

Annual PTC
Progress
Report

2015

Union Pacific Railroad

FRA-2010-0061

The Annual Positive Train Control (PTC) Progress Report is due by March 31st of each year until full PTC system implementation is complete. The Annual PTC Progress Report must cover the railroad's implementation efforts and progress from the directly previous calendar year, and must be submitted electronically to the Federal Railroad Administration (FRA) via the FRA Secure Information Repository at <https://sir.fra.dot.gov>.

Name of Railroad or Entity Subject to 49 U.S.C. § 20157(a): Union Pacific Railroad

Railroad Code: UP

Annual PTC Implementation Progress Report for: 2015

PTCIP Version Number of File with FRA (basis for goals stated): Version 3.0

Submission Date: 3/31/2016

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1. Summary

Please provide a narrative summary of overall PTC implementation progress during the preceding calendar year (January 1 to December 31):

[REDACTED]

At the end of 2015, UP had over 600 locomotives equipped and commissioned for PTC/RSD operation. However, due to technical difficulties with the Crash-Hardened Memory (CHM) subsystem, UP has not been able to accept the product from its supplier and widely deploy it. The small locomotive count below represents just those locomotives on which the CHM product was actually installed and being utilized to assist the vendor in development and field testing. In discussion with Robert Lauby, UP plans to submit a waiver on this matter to address the technical delays and final approval.

The reporting of route miles in testing or RSD reflects that mileage for which FRA has authorized UP to conduct such operations.

UP submitted a Request for Amendment (RFA) to its PTCIP v3.0 on 27 January 2016.

* For this initial PTC Progress Report, data reported for calendar year 2015 includes totals for 2015 and years prior.

Category	Quantity Installed During Calendar Year*	PTCIP Year End Goal (If Applicable)*	Cumulative Quantity Installed at End of Calendar Year	Total Quantity Required for PTC Implementation
Locomotives Fully Equipped	6	6	6	5,656
Installation/Track Segments Completed	15	15	16	231
Radio Towers Fully Installed and Equipped	521	521	521	925
Employees Trained	2,934	2,934	2,934	40,269
Route Miles In Testing or Revenue Service Demonstration	287	0	287	20,858
Route Miles in PTC Operation	0	0	0	20,858

2. Update on Spectrum Acquisition

Required content:

- The amount of spectrum acquired and available for use during the applicable calendar year and the cumulative amount acquired and available for use at the end of the applicable calendar year, as compared to the amount the railroad stated would be acquired and available for use by the end of that calendar year and in total for PTC implementation, in the applicable revised PTCIP, as amended
- The basis for how the railroad is determining that the acquired spectrum is available for use by PTC radios (e.g., ensuring non-interference with other radios)

Spectrum Area or Location (E.g., county)	Spectrum Acquired and Available for Use (Owned/Leased) During Calendar Year	Cumulative Amount of Spectrum Acquired and Available for Use (Owned/Leased) at End of Calendar Year	PTCIP Year End Goal for Spectrum Acquired and Available for Use	Total Spectrum Required for PTC Implementation, as Reported in PTCIP
Spectrum Coverage Area or Location†: See Note below	See Note below	See Note below	See Note below	See Note below

Please provide any additional narrative for Spectrum Acquisition below:

UP is a member of PTC-220, owned equally by each of the seven Class 1 railroads including UP. PTC-220 holds nationwide and regionally licensed FCC spectrum for PTC implementation in the 220-222 MHz spectrum band. Access to this spectrum for UP and each of the PTC-220 owner-members, and for non-members, is provided by a spectrum lease. UP will utilize spectrum planning tools provided by PTC-220 that will enable UP to coordinate its spectrum usage with other railroads to ensure adequate availability and interference mitigation in areas of overlapping operation.

PTC-220 and its member-owners, including UP, believe that the licenses that PTC-220 now currently holds provide spectrum sufficient for nationwide PTC implementation. Should it prove necessary, PTC-220 would seek to acquire additional spectrum licenses.

3. Quantity Update on Hardware Installation

Required content:

- Separated by each major hardware category and subcategory identified below, the amount of PTC hardware installed during the applicable calendar year and the cumulative quantity installed at the end of the applicable calendar year, as compared to the amount the railroad stated would be installed by the end of that calendar year and in total for PTC implementation, in the applicable revised PTCIP, as amended

3.1. Locomotive Status

Category / Installation Feature	Quantity Installed During Calendar Year*	PTCIP Year End Goal	Cumulative Quantity Installed at End of Calendar Year	Total Required for PTC Implementation, as Reported in PTCIP
Locomotive (Apparatus)¹				
On-board Computers (e.g., Train Management Computer)	2,344	2,344	2,344	5,656
Software For Train Management and other applications	2,344	2,344	2,344	5,656
PTC Displays	8,108	8,108	8,108	11,312
Event Recorders	6	6	6	5,656
Onboard Antennas and/or Transponder Readers	4,054	4,054	4,054	5,656
GPS Receivers	2,344	2,344	2,344	5,656
Locomotive Radios – Primary Communications (e.g., 220 MHz radios)	2,344	2,344	2,344	5,656
Secondary Communications (e.g., cell or Wi-Fi communications) Equipment	2,344	2,344	2,344	5,656

¹ Railroads may elect to add categories or subcategories if more detail is desired.

Please provide any additional narrative for Locomotive Status below. If any of the information called for in Section 3.1 is unavailable to the railroad at the time it is completing and submitting this form, please insert "TBD" in the appropriate field and/or use this comment box to explain when such information will be available and when the railroad expects to submit it to FRA.

At the end of 2015, UP had over 600 locomotives equipped and commissioned for PTC/RSD operation. However, due to technical difficulties with the CHM subsystem, UP has not been able to accept the product from its supplier and widely deploy it. The small locomotive count below represents just those locomotives on which the CHM product was actually installed and being utilized to assist the vendor in development and field testing.

* For this initial PTC Progress Report, data reported for calendar year 2015 includes totals for 2015 and years prior.

3.2. Infrastructure/Back Office Status

Category / Installation Feature	Completed During Calendar Year*	PTCIP Year End Goal	Cumulative Quantity Complete at End of Calendar Year	Total Required for PTC Implementation, as Reported in PTCIP
Infrastructure (Back Office)				
Dispatching Locations (installations complete)	1	1	1	1
Physical Back Office System Equipment (installations complete)	1	1	1	1

Are the Back Office Location(s) fully operable?	Yes
Are the Dispatching Location(s) fully operable?	Yes

Please provide any additional narrative for Infrastructure/Back Office Status below:

The counts above reflect the fact that all UP dispatching and PTC back office equipment is installed and operated out of its Harriman Dispatching Center (HDC) located in Omaha, NE. UP train dispatchers are located in several offices other than the HDC; however, they remotely utilize the dispatching and PTC systems located there.

* For this initial PTC Progress Report, data reported for calendar year 2015 includes totals for 2015 and years prior.

3.3. Installation/Territory Status

Line Segment	State	From MP	From Station	To MP	To Station	Wayside Interface Units (WIU)			Switch Position Monitors		
						# WIUs Installed 2015**	# WIUs Installed 2015 Cumulative	Total # WIUs Required	# Switch Position Monitors Installed 2015**	# Switch Position Monitors Installed 2015 Cumulative	Total # Switch Position Monitors Required
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Line Segment	State	From MP	From Station	To MP	To Station	Wayside Interface Units (WIU)			Switch Position Monitors		
						# WIUs Installed 2015**	# WIUs Installed 2015 Cumulative	Total # WIUs Required	# Switch Position Monitors Installed 2015**	# Switch Position Monitors Installed 2015 Cumulative	Total # Switch Position Monitors Required
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Please provide any additional narrative for Installation/Territory Status below. If any of the information called for in Section 3.3 is unavailable to the railroad at the time it is completing and submitting this form, please insert "TBD" in the appropriate field and/or use this comment box to explain when such information will be available and when the railroad expects to submit it to FRA.

* Indicates lines for which exemption has been requested in UP PTCIP RFA #2.
 ** For this initial PTC Progress Report, data reported for calendar year 2015 includes totals for 2015 and years prior.

Line Segment	State	From MP	From Station	To MP	To Station	Communication Towers			Radios					
						# Comm Towers Installed 2015*	# Comm Towers Installed 2015 Cumulative	Total # Comm Towers Required	# Wayside Radios Installed 2015*	# Wayside Radios Installed 2015 Cumulative	Total # Wayside Radios Required	# Base Radios Installed 2015*	# Base Radios Installed 2015 Cumulative	Total # Base Radios Required

Are all necessary communication backbone utilities for this track segment (including fiber, copper, ground wiring etc.) installed and ready for operation?†

“Communication backbone utilities” are associated exclusively with base station locations on the UP and installation of backhaul is reflected in the base station completion status above.

The base station totals reflected in this status report differ from those contained in the current UP PTCIP due to a re-engineering of solutions for support of communications in tunnels and snow sheds. The PTCIP will be corrected in a future RFA.

*For this initial PTC Progress Report, data reported for calendar year 2015 includes totals for 2015 and years prior.

Please provide any additional narrative for Installation/Territory Status below. If any of the information called for in Section 3.3 is unavailable to the railroad at the time it is completing and submitting this form, please insert “TBD” in the appropriate field and/or use this comment box to explain when such information will be available and when the railroad expects to submit it to FRA.

* For this initial PTC Progress Report, data reported for calendar year 2015 includes totals for 2015 and years prior.

4. Quantity Update on Employees Trained

Required content:

- Separated by each employee category identified below, the number of employees trained during the applicable calendar year and the cumulative number of employees trained at the end of the applicable calendar year, as compared to the number the railroad stated would be trained by the end of that calendar year and in total, in the applicable revised PTCIP, as amended

Employee Category ²	Number of Employees Trained During Calendar Year*	PTCIP Year End Goal	Cumulative Number of Employees Trained at End of Calendar Year	Total Reported in PTCIP
Employees who Install, Maintain, Repair, Modify, Inspect, and Test the PTC System	1,776	1,776	1,776	7,170
Employees who Dispatch Train Operations	36	36	36	655
Train and Engine (Operations) Employees	1,001	1,001	1,001	22,569
Roadway Worker Employees	23	23	23	8,953
Direct Supervisors of the Above Employees	47	47	47	820

Please provide any additional narrative for Employee Training below:

* For this initial PTC Progress Report, data reported for calendar year 2015 includes totals for 2015 and years prior.

² See 49 C.F.R. § 236.1041(a).

5. Progress on Implementation Schedule/Milestones

Required content:

- Describe the extent to which the railroad or other entity is not complying with the implementation schedule it provided in its revised PTCIP, as amended

UP is fully compliant with the implementation schedule provided in PTCIP Version 3.0.

6. Summary Update of Challenges/Risks

Required content:

- Any update to the summary of remaining technical, programmatic, operational, or other challenges that the railroad or other entity provided in its revised PTCIP, as amended, including challenges with availability of public funding, interoperability, spectrum, software, permitting, and testing, demonstration, and certification
- Schedule Risk Updates (e.g., funding, technology, agreements)

Please provide Summary Update of Challenges/Risks below:

Refer to page 1 summary about CHM.

7. Progress on Revenue Service Demonstration (RSD) or Implementation

Required content:

- The total number of route miles on which PTC has been initiated for revenue service demonstration or implemented, as compared to the total number of route miles required to have a PTC system (see Section 1 Summary Table)
- Estimated start date (month and year) for RSD

Line Segment	State	From MP	From Station	To MP	To Station	Route Miles	RSD Start Date	RSD Status
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Please provide any additional narrative for Revenue Service Demonstration or Implementation below:

All other line segments will enter into RSD and/or PTC operations according to the schedule contained in the UP PTCIP Version 3.0.

8. Update for Intercity or Commuter Rail Passenger Transportation (if applicable)

If this section is not applicable to your railroad, please mark N/A.

Required content (if applicable):

- For each entity providing regularly scheduled intercity or commuter rail passenger transportation, a description of the resources identified and allocated to implement PTC

Please provide Update for Intercity or Commuter Rail Passenger Transportation below, if applicable:

N/A

9. Update on Interoperability Progress and Other Formal Agreements

Required content:

- For host railroads: provide updates to any agreements and key milestones for all tenant operations
- For tenant railroads: provide updates to any agreements and key milestones for all operations over tracks hosted by another railroad

Host and Tenant Railroads: Please provide a general update on interoperability in the textbox below.

The following content is contained in Section 5.1.1 and 5.1.2 of the PTCIP:

UP is party to the ITC Collaboration Agreement and is a participant on all ITC technical teams. Through the agreement and technical team activities, interoperability has been established with the following tenant carriers:

- NS Railway Company;
- CSX Transportation, Inc.; and
- BNSF Railway.

UP has additionally exchanged a *Letter of Understanding* with each of its passenger and freight tenant carriers who are required to install and operate PTC on its track, but who have not to date become party to the ITC Collaboration Agreement. The letter establishes agreement between UP and its tenants in the following areas:

- Implementation of PTC technical solutions which meet the requirements of interoperability as defined in §236.1003(b);
- Participation in a PTC testing program to verify functionality and interoperability; and
- Exchange of technical information needed to implement PTC in accordance with applicable FRA requirements.

UP has executed the *Letter of Understanding* and is coordinating implementation of an interoperable PTC system in accordance with the interoperability requirements stated in the ITC Collaboration Agreement with the following tenant carriers:

- Canadian Pacific Railway Company;
- Canadian National Railway Company;
- Kansas City Southern Railway Company;
- Terminal Railroad Association of St. Louis;
- Kansas City Terminal Railway;
- National Railroad Passenger Corporation (Amtrak);
- Southern California Regional Railroad Authority (Metrolink);

Tenant Identification <i>(Please add rows for additional tenants as necessary)</i>	Estimated Tenant Locomotive Fleet <i>(if the tenant does not have a separate PTCIP on file)</i>	Current Tenant Implementation Status
	█	█
	█	█
	█	█

10. Estimated PTC Safety Plan (PTCSP) Submission Date (if not already submitted)

If this section is not applicable to your railroad, please mark N/A.

PTCSP Submission Date
5/31/2016

Please provide any additional narrative for PTCSP Submission below:

UP has concerns with FRA’s ability to provide timely review of its PTCSP submission, based on the experiences to date of other railroads. Additionally, UP has great concern with FRA’s stated requirement that it must approve all changes to the railroad’s PTC Operations and Maintenance (O&M) Manual. Because of the immaturity of the PTC system and the evolution of its support, changes to policies, procedures, and tools utilized in O&M Manual occur frequently. The requirement to seek and obtain FRA approval for all changes related to PTC O&M materials will be exceptionally burdensome, and will delay implementation goals.

11. Testing and Integration Efforts (if applicable, laboratory, integration, and revenue service demonstration)

Please provide Update on Testing and Integration efforts below:

12. Updated Information That FRA Can Use to Maintain Its Geographic Information System (GIS) Database – Segments Complete and Operable

In its annual progress reports, a subject railroad or entity may submit a geographic information system (GIS) shapefile to indicate where various rail segments that must have PTC are located, as long as it includes the following fields: (1) a PTC attribute field (coded with "Y" if line segment is to have PTC installed, otherwise left blank); (2) a SUBDIV attribute field (populated with subdivision name); (3) a MONTH attribute field (populated with the month in which PTC is to be installed); and (4) a YEAR attribute field (populated with the year in which PTC is to be installed). A railroad may submit this information by means other than shapefile format.

Please provide any additional narrative for GIS Information below:

UP is not enclosing any GIS information with this submission.

Public reporting burden for this information collection is estimated to average 38.41 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. According to the Paperwork Reduction Act of 1995, a federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for this information collection is **2130-0553**. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection, including suggestions for reducing this burden to OMB's Office of Information and Regulatory Affairs, Attn: FRA OMB Desk Officer.