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ORIGINAL TD-35

Decision 92974 APR 21 1981

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of the SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT for authority to institute revenue passenger service utilizing the Automatic Train Control System for train separation over its lines without the present computer enforced train separation procedures provided under the Computer Automated Block System.	Application 57727 (Filed December 6, 1977; amended September 15, 1978; Petition for Modification filed March 2, 1981)

SECOND INTERIM OPINION

On March 2, 1981, the Bay Area Rapid Transit District (BART) filed a petition for modification of Decision (D.) 91846 dated June 3, 1980. That decision permitted "close headways" operations subject to certain conditions and restrictions. By its petition, BART seeks an order modifying two of those conditions and restrictions, Ordering Paragraphs 1.D.b. and 1.D.a., which, respectively, require half-speed operation whenever a loss of friction braking capability occurs on one or more cars and reduced speed operations under wet track conditions.

As more fully described in the petition, BART has modified certain portions of its control systems to provide for full speed operation of trains with reduced friction braking capability without regard to weather conditions. To implement these modifications, it is necessary to modify paragraph 1.D.b. to eliminate the requirement of half-speed operation under reduced friction braking conditions and paragraph 1.D.a. to eliminate restrictions on use of full-speed commands which would no longer be necessary as a result of control system modifications.

Through a filing made March 25, 1981, staff recommends the Commission grant BART's petition without hearing. Staff claims the modifications would significantly enhance BART's service capability without creating unsafe conditions. Staff's recommendation is based on information supplied to the staff by BART and its engineering consultant, staff's independent study and review of the proposed modifications, record evidence from the close headways hearings, and an independent consultant employed by the Commission.

Staff, in its filing, commented on the half-speed operation during braking loss currently mandated by paragraph 1.D.b. even if only one car has experienced braking loss. In the staff's view, the need to reduce train speed should be based on the loss of friction braking compared to the remaining braking capability available on the train. This test is realistic because each car brakes independently. Under such a criteria, there would be less of a need to reduce speed if one car in a ten-car train experienced braking loss, than if two cars in a five-car train suffered braking loss. Accordingly, staff believes it is proper to account for variable train consist lengths when considering train braking capability. Staff engineers and BART have worked together to develop safe speed criteria for a specified loss of braking as required by Ordering Paragraph 1.D.c. of D.91846. The result is a "Cutout Car Operations Table" as shown in Appendix A (BART's Attachment 1 to its petition). Physical modifications and operational tests of BART vehicles to accommodate the requested methods of operation have been closely monitored and reviewed by the staff and found to be satisfactory.

As discussed in D.91846, the BART system was originally signaled for a 2.7 miles per hour per second (MPHPS) deceleration rate under braking conditions. Early braking tests indicated that

under reduced wheel-to-rail friction conditions, e.g., wet track, the originally programmed stopping distances did not provide adequately safe stopping distances. Under current procedures, a train must operate at half normal speed if only one of its cars loses braking capability even though the train could be up to ten cars long. BART claims this limitation produces a severe negative impact on system schedule performance.

To determine a safe brake rate for close headways operation, BART performed an extensive series of braking tests under various conditions. The tests resulted in the resignaling of the entire BART system to insure adequate stopping distances under the close headways mode of operation. A complete presentation of the resignaling program was made during the hearings conducted in this application and is commented upon in D. 91846 at pages 13, 14, and 54. The resignaling is based on a brake rate of 1.2 MPHPS for exposed (potentially wet) track and 1.6 MPHPS in areas of covered (dry) track.

BART employed an engineering consultant, Advanced Research and Applications Corporation (ARACOR) of Mountain View, California, to conduct analyses of train operations with reduced braking capability. "Risk Assessment of BART Cutout Car Operation" prepared by ARACOR, provides BART information and parameters for operation of trains with reduced braking capability.

Findings of Fact

1. Appendix A fulfills the requirement of Ordering Paragraph 1.I.c. of D.91846 and should be adopted.

2. A copy of the petition was served on all parties to the proceeding.

3. A public hearing in this matter would serve no useful purpose.

4. Because the changes in service resulting from this order will benefit the public this order should be made effective the date hereof.

Conclusion of Law

The requested modification of D.91846 should be granted.

SECOND INTERIM ORDER

IT IS ORDERED that:

1. Ordering Paragraphs 1.D.a. and 1.D.b. of D.91846. are rescinded.

2. Bay Area Rapid Transit District is authorized to operate trains with brakes cut out in accordance with the "Cutout Car Operations Table" and the "Train Removal Guidelines", attached hereto as Appendix A.

This order is effective today.

Dated APR 21 1981, at San Francisco, California.

President

Commissioners

CUTOUT CAR OPERATIONS TABLE

# OF CUTOUTS	TRAIN LENGTH 3	4	5	6	7	8	9	10
0	FS-1	FS-1	FS-1	FS-1	FS-1	FS-1	FS-1	FS-1
1	RS-3	RS-2	FS-1	FS-1	FS-1	FS-1	FS-1	FS-1
2	OR-4	HS-3	RS-3	RS-2	FS-2	FS-2	FS-2	FS-2
3	OR-4	OR-4	OR-4	HS-3	HS-3	RS-3	FS-3	FS-3
4 or more	NE	OR-4	OR-4	OR-4	OR-4	OR-4	OR-4	OR-4

"FS" - Full Speed Operation

"RS" - 90% of Full Speed

"HS" - Half Speed

"OR" - Offload & Remove from Service

"NE" - Non-Existent

"1-4" - Train Removal Guidelines (see below)

Train removal guidelines:

1. No restriction on operation. Trains may be dispatched into revenue service in this condition.

2. Remove from service at the end of the day. Trains may be dispatched into revenue service in this condition only on the same day the condition occurs. Trains must be returned to condition 1 for dispatch into revenue service on subsequent days.

3. Remove from service at next yard. Trains may not be dispatched into service in this condition. Trains must be returned to condition 1 for dispatch into revenue service.

4. Immediate passenger offload and removal from service.

   4.1 Trains with at least 50% of the friction brakes operative shall proceed to the next station in the automatic mode at half speed for passenger offload. Following offload, proceed off the mainline in the automatic mode at half speed.

   4.2 Trains with at least 33% of the friction brakes operative, but less than 50%, proceed in manual at speeds consistent with grade and track conditions not to exceed 10 mph to the next station for immediate passenger offload. Following offload, proceed off the mainline in road manual at speeds consistent with grade and track conditions.

Train Removal Guidelines (continued)

4.3 Trains with less than 33% of the friction brakes operative shall not be moved alone, and shall be shoved or towed off the mainline. Shoving or towing operations shall require the combined consist to have at least 33% of the friction brakes operative. The combined consist shall proceed to the next station for passenger offload at speeds consistent with grade and track conditions, not to exceed 10 mph. Both trains in the combined consist shall be offloaded. Following offload, the combined consist shall proceed off the mainline in road manual at speeds consistent with grade and track conditions.

EXCEPTION: Three and four car consists with only one friction brake operative may be moved at speeds consistent with grade and track conditions, not to exceed 10 mph, to the next station for passenger offload. Following offload, trains shall be shoved or towed off the mainline in accordance with the procedures set forth above.

(END OF APPENDIX A)