



U.S. Department of Transportation  
**Federal Railroad Administration**



# Industry Status and Full Implementation of PTC Systems

*Federal Railroad Administration – Symposium #1*  
**Presentation #1**

June 15, 2018

# Outline

1. High-level Overview of Industry Status
2. Full Implementation of PTC Systems
3. Interoperability
4. Tenant Railroad Considerations
5. New Interoperability Infographic



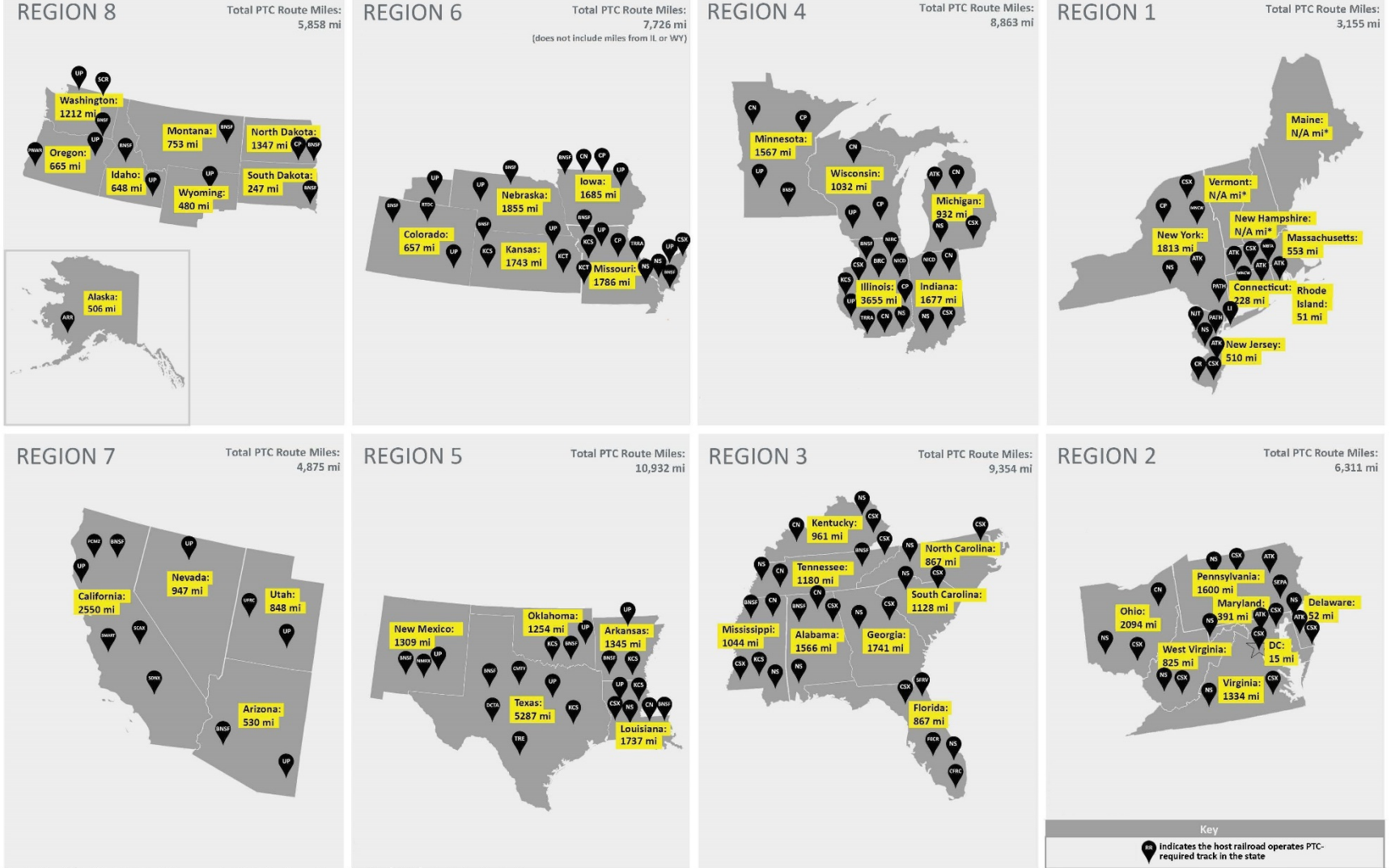


# High-level Overview of Industry Progress Toward Implementing PTC Systems

See <https://www.fra.dot.gov/ptc> for standard infographics.

# Regional Map of PTC Implementation

## Host Railroads and Approximate PTC Route Miles as of 4/14/2018



\*Host railroad(s) in this state have FRA-approved mainline track exception addendum (MTEA) over their entire track

# Significant Progress Toward Full Implementation

*As of June 15, 2018*

- **14 Railroads** have all PTC system hardware installed<sup>+</sup>
- **25 Railroads** have commenced field testing
- **15 Railroads** have commenced RSD\*, and 9 are now complete
- **9 Railroads** have obtained conditional PTC System Certification
- **Interoperability testing** has commenced systematically

*33,247 Route Miles are in PTC Operation*


*+As of March 31, 2018, based on railroads' self-reported Quarterly PTC Progress Reports for Quarter 1 of 2018.*

*\*Revenue service demonstration (RSD) or equivalent.*

# Progress Headlines

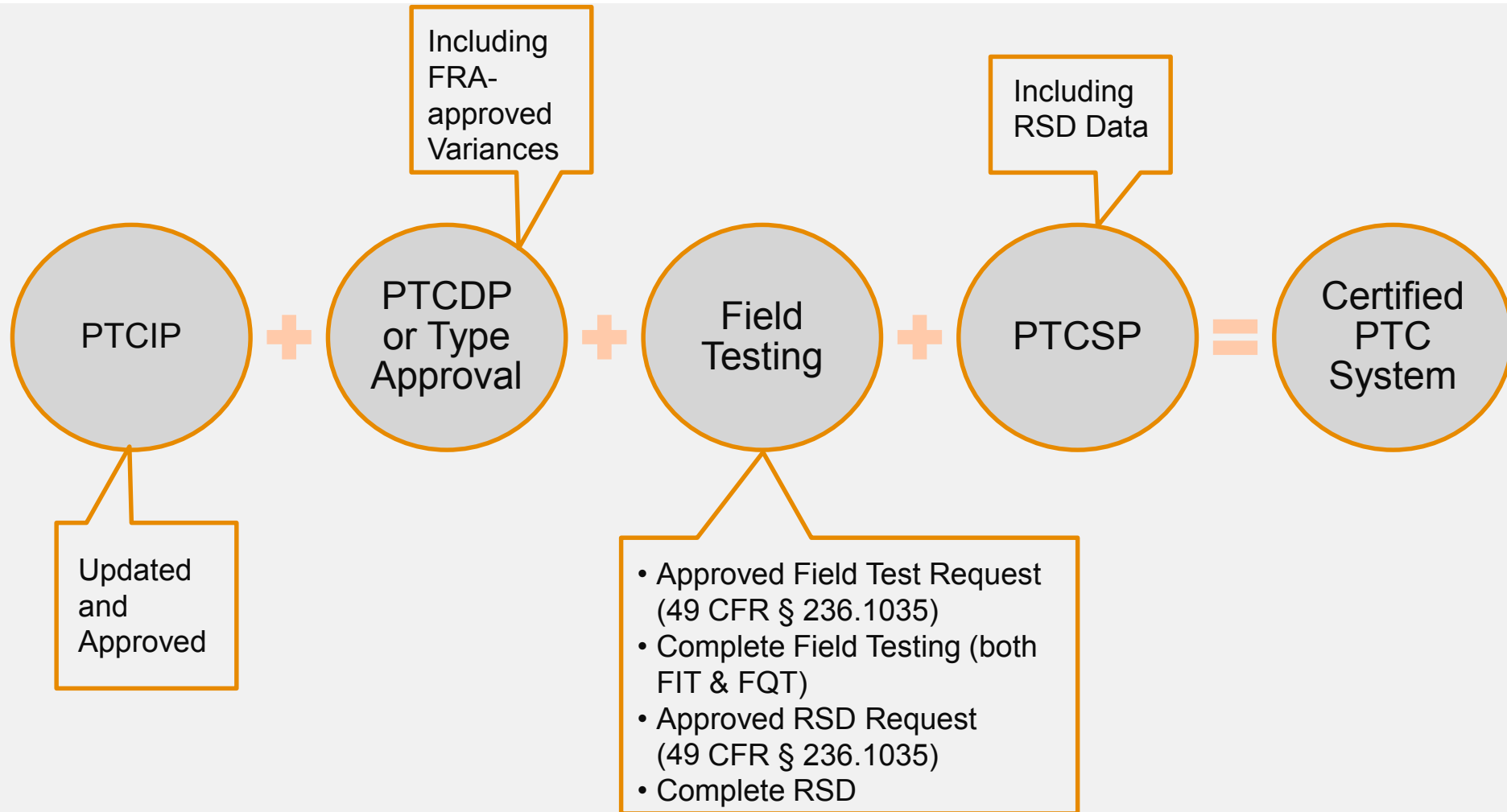
*As of March 31, 2018 (Quarter 1 of 2018)*

- **Locomotives Fully Equipped and PTC Operable: ~ 16,479**
  - Freight Railroads: 14,382 of 16,930 (85%)
  - Intercity Passenger and Commuter Railroads: 2,097 of 3,479 (60%)
- **Track Segments Completed: ~ 546**
  - Freight Railroads: 478 of 632 (76%)
  - Intercity Passenger and Commuter Railroads: 68 of 151 (45%)
- **Spectrum**
  - All but 2 railroads have acquired spectrum
  - Several other railroads are working on spectrum availability
- **Employee Training: ~ 102,391 / 111,438 employees (92%)**
- **Route Miles in Operation: ~ 33,247**
  - Freight Railroads: 32,233 of 53,904 (60%)
  - Intercity Passenger and Commuter Railroads: 1,014 of 4,120 (25%)



# Full Implementation of a PTC System

# Full Implementation: FRA Approvals

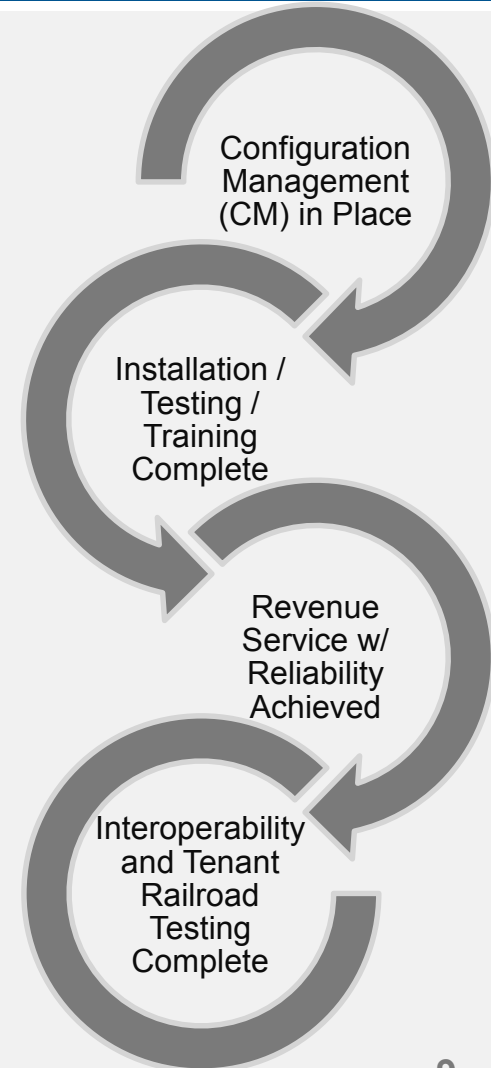




# Requirements for Full Implementation\*

## (Summary Slide 1 of 2)

1. All wayside PTC system hardware and other components have been fully installed on ALL route miles subject to the mandate.
2. Locomotives and cab cars are fully equipped with hardware, software, and firmware, and have been sufficiently tested to support operations.
3. The back office, dispatch, and communications systems are fully operational.
4. Training programs are in place and all required employees (in all disciplines listed under 49 CFR §§ 236.1041–1049) have been properly trained.
5. Field testing and RSD testing have been satisfactorily completed.



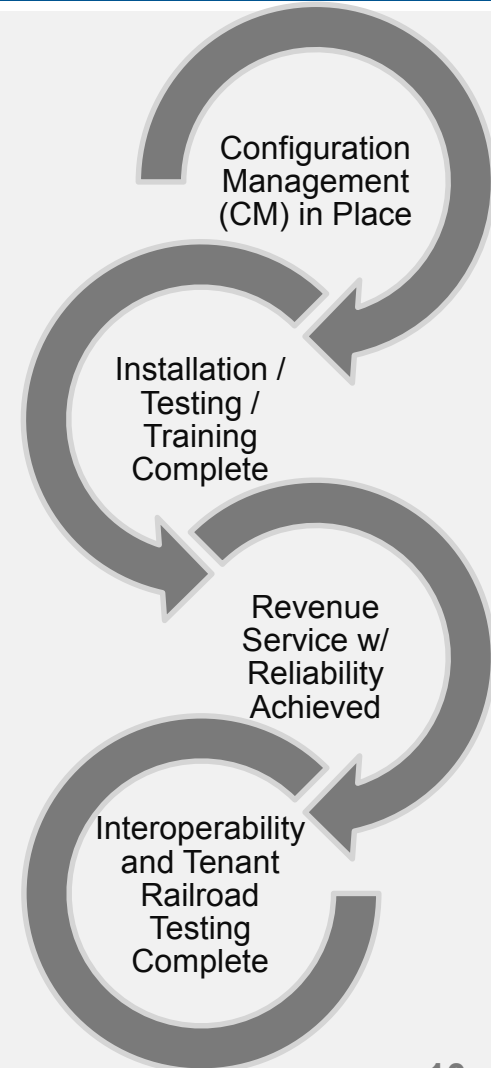
\*FRA understands that completion of these elements is not necessarily linear.

# Requirements for Full Implementation\*

## (Summary Slide 2 of 2)

6. The host railroad has submitted a PTC Safety Plan to FRA.
7. FRA has granted PTC System Certification to the host railroad, and the PTC system meets each technical requirement in 49 CFR part 236, subpart I.
8. Interoperability testing has been conducted and satisfactorily completed with all required tenant railroads (i.e., unless subject to an exception).
9. All host railroad, tenant railroad, and other operations are governed by a PTC system on all required route miles.

\*FRA understands that completion of these elements is not necessarily linear.



# Interoperability Requirement

**General Rule:** Consistent with the applicable PTC Implementation Plan (PTCIP) and PTC Safety Plan, any train—including trains operated by foreign power and tenant railroads—that operates on a main line subject to the mandate must be governed by a PTC system.

## Practical Steps:

- Comply with the host railroad's PTCIP, which:
  - ▣ Provides the **written agreement** between each host railroad and tenant railroad to achieve interoperability, and
  - ▣ Outlines the **specific methods** the railroads will utilize to achieve interoperability.
- Testing defined by railroad, subject to FRA approval:
  - ▣ Test types include system level, functional, and performance, and
  - ▣ FRA may witness and audit.

# Overview of Exceptions to Interoperability Requirement

Notable exceptions (please see 49 CFR § 236.1006(b) for full explanations):

- Certain yard switching movements in or near yards,
- Certain limited short line operations subject to an exception (slide #14), and
- Operations during certain system failure scenarios, under 49 U.S.C. § 20157(j) (slide #17).

**Note: Failure to equip a locomotive with fully functioning and operative onboard PTC technology is not considered an initialization failure, en route failure, or malfunction.**

# Tenant Railroad Considerations

- Please review your FRA-approved PTC Implementation Plan (a *binding and enforceable document*) to make sure it accurately and clearly:
  - ❖ Identifies the **names of each tenant railroad** that operates on a railroad's main lines where PTC systems must be implemented; and
  - ❖ Identifies **when** each tenant railroad's controlling rolling stock will be equipped with "fully functioning and operative" onboard PTC technology.
    - ❖ If applicable, please clearly state that the tenant railroad is subject to an exception and provide the relevant justification (see next slide).

# Tenant Railroads in PTCIPs

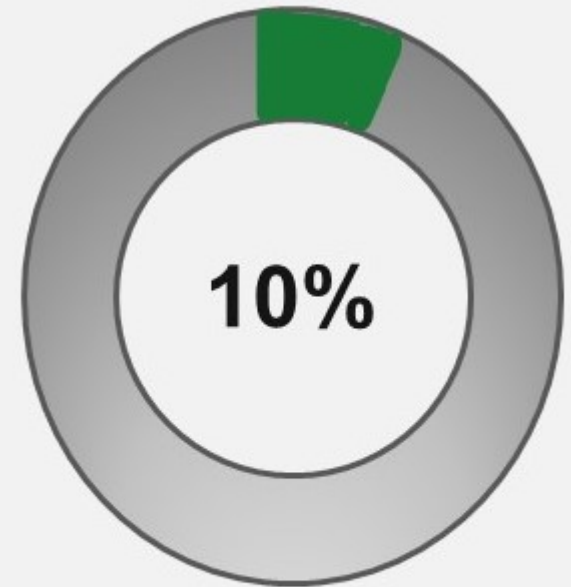
## *Applicable Deadlines*

1. **In Tandem (Default Rule)** – Each tenant railroad is required to implement a PTC system in accordance with a host railroad’s final implementation date (i.e., the deadline in the host railroad’s FRA-approved PTCIP).
2. **Exempt** –
  - ❑ A Class II or Class III railroad (including a tourist or excursion railroad) that has 4 or fewer unequipped movements per day and each movement does not exceed 20 miles in length. This exception could be permanent.
  - ❑ A tenant railroad that operates on a track segment that is subject to an FRA-approved main line track exception (MTEA) under 49 CFR § 236.1019.
3. **Deferred Installation** (Deadline: NLT December 31, 2023) – A Class II or Class III railroad (including a tourist or excursion railroad) that has 4 or fewer unequipped movements per day and the movements exceed 20 miles in length.

For full criteria and information regarding requesting a Class II or Class III tenant railroad exception via a host railroad’s PTCIP, please see 49 CFR §§ 236.1006(b)(4) and 236.1021.

# New Interoperability Infographic

- On May 15, 2018, FRA added a new feature to one of its PTC infographics that depicts progress toward interoperability.
- The column helps showcase how many required tenant railroads have achieved interoperability with the host railroad's PTC system (i.e., based on the PTCIP and the tenant railroads required to implement *at the same time* as the host railroad).
  - In cases of tenant-only railroads, FRA instead identifies that specific tenant railroad's interoperability status with each of its host railroads.
- See <https://www.fra.dot.gov/ptc>.



2/20 Railroads

# PTC Testing and Interoperability

FRA will hold a second symposium on  
**July 16, 2018**  
to discuss best practices for PTC system  
field testing, revenue service  
demonstration, and interoperability testing.

Railroads are welcome to present and  
provide lessons learned!



# Early Adoption Provisions

## (Slide 1 of 3)

- The PTC Enforcement and Implementation Act of 2015 imposes a temporary prohibition on FRA's authority to enforce certain PTC regulations.
  - **When?** October 29, 2015 → *One year after* the last Class I railroad obtains PTC System Certification and finishes implementing a PTC system on all of its required lines.
  - **What is the scope of the prohibition?** FRA cannot subject a railroad to the operational restrictions (e.g., speed restrictions) in 49 CFR §§ 236.567 or 236.1029 that would apply where a controlling locomotive experiences a PTC system failure; a PTC-operated consist is not provided by another railroad in interchange; or a PTC system otherwise fails to initialize, cuts out, or malfunctions.

# Early Adoption Provisions

## (Slide 2 of 3)

- **Is this prohibition unlimited?** No, this prohibition applies only if the railroad operates at an equivalent or greater level of safety than the level achieved immediately prior to PTC system implementation.
- **So, what operational restrictions do apply and what does FRA enforce during this period?** The safety measures (including operating rules) that the railroad states, in its PTC Safety Plan, it will put in place during a system failure. 49 U.S.C. § 20157(j)(3); 49 CFR § 236.1009(d)(3).
- **What safety assurances does Congress require?** If an FRA-certified PTC system fails to initialize, cuts out, or malfunctions, the affected railroad shall make reasonable efforts to determine the cause of the failure and adjust, repair, or replace any faulty component causing the system failure in a timely manner.

# Early Adoption Provisions

## (Slide 3 of 3)

- The statute also imposes reporting requirements.
  - **When?** During the period in the statute (Oct. 29, 2015 → ~Dec. 31, 2021)
  - **What triggers the requirement?** When an FRA-certified PTC system **fails to initialize, cuts out, or malfunctions**, the railroad **shall submit a notification to the appropriate FRA regional office within 7 days** (or under alternative location and deadline requirements set by FRA).
    - Notification must include a description of safety measures the railroad has in place.
    - Future – FRA is considering alternative options—e.g., centralized reporting to Washington, DC and a different frequency.
  - **What is the current requirement?** The above reporting requirement is in effect for all **9 hosts railroads** that have obtained conditional PTC system certification and **any tenant railroad** that is in operation on such main lines.

# Full Implementation of a PTC System (Reference Sheet)

Law Enacted:  
October 16, 2008

Deadline: December 31, 2018  
(unless a railroad obtains FRA  
approval of an Alternative  
Schedule)

**Planning and Development** – The railroad submitted: (1) a PTC Implementation Plan (PTCIP), including a precise list of the main lines on which a PTC system will be implemented, its schedule and risk-based sequence, and all other information required under 49 U.S.C. § 20157(a)(1)–(2), 49 CFR § 236.1011, and, if applicable, 49 CFR § 236.1021; and (2) a PTC Development Plan meeting all requirements under 49 CFR § 236.1013, and/or the necessary documentation under 49 CFR § 236.1009(b)–(c), including for any variances to an FRA-issued Type Approval.

**PTC System Deployment** – The PTC system—including all hardware, software, and other components—has been fully installed on all controlling locomotives and any other necessary rolling stock, the back office, and on the wayside of all route miles subject to 49 U.S.C. § 20157 and as set forth in the PTCIP. In addition, all spectrum necessary for the PTC system has been acquired and is available for use.

**PTC Testing and Training** – The railroad obtained FRA approval to conduct field testing of the PTC system, and subsequently, to conduct advanced field testing, known as “revenue service demonstration” (RSD). All field testing, including RSD, has been satisfactorily completed. Also, the railroad established and implemented the PTC training program under 49 CFR §§ 236.1041–1043 and trained all personnel required under 49 CFR §§ 236.1041–1049.

**PTC System Certification** – The host railroad submitted its PTC Safety Plan to FRA meeting the requirements of 49 CFR § 236.1015 and obtained PTC System Certification from FRA. *See* 49 U.S.C. § 20157(h)(1); 49 CFR §§ 236.1009(d), 236.1015.

**Interoperability and Full PTC Operations** – All operations of the host railroad and each required tenant railroad are governed by an FRA-certified and interoperable PTC system on all route miles subject to the statutory mandate (except as otherwise permitted under 49 CFR § 236.1006(b)). Interoperability means the locomotives operating on the same main line are able to communicate with and respond to the PTC system, including uninterrupted movements over property boundaries. *See, e.g.*, 49 U.S.C. § 20157(a)(2)(A)(i)(I), (a)(2)(D), (i)(3); 49 CFR §§ 236.1003, 236.1006, 236.1011(a)(3).