessed April 28, 2020. The base wage was adjusted for 2017 dollars using the BLS Inflation Calculator, and burdened for benefits (30% of compensation per BLS Guidance). See primary analysis in the RIA for detailed explanation.

[31] Calculation: About $1,000 in annualized report cost/$16,000,000 annual revenues = 0.0000625 ≈ 0.006%

[32] Cost = Cost to revise training = 69 Class III railroads * (15 minutes/60 minutes) * $72.01 per hour (STB Professional and Administrative rate) = $1,242.22. Cost per affected railroad = $1,242/69 railroads = $18.00 per railroad.

[33] ASLRRA, *Short Line and Regional Railroad Facts and Figures,* p. 10 (2014 pamphlet) [hereinafter *Facts and Figures*].

[34] Totals may not add due to rounding.

[35] The dollar equivalent cost is derived from the Surface Transportation Board's Full Year Wage A&B data series using the appropriate employee group hourly wage rate that includes 75 percent overhead charges.

CFR section	Respondent universe	Total annual responses	Average time per responses	Total annual burden hours [34]	Total cost equivalent [35]
229.27—Annual tests	30,000 locomotives	30,000 records of tests	30 seconds	250 hours	$18,000
232.3—Applicability—Export, industrial, & other cars not owned by railroads-identification.	708 railroads	8 cards	10 minutes	1 hour	72
232.7—Waivers	708 railroads	2 petitions	160 hours	320 hours	23,040
232.15—Movement of Defective Equipment -Tags/Records.	1,620,000 cars	128,400 tags/records	3 minutes	5,350 hours	385,200
—Written Notification	1,620,000 cars	25,000 notices	3 minutes	1,250 hours	90,000
232.17—Special Approval Procedure—Petitions for special approval of safety-critical revision.	708 railroads	1 petition	100 hours	100 hours	7,200
—Petitions for special approval of pre-revenue service acceptance plan.	708 railroads	1 petition	100 hours	100 hours	7,200
—(d) Service of petitions	708 railroads	1 petition	20 hours	20 hours	1,440
—(d)(2)(ii) Statement of interest	Public/railroads	4 statements	15 minutes	1 hour	72
—(f) Comment	Public/railroads	6 comments	4 hours	24 hours	1,728
232.103(f)(2)—Gen'l requirements—all train brake systems—stickers.	1,200,000 cars	70,000 stickers/stencils/badge plates.	10 minutes	11,667 hours	840,024
(n)(7)—RR Plan identifying specific locations or circumstances where equipment may be left unattended.	708 railroads	1 revised plan	10 hours	10 hours	720
—Notification to FRA when RR develops and has plan in place or modifies existing plan.	708 railroads	1 notice	30 minutes	1 hour	72
—Inspection of Equipment by Qualified Employee after Responder Visit.	708 railroads	12 inspections/records	4 hours	48 hours	3,456
232.107—Air source requirements and cold weather operations—Monitoring Plan (Subsequent Years).	10 new railroads	1 plan	40 hours	40 hours	2,880
—Amendments/Revisions to Plan	50 railroads/plans	10 revisions	20 hours	200 hours	14,400
—Recordkeeping	50 railroads/plans	1,150 records	10 minutes	192 hours	13,824
232.109—Dynamic brake requirements—status/record.	708 railroads	1,656,000 records	4 minutes	110,400 hours	7,948,800
—Inoperative dynamic brakes: Repair record	30,000 locomotives	6,358 records	4 minutes	424 hours	30,528
—Tag bearing words ''inoperative dynamic brakes''.	30,000 locomotives	6,358 tags	30 seconds	53 hours	3,816
—Deactivated dynamic brakes (Sub. Yrs.)	8,000 locomotives	10 markings	5 minutes	1 hour	72
—Operating rules (Subsequent Years)	5 new	5 rules	4 hours	20 hours	1,440
—Amendments/Revisions	708 railroads	15 revisions	1 hour	15 hours	1,080
—Requests to increase 5 mph overspeed restriction.	708 railroads	5 requests	30 min. + 20 hours	103 hours	7,416
—Knowledge criteria—locomotive engineers—Subsequent Years.	5 new	5 amendments	16 hours	80 hours	5,760
232.111—Train information handling	5 new	5 procedures	40 hours	200 hours	14,400
Sub. Yrs.—Amendments/Revisions	100 railroads	100 revisions	20 hours	2,000 hours	144,000
—Report requirements to train crew	708 railroads	2,112,000 reports	5 minutes	176,000 hours	12,672,000
232.203—Training requirements—Tr. Prog.—Sub Yr..	15 railroads	5 programs	100 hours	500 hours	36,000
—Amendments to written program	708 railroads	236 revisions	8 hours	1,888 hours	135,936
—Training records	708 railroads	24,781 records	8 minutes	3,304 hours	237,888
—Training notifications	708 railroads	24,781 notices	1 minute	413 hours	29,736
—Efficiency test plans	708 railroads	708 copies	1 minute	12 hours	864
232.205—Initial terminal inspection: Class I brake tests and notifications/records (Revised requirement).	708 railroads	383,840 notices/records.	45 seconds	4,798 hours	345,456
(c)(1)(ii)(B)—RR Development/implementation of operating rules to ensure compliant operation of train if air flow exceeds stipulated section parameters after Class I brake test is completed (New Requirement).	708 railroads	10 revised operating rules.	8 hours	80 hours	5,760
232.207—Class 1A brake tests—Designation Lists Where Performed.	708 railroads	1 list	1 hour	1 hour	72
Subsequent Years: Notice of Change	708 railroads	250 notices	10 minutes	42 hours	3,024
232.209—Class II brake tests-intermediate ''Roll-by inspection—Results to train driver.	708 railroads	159,740 comments	3 seconds	133 hours	9,576
232.213—Written Designation to FRA of Extended haul trains.	83,000 long	250 letters	15 minutes	63 hours	4,536
—Notification to FRA Associate Administrator for Safety of a change in the location where an extended haul brake test is performed (New Requirement).	7 railroads	250 notices	10 minutes	42 hours	3,024
232.219—Double heading and helper service: Testing/calibration/records of Helper Link devices used by locomotives (formerly under 232.219(c)(3)).	2 railroads	100 records	5 minutes	8 hours	576
232.303—General requirements—single car test: Tagging of Moved Equipment.	1,600,000 frgt.	5,600 tags	5 minutes	467 hours	33,624
—Last repair track brake test/single car test—Stenciled on Side of Equipment.	1,600,000 frgt.	240,000 markings	2 minutes	8,000 hours	576,000
232.307—Modification of single car air brake test procedures: Requests (includes 232.409(e)).	railroads/AAR	1 request + 3 copies	20 hours + 5 minutes	20 hours	1,440
—Affirmation Statement on Mod. Req. To Employee Representatives.	railroads/AAR	1 statement + 4 copies	30 minutes + 5 minutes.	1 hour	72

CFR section	Respondent universe	Total annual responses	Average time per responses	Total annual burden hours [34]	Total cost equivalent [35]
232.309—Repair track brake test equipment and devices used to perform single car air brake tests—Periodic calibration of devices.	640 shops	5,000 records of calibrations.	2 minutes	167 hours	12,024
232.403—Unique Code	245 railroads	12 requests	5 minutes	1 hour	72
232.409—Inspection/Tests/Records EOTs	245 railroads	447,500 recording of tests.	30 seconds	3,729 hours	268,488
—(d)–(e) Telemetry equipment—Testing/Calibration/Rcds/—Documentations of testing (paragraph (d) is a revised requirement; paragraph (e) clarifies the use of § 229.27).	245 railroads	17,000 records	2 minutes	567 hours	40,824
—(f)(2) Annual report to FRA on radios found with frequency drift (New requirement).	1 manufacturer	1 report	12 hours	12 hours	864
232.503—Process to introduce new brake technology.	708 railroads	1 letter	1 hour	1 hour	72
—Special approval	708 railroads	1 request	3 hours	3 hours	216
232.505—Pre-revenue service acceptance test plan—Submission of maintenance procedure.	708 railroads	1 procedure	160 hours	160 hours	11,520
—Amendments to maintenance procedure	708 railroads	1 revision	40 hours	40 hours	2,880
—Design description	708 railroads	1 petition	67 hours	67 hours	4,824
—Report to FRA Assoc. Admin. for Safety	708 railroads	1 report	13 hours	13 hours	936
—Brake system technology testing	708 railroads	1 description	40 hours	40 hours	2,880
232.717(c)—Freight and passenger train car brakes—Written maintenance plan (formerly under appendix B, recodified subpart H).	40 railroads	40 written plans	6 hours	240 hours	17,280
Total	708 railroads	5,345,581 responses	N/A	333,682 hours	24,025,104

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 Ms. Hodan Wells, Information Collection Clearance Officer, Office of Railroad Safety, Federal Railroad Administration, at 202–493–0440.

Organizations and individuals desiring to submit comments on the collection of information requirements should direct them to Ms. Hodan Wells via email at *Hodan.Wells@dot.gov.*

OMB is required to make a decision concerning the collection of information requirements contained in this rule between 30 and 60 days after publication of this document in the **Federal Register**. Therefore, a comment to OMB is best assured of having its full effect if OMB receives it within 30 days of publication. FRA is not authorized to impose a penalty on persons for violating information collection requirements that do not display a current OMB control number, if required. The current OMB control number for 49 CFR 229 is 2130–0008.

D. Environmental Impact

FRA has evaluated this final rule consistent with the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*), the Council of Environmental Quality's NEPA implementing regulations at 40 CFR parts 1500–1508, and FRA's NEPA implementing regulations at 23 CFR part 771 and determined that it is categorically excluded from environmental review and therefore does not require the preparation of an environmental assessment (EA) or environmental impact statement (EIS). Categorical exclusions (CEs) are actions identified in an agency's NEPA implementing regulations that do not normally have a significant impact on the environment and therefore do not require either an EA or EIS. *See* 40 CFR 1508.4. Specifically, FRA has determined that this final rule is categorically excluded from detailed environmental review pursuant to 23 CFR 771.116(c)(15), ''[p]romulgation of rules, the issuance of policy statements, the waiver or modification of existing regulatory requirements, or discretionary approvals that do not result in significantly increased emissions of air or water pollutants or noise.''

The purpose of this rulemaking is to revise FRA's regulations governing brake inspections, tests, and equipment to reduce unnecessary costs and incentivize innovation, while improving or maintaining rail safety. This rule does not directly or indirectly impact any environmental resources and will not result in significantly increased emissions of air or water pollutants or noise. Instead, the final rule is likely to result in safety benefits. In analyzing the applicability of a CE, FRA must also consider whether unusual circumstances are present that would warrant a more detailed environmental review. *See* 23 CFR 771.116(b). FRA calculated quantifiable reductions in air emissions related to reduced idling in the cost-benefit analysis for this rulemaking. However, these reductions are likely to result in environmental benefits and do not necessitate further environmental documentation. FRA has concluded that no such unusual circumstances exist with respect to this final regulation and it meets the requirements for categorical exclusion under 23 CFR 771.116(c)(15).

Pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, FRA has determined this undertaking has no potential to affect historic properties. *See* 16 U.S.C. 470. FRA has also determined that this rulemaking does not approve a project resulting in a use of a resource protected by Section 4(f). *See* Department of Transportation Act of 1966, as amended (Pub. L. 89–670, 80 Stat. 931); 49 U.S.C. 303.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and DOT Order 5610.2(a) (91 FR 27534 May 10, 2012) require DOT agencies to achieve environmental justice as part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects, including interrelated social and economic effects, of their programs, policies, and activities on minority populations and low-income populations. The DOT Order instructs DOT agencies to address compliance with Executive Order 12898

and requirements within the DOT Order in rulemaking activities, as appropriate. FRA has evaluated this final rule under Executive Order 12898 and the DOT Order and has determined it would not cause disproportionately high and adverse human health and environmental effects on minority populations or low-income populations.

E. Federalism Implications

E.O. 13132, ''Federalism'' (64 FR 43255, Aug. 10, 1999), requires FRA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' are defined in the Executive Order to include regulations that have ''substantial direct effects 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.'' Under E.O. 13132, the agency may not issue a regulation with federalism implications that imposes substantial direct compliance costs and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments or the agency consults with State and local government officials early in the process of developing the regulation. Where a regulation has federalism implications and preempts State law, the agency seeks to consult with State and local officials in the process of developing the regulation.

FRA has analyzed this final rule in accordance with the principles and criteria contained in E.O. 13132. This final rule generally codifies existing waivers or makes technical amendments to existing FRA regulations. FRA has determined that this final rule has no federalism implications, other than the possible preemption of state laws under 49 U.S.C. 20106. Therefore, the consultation and funding requirements of E.O. 13132 do not apply, and preparation of a federalism summary impact statement for the proposed rule is not required.

F. Unfunded Mandates Reform Act of 1995

Pursuant to section 201 of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, 2 U.S.C. 1531), each Federal agency shall, unless otherwise prohibited by law, assess the effects of Federal regulatory actions on State, local, and tribal governments, and the private sector (other than to the extent that such regulations incorporate requirements specifically set forth in law). Section 202 of the Act (2 U.S.C. 1532) further requires that before promulgating any general notice of proposed rulemaking that is likely to result in the promulgation of any rule that includes any Federal mandate that may result in expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100,000,000 or more (adjusted annually for inflation) in any 1 year, and before promulgating any final rule for which a general notice of proposed rulemaking was published, the agency shall prepare a written statement detailing the effect on State, local, and tribal governments and the private sector. This final rule would not result in such an expenditure, and thus preparation of such a statement is not required.

G. Energy Impact

E.O. 13211 requires Federal agencies to prepare a Statement of Energy Effects for any ''significant energy action.'' 66 FR 28355, May 22, 2001. FRA evaluated this final rule in accordance with E.O. 13211 and determined that this regulatory action is not a ''significant energy action'' within the meaning of the E.O.

E.O. 13783, ''Promoting Energy Independence and Economic Growth,'' requires Federal agencies to review regulations to determine whether they potentially burden the development or use of domestically produced energy resources, with particular attention to oil, natural gas, coal, and nuclear energy resources. *See* 82 FR 16093, March 31, 2017. FRA determined this final rule would not burden the development or use of domestically produced energy resources.

List of Subjects

49 CFR Part 218

Occupational safety and health, Penalties, Railroad employees, Railroad safety, and Reporting and recordkeeping requirements.

49 CFR Part 221

Railroad safety.

49 CFR Part 232

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

V. The Rule

For the reasons discussed in the preamble, FRA amends parts 218, 221, and 232 of chapter II, subtitle B of title 49, Code of Federal Regulations as follows:

PART 218—RAILROAD OPERATING PRACTICES

■ 1. The authority citation for part 218 is revised to read as follows:

Authority: 49 U.S.C. 20103, 20107, 20131, 20138, 20144, 20168, 28 U.S.C. 2461, note; and 49 CFR 1.89.

■ 2. Amend § 218.22 by revising paragraphs (c) introductory text and (c)(5) to read as follows:

§ 218.22 Utility employee.

* * * * *

(c) A utility employee may be assigned to and serve as a member of a train or yard crew without the protection otherwise required by subpart B of part 218 of this chapter only under the following conditions:

* * * * *

(5) The utility employee is performing one or more of the following functions: Set or release handbrakes; couple or uncouple air hoses and other electrical or mechanical connections; prepare rail cars for coupling; set wheel blocks or wheel chains; conduct air brake test to include cutting air brake components in or out and position retaining valves; inspect, test, install, remove or replace a rear end marking device or end of train device; or change batteries on the rear end marking device or the end of train device if the change may be accomplished without the use of tools. Under all other circumstances, a utility employee working on, under, or between railroad rolling equipment must be provided with blue signal protection in accordance with §§ 218.23 through 218.30 of this part.

* * * * *

PART 221—REAR END MARKING DEVICE—PASSENGER, COMMUTER AND FREIGHT TRAINS

■ 3. The authority citation for part 221 is revised to read as follows:

Authority: 49 U.S.C. 20103, 20107; 28 U.S.C. 2461, note; and 49 CFR 1.89.

■ 4. Amend § 221.13 by revising paragraph (d) to read as follows:

§ 221.13 Marking device display.

* * * * *

(d) The centroid of the marking device must be located above the coupler, where its visibility is not obscured and it does not interfere with an employee's access to, or use of, any other safety appliance on the car.

■ 5. Amend appendix A to part 221 by revising paragraphs (a)(2)(ii) and (b)(3)(ii) to read as follows:

Appendix A to Part 221—Procedures for Approval of Rear End Marking Devices

* * * * *

(a) * * *

(2) * * *

(ii) The results of the tests performed under paragraph (i) of this subsection demonstrate marking device performance in compliance with the standard prescribed in 49 CFR 221.15;

* * * * *

(b) * * *

(3) * * *

(ii) The results of the tests performed under paragraph (i) of this subsection demonstrate marking device performance in compliance with the standard prescribed in 49 CFR 221.15;

* * * * *

PART 232—BRAKE SYSTEM SAFETY STANDARDS FOR FREIGHT AND OTHER NON–PASSENGER TRAINS AND EQUIPMENT; END–OF–TRAIN DEVICES

■ 6. The authority citation for part 232 is revised to read as follows:

Authority: 49 U.S.C. 20102–20103, 20107, 20133, 20141, 20301–20303, 20306, 21301–20302, 21304; 28 U.S.C. 2461, note; and 49 CFR 1.89.

■ 7. Amend § 232.1 by revising paragraphs (b) and (c) and removing paragraph (d) to read as follows:

§ 232.1 Scope.

* * * * *

(b) Except as otherwise specifically provided in this paragraph or in this part, railroads to which this part applies must comply with all the requirements contained in this part.

(c) Except for operations identified in § 232.3(c)(1), (4), and (6) through (8), all railroads part of the general railroad system of transportation must operate pursuant to the requirements in subpart H of this part (which contains the requirements in this part 232 as they existed on May 31, 2001), until they are either required to operate pursuant to the requirements contained in subparts A through G of this part or the requirements contained in part 238 of this chapter.

■ 8. Amend § 232.3 by revising paragraph (c) introductory text to read as follows:

§ 232.3 Applicability.

* * * * *

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

* * * * *

■ 9. Amend § 232.5 by revising the introductory text and removing the definition of ''Air Flow Indicator, AFM'' and adding definitions for ''Air flow method indicator, AFM,'' ''Air repeater unit, ARU,'' ''APTA,'' and ''Gradient, brake pipe'' in alphabetical order to read as follows:

§ 232.5 Definitions.

The definitions in this section are intended to clarify the meaning of terms used in this part.

* * * * *

Air flow method indicator, AFM means a calibrated air flow measuring device used as required by the air flow method (AFM) of qualifying train air brakes and with information clearly and legibly displayed in analog or digital format and visible in daylight and darkness from the engineer's normal operating position. Each AFM indicator includes:

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

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

Air repeater unit, ARU means a car, container, or similar device that provides an additional brake pipe air source by responding to air control instructions from a controlling locomotive using a communication system such as a distributed power system.

APTA means the American Public Transportation Association.

* * * * *

Gradient, brake pipe means the difference in brake pipe pressure, usually measured in pounds per square inch (psi), between each air supply source (*e.g.,* locomotive, distributed power unit, or ARU) or between an air supply source and the rear car of the train when the brake system is fully charged under existing leakage and temperature conditions.

* * * * *

■ 10. Amend § 232.11 by revising paragraph (a) to read as follows:

§ 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 the minimum civil monetary penalty and not more than the ordinary maximum civil monetary penalty 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 individuals, or has caused death or injury, a penalty not to exceed the aggravated maximum civil monetary penalty per violation may be assessed. See 49 CFR part 209, appendix A. Each day a violation continues shall constitute a separate offense. FRA's website at *https://railroads.dot.gov/* contains a schedule of civil penalty amounts used in connection with this part.

* * * * *

■ 11. Amend § 232.17 by revising paragraph (a), and revising and republishing paragraph (b) to read as follows:

§ 232.17 Special approval procedure.

(a) *General.* The following procedures govern consideration and action upon requests for special approval of a plan under § 232.15(g); an alternative standard under § 232.305 or § 232.603; an alternative technology under § 232.407(b) or (c); or a single car test procedure under § 232.611; and pre-revenue service acceptance testing plans under subpart F of this part.

(b) *Petitions for special approval of an alternative standard or test procedure.* Each petition for special approval of a plan under § 232.15(g); an alternative standard under § 232.305 or § 232.603; an alternative technology under § 232.407(b) or (c); or a single car test procedure under § 232.611 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 plan, alternative standard, alternative technology, or test procedure proposed, in detail, to be submitted for or to meet the particular requirement of this part;

(3) Appropriate data or analysis, or both, for FRA to consider in determining whether the plan, alternative standard, alternative technology, or test procedure, will be consistent with the guidance under § 232.15(f), if applicable, and will provide at least an equivalent level of safety or otherwise meet the requirements contained in this part; 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.

* * * * *

■ 12. Amend § 232.103 by revising paragraphs (l) and (m) to read as follows:

§ 232.103 General requirements for all train brake systems.

* * * * *

(l) Except as otherwise provided in this part, all equipment used in freight or other non-passenger trains must, at a minimum, meet the Association of American Railroads (AAR) Standard S–469, ''Freight Brakes- Performance Specification,'' Revised 2006 (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment), also referred to as AAR Standard S–469–01. The Director of the **Federal Register** approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy from the Association of American Railroads, 425 Third Street SW, Washington, DC 20024, telephone: (202) 639–2345, email: *publications@aar.com,* website: *https://aarpublications.com*. You may inspect a copy of the document at the Federal Railroad Administration, Docket Clerk, 1200 New Jersey Avenue SE, Washington, DC 20590 (telephone: (855) 368–4200) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email *fedreg.legal@nara.gov,* or go to: *www.archives.gov/federal-register/cfr/ibr-locations.html*.

(m) An en route train shall be stopped at the next available location, inspected for leaks in the brake system, and provided with corrective action, if the train experiences:

(1) A brake pipe gradient of greater than 15 psi; or

(2) A brake pipe air flow of greater than that permitted by this part, when the air flow has been qualified by the Air Flow Method as provided for in subpart C of this part and the indication does not return to within the limits in a reasonable time.

* * * * *

■ 13. Amend § 232.203 by revising paragraph (c) to read as follows:

§ 232.203 Training requirements.

* * * * *

(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 that specifically addresses:

(1) 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; and

(2) For operating employees the limitations and proper use of the emergency application signal and the loss of communication indication between front-of-train and rear-of-train devices.

* * * * *

■ 14. Amend § 232.205 by revising paragraph (a)(3), revising and republishing paragraphs (b) and (c)(1), adding paragraph (c)(9), and revising paragraph (e) to read as follows:

§ 232.205 Class I brake test-initial terminal inspection.

(a) * * *

(3) A location where the train is off-air for a period of more than 24 hours.

(b) Except as provided in § 232.209, each car and each solid block of cars added to a train shall receive a Class I brake test as described in paragraph (c) of this section at the location where it is added to a train unless:

(1) The solid block of cars is comprised of cars from a single previous train, the cars of which have previously received a Class I brake test and have 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 and have not been off-air for more than 24 hours; or

(2) The solid block of cars is comprised of cars from a single previous train, the cars of which were required to be separated into multiple solid blocks of cars due to space or trackage constraints at a particular location when removed from the previous train, provided the cars have previously received a Class I brake test, have not been off-air more than 24 hours, and the cars in each of the multiple blocks of cars have remained continuously and consecutively coupled together with the train line remaining connected, except for the removal of defective equipment. Furthermore, these multiple solid blocks of cars shall be added to a train in the same relative order (no reclassification) as when removed from the previous train, except for the removal of defective equipment.

(c) 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) Use a calibrated AFM indicator to measure air flow. A train equipped with at least one distributed power unit or an air repeater unit providing a source of brake pipe control air from two or more locations must not exceed a combined flow of 90 cubic feet per minute (CFM). Otherwise, the air flow must not exceed 60 CFM. Railroads must develop and implement operating rules to ensure compliant operation of a train if air flow exceeds these parameters after the Class I brake test is completed.

(iii) The AFM indicator must be calibrated for accuracy at periodic intervals not to exceed 92 days. The AFM indicator and all test orifices must be calibrated at temperatures of not less than 20 °F. AFM indicators must be accurate to within ±3 standard cubic feet per minute (CFM) at 60 CFM air flow.

(iv) For each AFM indicator, its last date of calibration must be recorded and certified on Form F6180–49A.

(v) An AFM indicator not incompliance with this part must:

(A) Not be used, including in the performance of a leakage test or to aid in the control or braking of the train;

(B) Be tagged in accordance with § 232.15(b) and include text that it is ''inoperative'' or ''overdue''; and

(C) Be placed with its tag in a conspicuous location of the controlling locomotive cab.

* * * * *

(9) Although an air repeater unit is not a locomotive or appurtenance under part 229, an air repeater unit operated in accordance with this part must:

(i) Receive an inspection in accordance with § 229.21 where and when an inspection is required in accordance with § 232.205(a)(1); and

(ii) Otherwise comply with part 229 as applicable to those parts that provide compressed air, modulate the brake pipe, and otherwise control the movement of the train. All remaining parts are subject to the inspection requirements of parts 215 and 232.

* * * * *

(e) A railroad must notify the locomotive engineer that the Class I brake test was satisfactorily performed, whether the equipment to be hauled in his train has been off-air for a period of more than 24 hours, 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 must be retained in the cab of the controlling locomotive until the train reaches its destination. The written or electronic record must 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.

* * * * *

■ 15. Amend § 232.207 by revising paragraph (c)(2) to read as follows:

§ 232.207 Class IA brake tests—1,000-mile inspection.

* * * * *

(c) * * *

(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 within 24 hours after the designation has been changed and the reason for that change.

■ 16. Amend § 232.209 by revising and republishing paragraph (a) to read as follows:

§ 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 must 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 24 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) Except as provided in paragraph (a)(4) of this section, each solid block of cars that is comprised of cars from only one previous train, the cars of which have not remained continuously and consecutively coupled together with the train line remaining connected since being removed from the previous train. A solid block of cars is considered to have remained continuously and consecutively coupled together with the train line remaining connected since being removed from the previous train if it has been changed only by removing defective equipment.

(4) Each solid block of cars that is comprised of cars from a single previous train, the cars of which were required to be separated into multiple solid blocks of cars due to space or trackage constraints at a particular location when removed from the previous train, if they are not added in the same relative order as when removed from the previous train or if the cars in each of the multiple blocks of cars have not remained continuously and consecutively coupled together with the train line remaining connected, except for the removal of defective equipment.

* * * * *

■ 17. Amend § 232.211 by revising paragraphs (a)(3) through (5) to read as follows:

§ 232.211 Class III brake tests-trainline continuity inspection.

(a) * * *

(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:

(i) 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

(ii) That has not been off-air for more than 24 hours is added to a train;

(4) At a point, other than the initial terminal for the train, where a solid block of cars that is comprised of cars from a single previous train is added to a train, provided:

(i) The solid block of cars was required to be separated into multiple solid blocks of cars due to space or trackage constraints at a particular location when removed from the previous train;

(ii) The cars have previously received a Class I brake test;

(iii) Have not been off-air more than 24 hours; and

(iv) The cars in each of the multiple blocks of cars have remained continuously and consecutively coupled together with the train line remaining connected, except for the removal of defective equipment. Furthermore, these multiple solid blocks of cars must be added to the train in the same relative order (no reclassification) as when removed from the previous train, except for the removal of defective equipment; or

(5) 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 24 hours, is added to a train.

* * * * *

■ 18. Amend § 232.213 by:

■ a. Removing paragraph (a)(1)(iii);

■ b. Redesignating paragraph (a)(1)(iv) as (a)(1)(iii);

■ c. Revising paragraph (a)(5);

■ d. Revising and republishing paragraph (a)(6); and

■ e. Adding paragraph (a)(8).

The revisions and addition read as follows:

§ 232.213 Extended haul trains.

(a) * * *

(5) The train must 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. Cars added to the train en route must be inspected pursuant to

the requirements contained in paragraphs (a)(2) through (5) of this section at the location where they are added to the train.

(6) 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 must be conducted pursuant to § 232.205 to ensure 100 percent effective and operative brakes.

(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 must meet all the requirements contained in paragraphs (a)(1) through (5) of this section. Such trains must 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 must either be repaired or removed from the train.

* * * * *

(8) 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 an extended haul brake test is performed to a location not on the railroad's list of designated locations for performing extended haul brake tests, provided that the railroad notifies FRA's Associate Administrator for Safety within 24 hours after the designation has been changed and the reason for that change.

* * * * *

■ 19. Amend § 232.217 by revising paragraph (c)(1) to read as follows:

§ 232.217 Train brake tests conducted using yard air.

* * * * *

(c) * * *

(1) If the cars are off-air for more than 24 hours, the cars must be retested in accordance with § 232.205(c) through (f).

* * * * *

■ 20. Amend § 232.219 by revising the section heading and revising and republishing paragraph (c) to read as follows:

§ 232.219 Double-heading and helper service.

* * * * *

(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. Alternatively, the helper locomotive or the device shall be equipped with a means to automatically reset the device, provided that the automatic reset occurs within the period time permitted for manual reset of the device; and

(3) When helping trains equipped with distributed power or ECP brakes on the rear of the train, and utilizing a *Helper Link* device or a similar technology, a properly installed and tested end-of-train device may be utilized on the helper locomotive. Railroads must adopt and comply with an operating rule consistent with this chapter to ensure the safe use of this alternative procedure.

(4) 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.

■ 21. Amend § 232.305 by revising paragraphs (a) and (b)(2) and adding paragraph (f) to read as follows:

§ 232.305 Single car air brake tests.

(a) Single car air brake tests must be performed by a qualified person in accordance with either Section 3.0, ''Tests-Standard Freight Brake Equipment,'' and Section 4.0, ''Special Tests,'' AAR Standard S–486–18; Section 3.0, ''Single-Car Test Requirements,'' Section 4.0, ''Special Tests,'' and Section 13.0 ''4-Pressure Single-Car Test Requirements,'' AAR Standard S–4027–18; an alternative procedure approved by FRA pursuant to § 232.17; or a modified procedure approved in accordance with the provisions contained in § 232.307.

(b) * * *

(2) A car is on a shop or repair track, as defined in § 232.303(a), for any reason and has not received either:

(i) A manual single car air brake test (AAR Standard S–486) within the previous 12-month period;

(ii) An automated single car air brake test (AAR Standard S–4027 §§ 3.0 and 4.0) within the previous 24-month period;

(iii) Or a 4-pressure single car air brake test (AAR Standard S–4027 § 13.0) within the previous 48-month period;

* * * * *

(f) The Director of the Federal Register approves the incorporation by reference of the standards required in this section into this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may inspect a copy of the material at the Federal Railroad Administration, Docket Clerk, 1200 New Jersey Avenue SE, Washington, DC 20590 (telephone: 855–368–4200). You may also inspect the material at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email *fedreg.legal@nara.gov,* or go to: *www.archives.gov/federal-register/cfr/ibr-locations.html.* You may obtain the material from the following source(s):

(1) Association of American Railroads (AAR), 425 Third Street SW, Washington, DC 20024, telephone: (202) 639–2345, email: *publications@aar.com,* website: *https://aarpublications.com.*

(i) AAR Standard S–486, ''Code of Air Brake System Tests for Freight Equipment—Single Car Test,'' Revised 2018 (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment), also referred to as AAR Standard S–486–18.

(ii) AAR Standard S–4027, ''Automated Single-Car Test Equipment, Conventional Brake Equipment—Design and Performance Requirements,'' Revised 2018 (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment), also referred to as AAR Standard S–4027–18.

(2) [Reserved]

■ 22. Amend § 232.307 by revising the section heading and revising and republishing paragraph (a) to read as follows:

§ 232.307 Modification of brake test procedures.

(a) *Request.* The AAR or other authorized representative of the railroad industry may seek modification of brake test procedures prescribed in this chapter. The request for modification shall be submitted to the Associate Administrator for Safety, Federal Railroad Administration, 1200 New Jersey Avenue SE, Washington, DC 20590 and shall contain:

(1) The name, title, address, and telephone number of the primary person to be contacted with regard to review of the modification;

(2) The section and paragraph at issue, and the modification, in detail, to be substituted for a particular procedure prescribed in this chapter;

(3) Appropriate data or analysis, or both, for FRA to consider in determining whether the modification will provide at least an equivalent level of safety; and

(4) A statement affirming that the railroad industry has served a copy of the request on the designated representatives of the employees responsible for the equipment's operation, inspection, testing, and maintenance under this part, together with a list of the names and addresses of the persons served.

* * * * *

■ 23. Amend § 232.403 by revising paragraph (d)(6) and revising and republishing paragraphs (f)(4) and (g) to read as follows:

§ 232.403 Design standards for one-way end-of-train devices.

* * * * *

(d) * * *

(6) During a shock of 10 g. peak for 0.01 seconds in any axis.

* * * * *

(f) * * *

(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 shock of 10 g. peak for 0.01 seconds in any axis.

(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 only, the operating life must be a minimum of 36 hours at 0 °C.

(3) If power is supplied by a generator—an air turbine or alternative technology—a backup battery or similar energy storage device is required with a minimum of 12 hours continuous power at 0 °C in the event the generator stops functioning as intended.

■ 24. Amend § 232.407 by revising paragraphs (b), (c), (e)(1), and (f)(2) to read as follows:

§ 232.407 Operations requiring use of two-way end-of-train devices; prohibition on purchase of nonconforming devices.

* * * * *

(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 approved by FRA pursuant to § 232.17 to perform the same function.

(c) *New devices.* Each newly manufactured end-of-train device purchased by a railroad 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 approved by FRA pursuant to § 232.17 to perform the same function.

* * * * *

(e) * * *

(1) Trains with a locomotive, locomotive consist, or air repeater unit 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.

* * * * *

(f) * * *

(2) The rear unit batteries must 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. Air-powered generator equipped devices must be tested for a minimum charge at installation before initiating generator operation.

* * * * *

■ 25. Amend § 232.409 by revising paragraph (d) and adding paragraphs (e) and (f) to read as follows:

§ 232.409 Inspection and testing of end-of-train devices.

* * * * *

(d) The telemetry equipment must be tested for accuracy and calibrated if necessary according to the manufacturer's specifications and procedures. If the manufacturer's specifications requires periodic calibration of the telemetry equipment, the date and location of the last calibration or test and the name or unique employee identifier of the person performing the calibration or test must be legibly displayed on a weather-resistant sticker 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 that the serial number of the unit is recorded.

(e) The air pressure sensor contained in the end-of-train device must be tested by the processes and frequency identified in § 229.27 or by manufacturer specifications approved under § 232.307. The date and location of the test and the name or unique employee identifier of the person performing the test must be legibly displayed on a weather-resistant marking device affixed to the outside of the unit.

(f) Each manufacturer of telemetry transceiver equipment must either:

(1) Establish and communicate publicly to its customers a reasonable recommended calibration period; or

(2) Submit to FRA an annual report including:

(i) The total number of transceivers—itemized by model name, number, or type—sold to date;

(ii) The number of transceivers that have been reported as inoperative or otherwise malfunctioning or returned for servicing; and

(iii) The number of transceivers reported or returned for service with frequency modulation or transmit power outside of either manufacturer's specifications or FCC-approved specifications.

■ 26. Amend § 232.603 by revising paragraphs (a) introductory text, (d), and (f) and adding paragraph (g) to read as follows:

§ 232.603 Design, interoperability, and configuration management requirements.

(a) *General.* A freight car or freight train equipped with an ECP brake system must, at a minimum, meet the Association of American Railroads (AAR) standards contained in the AAR Manual of Standards and Recommended Practices related to ECP brake systems listed in paragraph (g) of this section; an alternate standard approved by FRA pursuant to § 232.17; or a modified standard approved in accordance with the provisions contained in paragraph (g) of this section.

* * * * *

(d) *Exceptions.* (1) A freight car or freight train equipped with a standalone ECP brake system is excepted from the requirement in § 232.103(l) referencing AAR Standard S–469–01, ''Freight Brakes—Performance Specification.''

* * * * *

(f) *Modification of standards.* The AAR or other authorized representative of the railroad industry may seek

modification of the industry standards identified in or approved pursuant to paragraph (g) of this section. The request for modification will be handled and shall be submitted in accordance with the modification procedures contained in § 232.307.

(g) *Incorporation by reference.* The Director of the Federal Register approves the incorporation by reference of the standards required in this section into this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may inspect a copy at the Federal Railroad Administration, 1200 New Jersey Avenue SE, Washington, DC, 202–493–6300 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email *fedreg.legal@nara.gov,* or go to: *www.archives.gov/federal-register/cfr/ibr-locations.html.* You may obtain the material from the following source(s):

(1) Association of American Railroads, 425 Third Street SW, Washington, DC 20024, telephone: (202) 639–2345, email: *publications@aar.com,* website: *https://aarpublications.com.*

(i) AAR S–4200, ''Electronically Controlled Pneumatic (ECP) Cable-Based Brake Systems—Performance Requirements,'' Revised 2014, (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment).

(ii) AAR S–4210, ''ECP Cable-Based Brake System Cable, Connectors, and Junction Boxes—Performance Specifications,'' Revised 2014, (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment).

(iii) AAR S–4220, ''ECP Cable-Based Brake DC Power Supply—Performance Specification,'' Version 2.0, Revised 2002, (contained in AAR Manual of Standards and Recommended Practices, Electronically Controlled Brake Systems).

(iv) AAR S–4230, ''Intratrain Communication Specification for Cable-Based Freight Train Control System,'' Version 4.1, Revised 2014, (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment).

(v) AAR S–4240, ''ECP Brake Equipment—Approval Procedure,'' Adopted 2007, (contained in AAR Manual of Standards and Recommended Practices, Electronically Controlled Brake Systems).

(vi) AAR S–4250, ''Performance Requirements for ITC Controlled Cable-Based Distributed Power Systems,'' Version 3.0, Revised 2014, (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment).

(vii) AAR S–4260, ''ECP Brake and Wire Distributed Power Interoperability Test Procedures,'' Revised 2008 (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment).

(viii) AAR S–4270, ''ECP Brake System Configuration Management,'' Adopted 2008, (contained in AAR Manual of Standards and Recommended Practices, Electronically Controlled Brake Systems).

(2) [Reserved]

* * * * *

■ 27. Add Subpart H to read as follows:

Subpart H—Tourist, Scenic, Historic, and Excursion Operations Braking Systems

Sec.

§ 232.700 Applicability.

(a) Except as provided in paragraph (b) of this section, this subpart applies to standard gage railroads.

(b) This subpart 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 subpart, carrier means ''railroad,'' as that term is defined by 49 CFR 232.5

§ 232.701 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.

§ 232.702 Drawbars; standard height.

Not included in this subpart. Moved to 49 CFR part 231.

§ 232.703 Power brakes and appliances for operating power-brake systems.

Requirements are contained in 49 CFR 232.103(l).

§ 232.710 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
(i) Steam locomotives:	
(A) Cam type of driving wheel brake	3½
(B) Other types of driving wheel brakes	6
(C) Engine truck brake	8
(D) Engine trailer truck brake	8
(E) Tender brake (truck mounted and tender bed mounted)	8
(F) Tender brake (body mounted)	9
(ii) Locomotives other than steam:	
(A) Driving wheel brake	6
(B) Swivel type truck brake with brakes on more than one truck operated by one brake cylinder	7
(C) Swivel type truck brake equipped with one brake cylinder	8
(D) 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
(1) Locomotives:	
(i) Minimum brake pipe air pressure:	
(A) Road Service	70
(B) Switch Service	60
(ii) Minimum differential between brake pipe and main reservoir air pressures, with brake valve in running position	15
(iii) Safety valve for straight air brake	30–55
	30–68
(iv) Safety valve for LT, ET, No. 8–EL, No. 14 El, No. 6–DS, No. 6–BL and No. 6–SL equipment	30–75
(v) Safety valve for HSC and No. 24–RL equipment	30–50
(vi) Reducing valve for independent or straight air brake	50
(vii) Self-lapping portion for electro-pneumatic brake (minimum full application pressure)	30–50
(viii) Self-lapping portion for independent air brake (full application pressure)	40–60
(viiii) Reducing valve for air signal	50
(x) Reducing valve for high-speed brake (minimum).	
(2) Cars:	
(i) Reducing valve for high-speed brake	58–62
(ii) Safety valve for PS, LN, UC, AML, AMU and AB–1–B air brakes	58–62
(iii) Safety valve for HSC air brake	58–77
(iv) Governor valve for water raising system	60
(v) Reducing valve for water raising system	20–30

§ 232.711 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.

§ 232.712 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 paragraphs (a)(1)(iii)(A), (B), and (C) of this section. 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 § 232.713 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 gauge, 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.

§ 232.713 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 § 232.712(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 § 232.712 (c) through (j) must be so inspected and tested at the next terminal where facilities are available for such attention.

(2)(i) At a terminal where a solid block of cars, which has been previously charged and tested as prescribed by § 232.712 (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.

(ii) When cars which have not been previously charged and tested as prescribed by § 232.712 (c) through (j) are added to a train, such cars may either be given inspection and tests in accordance with § 232.712 (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 § 232.712 (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 § 232.712 (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 § 232.719.

(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 (5) pounds.

§ 232.714 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.

§ 232.715 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.

§ 232.716 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.

§ 232.717 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 Rules 3 and 4 of the 2020 Field Manual of the AAR Interchange Rules (AAR Field Manual); or an alternative procedure approved by FRA under paragraph (d) of this section. Brake equipment shall then be tested by use of a single car testing device as prescribed by § 232.305.

(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 § 232.305.

(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 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 the applicable standards referenced in § 232.305 or by the American Public Transportation Association (APTA) standard referenced in § 238.311(a) of this chapter. 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) *Clean, repair, lubricate and test (COT&S).* (1) Brake equipment on cars other than passenger cars must be cleaned, repaired, lubricated and tested (''COT&S'') as often as required to maintain it in a safe and suitable condition for service but not less frequently than as required by Rules 3 and 4 of the AAR Field Manual.

(2) Brake equipment on passenger cars must be cleaned, repaired, lubricated and tested (''COT&S'') 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–4045–13 in the Manual of Standards and Recommended Practices of the AAR or an alternative procedure approved by FRA pursuant to § 232.717(d).

(c) *Discontinued brake systems.* For a brake system once, but no longer, included in AAR's current Code of Rules or Code of Tests (presently known as the Field Manual of the AAR Interchange Rules or the Manual of Standards and Recommended Practices), the brake system must be maintained in a safe and suitable condition for service according to a railroad's written maintenance plan. The maintenance plan, including its COT&S component and a periodic attention schedule, must be based upon a standard appropriate to the equipment. The railroad must comply with and make its written maintenance plan available to FRA upon request.

(d) *Modification of standards.* The AAR or other authorized representative of the railroad industry may seek modification of the industry standards identified in or approved pursuant to paragraph (a) of this section. The request for modification will be handled and must be submitted in accordance with the modification procedures contained in § 232.307 of this part.

(e) *Incorporation by Reference.* The Director of the Federal Register approves the incorporation by reference of the standards required in this section into this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may inspect a copy of the material at the Federal Railroad Administration, Docket Clerk, 1200 New Jersey Avenue SE, Washington, DC 20590 (telephone: 855–368–4200). You may also inspect the material at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email *fedreg.legal@nara.gov,* or go to: *www.archives.gov/federal-register/cfr/ibr-locations.html.* You may obtain the material from the following source(s):

(1) Association of American Railroads (AAR), 425 Third Street SW, Washington, DC 20024, telephone: (202) 639–2345, email: *publications@aar.com,* website: *https://aarpublications.com.*

(i) 2020 Field Manual of the AAR Interchange Rules, Rule 3—Testing of Air Brakes and Rule 4—Air Brake Valves and Parts, effective January 1, 2020.

(ii) AAR Standard S–4045, ''Passenger Equipment Maintenance Requirements,'' Revised 2013 (contained in AAR Manual of Standards and Recommended Practices, Brakes and Brake Equipment), also referred to as AAR Standard S–4045–13.

(2) [Reserved]

§ 232.719 End-of-train devices.

Requirements are contained in subpart E of this part.

APPENDICES A AND B TO PART 232—[REMOVED]

■ 28. Remove appendices A and B to part 232.

Issued in Washington, DC.

Quintin C. Kendall,

Deputy Administrator.

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