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May 12, 2006

Docket Clerk
DOT Central Docket Management Facility
Room PL-401
400 7th Street, SW (Plaza Level)
Washington, DC 20590-0001

Re: Docket Number FRA-2006-24002

Dear Docket Clerk:

Attached hereto please find the Comments of the United Transportation Union and the Brotherhood of Locomotive Engineers and Trainmen with respect to the above-referenced docket.

Respectfully submitted,

A handwritten signature in black ink that reads "Paul C. Thompson".

Paul C. Thompson
International President

A handwritten signature in black ink that reads "Don M. Hahs".

Don M. Hahs
National President

attachment

Federal Railroad Administration
in re
Union Pacific Railroad
Railroad Safety Program Plan
DOT DMS Docket No. FRA-2006-24002

Comments of
Brotherhood of Locomotive Engineers and Trainmen
and
United Transportation Union

The United Transportation Union (“UTU”) and the Brotherhood of Locomotive Engineers and Trainmen (“BLET”), a division of the Rail Conference of the International Brotherhood of Teamsters, are filing joint comments concerning the above-referenced document. BLET and UTU are the duly recognized collective bargaining representatives, under the Railway Labor Act (45 U.S.C. §§ 151 et seq.), for more than 20,000 operating craft employees and yardmasters employed by the Union Pacific Railroad (“UP”), all of whom are directly affected by the document. For the reasons set forth below, UTU and BLET submit that FRA should require UP to make the following amendments and changes to its Railroad Safety Program Plan (“RSPP”) referenced above.

Our first concern is with Section 4.1.2 of the RSPP, which addresses risk assessment. UP notes that its risk assessment process will be standardized, and goes on to state the following:

While it is possible to develop a quantitative methodology for this type of analysis, the most practical method for railroad application is straightforward deductive reasoning, applied on a collective or organizational basis. A composite of experienced railroad personnel from appropriate line and staff departments can effectively determine the severity of all but the most difficult or unusual hazards.

RSPP at p. 4-2.

We believe UP's proposed process is insufficient in two respects. First, foregoing altogether any analysis of quantitative data will produce a risk assessment that is not grounded on any performance data. Given current requirements of Parts 225 and 240, if not others, there is no lack of data that should properly be considered in conducting a PTC analysis. UP should be required to revise its RSPP to include a quantitative methodology in performing its risk analysis.

Second, UP's description of the body who will perform the "straightforward deductive reasoning" portion of the analysis is wholly insufficient. Id. No provision is made in the RSPP for either identifying those who will participate in the analysis, or for the analysis to be documented. UP should be required to modify this section of the RSPP to provide for both the identification of personnel used in the process, as well as documentation of the process.

With respect to UP's risk assessment protocols, we also would point out that the proposed RSPP fails to meet applicable regulatory requirements. FRA recognizes U.S. Department of Defense Military Standard for System Safety Program Requirements ("MIL-STD-882C") "as providing appropriate risk analysis processes for incorporation into verification and validation standards" for PTC systems. 49 C.F.R. Part 236, App. C at ¶ (c)(3). All 882C hazard severity categories include varying levels of environmental damage; however, UP's proposed RSPP fails to include environmental damage in any of its hazard severity categories. RSPP at p. 4-2. UP should be required to conform its hazard severity classifications to those set forth in the DOD 882C standard, as required by Part 236.

The second issue we raise is Section 4.1.3.a, addressing system safety precedence, which states that risk design standards shall “[m]inimize **or eliminate** the use of human input for safety-critical functions.” RSPP at p. 4-4 (emphasis added). In its Final Rule on processor-based signal and train control systems, FRA noted that the “overriding conclusion from the research is that processor-based signal or train control systems that have been designed with human-centered design principles in mind — **system products that keep human operators as the central active component of the system** — are more likely to result in improved safety.” *See* 70 Fed. Reg. 11090 (emphasis added). For this reason, FRA promulgated design criteria for the human-machine interface, or HMI, as Appendix E to Part 236.

In particular, FRA promulgated paragraph (c)(1), which “addresses ‘reduced situation awareness and over-reliance,’ which can result when products transform the role of a human operator from an active system controller to a passive system monitor. Essentially, a passive operator is less alert to what the system is doing, may rely too heavily on the system and become less capable of reacting properly when the system requires the operator’s attention.” Id. To safeguard against over-reliance and loss of situation awareness, FRA’s HMI design requires that a locomotive engineer must “remain ‘in-the-loop’ for at least 30 minutes at a time,” as specified in paragraph (c)(1)(i) of Appendix E.

To the extent that Section 4.1.3.a addresses, for example, electronic transfer of train consist information from a computer into the PTC system computer — rather than having an employee manually enter such information — the concept makes sense. However, a locomotive

engineer may be required to interact, via the system's Human-Machine Interface, with the system by inputting movement-related information or by acknowledging a warning, both of which involve a safety-critical function. We submit that Appendix E prohibits the elimination of this second category of human input, and question, therefore, whether this design standard meets the requirements of Appendix E, paragraph (c)(1)(i). At the very least, FRA should require UP to provide clarification as to the meaning and intent of this phrase.

Thirdly, we have a concern with respect to the RSPP's treatment of the Human-Machine Interface ("HMI"), which is contained in Section 11 of the document. UP states that the "HMI shall provide consistent and predictable display of information" and that the "system shall provide automatically refreshable display that can supplement the operator's memory." RSPP at p. 11-1. It is unclear from the context whether UP contemplates a constant PTC display, or one that is activated only when the system provides a warning or initiates an enforcement action; each type of display operation is being currently tested on various portions of the industry.

In a January 2005 Final Report entitled *Effects of Train Control Technology on Operator Performance*, DOT's Research and Special Programs Administration ("RSPA") described the work of a locomotive engineer in these terms:

Operating a rail vehicle (and, in general, operating any vehicle) can be considered a combination of divided attention and selective attention tasks. The task is divided attention, in that the locomotive engineer must attend to several different tasks at once, including speed control, position control, system status monitoring, and vehicle status monitoring. The monitoring subtasks can each be considered as selective attention tasks. The objective is to identify a system or vehicle fault, and the engineer must monitor several channels of information to detect a fault. From a different perspective, the task of a locomotive engineer is a combination of relatively high frequency monitoring and control

(to fulfill the task of speed and position control) with vigilance (for system failures and emergencies).

See DOT/FRA/ORD-04/18 at p. 5.

Six months after the publication of this report, RSPA published another, entitled *Effects of Supervisory Train Control Technology on Operator Attention*, which defined “vigilance” as “the capacity of the human operator to sustain attention and remain alert to stimuli over a prolonged time.” See DOT/FRA/ORD-04/10 at p. vii. All PTC systems present a locomotive engineer with the numerous additional visual, auditory, and tactile stimuli, compared to standard operations. This creates a concern, which was acknowledged in the July 2005 RSPA report:

The human performance concern, with regard to display automation, is potential overload of the operator sensory channels. Too much information will ultimately degrade overall performance due to the inability to process that information and extract the pertinent data from it.

See DOT/FRA/ORD-04/10 at p. 3.

We have voiced similar concerns in a number of PTC proceedings over the years. FRA should require UP to revise Section 11 to identify the type of display it intends to use, and to address the extent to which over-reliance and/or distraction caused by a constant display may introduce risks that do not exist in current operations.

Fourth, UP’s Hazard Identification and Mitigation protocols, as outlined in Attachment A, do not fully correspond with the requirements of Subpart H. UP states that its toolbox will include a Functional Fault Tree as specified in IEEE Standard 1483. RSPP Att. A, p. 2. Use of this IEEE standard is acceptable under FRA regulation; indeed, it is specifically identified in

paragraph (c)(3)(i) of Appendix C to Part 236. However, UP also proposes to reserve the right to substitute a Master Logic Diagram — based on nuclear energy industry PRA Procedures Guidelines published as NUREG/CR-2300 — as an “acceptable equivalent method.”

We believe that UP must satisfy a burden of proving that the NUREG standard is an acceptable equivalent, if it wants to substitute that standard for the one required by FRA. Since no such attempt was made by UP, whether by comparing the two standards or by citing to other risk management protocols under which substitution was deemed permissible, FRA should require UP to adhere to the standard specified in the regulation.

Lastly, we wish to raise an issue that was omitted altogether from UP’s RSPP. There is no mention in the RSPP regarding the capture and retention of safety critical control data routed to the locomotive engineer’s display. In the case of a train control system, the technical details of the format, content, and proposed duration for retention of this type of data are to be addressed by the Product Safety Plan. 49 C.F.R. §§ 229.135(b)(3)(xxv), and 229.135 (b)(4)(xxi). It only makes sense for UP to have noted this requirement in the RSPP, and provided any standardized guidance that it intends to apply (e.g., whether retention of data will be accomplished in event recorders with a certified crashworthy memory module or in separate certified crashworthy memory modules). FRA imposed this requirement as part of its conditional approval of the RSPP submitted by the BNSF earlier this year. *See* FRA-2006-23686-4 at p. 2.

We appreciate FRA's most serious consideration of the concerns and proposals we have raised in these comments. These conditions are necessary in order for the letter and the spirit of Subpart H to be fulfilled.



Don M. Hahs
National President
Brotherhood of Locomotive
Engineers and Trainmen

Respectfully submitted,



Paul C. Thompson
International President
United Transportation Union