

## Tri-State Oversight Committee



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**DRPT**

## Three-Year Safety and Security Review of the Washington Metropolitan Area Transit Authority

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### Stations Maintenance

### Elements 14, 15, and 16

**Review Conducted: November-December 2014**

Final Report: June 30, 2015

## **Introduction**

Representatives from the Maryland Department of Transportation (MDOT), the District of Columbia Department of Transportation (DDOT), and the Virginia Department of Rail and Public Transportation (DRPT) comprise the Tri-State Oversight Committee (TOC), which provides regular oversight of the Washington Metropolitan Area Transit Authority (WMATA) Metrorail system. To comply with State Safety Oversight Final Rule 49 Code of Federal Regulations Part 659 (Part 659), the Federal Transit Administration (FTA) requires states to designate a State Safety Oversight (SSO) agency to administer safety and security programs for rail transit and fixed guideway systems within their jurisdictions. Specifically, 49 CFR Part 659 requires TOC to conduct an on-site safety review of each element of the WMATA System Safety Program Plan (SSPP) at least once every three years. These reviews must assess WMATA's implementation with all 21 elements of its SSPP and seven elements of its Security and Emergency Preparedness Plan (SEPP), along with related plans and procedures. Beginning in 2013, the TOC has split its Three-Year Safety and Security Review topic areas into separately occurring reviews spread out during a three-year period.

The following report documents the observations and findings of the TOC's review of stations maintenance. Generally, this review focused on the conditions of Metrorail stations and the proper inspection of equipment contained within those facilities. These topics are the responsibility of the offices of Plant Maintenance (PLNT), Power (POWR), Communications (COMM), and Rail Transportation (RTRA) with support from the Department of Safety and Environmental Management (SAFE) and Quality Assurance and Warranty (QAAW). The relevant SSPP elements for this review were all or part of:

- Element 14: Facilities and Equipment Inspections
- Element 15: Maintenance Audits/Inspections
- Element 16: Training and Certification

The TOC Program Standard and Procedures defines WMATA requirements for these elements in Section 12 and in Appendix B. Specific requirements are cited further, below.

## **Methodology**

In advance of the review, the TOC requested and reviewed relevant WMATA plans, procedures, checklists, and reports. The on-site portions of the review occurred Nov. 17-18, Nov. 25, and Dec. 16, 2014. During the on-site review sessions, the review team interviewed WMATA personnel and reviewed various documents and records to assess compliance with procedures. Persons interviewed and documents reviewed are noted at the end of this report. As the review progressed, TOC representatives discussed preliminary findings and addressed questions from WMATA personnel. This report identifies conditions evident during the review period, regardless of the current progress of potential remediation activities.

Findings are categorized as Findings of Non-Compliance or Findings of Compliance with Recommendation. A Finding of Non-Compliance refers to an instance of WMATA operating out of compliance with an applicable internal or external written requirement, plan, policy, rule, standard, or procedure. Findings of Non-Compliance may be safety-critical in nature. If a Finding of Non-Compliance is identified, WMATA is required to develop an appropriate Corrective Action Plan (CAP) and take action to achieve compliance with the applicable requirement.

A Finding of Compliance with Recommendation refers to a condition whereby WMATA may technically be conducting business in compliance with existing WMATA, TOC, or FTA procedures and requirements; however, there may be no relevant written plan, policy, or procedure in place, or the existing plan, policy, or procedure is not in accordance with industry best practices or standards (such as those by the American Public Transportation Association). Even if there is no “non-compliance” issue, these findings may also be safety-critical in nature. In response to a Finding of Compliance with Recommendation, WMATA is required to formally respond in writing, and is strongly urged to develop an appropriate CAP to update relevant plans, policies, rules, and/or procedures, or to address a particular identified resource or organizational issue. If WMATA determines no CAP is necessary, the agency must complete a hazard analysis in accordance with its hazard management procedure in order to justify taking no action and accept the level of risk associated with the finding.

This review, including all findings presented in this report, intends to assist WMATA with enhancing system safety throughout Metrorail operations. WMATA received a draft of this report and provided comments, which were considered for integration into this Final Report. **Upon receipt of this Final Report, WMATA has 45 days to submit CAPs in response to each finding. Each proposed CAP must include the planned action, person responsible, and estimated completion date.** TOC thanks WMATA for providing updates on progress already made toward addressing the findings. TOC requests that WMATA resubmit the material along with its proposed CAPs so that they can be consistently approved and verified.

The TOC would like to thank WMATA personnel for their time, cooperation, and forthrightness throughout the review process.

### **Current Conditions**

The responsibility for stations maintenance is generally split over three WMATA offices: PLNT, POWR, and COMM, with additional support from RTRA for problem identification. PLNT is responsible for the maintenance of building structures as well as larger or facility-related equipment, such as station entrance gates; station platform end gates; sewage ejectors; air handling systems; kiosk and train control room air conditioners; floor tiles; station platform tactile strips; doors; surfaces; hand rails; signage; platform shelters at outdoor stations; sprinkler systems; and the flow portion of fire alarm testing. PLNT has responsibility for fire suppression equipment (i.e. fire extinguishers and sprinklers), with the exception of those areas to which PLNT does not

have access. For example, fire extinguishers in COMM rooms are under COMM's purview. Generally, PLNT has responsibility for station areas that are walking surfaces. Station walls, ceilings, and stairs are considered structural items; structural items fall under the purview of Track and Structures (to be reviewed in 2015). For some assets in station public areas, such as floor tiles, doors, and hand rails, PLNT performs only corrective maintenance (CMs) and relies on defect reports. It does have routine inspections for items such as end gates and sprinklers. PLNT has a rolling station rehabilitation program; each Metrorail station is rehabilitated on a once-per-3.75-year cycle.

PLNT employs personnel in approximately 20 craft trades (carpenters, masons, etc.). Each craft trade has a leader in addition to general mechanics working within seven geographic regions; each region has an assigned supervisor and Assistant Superintendent. PLNT has a Superintendent responsible for all seven regions. WMATA only hires mechanics with experience; PLNT-hired mechanics then take a six-week training course taught by Technical Training and Document Control (TTDC). The TTDC training course acclimates the newly-hired PLNT mechanics to the transit industry and also teaches safety courses required by the Occupational Safety and Health Administration (OSHA). [OSHA-required safety training was covered during the TOC Three-Year Safety and Security Review of System Safety elements in 2013]. PLNT maintains a training SOP and training matrix, the latter of which shows which personnel need what training at what time, along with recurring training requirements. At the time of the on-site review, TOC received a draft copy of this SOP and matrix and was advised that the final SOP was undergoing the signature process. PLNT reported that for some pieces of equipment, vendors train PLNT trainers, who then train the remaining PLNT staff. Recently, PLNT has been writing into contracts a requirement for vendor training of PLNT trainers. Any training on new equipment is incorporated into OJT (though the OJT itself was not formalized in a plan or curriculum as of the time of the on-site review), or PLNT will pay to send its employees to attend equipment manufacturer training. PLNT training is tracked in WMATA's Electronic Learning Management (ELM) computerized training tracking system. PLNT training in ELM is subdivided into three "schoolhouses": technical (PLNT-specific technical training), safety (e.g. bloodborne pathogen training), and human resources (WMATA-required human resources training). PLNT ELM tracks training certifications; the WMATA Department of Human Resources and Talent Management (HRTM) and SAFE determine what training is required for each PLNT position. PLNT has stand-alone training software to flag when its employees' licenses are expiring and which personnel are due (or overdue) for specific training classes. As noted above, the PLNT training SOP and training matrix were in draft form at the time of the on-site review, and WMATA reported that the PLNT training SOP and training matrix were cycling through the signature process. **TOC requests that WMATA submit the final, signed PLNT training SOP and training matrix to TOC.**

POWR is responsible for systems within stations that have an electrical component to them, such as lighting, and trackbed lighting. POWR performs bi-weekly preventative maintenance (PMs) for stations as a whole, except for trackbed lighting. POWR

performs PMs on trackbed lighting annually. POWR's bi-weekly station PMs including station lighting and emergency generators. POWR's bi-weekly station PMs also include the lights along station walls adjacent to escalators, but not lights embedded in the escalators. POWR is also responsible for maintaining the lights above and outside the elevators, but not inside the elevators, on a bi-weekly basis. POWR employs several hundred technicians, divided into high-voltage, low-voltage, and test technicians. POWR has two Technical Training and Document Control (TTDC) personnel dedicated to training POWR personnel at the Branch Avenue Yard. POWR stated that its training programs focus chiefly on equipment for which it is responsible. POWR also stated that it currently lacks sufficient facilities to train 10-12 staff at once. Additionally, the in-house training for the new N-Line equipment needs to be developed; currently, only vendor training for this equipment is available, and the vendor training does not go into great depth. Please see related Finding NC-1 below.

COMM has responsibility for the fire and intrusion alarm (FIA) and PA systems, as well as emergency call boxes mounted on pylons on station platforms, closed-circuit television (CCTV), the Passenger Information Displays (PIDs), COMM rooms, and Kiosk Information Display Systems (KIDS). (Information Technology is responsible for maintaining the telephones in Emergency Trip Stations). Additionally, the WMATA SSPP lists COMM as having responsibility for maintaining the PROTECT chemical detection system. COMM stated during the review that this is not the case; please see related Finding NC-2 below. COMM's inspection intervals are as follows for assets under TOC review: annual and monthly inspections of station PA systems, CCTV, and fire alarms. COMM employed approximately 163 employees at the time of this review, divided into three groups: Emergency Support System (ESS – 30 persons), the Radio Group (30-33 people), and field maintenance (97-103 people). ESS is subdivided into groups under the Fire Intrusion Administrator, the CCTV Administrator, and the Vidaroute Administrator. COMM has no set schedule for training on the systems for which it is responsible, e.g. FIA, PIDS, KIDS, PA systems, etc. COMM pairs newly-hired technicians with more senior technicians for training in the field on an informal basis, though COMM does not have a formal, written OJT process in place. COMM does have set training for safety and human resources requirements, including Roadway Worker Protection (RWP). TOC will further evaluate maintenance training during an upcoming Triennial Review of the TTDC department.

The TOC review team also met with representatives from RTRA to discuss the procedures for Station Manager completion of Stations Conditions Checklists and to review a sample of completed Stations Conditions Checklists to review the methodology by which Station Managers complete the checklists. Of particular interest to the TOC was how Station Managers observed and reported station defects for corrective maintenance to be performed by PLNT, COMM, or POWR, as appropriate. Please see related Finding of NC 4 below.

At the time of this review, there was not a finalized maintenance plan or list compiling all PLNT assets and their preventive maintenance frequencies, but they are programmed in MAXIMO to print out based on their assigned frequencies (see Finding NC-4 in the

November 2014 TOC Three-Year Safety and Security Review for Shop Safety and Equipment inspections). However, the PLNT maintenance management plan was in draft form at the time of the review, and WMATA reported that the PLNT maintenance management plan was cycling through the signature process. TOC expects to receive the plan as a result of a CAP deriving from the aforementioned shop safety review. COMM has a branch maintenance plan listing assets and fully describing the maintenance process and relation to the rest of the authority.

TOC reviewed preventative maintenance records from PLNT, POWR, and COMM for six months prior to the review (i.e. May through November 2014) from a selection of stations: Gallery Place, L'Enfant, Ft. Totten, Rhode Island Ave., Rosslyn, and Wiehle-Reston East. During preventive maintenance inspections, minor repairs and adjustments were noted on checklists or work orders. Any inspection that required further corrective action received a new work order in MAXIMO. Note that most PLNT performs mostly corrective maintenance in stations in response to work orders entered by other WMATA personnel, primarily RTRA Station Managers.

The TOC observed a PM of a sewage ejector in Crystal City Station. Additionally, the TOC conducted inspections of Gallery Place, Ft. Totten, L'Enfant Plaza, and Rosslyn Stations. Overall, conditions at all four facilities were good. Only a few issues were systemic or serious; those are described as findings later in this report. For all other minor deficiencies that follow, TOC has issued Finding of CWR 2 below.

### **Findings of Non-Compliance (NC)**

**Finding of NC 1: PLNT, COMM, and POWR reported that not all employees have received training on new equipment, including new N-Line (Silver Line) assets requiring inspection.** This was reported as a resources issue, as vendors provided “train-the-trainer” training that was not fully passed down within WMATA, in some cases. Also, while PLNT has a six-week training course for new hires through TTDC, COMM and POWR reported that they do not have similar programs.

Recommended CAP: WMATA should develop policies and/or procedures as appropriate to ensure that vendor “train-the-trainer” training is fully passed down to WMATA trainers. COMM and POWR should also consider developing new-hire training courses similar to those for PLNT in conjunction with TTDC. WMATA must submit the policies and/or procedures to ensure that vendor “train-the-trainer” training is fully passed down to WMATA TTDC trainers. COMM and POWR should also submit evidence of new-hire training courses being developed for their respective staffs.

**Finding of NC 2: The WMATA SSPP currently lists COMM as having responsibility for the PROTECT system, but COMM does not fully include PROTECT in its PM process.** WMATA personnel reported during the audit that management of the PROTECT system is contracted out through the WMATA Infrastructure Renewal Group (IRPG). Also, COMM submitted an “All COMM Dept. Master PMs” spreadsheet that did not include PROTECT maintenance.

Recommended CAP: WMATA should revise the SSPP to reflect the actual situation for maintenance of the PROTECT system and ensure that PROTECT is included in MAXIMO for regular maintenance. WMATA should revise its SSPP for the 2016 annual update to reflect the current situation, i.e. that IRPG manages the contract for maintenance of the PROTECT system. WMATA should also submit verification that PROTECT is included in PM lists and scheduled for routine maintenance.

**Finding of NC 3: Both battery rooms on the Red Line level of Gallery Place did not have ventilation, creating a potential hazard for explosion.** No fans exist in either room, however WMATA reported that the rooms are passively ventilated through adjacent rooms. Hydrogen gas forms when batteries are charging and can pose risk of fire and explosion when concentrations exceed 4 percent. International Code Council International Fire Code section 608.6.1 states:

*Ventilation shall be provided to limit the concentration of hydrogen gas to 1.0 percent of the total volume in the room. Continuous mechanical ventilation shall be provided to maintain hydrogen gas to 1.0 percent of the total volume in the room.*

Recommended CAP: WMATA should ensure that all battery rooms in all station areas have ventilation fans or otherwise mitigate this hazard as appropriate. WMATA must submit evidence that ventilation fans exist in all battery rooms in all station areas or otherwise mitigated appropriately; this may include photographs of alternate ventilation and air quality samples showing hydrogen levels below the threshold required by fire code.

**Finding of NC 4: RTRA does not appear to have a procedure for station inspections and Station Conditions Checklist completion.** The TOC found a wide degree of variability in the manner in which Stations Conditions Checklists were completed by Station Managers, including several days' checklists at select stations being missing. Many defects also appear to have gone unreported. The TOC was also unable to determine if repeated issues noted on consecutive days' Stations Conditions Checklists (sometimes multiple consecutive days') were verified with the Maintenance Operations Center (MOC), or work order numbers were simply copied from the previous day's work order log in the Station Manager's kiosk without verification with MOC. The Station Manager inspections are important because they act in lieu of a full preventive maintenance inspection of the station, and noted hazards have the potential for exposure to patrons and employees. RTRA has a Standard Operating Procedure (SOP) that describes overall Station Manager responsibilities but not how to conduct the station inspection and follow-up.

Recommended CAP: WMATA should develop an SOP that covers completion of Station Conditions Checklists. RTRA, PLNT, POWR, and COMM should coordinate their expectations regarding Station Manager checks of stations and document the types of

defects to be reported in the Station Conditions SOP. WMATA should submit this SOP to TOC for review.

**Finding of NC 5: PLNT, COMM, and POWR do not appear to have established benchmarks for when and how often quality control (QC) checks are performed by front-line supervisors.** In addition, the TOC observed an inspection log in a COMM room that indicated that a front-line supervisor had not inspected the room in approximately one year. PLNT indicated that it has already begun working on a maintenance plan that includes QC checks as part of an Internal Safety and Security Audit (ISSA) corrective action plan (CAP). Such QC assessments are expected to be not only inspections of rooms but quality checks of inspections and repair work completed.

Recommended CAP: PLNT, COMM, and POWR should institute regular QC checks to be performed by front-line supervisors of their employees' inspection and repair work. WMATA should provide the associated plan or procedure to the TOC.

**Finding of NC 6: The TOC observed several fire extinguishers in AC and COMM rooms at Ft. Totten and Gallery Place to have out-of-date inspection tags.** These tags indicate that the POWR and COMM are not inspecting these fire extinguishers as scheduled, or if they are being inspected, the tags are not being marked appropriately. This finding does not apply to PLNT, as PLNT does not have access to AC and COMM rooms, and fire extinguishers in these locations fall under POWR's and COMM's purviews, respectively.

Recommended CAP: POWR and COMM should add the fire extinguishers in AC, TPSS, TBS, and COMM rooms, respectively, to MAXIMO to ensure regular inspections occur. POWR and COMM should submit evidence of their entry into MAXIMO and/or that visual inspections are now occurring monthly.

**Finding of NC 7: The vast majority of emergency call boxes tested in the field during the audit did not function correctly.** TOC tested all emergency intercoms at four stations for proper connection to the Station Manager as well as rollover to the Rail Operations Control Center (ROCC). At all locations, at least one of the call boxes (six total) either did not connect to the station manager, did not connect to the ROCC, or did not activate at all when the red buttons were pressed. The rate of success at these four stations is unacceptable in the case there is need for urgent communication during an emergency. The TOC was unable to review the PM program documentation and completed checklists during the review.

Recommended CAP: WMATA should perform a technical analysis of its PM procedures to see if modifications need to be made in order to correct performance of the call boxes and improve the way technicians verify functionality. PM procedures must include a confirmed and audible connection to the Station Manager as well as rollover to the ROCC. COMM should consider having a technician in ROCC available during



inspections to confirm whether rollover occurred properly. WMATA must submit this technical analysis along with any associated changes to PMs for TOC review.

### **Findings of Compliance with Recommendation (CWR)**

**Finding of CWR 1: There were numerous uncovered electrical outlets in stations.** These outlets typically were found on the sides of passenger benches, on platform floors, or on escalators, which may present an electrical shock hazard to children or other patrons and personnel.

Recommended CAP: WMATA should submit a schedule with completion dates for implementation of covering electrical outlets. Additionally, the Station Manager's inspection checklist should include checks for covered electrical outlets and opening work orders for uncovered outlets.

**Finding of CWR 2: TOC observed numerous minor issues during on-site inspections during this review. WMATA should take steps to address the issues listed below.**

Recommended CAP: WMATA should take steps using its established maintenance and inspection processes to address the issues below and submit the results to TOC for review.

#### Systemic issues

Several electrical outlets, typically on the sides of passenger benches, in platform floors, or on escalators, were uncovered.

#### Gallery Place

- Several lights behind the parapet walls on the Red Line level, both directions' platforms, were burnt out.
- Several trackbed lights on the Green/Yellow level, both directions, were burnt out.
- AC Room 1 on Red Line Level, Glenmont Platform, on eastern (side closet to Judiciary Sq.)
  - Emergency egress was blocked
  - A circuit breaker on Panel EE was missing
  - The door to Battery Room E106 was difficult to open
  - The eye wash in Battery Room E106 needs to be replaced (solution container was missing)
  - The cover on circuit breaker SSWP was loose.
- Red Line Level, Glenmont Platform, Ventilation Room W103
  - A circuit breaker panel was observed to be on the floor and not in position.
- Red Line Level, Glenmont Platform, Mechanical Room W101
  - A water heater was leaking.
- Red Line Level, Shady Grove Platform

- A break in the guardrail under the escalator was observed near CM B2-012+00.
- Equipment and objects were stored behind ELES scaffolding on the platform but were not secure.
- Red Line Level, west end of Shady Grove platform, COMM Room W107
- The ventilation appeared to be insufficient, as the room temperature was observed to be unusually warm.
  - A water leak was observed in the ceiling, and plastic sheets were covering electronic equipment as a mitigation.
  - As labeled, the fire extinguisher did not have a current monthly inspection for over one year (NB. PLNT inspects all fire extinguishers except those in rooms to which they do not have access; thus, this fire extinguisher falls under COMM's purview)
- Green/Yellow Line Level, South (Branch Ave./Huntington) end
  - The yellow emergency call box mounted on a pylon took 52 seconds to start ringing, and the call was not answered

#### Fort Totten

- COMM Room C110
  - Circuit breaker panel not labeled
  - As labeled, the fire extinguisher did not have a current inspection since August 2014. The review team observed a WMATA employee initial the label on the spot without proper inspection.
- Red Line Platform
  - Platform edge lights not working, both sides. (TOC also observed this to be the case at New Carrollton and Friendship Heights, which were not formally observed in this review)

#### L'Enfant Plaza

- Green/Yellow Line Level
  - The light in Station Manager kiosk by 9<sup>th</sup> & D Sts. NW entrance had a light out.
- An expansion joint on the Branch Ave./Huntington platform was splayed.
- Blue/Orange/Silver Line Level
  - The emergency intercom on the east end of Blue/Orange/Silver line platform was not working.
  - Several track bed lights on the Blue/Orange/Silver Line level were observed to be burnt out. POWR personnel reported difficulty in security track rights to be able to perform re-lamping.

#### Rosslyn

- Lower Level Platform
  - Two unsecured large concrete blocks were observed resting on the platform near the Franconia-Springfield/Vienna/Wiehle-Reston East end of the platform, under the "Welcome to Virginia" sign.

- Emergency intercom on end of platform closest to DC (i.e. opposite side of the “Welcome to Virginia” sign) – a Station Manager answered the call but was unable to hear the TOC reviewers who activated the intercom.
- The Fire Intrusion Alarm (FIA) panel in the Station Manager kiosk in the new mezzanine by the express elevators was beeping approximately once every five seconds. A work order ticket for the FIA panel beeping had been open since October 1, 2014.

### **Persons Interviewed**

- [REDACTED] Plant Maintenance
- [REDACTED] Plant Maintenance
- [REDACTED] Plant Maintenance
- [REDACTED] Power
- [REDACTED] Communications
- [REDACTED] Rail Transportation

### **WMATA Audit Observers**

- [REDACTED] Quality Assurance and Warranty
- [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] Quality Assurance and Warranty

### **Documents Reviewed**

- Blank PLNT PM checklists for various station assets, including Packaged and Split Air Conditioning System, Fan Coil Unit, Entrance Gate/Scissor Gates, Roll-Up Gate, Sewage Ejector Systems, Sprinkler Standpipe Quarterly Test Report
- PLNT MAXIMO work orders for station assets maintained at the following stations, dated from May through November 2014: Gallery Place, Rhode Island Ave., Ft. Totten, L’Enfant Plaza, Rosslyn, and Wiehle-Reston East
- Completed POWR checklists for AC Substation and Electrical Room Facility Inspections at the following stations, dated from May through November 2014: Wiehle-Reston East
- Completed POWR checklists for POWR PMI – Stationary Emergency Stand-by Power Generator, dated from May through November 2014: Ft. Totten and Rosslyn
- POWR MAXIMO work orders for Station re-lamping, dated from May through November 2014: Ft. Totten, Gallery Place, and L’Enfant Plaza
- Communications Branch Maintenance Control Policy, Revision 3, July 1, 2014
- RTRA SSOP #33, Station Managers’ Log
- RTRA Supervisor Performance Expectations and Standards, Revised July 31, 2013

- RTRA Training Module for Station Manager Logs and Station Managers' Checklists
- RTRA Station Conditions Checklists for Dupont Circle, Farragut North, Metro Center, Gallery Place, Judiciary Square, and Union Station, September through November 2014
- Inventory of COMM assets
- Inventory of COMM Master PMs
- QAAW audit report for Drain Pumping Stations, Columbia Heights and Georgia Ave., January 2014
- QAAW audit report for Tunnel Fans and Vent Shaft Dampers, Van Ness, June 2014
- QAAW audit report for Stationary Emergency Stand-By Power Generator (Monthly PMI), Medical Center August 2014
- QAAW audit report for RAMEX Intercom System, Woodley Park, September 2014
- QAAW audit report for Fire Alarm Testing, Farragut West, September 2014
- QAAW audit report for Battery Banks Inspection, Branch Ave., October 2014