



**PNWR**

**PTC Progress Report**

**Annual Report**

**March 31, 2016**

**Submitted in fulfillment of 49 U.S.C. § 20157**

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## **1 SUMMARY**

### **1.1 PURPOSE**

This report is prepared in compliance with the FRA requirement specified in 49 U.S.C. § 20157(c) (1), which reads as follows:

*Each railroad carrier or other entity subject to subsection (a) shall, not later than March 31, 2016, and annually thereafter until such carrier or entity has completed implementation of a positive train control system, submit to the Secretary a report on the progress toward implementing such (Positive Train Control) systems.*

### **1.2 EXECUTIVE SUMMARY**

This report represents the progress towards achieving the goals for the year 2015 as outlined in the PNWR PTCIP (Revision 1.9 – submitted to the FRA on 01/18/16); specifically the high-level schedule shown in Section 7, Deployment Sequence and Schedule, of the PTCIP and Appendix 15.1, Project Schedule. Our intent is to meet the PTC compliance date of December 31, 2018.

The format of this report is based on the FRA supplied template (FRA F 6180.166 – 2-16). Sections that are not applicable, due to the use of E-ATC as our PTC technology solution, are marked as such.

In CY2015, significant progress was made in upgrading the major components of PTC system. The details of these upgrades are contained in this report. As a summary, software design modifications for the OnBoard, Wayside and Office segments were completed. Note that no hardware modifications associated with OnBoard/Wayside/Office PTC technology was or is needed due to these components being already in place per the existing Automatic Train Control (ATC) system.

Physical modifications for the system included installation of approximately two and one-quarter miles of communication cable to assure that every cut section and grade crossing has a communication link to the nearest Control Point (CP), which allows communication between the Office and all CP's, cut sections, and grade crossings. This work was completed in 2015.

Also, to accommodate the new 15/15 code, event recorders on all 27 PNWR locomotives are scheduled to be modified. At the end of 2015, approximately ten percent of the locomotives were modified, with the remainder scheduled to be complete in early 2016.

PTC training of wayside and mechanical staff was completed in CY2015 with the remainder of staff training to be completed in CY2016.

PNWR is poised to begin PTC field testing in early 2016 now that the FRA has approved their Test Request. Although this approval came two months later than

expected, PNWR is still projecting a testing completion date consistent with the PTCIP (July 1, 2015).

PNWR is engaged in early discussions with FRA staff regarding necessary conditions to enter a Revenue Service Demonstration (RSD) at the conclusion of field testing. As stated in the PTCIP, PNWR intends to submit the PTCSP to the FRA in July, 2016. Assuming a six-month FRA PTCSP review period, it is PNWR's goal to achieve FRA PTC system certification by December 31, 2016.

Table 1 contains a PNWR PTC summary status (as of the end of CY2015):

Table 1 - PNWR PTC Status Summary

Category	Quantity Installed during CY 2015	PTCIP Year End Goal (if applicable)	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation
Locomotive s Fully Equipped <sup>2</sup>	0	0	33	33
Installation/Track Segments completed	0	0	0	9
Radio Towers Installed	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Employees Trained	16	16	16	31
Back Office Locations Completely Installed and Fully Operable	0	0	1	1
Dispatching Locations Completely Installed and Fully Operable	0	0	1	1
Route Miles in Testing	0	0	0	13.8
Route Miles in RSD	0	0	0	13.8
Route Miles in Full PTC Operation	0	0	0	13.8

Notes:

1 - Not Applicable for E-ATC.

2 - Includes 27 PNWR Locomotives and 6 TM DMU's (PTC Hardware Only - see Table 3-1 for Event Recorder subset information).

## 2 UPDATE ON SPECTRUM ACQUISITION

This section is not applicable.

## 3 QUANTITY UPDATE ON HARDWARE INSTALLATION

### 3.1 Locomotive Status:

Table 3.1 - Locomotive/DMU Status (27 PNWR locomotives/6 TM DMU's)

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Locomotive (Apparatus)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Onboard Computer (e.g. TMC) <sup>3</sup>	0	0	33	33
Software for Train Management & other applications	17	17	17	33
PTC User Displays	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Event Recorders <sup>2</sup>	3	3	3	27
Onboard Antennas	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Transponder readers as applicable	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
GPS receivers	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Locomotive radios - Primary communications (e.g. 220 MHz radios)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Secondary communications - cellular	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Secondary communications - WiFi	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Notes:

1 - Not Applicable for E-ATC.

2 - PNWR locomotives only, not applicable for TM DMU's.

3 - Assume this to mean GE - UCII hardware, already installed per ATC.

### 3.2 Infrastructure/Back Office Status:

Table 3.2 - Infrastructure/Back Office Status

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Infrastructure (Back Office) <sup>1</sup>	0	0	1	1
Dispatching Locations (installation complete) <sup>2</sup>	0	0	1	1
Back Office Locations (installation complete) <sup>3</sup>	0	0	1	1

Notes:

- 1 - Assume this to mean hardware associated with Central Command Center in Salem; no new hardware required for PTC.
- 2 - Assume this to mean hardware associated with Central Command Center in Salem; no new hardware required for PTC.
- 3 - Assume this to mean hardware associated with back-up command center in Albany; no new hardware required for PTC.

### 3.3 Installation/Track Segment Status:

Table 3.3 - Installation/Track Segment Status

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Farmington - MP 28.03)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	4	4
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Hall - MP 29.90)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	3	3
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Greton - MP 31.86)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	1	1
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Tigard - MP 32.29)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	4	4
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Bonita - MP 33.16)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	2	2
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Niles - MP 34.14)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	2	2
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Tualatin - MP 36.06)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	2	2
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Tonquin - MP 39.75)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	2	2
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>



Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Mulloy - MP 40.44)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	1	1
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Category/Installation Feature	Quantity Installed during CY 2015	PTCIP Year End Goal	Cumulative Qty installed at end of CY 2015	Total Required for PTC Implementation as Reported in PTCIP
Installation/Track Segment Identification (CP Wilsonville - MP 41.82)				
Wayside Interface Units <sup>2</sup>	0	0	1	1
Communication towers or poles	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Switch Position Monitors	0	0	4	4
Fiber or ground wiring (per mile)	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Wayside Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>
Base Station Radios	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>	NA <sup>1</sup>

Notes:

- 1 - Not Applicable for E-ATC.
- 2 - Hardware already installed per ATC; no new hardware required for E-ATC.

## 4 QUANTITY UPDATE ON EMPLOYEES TRAINED

Table 4 - Quantity Update on Employees Trained

Employee Category	Number employees trained during CY 2015	PTCIP Year End Goal	Cumulative number of employees trained at end of CY 2015	Total as Reported in PTCIP
T&E Crew (Operations) <sup>1</sup>	0	0	0	8
Mechanical Employees <sup>2</sup>	12	12	12	12
MOW/Engineering/Roadway Worker Employees <sup>3</sup>	4	4	4	4
Management Employees	0	0	0	0
Other Employees <sup>4</sup>	0	0	0	7

Notes:

- 1 - Operating Engineers, as specified in PTCIP.
- 2 - Carborne, as specified in PTCIP.
- 3 - Wayside, as specified in PTCIP.
- 4 - Office, as specified in PTCIP - meaning dispatchers. Note the PTCIP indicated there were 10 to be trained; there are actually only 7.

## 5 PROGRESS ON IMPLEMENTATION SCHEDULE/MILESTONES

Table 5 - Progress Schedule

Activity	PTCIP Finish Date	Actual (or Projected) Finish Date
PNWR awards contract for PTC modifications	02/17/14	02/17/14
Vehicle modifications ready for testing	01/01/16	01/01/16
Field (wayside) modifications ready for testing	01/01/16	01/01/16
Office modifications ready for testing	01/01/16	01/01/16
FRA Approves Test Request to begin Field Testing	01/01/16	02/26/16
Testing Complete	07/01/16	07/01/16
PNWR Completes all Documentation and Submits PTSCP	07/01/16	07/01/16
PNWR Begins Revenue Service Demonstration	07/05/16	07/05/16
PNWR Completes Revenue Service Demonstration	12/31/16	12/31/16
FRA Final Approval and System Certification	12/31/16	12/31/16

PNWR remains on schedule (per the PTCIP) to achieve PTC system certification by 12/31/16. Table 5 lists relevant milestones listed in the PTCIP and the subsequent actual (or currently projected) finish dates for each. PNWR's Test Request approval was achieved on February 26, 2016, approximately two months later than expected. However, it is still PNWR's intent to complete testing and submit its PTSCP by July 1, 2016, with the expectation that FRA will review, approve and certify PNWR's PTC system by December 31, 2016. Further, PNWR is in preliminary discussions with the FRA regarding progressing from the end of testing to a projected RSD start date of July 5, 2016.

## 6 SUMMARY UPDATE OF CHALLENGES/RISKS

There is no change to the summary of challenges and risks as outlined in the PTCIP. This summary is repeated below:

- Availability of public funding – funding for full implementation of PTC has been

secured, no outstanding issues.

- Interoperability – see Section 9 of this report, no outstanding issues.
- Spectrum – not applicable, no outstanding issues.
- Software – block design has been completed, software has been loaded to wayside, vital sim software modeling and field testing to begin early 2016 (dependent on FRA Test Request approval), no outstanding issues.
- Permitting – not applicable, no outstanding issues.
- Testing, Demonstration and Certification – Vital Sim modeling and field testing to begin early 2016, subject to FRA approval of test request. Successful pre-testing conducted in fall of 2015 projects well for start of formal testing, no outstanding issues.
  - As an update, with FRA approval of test request on 02/26/16; PNWR will begin field testing in early April, 2016 with a projected end date of 06/30/16.
  - Also, as stated in Section 5, PNWR has begun preliminary discussions with the FRA regarding the details of progressing from the end of testing to RSD.

## **7 PROGRESS ON REVENUE SERVICE DEMONSTRATION (RSD) OR IMPLEMENTATION**

PNWR has begun preliminary discussions with the FRA regarding the details of progressing from the end of testing to RSD. It is still the intent of PNWR to progress from the end of testing to RSD, on or about July 5, 2016 (as stated in the PTCIP).

Table 7 - Progress on Revenue Service Demonstration (RSD) or Implementation

Segment Identification Start	Segment Identification Finish	Number of Route Miles in Segment	Status at end of CY 2015	Estimated Start Date for RSD if not yet begun
CP Farmington	CP Hall	1.87	Installing	5-Jul-16
CP Hall	CP Greton	1.96	Installing	5-Jul-16
CP Greton	CP Tigard	0.43	Installing	5-Jul-16
CP Tigard	CP Bonita	0.87	Installing	5-Jul-16
CP Bonita	CP Niles	0.98	Installing	5-Jul-16
CP Niles	CP Tualatin	1.92	Installing	5-Jul-16
CP Tualatin	CP Tonquin	3.69	Installing	5-Jul-16
CP Tonquin	CP Mulloy	0.69	Installing	5-Jul-16
CP Mulloy	CP Wilsonville	1.38	Installing	5-Jul-16

13.8

## **8 UPDATE FOR INTERCITY OR COMMUTER RAIL PASSENGER TRANSPORTATION**

A description of the resources identified and allocated to implement PTC is outlined as follows:

- Per the Shared Use Agreement between PNWR and TriMet (TM), TM will fund and manage the implementation of PTC on the WES corridor.
- Modern Railway Systems (MRS) has been retained to design, furnish, install and test the PTC solution (E-ATC) on the WES corridor.
- A full-time project manager has been retained by TM to manage this effort.
- Executive Management personnel at both PNWR and TM are fully engaged and supportive of this effort.
- Operational, Mechanical and other personnel from PNWR and TM have been engaged, trained and are integral to the successful implementation of PTC on the WES corridor.

## **9 UPDATE ON INTEROPERABILITY PROGRESS AND OTHER FORMAL AGREEMENTS**

There are no updates on interoperability or to any agreements and key milestones as listed in the PTCIP.

## **10 ESTIMATED PTC SAFETY PLAN (PTCSP) SUBMISSION DATE**

The estimated PTCSP submission date is July 1, 2016.

## **11 TESTING AND INTEGRATION EFFORTS**

The FRA approved PNWR's Test Request on February 26, 2016. PNWR will begin PTC field testing in early April, 2016 with a projected end date of 06/30/16. Vital Sim testing (computer simulation) will be conducted concurrently with field testing and will be completed by 06/30/16.

Testing results will be submitted, with the PTCSP, to the FRA by July 1, 2016.

## **12 UPDATED INFORMATION THAT FRA CAN USE TO MAINTAIN ITS GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE – SEGMENTS COMPLETE AND OPERABLE**

This section is not applicable.