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Decision 01-03-068 March 27, 2001

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of the San Francisco Bay Rapid Transit District for Authority to Institute Revenue Passenger Service Utilizing the Advanced Automatic Train Control System for Safety-Critical Motion Control.	Application 99-02-012 (Filed on February 9, 1999)

O P I N I O N

I. Summary

This decision grants the motion for adoption of a Settlement Agreement between the San Francisco Bay Area Rapid Transit District (BART) and the Commission's Rail Transit Safety Section of the Rail Safety and Carriers Division (Rail Safety) filed on May 10, 2000. Pursuant to the Settlement Agreement, this decision grants deviations to General Order (GO) 127 and relief from Ordering Paragraph 1.A. of Decision (D.) 91846 that permit BART to conduct tests, including some during revenue service, for implementation of an Advanced Automatic Train Control System. Final authority for implementation of the Advanced Automatic Train Control System in revenue service operation is withheld pending a subsequent application making this request. This decision closes this proceeding and directs BART to file a new application seeking authority for full revenue service operation once it completes its testing.

II. Background

BART is a rapid transit district of the State of California, existing under Sections 28500 et seq. of the Public Utilities Code (Ch. 1056, Stats. 1957). One of

BART's responsibilities is the construction and operation of a rapid transit system in the counties of Alameda, Contra Costa, San Francisco, and San Mateo. The Commission has safety oversight jurisdiction over BART pursuant to Pub. Util. Code § 29047, which requires (in relevant part):

> "The district shall be subject to regulations of the Public Utilities Commission relating to safety appliances and procedures, and the commission shall inspect all work done pursuant to this part and may make such further additions or changes necessary for the purpose of safety to employees and the general public."

As initially filed, the application before us requested authority to modify the existing method for train separation and control under GO 127, approve all tests for the new systems (collectively, Phase Two) and authority to commence revenue train service utilizing the Advanced Automatic Train Control System for train separation and motion control (Phase Three). As a result of the Settlement Agreement presented, approval is sought at this time only for Phase Two, the development and testing of the system. While some of this testing will occur during revenue service, it will be done in a limited area, during limited periods with operators specially trained for the new system. The request to operate full revenue service with the new Advanced Automatic Train Control System will require a separate application.

III. Procedural History

BART filed this application on February 9, 1999, and notice of the filing appeared on the Commission's Daily Calendar on February 16, 1999. On March 18, 1999, Rail Safety filed a response to the application. On March 29, 1999, BART filed a reply to the Rail Safety response.

On May 11, 1999, a prehearing conference (PHC) was held in this matter. A second PHC was conducted on September 1, 1999, to ascertain the application

status. On November 8, 1999, Rail Safety provided notice of a settlement conference to be held on November 15, 1999. On November 18, 1999, BART and Rail Safety filed a motion for adoption of settlement.[1] This matter was submitted on November 18, 1999.

An additional PHC was held on March 23, 2000. During that PHC conference Administrative Law Judge (ALJ) DeUlloa questioned the parties at great length about the terms of the settlement, issues related to compliance and various commitments, and generally raised questions about whether the proffered settlement truly resolved (or even had the mechanism for resolution of) the many issues remaining before revenue service could be authorized in a safe manner.

The parties committed to consider ALJ DeUlloa's concerns and were given 30 days to respond to his questions, as well as seeing if agreement could be reached between BART and the Rail Safety unit over the safety certification program for the testing program and revenue service. The parties subsequently requested additional time and, on May 10, 2000, filed a new settlement agreement that supercedes the settlement of November 18, 1999.

IV. Application Request

A. Purpose of Request

BART currently uses the Sequential Occupancy Release System (SORS) for monitoring and controlling train separation during revenue service. BART's

[1] The parties originally filed a Settlement Agreement on September 16, 1999. In order to comply with the requirement of Rule 51.1 to hold a settlement conference, the Settlement Agreement was subsequently filed with the Commission on November 18, 1999.

application seeks authority to modify the existing train system with an overlay subsystem that will enable trains to operate at closer headways while maintaining no less than the existing degree of safety. BART contends the benefits of the proposed Advanced Automatic Train Control System are that (1) train location is more precise and (2) braking is less severe and more controlled with reduced probability for wheel/rail slippage. The Advanced Automatic Train Control System will transfer the motion control function of train operations from the original track circuit based system to a radio based system working in conjunction with station based computers.

BART explains that the proposed system uses a network of radio sets installed on the train control cars and at intervals along the wayside ranging from 1/3 of a mile to one mile apart. BART states that the radio sets exchange reports and commands between the lead and tail control cars of the trains and the station computer. The station computer decodes the data, computes positions of trains, references track data, then calculates and sends back optimized motion and control commands to the train.

The application states that BART has begun developing the technology, both software and hardware, and tested preliminary versions in a test track demonstration. BART proposes to implement the Advanced Automatic Train Control System as a three-phase project.

Phase One involves interfacing new Advanced Automatic Train Control System station computer and communications technology with the existing vehicle and station control equipment at the test track and making necessary modifications to such equipment to accommodate the Advanced Automatic Train Control System operation.

In Phase Two, BART contemplates full development of the system hardware and software for revenue service operation. Phase Two entails a pilot test of the project, involving installation of Advanced Automatic Train Control System operation equipment on 10 cars and in two stations, Lake Merritt and Fruitvale, and is currently underway. Phase Two activities will entail the operation of modified equipment during revenue hours on passenger carrying trains, to collect communications and train location functions data. However, movement of trains will continue to be controlled by existing track circuit equipment.

During Phase Two, existing equipment will be modified to achieve hybrid operation in which the vehicle will respond (1) to motion control commands sent by the Advanced Automatic Train Control System through the radio network or, in the absence of such commands, and (2) to speed commands sent by the existing track circuits. In revenue hour tests, trains will be under the control of the usual track circuits, but with software modified to allow collection of Advanced Automatic Train Control System related data. BART states that it will notify the Commission prior to the start of such tests.

The application states that Phase Three entails the manufacture and installation of Advanced Automatic Train Control System equipment for revenue service on all control cars, and on 22 miles of BART's system: the A-Line from Fruitvale south through Bayfair; in the Lake Merritt area to MacArthur Station interface; and the M-Line through Daly City.

The application requests deviations (referred to as variances by BART and in the Settlement Agreement) from several provisions of GO 127, which governs Automatic Train Control design and operation. BART states that GO 127 currently mandates the use of several technologies which prevailed in

1972, but which are superceded by the Advanced Automatic Train Control System. Mandated technologies include (1) track circuits for communications and train detection, which BART contends are now being replaced by radio communication and radio ranging, respectively; and (2) fixed-rate braking, which is being replaced by controlled variable braking.

GO 127, by its own terms, allows for the Commission to grant deviations from the rules contained in the general order. Requests are to provide a full statement of the reasons justifying the requested deviations and any deviation so granted is to be limited to the particular case covered by the request. (GO 127, Rule 5.1.) It is not the purpose of the proceeding to formally amend GO 127. In the event it is believed amendment of GO 127 is appropriate, this will be initiated either by a formal Commission rulemaking proceeding or by a party petition pursuant to Pub. Util. Code § 1708.5.

BART's application provides specific methodologies for testing and implementing the Advanced Automatic Train Control System. The application states that stringent safety requirements are a major focus of the program. BART states that it will review and submit to the Commission all required safety documents.

B. Request as Initially Filed

Initially, BART sought deviations of GO 127 in the following respects, with additions underlined and deletions shown as strikeout:

> Section 1.10 to be modified to read as follows:
>
> Fail-Safe – A characteristic of a system which ensures that any malfunction affecting safety will cause the system to revert, <u>within probabilistically-defined system Mean Time Between Hazard,</u> to a state that it is known to be safe.

Section 3.3 to be modified to read as follows:

~~Trains shall be detected continuously. The maximum length of a train detection zone shall not exceed 5,000 feet. If the train detection equipment becomes incapable of detecting the presence of a train in a zone or zones, the effect shall indicate that zone or zones as occupied.~~ Train location shall be determined periodically by a Station Computer-based system that shall store last-known occupancies, and use them along with civil speed limits and other track data to compute safe speed and deceleration commands for following trains.

Section 3.8(a) to be modified to read as follows:

If the speed of a train broaches the safe speed-distance profile, the system shall immediately command an accelerometer-controlled brake rate calculated to be safe, and shall monitor the progress of the trains to assure maintenance of the commanded rate within prescribed limits. If the system detects that the prescribed limits are broached, the system shall immediately and automatically cause an open-loop brake application which shall be maintained at least until the train speed reduces to a value below the safe speed-distance profile.

Section 3.8(b) to be modified to read as follows:

The safe braking distance shall be a curve based on the track and wayside structure requirements and shall apply to each track throughout the length of the system. The profile transition from a lower speed limit to a higher speed limit shall not rise from the lower value until the rear of a train clears the lower speed limit. The profile transition from a higher speed limit to a lower speed limit shall be a continuous curve beginning at a point preceding the entrance to the lower speed limit by a distance at least equal to the sum of the maximum open-loop braking distance ~~and the distance traveled in 3.0 seconds at the higher speed limit,~~ and the equipment reaction time distance at the higher

speed limit, and ending at a point preceding the entrance to the lower speed limit by a distance ~~at least equal to the sum of the distance traveled in 3.0 seconds at the lower speed limit, and the equipment reaction time distance at the loser speed limit.~~ sufficiently large to offer safe separation under adverse conditions.

BART also sought the following changes to D.91846.

Section 1.A.a of D.91846 is modified to read as follows:

BART shall operate the SORS as a backup for the ~~primary detection system during both revenue and nonrevenue service. SORS may be disabled during nonrevenue service only when adequate train separation is assured by Central Control operating procedures, as authorized by the Commission staff.~~ track-circuit based system of train detection unless the trains in the associated control zone are all under AATC system Control Mode control, in which case train detection, location and train separation shall be enforced by the AATC system.

The application also sought approval of the Phase Two testing, including revenue service testing of the Advanced Automatic Train Control System and approval of the Phase Three revenue service as described above.

C. Position of Rail Safety on Initial Request

In its response to BART's application, Rail Safety asserted that an evidentiary hearing might be necessary to resolve issues raised by BART's application, including those that might arise during the process of certifying the safety of the Advanced Automatic Train Control System. Rail Safety's response states that BART's application lacked information necessary for Rail Safety to oversee the safety of the proposed project. Specifically, Rail Safety objected that BART had not yet submitted its Advanced Automatic Train Control System Safety Certification Program Plan to the Commission. Rail Safety contended that

it could not make a recommendation that BART institute the Advanced Automatic Train Control System in revenue service until it had received, reviewed and concurred with BART's Advanced Automatic Train Control System Safety Certification Report. However, Rail Safety indicated its support for granting the General Order deviations requested, concurring that the technology in place when the current version was adopted was very different from what was now available.

D. Initial Settlement Proposal

On November 18, 1999, BART and Rail Safety filed a motion for adoption of what is identified as a settlement. The settlement proposes deviations to certain provisions of GO 127 and D.98146 for purposes of enabling BART to use the new technology required by its proposed Advanced Automatic Train Control System. These are somewhat different than those deviations requested in the application.

A copy of the Safety Certification Plan was provided to Rail Safety by BART transmittal letter dated September 16, 1999, prior to the initial settlement proposal. Counsel for BART noted at the March 23, 2000 PHC that a more recent copy of this Safety Certification Plan would be provided to Rail Safety on, or soon after the PHC. It was also noted that there would be additional revisions to the Safety Certification Plan.

In the initial settlement, the Parties agreed that BART would provide Rail Safety with a copy of the most recent draft of the Safety Certification Plan setting forth the tasks, goals, documents, schedules, and personnel intended to ensure the safe development of the technology necessary for revenue service of the Advanced Automatic Train Control System and that Rail Safety would have 14 days to file with the Commission comments on that plan. The Parties further

agreed that any changes in the Safety Certification Plan would be provided to Rail Safety within two days of being finalized and Rail Safety would have 14 days to file any comments on such changes with the Commission.

The Parties agreed that BART would provide Rail Safety a schedule indicating the time and place of each audit to be performed by BART's Independent Safety Auditor regarding development of the Advanced Automatic Train Control System and notice at least two weeks in advance of any change in that schedule. The Parties further agreed that BART will provide Rail Safety an unedited copy of any report prepared by the Independent Safety Auditor of any such audit within two days of receiving it.

Finally, the Parties agreed that, on completion of Test Gate 3MD, as described in the Safety Certification Plan, BART will report to the Commission on the status of the development of technology necessary for Revenue Service of Advanced Automatic Train Control System and that Rail Safety will have 30 days to file comments on that report. The Parties further agreed that at that time they would address the need for BART to submit a report on completion on any subsequent Test Gate.

E. Final Settlement Proposal

On May 10, 2000, BART and Rail Safety filed a motion for approval of a new settlement, constituting what is now the Settlement Agreement before the Commission for approval. The settlement provisions are set forth as follows:

BART and Rail Safety stipulate that BART should be able to use the Advanced Automatic Train Control System in revenue service during Phase Two of the project subject to "execution" by BART of the Safety Certification Plan attached to the Settlement Agreement as Exhibit A, and verification by the Rail Safety unit "that each element detailed therein has been completed in accordance

with the Safety Oversight Plan" attached to the Settlement Agreement as Exhibit B.

Both parties stipulate that Rail Safety has accepted the Safety Certification Plan, that the plan is complete and that it provides sufficient opportunity for Rail Safety to carry out it responsibilities.

The parties recommend deviations from GO 127, that are again somewhat different from those requested in the application. The recommended changes are as follows:

Section 1.10 should be revised to read:

> Failsafe - A characteristic of a system which ~~ensures that any malfunction affecting safety will cause the system to revert to a state that is known to be safe~~ either has no known mechanism that can lead to unsafe operation, or if the absence of such unsafe mechanisms cannot be proven, can be shown by analysis that the equipment will not fail in an unsafe manner more frequently than the criteria established by the mean time between hazards for the system or component.

Section 3.3 should be revised to read:

> ~~Trains shall be detected continuously. The maximum length of a train detection zone shall not exceed 5000 feet. If the train detection equipment becomes incapable of detecting the presence of a train in a zone or zones, the effect shall indicate that zone or zones as occupied.~~ The AATCS shall locate each train continuously, store information on its last known location, and use this information to compute safe speed and deceleration for each following train.

Section 3.8 should be revised to read:

> The ~~train protection system~~ AATCS shall ensure that the speed of each ~~trains~~ train at each location is always less that the safe speed ~~distance profile over the entire system~~

determined according to physical constraints of the system and by the distance necessary to brake safely before reaching any closed interlocking gate or a detected obstacle.

(a) The Train Protection System ~~If the speed of a train broaches the safe speed-distance profile, the system~~ shall immediately and automatically ~~cause an open-loop brake application which shall be maintained at least until the train speed reduces to a value below the safe speed-distance profile~~ command any train exceeding safe speed to brake at a rate governed by the model and associated parameters specified in Exhibit A of the Safety Certification Plan and to maintain such braking until the train slows below the safe speed.

(~~b~~) The AATCS shall not permit any train to violate the Civil Speed Limit prevailing for any portion of track over which it is traveling ~~The safe speed-distance profile shall be a curve based on the track and wayside structure requirements and shall apply to each track throughout the length of the system. The profile transition from a lower speed limit to a higher speed limit shall not rise from the lower value until the rear of a train clears the lower speed limit. The profile transition from a higher speed limit to a lower speed limit shall be continuous curve beginning at a point preceding the entrance to the lower speed limit by a distance at least equal to the sum of the maximum open-loop braking distance and the distance traveled in 3.0 seconds at the higher speed limit, and the equipment reaction time distance at the higher speed limit, and ending at a point preceding the entrance to the lower speed limit by a distance at least equal to the sum of the distance traveled in 3.0 seconds at the lower speed limit, and the equipment reaction time distance at the lower speed limit.~~

~~(c) If the ATC speed limit is zero mph, the train protection system shall maintain an open-loop brake call after the train stops and until the train protection system changes the ATC speed limit.~~

~~(d) For purposes of train speed detection, the measurement of speed shall continuously represent true train speed within plus or minus 0.5 mph and independent of wheel wear.~~

~~(e) Zero speed shall be detected and used to prevent door operation and direction reversal when a train is moving.~~

~~(f) The train protection system shall initiate emergency braking in the event a train is detected to be rolling back. The emergency braking shall be applied before roll-back speed exceeds 1.0 mph, or before roll-back distance exceeds 30 inches.~~

Section 3.9 should be revised to read:

~~All signals that govern train movements shall be~~ Any signal commanding a train's movement shall be transmitted at the Command Transmission Interval specified in Exhibit A of the Safety Certification Plan. The . The interruption of any such signal for longer than ~~continuous 1.0 second shall automatically initiate open loop braking.~~ Command Persistence Interval specified in Exhibit A shall automatically ~~initiate~~ cause the Train Protection System to command the train to enter open-loop braking.

The parties also stipulate to a modification of D.91846 to the effect that notwithstanding Ordering Paragraph 1.A. of that decision, BART should be authorized to suspend its Sequential Occupancy Release System (SORS) for any portion of track controlled by AATCS.

The parties have also reached agreement on various notification situations. If there are any changes made to the Safety Certification Plan, BART

will provide the Rail Safety unit notice of the changes within two days and the Rail Safety unit will have 14 calendar days to notify BART of any objections to the changes. BART agrees to not implement any changes without the agreement of the Rail Safety unit.

With regard to the Independent Safety Auditor, BART agrees to provide the Rail Safety unit a schedule indicating the time and place for each audit to be performed, at least two weeks' notice of any changes in that schedule, and unedited copies of any report prepared by the Independent Safety Auditor of any such audit within two days.

BART is to also file an advice letter with the commission upon completion of Safety Certification "Gates" defined in the Safety Certification Plan, along with a copy of each required certificate of conformance, allowing the Rail Safety unit two weeks to verify whether they were properly completed.

Finally, BART withdraws its request for approval of Phase Three revenue service and will seek its approval at a later time.

V. Discussion

Although subject to some periodic confusion during the proceeding, what is being requested here is not a complete Commission approval of Phase Two testing, but rather an approval of the deviations from provisions of GO 127 that would allow such testing to occur, and mechanisms to have Rail Safety be involved in reviewing every aspect of the testing program.

With those deviations approved, Phase Two testing can occur. The agreement between Rail Safety and BART provides for Rail Safety to approve in advance each proposed component of the Phase Two testing for compliance with the agreed-upon Safety Certification Plan. Rail Safety would have a minimum of 14 days to review any modifications to the Safety Certification Plan. Upon

completion of all of the required elements of the Phase Two program, BART would file what is, in the agreement, denominated an "advice letter" to advise the Commission of achieving completion and to provide some notice to the public and the opportunity for any challenges to that status.

As now presented (and as we will require) Phase Three revenue service will necessitate a separate application which will apprise us of the results of the Phase Two testing, the status of all safety certifications necessary and the involvement of the Rail Carrier unit. Therefore, this settlement is not of the ultimate approval to institute a new operational program, but rather to authorize the operational rule changes necessary to permit the proposed new operational program to be evaluated.

Rule 51.1(e) provides that the Commission must find a settlement "reasonable in light of the whole record, consistent with the law, and in the public interest" in order to approve the settlement. These criteria apply to the settlement before us.

BART and Rail Safety have tendered an "uncontested settlement" as defined in Rule 51(f), *i.e.*, a settlement that "...is not contested by any party to the proceeding within the comment period after service of the [] settlement on all parties to the proceeding." Only one other party has noted any comments on any of the various iterations of settlements offered in this proceeding. On November 17, 1999, the United Transportation Union advised the assigned administrative law judge that it "waives any right to comment on the proposed settlement agreement between the San Francisco Bay Rapid Transit District and the California Public Utilities Commission regarding Application 99-02-012." (Letter of Michael N. Anderson, November 17, 1999.)

In *San Diego Gas & Electric* (1992) 46 CPUC2d 538, the Commission further defined its policy as applicable to all party settlement proposals. As a precondition to approval the Commission must be satisfied that:

a. the proposed all party settlement commands the unanimous sponsorship of all active parties to the instant proceeding;

b. the sponsoring parties are fairly reflective of the affected interests;

c. no term of the settlement contravenes statutory provisions or prior Commission decisions; and,

d. the settlement conveys to the Commission sufficient information to permit it to discharge its future regulatory obligations with respect to the parties and their interests.

This settlement is tendered pursuant to Rule 51, and the settling parties aver that it conforms to all the above criteria.[2]

Settlements presented to the Commission must necessarily be reviewed and considered with a certain element of caution. Unlike a situation involving purely private litigants and limited to their individual interests, matters before this Commission often involve elements affecting broad public interests. Even those public interests may be quite diverse reflecting all of the participants in the provision of utility service from investors to employees to suppliers to customers, as well as interests impacted by those activities, including the broader public, other public agencies, the environment and other concerns. Here that is clearly the case, where the applicant is itself a public transit district and the

[2] The United Transportation Union (Union), the only other party to this proceeding other than BART and Rail Safety, notified the ALJ by letter dated November 17, 1999, that the Union would not be filing comments on the Settlement Agreement.

issues at stake are the safety of and service to their passengers. The settlement here is between BART and the Commission's Rail Safety unit, our staff division charged with primary responsibility on behalf of the Commission for actively monitoring and reviewing all elements related to public rail transit safety.

We are confident that Rail Safety takes these responsibilities very seriously and will carefully monitor and review all aspects of this evolving program. The public safety demands no less. We need to be sure there is no question as to what exactly the Rail Safety unit's role will be during the implementation and evaluation of the various steps for the Phase Two and, ultimately, Phase Three operations. Comments from Rail Safety's counsel at the third PHC indicated that the role of Rail Safety would be to "monitor BART's progress through these phases." (Tr. PHC 50.) We want to ensure that there is no misunderstanding and that Rail Safety's role will be extensive and not just serve to "monitor BART's progress."

In the last adopted Commission business plan, the role of our staff in maintaining rail safety oversight was specified. Among the adopted strategies for carrying out its rail safety role with respect to rail transit operations such as BART was the following:

> "Participate in engineering design reviews, identify oversight focus on safety-critical systems and sub-systems, review design documents, review safety certification process, including verification and validation of software, witness testing, perform sampling inspections, and check records to evaluate compliance with the Commission's safety rules and regulations and other established industry safety standards. Resolve safety issues and insure closure of all open safety concerns prior to opening for revenue service." (Public Utilities Commission, 1999-2000 Business Plan, Rail Safety and Carriers Division Section, 4, Strategy 1.)

We have no reason to believe that that role has changed. We will require that the Rail Safety unit's role is not merely to determine if BART is proceeding to do what it said it would do, but to evaluate each and every step of the process to determine whether the paramount concern of passenger safety is being adequately addressed or modifications are necessary.

The settlement here is limited to approving certain deviations from GO 127 and a prior Commission decision that will permit the testing of the proposed change in control/monitoring technology. It establishes agreed-upon procedures for the Rail Safety unit to continuously monitor all aspects of the Phase Two testing, to review and approve each new element of testing prior to it being undertaken and, in so doing, to provide an on-going exercise of the Commission's statutory obligation BART safety. In effect, the settlement is more an approval of an agreed upon process than an outcome.

We note that the proposed Settlement Agreement language modifying GO 127 is clearer than the proposed language contained in BART's original application. We also note that the Settlement Agreement contains provisions for periodic reporting to staff. Rail Safety's concern regarding the Safety Certification Plan has resolved and, according to the Settlement Agreement, Rail Safety will receive and review any future revisions of the Safety Certification Plan.

When examined as a total product, we find the Settlement Agreement to be reasonable in light of the whole record, consistent with law, and in the public interest.

VI. Need for Hearing

This matter was categorized as a ratesetting proceeding and it was preliminarily determined that a hearing might be necessary. The settling parties have reached a stipulation that resolves all the contested facts. Thus, no factual dispute exists that requires an evidentiary hearing.

VII. Comments on Draft Decision

This is an uncontested matter in which the decision grants the relief requested. Accordingly, pursuant to Pub. Util. Code § 311(g)(2), the otherwise applicable 30-day period for public review and comment is being waived.

Findings of Fact

1. A notice of a November 15, 1999 settlement conference was provided on November 8, 1999.

2. The first settlement agreement between BART and Rail Safety and a motion to accept it were filed on November 18, 1999.

3. A PHC (the third one in this proceeding) was held on March 23, 2000 to ascertain whether the settlement resolved the issues presented in the proceeding.

4. On May 10, 2000 a new settlement agreement and motion requesting its approval were filed to supercede the November 18, 1999 settlement agreement.

5. In A.99-02-012, BART seeks authority to commence train service utilizing the Advanced Automatic Train Control System for train separation and motion control.

6. BART's application seeks authority to modify the existing train system with an overlay subsystem that will enable trains to operate at closer headways while maintaining no less than the existing degree of safety.

7. The Advanced Automatic Train Control System will transfer control of the motion control function of train operations from the original track circuit based

system to a radio based system working in conjunction with station based computers.

8. The Settlement seeks deviations from GO 127 and D.91846 that will permit BART to do testing for the Advanced Automatic Train Control System.

9. The technology for train control has changed from the time of the adoption of GO 127 to the present.

10. The Rail Safety unit is the Commission staff organization with responsibility for carrying out the Commission's safety responsibilities with respect to BART.

11. The Settlement Agreement provides that approval is not being sought at this time for BART's application request for Phase Three revenue service on BART's other tracks and trains.

12. No party opposed the Settlement Agreement.

13. An evidentiary hearing is not required in this proceeding.

Conclusions of Law

1. GO 127, by its own terms, permits deviations to be granted to the rules it contains.

2. The deviations to GO 127 as contained in the Settlement Agreement and authorized by this order are reasonable and limited to the circumstances described in this application and the Settlement Agreement and do not constitute an amendment of GO 127 itself.

3. The modification of D.91845 as contained in the Settlement Agreement and authorized by this order is reasonable.

4. The Commission has a statutory duty to regulate the safety appliances and procedures of BART, to inspect all safety related work and take such steps as are necessary for the purpose of safety to BART employees and the general public.

5. The May 10, 2000 Settlement Agreement is the Settlement Agreement which BART and Rail Safety request be approved.

6. The Settlement Agreement is an "uncontested" settlement as defined in Rule 51(f) of the Commission's Rules.

7. The proposed Settlement Agreement is reasonable in light of the whole record, consistent with law, and in the public interest.

8. The proposed Settlement Agreement satisfies the Commission criteria for an all-party settlement as set forth in Rule 51 et seq. of the Commission's Rules and in *San Diego Gas & Electric* (1992), 46 CPUC2d 538.

9. The proposed Settlement Agreement should be approved.

10. No evidentiary hearing is required in this matter.

O R D E R

IT IS ORDERED that:

1. The motion of the San Francisco Bay Area Rapid Transit District (BART) and the Commission's Rail Transit and Safety Section of the Rail Safety and Carriers Division (Rail Safety) for adoption of a Settlement Agreement filed on May 10, 2000, and set forth in Appendix A of this order, is granted.

2. BART may request final approval of the Advanced Automatic Train Control System in Phase Three revenue service on BART's other tracks and trains after successful completion of Phase Two objectives and any such request shall be by separate application.

3. This proceeding is closed.

This order is effective today.

Dated March 27, 2001, at San Francisco, California.

LORETTA M. LYNCH
President
HENRY M. DUQUE
RICHARD A. BILAS
CARL W. WOOD
GEOFFREY F. BROWN
Commissioners

APPENDIX A

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of the San Francisco Bay Rapid Transit District for Authority to Institute Revenue Passenger Service Utilizing the Advanced Automatic Train Control System for Safety-Critical Motion Control.	Application 99-02-012

SETTLEMENT

The parties to this settlement before the California Public Utilities Commission ("Commission") are the San Francisco Bay Area Rapid Transit District ("SFBARTD") and the Rail Transit Safety Section ("RTSS") of the Rail Safety and Carriers Division, collectively referred to as "the Parties."

The Parties stipulate that SFBARTD should be authorized to use the Advanced Automatic Train Control System ("AATCS") in Revenue Service during Phase 2 of this project (as described in SFBARTD's application), subject to execution by SFBARTD of the Safety Certification Plan (the "Plan"), a copy of which is attached hereto as Exhibit A, and verification by RTSS that each element detailed therein has been completed in accordance with the Safety Oversight Plan (a copy of which is attached hereto as Exhibit B.)

Further, the Parties stipulate that RTSS has accepted the Plan, that the Plan is complete, and that the Plan provides sufficient opportunity for RTSS to carry out its responsibilities.

Further, the Parties stipulate that variances to various provisions of General Order 127 and Decision 98146 should be authorized for purposes of the present proceeding to enable SBARTD to use the AATCS:

1) Section 1.10 of General Order 127 should be revised for these purposes to read:

Failsafe - A characteristic of a system or a component of a system which either has no known mechanism that can lead to unsafe operation or, if the absence of

such unsafe mechanisms cannot be proven, can be shown by analysis that the equipment will not fail in an unsafe manner more frequently than the criteria established by the mean time between hazards for the system or component.

2) Section 3.3 of General Order 127 should be revised for these purposes to read: The AATCS shall locate each train continuously, store information on its last known location, and use this information to compute safe speed and deceleration for each following train.

3) Section 3.8 of General Order 127 should be revised for these purposes to read: The AATCS shall ensure that the speed of each train at each location is always less than the safe speed determined according to physical constraints of the system and by the distance necessary to brake safely before reaching any closed interlocking gate or a detected obstacle.

   (a) The Train Protection System shall immediately and automatically command any train exceeding safe speed to brake at a rate governed by the model and associated parameters specified in Exhibit A of the Safety Certification Plan and to maintain such braking until the train slows below the safe speed.

   (b) The AATCS shall not permit any train to violate the Civil Speed Limit prevailing for any portion of track over which it is traveling.

4) Section 3.9 of General Order 127 should be revised for these purposes to read: Any signal commanding a train's movement shall be transmitted at the Command Transmission Interval specified in Exhibit A of the Safety Certification Plan. The interruption of any such signal for longer than the Command Persistence Interval specified in Exhibit A shall automatically cause the Train Protection System to command the train to enter Open Loop Braking.

5) Notwithstanding Ordering Paragraph 1.A. of Decision 91846, SFBARTD should be authorized to suspend its Sequential Occupancy Release System for any portion of track controlled by AATCS.

Further, the Parties stipulate that SFBARTD will provide RTSS a copy within two working days of any change in the Plan and that RTSS will have fourteen calendar days to notify SFBARTD of any objection to the change. SFBARTD will not implement any change without the agreement of RTSS. Minor, nonsubstantive revisions to the Plan having nothing to do with the certification, such as changes to titles and formats, may be made without the process described herein.

Further, the Parties stipulate that SFBARTD will provide RTSS a schedule indicating the time and place of each audit to be performed by the Independent Safety Auditor regarding development of AATCS and notice of at least two weeks of any change in that schedule and agree that SFBARTD will provide RTSS an unedited copy of any report prepared by the Independent Safety Auditor of any such audit within two days.

Further, the Parties stipulate that SFBARTD will file an Advice Letter with the Commission upon completion of Safety Certification Gates defined in the Plan, along with a copy of each required certificate of conformance and that RTSS will then have two weeks to verify whether they were properly completed.

Further, SFBARTD hereby withdraws its request, as set forth on page 15 of its application, that the Commission issue "an order granting approval of Phase 3 revenue service," and will seek its approval at a later time.

Executed 10th day of May, 2000

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(END OF APPENDIX A)