



U.S. Department
of Transportation

**Federal Railroad
Administration**

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Mr. Paul P. Skoutelas
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American Public Transportation Association
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Ms. Linda Bauer Darr
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**Re: Revised Positive Train Control Guidance Regarding Interoperability Testing,
Operations and Maintenance Manuals, and Certification Responsibilities**

Dear Mr. Hamberger, Mr. Skoutelas, and Ms. Darr:

Thank you for the continued assistance your associations provide to your member railroads implementing positive train control (PTC) systems pursuant to the statutory mandate and the Federal Railroad Administration's (FRA) implementing regulations. As you might recall, in January and February 2017, per the railroad industry's request, FRA issued three guidance letters regarding interoperability testing; Operations and Maintenance Manual (OMM) requirements and the relationship between an OMM and a host railroad's PTC Safety Plan (PTCSP); and the responsibilities of a host railroad and its tenant railroads with respect to a host railroad's PTCSP and FRA's certification of PTC systems.

After issuing the letters, FRA received extensive feedback from the industry, including three letters from the Association of American Railroads, dated January 3, 2018, and informal requests for further clarification from several commuter, intercity passenger, and freight railroads. Based on FRA's review of industry's feedback and inquiries, FRA has revised and simplified the three

guidance documents. Enclosures I, II, and III to this letter supersede and replace FRA's three guidance letters, dated January 10, 2017; January 25, 2017; and February 10, 2017. Please share this information and the revised guidance letters with your member railroads implementing PTC systems.

In addition, FRA appreciates your associations' and member railroads' attendance and participation in FRA's June 15 and July 16, 2018, PTC symposia regarding, respectively, compliance with the statutory PTC system implementation mandate and best practices for testing PTC systems on the general rail system. To ensure broad dissemination and availability of this information, FRA posted on its website¹ detailed presentations regarding the scope of full implementation of PTC systems; the statutory criteria necessary to qualify for an alternative schedule and the procedures for requesting and obtaining FRA's approval of an alternative schedule; and FRA's authority to establish certain substitute criteria for railroads other than Class I railroads or Amtrak. Also, as technical assistance and information only, FRA posted on its website² a presentation regarding PTC system field testing, revenue service demonstration, and interoperability testing between host railroads and tenant railroads.

We hope that these presentations and the enclosed guidance assist railroads in safely and expeditiously implementing PTC systems in accordance with the governing statutes and regulations.

If you have any questions, please contact Ms. Carolyn Hayward-Williams, Staff Director, PTC/Signal and Train Control Division, at (202) 493-6399 or c.hayward-williams@dot.gov, or Dr. Mark Hartong, Senior Scientific Technical Advisor, at (202) 493-1332 or mark.hartong@dot.gov.

Sincerely,



Robert C. Lauby
Associate Administrator for Railroad Safety
Chief Safety Officer

Enclosures

¹ FRA's June 15, 2018, symposium presentations are available in FRA's eLibrary at: https://www.fra.dot.gov/eLib/Find#p1_z5_gD_kPTC%20Symposium%20June%202018.

² FRA's July 16, 2018, symposium presentation is available in FRA's eLibrary at: https://www.fra.dot.gov/eLib/details/L19578#p1_z5_gD_IOP_y2018_m7.

Enclosure I

Positive Train Control Interoperability Testing and Notification Guidance

This document is intended to provide guidance to railroads on how to approach positive train control (PTC) system interoperability testing.

Under the Rail Safety Improvement Act of 2008, as amended by the Positive Train Control Enforcement and Implementation Act of 2015, each host railroad's PTC Implementation Plan (PTCIP) must describe how the host railroad's PTC system will provide for interoperability of the system with the movements of other railroad carriers over its lines. *See* Title 49 United States Code (U.S.C.) § 20157(a)(2)(A)(i)(I); Title 49 Code of Federal Regulations (CFR) § 236.1011(a)(3). Interoperability means the ability of a controlling locomotive to communicate with and respond to the PTC system in use on the line over which it is operating, including uninterrupted movements over property boundaries. *See* 49 U.S.C. § 20157(i)(3); 49 CFR § 236.1003.

To receive PTC System Certification for its system, each host railroad must provide a complete description of the "as built" system in its PTC Safety Plan (PTCSP) with its associated safety case, specific procedures and test equipment necessary to ensure safe and proper implementation of its PTC system, and show that it has equipped its lines as provided in its approved PTCIP, including its interoperability plans. *See* 49 U.S.C. § 20157(h); 49 CFR §§ 236.1005(b)(l), 236.1015(d)(7).

To obtain the data necessary to support its PTCSP, FRA recommends that host railroads perform the following PTC system tests before any interoperability or boundary testing (including field testing):

- *Requirements Validation:* Through lab, vendor, and field testing, railroads should demonstrate that the installed PTC system works as designed, is highly reliable and available with a high level of supportability, and meets all statutory and regulatory requirements.
- *Hosted Service Acceptance Testing:* Validate any third-party contractors (hosted service provider), if used, meets the railroad's and the PTC system's contractual, functional, and technical requirements. The railroad contracting to use a third-party contractor/hosted service provider should consider requiring the third-party contractor/hosted service provider to provide standard test cases and railroad-specific results to reduce the railroad's overall cost and preparation time and FRA's review time.
- *Dispatch System Integration Testing:* Validate functional and technical requirements for the dispatch system and its interface to the PTC Back Office Server. Each dispatch vendor and/or hosted service vendor, if used, should be able to provide testing assistance.
- *PTC Subdivision Readiness:* Validate the critical features of the PTC system's wayside interface units, PTC routes, and the PTC system's geographical information system.

- *Train Braking Tests:* Demonstrate that the onboard system's braking algorithm meets regulatory requirements by not violating an enforcement target on the steepest track grade of the railroad under worst-case conditions of speed and load. A railroad may be capable of referencing braking tests conducted by other railroads, but is generally expected to conduct at least some tests in the field. Railroads are encouraged to submit braking test results to the Transportation Technology Center, Incorporated to support ongoing braking algorithm research and model development.
- *Locomotive Segment Integration Testing:* Conduct a thorough integration test for each class of PTC-equipped locomotive and an installation verification test for each PTC-equipped locomotive. Such testing should include verification of the following:
 - Onboard system integration with locomotive control systems (e.g., brakes, wheel tachometer, head of train device (HOTD), end of train device (EOTD), and Locomotive Interface Gateway (LIG)).
 - All service and emergency brake applications.
 - All communications paths (primary and backup communications systems).
 - Global Positioning System operations.
 - Correct operation of the locomotive dead reckoning.

Railroads are also encouraged to avail themselves of industry guidance regarding establishing a structured approach for conducting PTC testing, such as the Interoperable Electronic Train Management System (I-ETMS) Master Test Strategy (MTS). *See* Association of American Railroads Recommended Practice RP-9457.V1.0 (2012). The MTS provides a recommended practice for testing the I-ETMS PTC system, establishing a common approach and terminology for testing the PTC system for use among railroads and their vendors. It contains a high-level description of the testing processes and procedures, the management of defects encountered during the testing process, the various levels of testing, the criteria for entrance to and exit from each level of test, and the resource requirements of each level of testing.

FRA approval under 49 CFR § 236.1035 to conduct interoperability testing on the general rail system is unnecessary if:

1. The host railroad has received from FRA at least conditional certification for the PTC system(s) being tested;¹ and
2. The host and tenant railroad agree with the testing to be conducted.²

¹ FRA approval is required, for example, before a railroad may field test two PTC systems on the general rail system if one or both of the PTC systems that is being tested has not yet received PTC System Certification from FRA. *See* 49 CFR § 236.1035(a).

² Although not a requirement, host railroads and tenant railroads should consider documenting any interoperability testing agreements in writing to ensure mutual understanding of the railroads' roles and responsibilities and the scope of the testing. A written agreement could include, for example, the testing approach and strategy, the testing processes and procedures, and the obligations and responsibilities of the parties for safety.

A tenant railroad may not conduct interoperability testing, regardless of the certification status of the tenant railroad's PTC system, on a host railroad without prior FRA notification and approval if the host railroad's PTC system is not certified.

Consistent with 49 CFR § 236.1035(b), when approving any railroad's field testing request, FRA will reserve the right to impose and/or modify the conditions of FRA's approval of the testing, as it believes may be necessary for the safety of train operations.

Enclosure II

Operations and Maintenance Manual Requirements

A. Background on the Operations and Maintenance Manual Requirements

The purpose of this document is to provide guidance to railroads on the requirement to prepare and maintain an Operations and Maintenance Manual (OMM) under Title 49 Code of Federal Regulations (CFR) Section 236.1039, *Operations and Maintenance Manual*. This guidance also identifies which elements described by a railroad's Positive Train Control Safety Plan (PTCSP) must be included in the OMM and FRA's expectations regarding OMM elements.

In support of a request for PTC System Certification, each railroad must provide in its PTCSP a "complete description of the specific procedures and test equipment necessary to ensure the safe and proper installation, implementation, operation, maintenance, repair, inspection, testing, and modification of the PTC system."¹ In addition, FRA's regulations require each railroad to "catalog and maintain all documents as specified in the [PTC Development Plan (PTCDP)] and PTCSP for the installation, maintenance, repair, modification, inspection, and testing of the PTC system," and to maintain all these documents "in one Operations and Maintenance Manual."² FRA's regulations do not require submission of the OMM with the railroad's PTCSP; rather, the railroad must provide in its PTCSP the information required under 49 CFR § 236.1015, *PTC Safety Plan content requirements and PTC System Certification*, including descriptions of the railroad's maintenance procedures.³ The OMM must be maintained according to the railroad's configuration management control plan and any additional configuration/revision control measures specified in the PTCDP and PTCSP, and the OMM must be readily available for inspection by FRA and FRA-certified state inspectors.⁴

Each railroad should maintain a comprehensive program within its organization to monitor the well-functioning of its PTC system or PTC component maintenance efforts. The OMM is a tool to assist a railroad with managing and controlling the maintenance of PTC system equipment. The OMM must provide detailed guidance about the installation, maintenance, repair, modification, inspection, and testing of the PTC system throughout the PTC system's lifecycle.⁵

¹ See, e.g., 49 CFR § 236.1015(d)(7).

² 49 CFR § 236.1039(a).

³ See 49 CFR § 236.1015. For example, under 49 CFR § 236.1015(d)(8), the PTCSP must contain a "complete description of any additional warning to be placed in the Operations and Maintenance Manual in the same manner specified in § 236.919 and all warning labels to be placed on equipment as necessary to ensure safety." Under 49 CFR § 236.1015(d)(12), the PTCSP must also contain a "complete description of each record necessary to ensure the safety of the system that is associated with periodic maintenance, inspections, tests, adjustments, repairs, or replacements, and the system's resulting conditions, including records of component failures resulting in safety-relevant hazards."

⁴ See 49 CFR §§ 236.1009(h), 236.1037(a)(3), 236.1039(a)–(c).

⁵ 49 CFR § 236.1039(a)–(d).

B. Information Required to be in a Railroad's OMM

In accordance with 49 CFR § 236.1039, *Operations and Maintenance Manual*, a railroad's OMM must catalog, at a minimum, the following information:

1. All documents as specified in the PTCDP and PTCSP for the installation, maintenance, repair, modification, inspection, and testing of the PTC system;⁶
2. Plans required for the proper maintenance, repair, inspection, and testing of safety-critical PTC systems. The plans must identify all software versions, revisions, and revision dates;⁷
3. Documentation of all hardware, software, and firmware revisions in accordance with the railroad's configuration management control plan and any additional configuration/revision control measures specified in the PTCDP and PTCSP;⁸
4. Identification of safety-critical components, including spare equipment;⁹ and
5. Designation of an appropriate railroad officer responsible for issues relating to scheduled interruptions of service contemplated by 49 CFR § 236.1029.¹⁰

Under 49 CFR § 236.1039(d) and other applicable provisions,¹¹ FRA will conduct periodic inspections of the railroad's OMM and the railroad's maintenance practices to verify:

1. The railroad has complied with the procedures identified in the OMM; and
2. The maintenance completed was done in accordance with the referenced maintenance documents listed in the OMM.

C. Changes to a Railroad's Maintenance Procedures

Once FRA has approved a railroad's PTCSP and granted PTC System Certification, the railroad is responsible for maintaining the PTC OMM in accordance with the railroad's configuration management control plan and must make the PTC OMM available for inspection by FRA and FRA-certified state inspectors.¹²

As necessary, a railroad should also update its OMM¹³ whenever any corresponding information is updated in the railroad's PTCDP or PTCSP pursuant to an FRA-approved request for

⁶ 49 CFR § 236.1039(a).

⁷ 49 CFR § 236.1039(b).

⁸ 49 CFR § 236.1039(c).

⁹ 49 CFR § 236.1039(d).

¹⁰ 49 CFR § 236.1039(e).

¹¹ See, e.g., 49 CFR §§ 236.1009(h), 236.1039.

¹² 49 CFR § 236.1039(b).

¹³ See 75 Fed. Reg. 2598, 2654 (Jan. 15, 2010) (noting that a railroad's OMM will be maintained throughout a PTC system's lifecycle).

amendment (RFA), under 49 CFR § 236.1021.¹⁴ As noted above, 49 CFR § 236.1039(a) requires that a railroad “shall catalog and maintain all documents as specified in the PTCDP and PTCSP for the installation, maintenance, repair, modification, inspection, and testing of the PTC system and have them in one Operations and Maintenance Manual.” For the OMM to be effective, a railroad must ensure consistency between its OMM and its “complete description of the specific procedures and test equipment necessary to ensure the safe and proper installation, implementation, operation, maintenance, repair, inspection, testing, and modification of the PTC system” and all other relevant procedures described in the PTCSP, including FRA-approved amendments.¹⁵

¹⁴ FRA’s regulations require a railroad to submit, for FRA review and approval, an RFA to the railroad’s PTCSP for a proposed amendment that involves, for example, modification of a safety-critical element of a PTC system or modification of a PTC system that affects the safety-critical functionality of any other PTC system with which it interoperates. *See* 49 CFR § 236.1021(h)(3)–(4).

¹⁵ 49 CFR §§ 236.1015(d)(7), 236.1037(a)(3), 236.1039(a)–(d) (“Plans must be legible and correct”).

Enclosure III

Guidance on Positive Train Control System Certification: Host and Tenant Relationships and Responsibilities

The purpose of this document is to provide guidance on each host railroad's and tenant railroad's responsibilities when implementing a positive train control (PTC) system and developing a Positive Train Control Safety Plan (PTCSP) necessary to gain PTC System Certification.¹

Each PTC system required by the Rail Safety Improvement Act of 2008 (RSIA), Pub. L. No. 110-432, § 104(a), 122 Stat. 4848, 4858 (Oct. 16, 2008), subsequently amended by the Positive Train Control Enforcement and Implementation Act of 2015, Pub. L. No. 114-73, 129 Stat. 568, 576-82 (Oct. 29, 2015), and the Fixing America's Surface Transportation Act, Pub. L. No. 114-94, 129 Stat. 1312, 1675 (Dec. 4, 2015), must receive PTC System Certification from the Federal Railroad Administration (FRA) prior to full revenue service operation. *See* 49 U.S.C. § 20157(h); 49 CFR § 236.1009(d). To achieve PTC System Certification, the host railroad—as the railroad with effective operating control over a track segment—must comply with the regulatory planning and filing requirements of 49 CFR part 236, subpart I, including submission of a PTCSP to FRA for approval. *See* 75 Fed. Reg. 2598, 2610 (Jan. 15, 2010); 49 CFR § 236.1015(a).

Most tenant railroad locomotives operating on track segments where PTC is implemented shall be equipped with an onboard PTC apparatus operating and functioning per the host railroad's PTCSP. *See* 49 CFR § 236.1006(a). Some tenant railroad operations on a host railroad's PTC track segments may be eligible for an exception from PTC system implementation on its locomotives. *See, e.g.,* 49 CFR § 236.1006(b).² The conditions under which tenant operations are allowed must be detailed in the host railroad's PTC Implementation Plan (PTCIP).

Each host railroad's PTCIP must describe how the PTC system will provide for interoperability of the system with the movements of trains of other railroad carriers over its lines. *See* 49 U.S.C. § 20157(a)(2)(A)(i)(I); 49 CFR § 236.1011(a)(3). The statutory mandate defines “interoperability” as the ability to control locomotives of the host railroad and tenant railroad to communicate with and respond to the PTC system, including uninterrupted movements over property boundaries. 49 U.S.C. § 20157(i)(3); *see also* 49 CFR § 236.1003. Such interoperability cannot be achieved without cooperation between host and tenant railroads. Each railroad must comply with all provisions in the applicable PTCSP for each PTC system it uses. *See* 49 CFR § 236.1029(d); *see also* 49 CFR § 236.1009(d)(3).

¹ Host and tenant railroads are defined in 49 CFR § 236.1003.

² However, pursuant to 49 CFR § 236.1001(b), the host railroad—through its own PTCIP, operating rules, or other operational or commercial arrangements—may be entitled to place certain restrictions on each tenant railroad, including requiring PTC system operation. FRA may apply its approval or enforcement powers if such decisions adversely affect railroad safety (e.g., FRA could enforce the relevant regulations), but any commercial or other impact would more likely come under the jurisdiction of the Surface Transportation Board.

Accordingly, interoperability requires that each tenant railroad reasonably provide its host railroad with the necessary and relevant information and assistance the host railroad requires to ensure interoperability. Similarly, interoperability also requires that each host railroad consult with its tenant railroads, include a summary of its requirements for tenant railroads to achieve and maintain interoperability with the host railroad in its PTCSP, preferably in an appendix, and provide FRA assurances that interoperability has been achieved.

Upon certification of a host railroad's PTC system, FRA will notify the host railroad as a condition of its certification that if a tenant railroad is not operating equipment with an onboard PTC apparatus that is interoperable with the host railroad's certified PTC system, the certified host railroad shall not allow the tenant railroad to operate on its track where operations are governed by a PTC system, unless one of the regulatory exceptions under 49 CFR § 236.1006(b) applies to that tenant railroad's operations. The certified host railroad has the right of refusal regarding non-equipped trains, subject to the restrictions and exceptions of 49 CFR §§ 236.1005(g), 236.1006, and 236.1029, and 49 U.S.C. § 20157(j), as applicable. FRA believes certain operational restrictions are consistent with the current host railroad practice of restricting movements when its traffic is threatened by unsafe operations, congestion, or other interference.

When a tenant railroad is required by law or by the host railroad to install and operate a PTC system, at a minimum, the host railroad should:

1. Identify in its PTCSP any applicable interoperability and safety standards requiring tenant railroad compliance;
2. Include in its PTCSP a high-level summary of requirements for tenant railroads to achieve and maintain interoperability with the host railroad; and
3. Identify for tenant railroads what constitutes evidence of interoperability that is satisfactory to the host railroad and that the host railroad may use to provide assurances to FRA that PTC interoperability has been achieved.

For a host railroad to meet its responsibilities as outlined above, any tenant railroad operating a PTC system on a host railroad should submit to the host railroad, at a minimum, evidence of interoperability that is satisfactory to the host railroad and that the host railroad may use to provide assurances to FRA that PTC interoperability has been achieved.

In addition, any tenant railroad operating a PTC system on a host railroad must:

1. Comply with any and all pertinent sections of the host railroad's FRA-approved PTCSP and operating rules as modified for operation under the host railroad's PTC system;
2. Comply with any and all applicable FRA conditions to each host railroad's FRA-approved PTCSP and PTC System Certification;

3. If requested, provide the host railroad with the tenant railroad's PTC system design, installation, testing, training, operation, and maintenance procedures necessary for the host railroad to achieve and maintain PTC System Certification for its PTC system.
4. Maintain at a designated office on the tenant railroad all records required by 49 CFR § 236.1037, *Records retention*, demonstrating the tenant railroad has:
 - a. Conducted appropriate testing (including appropriate lab testing, prior to performing field interoperability tests with the host railroad, to validate and verify that the tenant railroad's PTC system installation, operation, and functionality are interoperable with the host railroad) and field interoperability testing according to the field test plan to validate and verify that the tenant railroad's PTC system is functionally operable and interoperable for PTC service on the host railroad. Records of such tests must be made available to FRA upon request;
 - b. Properly installed all PTC equipment consistent with the procedures required by 49 CFR § 236.1039, *Operations and Maintenance Manual*;
 - c. Conducted locomotive installation checkout procedures as outlined in the relevant PTCS and Operations and Maintenance Manual;
 - d. Performed all necessary training for train crews and other personnel required by 49 CFR § 236.1041, *Training and qualification program, general*, 49 CFR § 236.1043, *Task analysis and basic requirements*, § 236.1045, *Training specific to office control personnel*, 49 CFR § 236.1047, *Training specific to locomotive engineers and other operating personnel*, and 49 CFR § 236.1049, *Training specific to roadway workers*. Records of training, exams, and training plans must be made available by the tenant railroad to FRA upon request; and
 - e. Ensured each contractor providing services relating to the testing, maintenance, or operation of a tenant railroad's PTC system maintains at a designated office training records required under 49 CFR § 236.1039(b). Records of training, exams, and training plans must be made available to FRA upon request.
5. Operate consistent with 49 U.S.C. § 20157(j) or 49 CFR § 236.1029, *PTC system use and failures*, as applicable, in the event of an en route failure of the tenant railroad's PTC system.
6. If implementing a PTC system other than the system implemented by the host railroad, obtain a Type Approval number for its PTC system prior to operation of the tenant railroad's PTC system on the host railroad.