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49 CFR Parts 229, 232, and 238
Electronically Controlled Pneumatic Brake System; Proposed Rule

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

49 CFR Parts 229, 232, and 238

[Docket No. FRA–2006–26175, Notice No. 1]

RIN 2130–AB84

Electronically Controlled Pneumatic Brake Systems

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

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: FRA proposes revisions to the regulations governing freight power brakes and equipment by adding a new subpart addressing electronically controlled pneumatic (ECP) brake systems. The proposed regulations are designed to provide for and encourage the safe implementation and use of ECP brake system technologies. The proposal contains specific requirements relating to design, interoperability, training, inspection, testing, handling defective equipment, and periodic maintenance related to ECP brake systems. The document also identifies provisions of the existing regulations and statutes where FRA is proposing to provide flexibility to facilitate the introduction of this advanced brake system technology.

DATES: (1) Written comments must be received by November 5, 2007. Comments received after that date will be considered to the extent possible without incurring additional expenses or delays.

(2) FRA will hold an oral public hearing on a date to be announced in a forthcoming notice.

ADDRESSES: *Comments:* Comments related to Docket No. FRA–2006–26175, may be submitted by any of the following methods:

- *Web site:* Until September 28, 2007, comments should be filed at *http://dms.dot.gov*. After September 28, 2007, comments should be filed at the Federal eRulemaking Portal, *http://www.regulations.gov*. At each site, follow the online instructions for submitting comments.
- *Fax:* 202–493–2251.
- *Mail:* Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Avenue SE., W12–140, Washington, DC 20590.
- *Hand Delivery:* Room W12–140 on the Ground level of the West Building, 1200 New Jersey Avenue SE., Washington, DC between 9 a.m. and 5 p.m. Monday through Friday, except Federal holidays.

Instructions: All submissions must include the agency name and docket number or Regulatory Identification Number (RIN) for this rulemaking. Note that all comments received will be posted without change to *http://dms.dot.gov* including any personal information. Please see the Privacy Act heading in the **SUPPLEMENTARY INFORMATION** section of this document for Privacy Act information related to any submitted comments or materials.

Docket: For access to the docket to read background documents or comments received, go to *http://dms.dot.gov* until September 28, 2007, to *http://www.regulations.gov* after September 28, 2007, or to Room W12–140 on the Ground level of the West Building, 1200 New Jersey Avenue SE., Washington, DC between 9 a.m. and 5 p.m. Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: James Wilson, Office of Safety Assurance and Compliance, Motive Power and Equipment Division, RRS–14, Mail Stop 25, Federal Railroad Administration, 1120 Vermont Avenue, NW., Washington, DC 20590 (telephone 202–493–6259); or Jason Schlosberg, Trial Attorney, Office of Chief Counsel, Mail Stop 10, Federal Railroad Administration, 1120 Vermont Avenue, NW., Washington, DC 20590 (telephone 202–493–6032).

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I. Background

Since the inception of automatic air brakes by George Westinghouse in the 1870s, brake signal propagation has been limited by the nature of air and the speed of sound. Other adjustments have sought to alleviate this deficiency, but have left the basic system unaltered. As early as 1990, the Association of American Railroads (AAR) has investigated more advanced braking concepts for freight railroads, including ECP brake systems, which promise to radically improve brake propagation by using electrical transmissions of the braking signal through the train while still using air pressure in the cylinder to apply the force of the brake shoe. During the past 15 years, ECP brake technology has progressed rapidly and has been field tested and used on various railroads' revenue trains.

FRA has been an active and consistent advocate of ECP brake system implementation. In 1997, FRA participated in an AAR initiative to develop ECP brake standards and in 1999, FRA funded, through Transportation Technology Center, Inc., a Failure Modes, Effects, and Criticality Analysis (FMECA) of ECP brake systems based on the AAR standards. FRA also took part in programs to develop and enhance advanced components for ECP brake systems.

To assess the benefits and costs of ECP brakes for the U.S. rail freight industry, FRA contracted Booz Allen Hamilton (BAH) in 2005 to conduct a study. BAH engaged an expert panel consisting of principle stakeholders in ECP brake technology conversion to participate in the study. The expert panel made various conclusions relating to technological standards, safety, and efficiency. In addition, the final BAH report provided a comprehensive analysis and comparison of ECP and conventional air brake systems. On August 17, 2006, FRA announced in a press release its intention to issue a notice of proposed rulemaking to revise the federal brake safety standards to encourage railroads to invest in and deploy ECP brake technology. In the press release, FRA encouraged railroads to submit ECP brake plans before the proposed rule changes are completed.

In a petition dated November 15, 2006, and filed November 21, 2006, two railroads—the BNSF Railway Company (BNSF) and the Norfolk Southern Corporation (NS)—jointly requested that FRA waive various sections in parts 229 and 232 as it relates to those railroads' operation of ECP brake pilot trains. *See* Docket No. FRA–2006–26435. FRA held a fact-finding hearing on this matter on January 16, 2007, featuring testimony from representatives of the petitioners, air brake manufacturers, and labor unions and issued a conditional waiver on March 21, 2007. *See id*. In drafting this proceeding's proposed rules, FRA has considered information filed and decisions made in the related, but separate, proceeding concerning the petition for waiver filed by BNSF and NS.

II. Conventional Brake Operations

While the basic operational concept of the automatic air brake system, originally conceived by George Westinghouse in the 1870s, remains the same, it has seen continuous improvement in practice. An air compressor in the locomotive charges a main reservoir to about 140 pounds per square inch (psi). With controls located in the locomotive, the locomotive engineer uses the main reservoir to charge the brake pipe—a 1¼ inch diameter pipe—that runs the length of the train and is connected between cars with hoses. The brake pipe's compressed air—used as the communication medium to signal brake operations and the power source for braking action—then charges each car's two-compartment reservoir to a pressure of 90 psi. Braking occurs through a reduction of air pressure in the brake pipe, which signals the valves on each car to direct compressed air from the reservoir on each car to its respective brake cylinder for an application of brakes. When air pressure is supplied to the brake cylinder—which is connected to a series of rods and levers that apply and release the brakes—the resulting force presses the brake shoes against the wheel, slowing the car's speed.

While brake applications were initially directed by George Westinghouse's triple valve, modern applications direct a control valve, which directs air from the brake pipe into the air reservoir when air pressure is rising in the brake pipe in order to charge the auxiliary and emergency reservoir and be ready for a brake application. To perform a brake application, the locomotive automatic brake valve reduces pressure in the brake pipe by exhausting air, causing the car's control valve to direct air from the auxiliary reservoir into the brake cylinder. The increase in pressure to the brake cylinder is approximately proportional to the drop in brake pipe pressure. A 26 psi reduction in brake pipe pressure is equal to a full service brake application on a fully charged brake pipe, and should result in a brake cylinder pressure adequate to achieve a full service braking effort (brake force). While the control valve is directing air into the brake cylinder, or holding air in the brake cylinder, it is unable to recharge the auxiliary reservoir on each car. The engineer can apply the brakes in increments, at few psi at a time, go directly to a full service application of 26 psi reduction, or initiate an emergency application of the brakes, as explained below.

Unlike a brake application, the incremental release of brakes on a freight train cannot be accomplished. Brakes can only be fully released, called a direct release, and the auxiliary reservoirs then begin to charge. Brake applications are possible, but are more complicated, from undercharged brake pipe and reservoirs. Recharging takes more time for a longer train, because the air has to be sent down the length of the train's brake pipe—which can be up to a mile and a half. In addition, on extremely long trains, the brake pipe pressure on the last car may not reach 90 psi due to small leaks throughout the brake pipe, and there may be problems getting enough brake pipe pressure to fully release the brakes during cold weather.

Brake pipe pressure is measured by an end-of-train (EOT) device, which is electrically and pneumatically connected to the rear of a train equipped with conventional pneumatic brakes and sends signals (EOT Beacon) via radio indicating the brake pipe pressure to the lead locomotive. Current Federal regulations specify the design and performance standards for both one-way and two-way EOT devices. *See* Part 232, subpart E. Both EOT device designs comprise of a rear unit pneumatically connected to the rear of the train's last car that an EOT Beacon to a Head End Unit (HEU)—a brake system control device mounted within the locomotive and used to control the ECP brake system by the locomotive engineer and containing the fail-safe software for certain undesirable conditions. One-way EOT devices can transmit information from the rear unit to the HEU. At a minimum, the one-way device must transmit the brake pipe pressure to the HEU and display the reading to the locomotive engineer. Two-way EOT devices transmit and receive information from both the rear end unit and the HEU.

An emergency brake application can be initiated in several ways. The locomotive engineer can initiate the application by moving the brake handle to the emergency position, which exhausts air from the locomotive end at a faster rate than the service application. Emergency brake applications can also be initiated by opening the conductor's valve, located in the cab of the locomotive, or by a break-in-two, where the train separates between cars and the brake pipe hoses separate, exhausting brake pipe pressure. While performing an emergency brake application from the locomotive, a locomotive engineer can also use a two-way EOT to initiate an emergency brake application at the rear of the train. This permits the emergency application to be simultaneously initiated from both the front and rear of the trains and ensures that the brakes on the cars at the rear of the train apply in the event a brake pipe blockage occurs.

III. ECP Brake Operations

As early as 1990, AAR began investigating a more advanced braking concept for freight railroads, the ECP brake system. The ECP brake system radically improves the operation of the automatic air brake by using electrical transmissions to signal the application and release of brakes on each car in a train while still using compressed air to apply the force of the brake shoe against the wheel. ECP brakes also greatly simplify the brake system by eliminating multiple pneumatic valves used by conventional brakes and replacing them with a printed circuit board with microprocessor, one electrically activated application valve, and one electrically activated release valve, with feedback on brake cylinder pressure for control.

ECP brake technology requires equipping locomotives and cars with special valves and equipment that are unique to the operation of ECP brakes. While this system still requires a brake pipe to supply compressed air from the locomotive to each car's reservoir in a train, there are currently two known methods to send the electronic signal for ECP brake operations from the locomotive to each car in the train. These methods include using a hard wire electrical cable running the length of the train or a radio-based technology requiring a transmitter and a receiver installed on the cars and locomotives. At this time, it appears that the railroad industry has chosen to use a cable-based system for ECP brake operation. Therefore, the proposed rules will be

limited to operations involving cable-based ECP brake systems.

ECP brake systems still employ the automatic air brake system's basic concept where the locomotive supplies compressed air to each car's reservoir via the conventional brake pipe. Each car's brake valve reacts to a signal to apply the brakes by directing compressed air from the reservoir to the brake cylinder or to release the brakes by releasing air from the brake cylinder. The similarities between the conventional pneumatic and ECP brake systems end here. Instead of utilizing reductions and increases of the brake pipe pressure to convey application and release signals to each car in the train, ECP brake technology uses electronic signals, resulting in an almost instantaneous application and release of brakes on each car in the entire train. Since the brake pipe pressure no longer serves as the communication medium in ECP braked trains, the brake pipe is constantly supplied or charged with compressed air from the locomotive regardless of whether the brakes are applied or released. In addition, ECP brake equipped trains offer graduated release, where a partial brake release command provides a partial, proportional brake release.

The basic ECP brake system is controlled from the HEU and each car is equipped with a Car Control Device (CCD), an electronic control device that replaces the function of the conventional pneumatic service and emergency portions during electronic braking. The CCD acknowledges and interprets the electronic signals from the HEU and controls the car's service and emergency braking functions and brake releases. The CCD also controls reservoir charging and sends a warning signal to the locomotive in the event any component fails to appropriately respond to a braking command. Each CCD has a unique electronic address located in the Car ID Module, which is keyed to a car's reporting mark and number.

Each car connects to the locomotive via special connectors and junction boxes. More specifically, an ECP brake equipped train's train line cable—a two-conductor electric cable (#8 A–WG and a shield)—connects the locomotive and cars and carries train line power to operate all CCDs and ECP brake system's end-of-train (ECP–EOT) device and communicates network signals via the power voltage. A Power Supply Controller (PSC)—mounted within the locomotive and providing 230 VDC of electricity—interfaces with the train line cable's communication network, provides power to all connected CCDs and ECP–EOT devices, and controls the train line power supply as commanded by the HEU. Under the AAR standards, a single power supply shall be capable of supplying power to an ECP brake equipped train consisting of at least 160 CCDs and an ECP–EOT device.

Under the existing regulations, the conventional pneumatic brake system's EOT device can lose communication for 16 minutes and 30 seconds before the locomotive engineer is alerted. *See* 49 CFR 232.407(g). After the message is displayed, the engineer must restrict the speed of the train to 30 mph or stop the train if a defined heavy grade is involved. Per the regulations, railroads must calibrate each conventional two-way EOT devices every 365 days and would likely incur additional maintenance and cost expenses while replacing its batteries. Further, a conventional EOT device is heavy and presents a potential for personal injury when applied to the rear of the train.

By contrast, an ECP–EOT device uniquely monitors both brake pipe pressure and operating voltages and sends an EOT Beacon every second from its rear unit to its HEU on the controlling locomotive. The HEU will initiate a full service brake application should brake pipe pressure fall below 50 psi or an emergency brake application should a communication loss occur for five consecutive seconds or the electrical connection break. An ECP–EOT device may not require calibration and its battery, only a back-up for the computer, is charged by the train line cable and is much lighter in weight than the conventional EOT device battery. Physically the last network node in the train, the ECP–EOT device also contains an electronic train line cable circuit—a 50 ohm resistor in series with 0.47 micro-farad capacitor—and must be connected to the network and transmit status messages to the HEU before the train line cable can be powered continuously.

ECP brake systems have a great advantage of real-time monitoring the brake system's health. In normal operation, the HEU transmits a message/status down the train line cable to each car. If an individual car's brakes do not respond properly to the HEU's brake command, or if air pressures are not within the specified limits for operation, a message indicating the problem and the applicable car number is sent back to the HEU, which in turn notifies the locomotive engineer. The ECP brake system can identify various faults, including, but not limited to: low brake pipe pressure; low reservoir pressure; low train line cable voltage; low battery charge; incorrect brake cylinder pressure; and offline or cut out CCDs.

Emergency or full service brake applications—enabled by compressed air propagating pneumatic pressure signals through the brake pipe—automatically occur when the ECP brake system software detects certain faults. For instance, if the HEU detects that the percentage of operative brakes falls below 85 percent, a full service brake application will automatically occur. In addition, the brakes will automatically apply when the following occurs: (1) Two CCDs or the ECP–EOT report a ''Critical Loss'' within 5 seconds; (2) the train line cable indicates low voltage with less than 90 percent operative brakes; (3) the ECP–EOT reports a low battery charge; (4) the train moves during set-up; (5) the train line cable becomes disconnected; or (6) the train exceeds 20 mph in Switch Mode. Under the AAR standards, the ECP brake system shall also have a pneumatic back-up system on each car for an emergency brake application in the event of a vented brake pipe or a train separation. These features preserve the fail safe feature of conventional pneumatic brake systems.

IV. Interoperability

Due to control methodology differences, ECP brake systems are not functionally compatible with conventional pneumatic air brake systems. For instance, while conventional pneumatic air brake systems command a brake application by reducing the air pressure in the brake pipe, ECP brake systems command a brake application through a digital communications link transmitted on the electrical train line cable. Further, conventional freight cars are not equipped with an electrical train line cable and must depend on the pneumatic brake pipe for the brake command.

Manufacturers have developed application strategies to address issues relating to car and locomotive fleet interchangeability. In particular, they have proposed three major schemes of ECP brake design: stand-alone systems using only ECP brakes; overlay (dual mode) systems capable of operating in either conventional or ECP brake mode; and emulation systems, also capable of operating in either conventional or ECP brake mode.

Since cars with stand-alone ECP brake systems do not include a fully pneumatic brake control valve, they are incompatible with conventionally braked cars and must be operated in complete ECP brake equipped train sets. Stand-alone ECP brake systems cannot

intermix in the same train with conventional pneumatic braked cars unless those cars are transported as cars with inoperative brakes. While the stand-alone ECP brake system is the least expensive alternative of the three design types, its incompatibility with conventional pneumatic brake systems requires train segregation, potentially posing significant operational problems until the entire car fleet is converted to ECP brakes.

Overlay configurations—cars equipped with both ECP CCDs and conventional pneumatic control valve portions—allow cars to operate with either ECP or conventional pneumatic air brakes. To operate in ECP brake mode, compatible ECP equipment must be installed on the locomotive as well as on the freight car. While an overlay system's dual mode capability provides significant flexibility, railroad operators must purchase, install, and maintain equipment to support both types of brake systems for as long as dual mode capability is required.

Emulation configurations use a CCD capable of operating in either ECP or conventional mode without requiring conventional pneumatic controls. One manufacturer has provided an emulation ECP brake valve that monitors both the digital communications cable and the brake pipe for a brake command. If an electrical signal is present, the ECP brake valve operates in ECP brake mode. If the electrical brake command signal is not present, then the valve will monitor the changes in the brake pipe pressure like a conventional pneumatic control valve and the CCD will use a software program to emulate the function and response of a conventional pneumatic valve. This mode is called limited emulation and is meant to be used for small cuts of cars hauled short distances at slow speeds with a non-ECP brake equipped locomotive. An emulation ECP brake system can be operated in any train with any mix of emulation ECP and conventional brake systems. In a mixed train, the emulation ECP brake system will monitor the brake pipe for pressure changes and set up brake cylinder pressure like a conventional pneumatic valve. Currently, FRA does not propose any rules uniquely regulating trains or cars equipped with emulation ECP brake systems. However, FRA seeks comments on whether or how it should regulate such systems differently than what is proposed herein.

Manufacturers have also addressed ECP brake compatibility with conventional pneumatic brake equipped locomotives, which must be equipped with a HEU unit to operate the brakes on ECP brake equipped cars. For instance, one manufacturer has developed a portable unit that will allow a non-ECP brake equipped locomotive to operate an ECP brake equipped train by converting the air pressure changes in the brake pipe to digital command signals that are transmitted to the freight cars through the electrical train line cable. The locomotive engineer operates the brakes with the conventional automatic brake valve in the control cab. The brakes, however, will respond instantaneously and provide all of the benefits of an ECP brake system.

V. Advantages of ECP Brakes Over Conventional Pneumatic Brakes

ECP brake technology overcomes many of the physical limitations inherent in conventional pneumatic brake technology. Field testing of AAR compliant ECP brake systems over the past decade has not revealed any indication of a catastrophic event that could be caused by an ECP brake system malfunctioning. With a high level of confidence, the ECP brake stake holders support the implementation of ECP brake systems on the Nation's railroads. FRA concludes that the advantages of ECP brake technology will significantly improve the safety and the performance of train operations. Examples of such benefits include better train handling through simultaneous brake applications, continuous brake pipe charging, and graduated brake operation. ECP brake benefits also include electronic train management and improved performance.

A. Simultaneous Brake Application

The conventional pneumatic brake system uses compressed air as the source for braking power and as the medium for communicating brake application and release commands and communicates brake commands by changing brake pipe pressure through the use of the locomotive automatic brake control valve. These commands begin at the front of the train and propagate to the rear of the train at the speed of the air pressure moving from car to car. This slow propagation of the brake command contributes to uneven braking, excessive in-train and run-in forces, train handling challenges, longer stopping distances, safety risks of prematurely depleting air brake reservoirs, and a corresponding low brake rate until all cars in the train receive and fully respond to the brake command. FRA recognizes that the slow application and release of brakes in a train causes excessive in-train forces, which have the potential to cause derailments when they occur in curves, cross-overs, or when heavier cars are placed at the rear of the train. When the brakes on the rear of the train release much more slowly than the brakes on the front of the train, the potential for a ''string-line'' derailment—where the train stretches out until one or more wheels are lifted off the inside of a curve—increases.

The ECP brake system reduces these problems by enabling cars to brake simultaneously at the command of an electronic signal. The electronic signal's speed ensures an instantaneous, simultaneous, and even activation of each car's brake valves, significantly reducing braking distances—40 to 60 percent for the longest trains—and minimizing the consequences of collisions or derailments by reducing the collision speed and slowing the non-derailed portion of the train.

B. Continuous Brake Pipe Charging

Propagating a brake command signal through the induction or reduction of air pressure in the brake pipe represents a significant limitation of conventional pneumatic brakes. The same brake pipe air used to propagate brake commands also charges reservoirs on each freight car. As a result, the brake pipe must be fully charged to restore full braking capacity to depleted reservoirs. Partially depleted air from the brake pipe, which occurs during the initial stage of braking, prohibits repeat applications of brakes until the brake pipe can be recharged. A brake pipe can only be recharged once the brakes have been fully released. This characteristic of conventional pneumatic brakes contributes to the risk of run-away trains caused by prematurely depleted brake pipe pressure, particularly on steep grades.

The ECP brake system reduces this risk by continuously charging the brake pipe. Since ECP brakes do not use the brake pipe as a brake command medium, the brake pipe is constantly being charged, allowing the locomotive engineer to operate the brake system more aggressively. With ECP brake systems, it is unnecessary to apply hand brakes on steep grades to recharge the brake pipe after the train stops on the grade.

C. Graduated Brake Application and Release

The conventional pneumatic brake system's inability to operate freight trains in graduated release has long hampered train operations and has increased fuel consumption. The conventional pneumatic brake system

can only operate in direct release, preventing locomotive engineers from reducing the braking effort without completely releasing and resetting the brakes. In other words, after a direct release brake application with a conventional pneumatic brake system, braking effort can be increased but not decreased without fully releasing the brakes. In many cases, direct release leads to unnecessary train stops and insufficient initial brake applications. ECP brake systems overcome this deficiency by operating in graduated release, which enables the operator to reduce braking effort to a lower level after making an initial brake application without fully releasing the brakes. As a result, the operator can accurately adjust the braking level as each situation requires, eliminating the stops required to recharge and reset the brakes after excessive brake applications and prior to negotiating hills and valleys.

D. Train Management

The use of a train line cable allows real-time self-diagnostic functions to be incorporated in the brake system. The initial check of brake system conditions on each car and continuous monitoring of each car's braking functions provides immediate communication to the locomotive engineer of certain brake failures. The continuous monitoring of each car's braking functions and real-time diagnostics of the train's brake system is a significant advantage to the locomotive engineer for the operation of the train and provides justification to eliminate the need for some of the required physical inspections of the train and supports regulatory change to operate cars with non-functioning brakes out of the initial terminal. When the ECP brake system diagnostics detect a serious problem, including when the brake pipe pressure falls below 50 psi, the ECP brake system will automatically command a penalty brake application. ECP brake systems also eliminate the conventional pneumatic brake system's inability to apply all brakes in the train when there is a blockage in a brake pipe, which is handled through the use of a two-way EOT telemetry device not required by all trains. This failure will not affect brake applications in ECP brake systems, because each car is provided a braking command through a train line cable, not solely through the reduction of brake pipe pressure, which would not be propagated through the consist if the brake pipe is blocked. Therefore, ECP brake systems incorporate features that make them inherently safer than conventional pneumatic brakes. Using sensor-based technology to maintain a continuous feedback loop on train conditions for the crew and any centralized monitoring, the electrical communication cable network can also serve as a platform for the gradual addition of other train performance monitoring and management controls, including distributed power locomotive control, automatic activation of hand brakes, hot bearing detection, and truck oscillation and vibration. These and other train management features will increase the reliability and overall safety of train operations.

E. Improved Performance

Ultimately, ECP brake technology also provides improved performance, which will contribute to safer train operations and significant cost savings over time. Since ECP brake operated trains can operate in graduated release, instead of direct release, of the brakes, fuel will not be wasted while dragging trains against a brake application. Further, because all of the cars' ECP brakes release instantaneously, fuel will not be wasted on initial start-ups and power-ups after a brake application.

Operations utilizing ECP brake systems also promise increased average train speeds and decreased trip times. ECP brake systems allow the locomotive engineer to modulate the brake applications in territories with descending grades, thus increasing overall trip average speeds and reaching destinations sooner. While the slow release of the rear cars' brakes on conventional pneumatic braked trains cause drag, the brakes on ECP brake equipped trains release simultaneously, improving start-up and acceleration times. Further, due to its shorter stopping distances, trains equipped solely with ECP brake systems may potentially permit higher train speeds within existing signal spacing, which will increase average system velocity, or permit use of shorter ''blocks'' between signals, facilitating greater system capacity.

The instantaneous application and release of ECP brakes will result in more uniform braking, thus improving wheel wear and lengthening brake shoe life. In a conventional pneumatically braked train, the brake pipe gradient and slower response time causes the first third of the train's cars to provide the majority of the braking action, thus applying additional pressure and heat on those cars' wheels. Since ECP brake systems provide instantaneous braking on all cars, such pressure will be more uniformly distributed along the train, thus eliminating the uneven braking force on the wheels of those leading cars. The ECP brake system also self-monitors each car's brake cylinder pressure and maintains the prescribed pressure, thus reducing the potential for creating shelling and flat spots on wheels.

Due to minimized wheel defects, and their accompanying vibrations, freight cars and brake components will enjoy increased life. Further, instantaneous braking will also prevent draft gear assemblies from receiving the constant pressure caused by trains equipped with conventional pneumatic brake systems and will reduce lading damage by eliminating slack action and in-train forces caused by uneven braking. ECP brake systems will also reduce the number of brake parts and rubber diaphragms required by conventional pneumatic brake systems.

VI. Standards, Approval, and Testing

During the past 17 years, FRA has monitored the progression of ECP brake technology and has observed field testing on various revenue trains, both freight and passenger. In 1997, FRA participated in an AAR initiative to develop ECP brake standards and in 1999, FRA funded, through the Transportation Technology Center, Inc., an FMECA of the ECP brake system based on AAR's Standards and Recommended Practices, S–4200 Series. FRA also participated in programs to develop and enhance advanced components for ECP brake systems. After all of these efforts, FRA has decided that the AAR S–4200 Series of standards is appropriate substantively and legally for adoption by reference in this rule and that the AAR Air Brake Systems Committee is an appropriate vehicle to rely upon in the implementation of ECP brake technology and this rule.

FRA acknowledges that ECP brakes are an attractive, viable, and enabling technology with the potential to substantially improve the operational efficiency of trains and that by complying with AAR Standard S–4200, ECP-braked trains offer significant safety and efficiency benefits in freight train handling, car maintenance, fuel savings, network capacity, self-monitoring, and fail-safe operation. FRA proposes that all suppliers obtain AAR approval for ECP brake-equipped-trains intended for use on U.S. railroads.

AAR administers the existing industry ECP brake standards through its Air Brake Systems Committee—consisting of representatives from the major railroads, brake manufacturers, and FRA—which requires demonstrated proof of compatibility, safety, and reliability of air brake systems to receive AAR approval. FRA is satisfied that the

existing AAR S–4200 specifications, AAR approval procedures, and continuing oversight by the AAR Air Brake Systems Committee will best ensure the safety and reliability of ECP brake systems. An ECP brake monitoring system complying with AAR Standard S–4200 Series increases safety by communicating information on the location and quantity of defective equipment and by providing for the safe movement of equipment over longer distances and periods of time.

A. AAR Standards and Approval Process

In order to assure the safety and the interoperability of ECP brake system designs, AAR developed the S–4200 Series of standards. The first five standards (S–4200, S–4210, S–4220, S–4230, and S–4250)—issued in 1999 and updated in 2002 and 2004—specify the functional, operational, and interface requirements for cable-based ECP brake systems. AAR issued two additional standards in January 2007, specifying ECP brake equipment approval procedures (S–4240) and interoperability testing requirements (S–4260). AAR has not completed specifications for radio-based ECP brakes, which it considers technically immature and unsuitable. The purposes of the standards are to ensure that AAR-approved electronic brake systems are interoperable between different manufacturers and meet high standards of safety and reliability. The analysis of the S–4200 Series of standards indicates that the performance specifications for the cable-based ECP brake concept are complete.

The AAR Manual of Standards and Recommended Practices (MSRP) contains the following standards for cable-based ECP brake systems:

- S–4200, ECP Cable-Based Brake Systems—Performance Requirements;
- S–4210, ECP Cable-Based Brake System Cable, Connectors, and Junctions Boxes—Performance Specifications;
- S–4220, ECP Cable-Based Brake DC Power Supply—Performance Specification;
- S–4230, Intratrain Communication Specification for Cable-Based Freight Train Control System;
- S–4240, ECP Brake Equipment—Approval Procedure;
- S–4250, Performance Requirements for ITC Controlled Cable-Based Distributed Power Systems; and
- S–4260, ECP Brake and Wire Distributed Power Interoperability Test Procedures.

The main standard, S–4200, ensures that the functionality and performance of freight ECP brake systems are uniform and consistent among equipment from different manufacturers, that cars equipped with AAR-approved ECP brake systems from different manufacturers are interoperable, and that AAR-approved electronic brake systems meet a high standard of safety and reliability. This standard defines ECP brake system elements, specifies their functionality in different implementation schemes—such as stand-alone, overlays, and emulators—and sets the requirements for all system functions. It covers all primary functions of ECP brakes, including graduated brake application and releases, continuous reservoir charging, adjustment of braking level to car load, continuous fault detection, equipment status monitoring, and pneumatic backup. It also specifies requirements for all modes of train operation and provides an extensive description of fault response and recovery functions for all possible faults of the system components. The standard also establishes environmental requirements for the designed systems, in-service testing, and rigorous approval procedures for certification process of new ECP brake equipment.

Other standards in the AAR S–4200 Series (S–4210, S–4220, S–4230, S–4250, and S–4260) contain requirements for critical ECP brake system components and communication protocols. Standard S–4210 contains the performance specifications and qualification test procedures for ECP brake system cables, connectors, and end-of-car junction boxes. The required testing verifies that the designed components have high reliability, will withstand harsh environmental conditions, and will have at least an 8-year operating life.

Standard S–4220 contains performance specifications for the DC power supply system through the hard-wired train line cable for ECP brake controllers and other electronic freight car components. Since a DC power supply conductor will also send communication control commands between a locomotive and its attached cars, the standard requires reliable separation and absence of interference between the DC power supply and the communication circuits.

Standard S–4230 contains the requirements related to intra-train communication systems on freight equipment used in revenue interchange service. The standard facilitates interoperability between freight cars and locomotives without limiting the proprietary design approaches used by individual suppliers. The communication protocol was developed for control of ECP brakes and multiple remote units, including distributed power locomotives, and for safety reporting of various car and locomotive components.

Standard S–4250 contains the methodology and communication flow requirements for controlling the operation of multiple locomotives in a freight consist through the intra-train communication network that is shared with the ECP brake system. The locomotive control through the intra-train communication line is an alternative method of locomotive control, which was not available before the introduction of ECP brake system technology. The controlled locomotives can either trail a lead locomotive or be remotely located (i.e., separated by cars) in a train. The standard establishes protocols for different types of locomotive controls through the intra-train line cable, depending on the location of the consist's multiple locomotives.

Standard S–4260 contains the test procedures that must be completed by ECP brake suppliers to establish interoperability baselines among ECP brake and wire distributed power (WDP) systems in compliance with the S–4200 standards series. The test procedures validate the functional interoperability of ECP brake and WDP systems developed by different manufacturers.

The AAR approval process and the work of the Air Brake Systems Committee has been the primary method of ensuring the safety and reliability of railroad brake systems and components for decades. FRA proposes that meeting all the requirements of the AAR ECP brake standards and obtaining AAR approval will be a prerequisite for any new ECP brake system to be employed on U.S. railroads. Through its participation on the Air Brake Systems Committee, FRA can monitor any safety or reliability issues that may develop with ECP brake systems. In the event of a serious safety issue with a supplier's ECP brake system, FRA can appropriately respond by invoking its authority to intervene with additional rulemaking or an emergency order. FRA does not expect to use this authority, because the AAR Air Brake Systems Committee already has the authority to rescind AAR approval for brake systems that do not perform safely or reliably.

Standard S–4240 contains the acceptance procedure for seeking AAR approval of ECP brake equipment. The standard requires a manufacturer to apply for approval by submitting certain information under Administrative Standard S–060. Following review and

approval of the initial application data and test plan by the AAR Air Brake Systems Committee, a manufacturer maintains the burden of establishing compliance with Standards S–4200, S–4210, S–4220, S–4230, S–4250, and S–4260 to obtain conditional approval.

For laboratory testing, an AAR representative will select 150 CCDs from a lot of 200 and will select HEUs, train power supplying units (TPSs), and ECP–EOTs from lots of four each. The testing will be performed on a 150–car test rack configured in accordance with AAR specifications. The manufacturer will provide for AAR evaluation of the test results, which shall include a requirements traceability and compliance matrix for each AAR standard and all necessary test reports, and then conduct interoperability laboratory testing between new ECP brake equipment and AAR-approved ECP brake equipment in accordance with standard S–4260.

Upon satisfactory completion of the aforementioned laboratory tests, AAR will consider conditional approval for field testing of ECP brake equipment. If conditional approval is granted, 150 ECP brake CCDs shall be selected from a production lot of 200 test-approved CCDs, and 100 of those selected, plus at least two ECP brake equipped locomotives and one ECP–EOT device, must be placed in railroad service for 24 months. Under conditional approval, at least 1,000 cars must be allotted for use.

Within those 24 months, all in-service tests must be conducted. After those 24 months, the Air Brake Systems Committee continues to monitor the product for reliability and safety concerns. If a problem with any brake component is discovered, the Committee will discuss the issue and may either demand further tests or withdraw AAR approval.

Full AAR approval shall be provided after 4 years if during that time a manufacturer furnishes AAR at specified intervals various service reports, which must include accurate ECP brake equipment malfunction records. FRA agrees with AAR's assessment that 4 years are needed to collect a history of reliable data with minimum failures. In addition, the manufacturer must provide to AAR a semiannual report containing any repair material for the test ECP brake equipment. Under the draft standard, AAR reserves the right to withdraw conditional test approval if it determines that safety is impaired, reliability degrades, or incompatibility of ECP brake operation develops, and may require any additional testing or performance evaluations it deems necessary. Standard S–4240 also contains specific procedures that must be followed when a manufacturer intends to change certain ECP brake equipment physical characteristics, software, or electronics.

FRA supports this effort as a timely measure for AAR to strengthen the regulatory package for ECP brake systems. Overall, FRA considers AAR approval a valuable step to ensure the reliability and safety of ECP brake systems and a minimum requirement for initial application of ECP brake systems on the Nation's railroads. However, FRA fully intends to monitor the application and safety of ECP and may, at its discretion, require additional safety analysis to be performed to confirm the safety of ECP brake systems installed and operating in revenue service. FRA reserves the right to witness the AAR approval testing of the product.

B. FMECA

AAR Standard S–4200 Series was developed to support the design of a safer, more reliable ECP braking system when compared with conventional air brakes. Once the standard was created, the railroad industry identified the need to perform a safety and reliability assessment of an ECP brake system built in accordance with this standard. Since actual S–4200 ECP brake systems did not yet exist, the industry decided to conduct a FMECA for a hypothetical ECP brake system that satisfied all the requirements of the standard. At FRA's insistence, the FMECA on AAR Standard S–4200 was performed in 1999 by DEL Engineering with participation of AAR, FRA and a number of experts with significant experience in the development and application of ECP brake systems.

The FMECA team began the analysis by identifying all major ECP brake system components and their intended functions. The analysis examined each component and function and identified associated failure modes and effects. The failure modes were analyzed to determine severity, frequency of occurrence, and effectiveness of detection. The FMECA team created a numeric ranking criterion and determined and prioritized the level of risk posed by each failure mode. High risk failure modes were identified and appropriate mitigation strategies were developed to decrease the risk.

The FMECA team analyzed the failure modes of all ECP brake components, including: CCDs with the battery; HEUs on the head locomotive; ECP–EOT devices; train line cables, communication and power supplies; power supply controllers; head end line terminators; car ID modules; locomotive ID modules; and operative brakes. The analysis included different types of ECP brake systems, including stand alone, overlay (dual mode), and emulator and all system functional requirements and operating modes, including Initialization, Switch, Run, and Cut-out. The FMECA failure log contained about 1,500 failure modes. For each high-risk failure mode, the FMECA team identified action items and offered recommendations on how to mitigate the consequences of component failures or system functional failures. The team primarily examined single-point failures but also identified and evaluated some cases of combined failures that had significant safety consequences.

The FMECA results confirmed that the ECP brake concept offers the potential for improved performance, reliability, and safety over that of conventional pneumatic brake systems. The FMECA concluded that no failure mode of an AAR-compliant ECP brake system exists that can cause a catastrophic accident due to single-point failure of the system itself. The AAR standards, as written, eliminate or mitigate critical outcomes of single-point failure of ECP brake systems.

The FMECA team encouraged manufacturers to pursue ECP brake technology, because the potential safety and efficiency benefits will far outweigh any disadvantages. If designed and maintained properly, ECP brakes will be substantially safer and more reliable than the conventional pneumatic brake system they are intended to replace.

AAR and the brake manufacturers indicated that they were completely satisfied that ECP brake systems are significantly safer than conventional pneumatic systems. They accepted the results of the FMECA and concluded that no modifications were necessary to the AAR standards related to ECP brake systems.

VII. Market Maturity and Implementation

The U.S. market for ECP brake systems is mature enough to begin implementation of ECP brake technology. The equipment manufacturers have made a significant investment in the technology and have completed the preliminary design work and field testing of ECP brakes. For instance, they have provided technical solutions for different ECP brake implementation strategies, enabling non-ECP and ECP brake equipped cars to run in combined trains and, in some cases, allowing ECP-equipped freight cars to run in ECP brake mode using locomotives with conventional

pneumatic brake systems. In addition, they are ready to supply fully operational stand-alone ECP brake systems, overlays, and emulators for the U.S. market, easing the industry's migration process. A commitment by the railroad industry to change over to ECP brakes is necessary to inspire additional technological initiatives by the manufacturers.

ECP brake systems from three U.S. manufacturers—all in different stages of AAR approval and testing in revenue service—have been built with the intention of complying with the AAR S–4200 Series of standards, proven safe through field testing, designed using fail-safe principles, and accommodated the industry's need for a different implementation scheme. The AAR S–4200 Series standards are intended to assure the necessary level of safety, reliability, interoperability, and, ultimately, the applicability of this equipment in the U.S. market. The equipment of all three suppliers relies on the conventional pneumatic emergency brake system as a backup in case of failure of the ECP brake control. In most cases, ECP brake systems will support enhanced safety even if the electronics fail, because continuous recharging of the brake pipe will ensure availability of an emergency application. Therefore, the ECP brake system reduces the risk caused by depleted air in the case of an emergency. There is no instance of a malfunctioning ECP brake system that resulted in a catastrophic or critical event.

To assess the benefits and costs of ECP brakes for the U.S. rail freight industry, FRA contracted BAH in 2005 to conduct a study. An ECP brake expert panel of principal stakeholders in the conversion of the U.S. freight car fleet to ECP brake technology, including suppliers, railroads, private car owners, AAR, and FRA was assembled to participate in the study. The expert panel supports the conclusion that the AAR standards are sufficient for the ECP brake system designer to achieve a system safety level adequate for a safety-critical system. In particular, an AAR-compliant system, while providing a significant increase in safety and efficiency, does not introduce extra risks associated with single-point failure of the ECP system itself.

The final BAH report provided a comprehensive analysis and comparison of ECP and conventional air brake systems. BAH acknowledged that while trains with ECP brake systems have been run in North America, South America, and Australia, U.S. implementation has been stalled due to the absence of an acceptable implementation plan for conversion and hard data to support a sound economic analysis, limited interoperability with traditionally braked trains, and insufficient capital investment required for conversion. It concluded that although the barriers to implementation are formidable, ECP brake systems are economically and technically ripe for adoption and should be implemented in phases over the course of 2 to 4 years to collect hard data supporting further implementation. BAH posits that implementing ECP brakes on 2,800 locomotives and 80,000 cars in the Powder River Basin (PRB) would cost the industry approximately $432 million. However, according to BAH, the annual $157 million in anticipated benefits—resulting from saved fuel, improved wheel and brake shoe life, and a reduction in necessary brake inspections—will allow railroads to recover those costs in less than three years. To justify the investment, the BAH report says, conversion must be focused first on the high-mileage, unit-train-type services that would most benefit from its use.

FRA acknowledges that BAH's fuel cost estimates are substantially underestimated due to subsequently rising prices and that the benefits from improved wheel life require re-evaluation since BAH was privy to insufficient hard data. It is notable that BAH did not attempt to quantify potential savings relating to capacity increases or emissions decreases due to the difficulty in arriving at acceptable values. Accordingly, the report's estimated internal rate of return should be viewed as conservative.

VIII. Related Proceeding

In a petition dated November 15, 2006, and filed November 21, 2006, BNSF and NS jointly requested that FRA waive various sections in parts 229 and 232 as it relates to those railroads' operation of ECP brake pilot trains. *See* Docket No. FRA–2006–26435. The FRA Safety Board held a fact-finding hearing on this matter on January 16, 2007, featuring testimony from representatives of the petitioners, air brake manufacturers, and labor unions. On March 21, 2007, the Safety Board granted the petitioners' request, in part, subject to various conditions designed to ensure that trains subject to the waiver will be as safe as trains operated without benefit of the waiver. *See Id.* FRA will closely monitor compliance with the waiver and verify brake system and component performance characteristics using unannounced inspections of trains subject to the waiver.

IX. Legal Impediments and Proposed Relief

ECP brake operation provides for continuous electronic monitoring of air brake system components condition and brake pipe pressure, potentially limiting the need for certain physical brake inspections currently required under part 232. Accordingly, FRA proposes modifying, relaxing, or removing certain requirements, including intermediate terminal inspections (§ 232.209), single-car air brake tests (§ 232.305), and the required percent of operable brakes at initial terminal departure (§ 232.103(d)), as they apply to trains operating in ECP brake mode.

The rail industry's implementation of ECP brakes is frustrated by such inapplicable and inefficient statutory and regulatory requirements. Without a large-scale proliferation and implementation of ECP brake technologies, the industry will not be able to enjoy economies of scale and to overcome the industry-wide limits caused by interoperability problems. FRA seeks to improve market efficiency by providing reliable and suitable standards and procedures that will support investments in ECP brake technology.

The current statutory and regulatory requirements, however—including those concerning brake inspections and the operation of trains with defective equipment—may reduce or eliminate incentives for railroads to implement new ECP brake technology and take advantage of its operational and safety benefits. For example, 49 U.S.C. 20303 presents an obstacle to cost-saving, safe, and efficient long hauls promised by ECP brakes. To avoid incurring civil penalties, operators are required under 49 U.S.C. 20303 to transport rail vehicles with defective or insecure equipment ''from the place at which the defect or insecurity was first discovered to the nearest available place at which the repairs can be made.''

When the defective equipment is an ECP brake, stopping for a physical inspection is not necessary, as it does not increase the safe operation of the train. If more than 15 percent of the train's AAR approved ECP brakes become inoperable, the train automatically stops. A train with 85 percent operative ECP brakes will have 15 percent less overall braking capacity than a conventional pneumatic train with 100 percent operative brakes—an important concern when operating on long grades. However, a train with 85 percent operative ECP brakes will still

have shorter stopping distances than a conventional pneumatic braked train with 100 percent operative brakes. Considering the technology's continuous self-monitoring and constant communication with the engineer, it is highly unlikely that a train will ever reach such a level of inoperability. Further, FRA believes that an ECP brake operated freight train may travel non-stop to its destination, not to exceed 3,500 miles, because foundation brake rigging and brake shoes will safely operate over this distance and redundant intermediate brake inspections for an ECP brake operated train moving that distance do not increase ECP brake system safety. As an added benefit, the increased mileage allowance would provide for coast-to-coast travel. In the related proceeding, Docket No. FRA–2006–26435, FRA's Safety Board granted the request of BNSF and NS to allow the non-stop movement of an ECP brake operated train to its destination, each not to exceed 3,500 miles. FRA believes that the proposed rule should codify this regulatory relief so that it applies universally.

Nevertheless, 49 U.S.C. 20303 requires trains with defective equipment, including brakes, to travel to the nearest repair location. If the nearest available repair location is in a direction other than that in which the train is traveling, the train with defective equipment must switch the defective car out of the train and add it to another train traveling in the direction of the repair location, sometimes requiring a ''backhaul.'' ECP brake implementation has been complicated by the ECP brakes system's technological incompatibility with conventional pneumatic brake systems. To switch a car equipped with ECP brakes into a technologically incompatible train operating with conventional pneumatic brakes, however, will create additional safety hazards for that train.

The potential risks involved in combining cars with incompatible braking systems coupled with the hazards normally associated with switching cars in the field, likely outweigh the potential harm of keeping the defective car in its existing ECP braked train and traveling to a repair location that is further away. In circumstances where the defective safety appliance is a non-brake defect, it may be safer and more efficient to allow ECP brake equipped trains with non-brake defective equipment to travel to the nearest forward repair station. Moreover, due to the ability of ECP brake systems to continuously monitor the brakes on each car in a train and to provide specific information to the locomotive engineer regarding the location of any car with inoperative brakes and the inherent design of such systems to prohibit operation with less than 85 percent operative brakes, the need to immediately set-out and handle cars with defective brakes for repair is unnecessary. There is also no safety need to require a railroad to incur the expense and delay involved with cutting the defective car out of the train. Currently, freight cars with defective mechanical conditions are permitted to be hauled long-distances for repair. *See* 49 CFR 215.9. In light of the technological advances provided by ECP brake systems, it appears logical and necessary to permit more flexibility in moving equipment with defective brakes when equipped with ECP brakes and hauled in a train operating in ECP brake mode. However, the language of 49 U.S.C. 20303, prevents FRA from providing this flexibility.

The aforementioned requirements governing conventional pneumatic braked trains may offset the increased safety and efficiency benefits afforded by ECP brakes, thus eliminating the incentives for rail operators to implement ECP brake technologies. To encourage implementation without hindering safety, FRA proposes to invoke its discretionary authority under 49 U.S.C. 20306 to exempt ECP brake equipped trains from the specific statutory requirements contained in 49 U.S.C. 20303. The requirements for moving defective equipment were created over a century ago, during the infancy of pneumatic brakes and before all cars were equipped with power brakes. With many more reasons to stop train operation along tracks with frequent repair shops and exponentially more employees, the legislative drafters of that time could not have envisioned the type of safer and more efficient technologies available today.

Recognizing the importance of upgrading rail technologies, Congress in 1980 passed the Rock Island Railroad Transition and Employee Assistance Act (the ''Rock Island Act''), which, inter alia, provides statutory relief for the implementation of new technologies. More specifically, when certain statutory requirements preclude the development or implementation of more efficient railroad transportation equipment or other transportation innovations, the applicable section of the Rock Island Act, currently codified at 49 U.S.C. 20306, provides the Secretary of Transportation with the authority to grant an exemption to those requirements based on evidence received and findings developed at a hearing.

According to Senate Report No. 96–614, ''This section fosters rail technological improvements by giving the Federal Railroad Administration *discretionary* authority to grant exemptions from the Safety Appliances Acts' mandatory requirements *when those requirements preclude the development or implementation of new rail technology.*'' Senate Comm. on Commerce, Science, and Transportation, S. Rep. No. 96–614, at 8–9 (Mar. 4, 1980) (emphases added). The House version of the bill includes no similar provision, but the Conference substitute adds that the authority granted FRA in this section must be exercised after a hearing, absent an agreement between labor representatives and the developers or operators of the new equipment or technology. Joint Explanatory Statement of the Committee of Conference, H. Conf. Rep. No. 96–1041, § 117, at 30 (May 20, 1980).

Under 49 CFR 1.49(v), the Federal Railroad Administrator is delegated authority to carry out the functions vested in the Secretary by the Rock Island Act. Under this authority, FRA intends to schedule a hearing to be set at a date established in a forthcoming notice, at which the Administrator or his delegated representative may preside, to receive evidence and develop findings to determine whether FRA should invoke 49 U.S.C. 20306. The scope of the hearing will include the following questions:

- Will allowing an ECP braked train with defective brakes to travel to its destination, not to exceed 3,500 miles, decrease, maintain, or exceed the level of safety provided for a conventional pneumatic braked train receiving a Class 1A brake inspections every 1,000 miles?
- What safety hazards, if any, will be caused by switching an ECP braked car into a technologically incompatible train equipped with conventional pneumatic brakes?
- What is safer for an ECP braked car with defective non-brake parts: Switching it into a train equipped with conventional pneumatic brakes—rendering the switched car's ECP brakes ineffective—for backhauling to the nearest repair station or allowing it to continue to the nearest forward repair location in the ECP brake equipped train with more than 85 percent effective and operative brakes?
- Does 49 U.S.C. 20303 provide a disincentive sufficient to preclude implementation of ECP brake technology?

X. Additional Issues

A. Part 229

In the related proceeding, Docket No. FRA–2006–26435, BNSF and NS seek relief from various provisions of parts 229 and 232. In relation to part 229, BNSF and NS seek relief from the requirements relating to daily locomotive inspections and electronic record keeping. At this point in time, FRA believes that there is insufficient information available to consider any exceptions to part 229 for operations using ECP brake systems. In any event, FRA seeks comments and information relating to this issue.

B. Dynamic Brake Requirements

At the public hearing conducted in the related proceeding, BNSF requested relief from some of the dynamic brake requirements contained in 49 CFR part 232. FRA is unclear of what specific relief is requested regarding dynamic brakes. Section 232.109 provides for the continued operation of a locomotive found with inoperative dynamic brakes for a period of up to 30 calendar days. FRA does not see how more flexibility in this area is necessary. However, FRA invites interested parties to comment on the requested relief or clarify the necessity of such relief.

C. Single Car Air Brake Test Approval Procedures and Single Car Air Brake Tests

The proposed rules include a provision requiring the submission and approval of single car air brake test procedures for cars with ECP brake systems in accordance with the special approval procedures in § 232.17. At this time, the proposed rules do not modify § 232.17. However, FRA reserves the right to modify § 232.17 to make clear the applicability of proposed subpart G, including, but not limited to, adding cross-references.

Section 232.305(a) provides that a single car air brake test may be performed partially in accordance with ''Section 4.0, 'Special Tests,' of the Association of American Railroads Standard S–486–01, 'Code of Air Brake System Tests for Freight Equipment,' contained in the AAR Manual of Standards and Recommended Practices, Section E (January 1, 2001).'' That standard has since been amended and FRA has approved the use of the new Standard S–486–04 as the procedure to use when performing a single car air brake test. Accordingly, FRA proposes to amend § 232.305(a) by replacing the directly preceding quoted text with the following: ''Section 4.0, 'Special Tests,' of the Association of American Railroads Standard S–486–04, 'Code of Air Brake System Tests for Freight Equipment,' contained in the AAR Manual of Standards and Recommended Practices, Section E (January 1, 2004).''

D. Train Handling Information

Section 232.111 requires railroads to adopt and comply with written procedures ensuring that railroad train crews receiving trains are provided accurate information concerning the train's condition. The continuous monitoring capabilities of ECP brake systems provide information regarding the location of equipment with inoperative or cut out brakes. At this time, however, FRA does not see any reason for excepting any portion of or provision contained in § 232.111. FRA believes that, if anything, ECP brake systems' continuous monitoring capabilities will assist railroads in complying with the train handling information rules in § 232.111 by monitoring defects and potentially allowing for the manual input of defects not monitored electronically and then electronically providing such information to subsequent train crews. FRA seeks comments and information on this issue.

E. Piston Travel Limits

For cars equipped with 8½-inch or 10-inch diameter brake cylinders receiving either a Class I brake test or a periodic inspection while on a shop or repair track, §§ 232.205(c)(5) and 232.303(c) currently limit piston travel to 7 to 9 inches. An industry-wide waiver currently in effect, however, permits piston travel limits to range from 6 to 9 inches. FRA proposes to incorporate that waiver into the rules by amending §§ 232.205(c)(5) and 232.303(c) accordingly. FRA seeks comments and information on this issue.

F. Extended Haul Trains

Section 232.213(a)(6) requires inbound inspections for extended haul trains and states that, ''After April 1, 2007, the inbound inspection described in this paragraph shall not be required unless FRA provides notification to the industry extending the requirement to perform inbound inspections on extended haul trains.'' Section 232.213(a)(7) requires railroads to maintain a record of all defective, inoperative, or ineffective brakes and all conditions not in compliance with parts 215 and 231 of discovered during train movement. In addition, that section says that, ''After April 1, 2007, the records described in this paragraph need not be maintained unless FRA provides the notification required in paragraph (a)(6) of this section extending the requirement to conduct inbound inspections on extended haul trains.''

FRA proposes to amend Part 232 by deleting §§ 232.213(a)(6) and (a)(7) from the regulations. These regulations ''sunsetted'' on April 1, 2007, without further FRA action. Accordingly, they serve no purpose remaining in the CFR. FRA seeks comments on this proposal.

G. Part 238

Amtrak has informally expressed interest in potentially using ECP brake system technology for its Auto Train that runs from Lorton, Virginia to Sanford, Florida. Amtrak has previously employed overlay ECP braking on that train, and presumably would benefit from some additional flexibility with respect to the conduct of intermediate inspections. However, since FRA does not currently have sufficient information regarding the use of ECP brake systems on passenger trains and passenger equipment, FRA does not propose in this rulemaking to amend 49 CFR part 238. The functions of freight and passenger trains and cars, evidenced by the varied rules applicable to each, are too disparate to provide a one-size-fits-all solution for ECP brake integration and use. FRA may consider Part 238's applicability to ECP brake systems in another rulemaking or in other proceedings. If comments appropriate to this rulemaking are submitted, FRA reserves the right to include provisions addressing those issues at the final rule stage. Further, FRA would consider requests for waivers relating to the regulation of freight trains and freight cars equipped with ECP brake systems for passenger trains on a case-by-case basis.

XI. Section-by-Section Analysis

Proposed Amendments to 49 CFR Part 232

Unless otherwise noted, all section references below refer to sections in title 49 of the Code of Federal Regulations (CFR). FRA seeks comments on all proposals made in this NPRM.

Subpart A—General

This subpart of the proposal contains amendments to the definitions listed in subpart A of part 232.

Section 232.5 Definitions

FRA proposes to amend § 232.5 by adding an extensive set of definitions to introduce the regulatory relief and regulations applicable to ECP brake systems. FRA has worded these definitions to mirror, to the extent possible, the definitions provided in

existing AAR standards. FRA intends these definitions to clarify the meaning of important terms that are used in the text of the proposed rule. The proposed definitions are carefully worded in an attempt to minimize the potential for misinterpretation of the rule. Some of the definitions introduce new concepts or new technologies which require further discussion.

The proposed definitions acknowledge the two general types of ECP brake systems—dual mode and stand-alone. The definition of a dual mode ECP brake system, which means a brake system that can work either as a conventional pneumatic brake system or an ECP brake system, intends to cover both an overlay ECP brake system and an ECP brake system equipped with an emulator CCD. The definition of CCD is intended to describe an important and necessary part of ECP brake system technology.

Subpart G—Electronically Controlled Pneumatic (ECP) Braking Systems

FRA proposes to add a new subpart G to Part 232. This proposed subpart contains the design and operational requirements that will provide regulatory relief and modifications to allow implementation of ECP brake systems on the Nation's railroads and to ensure the safety of such operations.

Section 232.601 Scope

This section contains a formal statement of the proposed rules' purpose and scope. The proposed rules contain specific requirements relating to the operation of freight trains and freight cars equipped with ECP brake systems and operating in ECP brake mode. The proposed provisions also intend to provide specific exceptions from various requirements contained in part 232 for ECP brake equipped freight trains and freight cars.

Section 232.602 Applicability

As a general matter, this section proposes that these rules apply to all railroads that operate ECP brake equipped freight trains or freight cars on track which is part of the general railroad system of transportation. The proposed rules will apply to freight trains operating in ECP brake mode, freight cars equipped with ECP brake systems, and conventionally braked freight trains and freight cars when operated in conjunction with ECP brake equipment.

The regulatory relief contemplated by this NPRM and the need to ensure the safe operation of trains and vehicles equipped with this advanced technology requires that exception of certain existing Part 232 provisions be afforded. Many of the provisions for which FRA proposes an exception either apply awkwardly or should otherwise not apply to ECP brake systems due to the new technology's design or additional safety benefits. Similarly, the addition of various requirements directly related to ECP brake systems is necessary to ensure that the equipment is properly inspected, tested, maintained, and safe to operate.

To fulfill these goals and to avoid an excess of confusing cross-references, FRA proposes to except specific provisions and an entire subpart of Part 232 from application to ECP brake systems. Each section of this proposed subpart contains specific exceptions from various provisions contained in other portions of Part 232 or contain appropriately rewritten provisions directly applicable to ECP brake systems. Those portions and sections of Part 232 not specifically excepted by the provisions proposed in this NPRM remain applicable to ECP brake equipped freight trains and freight cars.

Section 232.603 Design, Interoperability, and Configuration Management Requirements

In order to ensure the safety and interoperability of ECP brake systems, this section proposes to incorporate by reference the existing AAR standards and approval procedures for ECP brake systems. The AAR, its member railroads, and various brake manufacturers have invested considerable time and effort in developing industry standards addressing the design, performance, and interoperability of ECP brake systems. FRA has reviewed the industry standards it proposes to incorporate in this rule and has determined that the standards effectively address and ensure the safe and proper operation of the brake system technology. As noted in the preamble, FRA funded a FMECA, which validated the safety and applicability of AAR's ECP brake system standards for freight railroads.

FRA believes that compliance with the AAR standards identified in proposed paragraph (a) will ensure the safety and efficiency of ECP brake equipped freight trains and freight cars. Implementation of ECP braking systems complying with these standards will bring benefits and efficiencies encompassing train handling, car maintenance, fuel savings, network capacity, self-monitoring, fail-safe operation, accurate and instantaneous brake commands throughout the train, and continuous, real-time self-diagnostics. Paragraph (a) proposes to require all suppliers to meet existing AAR standards when developing and installing ECP brake systems.

Paragraph (a) proposes the incorporation of the most recent AAR standards related to ECP brake systems. FRA recognizes that ECP brake systems are a growing technology and realizes that the existing AAR standards may need to change as the technology advances. Accordingly, FRA proposes two methods the incorporated industry standards may be changed. Proposed paragraph (a) permits the submission of an alternate standard under the special approval procedures contained in § 232.17. In addition, proposed paragraph (f) permits the AAR or other authorized representative of the railroad industry to seek modification of the incorporated industry standards through the modification procedures contained in § 232.307. The modification procedures in § 232.307 were developed to permit modification of the incorporated AAR single car test standard and FRA believes that the procedures are equally applicable to these proposed regulations. The industry has successfully utilized both these methods to change or modify other industry standards incorporated in part 232 and FRA believes it is appropriate and necessary to provide this latitude for the standards related to ECP brake systems and components.

Paragraph (b) proposes that all ECP brake systems receive conditional or final approval under AAR's recently adopted Standard S–4240 prior to use and that they maintain such approval while in use. In this paragraph, FRA intends to prohibit the use of ECP brake systems that do not receive conditional or final AAR approval or that cease to comply with the incorporated AAR standards relating to ECP brake systems. FRA has reviewed the approval procedures contained in AAR Standard S–4240 and believes that they provide an appropriate review process to ensure the safe and proper operation of ECP brake systems. FRA believes that AAR is in the best position to approve those ECP brake systems that will be used by its member railroads and, over time, other non-member railroads interchanging traffic on the general rail system.

In paragraph (c), FRA proposes that all ECP brake systems meet the configuration management requirements contained in an FRA-recognized industry approved standard. FRA believes that configuration management of ECP brake system hardware and software components is an absolute requirement to ensure the

interchangeability, interoperability, compatibility and continued proper and safe operation of ECP brake systems. Compatibility of ECP hardware and software will have a direct effect on the safety and reliability of ECP brake systems running on the Nation's railroads.

The AAR approval process and Air Brake Systems Committee requires various procedures to ensure the interoperability and interchangeability of AAR approved ECP brake systems and their components. These same requirements and procedures have been used for many years to successfully manage the configuration of conventional pneumatic AAR approved air brake valves. Therefore, FRA believes that responsibility for the configuration management of AAR approved brake systems and their components should continue to reside with AAR and its Air Brake Systems Committee.

AAR standards, including its S–4200 Series of standards for ECP brake systems, however, do not provide requirements for hardware and software configuration management plans. AAR is in the process of developing standards related to ECP brake system configuration management, as evidenced by, among other things, standards S–4240, §§ 5.1 and 5.2, which require ECP brake manufacturers to obtain AAR approval for changes to approved hardware and software.

If a configuration management standard is completed and issued prior to the publication of this notice, FRA seeks comments during this proposed rule's comment period on the incorporation of the respective standard into the rules by reference. If it is published subsequent to the publication of this notice, FRA still seeks comments during this proposed rule's comment period and FRA will also consider other forums for receiving comments, including, but not limited to, the public hearing that will be held in connection with this proposal or by issuance of a supplemental notice informing interested parties of the standard's availability. In anticipation of AAR issuing such a standard in the near future, FRA proposes to incorporate that standard by reference in the final rule; provided FRA's review of the standard determines it is acceptable.

Although FRA prefers that the industry develop, adopt, and comply with a recognized industry configuration management standard, FRA recognizes that such a standard does not yet exist. Accordingly, paragraph (c) proposes that, in lieu of compliance with an AAR software configuration management standard, railroads may submit to FRA an alternate configuration management plan for approval. FRA seeks comments and information on what minimum requirements or guidelines should be considered for such submitted plans. FRA believes that configuration plans must be submitted for approval under § 232.17 and must be structured in accordance with accepted configuration management standards such as IEEE Std 28–1990, IEEE Standard for Software Configuration Management Plans, American National Standards Institute, 1990; or IEEE Std 1042–1987, IEEE Guide to Software Configuration Management, American National Standards Institute, 1987. FRA seeks comments on these suggested structures or any other standard structures. FRA intends that no train shall be operated in ECP brake mode in revenue service unless it is using an ECP brake system that complies with a configuration management plan incorporated into the final rule or another configuration management plan otherwise approved by FRA.

FRA believes that any ECP brake configuration standards should consider issues beyond initial approval. For instance, use of improper or out-of-date software versions for microprocessor controlled systems has been an issue in a variety of industries. Therefore, FRA cautions that more robust configuration management processes beyond those already included in AAR standard S–4200 may be needed to adequately control ECP brake system components, especially as more manufacturers apply for AAR approval of ECP brake systems. Further, safety or reliability issues may dictate that hardware or software configurations be changed once ECP brake systems are put in service on a large scale in the U.S. FRA encourages AAR, railroads, and manufacturers to ensure their ability to continually monitor and respond to hardware and software issues affecting ECP brake systems after initial approval.

FRA believes that AAR is capable of setting appropriate configuration management standards and related approval procedures. FRA intends to rely on AAR to monitor ECP brake component approval, configuration and compatibility. However, FRA, in its federal oversight role will monitor the activities of the Air Brake Systems Committee and the AAR ECP brake approval process to ensure that any safety or reliability issues that may emerge are addressed promptly and comprehensively. FRA will also issue additional configuration management requirements for the operation of ECP brake systems if, in the sole opinion of the FRA, the oversight of the AAR and the AAR Air Brake Systems Committee proves inadequate for the continued safe operation of ECP brake systems. In this case, FRA may take a variety of approaches including requiring railroads and car owners to develop their own configuration management plans for monitoring ECP brake system interchangeability, interoperability and compatibility. FRA seeks comments on how the rules can ensure continued monitoring of hardware and software issues affecting ECP brake systems after initial approval.

Paragraph (d) of this section proposes to except a freight car or freight train equipped with ECP brakes from certain existing provisions contained in Part 232. FRA recognizes that Part 232 requires compliance with other AAR standards not applicable to ECP brake systems. For instance, section 232.103(l) requires compliance with AAR Standard S–469–47 (''Performance Specification for Freight Brakes''), which specifies a train's air brakes must respond to the decrease and increase of brake pipe pressure. However, ECP brake systems respond to an electronic signal, not brake pipe pressure, rendering S–469–47 inapplicable to ECP brake systems. Accordingly, paragraph (d) proposes to except ECP brake systems from the requirements of AAR Standard S–469–47.

Subpart F of part 232 contains general requirements for introducing new brake system technologies. More specifically, it requires, *inter alia*, a pre-revenue acceptance testing plan. As FRA views existing ECP brake system technology to be a fully mature and well tested technology, FRA does not believe the provisions contained in subpart F are applicable to this existing technology. When subpart F was originally added to part 232, ECP brake technology was just beginning to gain prominence. Since that time, experience with the technology is far more developed and the technology is being used on many different trains around the world. Moreover, FRA believes that its proposal to require ECP brake systems to initially and continually comply with AAR standards and to be approved in accordance with AAR's approval procedures prior to being placed in service obviates the need for existing ECP brake system technology to comply with the requirements under subpart F. Accordingly, paragraph (d)(2) proposes an exception from the requirements contained in subpart F freight trains and freight cars equipped with existing ECP brake system technology that has been conditionally or finally approved by

AAR in accordance with its approval procedures prior to the effective date of the final rule in this proceeding. FRA has limited the exception to ECP brake system technologies approved by AAR as of the effective date of a final rule to provide an incentive to the industry to move the introduction of the technology along in a timely fashion.

In anticipation of future ECP brake technologies not currently contemplated within the scope of the incorporated AAR standards or not approved by AAR prior to the effective date of a final rule in this proceeding, FRA proposes paragraph (e), which provides a procedure for introducing such technologies without going through the pre-revenue testing procedures contained in subpart F. Paragraph (e) permits a party interested in using new ECP brake system technologies or using an ECP brake system technology not approved by AAR prior to the effective date of a final rule in this matter to file a written request with the FRA seeking an exception from subpart F. FRA would expect any such request to include a comprehensive narrative statement and any evidence or facts justifying the exception of the new ECP brake technology from the testing and demonstration requirements of subpart F. The material should fully explain the testing or demonstration that will be conducted pursuant to an FRA-recognized industry standard and ensure that FRA is able to monitor such testing or demonstration. FRA's Associate Administrator may revoke the exception in writing for any reason after providing an opportunity for the affected party or parties to respond.

Section 232.605 Training Requirements

The general training requirements for railroad and contractor employees for performing the inspection, testing, and maintenance on brake systems are contained in § 232.203. FRA proposes paragraph (a) of this section to make clear that the training requirements contained in § 232.203 are applicable to ECP brake system operations and to ensure that railroads update their training, qualification, and designation programs to include provisions for these operations. Thus, FRA proposes to require that railroad and contract personnel responsible for performing brake system inspections, tests, and maintenance on ECP brake systems be trained, tested, and designated in accordance with the requirements contained in § 232.203 on the ECP brake systems they will be required to inspect, test, and maintain.

FRA continues to believe that railroads and contractors are in the best position to determine the precise method of training that is required for the personnel they use to conduct required brake system inspections, tests, and maintenance. Although FRA provides railroads and contractors with broad discretion to develop training programs specifically tailored to their operations and personnel, FRA will expect railroads and contractors to fully comply with the training and qualification plans they adopt as they apply to ECP brake operations. A critical component of this training requires ensuring that employees have knowledge of the specific Federal requirements that govern their work. Accordingly, FRA proposes to require the training and qualification plans mandated under § 232.203 to include provisions applicable to the inspection, testing, and maintenance of ECP brake systems.

Section 232.203(c) contains general requirements or elements which must be part of any training and qualification plan adopted by a railroad or contractor. FRA continues to believe that the elements contained in this section are specific enough to ensure high quality training and broad enough to permit a railroad or contractor to adopt a training plan that is best suited to its particular operation. FRA continues to believe that the required training must provide employees with the necessary knowledge, skills, and abilities to perform the tasks required for the various types of brake systems the individual employee will be required to inspect, test, or maintain. Since FRA expects only a limited number of employees will be involved with ECP brake operations, a railroad or contractor may tailor its training programs only for those individuals involved with ECP brake systems, based on the tasks that employee will be required to perform on those specific systems.

Section 232.203(e) contains record keeping requirements, the cornerstone of the training requirements. FRA continues to believe that such records should be kept for employees inspecting, testing, and maintaining ECP brake equipped freight cars and freight trains. Because § 232.203 and proposed § 232.605 allow each railroad and contractor the flexibility to develop a training program that best fits its operation and does not impose specific curriculum or experience requirements, FRA continues to believe it is vital for railroads and contractors to maintain detailed records on the training they provide. Such documentation will allow FRA to judge the effectiveness of the training provided and will provide FRA with the ability to independently assess whether the training provided to a specific individual adequately addresses the skills and knowledge required to perform the tasks that the person is deemed qualified to perform. Moreover, requiring these records will deter railroads and contractors from circumventing the training requirements and discourage them from attempting to utilize insufficiently trained personnel to perform the inspections and tests required by this rule. FRA also intends to make clear that the required records may be maintained either electronically or on paper in the same manner as required under § 232.203.

Paragraph (a) also proposes continued compliance with § 232.203(f), which requires that each railroad or contractor adopt and comply with a plan to periodically assess the effectiveness of its training program. Although FRA agrees that a formal audit process may not be necessary, FRA also continues to believe that railroads and contractors should periodically assess the effectiveness of their training programs that would include an assessment of the training related to ECP brake systems. FRA continues to believe that periodic assessments may be conducted through a number of different means and each railroad or contractor may have a need to conduct the assessment in a different manner. Paragraph (a) proposes that a railroad or contractor institute a plan to periodically assess its training program regarding ECP brake systems and permit the use of efficiency tests or periodic review of employee performance as methods for conducting such review. FRA continues to believe that many railroads, due to their small size, are capable of assessing the quality of the training their employees receive by conducting periodic supervisory spot checks or efficiency tests of their employees' performance. However, FRA also continues to believe that on larger railroads the periodic assessment of a training program should involve all segments of the workforce involved in the training. FRA believes it is vital that labor be intrinsically involved in the assessment process, from beginning to end. For example, evaluation of training techniques might best be approached through a ''team'' method, where several observers, including labor representatives, periodically evaluate course or ''hands-on'' training content and presentation.

Paragraph (b) proposes to require each railroad to appropriately amend or modify its operating rules to include safe train handling procedures when

utilizing ECP braking systems. The developed operating rules should address the equipment and territory operated by the railroad. FRA continues to believe that training on proper train handling procedures is essential to ensuring that locomotive engineers can properly handle their trains with or without ECP braking systems.

FRA also continues to believe that it should not specify the specific knowledge, skill, and ability criteria that a railroad must adopt into its locomotive engineer training program. FRA believes that each railroad is in the best position to determine what these criteria should be and what training is necessary to provide that knowledge, skill, and ability to its employees operating ECP brake equipped trains. However, to ensure that the railroads and contractors provide and complete training, paragraph (c) proposes to require each to adopt and comply with such criteria and training procedures and to incorporate them into its locomotive engineer certification program required by 49 CFR part 240.

Section 232.607 Inspection and Testing Requirements

Except for transfer trains, the existing Part 232 regulations require that a train receive a Class I brake test at its initial terminal and when certain events occur en route, a Class IA brake test every 1,000 miles and Class III brake tests when the train line cable continuity is interrupted. When operating as an extended haul train, the existing regulations require that a Class I brake test be performed at the train's initial terminal and at the train's 1,500-mile location consist, if operating further than 1,500 miles. In addition, under certain circumstances, cars and solid blocks of cars are required to receive either a Class I or a Class II brake test when they are added to a train. Each of these inspections is expensive and time-consuming.

An ECP brake system's self-monitoring capabilities, fail-safe operation, and enhanced safety and performance provide railroads the ability to reduce the number of physical inspections on a train and will reduce the number of repairs to the brake system. In a letter dated January 26, 2007, filed in the related waiver proceeding, BNSF and NS assert that ''This performance-based technology supercedes [sic] the need for a scheduled inspection based on the amount of mileage that can be accumulated within the boundaries of the U.S. rail system.'' Docket No. FRA–2006–26435. Similarly, in the same docket, two ECP brake manufacturers, Wabtec and New York Air Brake, state that when a ECP brake system enters ''Run'' mode, it provides diagnostics, continuous monitoring, and fault reporting to the locomotive display. According to the manufacturers, ECP brakes provide to the locomotive monitoring and feedback of the most important brake data and ''while it is not economically practical to monitor for all potential brake system failures, the increased level of monitoring and data reporting should allow safely extending the distance between inspection points, coupled with revised railroad procedures.'' Letter dated January 29, 2007 in Docket No. FRA–2006–26435.

FRA continues to believe that if a train is properly and thoroughly inspected, with as many defective conditions being eliminated as possible, then the train is capable of traveling distances much greater than 1,000 miles between brake inspections. FRA's experience with extended haul trains over the last three years has established that trains with conventional pneumatic brake systems that are inspected by highly qualified individuals can safely operate up to 1,500 miles between brake inspections. FRA is not aware of any significant incident or derailment related to a brake or mechanical component on an extended haul train. Accordingly, in paragraph (g), FRA proposes to except trains operating exclusively in ECP brake mode from the Class IA and Class II brake inspections currently required under §§ 232.207 and 232.209. FRA also proposes to except such trains from en route Class I inspections under § 232.205(a) and (b). Paragraph (g) also proposes to except § 232.211(a), which governs the locations where Class III brake inspections must be performed. For clarity, FRA proposes to include the events requiring the performance of a Class III brake test for trains operating in ECP brake mode in this section of the regulation. Accordingly, FRA proposes to except that section and instead include paragraph (e), which is analyzed below.

Paragraph (a) proposes continued compliance with § 232.205(c)—which describes the tasks and requirements of a Class I brake test—for an ECP brake equipped train at its initial terminal. To offset safety concerns regarding the proposed exceptions to intermediate inspections, FRA proposes that Class I brake tests at initial terminals be performed by a qualified mechanical inspector. FRA continues to believe that a Class I brake test performed on a train at its initial terminal needs to be as in-depth and comprehensive as possible and, thus, should be performed by an individual possessing the knowledge not only to identify and detect a defective condition in all of the brake equipment required to be inspected, but also to recognize the interrelated workings of the equipment and the ability to trouble-shoot and repair the equipment. Similarly, FRA proposes that all of the mechanical inspections required to be performed on a train at its initial terminal be conducted by an inspector designated pursuant to 49 CFR 215.11 in order to ensure that all mechanical components are in proper condition prior to the train's departure.

FRA believes that the regulatory relief proposed by paragraph (g) is justified by the increased safety level provided by ECP brake technologies and the proposed requirement under paragraph (a) that a Class I brake test of an ECP brake equipped car be performed by a qualified mechanical inspector at its initial terminal. The exceptions proposed in paragraph (g), in conjunction with the requirements of paragraph (a), would allow most ECP brake equipped and operated trains to travel to their destinations without stopping for any required intermediate inspections. The regulatory relief provided by the proposed elimination of intermediate brake tests would significantly reduce operating and train delay costs.

In paragraph (b), FRA proposes to permit a train operating in ECP brake mode to travel up to 3,500 miles or to its destination, whichever is less, without an additional Class I brake inspection. FRA believes that 3,500 miles allows virtually all ECP brake operated trains to travel to their respective destinations and provides for coast-to-coast travel. FRA also bases this mileage amount on the facts that foundation brake rigging and brake shoes will safety operate this distance and redundant intermediate inspections would not increase ECP brake system safety. Because many unit or cycle trains operate in a continuous loop with multiple loading and unloading locations, FRA has not included the destination of the train as a limiting factor for them. FRA is specifically making this distinction in order to prevent misinterpretation of the proposal as it relates to unit or cycle trains. As these trains may have multiple destinations, a strict application of destination could result in Class I brake tests being performed more frequently than intended by this proposed rule. Thus, in paragraph (b)(2), FRA proposes to treat unit and cycle trains differently by only requiring them to receive Class I brake inspections by

qualified mechanical inspectors at least once every 3,500 miles. To be clear, under the proposed rules, no ECP brake equipped freight car or freight train would be allowed to travel more than 3,500 miles without receiving a Class I brake inspection by a qualified mechanical inspector.

Currently, no extended haul train is permitted to travel more than 1,500 miles without receiving a brake inspection. For ECP brake equipped trains, FRA proposes to more than double the currently allowed distance to 3,500 miles. FRA acknowledges that in the related proceeding, Docket No. FRA–2006–26435, the Safety Board has provided for the movement of ECP brake equipped trains up to 3,500 miles. FRA proposes to codify this relief so that it would apply universally. Accordingly, during the pendency of this rulemaking, FRA will closely monitor those trains' operations and will collect information on the equipment operated in those trains. FRA reserves the right to make appropriate modifications in the final rule based on any further data then available.

FRA acknowledges, however, that notwithstanding the proposed allowance of an ECP brake equipped and operated train to travel up to 3,500 miles without an additional brake inspection, instances exist where certain trains would require the performance of a Class I brake inspection en route. For instance, the current regulations require that certain tests be performed when a car is off a source of compressed air for more than 4 hours. FRA acknowledges that an ECP brake equipped train's on board diagnostics reduce concerns relating to cars remaining off air for too long a period. Accordingly, FRA believes that an expansion of the time allowed off air is justified and proposes to modify this requirement for ECP brake equipped cars. For trains operating in ECP brake mode, FRA proposes in paragraph (c) to require a Class I brake test by a qualified person if that train is off air for more than 24 hours. FRA continues to believe that dangers, although reduced, remain when an ECP brake equipped train remains off air for too long. FRA proposes to limit off-air time to 24 hours since cars moving in service generally have a dwell time of 24 hours or less and to provide sufficient flexibility while allowing the industry to move equipment without impacting timely inspections and maintaining an acceptable level of safety. FRA also proposes that, for trains operating in ECP brake mode and off air for more than 24 hours, the Class I brake inspection be performed by a qualified person. FRA acknowledges that while a qualified mechanical inspector may be stationed at each route's initial terminal and destination, it may not be favorable at this time to require one at each location a train operating in ECP brake mode is off air for more than 24 hours. Requiring a qualified mechanical inspector at each point such a train is off air for more than 24 hours may provide a significant disincentive for a railroad to equip its trains with ECP brake systems.

FRA intends this requirement to also apply to trains operating in ECP brake mode, located at its initial terminal, and off air for more than 24 hours. In other words, under proposed paragraph (c), if at an initial terminal a qualified mechanical inspector performs a Class I brake test on a train operating in ECP brake mode and that train then goes off air for more than 24 hours before departing from the initial terminal, a qualified person must perform another Class I brake test prior to departure. FRA believes that requiring a qualified mechanical inspector at an initial terminal to perform a Class I brake test twice on the same train would be unnecessary, since the second testing would merely be a verification of the previous inspection, and possibly too onerous. FRA does not expect this situation to occur often, since trains rarely sit off air for more than 24 hours at its initial terminal after receiving a Class I brake test.

FRA's intent in proposing this narrow expansion of the 4-hour rule is not to alter the basic tenet that equipment should be retested when it is removed from a source of compressed air for any lengthy period of time. The proposed 24 hour off-air requirement would apply equally to any ECP brake equipped train, regardless of whether it is a unit or cycle train, and would replace the 4 hour off-air requirement under § 232.205(a), which would be excepted under proposed paragraph (g), as discussed above.

This proposed 24-hour allowance gives railroads flexibility to perform switching operations while ECP brake equipped trains are en route and provides flexibility to efficiently move cars from one ECP brake equipped train to another when necessary, yet retains the concept that such be retested when left disconnected from a source of compressed air for longer periods of time. The 24-hour time frame is also consistent with the general dwell time that cars experience while en route. FRA further believes that a limitation on the amount of time that such equipment may be off air is necessary for ensuring that such equipment is inspected in a timely and predictable manner. If no time limit were imposed or if too much time was permitted, an ECP brake equipped car could lawfully sit for days at various locations while en route to its destination and be switched in and out of numerous trains without ever being reinspected. Such an approach would drastically reduce the number of times that the brake systems on such equipment would ever be given a visual inspection from what is currently required and, in FRA's view, would seriously degrade the safety of the trains operating with such equipment in its consist.

Furthermore, if an ECP brake equipped train was allowed to be off-air for an excessive amount of time, it would be virtually impossible for FRA to ensure that equipment is being properly retested as it would be extremely difficult for FRA to determine how long a particular piece of equipment was disconnected from a source of compressed air. In order to make such a determination, FRA would have to maintain observation of the equipment for days at a time. Consequently, the proposed rule proposes a 24-hour limit on the amount of time equipment can be disconnected from a source of compressed air as it maintains current levels of safety and provides an enforceable and verifiable time limit that FRA believes provides the railroads some additional benefit over what is currently required both in terms of operational efficiency and cost savings.

In paragraph (d), FRA proposes to require that a Class I brake test be performed by a qualified person on ECP brake equipped cars added en route to a train operating in ECP brake mode. However, FRA believes that this requirement may not be necessary if other safety precautions are taken. Thus, FRA also proposes to allow such cars to not receive a Class I brake test when being added to a train operating in ECP brake mode if the car had previously received a Class I brake test, the train crew is provided documentation of that test, the car has not been off air for more than 24 hours, and a proper visual inspection is performed prior to use or departure.

Except in limited circumstances, the current regulations require a Class I brake test on each car added to a train at the location it is added to a train. *See* 49 CFR 232.205(b). Although FRA proposes to except ECP brake equipped trains and cars from § 232.205(b), as discussed above, FRA also proposes to retain the basic requirement that all cars added en route shall receive a Class I test by a qualified person unless they

have previously received a Class I brake test by a qualified mechanical inspector. A proper Class I brake test ensures that a car is in proper working condition and is capable of traveling to its destination with minimal problems en route.

Accordingly, if a ECP brake equipped car has received a Class I brake test by a qualified mechanical inspector within the last 3,500 miles, documentation of that test is provided to the train crew, the car has not been off air for more than 24 hours, and a proper visual inspection is conducted when the car is added to the train, FRA proposes with paragraph (d) that it would be unnecessary to require an additional Class I brake test when that car is added to an en route train operating in ECP brake mode. However, to account for those cars that have not received a Class I brake test by a qualified mechanical inspector within the last 3,500 miles and that will be added to a train operating in ECP brake mode, FRA proposes paragraph (d), which would require a Class I brake test under those circumstances. Paragraph (d) would be necessary in light of proposed paragraph (g) excepting compliance with section 232.205(b). FRA contemplates that this requirement would likely only apply to cars with overlay ECP brake equipment that had been operating in pneumatic mode. Unless a car operating in ECP brake mode is off air for more than 24 hours, it would not require a Class I brake test when it is added to a new train, since the proposed rules contemplate that the car would have already received a Class I brake test within the previous 3,500 miles or at its initial terminal. The documentation would be required to ensure that a Class I brake test by a qualified mechanical inspector will be performed every 3,500 miles. Under paragraph (d), any ECP brake equipped car being added to a train operating in ECP brake mode would require a Class I brake test when the car has been off air for more than 24 hours for the same reasons stated above concerning proposed paragraph (c).

FRA believes that a visual inspection of the car's brake components is a suitable replacement for an additional Class I brake test when the car or cars added in these circumstances have received a Class I brake test by a qualified mechanical inspector within the last 3,500 miles. The visual inspection proposed in this paragraph could be performed while the car is off air and could be conducted in conjunction with the mechanical inspection required under part 215 whenever a car is added to a train. Thus, FRA believes that the visual inspection proposed in this paragraph would not impose any significant burden on the railroads as they are already required to visually inspect the mechanical components on any car added to a train under part 215. FRA also acknowledges that the brake systems on cars not equipped with ECP brakes would be inoperative after being added to a train operating in ECP brake mode. To ensure the safe operation of such equipment and trains, FRA proposes that the transfer of cars equipped solely with conventional brake systems into trains operating in ECP brake mode also be given a visual inspection to ensure their safe operation and to ensure compliance with § 232.15.

FRA anticipates that placing a car equipped with conventional pneumatic brakes into an ECP brake equipped train may be awkward at best, requiring use of an electrical ''run around cable'' and manual inputs into the locomotive control system. In a letter dated February 5, 2007, AAR provided a list of recommended ''enhancements and modifications'' to Part 232 to facilitate the use of ECP brakes. A copy of this document has been placed in the docket of this rulemaking. In that communication, the AAR stated that railroads ''do not plan to commingle non-ECP equipment in stand-alone ECP trains.'' However, FRA believes that foreseeable—though rare—circumstances should be considered in this rulemaking to the extent possible. Accordingly, FRA seeks comments and information on what requirements may be necessary to safely allow the addition of cars equipped with conventional pneumatic brakes into an ECP brake equipped train, including, but not limited to, the placement and securement of cables along cars equipped with conventional pneumatic brakes to preserve their continuity between non-consecutive cars equipped with ECP brakes and the appropriate placement in the consist of cars equipped with conventional pneumatic brakes.

In the event that a car would be required to receive a Class I brake test when added to an en route train, FRA proposes that the Class I brake test be performed by a qualified person for the same reasons stated in the above analysis. To be clear, although any car added to a train en route may receive a Class I inspection by a qualified person, the entire train's travel distance is limited to its destination or the distance remaining until the train or any individual car picked up en route has traveled 3,500 miles since its last Class I brake inspection performed by a qualified mechanical inspector, whichever is less. A Class I brake inspection by a qualified person does not reset the mileage clock for the entire train.

FRA intends to continue to require Class III brake tests for trains operating in ECP brake mode. However, due to the changes related to adding cars en route and for purposes of clarity, FRA is including the triggering events for when a Class III brake test would be required in paragraph (e) of this section. As previously mentioned, for trains operating in ECP brake mode, FRA proposes in paragraph (g) to except § 232.211(a), which governs the locations where Class III brake inspections must be performed. Through paragraph (e), FRA intends to require Class III tests on trains operating in ECP brake mode where a locomotive or caboose is changed, a car or block of cars is added to or removed from the train, and whenever the ECP brake system's continuity is compromised when the train consist has not changed. FRA acknowledges that there has been confusion in unique circumstances where a Class III brake test may or may not be required. For instance, a Class III brake test would not be required when a consist is cut in half, but otherwise may remain unchanged, such as when blocking a crossing. Further, a block of cars could be added to the rear of a train without breaking the train line cable's continuity. Accordingly, to avoid any misunderstanding, FRA proposes to specifically detail when a Class III brake inspection will be required on trains operating in ECP brake mode. All other trains, including ECP brake equipped trains operating in conventional pneumatic mode, would remain subject to the provisions contained in § 232.211(a).

Paragraph (f) proposes to modify certain elements of the brake tests applicable to ECP brake equipped cars and trains operating in ECP brake mode. Under the current regulations, tests and inspections include brake pipe service reductions and designate specific psi specifications. FRA believes that modifications to the brake pipe reduction standard are appropriate to reflect the differences between ECP brakes and conventional pneumatic brakes. For instance, control of ECP brakes is not dependent on brake pipe pressure and ECP brake equipped trains have a nominal brake pipe pressure of 90 psi. Further, since brakes need only remain applied until the release signal is received and the ECP brake system communicates through an immediate electronic control signal, the requirement to keep the brakes applied for a period of three minutes is unnecessary. Since the ECP brake tests

include an equivalent electronic full service reduction with immediately provided results, the time consuming 20-psi brake pipe reduction required in the Class I and Class III brake tests and 15-psi brake pipe reduction required in the transfer train brake test and yard air test may no longer be necessary. In addition, the ECP brake system's electronic equivalent to a full service reduction may increase safety and testing efficiency.

In any event, brake pipe pressure remains important, since ECP brake equipped trains rely on the pneumatic backup system for safety purposes. Accordingly, for trains equipped with ECP brake systems, FRA proposes in paragraph (f)(1) to replace the existing brake pipe service reductions and increases with an alternative requirement for an electronic signal that provides an equivalent application or release of the brakes. FRA believes that any alternative test procedures must include, at a minimum, either the electronic equivalent to each existing test's brake pipe reduction requirements or the equivalent of a full service brake pipe reduction initiated by an electronic signal.

FRA seeks comments on this proposal, including the appropriate type of alternative test. In light of how the brake pipe's use in an ECP brake train will be limited to charging brake air reservoirs, FRA seeks comments on how the existing regulatory brake pipe leakage limits should be modified, if at all, for ECP brakes and whether changes in the leakage requirements will affect the pneumatic backup capability of the ECP brake system. In addition, comments should address the need to include the specific electronic reduction that is to be made on ECP equipped trains during the required brake tests and what type of electronic signals would be suitable equivalents to the currently mandated 20-psi and 15-psi brake reduction.

Paragraph (f)(2) proposes to modify certain regulatory requirements related to piston travel limits and adjustments during Class I brake inspections. For instance, under § 232.205(c)(5) a person performing a Class I brake test must ensure that piston travel be adjusted to specific distances. Although FRA believes that ECP brake operations require specific piston travel limits, FRA recognizes that the minimum piston travel limits contained in § 232.205(c)(5) may not be fully applicable to ECP brake systems. Since the ECP brake system precisely measures the amount of brake cylinder pressure for each specified application and maintains that pressure, piston travel tolerances for ECP brakes may not require the level of specificity as those for conventional pneumatic brake operations. Further, FRA acknowledges that a ''one-size-fits-all'' requirement for ECP brake system piston travel may not be ideal or applicable.

Accordingly, paragraph (f)(2) proposes to except the minimum piston travel limits in § 232.205(c)(5) as they apply to ECP brake systems. In place of the minimum piston travel limits required by § 232.205(c), paragraph (f)(2) proposes to require railroads, while performing Class I brake tests, to adhere to the minimum piston travel limits or distances recommended by the applicable manufacturer. FRA anticipates that a recommended minimum piston travel limit for each ECP brake system will be determined by the car's design, weight, and engineered brake ratio. FRA's basis for evaluation of manufacturer recommendations for the minimum piston travel limits will be based on the equivalent brake shoe force on the wheel as shown in the appropriate calculations or tests. At this time, FRA intends to retain the standard nominal adjustment of 7½ inches and the maximum piston travel limit of 9 inches in accordance with of § 232.205(c)(5). In any event, FRA seeks comments on whether and how the nominal piston travel adjustment limit should be flexible.

FRA proposes to require such limits be stenciled or marked on the car or badge plate in the same fashion FRA requires for systems and equipment subject to § 232.103(g). FRA believes that requiring the affixation of a legible decal, stencil, or sticker or the equipping of a badge plate displaying the permissible brake cylinder pistol travel range will effectively communicate the acceptable range to train crew members and will ensure the proper operation of a car's brakes after being inspected. FRA believes that this information is essential in order for a person to properly perform the required brake inspections. FRA believes that all vehicles equipped with ECP brake systems require marking in order to avoid confusion by those individuals responsible for inspecting and maintaining the equipment.

Section 232.609 Handling of Defective Equipment With ECP Brake Systems

In § 232.609, FRA proposes to modify certain part 232 requirements as they apply to freight cars and freight trains equipped with ECP brake systems and hauling defective equipment. In particular, for such trains and cars, FRA proposes in paragraph (k) to except certain existing requirements and in paragraphs (a) through (j) to provide alternative requirements.

Under § 232.15 and 49 U.S.C. 20303, railroads may be immune to civil penalty liability if a car or train with certain inoperative or defective equipment is hauled under certain conditions. Section 232.15(a) contains various parameters which must exist in order for a railroad to be deemed to be hauling a piece of equipment with defective brakes for repairs without civil penalty liability. The vast majority of the requirements contained in § 232.15(a) are a codification of the existing statutory requirements contained in 49 U.S.C. 20403 and are based on the voluminous case law interpreting those provisions. The statutory provisions require hauling defective equipment only to the nearest place where necessary repairs can be made and require 100 percent operative brakes from any location where such repairs can be effectuated. Thus, because many locations where trains are initiated with any frequency are also locations where brake system repairs can be effectuated, the statutory provisions essentially require 100 percent operative brakes from a train's initial terminal. FRA continues to believe that the proposed requirements relating to the movement of equipment with defective ECP brakes are generally consistent with the statutory requirements, ensure the safe and proper movement of defective equipment, and clarify the duties imposed on a railroad when moving such equipment.

In light of the increased safety levels produced by ECP brake systems, FRA proposes to use its discretionary authority under 49 U.S.C. 20306 to provide an exception from the rigid statutory provisions and modify the regulations concomitant to 49 U.S.C. 20303 governing the movement of defective equipment. Under certain circumstances, the statute and related regulations provide immunity from civil penalty when a train with defective equipment is hauled to the nearest location where the necessary repairs can be made, regardless of direction. Since a train equipped with an ECP brake system and operating in ECP brake mode with a minimum percentage of cars with defective ECP brakes is capable of traveling safely for long distances, FRA proposes to permit the operation of such a train and any cars with defective ECP brakes to its destination, not to exceed 3,500 miles, for repair without civil penalty.

While FRA believes that a train operating in ECP brake mode with some ineffective or inoperative ECP brakes

may continue to travel safely, concerns remain if such a train includes cars with defective non-brake or conventional pneumatic brake equipment. ECP brake systems do not reduce the danger of traveling with such defects. However, as previously noted, the switching and potential backhauling of ECP equipped cars into incompatible trains for the purposes of complying with 49 U.S.C. 20303 and 49 CFR 232.15 outweigh the danger of hauling such cars to the nearest repair location. FRA is also cognizant of the need for logistical flexibility to efficiently accomplish repairs during the transition from conventional pneumatic to ECP brake operations. Furthermore, requiring strict adherence to the statutory requirements related to moving defective equipment ignores the safety features provided by ECP brake system technology and could potentially stifle the industry's ability and desire to implement the technology. Accordingly, FRA will hold a public hearing to determine whether it can and should invoke its discretionary authority under 49 U.S.C. 20306 to except certain operations involving freight cars and trains equipped with ECP brake systems from the stringent statutory movement-for-repair provision. The hearing will also address FRA's exception of trains operating in ECP brake mode from the de facto statutory requirement for 100 percent operative brakes at an initial terminal as discussed above. At this time, FRA proposes to invoke such statutory and regulatory relief in paragraph (k) of this document, including exceptions from §§ 232.15(a)(2), (a)(5), (a)(6), (a)(7), (a)(8), and 232.103(d)-(e).

Under § 232.103(d), no train may depart a location where a Class I brake test is required to be performed on the entire train with any inoperative or ineffective brakes. Since trains equipped with ECP brakes and operating in ECP brake mode provide higher levels of safety, including shorter stopping distances and constant real-time monitoring of the brake system, than trains operating with conventional pneumatic brakes, FRA believes that some leeway needs to be provided for trains operating in ECP brake mode. However, FRA also acknowledges allowing a car to depart an initial terminal with inoperative or ineffective brakes may permit such equipment to move indefinitely without receiving the proper repairs. Accordingly, FRA proposes to limit the types and number of cars that may depart in a train operating in ECP brake mode from a location where the train is required to receive a Class I brake test.

Paragraph (a) proposes to allow a train operating in ECP brake mode to depart from its initial terminal with ninety-five percent effective and operative brakes under certain circumstances. Per paragraph (k), a train operating in ECP brake mode is excepted from § 232.103(d), which requires that one-hundred percent of the brakes on a train shall be effective and operative prior to use or departure from any location where a Class I brake test is required to be performed on the train pursuant to § 232.205. For ECP brake equipped trains, this requirement is replaced by the ninety-five percent effective and operative brake requirement proposed in paragraph (a). FRA believes that this requirement provides flexibility from the rules governing conventional pneumatic braking systems while rendering a sufficient brake failure buffer between departing an initial terminal with ninety-five percent effective and operative brakes and experiencing a penalty stop upon reaching eighty-five percent effective and operative brakes, as proposed by paragraph (d).

The one-hundred percent effective and operative brake requirement under § 232.103(d) is based on FRA's long-standing interpretation and application of AAR's inspection and testing standards as they existed in 1958 as well as the statutory provisions related to the use of power brakes and the movement of equipment with defective safety appliances. See 66 FR 4104, 4124, 4128 (Jan. 7, 2001). However, the design, operation, and safety benefits derived from the use of ECP brake systems dictate a need to modify this long-standing requirement. Under the AAR standards, if at any time the ECP brakes on a train become less than eight-five percent operative, the train will automatically stop via a penalty brake application. In addition, it has been determined that a train with eight-five percent operative ECP brakes will have better stopping distances than a conventional pneumatic braked train with one-hundred percent operative brakes. Moreover, ECP brake system technology provides the ability to continuously monitor the real-time status of the braking system on each car in a train. This allows a locomotive engineer to always know the exact status of his train's braking system. In light of this increased level of safety, FRA believes a partial reduction in the percentage of operative brakes is justified. FRA proposes modifying the requirement to 95 percent effective and operative brakes, which it believes strikes a balance between the current regulation and the need to allow for in-transit failures that could compromise the operation of the train or otherwise automatically shut it down when it reaches 85 percent effective or operative brakes.

Under paragraph (a), a train could only leave its initial terminal if a Class I brake test is performed by a qualified mechanical inspector and all ECP braked cars that are known to have arrived at the location with ineffective or inoperative brakes are repaired or handled accordingly. The proposed rule intends to ensure that at least 95 percent of the ECP brake equipped cars have effective and operative brakes prior to departure from an initial terminal and that cars are repaired in a timely fashion. The purpose of the ninety-five percent threshold is to prevent the delay or disassembly of a train for the removal or repair of a very small percentage of cars that are discovered to be defective for the first time while the railroad is conducting its in-depth inspections required at a train's initial terminal.

The 95 percent requirement also acknowledges that some initial terminals may not initially have the capabilities of repairing ineffective or inoperative ECP braking systems. Accordingly, paragraph (b) proposes to allow the movement of cars with such defects known to exist upon arrival at its destination to be moved only to the nearest forward location where repairs may be performed and restricts the car from being loaded or unloaded while being so moved. However, to ensure the safe operation of trains operating in ECP brake mode, operators are reminded that, under the proposal, the inclusion of such defective cars cannot make the train have less than ninety-five percent effective or operative brakes.

Paragraph (b) also proposes that a car with ineffective or inoperative ECP brakes shall be tagged in accordance with § 232.15(b). FRA believes that § 232.15(b) should equally apply to trains operating in ECP brake mode and should be a prerequisite for the movement from the initial terminal of any car with defective brakes. Section 232.15(b) contains the specific requirements regarding the tagging of equipment found with defective brake components and recognizes that the industry may attempt to develop some type of automated tracking system capable of retaining the information required by that section and tracking defective equipment electronically. Thus, paragraph (b), through § 232.15(b), proposes to permit the use of an automated tracking system in lieu of directly tagging the equipment if the automated system is approved for use

by FRA. FRA continues to believe that these provisions are necessary to ensure the agency's ability to monitor such systems and potentially prohibit the use of the system if it is found deficient. The proposed rule makes clear that, by ensuring application of section 232.15(b) to ECP brake systems, an automated tracking system approved for use by FRA be capable of being reviewed and monitored by FRA at any time. This paragraph also notifies the railroads that FRA reserves the right to prohibit the use of a previously approved automated tracking system if FRA subsequently finds it to be insecure, inaccessible, or inadequate. Such a determination would have to be in writing and include the basis for taking such action.

Paragraph (c) proposes permitting, with certain limitations, trains operating in ECP brake mode to move cars equipped with conventional pneumatic brakes. If a freight car equipped with only conventional pneumatic brakes would have effective and operable brakes in a train equipped with a ''stand-alone'' conventional pneumatic brake system, FRA proposes to permit a freight train operating in ECP brake mode to move such a car. If a car has defective conventional pneumatic brakes—which would be ineffective or inoperative in a train with a ''stand-alone'' conventional pneumatic brake system—FRA also proposes to permit its movement by a freight train operating in ECP brake mode, but only if the movement is made in accordance with § 232.15. By referring to § 232.15, paragraph (c) intends to, amongst other things, include the exceptions delineated in paragraph (k) and limit the movement of such cars to the nearest location where repairs can be made. Paragraph (c) also reminds regulated parties to comply with the tagging requirements of § 232.15(b) for the same reasons as paragraph (b). FRA notes that the inclusion of cars with defective or non-defective conventional pneumatic brakes into a train operating in ECP brake mode shall not cause the train to have less than ninety-five percent effective and operative brakes in accordance with paragraph (a). FRA believes that permitting a limited inclusion of cars equipped with conventional pneumatic brakes will provide some flexibility as operators transition their fleets from conventional pneumatic to ECP brake systems while ensuring a satisfactory level of safety.

Once an ECP brake system detects that the train has less than eight-five percent operative brakes, AAR standard S–4200 requires an automatic and immediate full service brake application. Paragraph (d) mirrors S–4200 by requiring a train operating in ECP brake mode to cease moving once less than eight-five percent of the train's cars have effective and operative brakes. In other words, under paragraph (d), no train shall move with more than fifteen percent of its brakes being defective or otherwise inoperative or ineffective. Recognizing, however, that foundation brake rigging defects may not be detected by the electronic system, and that calculation of the percentage may require an accurate manual entry of the total cars in the train by the train crew, FRA proposes paragraph (d) to continually ensure the safe operation of trains operating in ECP brake mode with ineffective or inoperative brakes.

Although there is no explicit statutory limit regarding the number of cars with inoperative brake equipment that may be hauled in a train, the fifteen percent limitation is a longstanding industry and agency interpretation of the hauling-for-repair provision currently codified at 49 U.S.C. 20303, and has withstood the test of time. This interpretation is extrapolated from another statutory requirement which permits a railroad to use a train only if ''at least 50 percent of the vehicles in the train are equipped with power or train brakes and the engineer is using the power or train brakes on those vehicles and on all other vehicles equipped with them that are associated with those vehicles in a train.'' 49 U.S.C. 20302(a)(5)(B). As originally enacted in 1903, section 20302, also granted the Interstate Commerce Commission (ICC) the authority to increase this percentage, and in 1910 the ICC issued an order increasing the minimum percentage to 85 percent. *See* 49 CFR 232.103(e), which codifies the ICC order. FRA believes that if the rule is read in its entirety there should be no confusion as to the movement of defective equipment, and that this provision merely sets an outside limit on the percentage of cars that may be hauled in any train with inoperative brakes. Consequently, FRA will continue to require that equipment with inoperative air brakes make up no more than 15 percent of any train.

FRA acknowledges that § 232.103(e) already prevents a train's movement ''if less than 85 percent of the cars in that train have effective and operative brakes.'' However, FRA has also stated that § 232.103(e) ''contains a clear and absolute prohibition on train movement if more than 15 percent of the cars in a train have their brakes cut out or have otherwise inoperative brakes.'' Because ECP brake systems are designed to automatically stop the train whenever and wherever the brake system has less than 15 percent operative brakes, FRA recognizes that some flexibility is needed to ensure that such trains are not stranded on the main track. To provide flexibility in those rare instances where a train experiences a penalty brake application as a result of having less than 85 percent operative brakes, paragraph (d) proposes to include requirements to ensure the safe movement of such trains. FRA recognizes the need for some trains operating in ECP brake mode to continue to an appropriate repair facility or nearest siding after experiencing a penalty brake application. Since ECP brake implementation is in its infant stages, FRA acknowledges that a railroad may not initially have a significant number of repair facilities beyond the initial terminals of ECP equipped cars. Accordingly, paragraph (d) proposes to permit limited movement of such trains for repair or consist modification purposes. In any event, in light of the Class I inspection required under proposed § 232.607 and an ECP brake system's continuous monitoring and diagnostics functions, FRA believes that trains operating in ECP brake mode will rarely, if ever, reach fifteen percent inoperative or ineffective brakes. However, FRA believes that paragraph (d)—in an abundance of caution and in anticipation of such a possibility occurring—ensures safe and efficient operations. In order to move a train operating in ECP brake mode that experiences a penalty brake application (i.e., an automatic and immediate emergency or full brake application made by the ECP brake system in accordance with the current AAR standards) due to having less than 85 percent effective and operative brakes, proposed paragraph (d) would require the train crew to perform a visual inspection of the entire train, ensure the safe operation of the train, and determine that it is safe to move the train.

Under the current regulations, visual inspections are generally performed when moving defective equipment since a ''qualified person'' must determine that the car is safe to move. It is FRA's understanding that most, if not all, railroads require a crew member to make a visual inspection of a car when a problem occurs en route. A proper visual inspection ensures that the brakes are cut out and eliminates the possibility of dragging or stuck brakes. A dragging or loose part or piece of equipment can find its way under a wheel, causing a derailment. A brake

that will not release—due to bent or fouled brake rigging or a problematic control valve—will cause the wheel to slide. A sliding wheel will not properly traverse a switch or cross-over, setting up a potential derailment. A sliding wheel may also cause a severe flat spot to occur on the wheel, which can also lead to a derailment. By requiring that the train crew ensure the safe operation of the train and determine that it is safe to move the train, FRA intends to make clear that it is the railroad's responsibility, through its crew, to do whatever is necessary to ensure safe train operation under the flexibility provided by paragraph (d). Any deviation from the requirements under paragraph (d) while moving a train with less than eight-five effective or ineffective brakes would pose a significant safety hazard and violate the rule.

In addition, under paragraph (d), the train's subsequent movement must be made in a restricted ECP brake Switch Mode to the nearest forward location where necessary repairs or changes to the consist can be made. Under AAR Standard S–4200 § 4.2.6.2.2, the speed of an ECP brake equipped train in Switch Mode shall not exceed 20 mph. The purpose of the 20 mph restriction, among Switch Mode's other restrictions, is to ensure the safe movement of the train with less than ideal brake operations while allowing the train to operate to a location where defective braking systems can be repaired or where cars can be added or removed from the train so that it will have at least eighty-five percent effective and operative brakes.

Paragraph (e) proposes to permit trains operating in ECP brake mode with defective ECP brakes to be used or hauled without civil penalty liability under part 232 to its destination, not to exceed 3,500 miles. Such defects must be found for the first time during a Class I brake test or en route. As previously mentioned, FRA believes that a train operating in ECP brake mode can safely continue to its destination with some ineffective or inoperative brakes. Accordingly, paragraph (e) proposes that all such trains be permitted to travel to its destination, not to exceed 3,500 miles, without incurring civil penalty liability in relation to the use of those brakes. Paragraph (e) also proposes that this civil penalty immunity be extended to such trains with ECP brake defects found at the initial terminal. If such defects are found after a train is put together in preparation for its next departure, it may be overly burdensome to require that the train be taken apart for repair. If a brake repair may be performed without taking the train apart, FRA acknowledges that the repair may cause undue delay. If the ECP brake defect is found at the location where a Class I inspection is performed, FRA believes that such burdens and delays may be avoided in light of the increased safety afforded by ECP brake systems.

FRA believes that this flexibility needs to be afforded differently to defects that are known to exist upon a car's arrival at its destination or at a location where a Class I brake test will be required on the train than to defects found for the first time at the location where a Class I brake test is performed. If a freight car equipped with an ECP brake system is known to have arrived with ineffective or inoperative brakes at the location of a train's initial terminal or at a location where a Class I brake test is required under § 232.607(b), that car is subject to the limitations in paragraph (b), not paragraph (e). Paragraph (b) intends to ensure that known defects be repaired before continued use and to prevent trains operating in ECP brake mode from traveling indefinitely without repairing their defective ECP brakes. On the other hand, by proposing paragraph (e), FRA recognizes the burden placed on operators to comply with such a rule when it discovers the defect when it is in the process of putting a train together or after a train is already put together and inspected. Paragraph (e) intends to recognize that burden by treating the train similarly to a train that detects a defective ECP brake while it is en route.

Paragraph (f) proposes providing limited flexibility for trains operating in ECP brake mode with a non-brake safety appliance defect on an ECP brake equipped car. To enjoy such flexibility under paragraph (f), the car may only be used or hauled to the nearest forward location for repairs. As noted above, in light of the increased safety levels afforded by ECP brake system technologies, FRA proposes to allow trains operating in ECP brake mode with defective ECP brakes to travel to its destination, not to exceed 3,500 miles. FRA does not believe it prudent to provide the same level of flexibility to cars operating in ECP equipped trains with non-brake safety appliance defects, since an ECP brake system's increased safety level does not reduce the dangers of such defects. However, FRA does believe that flexibility should be afforded to such equipment hauled directly to the nearest forward repair location. To require the hauling of ECP brake equipment to the nearest location where necessary repairs can be effectuated, rather than the nearest forward location, could create unnecessary safety hazards. As there will only be a limited number of ECP brake equipped trains in operation at any given time, the ability to switch cars from one ECP train to another, merely for the purposes of getting the car to a closer repair facility, will be severely limited. Rather than requiring ECP brake equipped cars to be hauled in non-ECP brake trains, where their brakes will be inoperative, FRA believes it is safer to permit the car to continue in the ECP brake equipped train with operative brakes to the next forward location where the necessary non-brake safety appliance repairs can be made.

In the event trains must include cars equipped with brake systems not compatible with the train's brake system, FRA proposes requirements to ensure the safe operation of such trains. FRA proposes to allow a train operating with a conventional pneumatic brake system—regardless of whether it is a train with ''stand-alone'' conventional pneumatic brakes or an ECP brake equipped train operating in conventional pneumatic brake mode—to include cars with stand-alone ECP brake systems. To maintain an acceptable level of safety, however, FRA proposes that such trains must have at least 95 percent effective and operative brakes at the conclusion of a Class I brake test, inclusive of all cars regardless of braking systems. Further, to meet the same level of safety intended by 49 CFR 232.103(d), FRA proposes to continue to require that the train have 100 percent effective and operative conventional pneumatic brakes at the Class I brake test site when operating in conventional pneumatic mode.

Accordingly, paragraph (g) proposes to allow trains equipped with a conventional pneumatic brake system—or with ECP brake systems and operating in conventional pneumatic brake mode—to operate with freight cars equipped with stand-alone ECP brake systems under limited circumstances. Under paragraph (g), any such train not in compliance with those circumstances shall not be operated. The purpose of these limitations is to ensure the safe operation of such trains that contain cars with incompatible stand-alone ECP brake systems. FRA understands that some trains operating with conventional pneumatic brakes may need to carry cars with incompatible stand-alone ECP brake systems, especially when the implementation of ECP brake system technology is in its infant stages. For instance, FRA anticipates that a need may arise to move a new ECP brake equipped car in a train operating with conventional pneumatic brakes from the

car building facility or a repair shop to a location where the railroad operates ECP brake equipped trains. FRA also anticipates that a dual mode ECP brake system operating in ECP brake mode may incur a malfunction—such as a broken train line cable or locomotive controller—forcing the operator to switch the train's operation to conventional pneumatic brake mode. As long as the train's total number of cars with ineffective or inoperative brakes does not fall below the threshold percentage proposed by paragraph (g)—via reference to paragraph (d)—FRA believes that the train may safely include cars with incompatible stand-alone ECP brake systems.

Paragraph (g) includes requirements for the subject train and each of its stand-alone ECP brake equipped cars. For such a train to operate, it must comply with the minimum percentage of operative brakes required by paragraph (h) when at an initial terminal—which will be discussed below—or paragraph (d) when en route for the same reasons discussed in paragraph (d). Under paragraph (g), a stand-alone ECP brake equipped car in a train operating with conventional pneumatic brakes can only be moved for delivery to a railroad receiving the equipment or to a location where the car may be added to a train operating in ECP brake mode. Otherwise, the movement of the car is restricted to the nearest available location where necessary repairs can be effectuated. In addition, such cars must be tagged in accordance with § 232.15(b) for the same reasons as stated for the analysis of paragraph (b) and placed in the train in accordance with § 232.15(e). Section 232.15(e) contains the requirements regarding the placement of cars in a train that have inoperative brakes. The requirements contained in that paragraph are consistent with the current industry practice and are part of almost every major railroad's operating rules. By incorporating § 232.15(e) by reference, paragraph (g) proposes to prohibit the placing of a vehicle with inoperative brakes at the rear of the train and the consecutive placing of more than two vehicles with inoperative brakes, as test track demonstrations have indicated that when three consecutive cars in a train operating with conventional pneumatic brakes have their brakes cut-out, it is not always possible to obtain an emergency brake application on trailing cars. To remain consistent with existing industry practice, paragraph (g) proposes, by referencing § 232.15(e), to require that such equipment shall not be placed in a train if it has more than two consecutive individual control valves cut out or if the brakes controlled by the valve are inoperative.

Paragraph (h) proposes additional requirements for freight trains equipped and operating with conventional pneumatic brakes when departing an initial terminal with freight cars equipped with stand-alone ECP brake systems. On such trains, paragraph (h) proposes to require that each car equipped with conventional pneumatic brake systems have effective and operative brakes. Paragraph (h) proposes to allow the train to depart its initial terminal with ninety-five percent effective and operative brakes. The five percent of cars with potentially defective brakes may only be cars equipped with stand-alone ECP brake systems. All cars equipped with dual mode ECP brake systems must operate in conventional pneumatic brake mode and have effective and operative conventional pneumatic brakes.

Various paragraphs of proposed § 232.609 require the tagging of defective equipment. Paragraph (i) proposes to provide for the electronic tagging of defective ECP brake equipment when being moved in a train operating in ECP brake mode. FRA recognizes that § 232.15(b) already provides requirements for electronic tagging of defective equipment. However, in view of the ECP brake system's unique characteristics, it is not entirely clear how § 232.15(b) would appropriately apply to electronic records developed, retained, and maintained by ECP brake systems. Accordingly, paragraph (i) contains the proposed criteria for determining whether an ECP brake system complies with § 232.15(b). In order for an ECP brake system to provide electronic tagging of equipment with defective safety appliances, the ECP brake system must provide appropriate, constant, and accurate information to the crew via a display in the cab of the lead locomotive, and ensure that the information is securely stored and is accessible to FRA and appropriate operating and inspection personnel.

To allow electronic tagging of defective ECP brake equipment, paragraph (i) proposes to ensure that the train crew be notified of such defects. FRA believes that the most logical and efficient communications medium is the ECP brake system's display monitor in the lead locomotive cab. FRA also believes that any such notification should include descriptive information suitable to identify the defect and its location in the train consist. FRA acknowledges that locomotive engineers may be distracted or subjected to information overload by multiple monitors or displays in the locomotive cab, thus potentially endangering the safe operation of the train. At this time, FRA does not have sufficient information to propose rules concerning display or monitor placement or the merging of various data into a smaller number of displays. In any event, FRA seeks comments on this issue.

To ensure the integrity of electronic tagging, the ECP brake system must securely store the information. FRA seeks comment on how secure a system must be. While the information must be secure, it must also be accessible for safety and oversight purposes. Paragraph (i) makes clear that an automated tracking system approved for use by FRA and its secured information must be capable of being reviewed and monitored by FRA at any time. The information should also be accessible to subsequent train crews that require notification of defects. FRA acknowledges that some railroads may also desire to use the ECP brake system to electronically tag defective non-ECP brake equipment. FRA anticipates that such electronic tagging must be manually entered into the system. FRA seeks comments on whether the proposed rules should include provisions allowing for the manual input of non-ECP brake defects into ECP brake systems for electronic tagging purposes. FRA also seeks comments on what requirements and allowances should be made in consideration of that interest, including means to associate or merge ECP brake system information with information not monitored electronically by the ECP brake system.

Paragraph (j) proposes that railroads adopt and comply with written procedures governing the movement of defective equipment. The procedures must comply with the related regulatory requirements, including those proposed in these rules. FRA intends for each railroad to develop appropriate procedures regarding its handling and repair of defective equipment containing ECP brake systems or hauled in trains operating in ECP brake mode. FRA acknowledges that many railroads may already have such procedures in place. FRA believes that the establishment of these procedures is the most effective means by which to minimize the possibility of future accidents caused by the movement of defective equipment on cars and trains equipped with ECP brake systems or operating in ECP brake mode. Given the introduction of new technology and its partial incompatibility with existing systems, FRA believes the need for

adoption and compliance with such procedures is critical for continued safety in the rail industry.

To ensure compliance with the proposed requirements concerning the performance of ECP brake system repairs, paragraph (j) proposes to require railroads to submit to FRA a list identifying locations where such repairs may be made. FRA believes that the list should encompass a sufficient number of locations to ensure that Class I brake tests are performed at appropriate intervals and that trains equipped with ECP brake systems do not travel further than their destination or 3,500 miles without being inspected and repaired in Class I inspection and repair facilities. If a railroad adds or removes any repair facility from its system, paragraph (j) proposes that the railroad amend or modify that list by timely notifying FRA of those changes.

Paragraph (k) proposes explicit exceptions to other portions of part 232. Paragraph (k) proposes that §§ 232.15(a)(2) and (a)(5) through (a)(7) not apply to freight cars and freight trains with ECP brake systems. These sections generally require that equipment with defective safety appliances be repaired at the location where they are first discovered to be defective or that they be moved only to the nearest available location where necessary repairs can be performed. As noted above, FRA believes that freight cars equipped with ECP brakes and freight trains operating in ECP brake mode need to be provided some flexibility in being handled for repair and when moving equipment with defective safety appliances. The provisions contained in § 232.15(a) for which FRA is proposing an exception would, in many circumstances, frustrate the purpose of FRA's proposal and ignore the safety advances provided by ECP braking systems.

Paragraph (k) also proposes to except § 232.15(a)(8), which prohibits the movement of a defective car or locomotive in a train required to receive a Class I brake test at that location. As discussed in detail above, FRA proposes to allow a leave its initial terminal with only ninety-five percent operative brakes after a Class I brake test. Similarly, § 232.103(d) prohibits a train from departing from its initial terminal with any inoperative or ineffective brakes, but paragraph (a) proposes to allow a train operating in ECP brake mode to depart from its initial terminal with ninety-five percent effective and operative brakes under certain circumstances. Paragraph (a) implicitly excepts trains operating in ECP brake mode from § 232.103(d). Paragraph (k) intends to clearly and explicitly except § 232.103(d). An explicit exception in this rule does not imply that there are no independent and implicit exceptions. Finally, § 232.103(e) ''contains a clear and absolute prohibition on train movement if more than 15 percent of the cars in a train have their brakes cut out or have otherwise inoperative brakes,'' thus preventing a train's movement ''if less than 85 percent of the cars in that train have effective and operative brakes.'' Due to relief proposed by this section, however, the strict limits imposed by § 232.103(e) would no longer be applicable to trains regulated under these proposed rules. Accordingly, paragraph (k) proposes excepting § 232.103(e).

Section 232.611 Periodic Maintenance

FRA intends that all unexcepted rules under part 232 apply to ECP brake operations. For the purposes of further clarity, however, paragraph (a) reminds the operators of equipment with ECP brake systems to comply with the maintenance requirements contained in § 232.303(b) through (d), which require the performance of certain tests and inspections whenever a car is on a shop or repair track. FRA continues to believe that a repair or shop track provides an ideal setting for railroads to conduct an individualized inspection on a car's brake system to ensure its proper operation. FRA also continues to believe that such inspections are necessary to reduce the potential of overlooking cars with excessive piston travel during the performance of ordinary brake inspections. If any problems are detected at that location, the personnel needed to make any necessary corrections are already present. Furthermore, performing these inspections at this time ensures proper operation of the cars' brakes and eliminates the potential of having to cut cars out of an assembled train and, thus, should reduce inspection times and make for more efficient operations.

FRA continues to believe that §§ 232.303(b) and (c) should apply to all operations, including those with ECP brake systems. Section 232.303(b) requires testing of each car on a shop or repair track to determine that its air brakes apply and remain applied until a release is initiated. If the brakes fail to apply or remained applied until a release is initiated, the car must be repaired and retested. Section 232.303(c) requires piston travel to be inspected and, if necessary, adjusted. FRA intends for this to be accomplished in accordance with the stencil or badge plate on cars equipped with ECP brakes.

FRA also continues to believe that § 232.303(d) should apply to all operations, including those with ECP brake systems. Section 232.303(d) lists brake system components requiring inspection prior to releasing a car from a shop or repair track. This section requires inspection of a car's hand brakes, angle cocks to ensure proper positioning to allow maximum air flow, and brake indicators, if equipped, to ensure their accuracy and proper operation. A periodic inspection is an ideal time for the railroad to inspect these items while imposing the least burden on the railroad's inspection and repair forces.

In addition to requiring continued compliance with §§ 232.303(b) through (d), paragraph (a) proposes to require further inspections of freight cars equipped with ECP brake systems prior to release from a shop or repair track. These additional inspections afford the inspector the opportunity to look at each car more thoroughly and take into consideration ECP brake systems' unique characteristics. For instance, while § 232.303(d) requires inspectors to ensure that brake pipes are securely clamped, paragraph (a) proposes the equivalent for ECP brake systems by requiring the secured clamping of ECP brake system wires. Accordingly, paragraph (a) proposes requiring inspectors to check the ECP brake system's wiring and brackets, electrical connections, electrical grounds and impedance, and any car mounted ECP brake system component. During such inspections, inspectors are expected to look for problems such as frayed wiring, loose or damaged brackets, and wires that have become loose due to a fallen bracket. FRA believes that a missing bracket may not cause concern during a regular train yard inspection or Class I brake test and FRA has proposed requiring shop or repair track inspections of such ECP brake related components to ensure their safe operation.

Paragraph (b) proposes requiring railroads to submit periodic single car air brake test procedures to FRA for approval and paragraph (c) proposes that railroads comply with such submitted and approved procedures whenever they perform a single car air brake test. FRA must be given an opportunity to review and comment on any revision of the procedures by which these tests are performed to ensure that there is no degradation in safety resulting from any such modification and to ensure consistency in how the tests are performed. FRA notes that the review and approval proposed by paragraph (b) are necessary to prevent

railroads from making unilateral changes to the test procedures. Paragraph (b) proposes to require the industry to follow the special approval process contained in § 232.17 in order to initially submit the procedures to FRA for approval. FRA understands that AAR and ECP brake manufacturers are currently in the process of developing single car air brake test procedures for ECP brake equipped freight cars. Should such procedures be formalized in an AAR approved and published standard prior to issuance of a final rule in this proceeding, FRA will consider incorporating that standard into the final rule. Paragraph (c) proposes to require that single car air brake tests be performed upon the occurrence of any of the events identified in § 232.305, except for § 232.305(b)(2). Section 232.305(b)(2) requires railroads to perform a single car air brake test when a car is on a shop or repair track for any reason and has not received a single car air brake test within the previous 12-month period. The single car air brake test is critical to ensuring the safe and proper operation of the brake equipment on the Nation's fleet of freight cars. When FRA issued § 232.305(b)(2), the single car air brake test was the sole method by which air brake equipment on freight cars is periodically tested to identify potential problems before they result in the brake's becoming inoperative. Due to the ECP brake system's ability to continuously monitor the condition of a car's air brakes, FRA believes that less frequent single car air brake tests are justified on such equipment.

FRA acknowledges that railroads may retrofit ECP brake systems on existing cars equipped with conventional pneumatic brake systems. While § 232.305(e) requires a single car air brake test on each new or rebuilt car prior to placing or using it in revenue service, it is unclear whether this rule applies to cars retrofitted with ECP brake systems. Accordingly, to ensure the proper and safe operation of cars with newly installed ECP brake systems, paragraph (d) proposes to require the performance of a single car air brake test prior to returning the car to revenue service. FRA believes that it is essential for retrofitted cars to receive this test prior to returning to revenue service in order to ensure the proper operation of the vehicle's new brake system. Most railroads already require this attention when installing a new brake system; thus the cost of this requirement is minimal and merely incorporates the industry's current best practices.

FRA acknowledges that, after receiving approval of the single car air brake test standard from FRA in accordance with paragraph (b), a railroad or an industry representative may—through its experience—subsequently determine better procedures applicable to single car air brake tests of cars equipped with ECP brake systems. Accordingly, FRA recognizes that the industry may find it necessary to modify the single car air brake test procedures from time to time. Section 232.307 provides regulatory procedures for those seeking modification of an approved single car air brake test procedure. Paragraph (b) proposes extending the application of § 232.307 to single car air brake test procedures for cars equipped with ECP brake systems.

FRA believes that § 232.307 provides the industry with a quick and efficient procedure to seek modification of an incorporated or approved testing procedure and provides both FRA and other interested parties an opportunity to review potential changes prior to their becoming effective. The process under § 232.307 permits the industry to modify the single car air brake test procedures and permits those modifications to become effective 75 days from the date that FRA publishes the requested modification in the **Federal Register**, if no objection to the requested modification is raised by either FRA or any other interested party. The process allows FRA and other interested parties 60 days to review and raise objections to any proposed modification requested by the industry and submitted to FRA. FRA believes the process established in § 232.307 will meet the needs of AAR and the industry to expeditiously modify the single car air brake test procedures required by and approved under paragraph (b).

FRA continues to believe that, for the process to work at optimum efficiency, the AAR and the industry would be best served if they ensure that there is open communication regarding any modifications with both FRA and the representatives of affected employees prior to requesting any modification of the procedures. This will ensure that interested parties are fully informed of any potential modification and their concerns are addressed or allayed before a request for modification is submitted to FRA. This information and dialogue will eliminate the potential for objections being submitted when the requested modification is officially sought.

FRA acknowledges that the self-monitoring capabilities of ECP brake systems may eliminate the need to perform single car air brake tests on a time-specific basis. Accordingly, paragraph (f) proposes to except § 232.305(b)(2) as it applies to single car air brake tests for cars with stand-alone ECP brake systems. Since cars with dual mode ECP brake systems include all of the components of a conventional pneumatic brake system and may be operated in conventional pneumatic brake mode at any time, FRA does not intend paragraph (f) to provide those cars relief from section 232.305(b)(2). At this time, FRA does not believe sufficient information exists to completely eliminate the need to conduct periodic single car air brake tests on ECP brake equipped cars.

Paragraph (f) also proposes to except the application of § 232.305(f) to cars equipped with stand-alone ECP brake systems. Section 232.305(f) concerns cars that had received their last single car air brake tests prior to January 1, 2001. Section 232.305(e), incorporated by reference from paragraph (c), requires that all new or rebuilt ECP brake equipped cars receive a single car air brake test prior to being placed or used in revenue service. Proposed paragraph (d) requires a single car air brake test be performed on all cars retrofitted with ECP brake systems prior to being placed or used in revenue service. Thus, the last time a stand-alone ECP brake equipped car would have received a single car air brake test would have been after it was built, rebuilt, or retrofitted. Accordingly, § 232.305(f) would no longer be applicable. For similar reasons, FRA also seeks comments and information on whether § 232.305(f) should be eliminated altogether.

Section 232.613 End-of-Train Devices

Current FRA regulations specify design and performance standards for one-way and two-way EOT telemetry devices, which, at a minimum, have the capability of determining rear-of-train brake pipe pressure and of transmitting this information by radio to a receiving unit in the controlling locomotive. Most rear units in service are battery operated and also incorporate a rear end marker required under 49 CFR part 221. Optional features include transmission of information regarding rear end motion and battery status. Most units operate on the same ultra high frequency (UHF), but each rear unit has a discrete identification code which must be recognized by the HEU before the message is acknowledged. The more modern two-way EOT device, in addition to the features of the one-way EOT device, has the ability of activating the emergency air valve at the rear of the train upon receiving an emergency brake application command from the HEU. This is a desirable feature in event

of a blockage in the brake pipe that would prevent the pneumatic transmission of the emergency brake application throughout the entire train.

Provisions governing the use of one-way EOT telemetry devices were initially incorporated into the power brake regulations in 1986. Pursuant to the Rail Safety Enforcement and Review Act, Pub. Law No. 102–365 (Sept. 3, 1992), which amends the Federal Rail Safety Act (FRSA) of 1970 (45 U.S.C. 421, 431 et seq.), FRA held rulemakings to amend the power brake regulations, including those concerning one-way and two-way EOTs. 62 FR 278 (Jan. 2, 1997); 66 FR 4104 (Jan. 17, 2001). The resulting regulations, contained in subpart E of part 232, specify the requirements related to the performance, operation, and testing of EOT devices for conventional pneumatic braking.

The new ECP–EOT devices—which must comply with AAR standards such as S–4200 and S–4220—will provide more and more varied functions than the EOT devices used on trains with conventional pneumatic brakes. In addition to serving as the final node on the ECP brake system's train line cable termination circuit and as the system's ''heart beat'' monitoring and confirming train, brake pipe, power supply line, and digital communications cable continuity, the ECP–EOT device transmits to the HEU a status message that includes the brake pipe pressure, the train line cable's voltage, and the ECP–EOT device's battery power level. Since the ECP–EOT device—unlike a conventional EOT device—will communicate with the HEU exclusively through the digital communications cable and not via a radio signal, it does not need to perform the function of venting the brake pipe to atmospheric pressure to engage an emergency brake application. However, ECP–EOT devices do verify the integrity of the train line cable and provide a means of monitoring the pressure and gradient, providing the basis for an automatic—rather than engineer-commanded—response if the system is not adequately charged. In the case of ECP brakes, the brake pipe becomes a redundant—rather than primary—path for sending emergency brake application commands. Under certain communication breakdowns between the ECP–EOT device, the HEU, and any number of CCDs, the system will self-initiate an emergency brake application.

FRA acknowledges that ECP–EOT devices, with their additional and changed features, may not comply with the rules under subpart E. FRA, however, is unclear what additional unique and varied features manufacturers of ECP–EOT devices may want to include beyond the functions specified in the AAR standard. Accordingly, FRA proposes in paragraph (a) that a railroad or a duly authorized representative of the railroad industry submit to FRA proposed design, testing, and calibration standards related to ECP–EOT devices used on freight trains operating in ECP brake mode. Paragraph (a) proposes that the submission comport with the special approval procedures contained in § 232.17 and be subject to FRA approval. FRA acknowledges that ECP–EOT devices may not require calibration. FRA seeks comments and information on this proposal and issue.

Once FRA approves those standards, paragraph (b) requires that each railroad operating trains in ECP brake mode adopt and comply with those standards. A railroad shall not operate a train in ECP brake mode until after FRA approves those standards. Paragraph (c) further ensures that ECP brake equipped trains properly connect and use an ECP–EOT device approved and complying with paragraphs (a) and (b) of this section.

Because paragraph (a) proposes requirements for ECP–EOT device design, testing, and calibration standards applicable only to ECP brake systems and because subpart E of part 232 contains requirements not necessarily applicable to ECP–EOT devices, paragraph (d) proposes to except trains operating in ECP brake mode from having to comply with subpart E of part 232.

XII. Regulatory Impact and Notices

A. Executive Order 12866 and DOT Regulatory Policies and Procedures

This proposed rule has been evaluated in accordance with existing policies and procedures, and determined to be significant under both Executive Order 12866 and DOT policies and procedures (44 FR 11034; Feb. 26, 1979). FRA has prepared and placed in the docket a Regulatory Analysis addressing the economic impact of this proposed rule. Document inspection and copying facilities are available at the DOT Central Docket Management Facility located in Room W12–140 on the ground level of the West Building, 1200 New Jersey Avenue, SE., Washington, DC 20590. Access to the docket may also be obtained electronically through the DOT Docket Management System Web site at *http://dms.dot.gov* until September 28, 2007, and the Federal eRulemaking Portal at *http://www.regulations.gov* after September 28, 2007. Photocopies may also be obtained by submitting a written request to the FRA Docket Clerk at Office of Chief Counsel, Stop 10, Federal Railroad Administration, 1120 Vermont Avenue, NW., Washington, DC 20590; please refer to Docket No. FRA–2006–26175.

The Regulatory Analysis prepared by the FRA in conjunction with this NPRM contains many assumptions and analyses on which we specifically request comments from interested parties. These specific questions can be found throughout that document, particularly in sections II.B., V.D., V.E., V.F., and VI.A. Anyone who wishes to examine the analysis and provide relevant data or arguments may request a copy of the Regulatory Analysis through the person listed under **FOR FURTHER INFORMATION CONTACT** above. FRA invites comments on the Regulatory Analysis.

For purposes of analysis, FRA has assumed that the proposed rule, if adopted, would support business decisions by Class I railroads to convert unit train service, such as coal and intermodal, to ECP brake operations over a 10-year period. This type of service is characterized by intensive utilization of assets and is reasonably discrete in terms of operational requirements. Although carload service is dispersed over the national rail network, unit train service tends to be concentrated in certain corridors. Locomotives are or could be dedicated to this service (e.g., as in the extensive use of high traction alternating current (AC) locomotives in coal service). FRA believes that, as costs and benefits are validated and the technology's market enjoys economies of scale, additional markets will benefit from ECP brake technology. However, based on available information, FRA is not able to determine whether or under what circumstances that may occur.

If the industry was to take advantage of the proposed relief to the extent estimated, it would cost it approximately $1.5 billion (discounted at 7%). The largest portion of these costs, $1 billion, is the cost to convert freight cars to ECP brakes and the remaining costs relate to locomotive conversion and training. The total benefits of the proposed rule are approximately $3.2 billion (discounted at 7%). Of those benefits, the $1.1 billion in regulatory relief or the $1.2 billion in fuel savings almost individually pay the costs or together substantially exceed the costs. The remaining benefits include wheel replacement savings and safety benefits.

The information currently available suggests that additional substantial benefits not included in the $3.2 billion referenced above may be realized. The most significant benefit of conversion of mainline corridors to all-ECP brake service is enhanced capacity, without the need for major new equipment or infrastructure investment. Although the FRA cannot predict the specific effect that ECP brakes will have in increasing velocity across the national rail network, the FRA believes that the adoption of ECP brake technology will increase train speed and this hypothesis is supported by the BAH analysis. Given sharply growing demand for rail freight service, and based on the enhanced features that ECP brake systems offer, including (1) reduced stopping distances, (2) shorter start times, (3) reduction of undesired emergencies, (4) continuous brake pipe charging, (5) graduated brake application and release, (6) self-diagnostic train management, and (7) potential increase in the total number of cars per train, an increase in average train velocity will likely result. For instance, the BAH report cites a Union Pacific Railroad (UP) estimate that, for each 1 mph (or 5 percent) improvement in its overall system average velocity, UP saves 250 locomotives and 5,000 freight cars that would otherwise be required. At a cost of $2 million per locomotive and an average of $50,000 per freight car, this savings represents $750 million for UP alone. The UP fleet is representative of the industry's Class I railroads and comprises approximately one-third of all Class I railroad owned locomotives and one-fourth of all Class I railroad owned freight cars. Assuming that other Class I railroads have similar equipment utilization rates, it could be possible to extrapolate the $750 million in UP savings to the other Class I railroads, which could realize $2.5 billion in savings from a 1 mph increase in network velocity. Any savings realized would increase accordingly if there are speed gains of greater than 1 mph.

However, the unit and unit-like trains covered by this analysis only cover a portion of the industry-wide train total. Given that unit coal trains, which are among the slowest moving trains on any given network, could experience velocity gains significantly greater than 1 mph and that all Class I railroads transport a significant amount of coal on their main lines, this estimate is likely a lower bound estimate. Thus, due to the number and variability of factors that would determine the actual level of savings realized due to network velocity improvements, such benefits are not included in the total benefits. The expected benefits of ECP braking technology appear to justify the investment, provided that the conversion is focused first on the high-mileage, unit and unit-like train services that would most benefit from its use.

As presented in the following tables, FRA estimates that the present value (PV) of the total 20-year benefits and costs which the industry would be expected to incur if it elected to comply with the alternative requirements proposed in this rule is $3.2 billion and $1.5 billion, respectively:

TOTAL TWENTY-YEAR BENEFITS AND DISCOUNTED BENEFITS

	Benefits	3% Discount	7% Discount
Regulatory Relief	$2,485,337,443	$1,726,315,620	$1,112,844,715
Rail Accident Risk Reduction	228,105,462	158,224,002	101,783,196
Highway-Rail Accident Risk Reduction	14,036,032	9,736,101	6,263,034
Fuel Savings	2,745,000,000	1,904,052,986	1,224,849,552
Wheel Replacement Savings	1,601,250,000	714,495,572	714,495,572
Total Benefits	7,073,728,937	4,909,026,194	3,160,236,069

TOTAL TWENTY-YEAR COSTS AND DISCOUNTED COSTS

	Costs	3% Discount	7% Discount
Freight Car Costs	$1,455,272,000	$1,241,376,534	$1,022,122,156
Locomotive Costs	485,520,000	414,158,408	341,008,931
Employee Training	196,425,710	161,710,759	96,152,211
Total Costs	2,137,217,710	1,817,245,701	1,459,283,298

B. Regulatory Flexibility Act and Executive Order 13272

The Regulatory Flexibility Act (5 U.S.C. 601 et seq.) and Executive Order 13272 require a review of proposed and final rules to assess their impact on small entities. FRA has prepared and placed in the docket an Analysis of Impact on Small Entities (AISE) that assesses the small entity impact of this proposed rule. Document inspection and copying facilities are available at the Department of Transportation Central Docket Management Facility located in Room W12–140 on the ground level of the West Building, 1200 New Jersey Avenue, SE., Washington, DC 20590. Docket material is also available on the DOT Docket Management System Web site at *http://dms.dot.gov* until September 28, 2007, and the Federal eRulemaking Portal at *http://www.regulations.gov* after September 28, 2007. Photocopies may also be obtained by submitting a written request to the FRA Docket Clerk at Office of Chief Counsel, Stop 10, Federal Railroad Administration, 1120 Vermont Avenue, NW., Washington, DC 20590; please refer to Docket No. FRA–2006–26175.

''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 railroad business ''line-haul operation'' that has fewer than 1,500 employees and a ''switching and terminal'' establishment with fewer than 500 employees. SBA's ''size standards'' may be altered by Federal agencies, in consultation with SBA and in conjunction with public comment.

Pursuant to that authority FRA has published a final statement of agency policy that formally establishes ''small

entities'' as being railroads that meet the line-haulage revenue requirements of a Class III railroad. See 68 FR 24891 (May 9, 2003). Currently, the revenue requirements are $20 million or less in annual operating revenue. The $20 million limit is based on the Surface Transportation Board's threshold of a Class III railroad carrier, which is adjusted by applying the railroad revenue deflator adjustment (49 CFR part 1201). The same dollar limit on revenues is established to determine whether a railroad, shipper, or contractor is a small entity. FRA uses this alternative definition of ''small entity'' for this rulemaking.

Implementation and use of ECP brake technology under the proposed rules is voluntary. In addition, the impacts for those who may choose to implement and use ECP brake technology and comply with the proposed rules are primarily a result of the conversion to ECP brake technology. These costs include locomotive crew and inspector training, freight car conversion costs, and locomotive conversion costs. The AISE developed in connection with this NPRM concludes that this NPRM will only impact four Class I railroads and therefore should not have any economic impact on small entities. Smaller railroads that carry unit and unit-like commodities often operate and transport trains owned by other parties over relatively short distances and turn them over to larger systems that, in turn, transport those trains relatively long distances to their ultimate destination or to another small railroad for final delivery. The FRA recognizes that small entities may, in some cases, be involved in specific route segments for trains that originate or terminate on a Class I railroad. In these cases, the cars involved are more likely to be owned or provided by shippers or a Class I railroad. Mutual support arrangements and shared power practices are likely to ensure that the smaller railroad will not require ECP brake equipped trains for this service. Further, FRA anticipates that ECP brake equipped train operations will be limited to long hauls of commodities such as intermodal, coal, ore, non-metallic minerals, motor vehicle parts, and grain. Since small railroads do not handle such commodities, they will not likely receive large blocks of cars equipped with ECP brakes from Class I railroads.

Since FRA does not expect small railroads to convert to ECP brake technology within the period of the analysis, this proposal is not anticipated to affect any small entities. Thus, FRA certifies that this NPRM is not expected to have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act or Executive Order 13272.

C. Paperwork Reduction Act

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

BILLING CODE 4910–06–P

CFR Section	Respondent Universe	Total Annual Responses	Average Time per Response	Total Annual Burden Hours	Total Annual Burden Cost
229.27 - Annual tests	22,500 locomotives	22,500 tests	15 minutes	5,625 hours	$253,125
232.3 -Applicability - Export, industrial, & other cars not owned by railroads-identification	545 railroads	8 cards	10 minutes	1 hour	$43
232.7 - Waivers	545 railroads	20 petitions	40 hours	800 hours	$34,400
232.11 - Penalties - Knowingly falsifying a record/report	545 railroads	1falsified recd/rpt	10 minutes	.17 hour	$8
232.15 - Movement of Defective Equipment					
-Tags	1,620,000 cars	128,400 tags/rcds	2.5 minutes	5,350 hours	$240,750
- Written Notification	1,620,000 cars	25,000 notices	3 minutes	1,250 hours	$56,250
232.17 - Special Approval Procedure					
- Petitions for special approval of safety-critical revision	545 railroads	4 petitions	100 hours	400 hours	$29,200
- Petitions for special approval of pre-revenue service acceptance plan	545 railroads	2 petitions	100 hours	200 hours	$14,600
- Service of petitions	545 railroads	4 petitions	40 hours	160 hours	$6,880
- Statement of interest	Public/railroads	14 statements	8 hours	112 hours	$4,816
- Comment	Public/railroads	13 comments	4 hours	52 hours	$2,236
232.103-Gen'l requirements - all train brake systems	114,000 cars	70,000 stickers	10 minutes	11,667 hours	$242,200
232.105 - Gen'l requirements for locomotives-Inspection	22,500 Locomotives	22,500.forms	5 minutes	1,875 hours	$84,375
232.107 - Air source requirements and cold weather operations – Monitoring Plan (Subsequent Years)	10 new railroads	1 plan	40 hours	40 hours	$2,920
- Amendments to Plan	50 railroads/plans	10 amendments	20 hours	200 hours	$14,600
-Recordkeeping	50 railroads/plans	1,150 records	20 hours	23,000 hours	$989,000
232.109 - Dynamic brake requirements - status	545 railroads	1,656,000 records	4 minutes	110,400 hours	4,747,200
- Inoperative dynamic brakes	20,000 locomotives	6,358 repair recds	4 minutes	424 hours	$18,232
- Tag bearing words "inoperative dynamic brakes"	20,000 locomotives	6,358 tags	30 seconds	53 hours	$2,385
- Deactivated dynamic brakes (Sub. Yrs.)	8,000 locomotives	10 stencilings	5 minutes	1 hour	$45
- Operating rules (Subsequent Years)	5 new railroads	5 operating rules	4 hours	20 hours	$1,460
- Amendments	545 railroads	15 amendments	1 hour	15 hours	$645
- Requests to increase 5 mph overspeed restriction	545 railroads	5 requests/lttrs.	30 min. + 20 hrs.	103 hours	$4,429
- Knowledge criteria - locomotive engineers -Sub Yrs	5 new railroads	5 amendments	16 hours	80 hours	$5,840
232.111 - Train information handling - Sub. Yrs.-Amendments	5 new railroads	5 procedures	40 hours	200 hours	$14,600
	100 railroads	100 amendments	20 hours	2,000 hours	$86,000
- Report requirements to train crew	545 railroads	2,112,000 reports	10 minutes	352,000 hours	$15,840,000

232.203 - Training requirements - Tr. Prog. - Sub Yr.	15 railroads	5 programs	100 hours	500 hours	$36,500
- Amendments to written program	545 railroads	545 amendments	8 hours	4,360 hours	$187,480
-Training records	545 railroads	67,000 records	8 minutes	8,933 hours	$384,119
- Training notifications	545 railroads	67,000 notific.	3 minutes	3,350 hours	$144,050
- Audit program	545 railroads	1 plan/545copies	40 hours/1 min.	49 hours	$3,091
- Amendments to validation/assessment program	545 railroads	50 amendments	20 hours	1,000 hours	$43,000
232.205 - Class 1 brake test - Notifications/Records	545 railroads	1,656,000 notific./records	45 seconds	20,700 hours	$1,035,000
232.207 - Class 1A brake tests - Subsequent Years	545 railroads	5 des. lists	1 hour	5 hours	$215
- Notification	545 railroads	5 amendments	1 hour	5 hours	$215
232.209 - Class II brake tests-intermediate inspection	545 railroads	1,600,000 comm	3.seconds	1,333 hours	$66,650
232.213 - Extended haul trains	84,000 long dist. mvmts.	100 letters	15 minutes	25 hours	$1,075
- Record of all defective/inoperative brakes	84,000 long dist. mvmts.	40,000 records	20 minutes	13,333 hours	$361,200
232.303 - Gen'l requirements - single car test	1,600,000 frgt. cars	5,600 tags	5 minutes	467 hours	$21,015
- Last repair track brake test/single car test	1,600,000 frgt. cars	320,000 stncl.	5 minutes	26,667 hours	$1,200,015
232.305 - Single Car tests	1,600,000 frgt. cars	320,000 tests/rcds	45 minutes	240,000 hours	$10,800,000
232.309 - Repair track brake test	640 shops	5,000 tests	30 minutes	2,500 hours	$112,500
232.403 - Unique Code	55 railroads	12 requests	5 minutes	1 hour	$43
232.407 - Operations requiring 2-way EOTs	245 railroads	50,000 comm.	30 seconds	417 hours	$20,850
232.409 - Insp. and Testing of EOTs	245 railroads	450,000 comm.	30 seconds	3,750 hours	$168,750
- Telemetry Equipment - Testing and Calibration	245 railroads	32,708 mar. units	1 minute	545 hours	$24,525
232.503- Process to introduce new brake technology	545 railroads	1 letter	1 hour	1 hour	$73
- Special approval	545 railroads	1 request	3 hours	3 hours	$219
232.505 - Pre-revenue svc accept. test plan - Sub Yr.	545 railroads	1 main. procedure	160 hours	160 hours	$11,680
- Amendments	545 railroads	1 main. procedure	40 hours	40 hours	$1,720
- Design description	545 railroads	1 petition	67 hours	67 hours	$4,891
- Report to FRA Assoc. Admin.. for Safety	545 railroads	1 report	13 hours	13 hours	$559
- Brake system technology testing	545 railroads	5 descriptions	40 hours	200 hours	$8,600
232.603 - Configuration Management - **New Rqmnts.**					
- Configuration Management Plan Submitted to FRA with Petition	4 railroads	1 petition + 1 plan	160 hours + 1 hour	161 hours	$11,753
- Subsequent Years	4 railroads	2 plans	60 hours	120 hours	$5,160
- Affirmative statement re: petition copy to RR employees representative	4 railroads	4 statements + 24 petition copies	1 hour + 5 min	6 hours	$258
- Comments on petition; copies of comment to FRA	Public/Int. Parties	3 petitions + 3 comment copies	4 hours + 5 min.	12 hours	$516
- New ECP Brake Technology: Exception to Testing	4 railroads	1 request	8 hours	8 hours	$344
- Modification of Standards - Request + Copies	4 railroads	1 request + 2 copies	8 hours + 5 min.	8 hours	$344
- Affirmative statement + statement copies re: modification request	4 railroads	4 statements + 24 copies	1 hour + 5 min.	6 hours	$258
- Comments on requested modification	Public/Int. Parties	4 comments	2 hours	8 hours	$344
232.605 - ECP Brakes:Training - **New Requirements**					
- Adopt/Developing an ECP Training Prog.- Yr. One	4 railroads	4 programs	100 hours	400 hours	$29,200
- Subsequent Years	6 railroads	2 programs	100 hour	200 hours	$14,600
- ECP Brakes Training of Employees - Yr. One	4 railroads	6,409 tr. Empl.	8 hrs/32 hrs.	105,512 hours	$0 (covered in RIA)
- ECP Brakes Training of Employees - Sub. Yrs.	4 railroads	6,409 tr. Empl	1 hour/8 hours	30,264 hours	$0 (covered in RIA)
- ECP Training Records -Yr. One	4 railroads	6,409 records	8 minutes	855 hours	$36,765
- ECP Training Records - Subsequent Years	4 railroads	6,409 records	4 minutes	428 hours	$18,404
- Assessment of ECP Training Plan	4 railroads	4 plans	40 hours	160 hours	$6,880
- Adopt Operating Rules for ECP Brakes	4 railroads	4 Oper. Rules	24 hours	96 hours	$7,008
- Loco. Engineers - ECP: Criteria For	4 railroads	4 amend. Progs.	40 hours	160 hours	$11,680
232.607 - ECP Inspection and Testing - **New Reqmnt**					
- Initial Terminal - Inspections and Notification of Class I Brake Tests	4 railroads	28,000 insp. + 28,000 notific.	90 min + 45 sec.	42,350 hours	$15,750
- Cars added or removed en route - Class I Br. Test	4 railroads	7,000 insp. + 3,500 notific.	60 min. + 45 sec.	7,044 hours	$1,980

232.609 - Handling of Defective Equipment with ECP Brake Systems - **New Requirements**					
– Freight Car w /defective conventional brakes moved in train operating in ECP brake mode	25 Cars	50 tags/records	2.5 minutes	2 hours	$90
- Inspections/Tagging for ECP Train moving w/less than 85 percent operative/effective brakes	20 Cars	20 Insp. + 40 tags/records	5 min. + 2.5 min.	3 hours	$135
- Cars tagged in accordance with Sec. 232.15--C- - CCCcCC					
232.609 - Freight Car with ECP brake system found with defective non-brake safety appliance – Tagging	75 Cars	150 tags/records	2.5 minutes	6 hours	$270
- Conventional Train with stand-alone ECP brake equipped cars – Tagging	15,000 Cars	30,000 tags/rcds.	2.5 minutes	1,250 hours	$56,250
- Procedures for handling ECP brake system repairs and designation of repair locations	4 railroads	4 procedures	24 hours	96 hours	$7,008
- List of repair locations	4 railroads	4 lists	16 hours	64 hours	$2,880
- Notification to FRA Safety Administrator regarding change to repair location list	4 railroads	1 notification	1 hour	1 hour	$45
232.611 - Periodic Maintenance - **New Requirement**					
- Inspections before being released from repair Shop	50,000 fr. Cars	50,000 insp./rcds	11 minutes	9,167 hours	$412,515
- Procedures for ECP Single Car Tests	1 Railroad Rep.	1 proc./petition + 2 copies	100 hours + 5 min.	100 hours	$7,300
- Single Car Air Brake Tests – Records	70,000 fr. Cars	70,000 test/rcds.	45 minutes	52,500 hours	$2,362,500
- Modification of Single Car Test Standards	1 Railroad Rep.	1 mod. Proc.	40 hours	40 hours	$2,920
232.613 - End-of-Train Devices -**New Requirement** - Submission of Design, Testing, and Calibration Standards related to ECP-EOT devices used on freight trains operating in ECP mode	4 railroads	1 standard	16 hours	16 hours	$1,168

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All estimates include the time for reviewing instructions; searching existing data sources; gathering or maintaining the needed data; and reviewing the information. Pursuant to 44 U.S.C. 3506(c)(2)(B), FRA solicits comments concerning: Whether these information collection requirements are necessary for the proper performance of the functions of FRA, including whether the information has practical utility; the accuracy of FRA's estimates of the burden of the information collection requirements; the quality, utility, and clarity of the information to be collected; and whether the burden of collection of information on those who are to respond, including through the use of automated collection techniques or other forms of information technology, may be minimized. For information or a copy of the paperwork package submitted to OMB, contact Mr. Robert Brogan at 202–493–6292 or Ms. Gina Christodoulou at 202–493–6139.

Organizations and individuals desiring to submit comments on the collection of information requirements should direct them to: Mr. Robert Brogan, Office of Safety, Planning and Evaluation Division, RRS–21, Federal Railroad Administration, 1120 Vermont Ave., NW., Mail Stop 17, Washington, DC 20590, or Ms. Gina Christodoulou, Office of Support Systems Staff, RAD–43, Federal Railroad Administration, 1120 Vermont Ave., NW., Mail Stop 35, Washington, DC 20590. Alternatively, comments may be transmitted via facsimile to (202) 493–6230 or (202) 493–6170, or via e-mail to Mr. Brogan at *robert.brogan@dot.gov*, or to Ms. Christodoulou at *gina.christodoulou@dot.gov*.

OMB is required to make a decision concerning the collection of information requirements contained in this NPRM between 30 and 60 days after publication of this document in the **Federal Register**. Therefore, a comment to OMB is best assured of having its full effect if OMB receives it within 30 days of publication. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

FRA is not authorized to impose a penalty on persons for violating information collection requirements which do not display a current OMB control number, if required. FRA intends to obtain current OMB control numbers for any new information collection requirements resulting from this rulemaking action prior to the effective date of a final rule. The OMB control number, when assigned, will be announced by separate notice in the **Federal Register**.

D. Federalism Implications

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

This proposed rule has preemptive effect. Subject to a limited exception for essentially local safety or security hazards, its requirements will establish a uniform Federal safety standard that must be met, and state requirements covering the same subject are displaced, whether those standards are in the form of state statutes, regulations, local ordinances, or other forms of state law, including state common law. Section 20106 of Title 49 of the United States Code provides that all regulations prescribed by the Secretary related to railroad safety preempt any State law, regulation, or order covering the same subject matter, except a provision necessary to eliminate or reduce an

essentially local safety hazard that is not incompatible with a Federal law, regulation, or order and that does not unreasonably burden interstate commerce. This is consistent with past practice at FRA, and within the Department of Transportation.

FRA has analyzed this final rule in accordance with the principles and criteria contained in Executive Order 13132. This proposed rule will not have a substantial effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among various levels of government. FRA concludes that this proposed rule will not impose any direct compliance costs on State and local governments and has no federalism implications, other than the preemption of state laws covering the subject matter of this final rule, which occurs by operation of law under 49 U.S.C. 20106 whenever FRA issues a rule or order. Elements of the final rule dealing with safety appliances affect an area of safety that has been pervasively regulated at the Federal level for over a century. Accordingly, the final rule amendments in that area will involve no impacts on Federal relationships.

E. Environmental Impact

FRA has evaluated this final rule in accordance with its ''Procedures for Considering Environmental Impacts'' (FRA's Procedures) (64 FR 28545, May 26, 1999) as required by the National Environmental Policy Act (42 U.S.C. 4321 et seq.), other environmental statutes, Executive Orders, and related regulatory requirements. FRA has determined that this proposed rule is not a major FRA action (requiring the preparation of an environmental impact statement or environmental assessment) because it is categorically excluded from detailed environmental review pursuant to section 4(c)(20) of FRA's Procedures. See 64 FR 28547, May 26, 1999. Section 4(c)(20) reads as follows: (c) Actions categorically excluded. Certain classes of FRA actions have been determined to be categorically excluded from the requirements of these Procedures as they do not individually or cumulatively have a significant effect on the human environment. * * * The following classes of FRA actions are categorically excluded: * * * (20) Promulgation of railroad safety rules and policy statements that do not result in significantly increased emissions or air or water pollutants or noise or increased traffic congestion in any mode of transportation.

In accordance with section 4(c) and (e) of FRA's Procedures, the agency has further concluded that no extraordinary circumstances exist with respect to this regulation that might trigger the need for a more detailed environmental review. As a result, FRA finds that this proposed rule is not a major Federal action significantly affecting the quality of the human environment.

F. Unfunded Mandates Reform Act of 1995

Pursuant to Section 201 of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, 2 U.S.C. 1531), each Federal agency ''shall, unless otherwise prohibited by law, assess the effects of Federal regulatory actions on State, local, and tribal governments, and the private sector (other than to the extent that such regulations incorporate requirements specifically set forth in law).'' Section 202 of the Act (2 U.S.C. 1532) further requires that ''before promulgating any general notice of proposed rulemaking that is likely to result in the promulgation of any rule that includes any Federal mandate that may result in expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $120,700,000 or more (adjusted annually for inflation) in any 1 year, and before promulgating any final rule for which a general notice of proposed rulemaking was published, the agency shall prepare a written statement'' detailing the effect on State, local, and tribal governments and the private sector. The proposed rule, if enacted, may result in the expenditure, in the aggregate, of $120,700,000 or more in any one year. However, those expenses are not mandated and would only be incurred by the private sector if it wishes to take advantage of the regulatory relief provided by the proposed rule. Although the preparation of such a statement is not required, the analytical requirements under Executive Order 12866 are similar to the analytical requirements under the Unfunded Mandates Reform Act of 1995 and, thus, the same analysis complies with both analytical requirements.

G. Energy Impact

Executive Order 13211 requires Federal agencies to prepare a Statement of Energy Effects for any ''significant energy action.'' 66 FR 28355 (May 22, 2001). Under the Executive Order, a ''significant energy action'' is defined as any action by an agency (normally published in the **Federal Register**) that promulgates or is expected to lead to the promulgation of a final rule or regulation, including notices of inquiry, advance notices of proposed rulemaking, and notices of proposed rulemaking: (1)(i) That is a significant regulatory action under Executive Order 12866 or any successor order, and (ii) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (2) that is designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action. FRA has evaluated this final rule in accordance with Executive Order 13211. FRA has determined that this final rule is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Consequently, FRA has determined that this regulatory action is not a ''significant energy action'' within the meaning of Executive Order 13211.

H. Privacy Act

FRA wishes to inform all potential commenters that anyone is able to search the electronic form of all comments received into any agency docket by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you may visit *http://dms.dot.gov.*

List of Subjects in 49 CFR Part 232

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

The Proposal

In consideration of the foregoing, FRA proposes to amend chapter II, subtitle B of title 49, Code of Federal Regulations as follows:

1. The authority citation for Part 232 continues to read as follows:

Authority: 49 U.S.C. 20102–20103, 20107, 20133, 20141, 20301–20303, 20306, 21301–21302, 21304; 28 U.S.C. 2461, note; and 49 CFR 1.49.

2. Section 232.5 is amended by adding definitions for ''car control device (CCD)'', ''dual mode ECP brake system'', ''ECP'', '' ECP brake mode'', ''ECP brake system'', ''ECP–EOT device'', ''emulator CCD'', ''overlay ECP brake system'', ''stand-alone CCD'', ''stand-alone ECP brake system'', ''switch mode'', and ''train line cable''; and by revising the definitions for ''train, unit or train, cycle'' and ''yard limits'' as follows in alphabetical order:

§ 232.5 Definitions.

* * * * *

Car control device (CCD) means an electronic control device that replaces the function of the conventional pneumatic service and emergency portions of a car's air brake control valve during electronic braking and provides for electronically controlled service and emergency brake applications.

Dual mode ECP brake system means an ECP brake system that is equipped with either an emulator CCD or an overlay ECP brake system on each car which can be operated in either ECP brake mode or conventional pneumatic brake mode.

ECP means ''electronically controlled pneumatic'' when applied to a brake or brakes.

ECP brake mode means the power braking system on a car or an entire train that is actuated by compressed air, controlled by electronic signals originating at the locomotive or an ECP–EOT for service and emergency applications, and whose brake pipe is used to provide a constant supply of compressed air to the reservoirs on each car but does not convey service braking signals to the car.

ECP brake system means a train power braking system actuated by compressed air and controlled by electronic signals from the locomotive or an ECP–EOT to the cars in the consist for service and emergency applications in which the brake pipe is used to provide a constant supply of air to the reservoirs on each car but does not convey braking signals to the car. ECP brake systems include dual mode and stand-alone ECP brake systems.

ECP–EOT device means the end-of-train device for ECP brake systems that is physically the last network node in the train, pneumatically and electrically connected at the end of the train to the train line cable operating with an ECP brake system. It shall transmit a status message (EOT Beacon) at least once per second and contain a means of communicating with the HEU, a brake pipe pressure transducer, and a battery that charges off the train line cable.

* * * * *

Emulator CCD means a CCD that is capable of optionally emulating the function of the pneumatic control valve while in a conventionally braked train.

* * * * *

Overlay ECP brake system means a brake system that has both conventional pneumatic brake valves and ECP brake components, making it capable of operating as either a conventional pneumatic brake system or an ECP brake system, which can continue to operate as a conventional pneumatic brake system using conventional control valves when its ECP brake functions fail or are placed in cutout mode.

* * * * *

Stand-alone CCD means a CCD that can operate properly only in a train operating in ECP brake mode and cannot operate in a conventional pneumatically braked train.

Stand-alone ECP brake system means a brake system equipped with a CCD that can only operate the brakes on the car properly in ECP brake mode.

* * * * *

Switch Mode means a mode of a train equipped with an ECP brake system that provides a means to allow operation of that train when the train's ECP—EOT device is not communicating with the lead locomotive's HEU or when the train is separated during road switching operations. Many of the ECP brake system's fault detection/response procedures are suspended during Switch Mode. A train operating in Switch Mode shall not exceed 20 miles per hour.

* * * * *

Train line cable is a two-conductor electric wire spanning the train and carrying both electrical power to operate all CCDs and ECP—EOT devices and communications network signals.

Train, unit or train, cycle means a train that, except for the changing of locomotive power ore for the removal or replacement of defective equipment, remains coupled as a consist and operates in a continuous loop or continuous loops without a destination.

* * * * *

Yard limits means a system of tracks, not including main tracks and sidings, used for classifying cars, making-up and inspecting trains, or storing cars and equipment.

* * * * *

3. Part 232 is amended by adding a new subpart G to read as follows:

Subpart G—Electronically Controlled Pneumatic (ECP) Braking Systems

Sec.

232.601 Scope.
232.602 Applicability.
232.603 Design, interoperability, and configuration management requirements.
232.605 Training requirements.
232.607 Inspection and testing requirements.
232.609 Handling of defective equipment with ECP brake systems.
232.611 Periodic maintenance.
232.613 End-of-train devices.

Subpart G—Electronically Controlled Pneumatic (ECP) Braking Systems

§ 232.601 Scope.

This subpart contains specific requirements applicable to freight trains and freight cars equipped with ECP brake systems. This subpart also contains specific exceptions from various requirements contained in this part for freight trains and freight cars equipped with ECP brake systems.

§ 232.602 Applicability.

This subpart applies to all railroads that operate a freight car or freight train governed by this part and equipped with an ECP brake system. Unless specifically excepted or modified in this section, all of the other requirements contained in this part are applicable to a freight car or freight train equipped with an ECP brake system.

§ 232.603 Design, interoperability, and configuration management requirements.

(a) *General.* A freight car or freight train equipped with an ECP brake system shall, at a minimum, meet the Association of American Railroads (AAR) standards contained in the AAR Manual of Standards and Recommended Practices related to ECP brake systems listed below; an alternate standard approved by FRA pursuant to § 232.17; or a modified standard approved in accordance with the provisions contained in paragraph (f) of this section. Copies of the standards identified in this section may be obtained from the Association of American Railroads, 50 F Street, NW., Washington, DC 20001. The applicable standards, which are incorporated into this regulation by reference, include the following:

(1) AAR S–4200, ''ECP Cable-Based Brake Systems—Performance Requirements'' (2004);

(2) AAR S–4210, ''ECP Cable-Based Brake System Cable, Connectors, and Junction Boxes—Performance Specifications'' (2002);

(3) AAR S–4220, ''ECP Cable-Based Brake DC Power Supply—Performance Specification'' (2002);

(4) AAR S–4230, ''Intratrain Communication (ITC) Specification for Cable-Based Freight Train Control System'' (2004);

(5) AAR S–4250, ''Performance Requirements for ITC Controlled Cable-Based Distributed Power Systems'' (2004); and

(6) AAR S–4260, ''ECP Brake and Wire Distributed Power Interoperability Test Procedures'' (2007);

(b) *Approval.* A freight train or freight car equipped with an ECP brake system

and equipment covered by the AAR standards incorporated by reference in this section shall not be used without conditional or final approval by AAR in accordance with AAR Standard S–4240, ''ECP Brake Equipment—Approval Procedures'' (2007).

(c) *Configuration management.*

(1) ECP brake systems shall meet the configuration management plan requirements contained in:

(i) An industry recognized standard approved by FRA, or

(ii) A configuration management plan submitted to and approved by FRA.

(2) To receive approval in accordance with paragraph (c)(1)(ii) of this section, a configuration management plan must:

(i) Be submitted in accordance with * 232.17;

(ii) Be structured in accordance with accepted configuration management standards; and

(iii) Define all of the purposes, procedures, organizational responsibilities, and tools to be used for ECP brake system hardware and software configuration management including: The purpose and scope of the application; control activities to be performed; responsibilities and authorities for accomplishing the activities; implementation schedules; tools and resources for executing the plan; and periodic updating of the plan to maintain currency.

(3) A railroad operating a freight train or freight car equipped with ECP brake systems shall adopt and comply with the configuration management plan required under paragraphs (c)(1) and (c)(2) of this section.

(d) *Exceptions.* (1) A freight car or freight train equipped with a stand-alone ECP brake system shall be excepted from the requirement in § 232.103(l) referencing AAR Standard S–469–47, ''Performance Specification for Freight Brakes.''

(2) The provisions addressing the introduction of new brake system technology contained in subpart F of this part are not applicable to a freight car or freight train equipped with an ECP brake system approved by AAR in accordance with paragraph (b) of this section, conditionally or otherwise, as of the effective date of this rule.

(e) *New technology.* Upon written request supported by suitable justification, the Associate Administrator may except from the requirements of subpart F of this part the testing of new ECP brake technology, demonstration of new ECP brake technology, or both, where testing or demonstration, or both, will be conducted pursuant to an FRA-recognized industry standard and FRA is invited to monitor the testing or demonstration, or both. FRA's Associate Administrator may revoke any such exception in writing after providing an opportunity for response by the affected parties.

(f) *Modification of standards.* The AAR or other authorized representative of the railroad industry may seek modification of the industry standards identified in paragraphs (a) and (b) of this section. The request for modification will be handled and shall be submitted in accordance with the modification procedures contained in § 232.307.

§ 232.605 Training requirements.

(a) *Inspection, testing and maintenance.* A railroad that operates a freight car or freight train equipped with an ECP brake system and each contractor that performs inspection, testing, or maintenance on a freight car or freight train equipped with an ECP brake system shall adopt and comply with a training, qualification, and designation program for its employees that perform inspection, testing or maintenance of ECP brake systems. The training program required by this section shall meet the requirements in *§ 232.203(a), (b), (e), and (f).

(b) *Operating rules.* A railroad operating a freight train or freight car equipped with an ECP brake system shall amend its operating rules to govern safe train handling procedures related to ECP brake systems and equipment under all operating conditions, which shall be tailored to the specific equipment and territory of the railroad.

(c) *Locomotive engineers.* A railroad operating a freight car or freight train equipped with an ECP brake system shall adopt and comply with specific knowledge, skill, and ability criteria to ensure that its locomotive engineers are fully trained with the operating rules governing safe train handling procedures related to ECP brake systems and equipment under all operating conditions, which shall be tailored to the specific equipment and territory of the railroad. The railroad shall incorporate the specific knowledge, skill, and ability criteria into its locomotive engineer certification program pursuant to part 240 of this chapter.

§ 232.607 Inspection and testing requirements.

(a) *Initial terminal.* A freight train operating in ECP brake mode shall receive a Class I brake test as described in § 232.205(c) by a qualified mechanical inspector (QMI) and shall receive a pre-departure freight inspection pursuant to part 215 of this chapter by an inspector designated under § 215.11 of this chapter at its point of origin (initial terminal).

(b) *Distance.* (1) Except for a unit or cycle train, a train operating in ECP brake mode shall not operate a distance that exceeds its destination or 3,500 miles, whichever is less, unless another inspection meeting the requirements of paragraph (a) of this section is performed on the train.

(2) A unit or cycle train operating in ECP brake mode shall receive the inspections required in paragraph (a) of this section at least every 3,500 miles.

(3) The distance that any car in a train has traveled since receiving a Class I brake test by a qualified mechanical inspector will determine the distance that the train has traveled.

(c) *Trains off air.* A freight train operating in ECP brake mode shall receive a Class I brake test as described in § 232.205(c) by a qualified person at a location where the train is off air for a period of more than 24 hours.

(d) *Cars added en route.* (1) Each car equipped with an ECP brake system that is added to a train operating in ECP brake mode shall receive a Class I brake test as described in § 232.205(c) by a qualified person, unless all of the following are met:

(i) The car has received a Class I brake test by a qualified mechanical inspector within the last 3,500 miles;

(ii) Information identified in § 232.205(e) relating to the performance of the previously received Class I brake test is provided to the train crew;

(iii) The car has not been off air for more than 24 hours; and

(iv) A visual inspection of the car's brake systems is conducted to ensure that the brake equipment is intact and properly secured. This may be accomplished as part of the inspection required under § 215.13 of this chapter and may be conducted while the car is off air.

(2) Each car and each solid block of cars not equipped with an ECP brake system that is added to a train operating in ECP brake mode shall receive a visual inspection to ensure it is properly placed in the train and safe to operate and shall be moved and tagged in accordance with the provisions contained in § 232.15.

(e) *Class III brake tests.* A freight train operating in ECP brake mode shall receive a Class III brake test as described in § 232.211(b), (c), and (d) at the location where the configuration of the train is changed, including:

(1) Where a locomotive or caboose is changed;

(2) Where a car or solid block of cars is added to the train;

(3) Where a car or solid block of cars is removed from the train; and

(4) Whenever the continuity of the brake pipe or electrical connections is broken or interrupted with the train consist otherwise remaining unchanged.

(f) *Modification to existing brake tests.* (1) In lieu of the specific brake pipe service reductions and increases required in subpart C of this part, an electronic signal that provides an equivalent application and release of the brakes shall be utilized when conducting any required inspection or test on a freight car or freight train equipped with an ECP brake system and operating in ECP brake mode.

(2) In lieu of the specific minimum piston travel ranges contained in § 232.205(c)(5), the piston travel on freight cars equipped with ECP brake systems shall be within the piston travel limits stenciled or marked on the car or badge plate consistent with the manufacturers recommended limits, if so stenciled or marked.

(g) *Exceptions.* A freight car or a freight train shall be exempt from the requirements contained in §§ 232.205(a) and (b), 232.207, 232.209, and 232.211(a) when it is equipped with an ECP brake system and operating in ECP brake mode.

§ 232.609 Handling of defective equipment with ECP brake systems.

(a) Ninety-five percent of the cars in a train operating in ECP brake mode shall have effective and operative brakes prior to use or departure from the train's initial terminal or any location where a Class I brake test is required to be performed on the entire train by a qualified mechanical inspector pursuant to § 232.607.

(b) A freight car equipped with an ECP brake system that is known to have arrived with ineffective or inoperative brakes at the location of a train's initial terminal or at a location where a Class I brake test is required under § 232.607(b) shall not depart that location with ineffective or inoperative brakes in a train operating in ECP brake mode unless:

(i) The location does not have the ability to conduct the necessary repairs;

(ii) The car is hauled only for the purpose of repair to the nearest forward location where the necessary repairs can be performed consistent with the guidance contained in § 232.15(f);

(iii) The car is not being placed for loading or unloading while being moved for repair unless unloading is necessary for the safe repair of the car; and

(iv) The car is properly tagged in accordance with § 232.15(b).

(c) A freight car equipped with only conventional pneumatic brakes shall not move in a freight train operating in ECP brake mode unless it would otherwise have effective and operative brakes if it were part of a conventional pneumatic brake equipped train or could be moved from the location in defective condition under the provisions contained in § 232.15 and is tagged in accordance with § 232.15(b).

(d) A freight train operating in ECP brake mode shall not move if less than 85 percent of the cars in the train have operative and effective brakes. However, after experiencing a penalty stop for having less than 85 percent operative and effective brakes, a freight train operating in ECP brake mode may be moved if all of the following are met:

(1) The train is visually inspected;

(2) Appropriate measures are taken to ensure that the train is safely operated to the location where necessary repairs or changes to the consist can be made;

(3) A qualified person determines that it is safe to move the train; and

(4) The train is moved in ECP brake Switch Mode to the nearest forward location where necessary repairs or changes to the consist can be made.

(e) A freight car or locomotive equipped with an ECP brake system that is found with inoperative or ineffective brakes for the first time during the performance of a Class I brake test or while en route may be used or hauled without civil penalty liability under this part to its destination, not to exceed 3,500 miles; provided, all applicable provisions of this section are met and the defective car or locomotive is hauled in a train operating in ECP brake mode.

(f) A freight car equipped with an ECP brake system that is part of a train operating in ECP brake mode that is found with a defective non-brake safety appliance may be used or hauled without civil penalty under this part to the nearest forward location where the necessary repairs can be performed consistent with the guidance contained in § 232.15(f).

(g) A train operating with conventional pneumatic brakes shall not operate with freight cars equipped with stand-alone ECP brake systems unless:

(1) The train has at least the minimum percentage of operative brakes required by paragraph (h) of this section when at an initial terminal or paragraph (d) of this section when en route; and

(2) The stand-alone ECP brake equipped cars are:

(i) Moved for the purpose of delivery to a railroad receiving the equipment or to a location for placement in a train operating in ECP brake mode or being moved for repair to the nearest available location where the necessary repairs can be made in accordance with §§ 232.15(a)(7) and (f);

(ii) Tagged in accordance with § 232.15(b); and

(iii) Placed in the train in accordance with § 232.15(e).

(h) A train equipped and operated with conventional pneumatic brakes may depart an initial terminal with freight cars that are equipped with stand-alone ECP brake systems provided all of the following are met:

(1) The train has 100 percent effective and operative brakes on all cars equipped with conventional pneumatic brake systems;

(2) The train has at least 95 percent effective and operative brakes when including the freight cars equipped with stand-alone ECP brake systems; and

(3) The requirements contained in paragraph (g) of this section are met.

(i) *Tagging of defective equipment.* A freight car equipped with an ECP brake system that is found with ineffective or inoperative brakes will be considered electronically tagged under § 232.15(b)(1) and (b)(5) if the car is used or hauled in a train operating in ECP brake mode and the ECP brake system meets the following:

(1) The ECP brake system is able to display information in the cab of the lead locomotive regarding the location and identification of the car with defective brakes;

(2) The information is stored or downloaded, is secure, and is accessible to FRA and appropriate operating and inspection personnel; and

(3) An electronic or written record of the stored or downloaded information is retained and maintained in accordance with § 232.15(b)(3).

(j) *Procedures for handling ECP brake system repairs and designation of repair locations.* (1) Each railroad operating freight cars equipped with ECP brake systems shall adopt and comply with specific procedures developed in accordance with the requirements related to the movement of defective equipment contained in this subpart. These procedures shall be made available to FRA upon request.

(2) Each railroad operating freight trains in ECP brake mode shall submit to FRA's Associate Administrator for Safety a list of locations on its system where ECP brake system repairs will be performed. A railroad shall notify FRA's Associate Administrator for Safety in writing 30 days prior to any change in the locations designated for such repairs. A sufficient number of locations shall be identified to ensure compliance

with the requirements related to the handling of defective equipment contained in this part.

(k) *Exceptions:* All freight cars and trains that are specifically identified, operated, and handled in accordance with this section are excepted from the movement of defective equipment requirements contained in § 232.15(a)(2), (a)(5) through (a)(8), and 232.103(d) and (e).

§ 232.611 Periodic maintenance.

(a) In addition to the maintenance requirements contained in § 232.303(b) through (d), a freight car equipped with an ECP brake system shall be inspected before being released from a shop or repair track to ensure the proper and safe condition of the following:

(1) ECP brake system wiring and brackets;

(2) ECP brake system electrical connections;

(3) Electrical grounds and impedance; and

(4) Car mounted ECP brake system components.

(b) Prior to placing a freight car equipped with an ECP brake system in revenue service, a railroad or a duly authorized representative of the railroad industry shall submit a procedure for conducting periodic single car tests to FRA for its approval pursuant to the special approval procedures contained in § 232.17.

(c) Except as provided in § 232.303(e), a single car air brake test conducted in accordance with the procedure submitted and approved in accordance with paragraph (b) of this section shall be performed on a freight car equipped with an ECP brake system whenever any of the events identified in § 232.305(e) occur, except for those paragraphs identified in paragraph (f) of this section.

(d) A single car air brake test conducted in accordance with the procedure submitted and approved in accordance with paragraph (b) of this section shall be performed on each freight car retrofitted with a newly installed ECP brake system prior to placing or using the car in revenue service.

(e) *Modification of single car test standard.* A railroad or a duly authorized representative of the railroad industry may seek modification of the single car test standard approved in accordance with paragraph (b) of this section. The request for modification will be handled and shall be submitted in accordance with the modification procedures contained in § 232.307.

(f) *Exception.* A freight car equipped with a stand-alone ECP brake system is excepted from the single car test requirements contained in § 232.305(b)(2) and (f).

§ 232.613 End-of-train devices.

(a) Prior to operating a freight train in ECP brake mode, a railroad, an ECP–EOT device manufacturer, or a duly authorized representative of the railroad industry may submit design, testing, and calibration standards related to ECP–EOT devices used on freight trains operating in ECP brake mode to FRA for its approval pursuant to the special approval procedures contained in § 232.17. An ECP–EOT shall, at a minimum, serve as the final node on the ECP brake circuit, provide a cable terminal circuit, and monitor, confirm, and report train, brake pipe, and train line cable continuity, cable voltage, brake pipe pressure, and the status of the ECP–EOT device battery charge.

(b) A railroad shall adopt and comply with the design, testing, and calibration standards approved pursuant to paragraph (a) of this section.

(c) A railroad shall not move or use a freight train equipped with an ECP brake system unless that train is equipped with a functioning ECP–EOT device approved pursuant to paragraph (a) of this section and the railroad complies with paragraph (b) of this section. The ECP–EOT device must be properly connected to the network and to the train line cable at the end of the train.

(d) *Exception.* A freight train operating in ECP brake mode is excepted from the end-of-train device requirements contained in subpart E of this part, provided that it is equipped with an ECP–EOT device complying with this section.

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Joseph H. Boardman,

Federal Railroad Administrator.

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