Brotherhood of Locomotive Engineers and Trainmen

A Division of the Rail Conference — International Brotherhood of Teamsters

NATIONAL LEGISLATIVE OFFICE
25 Louisiana Avenue, NW, 7th Floor Annex • Washington, DC 20001
Phone: (202) 624-8776 • Fax: (202) 624-3086 • holmes@ble-t.org

RAYMOND A. HOLMES
Vice President and
National Legislative Representative

March 30, 2006

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

Re: Docket No. FRA-2006-23751

Dear Docket Clerk:

On January 20, 2006, Quantum Engineering, Inc. ("Quantum") petitioned the Federal Railroad Administration ("FRA") for a waiver from compliance with the requirements of 49 C.F.R. Sections 232.403(g)(2) and 221.12(d). *See* DOT DMS FRA-2006-23751-1 ("Petition"). On February 23, 2006, FRA published notice of the filing of Quantum's petition, soliciting comments thereon from interested parties. *See* FRA-2006-23751-2.

These comments are submitted by the Brotherhood of Locomotive Engineers and Trainmen, a Division of the Rail Conference of the International Brotherhood of Teamsters ("BLET"), which is the duly designated and recognized collective bargaining representative for the craft or class of Locomotive Engineer employed on all Class I railroads. BLET also represents operating and other employees on numerous Class II and Class III railroads. Consequently, AAR's petition would have a significant impact upon our members. For the reasons set forth below, BLET opposes granting the requested relief.

Section 403 of Part 232 establishes design standards for one-way end-of-train devices ("EOTDs"). Subsection (g) governs an EOTD's radio equipment. Quantum requests a waiver from compliance with Subsection (g)(2), which states that if radio equipment "power is supplied by one or more batteries, the operating life shall be a minimum of 36 hours at 0°C." 49 C.F.R. § 232.403(g)(2). Quantum's position with respect to this portion of its petition is as follows:

> Quantum's end-of train (EOT) device includes both an air turbine powered alternator (which has been in service for several years), and two batteries. Both the batteries and the alternator are continuously connected to provide power to the other components of the device. Our EOT device could be substantially lightened if one battery could be removed. The remaining battery which is charged by the alternator during normal opera-

> tion would provide power for approximately 18 hours in cases where the alternator would not be able to function such as switching operations when train line brake pressure is cut out during train make up. The air turbine powered alternator has proven to provide very reliable power with low air consumption. We request a waiver to **reduce battery capacity by eliminating one of the two batteries from Quantum's current EOT device**.

Petition at p. 1 (emphasis supplied). Quantum also included with its petition testing documents purporting to establish the reliability of its estimate that a lone EOTD battery would provide power for approximately eighteen hours after the alternator stopped providing a charge.

Quantum's testing protocols are insufficient in several respects. First, despite the fact that FRA's performance standard specifies a temperature of 0°C, Quantum's Verification & Validation report ("V&V") states that all testing was performed in a temperature condition of 70°F, which is equivalent to approximately 21.1°C. Id. at p. 3. Not only was testing performed at a temperature other than that specified in the standard, Quantum has submitted no data by which FRA could even attempt to estimate what level of battery degradation is a function of colder temperatures.

Second, Quantum's V&V indicates that three tests were performed: #1 — a baseline test to determine whether a two-cell battery pack would discharge while the air turbine alternator was operational; #2 — a test to determine the length of time required to discharge a two-cell battery pack; and #3 — a test to determine the length of time required to discharge a one-cell battery pack. Id. However, the Test Plan submitted with the petition indicates that only Unit #Q3481-NS77944 was tested. Id. at p. 4. Thus, it is clear that each test was run only once, and that only one EOTD was tested. We believe that this level of sampling — both concerning the number of runs for each test and with respect to the number of EOTDs tested — is wholly insufficient for granting the waiver.

Third, some of the test data leads us to question whether a serious safety risk already is present under current FRA regulations. Tests #1 and #2 purport to replicate current conditions, because the EOTD tested was equipped with a two-unit battery. Id. at p. 3. The results reported for Test #2 indicate the following: at 36 hours, battery voltage was 11.6 V; at 46 hours "voltage reached a level where the processor control turned the marker light off to conserve power," although no specific voltage was reported; the test was concluded three hours later, with a reported voltage of 10.8 V; and the "'dead battery' indication is set to be transmitted at 10.5 V." Id. The chart labeled "Double Cell EOT Battery Discharge – No Charging" indicates that the voltage at the time the marker was automatically turned off was 11.0 V. Id. at p. 8.

Transferring the test results from Quantum's laboratory to the field causes grave concern. Today, with a two-cell battery, a crew will not receive a "dead battery" indication from the EOTD until more than three hours after the EOTD's processor turns off the marker light to preserve battery power. Indeed, if the rate of battery drain is linear, the "dead battery" indication would not

be transmitted until roughly 7½ hours after the marker light was automatically turned off by the EOTD's processor. Thus, it is conceivable that a train could be operated for several hours at night with no marker being displayed, without the crew receiving a "dead battery" indication.[1]

Fourth, according to the V&V and Quantum's Test Plan, each phase of each test was initiated with the battery arrangement — whether one cell or two cells — fully charged. Id. at pp. 3-4. While this protocol is appropriate for gauging battery life under a variety of operating conditions, the testing only addresses one aspect of operational reality. Quantum tested only the operational implications of a fully-charged EOTD in the absence of any charging capacity.

One flaw with limiting testing to fully charged batteries is that performance degradation caused by battery "memory" is not considered as a factor. This phenomenon, present predominantly in nickel cadmium cells, results from applying a charge to a battery before it has been completely discharged early during its use life. After a few such charging cycles, the battery "believes" that it is discharged when voltage drops below the level where charges have been applied in the past, even though there may be some battery life remaining. The laboratory condition of a fully charged battery is only found infrequently in the field.

Furthermore, Quantum has failed to address whatsoever the implications of its petition when a crew takes charge of an EOTD with a less-than-fully-charged battery. Quantum also has failed to provide data on charging rates for a one-cell battery. Since the EOTD's processor turns off the marker light when the battery voltage drops to 11.0 V, activating the marker light on an EOTD with a lower voltage will be delayed until the battery charges to a voltage greater than the level at which the processor turns off the marker.

The amount of time required to charge the battery to 11.0 V would be a function of (a) the rate at which the air turbine powered alternator produces electricity in excess of that consumed by operating EOTD functions, and (b) the battery voltage at the time the alternator begins to charge the system. Quantum performed no tests to determine either charging rates or charging times.

With the current two-cell battery arrangement, this is not an issue. Quantum's chart entitled "Double Cell EOT Battery Discharge – No Charging" indicates that the marker light was not automatically turned off by the EOTD processor until 46 hours after the alternator had been dis-

[1] Quantum's assurance that a "train crew will also receive a warning in the locomotive that no charging is taking place in time to take action before the [EOTD] shuts down from lack of power" does not assuage this concern. Id. at p 2. Since the EOTD controller turns off the marker light hours before the battery reaches a discharge level that triggers the "dead battery" indication, once a crew becomes aware that EOTD battery charging has been interrupted, the crew will be distracted from maintaining vigilance on the right-of-way ahead by continually attempting to verify that the marker continues to be displayed.

abled. Id. at p. 8. The likelihood that a scenario would arise in which an EOTD would be left operational for that length of time without any capacity to charge the battery is remote.

However, the chart entitled "Single Cell EOT Battery Discharge – No Charging" indicates that the processor turned off the marker light after only 22 hours. Id. at p. 7. Moreover, Quantum would only certify an 18-hour battery life. Id. at pp. 1, 2. If an alternator failure occurs early in a crew's tour of duty, only about ten hours of marker light protection will be available when the crew's hours of service expire. As FRA well knows, the prevalence of crews left on the line of road awaiting relief has increased dramatically over the past several years. Even greater is the length of time trains stand awaiting relief crews to board them.

We believe the granting of a waiver to permit one-cell batteries will produce numerous instances of EOTD processors shutting off marker lights on crewless trains, which could have catastrophic consequences. We further believe that train delays will increase by the length of time required to charge spent one-cell EOTD batteries to a voltage that will prevent the processor from shutting off the marker light. Accordingly, we believe FRA should deny that portion of Quantum's petition seeking relief from 49 C.F.R. Section 232.403(g)(2).

Quantum also seeks relief from FRA's requirement that "[t]he centroid of the marking device must be located at a minimum of 48 inches above the top of the rail." 49 C.F.R. § 221.13(d). The stated rationale for this request is as follows:

> With the coupler attachment mechanism approximately 36 inches above the rail, the 48 inch rule requires building the device at least 12 inches higher than necessary. 12 inches is marginal at best in providing greater sight distance; but, introduces a substantial mechanical moment in a high G force area promoting fatigue of components. A marker minimum height of 36 inches would allow the device to be more compact with a center of gravity closer to the coupler mounting mechanism and allow a further reduction of weight. We are therefore requesting a waiver to allow a **marker height at a minimum of 36 inches above the top of rail**.

Petition at p. 2 (emphasis supplied).

While Quantum broadly asserts that the current requirement "promotes" component fatigue under certain circumstances, no data or test results are provided by which FRA can properly assess the extent to which any such problem exists. We would presume that the EOTD was designed to withstand certain G forces, yet no information concerning design is provided. Nor has Quantum produced data that component failure related to excessive G forces is currently a problem.

Neither has Quantum conducted tests establishing the levels of G force that result in the promotion of component fatigue and correlated those levels of G force to frequent operational events in

the industry. Indeed, the paucity of evidence concerning this request leads inexorably to the conclusion that any such evidence would not support the waiver request, and that it is one of economic and/or manufacturing convenience, rather than safety or product reliability.

In addition, Quantum seriously misrepresents the operational impact of the waiver by stating that "12 inches is marginal at best in providing greater sight distance." Id. The safety concern is not the distance, *per se*; it is the uniformity of display and consistency of the visual information conveyed to the crew.

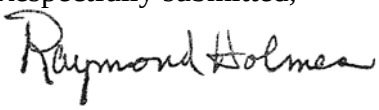
The marker light is one means by which a locomotive engineer can judge how to brake a train as it approaches the rear of another train. During periods of darkness, particularly in areas where ambient lighting is insignificant or absent, the marker light may be the only visual cue upon which the locomotive engineer can rely. This visual cue is only as reliable as its consistency and uniformity, and FRA's 48" standard is the mechanism by which this consistency and uniformity is maintained.

The impact in the field of Quantum's petition for relief from Section 221.12(d) would be to render all marker lights useless as visual cues. Quantum units would display marker lights at a level twelve inches below the display of other manufacturers. However, the crew in a trailing train that relies upon the marker light for its perspective would have no clue whether the EOTD was a Quantum unit, or that of another manufacturer. The risk of at least a low-speed rear end collision would increase, because a locomotive engineer may conclude — due to the different perspective provided by the shorter EOTD — that the train ahead is further away than it really is.

In sum, both of Quantum's requests would erode standards that are essential for maintaining safety. All EOTDs do not operate in pristine, 70° laboratory settings, with a fully charged battery every time they are activated. They are charged, depleted, recharged, and depleted again; charging frequently begins before the batteries have been completely depleted. Trains sit for hours — and, sometimes, days — waiting to be re-crewed, with rear end protection being provided by the EOTD.

The height of the EOTD is a standard upon which crews have come to rely for many years as an essential means of collision avoidance. They are able to do so because the information provided by the EOTD's marker light is consistent and uniform. Both of Quantum's requests are based upon economic and manufacturing convenience, and neither is adequately supported by data. Granting Quantum's petition would introduce risks that current FRA regulations anticipate, address, and mitigate. For all of the above reasons, FRA should deny Quantum's petition in its entirety.

Respectfully submitted,



Vice President and National Legislative Representative

cc: Advisory Board
All General Chairmen
All State Legislative Board Chairmen
John P. Tolman, Chief of Staff / Legislative & Political Director
Thomas A. Pontolillo, Director of Regulatory Affairs