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Amendments to Brake System Safety Standards Governing Operations Using an Electronic Air Brake Slip System

Notice of Proposed Rulemaking

Regulatory Impact Analysis

Federal Railroad Administration
Office of Safety Analysis
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List of Abbreviations Used in this Analysis:

2001 final rule	2001 Brake System Standards for Freight and Other Non-Passenger Trains and Equipment; End-of-Train Devices
AAR	Association of American Railroads
AEI	Automatic Equipment Identification
ASLRRA	American Short Line and Regional Railroad Association
BNSF	BNSF Railway
CFR	Code of Federal Regulations
CSX	CSX Transportation
eABS	Electronic Air Brake Slip
ECP	Electronically Controlled Pneumatic
EDI	Electronic Data Interchange
EO	Executive Order
FR	Federal Register
FRA	Federal Railroad Administration
MP&E	Motive Power and Equipment
NPRM	Notice of Proposed Rulemaking
NS	Norfolk Southern
OMB	Office of Management and Budget
PV	Present Value
Part 232	49 CFR Part 232, Brakes System Safety Standards for Freight and Other Non-Passenger Trains and Equipment; End-Of-Train Devices
RIA	Regulatory Impact Analysis
QMI	Qualified Mechanical Inspector
QP	Qualified Person
UP	Union Pacific Railroad Company

E1. Executive Summary

The Federal Railroad Administration (FRA) proposes to amend 49 CFR (Code of Federal Regulations) Part 232, *Brakes System Safety Standards for Freight and Other Non-Passenger Trains and Equipment; End-Of-Train Devices* (Part 232) to provide relief for operations that utilize the Electronic Air Brake Slip (eABS) system as developed by Association of American Railroads (AAR) member railroads. The eABS system records car brake test[1] information. The proposed amendments to Part 232 would change the focal point at which a railroad is required to perform brake tests from the entire train to the individual car. The proposed rule is designed to encourage the use of an eABS system by providing railroads with an optional, alternative regulatory framework that would relieve the obligation to perform certain brake tests.

FRA proposes to extend the distance that certain cars may be permitted to travel from 1,500 miles to 2,500 miles if the train is operating under the eABS system. The mileage extension would be granted if brake tests are performed by a qualified mechanical inspector (QMI) and the recordkeeping requirements for the proposed rule are met. These recordkeeping requirements include: the name of the railroad, the name of the employee recording the brake test, the name of the employee performing the brake test, the date and time of the event, and certification of the brake test.

In general, when adding or removing multiple (single or blocks of) cars to or from a train, current regulation requires a railroad to perform a brake test of the entire train and create a test record. The proposed rule would relieve any railroad that utilizes the eABS system from the existing brake test obligations related to the adding or removing of cars from a train.

The proposed rule does not require use of the eABS system. FRA assumes that any railroad that would realize a net cost savings from using the eABS system would do so. This analysis assumes that all seven Class I railroads would utilize the eABS system. FRA is unsure how many of the Class II and Class III railroads would utilize the eABS system.[2]

This analysis provides low and high estimates for costs and cost savings. Cost savings would primarily come from the reduction in brake tests that would result from mileage and block swap relief. The proposed rule would also reduce the filing of waiver renewals by Class I railroads seeking relief from mileage limitations between brake tests. Costs would primarily come from training, acquisition of hardware, and maintenance of the eABS system.

As shown in Table E-1 and Table E-2, over the 10-year period of analysis the proposed rule would result in net cost savings ranging between $128.1 million to $259.6 million (present value (PV), 3%) and $105.2 million to $217.3 million (PV, 7%).[3]

[1] A brake test includes both test and inspection activities.
[2] The revenue thresholds used for defining Class I, II, and III railroads are provided in Appendix A below.
[3] Unless otherwise noted, all costs and cost savings in this analysis are in 2018 dollars.

Table E-1: Net Cost Savings (Low) Over 10 Years (2018 Dollars)

		Present Value ($)		Annualized ($)	
Section	**Undiscounted**	**3%**	**7%**	**3%**	**7%**
Cost Savings					
Increased Mileage	91,641,000	79,932,000	67,672,000	9,370,000	9,635,000
Unlimited Block Swapping	121,590,000	105,551,000	88,804,000	12,374,000	12,644,000
Waiver Filing and Review	133,000	118,000	101,000	14,000	14,000
Government Waiver Review	12,000	11,000	10,000	1,000	1,000
Total Cost Savings	213,376,000	185,612,000	156,587,000	21,759,000	22,294,000
New Costs					
System Development and Maintenance	13,845,000	12,665,000	11,427,000	1,485,000	1,627,000
Training	6,830,000	6,830,000	6,830,000	801,000	972,000
Hardware	42,613,000	37,982,000	33,188,000	4,453,000	4,725,000
Total New Costs	63,288,000	57,477,000	51,445,000	6,738,000	7,325,000
Net Cost Savings	150,088,000	128,135,000	105,142,000	15,021,000	14,969,000

Note: In this and subsequent tables, numbers may not add due to rounding.

Table E-2: Net Cost Savings (High)

		Present Value ($)		Annualized ($)	
Section	**Undiscounted**	**3%**	**7%**	**3%**	**7%**
Cost Savings					
Increased Mileage	164,554,000	143,527,000	121,514,000	16,826,000	17,301,000
Unlimited Block Swapping	164,047,000	142,408,000	119,813,000	16,695,000	17,059,000
Waiver Filing	133,000	118,000	101,000	14,000	14,000
Government Waiver Review	12,000	11,000	10,000	1,000	1,000
Total Cost Savings	328,746,000	286,064,000	241,438,000	33,536,000	34,375,000
New Costs					
System Development and Maintenance	13,845,000	12,665,000	11,427,000	1,485,000	1,627,000
Training	5,126,000	5,126,000	5,126,000	601,000	730,000
Hardware	9,690,000	8,637,000	7,547,000	1,013,000	1,075,000
Total New Costs	28,661,000	26,428,000	24,100,000	3,099,000	3,432,000
Net Cost Savings	300,085,000	259,636,000	217,338,000	30,437,000	30,943,000

In addition to the net cost savings, this analysis identifies non-quantified benefits that may come from issuing the proposed rule. The benefits discussed may maximize and expand freight capacity, increase equipment availability, shorten cycle times, boost on-time performance and incentive greater accountability of employees who perform brake tests.

I. Introduction

Since the issuance of the FRA's 2001 final rule amending Part 232, there have been improvements in safety performance on the general railroad system. As explained in the *Background* section of the Notice of Proposed Rulemaking (NPRM), both data and experience indicate that, under certain conditions, trains can travel significantly greater distances before developing defects that would impair brake effectiveness. In addition, technological advancements have allowed for electronic tracking of cars on an individual basis as they traverse the general railroad system. Electronic tracking of cars would address concerns about uncertainty related to when and where brake tests would need to be performed. For these reasons, FRA proposes to amend Part 232 to provide brake test relief for freight operations that utilize the eABS system.

The proposed rule would permit railroads that utilize the eABS system to perform unlimited block swaps[4] without a required Class I brake test.[5] FRA proposes to afford such relief because railroads that utilize the eABS system would be able to accurately track individual train cars and maintain records related to brake tests on an individual car level. The utilization of the eABS system would greatly increase a railroad's accuracy in determining the point at which a Class I brake test would need to be performed. Because the eABS system would provide a railroad with accurate brake test records, this amendment is expected to reduce redundant brake tests without adversely impacting safety on the general railroad system.

In addition, the proposed rule would adopt AAR's request for relief to extend mileage limits for certain cars between brake tests from 1,500 to 2,500 when car brake tests are conducted by a QMI and the cars operate under the eABS system. The proposed rule includes mileage relief for QMI performed brake tests because data and experience indicates that such a mileage extension would not adversely impact safety on the general railroad system. This amendment is also expected to reduce redundant brake tests.

Due to uncertainty related to the impact on safety, the proposed rule does not include AAR's request for relief to extend mileage limits between brake tests from 1,000 to 1,500 for car brake tests conducted by a QP. FRA notes that safety data on train movements exceeding 1,000 miles between brake tests is primarily based upon brake tests conducted by QMIs. By contrast, safety data available to evaluate specifically the effectiveness of brake tests by QPs is limited. FRA requests comments and safety data on the possibility of extending mileage between brake tests from 1,000 to 1,500 when car brake tests are conducted by a QP.

II. Statement of Problem

In March 2019, FRA received a petition from AAR requesting that FRA "modernize" the brake system safety standards in Part 232. AAR asserted that technological advancements within the railroad industry have the potential to address safety risks related to block swapping. AAR also asked that Part 232 be amended to improve the efficiency of railroad operations. Specifically, AAR proposed that FRA provide relief from certain brake tests requirements for railroads that utilize an eABS system. FRA is proposing several amendments to Part 232 that would improve freight railroad operations without adversely impacting safety on the general railroad system.

Existing Part 232, based on the 2001 final rule, limits the number of blocks of cars added to a train consist to ensure that cars are inspected in a timely manner. Under existing regulations, the focal point for performing and tracking brake tests is the train, not the individual train car. A

[4] A block swap is defined as the combination of a pick-up and a set-out of a car or a block of cars at a location.
[5] Class I brake test is a complete train brake system test and inspection performed by a qualified mechanical inspector to ensure that the air brake system is 100 percent effective. A Class I brake test includes a test of brake pipe leakage and a series of visual inspections as defined in § 232.205, *Class I brake test-initial terminal inspection*.

"brake slip" [6] serves as proof that the brake pipe and each of the individual car brake systems in a train have been inspected at an appropriate time and found to be effective. A brake slip[7] is issued for each Class I test. A brake slip generally only permits the train, or any car in the train, to travel a distance up to 1,000 miles. The most restrictive car (based on mileage) in the trainset determines when the subsequent test for the trainset is required. The 1,000-mile brake test, called a Class IA brake test, includes all the same elements of a Class I test, but with less stringent requirements. [8] In the preamble of the 2001 final rule, FRA stated that if cars were permitted to be moved in and out of a trainset at will, determining when and where a Class IA brake test must be performed on a train would be impossible. Since the 2001 final rule, technological advancements have made it possible to accurately track when and where a brake test would need be performed on an individual car.

In addition, existing Part 232 permits certain train movements up to 1,500 miles between brake tests if the Class I brake test was conducted by a QMI. FRA believes that both data and experience indicate if a train receives a high-quality brake test, such as one a QMI can provide, then a train can travel distances greater than 1,500 miles before developing defects that would impair brake effectiveness.

III. Background

Air brake testing has been a cornerstone of railroad safety since requirements for train air brakes were first established under the Safety Appliance Act of 1893. This section provides a summary of the history of air brake testing regulations, mileage extension waivers, and the AAR petition.

1. History of Air Brake Testing Regulations

Mileage Regulations

In 1982, FRA eliminated the notification requirement and extended the maximum distance that a train could travel between brake tests from 500 miles to 1,000 miles. A 500-mile requirement was the original mileage requirement established in Federal law, based on AAR interchange rules, and was not significantly changed since the Power or Train Brakes Safety Appliance Act of 1958. In the preamble to the 1982 NPRM, FRA cited a history of relatively few accidents attributable to brake systems failure and considerable technological improvements as part of the basis for relaxing the mileage limit. FRA also noted the experience of railroad regulation in Canada, in which a train is permitted to make a movement of any distance after undergoing an

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[6] A brake slip is the "written or electronic record of the information" required by § 232.205(e), recording when a Class I brake test occurs.

[7] Section 232.205(e) states that the brake slip record must be maintained in the cab of the controlling locomotive until the train reaches its destination. FRA's MP&E Compliance Manual clarifies that a brake slip may be discarded where replaced by the brake slip from a subsequent Class I test performed on the train.

[8] A Class IA brake test is largely the same as a Class I brake test. There are two main difference between the two tests. A Class I brake test requires that the inspector walk the train when conducting an inspection, while a Class IA test allows for a "roll-by" inspection. Also, a Class I brake test requires the inspector measure the piston travel of each car, while a Class IA brake test does not have this requirement.

initial terminal test.[9] The 1982 amendments reflected a consensus by both railroad industry and labor groups. The amendments were intended to reduce the frequency of brake tests, incentivize railroads to develop dedicated brake test locations, and utilize highly qualified staff for brake tests. Thus, the amendments provided relief from mileage inspection requirements, while ensuring safe railroad operations.

In 2001, FRA authorized "extended haul trains" to move trains up to 1,500 miles between brake tests. FRA recognized that since 1982 new technology and improved equipment have been developed that allow trains to operate for longer distances with fewer defects. The mileage relief was conditioned on a railroad's Class I brake test being performed by a QMI and that the train was in full compliance with Parts 232 and 215. Also, the railroad would need to provide FRA with each train ID, the types of cars in the train, and all scheduled stops for testing, pick-up, and/or set-out.

Additionally, in 2008, FRA provided further relief for trains equipped and operating with compliant electronically controlled pneumatic (ECP) brake systems, allowing a train to travel up to 3,500 miles between brake tests. ECP systems provide an increased level of self-monitoring and data reporting for several brake system component conditions. FRA noted that this self-monitoring and data reporting ability was a critical component in the determination to provide for the additional relief.

Brake Inspections and the Brake Slip

A train brake system may be described simplistically as a combination of all the individual locomotive and car brake systems connected by a brake signal transmitter. The brake pipe is the main component for transmitting the braking signal, and the only component of the brake system that passes between individual cars. Because the train brake system is primarily the sum of its individual cars, the addition or subtraction of a small number of cars will not generally be expected to have a significant effect on the brake system's effectiveness. Where, as is required under current regulations, any cars added to a train have also passed a thorough brake test, there is little cause for concern that the train will have any significant reduction in braking effectiveness from the change.

Current regulations require the manual inspection of an entire train consist and creation of a brake test record for an entire train. Except in limited circumstances, current regulations also require a brake test when cars are added to or removed from the train.[10] The existing limitation on block swapping was put in place to ensure that railroads inspect cars in a timely manner.

A brake slip serves as proof at the initial terminal for the train that the brake pipe and each of the individual cars in that train have been inspected at an appropriate time and found to be effective. The brake slip is also a simplified record of that process, because it does not identify the individual cars that were inspected. A subsequent change in the train consist therefore renders

[9] *See* Transport Canada. (2017, December 5). Part II: Brake Test Requirements. https://www.tc.gc.ca/eng/railsafety/rules-tco0184-139.htm

[10] Current regulations permit up to one addition and removal of cars at any one location, if they form a single, solid block in the consist.

the brake slip inaccurate. A small number of changes may be manageable for maintaining accurate records of brake tests. However, each change to the train consist decreases the brake slip's accuracy and decreases the traceability of brake tests.

Block Swap Regulation

The Power Brake Law of 1958 established the requirements to inspect the brake system when the train consist is changed. Current block swap regulation allows a railroad to remove or add a single car or solid block of cars or to remove any cars found to be defective without completing a Class I brake test. For other changes of a train consist, a railroad is generally required to complete a Class I brake test.[11]

In the 2001 final rule, FRA expressed two concerns related to permitting unlimited additions and removals of cars from a train without the requirement for a new Class I brake test. FRA noted that unlimited additions and removals of cars would blur the distinction between a limited change in train consist and the assembly of a new train, the latter FRA regarded as the most critical point at which to conduct a thorough brake test. The ability to change substantially all of a train consist without the requirement of a new brake test would, in FRA's view, have the potential to eliminate the most important Class I brake test, performed at a train's initial terminal. Second, FRA noted that Class IA brake tests, which rely upon the mileage of the most restrictive car, would likewise be impossible to track. Both of these concerns would be addressed by the eABS system.

2. Mileage Waivers

FRA has periodically extended relief from the brake test requirements in response to petitions by the railroad industry through a waiver process.[12] Relief in both regulatory and waiver processes has generally involved creation of an alternative program for compliance with brake test requirements. The alternative programs specified more stringent requirements to ensure the likelihood of identification and repair of defects and closer FRA oversight. All waivers for mileage relief that FRA has granted have required that brake tests are performed by QMIs.

Since 2006, FRA has granted two waivers of the 1,500-mile limitation for extended haul trains. Union Pacific Railroad Company (UP)[13] and BNSF Railway (BNSF)[14] are permitted to operate certain trains up to 1,680 miles and 1,702 miles between brake tests, respectively. The waivers required that the requirements under § 232.213 for extended haul trains continue to be met (including the performance of Class I brake tests by QMIs and part 215 freight car inspections by designated inspectors). In addition, FRA required the railroads operating under the waivers to provide certain data, including data comparing defects identified on trains operating under the waivers as compared to typical, extended haul trains.

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[11] At the location where a train has been received at interchange, a train may also receive a change of motive power without the requirement of a Class I brake test. *See* 49 CFR § 232.205(a)(5)(iii).
[12] Waivers are typically reviewed and re-approved every five years.
[13] *See* FRA-2015-0036 https://www.regulations.gov/docket?D=FRA-2015-0036.
[14] *See* FRA-2006-24812 https://www.regulations.gov/docket?D= FRA-2014-0070.

FRA also granted two waivers related to hot and cold wayside detectors, which permit test trains to travel up to 2,600 miles between the brake tests. [15,16] A condition of the test plan required that the listing and parameters of the wayside detector information must be provided for review by QMIs before brake tests are conducted. FRA does not have sufficient data to show what impact, if any, that these new waivers have had on defect rates. The lack of data from these two waivers is primarily due to the recent implementation of the waivers.

FRA also approved waiver requests from Norfolk Southern (NS) and BNSF to extend the waivers previously granted.[17] The approved waivers allow unit or cycle trains traveling along specific routes, and using ECP brake systems, to travel distances up to 5,000 miles between brake tests. FRA previously granted NS and BNSF conditional relief from certain provisions regarding the 3,500-mile Class I brake test requirement for trains equipped with ECP brakes under § 232.607. FRA's Railroad Safety Board determined that granting NS's and BNSF's request was in the public's interest and consistent with railroad safety. This waiver relates to the proposed rule because of the similarities between mechanical components of conventional air brakes and ECP brakes. The waiver required that brake tests would be performed by QMIs.

CSX Transportation (CSX) requested relief from the requirements of § 232.205, *Class I brake test-initial terminal brake test*, and § 232.207, *Class IA brake tests -1,000-mile inspection* to allow certain trains to travel 1,052 miles between brake tests.[18] The waiver requested that Qualified Persons[19] (QPs) would be allowed to perform the brake tests. CSX's petition did not contain either safety data or a statement of safety justification to support the relief requested. Accordingly, FRA's Railroad Safety Board denied CSX's request for relief.

3. Association of American Railroads Petition

In March 2019, FRA received a petition from AAR requesting that FRA "modernize" the brake system safety standards in Part 232. AAR asserted that technological advancements within the railroad industry have the potential to address any safety risks related to performing multiple block swaps. AAR also stated that the existing mileage limitations within Part 232 could be amended to extend the maximum distance limit that a train could travel between brake tests without adversely impacting safety on the general railroad system. Specifically, AAR proposed that FRA amend Part 232 to provide block swap and mileage relief related to certain brake tests requirements for railroads that utilize an eABS system.

AAR's petition includes three main requests. First, AAR proposed that FRA "permits railroads to add or remove a car or cars with a valid eABS record(s) from a single location or multiple locations in a train solely made up of cars with eABS records." Second, AAR proposed that FRA

[15] *See* FRA-2018-0049. https://www.regulations.gov/docket?D=FRA-2018-0049.
[16] *See* FRA-2016-0018. https://www.regulations.gov/docket?D=FRA-2016-0018.
[17] *See* FRA-2009-0088. https://www.regulations.gov/docket?D=FRA-2009-0088.
[18] *See* FRA-2018-0075. https://www.regulations.gov/document?D=FRA-2018-0075-0010.
[19] Qualified person (QP) is defined as a person who has received, as a part of the training, qualification, and designation program required under § 232.203, instruction and training necessary to perform one or more functions required under Part 232. Typically, a QP is a conductor who is classified within the transportation employee job category.

"allow railroads to move a rail car up to, but not exceeding, 1,500 miles between brake tests if the rail car has a valid eABS system record." Finally, AAR proposed that FRA allow a railroad to move a car up to, but not exceeding, 2,500 miles if the car has a valid eABS system record and the Class I brake test was conducted by a QMI.

AAR proposed that this alternative regulatory requirement for brake tests be focused at the level of the individual car. AAR stated that the eABS system can report information for each individual car, which mitigates concerns about "who performed the last brake test and where and when it was performed." AAR asserted that the eABS system would provide increased traceability and granularity of information. AAR emphasized that the eABS system would directly address FRA's concern, as stated in the 2001 final rule, that permitting unlimited additions and removals of cars to and from a train might allow a railroad to circumvent the requirements for brake tests and testing. By placing the focus of brake test at the car level, reclassification of cars as part of a new train would not affect the mileage-based brake test requirements. AAR also noted that the availability of performing multiple block swaps, without the constraint of additional required brake tests, would allow for the movement of a greater number of cars with fewer train stops. According to AAR, block swap relief would increase the velocity of the rail network and reduce the dwell time of individual rail cars. The reduction in required brake tests would also reduce the frequency at which employees are required to secure trains by means of boarding cars to engage and disengage handbrakes. Thus, the proposal could reduce exposure to injuries related to both train securement and performance of brake tests.

AAR also requested that FRA extend the distance individual cars may be moved between brake tests, if the cars have a valid eABS system record. AAR asserted that improvements in the railroad industry's safety performance are sufficient to allow for mileage relief. In support of its request for mileage extension, AAR provided data from waivers granted to UP and BNSF to operate certain trains up to 1,680 miles and 1,702 miles, respectively, between brake tests.[20] Out of 7,827 trains operated by UP between November 2015 and June 2018 there were two reportable incidents. Neither of these incidents was caused by a defect in the air brake system . Of 15,480 trains operated by BNSF from July 2015 to June 2018 there was only one incident. The cause of the incident was attributable to a broken car axle.

AAR asserts that substantial savings would result from adopting its petition due to the elimination of unnecessary intermediate brake tests. Over a 10-year period of analysis, AAR estimates the total cost savings that would come from its proposal ranges from $746.0 to $862.0 million. The discounted value of this estimate is $629.7 to $727.8 million (PV, 3%), and $510.9 and $590.9 million (PV, 7%). In addition, AAR states "[s]afety is not compromised; overall safety is improved."[21]

IV. Methodology

[20] S*ee* FRA-2015-0036 and FRA-2006-24812.
[21] AAR petition, "Appendix D: Regulatory Initiatives, Pick-ups & Set-offs, Increased train mileage," Slide 2, February 5, 2019.

The purpose of this economic analysis is to analyze the costs, cost savings, and benefits of the proposed rule. This analysis estimates the proposed rule's costs and cost savings for 10 years.[22] This economic analysis adheres to methodologies historically followed and accepted by the U.S. Department of Transportation (DOT).

This analysis is consistent with the guidelines in DOT's Regulatory Policies and Procedures;[23] EO 12866, "Regulatory Planning and Review" and associated guidance;[24] and the Office of Management and Budget's (OMB) Circular A-4 on Regulatory Analysis.[25] The final rule arising from this rulemaking is expected to result in cost savings and to be an EO 13771 deregulatory action.

OMB Circular A-4 instructs accounting for benefits and costs relative to a baseline condition. The typical baseline scenario from which benefits and costs of the final rule are measured is the no-action baseline. Essentially, the no-action baseline asks, "What would the railroad world look like without the regulation?" For this proposed rule FRA is using long-standing waivers as the relevant baseline. Technologies and procedures permitted by waivers that have been used by members of the industry for a long time are essentially "built-in" to their operations. Long-standing waivers more accurately reflect a world without the final rule. For this analysis, waivers that have been granted by FRA for 10 years or longer are defined as long-standing waivers. Benefits and costs are measured relative to a scenario where industry can take advantage of technologies and procedures FRA has historically granted through waivers, but must do so by continually seeking waivers rather than being granted authority through regulation.

This analysis is based on the following assumptions:

1. The period of analysis is 10 years.
2. Unless otherwise mentioned, numbers are indexed to a base year of 2018.
3. Formulas for discounted present value do not discount the first year of analysis.
4. Costs and cost savings for Class I railroads are qualitatively and quantitively described.
    a. Costs for other railroads are qualitatively described.
5. AAR subsidiary Railinc[26] expended $4.4 million in eABS system development and maintenance costs.
6. Each Class I railroad incurs $500,000 in eABS system development costs in year 1.
7. Annual eABS system maintenance costs in year 2 to year 10 are $100,000 per Class I railroad (for a total of $900,000 per year).

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[22] Present values (PV) for costs and cost savings are calculated over a 10-year period. PV provides a way of converting future amounts into equivalent dollars today. The formula used to calculate these flows is: $1/(1+r)^t$ where "r" is the discount rate, and "t" is the year. Discount rates of 3 and 7 percent are used in this analysis.

[23] https://www.transportation.gov/sites/dot.gov/files/2020-03/Fed%20Reg%20Published%20Final%20Admin%20Rule.pdf.

[24] "Economic Analysis of Federal Regulations Under Executive Order 12866" (Jan. 11, 1996), available at https://www.reginfo.gov/public/jsp/Utilities/EO_12866.pdf.

[25] "Circular A-4: Regulatory Analysis" (Sep. 17, 2003), available at https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf.

[26] AAR has indicated that Railinc Corporation would incur the costs for development, maintenance, and utilization of an eABS system that would be made available to railroads. Railinc provides rail data and messaging services to the North American freight railway industry. Railinc is a wholly-owned, for-profit subsidiary of the Association of American Railroads.

8. AAR spends 100 hours developing eABS training material.
9. Each Class I railroad spends 10 hours specializing the eABS training material to its specific railroad operations.
10. The professional railroad employee hourly compensation rate is $75.77. [27,28]
11. All QMIs and QPs would be subject to initial training with times ranging from 1.5 (low) to 2.0 (high) hours.
12. The hourly compensation rate for a QP is $57.92.[29]
13. The hourly compensation rate for a QMI is $57.05.[30]
14. There are 49,000 QP employees.
15. There are 10,000 QMI employees.
16. Annual employee turnover applicable to QP and QMI employees is 3%.
17. Refresher training is not accounted for in this analysis because 49 CFR Part 243 already accounts for the railroad industry's costs associated with ongoing training under Part 232.
18. The cost of hand-held devices used to enter eABS system information ranges between $700 and $900.
19. Twenty-five percent of the hand-held device usage time is attributed to inputting eABS system information, while 75 percent of the time is attributed to other railroad activity purposes.
20. Employees may share hand-held devices.
    a. The number of QPs per hand-held device ranges from 1 QP per device to 4 QPs per device.
    b. The number of QMIs per hand-held device ranges from 1 QMI per device to 2 QMIs per device.
21. Each hand-held device has a life expectancy of 4 years, after which it is replaced.
22. There is an annual three percent device replacement cost due to lost or broken devices.
23. There are between 1.15 (low end) and 3.0 (high end) locomotives per train.
24. Hourly usage cost of a locomotive is $47.69.
25. Hourly usage cost of a freight car is $1.14.[31]

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[27] This analysis increased the average hourly straight time railroad employee wage rate (Group No. 200: $43.30) by 75 percent to account for overhead and fringe benefits. This increase is primarily based on a comment from AAR to the docket for the Reflectorization of Rail Freight Rolling Stock rulemaking that provided a detailed breakdown of such overhead and fringe benefits. *See* https://www.regulations.gov/document?D=FRA-1999-6689-0054, posted May 16, 2002.

[28] Hourly compensation for Class I administrative employees based on Wage Statistics published by the Surface Transportation Board, *available at* https://www.stb.gov/econdata.nsf/WageStatistics?OpenView&Start=1&Count=300&Expand=2#2. No. 200 Professional and Administrative, Average Straight Time Rate, $43.30. QP compensation rate equals wage rate ($43.30) * benefits factor (1.75) = $75.77.

[29] Hourly compensation for QPs based on Wage Statistics published by the Surface Transportation Board, Group No. 600 Transportation (Train & Engine), Average Straight Time Rate, $33.10. QP compensation rate equals wage rate ($33.10) * benefits factor (1.75) =$57.92.

[30] Hourly compensation for QMIs based on Wage Statistics published by the Surface Transportation Board, Group No. 400 Maintenance & Equipment & Stores, Average Straight Time Rate, $32.60. QMI compensation rate equals wage rate ($32.60) * benefits factor (1.75) = $57.05.

[31] Hourly usage costs per locomotive and freight car were provided by AAR. These hourly costs are based on a five-year average of the operating and capital costs of the rail equipment, including economic service life, salvage or scrap value, repair and maintenance costs.

26. There are two crew members who perform an intermediate (Class IA) brake test.
27. The time to perform a Class IA brake test ranges from 1.5 hours (low) to 2.0 hours (high).
28. A yard stop to perform a block swap takes 1.5 hours.
29. A Class III brake tests takes 0.17 hours.
30. Adding an additional block of cars to an existing train takes 15 minutes (0.25 hours).
31. There are 73.5 freight cars per train.[32]
32. Each railroad that has a waiver will spend 80 hours of administrative employee time preparing for and attending quarterly meetings with FRA.

V. Costs

This analysis estimates costs over a 10-year period. The proposed rule would not require any railroad to use the eABS system and incur any associated costs. FRA assumes that a railroad would only incur costs if it determined that utilizing the eABS system would result in net cost savings. Based on AAR's petition, each of the Class I railroads would likely utilize the eABS system and incur the associated development, maintenance, and utilization costs.

In AAR's March 1, 2019 petition, AAR included estimates of costs related to developing, maintaining, and utilizing the eABS system. FRA staff met with AAR to gain a better understanding of its petition and receive updated information on estimated costs and cost savings. FRA's Motive Power and Equipment (MP&E) Division has determined that AAR's estimates are reasonable. Aside from minor adjustments, FRA based the following cost estimates on the estimates that AAR provided. FRA requests comments from the public on these cost estimates. The discretionary costs associated with utilizing the eABS system include: (1) eABS system development and maintenance costs, (2) training costs, (3) hardware costs (4) recordkeeping costs, and (5) reporting costs.

1. eABS System Development and Maintenance Costs

AAR and Class I railroads would incur costs related to eABS system development and maintenance. This analysis assumes that costs would be higher during the first few years of analysis due to initial startup costs.

<u>Development and Maintenance Costs</u>

AAR subsidiary Railinc has already invested $4.4 million through 2019 in capabilities required to enable sharing of electronic air brake slips for interchanged freight cars. This investment is a sunk cost and exists regardless of whether the proposed rule is issued.[33]

In the 10-year period of analysis, it is estimated that Railinc would invest an additional $1.9 million in eABS system development costs and $2.1 million in eABS system maintenance costs (for a total of $4.0 million). As shown in Table 1, this analysis estimates that the system

[32] For average number of cars, FRA used the average freight train length produced in the AAR's 2019 edition of *Railroad Facts*, which was the most recent edition of this publication as of the publication of this notice.
[33] Appendix C shows the total net cost savings, including Railinc's previously made investments.

development and maintenance cost attributed to the proposed rule is $4.0 million. The discounted value of this is $3.7 million (PV, 3%) and $3.4 million (PV, 7%).

Class I Railroads Development and Maintenance Costs

This analysis assumes that each Class I railroad would incur an initial development cost of $500,000, which would occur in the first year of analysis. Each year thereafter, FRA expects that Class I railroads would incur maintenance costs of approximately 20 percent of their initial development costs. The Class I railroads' development and maintenance cost of the eABS system is $9.8 million. The discounted value of this is $9.0 million (PV, 3%) and $8.1 million (PV, 7%). In total, the railroad industry's development and maintenance cost of the eABS system is $13.8 million. The discounted value of this is $12.7 million (PV, 3%) and $11.4 million (PV, 7%).

Table 1: eABS System Development and Maintenance Costs

Year	Railinc ($)	Number of Class I Railroads	Class I Railroad Cost ($)	Class I Railroads Total Cost ($)	Total ($)
1	1,200,000	7	500,000	3,500,000	4,700,000
2	655,000	7	100,000	700,000	1,355,000
3	405,000	7	100,000	700,000	1,105,000
4	255,000	7	100,000	700,000	955,000
5	255,000	7	100,000	700,000	955,000
6	255,000	7	100,000	700,000	955,000
7	255,000	7	100,000	700,000	955,000
8	255,000	7	100,000	700,000	955,000
9	255,000	7	100,000	700,000	955,000
10	255,000	7	100,000	700,000	955,000
Total Cost, undiscounted	4,045,000		1,400,000	9,800,000	13,845,000
Total Cost, PV 3%	3,715,197		1,278,611	8,950,276	12,665,473
Total Cost, PV 7%	3,366,232		1,151,523	8,060,663	11,426,894
Annualized, PV 3%	435,534		149,892	1,049,245	1,484,780
Annualized, PV 7%	479,276		163,951	1,147,657	1,626,933

2. Training Costs

Training costs include the cost to create training materials and the employees' time away from performing their regular duties. This analysis assumes that training would be self-taught instruction disseminated through hand-held devices. AAR development of training materials for QPs, QMIs, and their supervisors is expected to take approximately 100 labor hours. AAR's cost to develop training materials is $7,577.[34] In year 1, each Class I railroad would spend 10 hours,

[34] AAR training development cost = number of hours spent developing training information (100) * professional railroad employee hourly compensation rate ($75.77) = $7,577.

or $758[35], tailoring the training to the railroad's specific operation. The total railroad industry's training materials cost is $12,883, all of which occurs in the first year of analysis.[36]

One of the largest costs associated with the proposed rule would be training employees on how to use the eABS system. Only costs associated with the initial year of training are associated with the proposed rule, as FRA already requires refresher training costs under FRA's training rule in Part 243 and assumes that any change in refresher training as a result of the rule would be minimal. This analysis uses a range of low (1.5 hours) and high (2.0 hours) range of training hours to estimate the railroad industry's cost of instructing employees in how to properly utilize the eABS system. In year 1, every QMI and QP would be required to take the initial training at a cost between $5.1 million and $6.8 million.[37] As these costs occur in the first year of analysis, they are not discounted.

3. Hardware Costs

FRA assumes that QPs and QMIs would primarily enter brake test information into the eABS system using hand-held devices. FRA expects that Class I railroad employees would use such hand-held devices for other railroad business purposes. This analysis, based on information provided by AAR, estimates that 25 percent of the hand-held device's usage would be for eABS information collection purposes. The estimated price of a hand-held device is between $700 to $900; therefore, the use cost per device associated with eABS information collection ranges from $175 to $225.[38]

This analysis also assumes employees may share railroad issued hand-held devices. FRA estimates a ratio of QPs to devices at 4 QPs to 1 device (Low estimate) and 1 QP to 1 device (High estimate). FRA estimates the ratio of QMIs to devices at 2 QMIs to 1 device (Low estimate) and 1 QMI to 1 device (High estimate). FRA seeks public comment on the proportion of employees per device. The initial number of hand-held devices that Class I railroads would initially purchase ranges from 17,250 to 59,000 devices.[39] As shown in Table 2, the year 1 cost for acquiring hand-held devices for eABS ranges from $3.0 million to $13.5 million.[40]

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[35] Class I railroad, training material cost development, year 1 = hours to tailor training (10 hours) * professional railroad employee hourly compensation rate ($75.77) ≈ $758.
[36] Training material total cost = AAR training development cost ($7,577) + Class I railroad refinement cost ($758) * Number of Class I railroads (7) = $12,883.
[37] Training cost, year 1 = [number of QP employees (49,000) * QP wage rate ($57.92) + number of QMI employees (10,000) * QMI compensation rate ($57.05)] * initial training time (1.5 to 2.0 hours) = [$2,838,080 + $570,500] * (1.5 to 2.0 hours) = $3,408,580 * (1.5 to 2.0 hours) = $5,112,870 to $6,817,160.
[38] Hand-held device, cost share for eABS usage, low estimate = cost of device, low ($700) * eABS usage share (0.25) = $175. High estimate = $900 * 0.25 = $225.
[39] Number of hand-held devices acquired, year 1, low estimate = [(number of QMIs (10,000) / number of QMIs per device, low estimate (2)) + (Number of QPs (49,000)/number of QPs per device, low estimate (4)] = [5,000 + 12,250] = 17,250. High estimate = 59,000 QMIs and OPs.
[40] Hardware cost, low estimate, year 1 = number of hand-held devices acquired in year 1, low estimate (17,250) * hand-held device, cost share for eABS usage, low estimate ($175) = $3,018,750. High estimate = 59,000 * $225 = $13,275,000.

This analysis also includes an annual three percent device replacement cost due to lost or broken devices that would need replacement for operational purposes. The annual device replacement cost ranges from $90,563 to $398,250.[41] This analysis includes a separate periodic replacement cost for all hand-held devices due to the hand-held devices reaching the end of their lifespan. Assuming a lifespan of four years, all devices would need to be replaced in year 5 and year 9 of this analysis. In year 5 and year 9, the periodic replacement cost ranges from $3.1 million to $13.3 million. Please see Table 2 below for the cost estimate of the hardware.

Table 2: Industry Cost for Hand-held Devices

	Low Estimate			High Estimate		
Year	**Number of devices**	**eABS cost share per device**	**Total cost**	**Number of devices**	**eABS cost share per device**	**Total cost**
1	17,250	$175	$3,018,750	59,000	$225	$13,275,000
2	518	175	90,563	1,770	225	398,250
3	518	175	90,563	1,770	225	398,250
4	518	175	90,563	1,770	225	398,250
5	17,250	175	3,018,750	59,000	225	13,275,000
6	518	175	90,563	1,770	225	398,250
7	518	175	90,563	1,770	225	398,250
8	518	175	90,563	1,770	225	398,250
9	17,250	175	3,018,750	59,000	225	13,275,000
10	518	175	90,563	1,770	$225	398,250
Total, undiscounted	55,373		$9,690,188	189,390		$42,612,750
Total, PV 3%			$ 8,637,074			$37,981,669
Total, PV 7%			$ 7,546,918			$33,187,688
Annualized, PV 3%			$ 1,012,529			$ 4,452,610
Annualized, PV 7%			$ 1,074,511			$ 4,725,180

4. Recordkeeping

The proposed record keeping requirement for brake testing primarily follows the current recordkeeping requirements and industry practices. FRA proposes that the following information be included in the record: the name of the inspecting railroad, the name of the inspector of the car where different from the author of the record, the date and time the record was created, and additional information certifying that the requirements of § 232.205(a)(3) and § 232.305(c) have been met.

This analysis concludes that the recordkeeping time burden is similar between the existing regulatory framework and the proposed alternative framework. The advantages of electronic submission of information offset the time burden of creating entries for such information for a larger number of units – cars instead of trains – as specified in the proposed rule. FRA seeks comments about the time burden associated with providing more detailed brake records.

[41] Hardware replacement cost, low estimate = hardware cost, low estimate, year 1 ($3,018,750) * replacement frequency due lost or damaged device (0.03) = $90,563. High estimate = $13,275,000 * 0.03 = $398,250.

As part of the recordkeeping requirement, FRA would require that eABS records be made available to FRA upon request. Existing regulation permits FRA to request any information that a railroad possesses related to brake tests. This information includes the test records and the written operating procedures with respect to brake testing. This analysis determined that the time burden on a railroad to provide eABS information to FRA would be similar to the existing regulatory burden to provide train consist information to FRA; therefore, there would be no additional cost for this requirement.

5. Small Entities

FRA met with the American Short Line and Regional Railroad Association (ASLRRA) to better understand the impact on small entities related to AAR's petition. This analysis concludes that most small entities would not receive much, if any, gain from the ability to conduct unlimited block swaps and extended mileage to 2,500 for QMIs. Therefore, the primary reason for most small entities to participate in the eABS system would come from improving interchange with the Class I railroads. Small entities' utilization of the eABS system would ensure that brake test records are maintained in the eABS system when interchanging with Class I railroads. This analysis concludes that small entities would likely participate in the eABS system if Class I railroads would arrange for access and assist with utilization of the eABS system. However, this analysis did not estimate the cost for small entities.[42] See Appendix B – Initial Regulatory Flexibility Analysis, for a more detailed discussion of the potential impact that the proposed rule would have on small entities.

FRA expects each Class I railroad will use Automatic Equipment Identification (AEI), an electronic recognition system, to establish car mileage as part of its eABS system. AEI includes tags mounted on each side of rolling stock and active trackside readers that use a radio frequency identification tag to identify the cars. The eABS system would compare the recent location history of each car to the location of the trackside reader to calculate and record mileage. AEI tags on cars are common, but the active trackside readers are primarily located at large points of interchange or yards where most Class III railroads do not operate. FRA requests comments on the number of small entities that would utilize the eABS system and their anticipated cost of utilizing the eABS system.

Lastly, the proposed rule includes relief for small railroads who would voluntarily operate under the proposed rule when interchanging with Class I railroads. This analysis expects that the proposed relief would allow Class III railroads to largely maintain existing business practices related to documenting train movement. A Class III railroad would not necessarily need to enter car specific information into the eABS system. Instead, upon interchange, Class III railroads could provide car specific recordkeeping information to the railroads that utilize the eABS system. Thereafter, the railroad would enter information into the eABS system. FRA seeks public comment on the proposed relief that would be granted to Class III railroads.

6. Total Costs

[42] The IRFA for small entities bases its preliminary cost estimate on a percentage of Class I costs. *See* Appendix B.

The total costs that would come from the proposed rule include system development and maintenance, training, and hardware costs needed to utilize the eABS system. As shown in Table 3, the 10-year total cost of the proposed rule ranges from $28.7 to $63.3 million. The discounted value of the total costs is $26.4 million to 57.5 million (PV, 3%), and $24.1 million to 51.4 million (PV, 7%).

Table 3: Total Costs, Low Cost and High Cost Estimate

	System Development and Maintenance ($)	Training ($)	Hardware ($)	Total Cost ($)
Low Costs				
Undiscounted	13,845,000	5,126,000	9,690,000	28,661,000
Present Value 3%	12,665,000	5,126,000	8,637,000	26,428,000
Present Value 7%	11,427,000	5,126,000	7,547,000	24,100,000
Annualized 3%	1,485,000	601,000	1,013,000	3,098,000
Annualized 7%	1,627,000	730,000	1,075,000	3,431,000
High Costs				
Undiscounted	13,845,000	6,830,000	42,613,000	63,288,000
Present Value 3%	12,665,000	6,830,000	37,982,000	57,477,000
Present Value 7%	11,427,000	6,830,000	33,188,000	51,445,000
Annualized 3%	1,485,000	801,000	4,453,000	6,739,000
Annualized 7%	1,627,000	972,000	4,725,000	7,324,000

VI. Cost Savings

This analysis estimates cost savings over a 10-year period. FRA assumes that a railroad would utilize the eABS system if it determines that its private benefits/cost savings would exceed its private costs. FRA assumes each of the seven Class I railroads would utilize eABS. Because of uncertainty as to whether small railroads would utilize the eABS system, this analysis did not attribute any specific cost savings to small railroads. FRA requests comment related to the cost savings that may come from small railroads' utilization of the eABS system.

To estimate the cost savings that would come from issuing the proposed rule, this analysis relies on inputs and data analysis that AAR provided in support of its petition. FRA compared AAR-provided inputs and data analysis against information from other FRA analyses, Government data sources, FRA subject matter experts, industry documents, and academic research. FRA accepted many inputs that AAR provided. However, this analysis adjusted some of AAR's input variables in circumstances where FRA deemed alternative variables more appropriate.

The proposed rule may affect the ratio of Class I brake tests performed by QPs and QMIs. However, due to uncertainty regarding the magnitude of the relative change, this analysis assumes the ratio of Class I brake tests by QPs and QMIs would remain constant. Section X. (Sensitivity Analysis) discusses the potential effect that the proposed rule would have on the ratio of Class I brake tests performed by QPs and QMIs.

This analysis provides low and high cost savings estimates. The remainder of this section provides cost savings estimates that would come from issuing the proposed rule. These cost savings include gains from regulatory relief on both mileage extensions and unlimited block swapping, as well as a reduced time burden related to existing waivers and waiver renewals.

1. Mileage Extension

AAR requested that FRA amend Part 232 to increase the distance a freight car can travel between a Class I brake test from 1,500 to 2,500 miles if the test is performed by a QMI and from 1,000 to 1,500 if the test is performed by a QP. FRA reviewed internal FRA data and AAR-submitted data to evaluate this request. FRA determined that data exists to support granting AAR's request related to QMIs, but FRA does not have sufficient data to support extending mileage for tests performed by QPs. FRA seeks public comment on relevant safety data regarding tests performed by QPs.

Based on data provided by AAR, and confirmed by FRA subject matter experts, there are approximately 45,000 Class IA brake tests performed each year that could be avoided, if FRA would adopt AAR's petition as submitted. However, the proposed rule would amend Part 232 to provide mileage relief only in circumstances where a brake test is performed by a QMI. Based on data from two of seven Class I railroads, QMIs perform approximately 62.4 percent of brake tests. Therefore, 28,080 Class IA brake tests would be avoided if FRA provided mileage relief for trains that have a QMI perform a Class I brake test.[43] FRA seeks public comment on this estimate of fewer Class IA brake tests.

This estimate relies upon the assumption that there will be no relative change in the proportion of brake tests performed by QPs and QMIs. FRA recognizes that some brake tests performed by QPs may also be avoided due to providing QMI mileage relief. However, because of a lack of information, this analysis was not able to quantify the reduction in QP-performed brake tests. FRA seeks comments on the impact that the proposed rule would have on the number of QP brake tests avoided due to QMI mileage relief.

This analysis decreases the estimate of 28,080 fewer brake tests by 10 percent to account for the likelihood that cars would not travel the entire 2,500 miles between QMI-performed brake tests. All cars would not likely reach 2,500 miles traveled between brake tests because of proximity of testing locations. Additionally, cars may not reach 2,500 miles between brake tests because railroads may determine that it is more efficient to perform a Class I brake test on the entire train rather than perform multiple Class IA brake tests on cars at varied locations. Assuming cars travel 90 percent of their allowable distance between brake tests, each year there would be 25,272 fewer brake tests.[44]

As shown in Table 4, this analysis estimates that the average cost of a Class IA brake test ranges from $381.71 to $685.40, where the low range ($381.71) assumes that a train has 1.15

[43] Number of brake tests avoided, mileage extension for only QMIs = estimate of brake tests avoided if both QPs and QMIs are provided mileage relief (45,000) * percentage of brake tests performed by QMIs (62.4%) = 28,080.
[44] Decrease in number of brake tests, annual = number of fewer brake tests if all cars traveled 2,500 miles (28,080) * factor to account for cars not traveling maximum allowable 2,500 miles (0.90) = 25,272.

locomotives and a brake test takes 1.5 hours and the high range ($685.40) assumes that a train has 3.0 locomotives and a brake test takes 2.0 hours.

Table 4: Cost Savings from One Avoided Brake Test Due to Extended Mileage

Calculations	Variable Inputs and Calculation Outputs	Low Estimate	High Estimate
	Number of locomotives per train[45]	1.15	3.00
	Hourly usage cost of a locomotive	$47.69	$47.69
1	Hourly use cost of locomotives, per train	$54.84	$143.07
	Number of freight cars per train	73.5	73.5
	Cost to use a freight car, per hour	$1.14	$1.14
2	Hourly use cost of train, including locomotive and cars	$83.79	$83.79
	Number of crew performing intermediate brake test	2	2
	Hourly labor wage rate	$57.92	$57.92
3	Hourly labor cost, per train	$115.84	$115.84
4	Hourly cost of performing a Class IA brake test	$254.47	$342.70
	Class IA brake test (i.e., intermediate brake test and inspection) (1.5 hours)	1.5	1.5
5	Intermediate brake test, brake test takes 1.5 hours	$381.71	$514.05
	Class IA brake test (i.e., intermediate brake test) (2 hours)	2.0	2.0
6	Intermediate brake test, brake test takes 2.0 hours	$508.95	$685.40

As seen in Table 5, the annual cost savings that would come from extending mileage due to QMI-performed brake tests, integrating the 10 percent reduction, ranges from $9.6 million to $12.9 million.

Table 5: Annual Cost Savings, Due to Extended Mileage

	1.5 Hour Brake Inspection		2.0 Hour Brake Inspection	
	Low Estimate	**High Estimate**	**Low Estimate**	**High Estimate**
Brake tests cost	$ 381.71	$ 514.05	$ 508.95	$ 685.40
Class I brake tests avoided	28,080	28,080	28,080	28,080
Total cost savings, unadjusted	10,718,276	14,434,524	14,291,316	19,246,032
Adjustment factor	90%	90%	90%	90%
Total cost savings, adjusted	$ 9,646,449	$ 12,991,072	$ 12,862,184	$ 17,321,429

In the first year of analysis, it is assumed that 50 percent of the available cost savings will be realized. Thereafter, the entire expected cost savings will be realized. Table 6 shows the total cost savings from extending mileage limits between QMI-performed brake tests ranges from $91.6 million to $164.6 million. The discounted value of this is $79.9 million to $143.5 million (PV, 3%), and $67.7 million to $121.5 million (PV, 7%).

[45] The estimate of number of locomotives per train for trains that would utilize the eABS system.

Table 6: Total Cost Savings, Due to Extended Mileage

	1.5 Hour Brake Test		2.0 Hour Brake Test	
Year	**Low Estimate**	**High Estimate**	**Low Estimate**	**High Estimate**
1	$4,823,224	$6,495,536	$6,431,092	$8,660,714
2	9,646,449	12,991,072	12,862,184	17,321,429
3	9,646,449	12,991,072	12,862,184	17,321,429
4	9,646,449	12,991,072	12,862,184	17,321,429
5	9,646,449	12,991,072	12,862,184	17,321,429
6	9,646,449	12,991,072	12,862,184	17,321,429
7	9,646,449	12,991,072	12,862,184	17,321,429
8	9,646,449	12,991,072	12,862,184	17,321,429
9	9,646,449	12,991,072	12,862,184	17,321,429
10	9,646,449	12,991,072	12,862,184	17,321,429
Total, undiscounted	$91,641,263	$123,415,180	$122,190,752	$164,553,574
Total, PV 3%	$79,931,525	$107,645,434	$106,577,461	$143,527,246
Total, PV 7%	$67,672,078	$91,135,384	$90,231,211	$121,513,846
Annualized, PV 3%	$9,370,413	$12,619,329	$12,494,130	$16,825,772
Annualized, PV 7%	$9,634,982	$12,975,628	$12,846,894	$17,300,838

2. Unlimited Block Swapping

The requirement to inspect the brake system when the train consist is changed has been in place since the Power Brake Law of 1958. Under current rules, a Class I brake test is required at a location in which the train consist is changed. There are exceptions for the removal of a solid block of one or more cars and an addition of a solid block of one or more cars.[46] These exceptions apply to a distinct location, such that a train may make a single pick-up and a single set-out at one location, and make another set-out and pick-up at a new location. Any block swap that does not meet these requirements is currently considered a reclassification of a train and would require a new Class I brake test.

The proposed rule would permit unlimited block swaps without requiring additional Class I brake tests. Under current regulations, a railroad needs multiple trains to move these blocks of cars, which creates operational inefficiencies.

Decreased dwell time and diversion of trains to conduct block swaps are the primary source of cost savings related to block swap relief. To estimate the cost savings that would come from block swap relief, this analysis considered inputs related to a freight train's composition. These inputs include the average time required for a train to leave main track, number of freight cars per train, number of employees per train, and number of locomotives per train.

FRA's MP&E Division estimates that the average time required for a train to leave main track, enter a yard, pick up a block of cars, and return to main track is 1.5 hours. This estimate is inclusive of all required brake tests. The Class III brake test would continue to apply to any block

[46] There is also an exception for removing any number of cars found to be defective.

swap. FRA estimates that a Class III brake test takes 10 minutes to complete. Therefore, FRA has subtracted 10 minutes from the estimated time saved. FRA also subtracted an additional 15 minutes from the estimated time saved for each train for adding each subsequent block of cars. This reduction in time is due to a train set performing multiple block swaps in the same yard more efficiently.

AAR's *Railroad Facts* states that the average number of cars per train for Class I freight railroads is 73.5.[47] FRA assumes that there are two employees per train. FRA also estimates that the average number of locomotives per freight train consist ranges between 1.15 and 3.00. In addition, this analysis estimates that each year there are 120,991 single-block pick-up events eligible for multiple pick-ups. Table 7 summarizes inputs that this analysis uses to estimate the cost savings that would come from block swap relief.

Table 7: Block Swap Calculation Input Values

Block Swap Calculation Inputs	Unit of Measure
Yard stop, hours	1.5
Time to conduct a Class III brake test, hours	0.17
Net time saved per additional yard stop, hours	1.33
Adding an additional car block to existing train	0.25
Number of eligible single-block pick-up events	120,991
Number of cars per freight train	73.5
Locomotives per freight train consist	1.15 to 3.00
Train stoppage, cost per hour[48]	$252.65 to $340.87

A block swap is either a pick-up or set-out of a car or block of cars. These cars or block of cars are picked up by a different train. If there are multiple blocks of cars that need to be removed from a trainset, multiple trains would be required to pick up each set. Under current regulation if more than one block swap occurs with the same train, a Class I brake test is required.

The cost savings that would come from block swap relief can be estimated in terms of the improved efficiency in moving cars along the general railroad system. As shown in Table 8, this analysis grouped the time savings that would come from railroads being able to perform multiple pick-up events with one train without having to perform a Class I brake test. This analysis estimates that the additional number of pick-ups per train ranges from two to five additional pick-ups per train. This analysis expects that there would be more occurrences of two pick-ups than three pick-ups and more occurrences of three pick-ups than four pick-ups. The annual low-end and high-end cost savings estimates are between $11.7 million and $15.8 million.

Table 8: Annual Cost Savings Due to Block Swap Events Involving Only Pick-up Events

[47] For average number of cars, FRA used the average freight train length produced in the AAR's 2019 edition of *Railroad Facts*, which was the most recent edition of this publication as of the publication of this notice.
[48] Train stoppage, hourly cost, low estimate = number of locomotive per train (1.15) * locomotive time, hourly cost ($47.69) + average number of crew members (2) * QP hourly compensation rate ($57.92) + average number of freight cars (73.5) * car dwell time cost, per hour ($1.14) = $54.84 + $115.84 + $83.79 = $252.65.

	Status Quo		Proposed Rule		Net Savings			Totals	
Car Blocks to Pick Up	Trains Required	Hours^	Trains Required	Hours	Hours	Percentage of Savings	Share of Multi-Block Events	Low-end Totals^^	High-end Totals^^
5	5	6.65	1	3	3.65	55%	3%	$755,016	$ 1,018,651
4	4	5.32	1	2.75	2.57	48%	7%	$1,550,541	$ 2,091,956
3	3	3.99	1	2.5	1.49	37%	30%	$5,136,866	$ 6,930,551
2	2	2.66	1	2.25	0.41	15%	60%	$4,240,500	$ 5,721,193
							100%	**$11,682,923**	**$15,762,351**

In addition, cost savings would come from multiple block swap events involving only set-outs and multiple block swap events involving at least one set-out. Based on input from both industry and FRA subject matter experts, multiple block swap events involving at least one set-out event would provide an additional cost savings equal to 15 percent of the cost savings that would come from block swap events involving only pick-ups. The estimated cost savings from allowing for set-out events is $1.8 million to $2.4 million.[49] The ability to set-out multiple blocks of cars would improve railroads' operational efficiency, and would reduce the number of stops that a train would need to make to set-out cars.

Because of difficulty integrating the efficiencies related to unlimited block swapping, this analysis concluded that railroads would not immediately accrue all potential costs savings that would follow from block swap relief. In the first year of analysis, FRA assumed that 50 percent of the potential cost savings from block swap relief would be realized. In each year thereafter, this analysis estimates that railroads would improve their operating efficiencies and would realize a larger percentage of the potential cost savings: year 2 (75%), year 3 (85%), year 4 (95%), and year 5 (100%). As shown in Table 9, over the 10-year period of analysis, the cost savings due to block swap relief ranges from $121.6 million to $164.0 million. The discounted value of this is $105.6 million to $142.4 million (PV, 3%) and $88.8 million to $119.8 million (PV, 7%).

Table 9: Total Cost Savings Due to Block Swap Relief

[49] Low estimate = Cost savings, multiple pick-ups without set-outs ($11,682,923) * factor of cost savings to account for multiple block swaps involving at least one set-out (0.15) = $1,752,438.

Year	Low Estimate			High Estimate		
	Fewer Stops: Pick ups	Fewer Stops: Set outs	Total Cost Savings	Fewer Stops: Pick ups	Fewer Stops: Set outs	Total Cost Savings
1	$ 5,841,462	$ 876,219	$ 6,717,681	$ 7,881,176	$ 1,182,176	$ 9,063,352
2	$ 8,762,192	$ 1,314,329	$ 10,076,521	$ 11,821,763	$ 1,773,264	$ 13,595,028
3	$ 9,930,485	$ 1,489,573	$ 11,420,057	$ 13,397,998	$ 2,009,700	$ 15,407,698
4	$ 11,098,777	$ 1,664,817	$ 12,763,593	$ 14,974,233	$ 2,246,135	$ 17,220,368
5	$ 11,682,923	$ 1,752,438	$ 13,435,361	$ 15,762,351	$ 2,364,353	$ 18,126,704
6	$ 11,682,923	$ 1,752,438	$ 13,435,361	$ 15,762,351	$ 2,364,353	$ 18,126,704
7	$ 11,682,923	$ 1,752,438	$ 13,435,361	$ 15,762,351	$ 2,364,353	$ 18,126,704
8	$ 11,682,923	$ 1,752,438	$ 13,435,361	$ 15,762,351	$ 2,364,353	$ 18,126,704
9	$ 11,682,923	$ 1,752,438	$ 13,435,361	$ 15,762,351	$ 2,364,353	$ 18,126,704
10	$ 11,682,923	$ 1,752,438	$ 13,435,361	$ 15,762,351	$ 2,364,353	$ 18,126,704
Total, undiscounted	$ 105,730,453	$ 15,859,568	$121,590,021	$ 142,649,277	$ 21,397,391	$164,046,668
Total, PV 3%	$ 91,783,894	$ 13,767,584	$105,551,478	$ 123,832,876	$ 18,574,931	$142,407,807
Total, PV 7%	$ 77,221,278	$ 11,583,192	$ 88,804,470	$ 104,185,305	$ 15,627,796	$119,813,101
Annualized 3%	$ 10,759,872	$ 1,613,981	$ 12,373,853	$ 14,516,991	$ 2,177,549	$ 16,694,539
Annualized 7%	$ 10,994,573	$ 1,649,186	$ 12,643,759	$ 14,833,644	$ 2,225,047	$ 17,058,690

3. Waivers

This analysis did not speculate as to whether railroads that currently do not hold waivers related to mileage relief and block swap relief would file waivers in absence of the proposed rule. In absence of the proposed rule, FRA anticipates that the two railroads that hold waivers related to extended mileage for QMI-performed brake tests would request renewals of those waivers. FRA requests public comment regarding what percentage of relief that would be afforded by the proposed rule would overlap with the cost savings that currently come from existing extended mileage waivers and would come from potential related waiver renewals.

The proposed rule would result in cost savings because the two railroads that currently hold extended mileage waivers would no longer need to participate in quarterly meetings with FRA to discuss existing QMI waivers. Each of these Class I railroads incurs a cost associated with preparing for and attending quarterly waiver meetings with FRA. Based on FRA's MP&E's Division input, FRA estimates that each Class I railroad requires 20 hours to prepare for and attend each of its quarterly meetings. The total time needed for each railroad to prepare and attend waiver meetings annually is 80 hours. The total annual burden for the two Class I railroads to prepare for and attend quarterly meetings is $12,125.[50]

In the absence of the proposed rule, FRA expects that both of these railroads would seek to renew their waivers. The cost of filing a waiver includes costs related to conducting research, preparing the waiver, and submitting the waiver. This analysis estimates that the cost of fling a waiver is $2,960, which is similar to the cost for FRA to review and respond to a waiver submission.[51] A waiver remains in effect for a five-year period. For waiver relief to remain in effect longer than five years, a railroad would need to file a waiver renewal. The cost savings due

[50] Quarterly meeting cost, annual = number of meetings per year (4) * number of hours to attend/prepare for a meeting (20 hour) * number of railroads with waivers (2) * railroad administrative employee compensation rate ($75.78) = $12,125.

[51] *See* section XI. Government Administrative Costs. The cost for FRA to review and respond to a waiver is $2,960.

to these two railroads not having to file waiver renewals is $11,840, discounted $11,017 (PV, 3%) and $10,095 (PV, 7%). Table 10 summarizes the cost savings that would come from Class I railroads not needing to file waivers or participating in waiver meetings as $133,088, discounted $117,547 (PV, 3%) and $101,216 (PV, 7%).

Table 10: Total Cost Savings Due to Fewer Waivers

Analysis Year	Number of Waiver Renewals	QMI Waivers Cost	Quarterly Meeting (hours)	Quarterly Meeting Cost	Total Cost
1	1	$2,960	160	$12,125	$15,085
2	1	2,960	160	$12,125	15,085
3	0	-	160	$12,125	12,125
4	0	-	160	$12,125	12,125
5	1	2,960	160	$12,125	15,085
6	1	2,960	160	$12,125	15,085
7	0	-	160	$12,125	12,125
8	0	-	160	$12,125	12,125
9	0	-	160	$12,125	12,125
10	0	-	160	$12,125	12,125
Total, undiscounted	4	$11,840	1600	$121,248	$133,088
Total, PV 3%		$11,017		$106,530	$117,547
Total, PV 7%		$10,095		$91,121	$101,216
Annualized, 3%		$1,292		$12,489	$13,780
Annualized, 7%		$1,437		$12,974	$14,411

4. Compounded Regulatory Impacts

Recently, FRA published another deregulatory action related to railroad braking systems. That proposed rulemaking[52] would extend the time that rail cars may remain off-air without triggering a Class I brake test. This proposed rulemaking would provide relief from brake test requirements for cars with QMI-performed brake tests. The proposed rulemaking extending the off-air time is expected to generate cost savings that are intercorrelated with this proposed rulemaking.

Most notably, the allowance of unlimited block swapping would enable a larger universe of cars to be added to existing trains without triggering an additional Class I brake test – specifically, those cars that have been off a source of air for between 4 and 24 hours. If the *Brake System Safety Standards and Codification of Waivers* rulemaking is not implemented, the universe of cars that could take advantage of the proposed rule would be much smaller than estimated herein. The overlapping impact of these proposed rules may generate additional cost savings than were accounted for in this regulatory analysis. FRA requests public comment regarding the variables and factors that FRA should consider when estimating the intercorrelated costs savings that may come if both proposed rules are promulgated

[52] Miscellaneous Amendments to Brake System Safety Standards and Codification of Waivers. 85 FR 2494, 2495-2496 (Jan. 15, 2020).

5. Government Administrative Costs (Waiver Review Avoided)

The proposed rule would reduce FRA's costs associated with processing waivers. FRA estimated the labor hours required for FRA to review and approve each waiver. Table 11shows the compensation rate and estimate of time burden associated with each FRA employee responsible for reviewing waiver submission. In total, the cost to the Government to process and review each waiver submission is $2,960.

Table 11: Government Administrative Costs – Waiver Review

Title	Pay Grade	Wage Rate	Burdened Wage Rate (Wages*1.75)	Hours	Total Wages
FRA Field Inspector (Field Office[53])	GS-12	$47.82	$83.69	8	$669
Administrative Assistant (Field Office)	GS-12	$47.82	$83.69	4	$334
Administrative Assistant (DC[54])	GS-9	$30.54	$53.45	4	$214
MP&E Specialist (DC)	GS-14	$62.23	$108.90	16	$1,742
Total FRA Labor Cost					$2,960

FRA has issued two waivers associated with granting a railroad extended mileage between QMI-performed brake tests. If the proposed rule is not issued, FRA expects that each of the two railroads holding a waiver would request renewals of their waiver. Over the 10-year period of analysis, each of the two railroads would submit two renewal requests.

Table 12: Total Government Administrative Cost Savings

Analysis Year	Number of Waivers	Cost Savings
1	1	$ 2,960
2	1	2,960
3	0	0
4	0	0
5	0	0
6	1	2,960
7	1	2,960
8	0	0
9	0	0
10	0	0
Total, undiscounted	4	$ 11,840

[53] U.S. Office of Personnel Management, Pay & Leave, Salaries & Wages, Salary Table 2018-RUS (Rest of USA). Base rate, step 5. Wages adjusted by a factor of 1.2 to account for locality pay differentials, which vary by city. https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/18Tables/html/RUS_h.aspx.

[54] U.S. Office of Personnel Management, Pay & Leave, Salaries & Wages, Salary Table 2018-DCB (Washington DC). Base rate, step 5. https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/18Tables/html/DCB_h.aspx.

Total, PV 3%		$ 10,866
Total, PV 7%		$ 9,809
Annualized, 3%		$ 1,274
Annualized, 7%		$ 1,397

FRA savings from attending quarterly waiver meetings

In addition to the cost to process and review waivers, FRA would continue to have quarterly meetings with each railroad that has a waiver. FRA did not quantify the Governmental administrative costs associated with these meetings. FRA and Class I railroads have required quarterly meetings to discuss existing QMI waivers. However, a substantial portion of the time allotted for these meetings may also be attributed to other matters. The total discounted Government administrative cost savings that would come from issuing the proposed rule is $11,840. The discounted value of this is $10,866 (PV, 3%), and $9,809 (PV. 7%).

6. Total Cost Savings

Issuing the proposed rule would result in cost savings that are expected to accrue to railroads that utilize the eABS system. This analysis includes a low and high cost savings estimate. As shown in Table 13, the total cost savings that would come from the proposed rule range from $213.4 to $328.7 million. The discounted value of this is $185.6 million to $286.1 million (PV, 3%) and $156.6 to $241.4 million (PV, 7%).

Table 13: Total Cost Savings

	Mileage Relief ($)	**Unlimited Block Swapping ($)**	**Waiver Filing and Review ($)**	**Total Cost Savings ($)**
Low Cost Savings				
Undiscounted	91,641,000	121,590,000	145,000	213,376,000
Present Value 3%	79,932,000	105,551,000	128,000	185,611,000
Present Value 7%	67,672,000	88,804,000	111,000	156,587,000
Annualized 3%	9,370,000	12,374,000	15,000	21,759,000
Annualized 7%	9,635,000	12,644,000	16,000	22,295,000
High Costs Savings				
Undiscounted	164,554,000	164,047,000	145,000	328,746,000
Present Value 3%	143,527,000	142,408,000	128,000	286,063,000
Present Value 7%	121,514,000	119,813,000	111,000	241,438,000
Annualized 3%	16,826,000	16,695,000	15,000	33,536,000
Annualized 7%	17,301,000	17,059,000	16,000	34,376,000

VII. Benefits (Qualitative)

Because FRA lacks sufficient information about several benefits that may come from issuing the proposed rule, this analysis qualitatively explains these benefits. FRA requests public comment about the benefits that may come from granting relief from Part 232 requirements for railroads that utilize the eABS system.

Several benefits may come from the proposed rule including improved efficiency of railroad operations, greater accountability of QMIs and QPs in the performance of brake test duties, positive environmental impact, and the potential for improved safety.

The proposed rule would afford railroads more flexibility to determine movement of cars along the general railroad system. The added flexibility may improve the efficiency of freight railroad operations. Because railroads that utilize the eABS system would be allowed to conduct unlimited block swapping, certain logistical operations may be more efficiently performed with fewer trains. The ability to conduct unlimited block swapping may improve train car velocity and on-time performance, as cars that are set-out can more easily be picked up and railroads have increased ability to rearrange the placement of cars within trains to improve the timeliness of their delivery. This includes the ability to carry and arrange a larger number of cars in a train without triggering a new brake test, which may reduce congestion on the general railroad system.

In its petition, AAR noted that a reduction in congestion may benefit passenger customers. Railroads may also gain a business benefit from having readily available access to accurate information on brake tests. Over time, railroads may find the readily available information that the eABS would provide is complementary to Electronic Data Interchange (EDI) information. The more granular nature of information that the eABS would provide may improve a railroad's ability to plan supply chain operations.

FRA additionally recognizes the potential of added flexibility in the reallocation of resources could result in increased safety through such channels as increasing specialization in safety inspection functions.

Fewer brake tests may reduce the time that locomotives idle, which would result in a positive environmental impact. Improved efficiency in moving cars may also reduce fuel consumption and decrease locomotive emissions.

The proposed rule is expected to enable shippers to benefit from superior car utilization rates and more reliable service. Train passengers are expected to benefit from improved scheduling options due to a reduction in congestion along routes.

Railroads that utilize the eABS system would be able to track QMI and QP performance. A railroad could use this information to identify employees in need of additional training. Because the proposed rule would require the eABS system to retain brake test records for an increased period of time, there is expected to be an increased ability to ensure individual accountability in the performance of brake tests. The retention of this information would facilitate FRA's monitoring of brake test compliance.

The proposed rule may also improve safety because participating railroads would be incentivized to have QMIs perform Class I brake tests, which are more detailed than Class IA and Class II brake tests.

Lastly, AAR asserts that providing relief from brake tests would improve safety because there would be reduction in employee exposure to safety hazards including slips, trips and falls. The proposed rule would change when and where brake test would be performed. The implementation of eABS across a railroad's system would allow for optimization of its asset utilization. This analysis agrees that if fewer brake tests are performed, the level of exposure to hazards from conducting brake tests would likely decrease.

FRA considered the potential negative safety impact that may result from promulgating the proposed rule. Currently, the average car does not traverse the statutory maximum mileage distance between brake tests. Under the proposed rule, FRA expects that the distance that the average car travels between brake tests will increase. As cars may travel longer distances between brake tests, there might be a greater safety exposure between brake inspections regardless if the brake tests would be performed by QPs and/or QMIs. FRA does not anticipate that safety would be reduced if mileage relief for QMI-performed brake tests was provided for railroads that utilize an eABS system.

FRA does not expect that safety would be negatively impacted by the allowance of unlimited block swapping for railroads that utilize an eABS system as compared to those same railroads if they operated under existing regulations. As noted in the 2001 final rule and under current regulations, block swap limitations are in effect due to the difficulty of determining when a brake test on a car would need to be performed. Thus, under current regulations, multiple block swap events (i.e. more than one event) necessitates the classification of a new train and a Class I brake test.[55] FRA expects that thorough recordkeeping of individual car inspection information will alleviate this concern.

FRA requests public comment on the potential safety impact that would come from promulgating the proposed rule.

VIII. Results

Under the proposed rule, each of the seven Class I railroads would realize net cost savings from the issuance of the rule as proposed. FRA is unsure how many of the Class II and Class III railroads would utilize the eABS system. The proposed rule would result in net cost savings ranging between $150.1 to $300.1 million. The discounted value of this is $128.1 million to $259.6 million (PV, 3%) and $105.2 to $217.4 million (PV, 7%).

Table 14: Net Cost Savings (Low)

		Present Value ($)		Annualized ($)	
Section	**Undiscounted**	**3%**	**7%**	**3%**	**7%**
Cost Savings					
Increased Mileage	91,641,000	79,932,000	67,672,000	9,370,000	9,635,000
Unlimited Block Swapping	121,590,000	105,551,000	88,804,000	12,374,000	12,644,000
Waiver Filing and Review	133,000	118,000	101,000	14,000	14,000
Government Waiver Review	12,000	11,000	10,000	1,000	1,000
Total Cost Savings	213,376,000	185,612,000	156,587,000	21,759,000	22,294,000

[55] *See* 66 FR at 4119.

New Costs					
System Development and Maintenance	13,845,000	12,665,000	11,427,000	1,485,000	1,627,000
Training	6,830,000	6,830,000	6,830,000	801,000	972,000
Hardware	42,613,000	37,982,000	33,188,000	4,453,000	4,725,000
Total New Costs	63,288,000	57,477,000	51,445,000	6,738,000	7,325,000
Net Cost Savings	150,088,000	128,135,000	105,142,000	15,021,000	14,969,000

Table 15: Net Cost Savings (High)

		Present Value ($)		**Annualized ($)**	
Section	**Undiscounted**	**3%**	**7%**	**3%**	**7%**
Cost Savings					
Increased Mileage	164,554,000	143,527,000	121,514,000	16,826,000	17,301,000
Unlimited Block Swapping	164,047,000	142,408,000	119,813,000	16,695,000	17,059,000
Waiver Filing	133,000	118,000	101,000	14,000	14,000
Government Waiver Review	12,000	11,000	10,000	1,000	1,000
Total Cost Savings	328,746,000	286,064,000	241,438,000	33,536,000	34,375,000
New Costs					
System Development and Maintenance	13,845,000	12,665,000	11,427,000	1,485,000	1,627,000
Training	5,126,000	5,126,000	5,126,000	601,000	730,000
Hardware	9,690,000	8,637,000	7,547,000	1,013,000	1,075,000
Total New Costs	28,661,000	26,428,000	24,100,000	3,099,000	3,432,000
Net Cost Savings	300,085,000	259,636,000	217,338,000	30,437,000	30,943,000

IX. Alternatives

This section presents three alternatives to the proposed rule. Each alternative is discussed along with estimated costs, cost savings, and benefits.

1. Baseline/No Action Alternative

An alternative to this rulemaking would be to maintain the status quo (i.e., do nothing). If FRA did not issue the proposed rule, railroads would need to file waivers seeking mileage relief in order to perform Class I brake tests after distances beyond what is permitted by the current regulation. As such, the baseline scenario would result in inefficiencies because FRA would likely approve petitions that would seek relief from Class I brake tests performed by QMIs beyond what is permitted by the current regulation based on recent experience with such waivers. Thus, the no action alternative would result in a burden on railroads from the cost of submitting a waiver and the opportunity cost of having to wait to receive FRA approval.

If FRA does not issue this proposed rule, railroads would continue to incur costs to submit petitions for waivers of compliance with current requirements to receive some of the relief contemplated in this proposed rule. Without this proposed rule, railroads would likely continue using the waivers under which they currently operate related to extended mileage between Class I brake tests. If FRA continually approves these renewal waivers, it is reasonable to codify the waivers rather than to require renewals for an indefinite period.

In the absence of the proposed rule, railroads may be less likely to pursue eABS because there would be greatly reduced incentives to do so. Because brake test requirements would continue to be calculated on a train-level basis, the eABS system's ability to track individual cars would provide little regulatory benefit to railroads. Railroads would not utilize the eABS system and therefore would not incur any costs, cost savings, or benefits related to adoption of the eABS system.

2. Extension for QMIs to 2,500 Miles and QPs to 1,500 Miles

Another alternative to the proposed rule would be to grant the AAR petition for rulemaking in its entirety. This would include relief for Class I brake tests performed by a QP to permit a car to run for 1,500 miles between brake tests. FRA does not have sufficient evidence to show that increasing that mileage for a QP-performed inspection would be just as safe as the current regulations, which is a prerequisite required by 49 U.S.C. 20302(d)(2) to amending regulations for installing, inspecting, maintaining, and repairing power and train brakes. In the proposed rule, FRA is allowing for extensions on brake tests up to 2,500 miles for certain brake tests performed by a QMI. However, in the proposed rule, FRA is not allowing for any additional mileage for brake tests performed by a QP.

In the primary analysis, FRA only estimated the costs and cost savings for allowing 2,500 miles for QMI brake tests, while keeping 1,000 miles for QP brake tests. This alternative (which would allow for 1,500 miles for QP brake tests) would provide greater cost savings. Under this alternative, the proposed rule's costs would remain the same as there would still be an incentive to invest in eABS to track cars that have received a brake test by a QMI.

An increase in the permitted mileage between brake tests for both QPs (up to 1,500 miles) and QMIs (up to 2,500 miles) would eliminate the need for 40,500 Class IA brake tests annually.[56] Compared with the primary analysis, this alternative analysis would result in 43.8 percent greater cost savings from mileage relief using the high-cost estimate.[57] Table 16 shows the cost savings for this alternative.

Table 16: Total Cost Savings Due to Mileage Relief for Both QMIs and QPs

	1.5 Hour Brake Test ($)		2.0 Hour Brake Test ($)	
Year	**Low Estimate**	**High Estimate**	**Low Estimate**	**High Estimate**
1	7,729,526	10,409,513	10,306,238	13,879,350
2	15,459,053	20,819,025	20,612,475	27,758,700
3	15,459,053	20,819,025	20,612,475	27,758,700

[56] The estimate of 45,000 fewer brake tests was reduced by 10% to account for cars not traveling the maximum distance between brake tests. (45,000 * 0.90 = 40,500).
[57] Percentage increase in cost savings from mileage relief, both QPs and QMIs = [(number of brake tests eliminated given mileage relief for QPs and QMIs (40,500)) – (estimate of brake tests eliminated in primary analysis (25,272))]/(estimate of brake tests eliminated in primary analysis (40,500) = 0.6025 or 60.25%.

4	15,459,053	20,819,025	20,612,475	27,758,700
5	15,459,053	20,819,025	20,612,475	27,758,700
6	15,459,053	20,819,025	20,612,475	27,758,700
7	15,459,053	20,819,025	20,612,475	27,758,700
8	15,459,053	20,819,025	20,612,475	27,758,700
9	15,459,053	20,819,025	20,612,475	27,758,700
10	15,459,053	20,819,025	20,612,475	27,758,700
Total, undiscounted	146,860,999	197,780,738	195,818,513	263,707,650
Total, PV 3%	128,095,393	172,508,709	170,797,213	230,011,612
Total, PV 7%	108,448,844	146,050,296	144,601,299	194,733,727
Annualized, PV 3%	15,016,688	20,223,283	20,022,644	26,964,378
Annualized, PV 7%	15,440,676	20,794,276	20,587,972	27,725,702

The primary analysis estimates the discounted cost savings from the additional mileage between QMI brake tests from between $79.9 million to $143.5 million (PV, 3%), and $67.7 million to $121.5 million (PV, 7%). This alternative would create a discounted cost savings from mileage relief from between $115.0 million to $206.4 million (PV, 3%), and $97.3 million to $174.8 million (PV, 7%). However, due to safety concerns, FRA cannot support extending the mileage limit for QP-performed brake tests. FRA invites public comment and supporting data related to the safety impact of extending the mileage for brake tests performed by QPs.

3. Canadian Law

Another alternative would be to adopt brake test requirements similar to those established by Transport Canada. Per Canadian regulations, a train is permitted to make a movement of any distance after undergoing an initial terminal test that is the equivalent of the Class I brake test. The Canadian brake test must be performed by a certified inspector, which is equivalent to a QMI in the United States.

If trains were permitted to travel for an unlimited distance for a single train movement for each Class I brake test, there would be fewer Class I brake tests conducted in the United States. However, permitting more than 2,500 miles between QMI-performed brake tests may have limited additional cost savings because most one-way routes in the U.S. are less than 2,500 miles.

Canadian railroads do not use eABS, and Transport Canada regulations do not allow for unlimited pick-ups and set-outs between brake tests. Therefore, the proposed rule would allow more flexibility for railroads by allowing for unlimited block swaps without requiring an additional Class I brake test. In Canada, after the one-way route has been completed or the limitation on the number of pick-ups or set-outs has been exceeded, the train is required to undergo another brake test. Under the proposed rule, cars operating with mileage remaining on an associated eABS may be permitted to continue in a new train movement without a Class I brake test.

Under this alternative, railroads would not need to utilize the eABS system, so they would not incur any costs. However, this alternative would likely result in smaller net cost savings because railroads would not be provided with block swap relief.

X. Sensitivity Analysis

The findings, results, and conclusions of this analysis could change if the assumptions or inputs were to change. In other words, the findings of this analysis are sensitive to its assumptions. This section analyzes two input changes that would alter the cost savings estimates presented in the primary analysis.

1. Increased proportion of QMI-performed brake tests

The primary analysis assumes that QMIs would perform 62.4 percent of the Class I brake tests and QPs would perform the remaining 37.6 percent. There are no cost savings for brake tests performed by QPs.

Under the proposed rule, railroads may see benefit to having more Class I brake tests done by QMIs. For this sensitivity analysis, FRA assumes that QMIs would instead perform 75 percent of the Class I brake tests and QPs would perform the other 25 percent. Under this new assumption, the proposed rule would reduce the number of Class IA brake tests by 30,375 annually.[58, 59]

Table 17: Adjusted Cost Savings Due to Higher Number of QMI-Performed Brake Tests

Year	Low Estimate
1	5,797,145
2	11,594,289
3	11,594,289
4	11,594,289
5	11,594,289

[58] Number of brake tests eliminated: QMIs perform 75% of brake tests = number of brake tests eliminated given mileage relief for QPs and QMIs (45,000) * percentage of brake tests performed by QMIs (75%) * adjustment factor for cars not traveling entire mileage relief between tests (0.90) = 30,375.

[59] Percentage increase in cost savings from mileage relief: QMIs perform 75% of brake tests = [(number of brake tests eliminated given 75% of brake tests performed by QMIs (30,375)) – (estimate of brake tests eliminated in primary analysis (25,272))]/(estimate of brake tests eliminated in primary analysis (25,272)) = 0.2019 or 20.2%.

6	11,594,289
7	11,594,289
8	11,594,289
9	11,594,289
10	11,594,289
Total, undiscounted	110,145,749
Total, PV 3%	96,071,545
Total, PV 7%	81,336,633
Annualized, PV 3%	11,262,516
Annualized, PV 7%	11,580,507

As shown in Table 9a, the total cost savings from extending mileage limits between QMI-performed brake tests ranges from$105.6 million to 142.4 million (PV, 3%) and $88.8 million to $119.8 million (PV, 7%). If QMIs were to perform 75% of the brake tests, railroads would realize a higher cost savings. As shown in Table 17, this sensitivity analysis estimates a cost savings of $96.1 million to $172.5 million (PV, 3%) and $81.3 million to $146.1 million (PV, 7%).

2. Filing of New Waivers for QMI Relief and Block Swap Relief

In absence of the proposed rule, it is possible that additional Class I railroads would file new waivers seeking relief from QMI mileage limitations and block swap relief. This sensitivity analysis assumes that each of the five Class I railroads that currently do not hold a waiver for mileage relief would file a waiver seeking mileage relief. This analysis assumes that one Class I railroad would file a waiver in each year, year 1 to year 5. In year 6 to year 10, one Class I railroad would file a waiver renewal. As shown in Table 18, the potential increase in discounted cost savings that would come from these railroads not having to file waivers for block swap relief is $29,600, $26,007 (PV, 3%), and $22,245 (PV, 7%).

This sensitivity analysis also assumes that three Class I railroads would each file one new waiver for block swap relief in year 1. The remaining other four Class I railroads would file a waiver for block swap relief in years 2, 3, 4, and 5 respectively. In year 6, the initial three Class I railroads would file a waiver renewal. In years 7, 8, 9, and 10, each of the other Class I railroads would file a waiver renewal. As shown in Table 18, the potential increase in discounted cost savings that would come from these railroads not having to file waivers for block swap relief is $41,440. The discounted value of this is $37,034 (PV, 3%), and $32,386 (PV, 7%). The total discounted cost savings related to not having to file waivers is $71,040. The discounted value of this is $63,040 (PV, 3%), and $54,631 (PV, 7%).

Table 18: Total Cost Savings Due to Fewer Expected New Waivers

Analysis Year	Number of QMI Waivers	QMI Waivers Cost	Number of Block Swap Waivers	Block Swap Labor Cost	Total Cost
1	1	$2,960	3	$8,880	$11,840
2	1	$2,960	1	$2,960	$5,920
3	1	$2,960	1	$2,960	$5,920
4	1	$2,960	1	$2,960	$5,920

5	1	$2,960	1	$2,960	$5,920
6	1	$2,960	3	$8,880	$11,840
7	1	$2,960	1	$2,960	$5,920
8	1	$2,960	1	$2,960	$5,920
9	1	$2,960	1	$2,960	$5,920
10	1	$2,960	1	$2,960	$5,920
Total, undiscounted	10	$29,600	14	$41,440	$71,040
Total, PV 3%		$26,007		$37,034	$63,040
Total, PV 7%		$22,245		$32,386	$54,631
Annualized, 3%		$3,703		$5,273	$8,976
Annualized, 7%		$2,608		$3,797	$6,404

As discussed in section VII of this analysis, railroads would need to have quarterly meetings with FRA to discuss existing QMI waivers. Based on FRA's MP&E Division's subject matter expert input, FRA estimates that each Class I railroad requires 20 hours to prepare for each of its quarterly meetings. The total time needed for each railroad to prepare and attend a waiver meeting is 80 hours. The total annual burden is $12,125. [60]

Table 19 shows the cost savings that may come from Class I railroads not having to attend and prepare for quarterly waiver meetings. The discounted cost savings to the industry for the ten-year period is $675,958, $579,882 (PV, 3%), and $480,051 (PV, 7%). In addition, Government administrative cost savings would accrue from FRA not needing to review waivers. FRA requests public comment with regard to whether Class I railroads would file new waivers for QMI mileage extension and block swap relief if FRA does not issue the proposed rule.

Table 19: Total Cost Savings Due to Fewer Quarterly Meetings for Expected New QMI Waivers and New Block Swap Waivers

Analysis Year	Hours Preparing	QMI Waivers Cost	Number of Block Swap Waivers	Block Swap Labor Cost	Total Cost
1	80	$6,062	240	$18,187	$24,250
2	160	$12,125	320	$24,250	$36,374
3	320	$24,250	400	$30,312	$54,562
4	400	$30,312	480	$36,374	$66,686
5	480	$36,374	540	$40,921	$77,296
6	480	$36,374	620	$46,984	$83,358
7	480	$36,374	620	$46,984	$83,358
8	480	$36,374	620	$46,984	$83,358
9	480	$36,374	620	$46,984	$83,358
10	480	$36,374	620	$46,984	$83,358
Total, undiscounted	3,840	$290,995	5,080	$384,962	$675,958
Total, PV 3%		$248,757		$331,125	$579,882

[60] Quarterly meeting cost, annual = number of meetings per year (4) * number of hours to attend/prepare for a meeting (20 hour) * number of railroads with waivers (2) * railroad administrative employee compensation rate ($75.78) = $12,125.

Total, PV 7%		$204,848		$275,203	$480,051
Annualized, 3%		$35,417		$47,145	$82,562
Annualized, 7%		$24,014		$32,262	$56,277

XI. Conclusion

The proposed rule is designed to encourage the use of eABS systems by providing relief from Part 232 requirements for railroads that use the eABS system. FRA is confident that the use of the eABS system would alleviate concerns regarding cars being inspected in a timely manner. The proposed rule would provide relief from brake tests by permitting unlimited block swapping to occur for railroads that utilize the eABS system. FRA also found sufficient evidence to propose an extension of the mileage permitted between brake tests performed by a QMI.

The proposed rule would result in net cost savings ranging between $150.1 to $300.1 million. The discounted value of this is $128.1 million to $259.6 million (PV, 3%) and $105.2 to $217.4 million (PV, 7%). The annual discounted cost savings would be $13.4 to $30.4 million (PV, 3%) and $13.3 to $30.9 million (PV, 7%). This analysis found that issuing the proposed rule would improve freight railroad operations without adversely impacting safety. FRA seeks comments on the inputs used throughout this analysis.

Exhibit 1: Low Cost Estimate

Year	System Development and Maintenance	Training	Hardware	Total
1	$4,700,000	$5,125,753	$3,018,750	$12,844,503
2	1,355,000	-	90,563	1,445,563
3	1,105,000	-	90,563	1,195,563
4	955,000	-	90,563	1,045,563
5	955,000	-	3,018,750	3,973,750
6	955,000	-	90,563	1,045,563
7	955,000	-	90,563	1,045,563
8	955,000	-	90,563	1,045,563
9	955,000	-	3,018,750	3,973,750
10	955,000	-	90,563	1,045,563
Total Cost, undiscounted	$13,845,000	$5,125,753	$9,690,188	$28,660,941
Total Cost, PV 3%	$12,665,473	$5,125,753	$8,637,074	$26,428,300
Total Cost, PV 7%	$11,426,894	$5,125,753	$7,546,918	$24,099,565
Annualized, PV 3%	$1,484,780	$600,895	$1,012,529	$3,098,203
Annualized, PV 7%	$1,626,933	$729,792	$1,074,511	$3,431,236

Exhibit 2: High Cost Estimate

Year	System Development and Maintenance	Training	Hardware	Total
1	$4,700,000	$6,830,043	$13,275,000	$24,805,043
2	1,355,000	-	398,250	1,753,250
3	1,105,000	-	398,250	1,503,250
4	955,000	-	398,250	1,353,250
5	955,000	-	13,275,000	14,230,000
6	955,000	-	398,250	1,353,250
7	955,000	-	398,250	1,353,250
8	955,000	-	398,250	1,353,250
9	955,000	-	13,275,000	14,230,000
10	955,000	-	398,250	1,353,250
Total Cost, undiscounted	$13,845,000	$6,830,043	$42,612,750	$63,287,793
Total Cost, PV 3%	$12,665,473	$6,830,043	$37,981,669	$57,477,184
Total Cost, PV 7%	$11,426,894	$6,830,043	$33,187,688	$51,444,625
Annualized, PV 3%	$1,484,780	$800,689	$4,452,610	$6,738,079
Annualized, PV 7%	$1,626,933	$972,444	$4,725,180	$7,324,557

Exhibit 3: Low Cost Savings Estimate

Year	Mileage Extension ($)	Block Swaps ($)	Waiver Filing ($)	Total Cost Savings ($)
1	4,823,000	6,718,000	15,000	11,556,000
2	9,646,000	10,077,000	15,000	19,738,000
3	9,646,000	11,420,000	12,000	21,078,000
4	9,646,000	12,764,000	12,000	22,422,000
5	9,646,000	13,435,000	15,000	23,096,000
6	9,646,000	13,435,000	15,000	23,096,000
7	9,646,000	13,435,000	12,000	23,093,000
8	9,646,000	13,435,000	12,000	23,093,000
9	9,646,000	13,435,000	12,000	23,093,000
10	9,646,000	13,435,000	12,000	23,093,000
Total Cost, undiscounted	91,641,000	121,590,000	133,000	213,364,000
Total Cost, PV 3%	79,932,000	105,551,000	118,000	185,601,000
Total Cost, PV 7%	67,672,000	88,804,000	101,000	156,577,000
Annualized, PV 3%	9,370,000	12,374,000	14,000	21,758,000
Annualized, PV 7%	9,635,000	12,644,000	14,000	22,293,000

Exhibit 4: High Cost Savings Estimate, Industry Cost Savings

Year	Mileage Extension ($)	Block Swaps ($)	Waiver Filing ($)	Total Cost Savings ($)
1	8,661,000	9,063,000	15,000	17,739,000
2	17,321,000	13,595,000	15,000	30,931,000
3	17,321,000	15,408,000	12,000	32,741,000
4	17,321,000	17,220,000	12,000	34,553,000
5	17,321,000	18,127,000	15,000	35,463,000
6	17,321,000	18,127,000	15,000	35,463,000
7	17,321,000	18,127,000	12,000	35,460,000
8	17,321,000	18,127,000	12,000	35,460,000
9	17,321,000	18,127,000	12,000	35,460,000
10	17,321,000	18,127,000	12,000	35,460,000
Total Cost, undiscounted	164,554,000	164,047,000	133,000	328,734,000
Total Cost, PV 3%	143,527,000	142,408,000	118,000	286,053,000
Total Cost, PV 7%	121,514,000	119,813,000	101,000	241,428,000
Annualized, PV 3%	16,826,000	16,695,000	14,000	33,535,000
Annualized, PV 7%	17,301,000	17,059,000	14,000	34,374,000

Appendix A – Initial Regulatory Flexibility Analysis

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) and EO 13272 (67 FR 53461, Aug. 16, 2002) require agency review of proposed and final rules to assess their impacts on small entities. An agency must prepare an Initial Regulatory Flexibility Analysis (IRFA) unless it determines and certifies that a rule, if promulgated, would not have a significant economic impact on a substantial number of small entities. FRA has not determined whether this proposed rule would have a significant economic impact on a substantial number of small entities.

Therefore, FRA prepares this IRFA to facilitate public comment on the potential small business impacts of the requirements proposed in this NPRM. FRA invites all interested parties to submit data and information regarding the potential economic impact on small entities that would result from the adoption of the proposals in this NPRM. FRA will consider all information and comments received in the public comment process when evaluating the economic impact on small entities.

1. Reasons for Considering Agency Action

In response to a petition from AAR, FRA proposes to amend its brake system standards to address operations using an electronic air brake slip (eABS) system. This system has the capability to track detailed brake test information at the individual car level, including the distance traveled between brake tests. Under current regulations, railroads keep track of brake test information at the train consist level, and generally use paper records, known as air brake slips. Also, except in limited circumstances, current regulations require a railroad to conduct a new Class I brake test when cars are added to or removed from the train. This NPRM would allow the use of eABS technology and encourage its use by extending the distance permitted between Class I brake tests, and reducing the current restrictions on adding to or removing cars from a train (i.e., block swapping) without performing additional brake tests where eABS is used. Specifically, FRA proposes:

- Extending the maximum allowable distance traveled between Class I brake tests from 1,500 miles to 2,500 miles for eABS cars receiving QMI-performed brake tests, and

- Allowing railroads, if the train is solely made up of eABS cars, to add or remove multiple cars to or from a train without conducting additional brake tests as currently required.

The use of the eABS system is optional. FRA estimates that by taking advantage of this system, small entities could realize cost-savings by reducing the occurrence of Class I brake tests performed. This NPRM would also give small entities more flexibility in block swapping, which would especially benefit small railroads that handle frequent or large blocks of rail cars. Small railroads that opt to use the eABS system may incur some costs for training employees, and hardware costs.

2. A Succinct Statement of the Objectives of, and the Legal Basis for, the Proposed Rule

The objective of this proposed rule is to provide an alternative regulatory framework to permit use of the eABS system technology. The proposed rule affects 49 CFR Part 232.[61] In addition to providing significant operational efficiencies for the large Class I railroads that developed the eABS system, the eABS system would provide the means for participating small entities to achieve some cost savings.

3. A Description of and, Where Feasible, an Estimate of the Number of Small Entities to Which the Proposed Rule Would Apply

The Regulatory Flexibility Act of 1980 requires a review of proposed and final rules to assess their impact on small entities, unless the Secretary certifies that the rule would not have a significant economic impact on a substantial number of small entities. "Small entity" is defined in 5 U.S.C. 601 as a small business concern that is independently owned and operated, and is not dominant in its field of operation. The U.S. Small Business Administration (SBA) has authority to regulate issues related to small businesses, and stipulates in its size standards that a "small entity" in the railroad industry is a for profit "line-haul railroad" that has fewer than 1,500 employees, a "short line railroad" with fewer than 500 employees, or a "commuter rail system" with annual receipts of less than seven million dollars. *See* "Size Eligibility Provisions and Standards," 13 CFR part 121, subpart A.

Federal agencies may adopt their own size standards for small entities in consultation with SBA and in conjunction with public comment. Under that authority, 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). The $20 million limit is based on the Surface Transportation Board's revenue threshold for a Class III railroad carrier. Railroad revenue is adjusted for inflation by applying a revenue deflator formula in accordance with 49 CFR 1201.1-1. The current threshold is $39.2 million.[62] FRA is using this definition for the proposed 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 proposed rule would be applicable to all railroads, although not all changes would be relevant to all railroads. Based on the railroads that are required to report accident/incidents to

[61] The Secretary of Transportation (Secretary) has broad statutory authority to "prescribe regulations and issue orders for every area of railroad safety." *See* 49 U.S.C. 20103.
[62] The Class III railroad revenue threshold is $39,194,876 or less, for 2018. (The Class II railroad threshold is between $39,194,876 and $489,935,956; and the Class I railroad threshold is $489,935,956 or more.) *See* STB, available at
https://www.stb.gov/econdata.nsf/d03c0c2161a050278525720a0044a825/1acf737531cf98ce8525841e0055e02e.

FRA under part 225, FRA estimates that there are approximately 736 Class III railroads, with 695 of them operating on the general system. These are of varying size, with some a part of larger holding companies. The industry trade organization representing small railroads, the American Short Line and Regional Railroad Association (ASLRRA), reports the average freight revenue per Class III railroad is $4.8 million.[63]

According to ASLRRA, Class III railroads generally perform brake tests in three situations: 1) when picking up cars from an interchange point, 2) when transferring cars from one railroad to another (i.e., bridge service), and 3) when picking up cars from sidings or main track. FRA expects that larger Class III railroads would likely be impacted by regulatory changes regarding the eABS system, because eABS may yield private cost savings to these railroads to justify using the system. Other Class III railroads would also be impacted by regulatory changes regarding the eABS system because they interact with the Class I railroads, either when they interchange cars with the Class I railroads, or provide bridge service to Class I railroads. Of the carloads moved on their rails, 48 percent of rail traffic is transferred from a Class I railroad to a short line for final delivery, and 10 percent of traffic is transported from one Class I to another (i.e., bridge service).[64] Given the amount of terminated and bridge traffic with Class I railroads, the eABS system may be part of the railroad environment for a substantial number of Class III railroads. However, FRA emphasizes that the proposed rule presents a voluntary alternative; Class III railroads can maintain their existing business practices.

<u>Costs</u>

Based on AAR data, the Class I railroads would incur costs for training employees, purchasing hardware to enter in air brake test data, and Railinc costs for developing the eABS system. FRA expects the costs for the Class III railroads that choose to participate in the system will be much less than those of the Class I railroads, because Class III railroads have significantly fewer employees, less rail traffic, and operate over shorter distances. The eABS system is a new system and its effects will become better known over time. The following estimates are preliminary, intended to identify and encourage comment on the relevant factors affecting small entities.

Training

The employees responsible for conducting brake tests are QMIs (Surface Transportation Board (STB), Employee Group 400, Maintenance of Equipment and Stores), and QPs (STB Employee Group 600, Transportation, Train and Engine). As described in the RIA above, the annualized training costs using a 7 percent interest rate range from about $730,000 to $972,000, or an average of $851,000. On a per employee basis, the cost is $14.42 per employee for the Class I railroads. The ASLRRA *Facts and Figures 2017* reports there are 12,900 Class III employees (p. 12). Because employees of Class III railroads "wear many hats," this analysis assumes all Class III employees would require training. This training could also be combined with existing power brake training. Using the same per employee cost for training as that of employees of Class I

[63] American Short Line and Regional Railroad Association (ASLRRA), *Short Line and Regional Railroad Facts and Figures,* p. 12 (2017 pamphlet) [hereinafter *Facts and Figures 2017*].
[64] ASLRRA, *Facts and Figures* 2017, p. 10.

railroads, the cost for training all Class III employees is $186,066. Scaling down from the industry level to the railroad level, the cost is estimated at $268 per Class III railroad on average.[65]

Hardware

For Class I railroads, the primary method for entering and retrieving data from the eABS system would be handheld electronic devices. The RIA estimates these electronic devices cost between $700 to $900 each (averaging $800), attributes 25 percent of their use for the eABS system, and assumes devices would be shared among employees depending on if the employees are QMIs or QPs.

For Class III railroads, ASLRRA stated an important factor for its members would be how information is entered into the eABS system. Some Class III railroads operate in locations where there may not be an available wireless signal to connect to the Internet, so allowing data entry by radio or telephone would provide them alternatives for implementing an eABS system. Class III railroads also noted they currently supply rail car-level data through Electronic Data Interchange (EDI).[66] Thus, adding a small number of extra fields for the eABS system would add a small marginal cost to their existing procedures. Furthermore, at locations where Class III railroads interchange with Class I railroads, or provide bridge service, the Class I railroad may assist the Class III railroad in entering in the information for eABS. The Class I railroad may have an incentive to facilitate the Class III railroad's eABS use to potentially avoid a time-consuming Class I brake test for the interchanged or bridge-service rail cars.

Nevertheless, FRA accounts for some Class III railroads that may purchase electronic devices to enter data into the eABS system. This analysis estimates that a Class III railroad's acquisition cost is around $200. The primary analysis estimates the total cost of hand-held device acquisition to include the initial acquisition cost, annual acquisition cost due to lost or damaged devices, and periodic replacement cost (which would occur every four years). Similarly, this analysis increases the small business initial acquisition cost ($200) by a factor of 1.5 to account for costs related to acquiring additional hand-held devices due to loss, damage, or periodic replacement. Based on the RIA analysis for Class I railroads, but estimating one electronic device per Class III railroad (which would be shared among employees), FRA accounts for a nominal $300 annual cost per Class III railroad.[67]

Separate from hardware needed to enter in data to the eABS system, there may be other hardware requirements that may constrain the Class IIIs eABS use to large points of interchange. The eABS system requires railroads to keep track of the mileage that cars are operated. FRA expects Class I railroads will use Automatic Equipment Identification (AEI) readers to read the

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[65] Calculations: Cost per employee: $851,000 average annualized training cost/59,000 QP and QMI Class I employees = $14.42 per employee. Cost for all Class III employees: 12,900 employees * $14.42 = $186,066. Cost per Class III railroad: $186,066/695 Class III railroads on the general system = $267.72, or about $268.

[66] EDI is a standard for sending data electronically from computer to computer. *See* John H. Armstrong, *The Railroad: What it Is, What It Does, 4th Edition* (Omaha, NE: Simmons-Boardman Books, 1998), p. 153.

[67] Hand-held device, cost share for eABS usage for small businesses, total acquisition cost = Hand-held device, cost share for eABS usage for small businesses ($200) * factor to additional for additional hand-held device acquisition cost (1.5) = $300.

AEI tags on rail cars to establish car mileage. AEI tags on rail cars are common, but the AEI readers are primarily located at large points of interchange or yards. While Class III railroads certainly interchange with Class I railroads, most Class III railroad do not operate in yards. Thus, Class III railroad use of eABS may be hindered, unless other records are used to record the mileage of cars they operate. For example, if a Class III railroad operates the same routes routinely, the mileage for those routes could be pre-populated on the manifest or consist record.

Railinc: eABS Development and Maintenance Costs

The Class I railroads have stated that they will continue to invest in developing their own individual interfaces to "dial-in" to Railinc to enter and receive information from the eABS system. Railinc has indicated that it will also develop a portal for the railroads to use to enter in eABS information, and for future enhancements and maintenance. The Class I railroads are making these large investments in return for significant operational cost-savings. (See the RIA. above.)

However, as the eABS system is still being developed, it is unknown what costs Class III railroads would incur to access the system, and for Railinc to develop a portal for the Class III railroads. In a meeting between AAR and FRA, one possibility discussed was that Class I railroads may help Class III railroads to access or enter data into the eABS system. Such an arrangement might benefit both parties when they interchange cars or in bridge service by reducing delays caused by redundant brake tests. Also, as noted above, if Class III railroads can use existing methods to enter information into the eABS system, they could send data directly to Railinc or to a dispatch center, in conjunction with the data they currently send using EDI. This flexibility would allow the Class III railroads to participate in the eABS system at low cost. Railinc may also, for example, charge Class III railroads a per-use charge based on Railinc computer time used, or a subscription service with a monthly charge.

For a broad approximation of potential Class III costs, this analysis uses the Class I and Railinc eABS development and maintenance costs annualized cost (using a 7-percent discount rate and a 10-year period of analysis) of $1.6 million. Because eABS works at the car level, and Class I railroads reported they originated 28.65 million carloads, the cost per carload is about $0.06 per car per year.[68] Class III railroads reported they handle 6.52 million carloads per year; applying the above cost per car to these carloads yields Class III industry costs of $370,200.[69] Then, dividing by the number of Class III railroads results in a per railroad cost of about $533 per year.[70] This cost may be overstated to the extent that not all carloads handled by Class III railroads would use the eABS system (likely only those used in interchange or bridge service with Class I railroads).

Total Cost

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[68] Association of American Railroads, *Railroad Facts: 2018 Edition* (Washington, DC, 2018), p. 9.
[69] ASLRRA, *Facts and Figures* 2017, p. 12.
[70] Cost per Class I carload originated = $1,626,933 Class I eABS annualized cost for Railinc/28,654,347, no. of carloads originated = $0.057 per carload. Cost for all Class IIIs = $0.057 * 6,520,000 carloads handled = $370,192. Cost per Class III railroad = $370,192/695 Class III railroads = $533.

Adding together the annualized costs per Class III railroad for the categories of Training, Hardware, and Railinc results in costs of about $1,100 per railroad. ($268 Training + $300 Hardware + $533 Railinc = $1,101 Total Costs). These costs are a very small percentage of the average freight revenue for a Class III railroad, amounting to less than one-half percent.[71] Based on this analysis, if the Class III railroads are provided appropriate flexibility as discussed above, there will not be a significant economic impact on small entities. Furthermore, FRA again notes that using the eABS system would be voluntary.

Cost Savings and Other Benefits

FRA estimates the provisions of this NPRM that allow more mileage between Class I brake tests, and that reduce the restrictions on pick-ups and set-outs would yield significant cost savings for the Class I railroads. These provisions would result in fewer brake tests performed and less redundant train stops.

Class III railroads would also realize some cost-savings from the proposed rule, but to a much lesser degree. Class III railroads' average length of haul is shorter, averaging 32 miles, with a median of 25 miles.[72] An average Class III railroad train could make many more trips before being restricted by even the current maximum limits of 1,500 consecutive miles (with a QMI-performed brake test) or 1,000 consecutive miles (with a QP-performed brake test) before a Class I brake test is due. Given that Class III railroads generally operate shorter trains than Class I railroads, the time saved in performing brake tests would be less. For the provision allowing multiple pick-ups and set-outs without another Class I brake test, Class III railroads would also benefit because they regularly pick-up and set-out cars. The benefits would depend on the nature of the Class III railroad's operations (for example, the number of cars interchanged), and would be less than those of the Class I railroads because of the fewer numbers of carloads handled. Also, Class III railroads currently have some relief under the transfer train brake test provision; this test is a less stringent brake test for train consists received in interchange, if the train will move 20 miles or less.[73]

In addition to cost savings, Class III railroads would experience similar types of non-quantified benefits as Class I railroads would from this NPRM. With fewer train stops and less train handling for brake tests (whether for mileage limits or pick-ups or set-outs), employees could be exposed to less risk of injury from walking in and around tracks and rail equipment. FRA expects the incidence of slips, trips, and falls—a common source of injury—to decrease. Other injuries related to applying handbrakes and conducting brake tests, including those related to movements involving bending and straining, could also decrease.

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[71] Class III average freight revenue per railroad = $4.75 million. See *Facts and Figures* 2017, p. 12. Calculation: $4,750,000/$1,226 costs = 0.00026 or about 0.03%.
[72] ASLRRA, *Facts and Figures* 2017, p. 12.
[73] See *Transfer train* as defined in 49 CFR § 232.5, and *Transfer train brake tests* in 49 CFR 232.215.

4. A Description of the Projected Reporting, Recordkeeping, and Other Compliance Requirements of the Rule, Including an Estimate of the Class of Small Entities That Will be Subject to the Requirements and the Type of Professional Skill Necessary for Preparation of the Report or Record

If Class III railroads use the eABS system, they would likely need to train their employees, and keep a record of that training. The eABS system would also require them to submit incrementally more information about a rail car's brake test and car mileage compared to current regulations. Among Class III railroads, those that handle more carloads, or perform more bridge service or interchange with Class I railroads, would be more likely to avail themselves of this rulemaking. All Class III railroads would likely spend a small amount of time reviewing the new regulation. It is likely that this review would only take one to two hours per railroad to review the proposed regulation. Additionally, ASLRRA may keep its members aware of new developments as regulations are changed in a manner that reduces the time and cost to conduct this review.

The changes in this proposed rule would provide some relief for the Class III railroads. Given the relatively low costs, including the additional burden of understanding the regulation, FRA estimates these costs would likely be more than offset by the cost savings from performing fewer brake tests and time saved from fewer trains needed for pick-ups and set-outs.

5. Identification, to the Extent Practicable, of All Relevant Federal Rules That May Duplicate, Overlap, or Conflict with the Proposed Rule

The proposed regulation allows the use of eABS technology. FRA is not aware of any relevant Federal rule that duplicates, overlaps with, or conflicts with the proposed regulation. FRA invites all interested parties to submit comments, data, and information demonstrating the potential economic impact on small entities that would result from the adoption of the proposed language in this NPRM. FRA particularly encourages small entities that could potentially be impacted by the proposed revisions to participate in the public comment process. FRA will consider all comments received during the public comment period for this NPRM when making a final determination of the rule's economic impact on small entities.

6. A Description of Significant Alternatives to the Rule

FRA expects small railroads would take advantage of the provisions included in the NPRM commensurate with the size of their operations. If FRA did not issue this regulation, small railroads would not potentially receive some cost savings and safety benefits by participating in the eABS system.

Another alternative to the proposed rule would be to allow more mileage between Class I brake tests for brake tests performed by QMIs as well as QPs by extending the QP-inspected maximum limit to 1,500 miles (currently 1,000 miles). However, as described in the NPRM and RIA, FRA cannot support extending the mileage limit for QP performed brake tests without additional evidence. Potentially, this alternative would reduce the number of Class I brake tests more than the proposed rule would. However, given the Class III railroads' shorter length of haul, FRA expects the typical Class III railroad would not receive significant additional benefits from this alternative. Similarly, if the United States adopted current Canadian regulations, which allow a train to move from coast to coast after undergoing an initial terminal brake test performed by an employee similar to a QMI, most Class III railroads would not see additional cost-savings.

Appendix B – Supporting Data: Train Accidents/Incidents for Brake Cause Codes

Purpose

FRA examined the accident/incident record of brake-caused accidents. FRA wanted to verify that the safety risk from brake-caused accidents/incidents is relatively low. Accident/incidents are often caused by a variety of factors and conditions. These may include the specific types of service, environmental factors such as weather and grade on the train route (i.e., mountainous terrain), age of railroad equipment, and human factors. While railroads identify the brake component fault that likely caused an accident/incident reported to FRA, the accident data does not show which accidents/incidents occurred while performing a brake test.[74] Thus, this analysis does not monetize the potential reduction in accidents/incidents that may result from this rulemaking because of fewer brake tests. However, FRA reasons that the injury risk from the actions that employees take when performing a brake test will decrease. These actions include walking the length of the train on potentially uneven ground, moving in and around rail equipment to check brake rigging, and physical exertion while releasing handbrakes and bending to check brake valves and hoses.

Data

The railroads involved in an accident/incident report it to FRA using Form FRA F 6180.54, Rail Equipment Accident/Incident Report ("Form 54"). Form 54 includes the railroad's designation for the cause of the accident/incident. Railroads enter the primary and secondary cause codes of the accident/incident corresponding to the list of cause descriptions in the *FRA Guide*.[75] For this analysis, FRA queried Form 54 data for accidents/incidents that would likely have been caused by brake systems, for the period January 1999 through December 2018. FRA searched by the cause codes for Mechanical and Electrical Failures, specifically the subset of Brakes, found in Appendix C of the *FRA Guide for Preparing Accident/Incident Reports*.[76]

Results

Over the 20-year period, the data show there were 727 accidents/incidents attributed to brake cause codes, resulting in 2 fatalities and 25 injuries varying in severity (i.e., nonfatal). The two fatalities resulted from one accident on Oct. 4, 2018 at Granite Canyon, WY from cause E03C—

[74] Some accident/incident reports include a narrative description that may include other causes, drug and alcohol involvement, or unusual circumstances. The narrative may include additional information on brake-caused injuries, such as if an employee injured his or her hand while releasing the handbrake. However, each individual narrative statement must be read to determine if the injury occurred while performing a brake test.

[75] FRA, *FRA Guide for Preparing Accident/Incident Reports*, published May 23, 2011, effective July 1, 2011, p. 113, and Appendix C. Also available on the FRA Safety Data website at https://safetydata.fra.dot.gov/officeofsafety/default.aspx, *see* Query 7.09.

[76] FRA used the following cause codes: Air hose uncoupled or burst (E00C and E00L), Hydraulic hose uncoupled or burst (E01C), Broken brake pipe or connections (E02C and E02L), Obstructed brake pipe (E03C and E03L), Other brake component damage (E04C and E04L), Brake valve malfunction /undesired emergency (E05C and E05L), Brake valve malfunction / stuck brake (E06C and E06CL), Rigging down or dragging (E07C), Hand brake broken or defective (E08C and E08L), Other brake defects (E09C and E09L), Hand brake link and/or connect defect (E0HC and E0HL), and Failure to release hand brakes on car(s), railroad employee (H019). FRA used Query 3.10 on the FRA Safety Data website cited in the footnote above, as accessed in November 2019.

obstructed brake pipe. Converted to an average annual basis, there were 36 accidents/incidents, 0.1 fatality, and 1.25 injuries per year. The sample size of fatalities and injuries is too small to make any statistical inferences. The average annual property damages are about $3.5 million a year, with the largest share caused by cause code E07C (Brake) Rigging Down or Dragging (about 25 percent of damages). FRA also queried the Form 54 data for all train accident/incidents (not at grade crossings) over the same time period. Comparing the train accident/incidents with brake cause codes to all train accidents (not at grade crossings) shows that brake accidents/incidents represented 1.5 percent of all train accident/incidents (not at grade crossings), 1.2 percent of the property damages, 1 percent of the fatalities, and 0.3 percent of the injuries. The relatively low numbers of brake-related accidents/incidents and associated casualties over a long period of time indicate the safety risk to the public is low, supporting the NPRM's extension of relief from brake tests under certain circumstances.

Table B-1: Train Accident/Incidents from Brake Cause Codes

Years	Number of Accidents/ Incidents	Property Damages ($ millions)*	Fatalities	Injuries	Average Train Miles (millions)	Accident/Incident Rate per Million Train Miles
1999-2003	198	11.05	0	9	723.8	0.274
2004-2008	212	20.60	0	9	788.1	0.269
2009-2013	159	16.96	0	0	714.1	0.223
2014-2018	158	20.90	2	7	722.2	0.219
TOTAL	**727**	**69.52**	**2**	**25**		

* Nominal dollars

Appendix C – Total Net Cost Savings Including Prior Costs

The table below shows the total net costs, including expenditures from AAR's subsidiary Railinc of $4.4 million on eABS system development and maintenance costs. These costs may give a more accurate picture of the overall net cost savings of the proposed rulemaking.

Table C-1: Net Cost Savings (Low) Over 10 Years (2018 Dollars), Including Prior Costs

		Present Value ($)		Annualized ($)	
Section	**Undiscounted**	**3%**	**7%**	**3%**	**7%**
Cost Savings					
Increased Mileage	91,641,000	79,932,000	67,672,000	9,370,000	9,635,000
Unlimited Block Swapping	121,590,000	105,551,000	88,804,000	12,374,000	12,644,000
Waiver Filing and Review	133,000	118,000	101,000	14,000	14,000
Government Waiver Review	12,000	11,000	10,000	1,000	1,000
Total Cost Savings	213,376,000	185,612,000	156,587,000	21,759,000	22,294,000
New Costs					
System Development and Maintenance	13,845,000	12,665,000	11,427,000	1,485,000	1,627,000
Training	6,830,000	6,830,000	6,830,000	801,000	972,000
Hardware	42,613,000	37,982,000	33,188,000	4,453,000	4,725,000
Total New Costs	63,288,000	57,477,000	51,445,000	6,738,000	7,325,000
Prior Costs Incurred					
Railinc (eABS Development)	4,400,000	4,400,000	4,400,000	516,000	626,000
Total Prior Costs Incurred	4,400,000	4,400,000	4,400,000	516,000	626,000
Net Cost Savings	145,688,000	123,735,000	100,742,000	14,505,000	14,343,000

Table C-2: Net Cost Savings (High), Including Prior Costs

		Present Value ($)		Annualized ($)	
Section	**Undiscounted**	**3%**	**7%**	**3%**	**7%**
Cost Savings					
Increased Mileage	164,554,000	143,527,000	121,514,000	16,826,000	17,301,000
Unlimited Block Swapping	164,047,000	142,408,000	119,813,000	16,695,000	17,059,000
Waiver Filing and Review	133,000	118,000	101,000	14,000	14,000
Government Waiver Review	12,000	11,000	10,000	1,000	1,000
Total Cost Savings	328,746,000	286,064,000	241,438,000	33,536,000	34,375,000
New Costs					
System Development and Maintenance	13,845,000	12,665,000	11,427,000	1,485,000	1,627,000
Training	5,126,000	5,126,000	5,126,000	601,000	730,000
Hardware	9,690,000	8,637,000	7,547,000	1,013,000	1,075,000
Total New Costs	28,661,000	26,428,000	24,100,000	3,099,000	3,432,000
Prior Costs Incurred					
Railinc (eABS Development)	4,400,000	4,400,000	4,400,000	516,000	626,000
Total Prior Costs Incurred	4,400,000	4,400,000	4,400,000	516,000	626,000
Net Cost Savings	295,685,000	255,236,000	212,938,000	29,921,000	30,317,000