



U.S. Department  
of Transportation

**Federal Railroad  
Administration**

1120 Vermont Ave., N.W.  
Washington, D.C. 20590

MAR 21 2007

Mr. Dave Dealy  
Vice President - Transportation  
BNSF Railway Company  
2600 Lou Menk Drive  
Fort Worth, Texas 76131

Mr. Tim Heilig  
Vice President - Mechanical  
Norfolk Southern Corporation  
1200 Peachtree Street NE, Box 184  
Atlanta, Georgia 30309

**Re: Docket Number FRA-2006-26435**

Dear Mr. Dealy and Mr. Heilig:

This letter is in reference to the petition submitted jointly by the BNSF Railway Company and the Norfolk Southern Corporation, hereafter referred to as BNSF/NS or "Petitioners," seeking a waiver of compliance from certain provisions of Title 49 Code of Federal Regulations (CFR) Part 232, *Brake System Safety Standards for Freight and Other Non-Passenger Trains and Equipment*, and 49 CFR Part 229, *Railroad Locomotive Safety Standards*, in order to begin equipping and operating pilot trains using electronically controlled pneumatic (ECP) brakes instead of conventional pneumatic brake systems.

After careful review and consideration of the petition and in light of the testimony provided at the January 16, 2007, public hearing, along with the various written comments submitted to the docket in this proceeding, the Federal Railroad Administration (FRA) grants this request, in part, subject to the conditions listed below. FRA specifically denies BNSF/NS's request regarding the performance of locomotive calendar day inspections on locomotives used in ECP brake-equipped train operations. While FRA expects calendar day inspections on locomotives to continue as prescribed in 49 CFR Part 229, FRA invites Petitioners to present alternatives for handling defects that are found during these inspections when performed on en route ECP brake-equipped trains. If a railroad would like to deviate from the current requirements on how defects are handled when discovered en route during a calendar day inspection, a plan should be submitted to FRA outlining the process, including defects permitted while the locomotive continues to operate an ECP brake-equipped train to its destination or the next repair point, the qualifications for those determining that such an operation could continue safely, and the means of providing actual notice to crews regarding any such conditions and any safeguards that should be observed.

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The railroad will be required to adopt and comply with any initial or modified plan approved by FRA.

FRA has decided that, in order to demonstrate the safety and efficacy of ECP brakes in a practical commercial setting, it is necessary to permit a train operating in ECP brake mode to operate to its destination or 3,500 miles, whichever is less, without receiving another Class I brake inspection or an inspection under Part 215. As a practical matter, railroads are most likely to use ECP brakes first on such trains as intermodal trains from West Coast ports to Chicago or unit coal trains from the Powder River Basin to distant power plants. A valid demonstration of the technology should address that reality, and this waiver does so with appropriate safeguards intended to ensure that these trains will be as safe as trains operated without benefit of the waiver, while collecting data on the demonstration to be used in FRA's pending rulemaking on ECP brakes.

The Brotherhood of Railway Carmen (BRC), the United Transportation Union (UTU), and the Brotherhood of Locomotive Engineers and Trainmen (BLET) each presented comments opposing the petition. BRC asserted that BNSF/NS had not proven that ECP brakes afford the same level of safety as visual inspections performed by carmen. Specifically, BRC noted that "ECP brakes can merely monitor the pressure in the system and are incapable of detecting unsafe conditions" to include defective handbrakes, brake rigging defects, or defective brake shoes. FRA believes that, based on the information known at this time, if a quality inspection is performed at a train's point of origination and all defects are found and corrected, the train will be able to safely traverse 3,500 or more miles. The conditional requirement for a visual inspection of a car's brake system when an ECP brake-equipped car is added to a train operating in ECP brake mode, will provide an added layer of safety. FRA appreciates that components wear in normal service. The brake shoe is the brake system component subject to the most immediate wear. Out of an abundance of caution, and recognizing that locomotive engineers may initially make more extensive use of the automatic brake with ECP brake technology, as a condition to this waiver, FRA is requiring that brake shoes have a minimum of 1/2-inch thickness, including the lining and backing plate, when a Class I brake test is performed by a qualified mechanical inspector (QMI) on ECP brake-equipped trains. This exceeds the current condemning limits for brake shoe wear under both the AAR Interchange Rules and Federal regulations. AAR's brake shoe condemning limit is three-eighths of an inch, including the lining and backing plate, and the Federal condemning limit is when the brake shoe is worn into the backing plate.

BLET and UTU opposed granting Petitioners' requested relief from the requirement of 49 CFR § 232.103(d) that 100 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. However, test data shows that trains with 85 percent operative ECP brakes will still have a shorter stopping distance than a conventional pneumatically braked train with 100 percent operative brakes. Accordingly, FRA's condition imposed below requiring that 95 percent of the cars in an ECP brake-equipped train operating in ECP brake mode shall be effective and operative prior to use or

departure is a very conservative requirement.

FRA recognizes that braking horsepower does not vary between perfectly adjusted and fully operational conventional and ECP brakes; however, FRA notes that actual delivered braking effort (after all brakes apply) by the ECP brake system may be superior as a result of brake cylinder pressure being maintained at the target level. FRA acknowledges that ECP brakes would not provide superior braking effort in heavy grade operations if heat effect-caused brake fade should occur, and has taken this into consideration, *inter alia*, by requiring that not less than 95 percent of brakes be operative at the time of the Class I brake test. However, FRA concludes that with ECP brakes: (1) the likelihood that an individual car will fail to provide braking effort without the knowledge of the train crew is significantly reduced; (2) the probability that brake shoes and wheels will become overheated in grade territory is greatly reduced because of the ability of the engineer to use graduated release; and (3) the chance that manipulation of the automatic brake valve will result in depletion of the brake pipe air pressure, requiring reliance on a last-chance emergency brake application at an elevated speed, is essentially negated. Accordingly, any ECP brake-equipped train would be expected to far exceed the safety levels of any conventional train operating under similar adverse circumstances.

Recognizing that the petition could present issues that would require the invocation of FRA's discretionary statutory authority under 49 U.S.C. § 20306 to exempt technological improvements from certain provisions of 49 U.S.C. Chapter 203 (the "Safety Appliance law"), FRA held a public hearing on January 16, 2007. Specifically, 49 U.S.C. § 20306 provides that when certain statutory requirements preclude the development or implementation of more efficient railroad transportation equipment or other transportation innovations, the Secretary of Transportation may grant an exemption to those requirements based on evidence developed at a hearing.<sup>1</sup> Based on evidence developed at the January 16 hearing, FRA understands that ECP brake operations provide for continuous electronic monitoring of air brake system component conditions and brake pipe pressure, potentially limiting the need for certain physical inspections currently required pursuant to Federal regulations. For example, 49 U.S.C. § 20303, which requires railroads 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," presents an obstacle to cost-saving, safe, and efficient long hauls promised by ECP brakes. 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. Accordingly, in granting this conditional waiver, FRA hereby invokes its authority under 49 U.S.C. § 20306 to exempt Petitioners from certain requirements of the Safety Appliance law.

FRA further acknowledges the concern expressed by BLET that deviations from Part 232 procedures should be minimized to avoid confusion among crews working on trains equipped with either ECP or conventional pneumatic brakes. FRA has endeavored to craft the following

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<sup>1</sup> Under 49 CFR 1.49(v), the Administrator of the FRA is delegated authority to carry out the functions vested in the Secretary by 49 U.S.C. § 20306.

conditions with this point in mind. However, FRA notes that a transition to powerful new technologies can require adjustments by all concerned and that the presence of an active ECP brake control system in the locomotive is highly evident to the locomotive engineer. As experience is gained, FRA reserves the right to make adjustments to these conditions that pertain to human machine interface and procedures.

Accordingly, BNSF/NS's request for relief from the requirements of 49 CFR Part 232 is granted, subject to the following conditions:

1. This waiver shall apply only to BNSF and NS trains equipped and operating with ECP brake systems.
2. The ECP brake system shall, at a minimum, meet all of the current American Association of Railroads (AAR) standards contained in the AAR Manual of Standards and Recommended Practices related to ECP brake systems.
3. A 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 car inspection, pursuant to the requirements specified in 49 CFR Part 215 by an inspector designated under § 215.11 at the initial terminal (where the train is originally assembled) or where a unit or cycle train Class I brake test is required.
4. A train operating in ECP brake mode shall not operate at a distance that exceeds its destination or 3,500 miles, whichever is less, without receiving another Class I brake inspection and another Part 215 inspection as outlined in condition #3.
5. A unit or cycle train operating in ECP brake mode shall receive a Class I brake inspection and Part 215 inspection at least every 3,500 miles as outlined in condition #3.
6. The distance that any car in a train has traveled since receiving a Class I brake test by a QMI will determine the distance that the train has traveled.
7. A 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.
8. 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:
  - 8.1 The car has received a Class I brake test by a QMI within the last 3,500 miles;

- 8.2 Information identified in § 232.205(e) relating to the performance of the previous Class I brake test is provided to the train crew;
  - 8.3 The car has not been off air for more than 24 hours; and
  - 8.4 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 and may be conducted while the car is off air.
9. An ECP brake-equipped train that receives a Class I brake test by a QMI is not required to receive any Class IA brake tests.
  10. A 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 or whenever the continuity of the brake pipe or electrical connections is broken or interrupted, with the train consist otherwise remaining unchanged.
  11. In lieu of the specific brake pipe service reductions required throughout 49 CFR Part 232, 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 train operating in ECP brake mode.
  12. In lieu of the specific piston travel ranges specified throughout 49 CFR Part 232, 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 manufacturer's recommended limits. However, at no time shall piston travel on a standard 12-inch stroke piston exceed 9 inches when conducting a Class I brake inspection as outlined in condition #3.
  13. When conducting the Class I brake test as outlined in condition #3, the composition type brake shoe must have at least ½-inch thickness, including the lining and backing plate.
  14. A freight car or a freight train shall be exempted from the requirements contained in §§ 232.205(a) and (b), 232.207, 232.209, 232.211(a), and 232.505 when it is equipped with an ECP brake system and operating in ECP brake mode.
  15. Handling of defective equipment with ECP brake systems:
    - 15.1 Ninety-five percent of the cars in an ECP brake-equipped train operating in ECP brake mode shall be effective and operative 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 QMI;
    - 15.2 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;
- 15.3 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 unit or cycle train Class I brake test is required shall not depart that location with ineffective or inoperative brakes in a train operating in ECP brake mode unless the location does not have the ability to conduct the necessary repairs. If the location does not have the ability to conduct the necessary repairs, the car must be properly tagged in accordance with § 232.15(b), and can only be hauled for the purpose of repair to the nearest forward location where the necessary repairs can be performed;
  - 15.4 A train operating in ECP brake mode shall not operate with less than 85 percent of the cars in the train with operative brakes, unless it is operating in Switch Mode for the purpose of moving to the nearest forward location where necessary repairs or changes to the consist can be made;
  - 15.5 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 to the nearest forward location where the necessary repairs can be performed consistent with the guidance contained in § 232.15(f); and
  - 15.6 A train operating with conventional pneumatic brakes shall not operate with freight cars equipped with standalone ECP brake systems, unless the train has 100 percent effective and operative brakes on all cars equipped with conventional pneumatic brakes and at least 95 percent effective and operative brakes when including the freight cars equipped with standalone ECP brake systems; or when cars are picked up en route, there shall be a minimum of 85 percent operative brakes for the entire train when including the standalone ECP brake-equipped cars.
16. 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 is able to display the location and identification of the car with defective brakes. The railroad shall develop a method acceptable to FRA to capture and secure the appropriate information so that it is accessible to FRA and appropriate railroad mechanical personnel, as well as satisfy the requirements of § 232.15(b)(3).

17. Each railroad shall submit to the FRA Associate Administrator for Safety a list of locations on its system, and an updated list of locations where ECP brake system repairs will be performed each time a location is added or subtracted to its system.
18. 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.
19. Using procedures developed by the brake manufacturer, a single car air brake test shall be performed on a freight car equipped with an ECP brake system before being placed into revenue service for the first time using the ECP brake system.
20. Trains operating in ECP brake mode are exempt from the two-way end-of-train device requirements contained in Subpart E of 49 CFR Part 232.
21. Prior to operating a freight train in ECP brake mode, the ECP brake system's end-of-train (ECP-EOT) device must be connected to the brake pipe and train line cable at the end of the train operating with an ECP brake system. The ECP-EOT device must be connected to the network and must be transmitting status messages to the head end unit (HEU) before the train line power can be energized continuously. The ECP-EOT device shall continually report brake pipe pressure and train line voltage to the HEU.
22. Each railroad shall develop and implement a training program for personnel who operate or perform inspections, testing, or maintenance on a freight car and/or freight train equipped with an ECP brake system. The training shall meet all of the requirements specified in § 232.203(a), (b), (e), and (f), and 49 CFR Part 240.
23. Each railroad 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.
24. Prior to operating a train under authority of this waiver, the railroad(s) shall provide notice to FRA in the same manner provided for extended haul trains pursuant to § 232.213(a)(1).

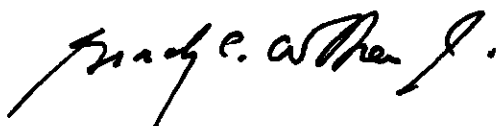
25. This waiver is effective for a 5-year period from the date of this letter or until a final rule is implemented for trains equipped with ECP brake systems. At the conclusion of the 5-year period, FRA reserves the right to extend the waiver if conditions warrant and BNSF/NS makes a written request for an extension to FRA's Office of Safety Assurance and Compliance within 6 months of the expiration date.

FRA will monitor compliance with this waiver and verify brake system and component performance characteristics using unannounced inspections of trains subject to the waiver, at inbound locations where trains will terminate or where a Class I test is required for cycle trains. These inspections will determine, among other things, the number of cars that have been removed or entered in the ECP brake onboard computer system; the number of cars with cut-out, inoperative or ineffective brakes; the condition of foundation brake rigging; brake shoe wear; and the accumulated brake defects visually identified at the end of the trip and note any discrepancies with defects captured by the onboard ECP brake computer system. A database will be maintained to support oversight of this waiver and inform determinations concerning future regulatory actions. As a further condition of this waiver, BNSF, NS, and all other persons performing duties under Part 232 and this waiver shall cooperate in facilitating these inspections, which will include the application and release of train brakes in the same manner required for the Class I brake inspection.

FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver. This action may be directed to an individual railroad.

In any future correspondence regarding this waiver, please refer to FRA-2006-26435.

Sincerely,



Grady C. Cothen, Jr.  
Deputy Associate Administrator  
for Safety Standards and Program Development