2005 ON-SITE SAFETY AUDIT OF THE SAN FRANCISCO MUNICIPAL RAILWAY RAIL TRANSIT SAFETY PROGRAM

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1. EXECUTIVE SUMMARY

The Rail Transit Safety Section staff, assisted by the Railroad Operations Safety Branch staff, (staff) of the California Public Utilities Commission's (Commission) Consumer Protection and Safety Division conducted the third triennial, on-site, safety audit of the San Francisco Municipal Railway (MUNI) from October 17, 2005 to October 26, 2005. The audit was comprehensive in nature and addressed safety programs and practices in the design, construction, operation, and maintenance of the system. Also included was a review of the system's security program and practices.

Track, signal and train control, revenue vehicle, and overhead lines inspections were carried out between September 13 and October 7, 2005. The on-site audit was preceded by an entrance meeting with MUNI and San Francisco Municipal Transportation Agency (SFMTA) representatives on October 17, 2005. The meeting included the SFMTA Acting Executive Director, the MUNI General Manager, and other agency executives. Audit activities began after the conclusion of the meeting.

An exit meeting, also attended by the SFMTA Acting Executive Director, the General Manager, and other agency executives, was held November 8, 2005. Staff provided a preliminary report concerning audit findings and possible recommendations for corrective actions.

Audit sessions were carried out at various MUNI and SFMTA offices, divisions, and departments. Seven of the checklists were dedicated specifically to the inspection of facilities, and equipment. The remaining checklists were devoted to the review of safety and security program adequacy and the verification of effective implementation of those programs.

Audit results indicate that MUNI has made continual improvements in implementing its system safety and system security programs. Auditors noted that MUNI continues to develop, refine, and improve those programs. Track and signals maintenance programs, training program formalization, corrective action plan formalization and implementation, and operations evaluations programs showed significant improvement between the 2002 and 2005.

Despite that continued progress, safety and security program deficiencies were identified. The deficiencies and subsequent recommendations for corrective action are described, where applicable, in the Results/Comments Section of each audit checklist. Of the 47 checklists employed in the audit, 35 included recommendations for corrective actions.

Twelve staff recommendations were to complete corrective actions that MUNI had independently identified, developed, and initiated prior to this safety audit. Eleven of the 43 staff recommendations were to complete corrective actions resulting from deficiencies previously identified by staff during the 2002 audit. Many other staff recommendations concerned important details of MUNI's increasingly comprehensive and refined system safety program. In previous audits, inadequacies found by staff were generally broader in scope or in more elemental aspects of the safety program.

Among the safety program elements found to be less than adequate, five were related to program deficiencies identified by staff during the 2002 MUNI Triennial Safety Audit. Those safety program elements are addressed in Checklist 9 – System Safety & Security

Program Plan Administration and in Checklist 29 – Operating Rules and Procedures for Historic Streetcars; Checklist 33 – Cable Car Operating Crew Performance; Checklist 43 – Emergency Response Planning and Training; Checklist 45 – Interdepartmental & Interagency Coordination and; Checklist 46 – Contractor Safety Program.

The Introduction for this report is presented in Section 2. The Background, in Section 3, contains a description of the MUNI rail system and 2002 audit results. Section 4 describes the 2005 Audit Procedure. Section 5 discusses the Audit's Findings and Recommendations.

Acronyms are listed in Appendix A. The MUNI 2005 Triennial Safety Audit Checklist Index and the Recommendations List are included, respectively, in Appendices B and C. The Triennial Safety Audit Checklists are presented in Appendix D.

2. INTRODUCTION

The Commission's GO 164-C, Rules and Regulations Governing State Safety Oversight of Rail Fixed Guideway Systems, and the Federal Transit Administration's (FTA) 49 CFR Part 659 require the Commission to perform triennial, on-site, safety audits of each rail transit agency. The purpose of these audits is to verify compliance with and evaluate the effectiveness of each rail transit agency's System Safety Program Plan (SSPP). MUNI was last audited in October 2002.

On August 15, 2005, staff sent a letter, including the seven safety inspection checklists, to the MUNI Director of Safety, Security, and Training. That letter advised that the safety inspections associated with the triennial audit would be scheduled with MUNI to begin in September 2005. Specific dates and times were subsequently confirmed with the San Francisco Municipal Transportation Agency (SFMTA) Office of Health and Safety.

The track inspections and train control and signal inspections were performed by Railroad Operations and Safety Branch staff on September 13 and 14, 2005. The overhead lines inspections were conducted by Rail Transit Safety Section staff on October 5 and 6, 2005. The light rail vehicle (LRV), historic streetcar (HSC) and cable car inspections were performed by Railroad Operations and Safety Branch staff on October 6 and 7, 2005.

Staff sent a letter to the SFMTA Acting Executive Director on September 16, 2005 that scheduled the safety audit entrance meeting and established the planned safety audit dates. That letter included the remaining 40 checklists that would serve as the basis for the safety audit.

Staff held the audit entrance meeting with SFMTA and MUNI representatives on the morning of Monday, October 17, 2005. Those representatives included the Acting Executive Director of SFMTA, the MUNI General Manager, several Deputy General Managers, Superintendents, and other Managers. At the meeting, staff provided a brief description of the audit process and discussed its expectation that the safety audit would be a positive, constructive, and cooperative process. SFMTA and MUNI representatives were invited to ask questions about the audit. Procedures for making any necessary schedule changes were also established.

The safety audit activities were performed beginning the afternoon of October 17 and concluded the afternoon of October 27, 2005. Interviews with MUNI representatives and reviews of various program records and other documents were the primary activities involved in the process. Specific tasks included in each of the audit checklists form the core of these activities. The auditors, however, were encouraged to examine safety program issues beyond those listed in the checklists to further help assure the efficacy of MUNI's safety program and its implementation.

A post-audit conference was held with MUNI representatives on Monday, November 7, 2005. That meeting was also attended by the Acting Executive Director of SFMTA, the MUNI General Manager, several Deputy General Managers, Superintendents, and other Managers. At the post-audit conference, staff provided MUNI representatives with a verbal synopsis of the preliminary findings and recommendations from the 47 checklists. Staff explained to the MUNI representatives that a preliminary draft audit report would be prepared for SFMTA and MUNI review and comments.

3. BACKGROUND

MUNI is the public transportation system of the City and County of San Francisco. MUNI, along with the San Francisco Department of Parking and Traffic, became a part of the SFMTA on March 1, 2000. A seven-member board, appointed by the mayor, governs the SFMTA and the Executive Director serves as the agency's senior management officer.

MUNI was the first publicly owned streetcar system in a major city of the United States when it began operation in 1912. It has a relatively small service area of just 46.7 square miles, but the combined rail transit modes average more than 178,000 weekday riders. MUNI's fleet of rail transit vehicles consists of the subway and surface operating light rail vehicles (LRV), surface operating HSCs, and cable cars.

A. MUNI Rail System Description

MUNI rail transit operations are carried out by the Metro Division and the Cable Car Division. The Metro Division is responsible for the operation of the LRVs and the HSCs. It operates LRVs on five different lines. The HSCs are operated on the surface and principally on one double track line. Trains in MUNI's Market Street Subway and Twin Peaks Tunnel operate under the control of a fully automated communications based train control system. The majority of operations are in street and in mixed traffic, with up to a 9 percent grade in some locations. Metro Division trains carry more than 157,000 riders on most weekdays.

The Cable Car Division is responsible for operation of the cable cars. It provides passenger cable car service on three surface lines and over grades of up to 21 percent. The cable cars operate exclusively in mixed traffic. Most cable car operations take place on narrow, congested streets. A moving cable, below the surface of the street, provides propulsion for the cable cars via a mechanical grip, extending from the cable car and down through a continuous slot between the running rails. All onboard propulsion and braking controls for the cable cars are mechanical and hand or foot operated. Cable car operation and equipment has changed little since the late 19th Century. Both operations and maintenance rely heavily on human performance and craft. Cable cars average more than 21,500 riders on weekdays.

<u>MUNI Metro Division Lines</u>

The MUNI Metro Division currently operates five light rail lines and one line devoted to the operation of HSCs. Those lines include:

- F – Market and Wharves Line, dedicated to HSC operation;
- J – Church Line
- K – Ingleside Line
- L – Taraval Line
- M – Ocean View Line
- N – Judah Line (Includes operation on the E – Embarcadero Line)

MUNI Cable Car Division Lines

The MUNI Cable Car Division operates three lines. They include:

- Powell-Hyde Line
- Powell-Mason Line
- California Line

MUNI Metro Third Street Extension – Phase I

MUNI is constructing a new light rail line in the southeastern part of San Francisco. Known as the MUNI Metro Third Street Extension – Phase I, the line extends southerly from Fourth and King Streets, near MUNI's existing Caltrain Station to Bayshore Boulevard and just beyond the San Francisco city and county limits at Sunnydale Avenue. Most of the double track line will be located in the medians of Third Street and Bayshore Boulevard.

MUNI Metro East

MUNI Metro East is also part of the MUNI Metro Third Street Extension. The facility will be a light rail/streetcar maintenance and storage facility. It is being constructed one block east of Third Street, between Cesar Chavez and 25th Street, and bordered on the west by Illinois Street. This facility is necessary to maintain and store the additional LRVs that will be necessary to operate the expanded service on the Third Street Line.

MUNI Metro Third Street Extension – Phase II – The Central Subway

Phase II of the MUNI Metro Third Street Extension is called the Central Subway. It will extend the new MUNI Third Street Light Rail line north from King Street, along Fourth Street. Current plans include a new subway between Townsend and Bryant Streets, which will cross under Market Street and run under Geary and Stockton Streets to a station at Stockton and Clay Streets, in Chinatown. Three or four new underground stations will be included on the line.

MUNI's Construction Division has primary responsibility for the planning, design, construction, and testing of these line extensions and the new maintenance and storage facility.

B. SF MUNI 2002 Triennial Audit Recommendations Status

Staff performed the previous triennial on-site safety audit in September 2002. Forty nine checklists were used by staff in that audit. Results demonstrated that MUNI had made significant progress in developing and implementing the major elements of its system safety program since staff's first on-site safety audit in 1999. The audit did result in 15 recommendations for corrective actions. The recommendations focused on important details of the system safety program plan and the plan's implementation.

Resolution ST-59 adopted staff's audit report and ordered MUNI to develop an appropriate corrective action plan and implementation schedule to carry out staff's recommendations. MUNI was also ordered to provide staff with monthly status reports of its progress in implementing the corrective actions until they were completed.

MUNI developed and submitted a corrective action plan and schedule to implement each of the 15 recommendations. MUNI also met with staff and provided monthly written and oral reports concerning the status of corrective actions for each of the 15 recommendations. During the first eight months of 2005, MUNI provided staff with status reports at least twice each month. The SFMTA Executive Director and other senior agency officials regularly participated in these meetings to discuss the progress of corrective actions with staff.

By September 2005, MUNI reported completing 12 of the 15 corrective actions required by the Commission following the 2002 safety audit. The three remaining open corrective actions were nearing completion. Two of the open items concerned formalizing the administrative aspects of training programs and the third item involved modifying and formalizing HSC operating procedures manuals.

Findings of the 2005 audit indicated that there were four recommendations from 2002 which had not been adequately addressed. A summary of those recommendations is as follows:

- Operating Rules and Procedures for Historic Streetcars includes findings that the revision of rules and procedures for historic streetcars had not yet been completed. This safety concern was addressed in Recommendation 8 of the 2002 MUNI Triennial Safety Audit. Staff was aware of the status of that project prior to the 2005 audit based on the monthly status reports from MUNI.
- Cable Car Operating Crew Performance includes an incidental observation and finding concerning track maintenance employee's failure to comply roadway worker safety rules. While this finding does not directly relate to cable car crew performance, the observation was made during that segment of the audit. A similar finding was recorded during a staff track inspection in the 2002 MUNI Triennial Safety Audit and addressed in that report's Recommendation 3.
- Emergency Response Planning and Training and in Checklist 45 – Interdepartmental & Interagency Coordination, staff found that the status of corrective actions resulting from emergency response drills was not being tracked. A similar finding was recorded during the 2002 safety audit and addressed in that audit report's Recommendation 13.
- Contractor Safety Program contains findings that MUNI drafted but had not adopted a revised contractor safety program procedure to better address its responsibilities, including elements contained in the 2002 audit's Recommendation 1.

4. AUDIT PROCEDURE

Staff conducted the 2005 audit in accordance with Rail Transit Safety Section Procedure RTSS-4, which is titled Procedure for Performing Triennial Safety Audits of Rail Transit Systems. Staff developed 47 checklists to evaluate the adequacy of MUNI's system safety program and the efficacy of its implementation. The safety evaluation included the system's various departments, programs and processes which have system safety functions and responsibilities. It is based on Commission and FTA requirements, American Public Transportation Association system safety program guidelines, MUNI's system safety program plan, safety related MUNI documents, and the staff's knowledge of the transit system. A list of the 47 checklists is contained in Appendix B.

Each checklist identifies the core safety-related elements and characteristics that staff audited or reviewed. Each of the checklists also references Commission, MUNI, and other documents that establish the safety program requirements. In addition, the completed checklists may include reference to the methods used by staff for evaluating compliance with the safety program requirements. These methods may include:

- Discussions and interviews with MUNI management
- Reviews of rules, procedures, policies, and records
- Observations of operations and maintenance activities
- Interviews with rank and file employees
- Inspections and measurements of equipment and infrastructure

Upon completion of the safety audit and inspection activities associated with each checklist, staff reviewed its findings and, if appropriate, its preliminary recommendations for corrective actions with the respective MUNI representatives. This practice not only provides a chance to clear up any misunderstandings about the findings and recommendations, it also provides the MUNI representative an opportunity to promptly address any necessary safety improvements.

In recent years, MUNI's internal safety audit program has become increasingly comprehensive and effective in identifying safety program elements needing improvement. While the safety audit did not dwell excessively on safety program deficiencies that MUNI had already identified and addressed, staff auditors did make note of some specific deficiencies. The auditors also included recommendations that the corrective action plans, developed by MUNI's internal safety audit process, be completed.

The audit checklists did focus on system safety program requirements that affect the safety of the public, employees, and property and that are known or believed to be important to reducing safety hazards, preventing accidents, and increasing security.

5. FINDINGS AND RECOMMENDATIONS

Staff audited various MUNI and SFMTA divisions, departments, programs and processes, which have rail transit system safety program responsibilities. In some previous safety audit reports, staff addressed its findings and recommendations by grouping them according to the transit agency departments where deficiencies were identified. In this report, however, it was decided not to incorporate that sort of grouping because it could detract from the integrated organizational nature of the system safety concept. Briefly, divisions, departments, or other organizational entities included in the system should not be considered to be independent or assumed to function independently.

Generally, the auditors and inspectors found that the MUNI rail transit system has a comprehensive SSPP and that MUNI, along with SFMTA, has been increasingly effective in implementing that plan. The findings from the audit indicate that MUNI made significant progress between the 2002 and 2005. Even though the 2005 audit contains 43 recommendations, they should be viewed in the context of a safety program that has been developed and expanded considerably since 2002. Staff had a more complete and expanded safety program to evaluate, but found program details in need of improvement.

Specific improvements and corrective actions were seen in the areas of training program formalization and administration, track maintenance standards, the Advanced Train Control System maintenance program and, implementation of corrective action plans. Improvements were also noted in the program of train operator and train crew performance observations and the safety certification program.

Audit findings identified areas where additional changes should further improve MUNI's system safety program. As noted earlier, there were five program elements found to be less than adequate during the 2005 audit, which were similar to deficiencies found during the 2002 audit. Those elements are addressed in 2005 checklists as follows:

Checklist 9 – System Safety & Security Program Plan Administration and Checklist 29 – Operating Rules and Procedures for Historic Streetcars includes findings that the revision of rules and procedures for historic streetcars had not yet been completed. This safety concern was addressed in Recommendation 9 of the 2002 MUNI Triennial Safety Audit. MUNI has provided monthly status reports of this project prior to the 2005 audit.

Checklist 33 – Cable Car Operating Crew Performance includes an incidental observation and finding concerning track maintenance employee's failure to comply with roadway worker safety rules. While this finding does not directly relate to cable car crew performance, the observation was made during that segment of the audit. A similar finding was recorded during a staff track inspection in the 2002 MUNI Triennial Safety Audit and addressed in that report's Recommendation 3.

In Checklist 43 – Emergency Response Planning and Training and in Checklist 45 – Interdepartmental & Interagency Coordination, staff found that the status of corrective actions resulting from emergency response drills was not being tracked. A similar finding was recorded during the 2002 safety audit and addressed in that audit report's Recommendation 13.

Checklist 46 – Contractor Safety Program contains findings that MUNI drafted but had not adopted a revised contractor safety program procedure to better address its responsibilities, including elements contained in the 2002 audit's Recommendation 1.

Complete findings for each element of the safety program reviewed by the auditors and inspectors can be found in the audit checklists. Specifically, those findings for each element/characteristic can be found under the Results/Comments heading on each of the 47 checklists. To assist the reader in finding desired MUNI safety audit report information quickly, there are four appendices attached to this report. The respective appendices include:

A. Acronyms

B. SF MUNI 2005 Triennial Safety Audit Checklist Index

C. SF MUNI 2005 Triennial Safety Audit Recommendations List

D. SF MUNI 2005 Triennial Safety Audit Checklists

The SF MUNI 2005 Triennial Safety Audit was a comprehensive review of MUNI's system safety program elements and their implementation. To achieve that end, auditors and inspectors reviewed system safety program elements, examined and evaluated selected program records, and inspected selected facilities and equipment.

Listed below, in outline form and in the same order as the audit checklists, are the MUNI system safety program's elements, which were reviewed or inspected. Each entry also includes, when appropriate, a brief summary of staff's findings of deficient conditions and recommendations to MUNI for corrective action.

1. **Metro Track Inspection**

   No deficiency – No recommendation

2. **Cable Car Track Inspection**

   No deficiency – No recommendation

3. **LRV Inspection**

   No deficiency – No recommendation

4. **Historic Streetcar Inspection**

   Deficiency found: There were burned and damaged PCC electrical components despite regular inspections and maintenance.

   Recommendation:

   1. Examine and revise specific PCC inspection cycles.

5. **Cable Car Inspection**

   Deficiency found: There were no formal standards for cable car inspection or maintenance and only limited pre operation inspection and records are not maintained.

Recommendation:

2. Formalize standards for cable car inspection and maintenance.
3. Revise and record pre operation inspections.

6. Train Control & Signal Inspection

Deficiency found: Several "train coming" flashing signals, at crossings, are initiated by highway traffic signals and independent of approaching trains.

Recommendation:

4. Modify the "train coming" flashing signals to operate only when trains are approaching crossings.

7. Overhead Catenary Inspection

Deficiency found: Various conditions were not in compliance with GO 95.

Recommendation:

5. Inspect the system overhead lines and correct GO 95 violations.

8. Authority and Responsibility for System Safety Program

Deficiency found: There was no control document for the Operations Safety Review Committee.

Recommendation:

6. Formalize the Operations Safety Review Committee.

9. System Safety & Security Program Plan Administration

Deficiency found: The Rules & Instructions Handbook and the HSC operating procedures, being revised, have not been completed. Effective dates on documents precede approved dates.

Recommendations:

7. Complete the revision and adopt the Rules & Instructions Handbook.
8. Complete, adopt, and implement the revision to HSC operating procedures.
9. Ensure that effective dates on documents are the same or later than the approved dates.

10. Reporting and Investigating Accidents and Unacceptable Hazardous Conditions

Deficiency found: Accident investigation reports have not been finalized and submitted in 2004 and 2005 as required by GO 164-C.

Recommendation:

10. Submit accident investigation reports or updates within time frames required by GO 164-C.

11. Internal Safety Audit Program

Deficiency found: Effective dates on documents precede approved dates.

Recommendation:

9. Ensure that effective dates on documents are the same or later than the approved dates.

12. System Security Program - Audits, Evaluations and Reports

No deficiency – No recommendation

13. Change Control Management

Deficiency found: Rail Change Control Board and Rail Procedures Committee members are not maintaining complete records and following prescribed MUNI procedures. Effective dates on documents precede approved dates.

Recommendation:

9. Ensure that effective dates on documents are the same or later than the approved dates.

11. Ensure all effected departments comply with Rail Change Control Board and Rail Procedures Committee procedures.

14. Configuration Management

Deficiency found: Effective dates on documents precede approved dates.

9. Ensure that effective dates on documents are the same or later than the approved dates.

15. Safety Certification – Third Street Extension

Deficiency found: Safety Certification Committee members frequently did not attend meetings, the committee did not always meet as scheduled, and the Safety Certification Plan is being revised but has not been completed.

Recommendations:

12. Ensure that affected departments attend Safety Certification Committee meetings

13. Ensure the committee meets at the required frequencies.

14. Complete the revision of, adopt, and implement the Safety Certification Plan.

16. Measuring and Testing Equipment

No deficiency – No recommendation

17. Subway Station and Emergency Equipment Maintenance

Deficiency found: There was no hard copy record of one work order in a sample of ten reviewed and some PM checklists were not signed or dated.

Recommendations:

15. Ensure that subway and emergency work order records are available for at least four years.

16. Ensure that PM checklists are completed with the proper dates and signatures.

18. Drug and Alcohol Program

No deficiency – No recommendation

19. Employee Safety Program

Deficiency found: The tracking of the Hazard Communication Program training and other training activities related to hazard management is incomplete.

Recommendation:

17. Complete the update of the Hazard Communication Program training database.

20. Operating Rules and Procedures – LRVs

Deficiency found: The Master File for All Rules procedures for issuing Bulletins, Notices, and Orders are redundant and unnecessarily complex, active/inactive status of bulletins and notices could not be tracked, there is no means to verify that employees have received bulletins and notices, and no one identified to keep the documents current on bulletin boards.

Recommendations:

18. Reexamine and revise the Master File for All Rules to simplify and limit authority regarding issuing Bulletins, Notices and Orders.

19. Develop a bulletins and notices master log for Green Division, similar to Cable Car Division's Master Log.

20. Develop a mechanism that ensures and verifies that employees receive bulletins and notices and identify persons responsible for keeping bulletin boards current.

21. Hours of Service Train Operators, Train Controllers and Supervisors

Deficiency found: Operations supervisors exceeded hours of service requirements by working up to 16 hours, exceeding the 12 hour maximum.

Recommendation:

21. Identify causes and take action to ensure supervisors and other employees comply with the Commission's hours of service requirements.

22. Hazardous Materials Management Program

Deficiency found: The revised SOP for hazardous waste has not been completed and the database for track employee training is incomplete.

Recommendations:

17. Complete the update of the Hazard Communication Program training database.

22. Complete and implement the revised SOP for hazardous waste.

23. Training and Certification of HSC and LRV Operators, Rail Inspectors, On Track Equipment Operators and Train Controllers

Deficiency found: There is no means to verify that all operator deficiencies, identified by trainers, have been resolved prior to the completion of training and certification and the time between training and certification classes of some operators has exceeded the two year maximum.

Recommendation:

23. Create a summary evaluation form for each training and certification program to consolidate the comments, about each trainee, from all participating trainers.

24. Ensure that all required LRV operator training and certification is provided within the GO 143-B required time periods.

24. Training and Certification of Cable Car Grip Person, Conductors and Inspectors

No deficiency – No recommendation

25. Training and Certification of LRV & HSC Mechanics and Technicians

Deficiency found: Training required for each LRV Maintainer classification is not specific and training records are incomplete.

Recommendation:

25. Revise the LRV Maintainer Training Program Plan to further specify the training requirements and provide complete records.

26. Track Maintenance Training and Certification

No deficiency – No recommendation

27. Signal Maintenance Training and Certification

Deficiency found: The scope of signal and communication training is not clearly defined and training records are incomplete.

Recommendation:

26. Revise the Signal & Communication Training Program Plan concerning the scope of training and completeness of the training and certification records.

28. Traction Power Maintenance Training and Certification

Deficiency found: The OCS maintenance training and certification program including trainer qualifications is not adequately detailed and the Motive Power Training Program Plan does not specify the GO 143-B required two years maximum between refresher and certification training classes.

Recommendation:

27. Evaluate the adequacy of the OCS maintenance training and certification program and trainer qualifications and revise the program to address any deficiencies.

28. Revise the Motive Power Training Program Plan to address the frequency of training and further specify the required training shown in Appendix A of the document.

29. Operating Rules and Procedures for Historic Streetcars

Deficiency found: Revision to HSC operating rules and procedures is not completed.

Recommendation:

8. Complete, adopt, and implement the revision to HSC operating procedures.

30. Program of Operational Evaluations – Metro and Cable Car Divisions

Deficiency found: MUNI SSPP and Rail Transit Operator Compliance Program do not reference Cable Car Division observation check procedures and Green Division surreptitious evaluations have been limited in number.

Recommendation:

29. Update the SSPP and Rail Transit Operator Compliance Program including observation check procedures that the Cable Car Division follows and expand the use of surreptitious observations.

31. Central Control Dispatchers Performance

No deficiency – No recommendation

32. Metro LRV and Historic Streetcar Train Operator Performance

Deficiency found: MUNI does not conduct performance evaluations of the train operators' pre operational check.

Recommendation:

30. Monitor and verify that Green Division train operators are performing the required pre-operational checks.

33. Cable Car Operating Crew Performance

Deficiency found: MUNI track maintenance workers were observed, from a cable car, working on a blind curve of a cable car line without required roadway worker protection.

Recommendation:

31. Reexamine employee compliance with MUNI's roadway worker rules and procedures and take the steps necessary to ensure employee compliance with the roadway worker safety program.

34. Operating Rules and Procedures for Cable Cars

Deficiency found: The procedure for issuing bulletins, notices, and orders includes: Considerable overlap in the functions of and authority to issue each type of directive; No way to verify that affected employees receive those directives and; No one is responsible for removing non-current bulletins and notices.

Recommendations:

18. Reexamine and revise the Master File for All Rules to simplify and limit authority to issue bulletins, notices, and orders

20. Develop a mechanism that ensures and verifies that employees receive bulletins and notices and establish who is responsible for removing non-current bulletins and notices.

35. Metro Track Maintenance Program

Deficiency found: Revision of the database for tracking open deficiencies from track inspections has not been completed and track maintenance resources may be inadequate.

Recommendation:

32. Complete and implement the database utilized for tracking open deficiencies found during track inspections and ensure adequate resources are provided to perform track maintenance.

36. LRV Maintenance Program

Deficiency found: Revision of the Rail Vehicle Preventive Maintenance Inspection Scheduling Procedure has not been completed and PMI forms are not always filled out completely and accurately by maintenance workers.

Recommendations:

33. Complete the revision, approve, and implement the Rail Vehicle Preventive Maintenance Inspection Scheduling Procedure.

34. Ensure that the PMI forms are filled out completely and accurately by the responsible maintenance workers.

37. Historic Streetcar Maintenance Program

Deficiency found: The draft Historic Streetcar Preventive Maintenance Inspection Scheduling Procedure has not been completed and PMI forms are not always filled out completely and accurately by maintenance workers.

Recommendations:

35. Complete the revision, approve, and implement the draft Historic Streetcar Preventive Maintenance Inspection Scheduling Procedures.

36. Ensure that Historic Streetcar PMI forms are filled out completely and accurately by the responsible maintenance workers and supervisors.

38. Cable Car Maintenance Program

Deficiency found: Revision of the Cable Car Preventive Maintenance Inspection and Scheduling Procedure has not been completed.

Recommendation:

37. Complete the revision, approve, and implement the Cable Car Preventive Maintenance Inspection and Scheduling Procedure.

39. Cable Car Track and Cable Maintenance Program

Deficiency found: There are no formal cable maintenance and inspection program standards, procedures, or training programs.

Recommendation:

38. Develop and implement formal cable maintenance and inspection program standards, procedures, and training programs.

40. ATCS Maintenance Program

No deficiency – No recommendation

41. Signal Systems Maintenance Program Including Power Switch Machines

No deficiency – No recommendation

42. Substation and Overhead Lines Maintenance Program

No deficiency – No recommendation

43. Emergency Response Planning and Training

Deficiency found: The status of open corrective actions from emergency preparedness drills is not being tracked.

Recommendation:

39. Develop and implement procedures to ensure that corrective actions from emergency response drills, including interdepartmental and interagency communications deficiencies, are recorded, promptly addressed and actively monitored to completion.

44. Safety Data Acquisition and Analysis

Deficiency found: Revision of the Safety Data Acquisition and Analysis procedure has not been completed.

Recommendation:

40. Complete, approve, and implement the Safety Data Acquisition and Analysis procedure and update the SSPP to reflect that procedure and the Corrective Action Plan procedure.

45. Interdepartmental & Interagency Coordination

Deficiency found: The status of open corrective actions from emergency preparedness drills is not being tracked.

Recommendation:

39. Develop and implement procedures to ensure that corrective actions from emergency response drills, including interdepartmental and interagency communications deficiencies, are recorded, promptly addressed and actively monitored to completion.

46. Contractor Safety Program

Deficiency found: Revision of the contractor safety program SOP, which also incorporates requirements in Recommendation No. 1 from APPENDIX C, in the SF MUNI 2002 Triennial Safety Audit, has not been completed.

Recommendation:

41. Complete, adopt and implement the revised contractor safety program SOP, ensuring that it incorporates the requirements from Recommendation No. 1 from APPENDIX C, in the SF MUNI 2002 Triennial Safety Audit.

47. Procurement Control

Deficiency found: Revision of the Approved Equal Parts for Railcars and Purchasing Material and Supplies procedures has not been completed and is not referenced in the SSPP.

Recommendation:

42. Complete, approve, and implement the Approved Equal Parts for Railcars and Purchasing Material and Supplies procedures.

43. Revise the SSPP procurement section to include or reference the procedures that MUNI follows in procurement control.

APPENDICES

APPENDIX A
ACRONYMS LIST

Abbreviation or Acronym	Meaning
APTA	American Public Transportation Association
ATCS	Advanced Train Control System
CFR	Code of Federal Regulations
Commission	California Public Utilities Commission
FTA	Federal Transit Administration
GO	General Order
HSC	Historic Streetcar
LRV	Light Rail Vehicle
Manual	Manual for the Development of System Safety Program Plans
MUNI	San Francisco Municipal Railway
OCC	Operations Control Center
OSRC	Operations Safety Review Committee
OTEO	On-track Equipment Operator
PCC	Presidential Commission Car
PM	Preventative Maintenance
PMI	Preventive Maintenance Inspection
RCCB	Rail Change Control Board
RPC	Rules and Procedures Committee
RTSS	Rail Transit Safety Section
SFMTA	San Francisco Municipal Transportation Authority
SOP	Standard Operating Procedure
SSPP	System Safety Program Plan *also* System Security Program Plan

APPENDIX B
SF MUNI 2005 TRIENNIAL SAFETY AUDIT CHECKLISTS INDEX

1	Metro Track Inspection
2	Cable Car Track Inspection
3	LRV Inspection
4	Historic Streetcar Inspection
5	Cable Car Inspection
6	Train Control & Signal Inspection
7	Overhead Traction Power Inspection
8	Authority and Responsibility for System Safety Program
9	System Safety & Security Program Plan Administration
10	Reporting and Investigating Accidents and Unacceptable Hazardous Conditions
11	Internal Safety Audit
12	System Security Program – Audits, Evaluations and Reports
13	Change Control Management
14	Configuration Management
15	Safety Certification – Third Street
16	Measuring and Testing Equipment
17	Subway Station and Emergency Equipment Maintenance
18	Drug and Alcohol Program
19	Employee Safety Program
20	Operating Rules and Procedures – LRVs
21	Hours of Service Train Operators, Train Controllers and Supervisors
22	Hazardous Materials Management Program
23	Training and Certification of HSC and LRV Operators, Rail Inspectors, On Track Equipment Operators and Train Controllers
24	Training and Certification of Cable Car Grip Person, Conductors and Inspectors
25	Training and Certification of LRV & HSC Mechanics
26	Track Maintenance Training and Certification
27	Signal Maintenance Training and Certification
28	Traction Power Maintenance Training and Certification
29	Operating Rules and Procedures for Historic Streetcars

30	Program of Operational Evaluations – Metro and Cable Car Divisions
31	Central Control Dispatchers Performance
32	Metro LRV and Historic Streetcar Train Operator Performance
33	Cable Car Operating Crew Performance
34	Operating Rules and Procedures for Cable Cars
35	Metro Track Maintenance Program
36	LRV Maintenance Program
37	Historic Streetcar Maintenance Program
38	Cable Car Maintenance Program
39	Cable Car Track and Cable Maintenance Program
40	ATCS Maintenance Program
41	Signal Systems Maintenance Program Including Power Switches
42	Substation and Overhead Lines Maintenance Program
43	Emergency Response Planning and Training
44	Safety Data Acquisition and Analysis
45	Interdepartmental & Interagency Coordination
46	Contractor Safety Program
47	Procurement Control

APPENDIX C
SF MUNI 2005 TRIENNIAL SAFETY AUDIT RECOMMENDATION LIST

No.	Recommendations	Checklist No.
1	In addition to current scheduled maintenance inspections, MUNI should further monitor and evaluate the flashing on the brushes in the traction motors and burnt contacts on the electric brake contactors of PCCs to establish the necessary more frequent inspection intervals for those components.	4
2	MUNI should formulate and adopt written maintenance standards and procedures for the inspection, maintenance and repair of cable cars.	5
3	MUNI should establish a policy requiring a written record of the cable car crew's daily pre operation inspection.	5
4	MUNI should ensure that "train coming" flashing signals are modified to provide appropriate warnings at crossings, only upon the approach of trains. MUNI should consider removal or "bagging" the "train coming" flashing signals until they can be modified to provide valid warning information.	6
5	MUNI should inspect its entire system, resolve the types of GO 95 violations noted in Checklist 7, and bring the system into compliance with Commission requirements.	7
6	MUNI should formalize the function, scope, and procedures of the Operations Safety Review Committee.	8
7	MUNI should complete, adopt and implement the revised Rules & Instructions Handbook.	9
8	MUNI should complete, approve, and implement the F-Line Operator Training Manual, Operating Rules Historic Streetcars, Milan Historic Operating Procedures, Presidential Conference Car Operating Procedures, Historic Streetcar General Operating Procedures, and other related operating rules and procedures as required by recommendation 9 of the 2002 triennial audit.	9, 29
9	MUNI should ensure that the effective dates of documents are either the same as or later than the approval date.	9, 11, 13, 14
10	MUNI should comply with GO 164-C, Section 6, by submitting accident reports to CPUC within 60 days. In the event report cannot be furnished in this time frame, updates must be provided every 30 days.	10
11	MUNI should ensure that all affected departments implement and follow the requirements of the RCCB and RPC procedures.	13
12	MUNI should ensure that representatives from all affected departments attend SCC meetings to actively participate in the safety certification process.	15

13	MUNI should ensure that the SCC meets regularly at the SSPP required monthly frequency.	15
14	MUNI should complete its revision of the Safety Certification Plan.	15
15	MUNI should ensure that the original subway station and emergency equipment work orders or facsimiles are accessible for review for at least four years as required by GO 143-B.	17
16	MUNI should ensure that each PM checklist is fully and accurately completed with the proper dates and signatures.	17
17	MUNI should complete the update of its Hazard Communication Program training database to ensure that all MUNI employees that handle chemical products or work in proximity to chemical products are being identified for the appropriate Hazard Communication Program training and receive training in a timely fashion.	19, 22
18	MUNI should develop a Bulletins and Notices Master Log for Green Division, which would be similar to the Cable Car Division's Master Log that is able to track the distribution and the active/inactive status of bulletins and notices and formally establish who is responsible for removing non-current bulletins and notices.	20, 34
19	MUNI should reexamine and revise the SOP Master File for All Rules to simplify and limit authority to issue written instructions in the form of Bulletins, Notices, and Orders and ensure compliance with the revised procedure.	20, 34
20	MUNI should develop a mechanism that ensures and verifies each employee receives bulletins and notices and formally establish who is responsible for removing non-current bulletins and notices.	20, 34
21	MUNI should identify the causes and take specific steps to ensure that supervisors and other employees strictly comply with the Commission's hours of service requirements.	21
22	MUNI should complete and implement the revision of its SOP for hazardous waste.	22
23	MUNI should create a summary evaluation form for training and certification to address all comments and recommendations noted on the individual MRO trainers' evaluation forms, to use as part of the training assessment prior to granting certification to MRO trainees.	23
24	MUNI should ensure that all required training and certification, including refresher training and recertification, is provided for LRV operators within the required periods of time.	23

25	MUNI should revise the LRV Maintainer Training Program Plan (Document No. L.PL.021) to further specify the required training for each of the LRV Maintainer classifications shown in Appendix A. of the aforementioned document and ensure the completeness of the training and certification records for all affected employees.	25
26	MUNI should revise the Signal & Communication Training Program Plan (Document No. R.SM.PR.001) to reflect the scope of required training and ensure the completeness of the training and certification records for all affected employees.	27
27	MUNI should evaluate the adequacy of the OCS maintenance training and certification program including its trainer qualifications and then revise the program to address any deficiencies identified as a result of such evaluation.	28
28	MUNI should revise the Motive Power Training Program Plan (Document No. W.MP.PR.157) to incorporate the change to the triennial frequency of training and further specify the required training shown in Appendix A. of the document.	28
29	MUNI should update the SSPP and Rail Transit Operator Compliance Program to include the newly adopted observation check procedures that the Cable Car Division follows and expand the use of the surreptitious observations.	30
30	MUNI should develop a method to ensure, monitor, and verify that Green Division train operators are properly and thoroughly performing the required pre-operational checks.	32
31	As recommended in the CPUC 2002 Triennial Audit, MUNI should reexamine employee compliance with roadway worker rules and procedures and take the additional steps necessary to ensure compliance with the roadway worker safety program.	33
32	MUNI should complete revising, adopt, and implement the database utilized for tracking open deficiencies found during track inspections and ensure adequate resources are provided to perform track maintenance.	35
33	MUNI should complete the revision, approve, and implement the Rail Vehicle Preventive Maintenance Inspection Scheduling Procedure L.PR.016.	36
34	MUNI should ensure that PMI forms are filled out completely and accurately to demonstrate that the responsible maintenance workers have properly documented the inspection and maintenance activities.	36
35	MUNI should complete the revision, approve and implement the HSC Preventive Maintenance Inspection Scheduling Procedures.	37

36	MUNI should ensure that the HSC PMI forms are filled out completely and accurately to demonstrate that the responsible maintenance workers and supervisors have properly documented the inspection and maintenance activities.	37
37	MUNI should complete, approve, and implement the revision of the Cable Car Preventive Maintenance Inspection and Scheduling Procedure, Document Number CC.RR.001	38
38	MUNI should develop and implement formal cable maintenance and inspection program standards, procedures and training.	39
39	MUNI should develop and implement procedures to ensure that corrective actions resulting from emergency response drills, including interdepartmental and interagency communications deficiencies, are recorded, promptly addressed, and actively monitored to completion.	43, 45
40	MUNI should complete, approve, and implement the adopted Safety Data Acquisition and Analysis procedure and also update the SSPP to reflect that procedure and the Corrective Action Plan procedure.	44
41	MUNI should complete, adopt and implement its revised contractor safety program SOP, ensuring that it also incorporates the provisions contained in APPENDIX C, SF MUNI 2002 Triennial Safety Audit Recommendations List, Recommendation No. 1	46
42	MUNI should complete, approve, and implement the revised Approved Equal Parts for Railcars and Purchasing Material and Supplies procedures.	47
43	MUNI should revise the SSPP procurement section to include or reference the procedures that MUNI follows in procurement control.	47

APPENDIX D

SF MUNI 2005 TRIENNIAL SAFETY AUDIT CHECKLISTS