

Memorandum

Date: July 21, 2009 (**Revised 2011**)

To: File

From: Adam Streit

Subject: Estimating the Cost of PTC for Passenger Rail Feasibility Studies

Recent changes in federal law, namely the Rail Safety Improvement Act of 2008 (RSIA) have created a new infrastructure requirement for all US commuter railroads. It is anticipated that this new development will substantially improve rail safety by greatly reducing the likelihood of:

- Train to train collisions
- Injuries to rail roadway workers
- Overspeed derailments and
- Accidents due to misaligned switches to sidings.

Under the RSIA all conventional passenger railroads (not light rail or rapid transit) must operate with Positive Train Control (PTC) before December 2015. PTC is also mandated for rail segments that carry commodities presenting an inhalation hazard and/or volumes of freight traffic exceeding 5 million annual gross tons. The American Association of Railroads¹ indicates that approximately 65,000 rail route miles are to be equipped before 2016.

This memo provides guidance developing order of magnitude estimates of the cost of installing and maintaining PTC on proposed new commuter rail lines.

Background - Positive Train Control refers to the technology that is capable of preventing train-to-train collisions, overspeed derailments, and casualties or injuries to roadway workers (e.g., maintenance-of-way workers, bridge workers, signal maintainers) operating within their limits of authority as a result of unauthorized incursion by a train. PTC is also capable of preventing train movements through a switch left in the wrong position. Existing PTC systems vary widely in complexity and sophistication based on the level of automation and functionality they implement, the system architecture utilized, the wayside system upon which they are based (i.e., non-signaled, block signal, cab signal, etc.), and the degree of train control they are capable of assuming.

Prior to October 2008, PTC systems were being voluntarily installed by various carriers. However, the Rail Safety Improvement Act of 2008 (signed by the President on October 16, 2008, as Public Law 110-432) has mandated the widespread installation of PTC systems by December 2015. There are currently 11 different PTC projects in varying stages development and implementation, involving 9 different railroads in at least 16 different States, and consisting of over 4,000 track miles.

¹ Gordon Mott, American Association of Railroads, "Rail Safety Improvement Act of 2008" presented to APTA Shared Use Working Group, Chicago, Illinois, June 18, 2009.

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PTC Elements – At the most basic level, all PTC systems require three equipment elements:

1. **Wayside Devices** – Equipment to detect, monitor and communicate the status of track and switches installed in the field.
2. **Locomotive/Cab Car Devices** – Equipment to monitor and control train status relative to information on field conditions communicated from central control and wayside equipment.
3. **Central Office Equipment** – To integrate and communicate information concerning the status of trains, track maintenance crews, switches, signals and tracks.

RSIA stipulates that PTC systems must be interoperable allowing equipment owned by one railroad to operate on the tracks of another without reequipping rolling stock with new or redundant on-board devices.

PTC Unit Costs - A recently published FRA Economic Analysis² provides the following estimates for PTC unit costs for ACSES and V/ETMS PTC systems). ACSES is deployed on Amtrak's Northeast Corridor. FRA seems to believe that an ACSES compatible system will become the dominant installation in the Northeastern and Middle Atlantic States. VTMS is being developed by UP for its network. BNSF's ETMS with a larger installed base is similar to VTMS. V/ETMS costs can be considered typical for systems outside the area of influence of Amtrak's Northeast Corridor.

Element	System	Unit	Unit Cost (000's)
Locomotive/Cab Car Device	ACSES	Locomotive/Cab Car	\$80
Locomotive/Cab Car Device	V/ETMS	Locomotive/Cab Car	\$55
2 nd Cab in a single car	Either	Double ended Cab Car	\$15
Wayside Devices	ACSES	Track Mile	\$121
Wayside Devices	V/ETMS	Track Mile	\$50
Central Office Equipment	Either	Each	\$15,000

About Central Offices - Within the planning horizon of most commuter rail feasibility studies, all train dispatch offices of existing commuter and Class I railways will be equipped with PTC Central Office Equipment. Hence, *should a new system be dispatched from an existing dispatch office the \$15 million cost for new Central Office Equipment can be avoided when developing a new passenger service.*

About Wayside Devices for Active Lines - Similarly, *if the subject line already hosts passenger trains, moves commodities considered an inhalation hazard, or carries more than 5 MGT of freight traffic, the wayside PTC devices will already be in place for existing track.*

² Roskind, Frank D, Senior Industry Economist, Federal Railroad Administration, Office of Safety Analysis **POSITIVE TRAIN CONTROL SYSTEMS: ECONOMIC ANALYSIS**. DEPARTMENT OF TRANSPORTATION, FEDERAL RAILROAD ADMINISTRATION, 49 CFR PARTS 229, 234, 235, AND 236 [DOCKET NO. FRA-2006-0132, NOTICE NO. 1] RIN 2130-AC03 July 10, 2009 202 302 9704 pp 112-119 (Retrieved from http://www.fra.dot.gov/downloads/PTC_%20RIA_%20Final.pdf on July 21, 2009)

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Maintenance Costs and Upkeep

A recent industry article³ provided order of magnitude cost estimates for the annual maintenance of the new PTC. According to the article, when fully implemented, there will be approximately 73,000 route miles of PTC installed on American railroads lines. FRA estimates that over the course of 20 years, it will cost anywhere between \$3 billion – \$8 billion to maintain. This equates to approximately \$150 million to \$400 million in additional O&M costs annually. In other words, operators will need to spend between \$2,100 – \$5,500 per route mile per year in maintaining the PTC system; On average, this equates to \$3,800 per route mile.

³ Frailey, Fred. Trains Magazine. November 2010. “Red Block Ahead! The case against rushing into PTC,” pp. 18.