

## Tri-State Oversight Committee



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

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### Maintenance Facility Safety and Equipment Inspections

Partial Audit of:  
Element 14 (Facility and Equipment Inspections)  
Element 16 (Training and Certification)  
Element 18 (Employee and Contractor Safety Program)  
Element 19 (Hazardous Materials)

**Audit Conducted: March 2017**

Final Report: July 25, 2017

## **Executive Summary**

The Tri-State Oversight Committee's (TOC) Triennial Audit of Maintenance Facility Safety and Equipment Inspections at the Washington Metropolitan Area Transit Authority (WMATA) identified a number of issues related to recordkeeping, document control, and connectivity between maintenance procedures, plans, and checklists which impact overall maintenance facility safety and the effectiveness of maintenance equipment inspections. TOC evaluated WMATA's activities in these areas during interviews with frontline and managerial personnel from a range of departments performing maintenance, training, and safety functions.

Certain issues identified during TOC's audit are consistent with Findings issued by both TOC and the Federal Transit Administration (FTA) following previous reviews. Findings stemming from this audit do not duplicate existing FTA findings, and corrective actions to resolve issues identified during the audit should not be redundant with ongoing WMATA Corrective Action Plans (CAPs) to address existing findings.

### Audit Findings:

- Finding 1: It is unclear from completed CMNT 12-Point Safety and Health Inspection Checklists whether issues identified during inspections were resolved.
- Finding 2: Outdated versions of the 12-Point Safety and Health Inspection Checklist are in use at some shops.
- Finding 3: Some safety training courses administered by SAFE do not include a formal testing/assessment component.
- Finding 4: PLNT PM records in Maximo do not provide a clear indication when a Supervisor conducted QC for a particular item.
- Finding 5: PLNT Supervisors are not routinely conducting QC for two PMs per week as required under SOP 209-07.
- Finding 6: Some PLNT CM work orders which have been open in Maximo for prolonged periods do not list an updated status of repair activities or describe mitigation measures.
- Finding 7: PLNT PM checklists do not indicate whether deficiencies were corrected or resulted in a new work order.
- Finding 8: PLNT preventive maintenance procedures and checklists are not prepared by WMATA Engineering.
- Finding 9: CMNT has regularly deferred or skipped monthly and quarterly PMs for wheel lathes, drill presses, and slings.
- Finding 10: Some CMNT tools remain in calibration due logs in consecutive months.
- Finding 11: Portable jacks with lapsed annual inspections were present on a New Carrollton shop floor, with no tags or labels indicating that they have been removed from service.
- Finding 12: Eyewash tank labels in multiple shops listed conflicting installation and/or expiration dates.

- Finding 13: Multimeters without “No Calibration Required” labels were identified at multiple shops.
- Finding 14: Shop pits without fall barriers / guardrails were present in both the Brentwood and New Carrollton shops.
- Finding 15: Exit signage for nearby doors was not visible from certain areas of the Brentwood shop floor.
- Finding 16: A wheel boring machine at the Brentwood shop was leaking a significant amount of coolant and oil, and oil-soaked rags were present on the floor around the machine.
- Finding 17: At Shady Grove, work was being performed on 7000-series rail cars on scaffolding in close proximity to the ceiling-mounted stinger power rail, with the scaffold wheels unlocked and immediately adjacent to the edge of an open shop pit.

## **Introduction**

The Federal Transit Administration’s (FTA) FTA WMATA Safety Oversight (FWSO) division provides regular oversight of the WMATA Metrorail system. 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 TOC, which has been delegated responsibility for triennial audits and other oversight activities by FWSO under the FWSO Oversight and Surveillance Plan. To comply with State Safety Oversight Final Rule 49 Code of Federal Regulations Part 659 (Part 659), the 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. 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 Service and Inspection (S&I) Maintenance Facility Safety and Equipment Inspections, pertaining to portions of Elements 14, 16, 18, and 19 of the WMATA 2015 SSPP. Generally, this review focused on whether WMATA’s practices comply with its own written plans as well as industry standards.

## **Methodology**

In advance of the audit, the TOC requested and reviewed relevant WMATA plans, procedures, records, and reports. The on-site portions of the audit occurred from March 20-23, 2017. TOC interviewed management personnel from the Office of Car Maintenance (CMNT), the Office of Plant Maintenance (PLNT), the Department of Safety and Environmental Management (SAFE), and Quality Assurance, Internal Compliance & Oversight (QICO) regarding maintenance facility safety programs and inspection of shop equipment. In addition, TOC conducted inspections of three WMATA Service and

Inspection facilities at New Carrollton, Brentwood, and Shady Grove. TOC representatives reviewed additional documentation provided by WMATA during the on-site portion of the review.

Findings refer to instances of WMATA operating out of compliance with an applicable internal or external written requirement, plan, policy, rule, standard, or procedure. A Finding may also refer to a condition whereby WMATA may technically be conducting business in compliance with existing WMATA, TOC, or FTA requirements, but there is no relevant written plan, policy, or procedure in place, or the existing plan, policy, or procedure is not in accordance with industry best practices such as those promulgated in American Public Transportation Association (APTA) standards.

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

## **Current Conditions**

### **Office of Plant Maintenance (PLNT)**

PLNT employees with S&I shop equipment inspection responsibilities are grouped in units based on geographic areas of the Metrorail system. There are seven PLNT regions for general equipment mechanics and a smaller number of regions for other, more-specialized tradespeople within PLNT. Each PLNT Supervisor oversees approximately 10 to 12 employees. S&I facility equipment maintained by PLNT includes assets that are essentially part of the building, such as train washes, cranes, rail lifts, HVAC system components, exhaust fans, air compressors, and pumps. PLNT plumbers, masons, carpenters, and locksmiths are also responsible for maintaining WMATA's other facilities and equipment.

Supervisors review Maximo extracts to prioritize work activities based on open tickets and thresholds identified in SOPs. There are checklists for all PLNT preventive maintenance (PM) inspections, though there are not associated procedures for all checklists; according to PLNT, detailed procedures are developed only for more complicated PMs, however TOC was not able to verify it. According to PLNT management, the PLNT 1000 training class is partly designed to familiarize new employees with PMs that do not have an associated procedure. Supervisors are responsible for conducting quality control (QC) on two PMs each week, either by observing maintenance activities or reviewing work that was conducted following completion. Supervisors check a box on PM checklists to indicate that QC was conducted on a particular PM, though no result of or corrective measure from the QC check is recorded.

PLNT tracks deficiencies identified during PM inspections in Maximo. Approximately 20,000 corrective maintenance (CM) tickets are issued for PLNT-maintained equipment each year, according to PLNT management. Maintenance technicians may contact the Maintenance Operations Center (MOC) to open corrective maintenance (CM) work orders. Records for PMs leading to CM activities include an associated work order

number for the CM, if required. Maximo tickets summarizing PLNT Supervisor QC activities provided to the review team show the supervisor ID number, the date of the PM, a work order number, description of the activity, and number of hours. While the reports did not specifically indicate that QC was being performed, PLNT personnel explained that Supervisors only record their field activities in Maximo to indicate that QC was carried out. While PLNT SOP 209-07 requires that Supervisors perform QC of two PMs per week, this does not appear to be taking place. Some PLNT Supervisors conduct QC for CM activities, which is not required under SOP 209-07.

Completed PM checklists are turned in to Supervisors by maintenance technicians on a daily basis. Records of completed PMs are summarized in quarterly analysis reports based on location or equipment type. PMs are sometimes deferred for non-Fire/Life Safety-sensitive assets, with passed PMs completed during the following month, though a PLNT report shows the on-time PM completion rate was 98.6% in 2016.

According to interviewees, PLNT develops PM checklists and procedures for most equipment maintained by the department. When the form, fit, or function of equipment is changed, checklists, and procedures are to be reviewed and updated. Engineering develops procedures and checklists for maintenance of more complex new equipment.

PLNT management stated that maintenance personnel hired by PLNT are licensed tradespeople at either the Journeyman or Master level; all new hires must demonstrate a minimum level of familiarity with their tools and potential job responsibilities before being hired. PLNT's administrative branch conducts tracking of licensing and other training responsibilities. PLNT's training database, maintained separately from WMATA's Electronic Learning Management (ELM) system, produces reports showing all training due within 60 days for personnel in the department and enables PLNT managers to plan upcoming training activities. Equipment-specific training courses are offered by the Technical Skills and Maintenance Training (TSMT) department. Maintenance training for new equipment is typically delivered by vendors as a condition of procurement contracts either directly or through a train-the-trainer model, with instruction of PLNT personnel facilitated by TSMT in the manner of a conventional course.

PLNT management stated that on-the-job training (OJT) is completed regularly, but not documented; TSMT in response to FTA System Maintenance Inspection's (SMI) finding is currently developing a system for PLNT to track OJT. Promotion questions for mechanics specifically target skills which are gained through OJT. PLNT management stated that supervisors also complete annual evaluations stating that employees are proficient in certain areas. If employees are found to be deficient, they are referred for additional training.

The audit team reviewed a sample of open PLNT CM work orders. A number of the oldest open work orders lacked information explaining why they remained open; PLNT personnel indicated that procurement of replacement parts often contributes to items remaining open for prolonged periods. There were a total of 146 open CM work orders assigned to PLNT's general equipment mechanics at the time of the audit. Several orders

dating from March, July, and October of 2016 related to hanging power cables, a misaligned lift, and tunnel ventilation equipment were listed as open and either missing updates or shown as waiting on parts and quotes for extended periods of time.

### **Office of Car Maintenance (CMNT)**

In addition to their responsibilities related to railcar maintenance, CMNT mechanics are responsible for maintaining shop equipment including drill presses, wheel lathes, grinders, small parts washers, slings, lifting tables, and other items used in support of vehicle maintenance. Some shop equipment utilized by CMNT is also maintained with contractor/original equipment manufacturer (OEM) support. All assets maintained by CMNT are labeled with a Maximo-linked asset number, where the full history of each tool or piece of equipment may be viewed.

CMNT does not currently possess a department-wide maintenance plan outlining maintenance practices and timelines for all equipment. CMNT representatives interviewed during the audit stated that Maximo asset lists and SOPs provide sufficient information for the department to manage its maintenance program.

Facility Superintendents are ultimately responsible for maintenance of all equipment in the facility. Managers use Maximo to generate PM schedules and associated job plans, which are utilized to conduct maintenance activities. Most CMNT job plans for shop equipment do not include an associated checklist. Instead of completing a checklist, mechanics mark the PM as closed in Maximo to indicate that it has been completed. Similarly, many CMNT procedures do not include detailed specifications for desired PM outcomes. CMNT does not have specific policies requiring that personnel assigned to maintain an item be trained or experienced in maintenance of that item, though according to CMNT interviewees, supervisors do attempt to assign staff who are familiar with each machine to perform maintenance. Supervisors are required to conduct QC for three PMs per week, though CMNT policies do not specifically require that the QC include shop equipment.

Supervisors are responsible for monitoring equipment and tools coming due for inspection or calibration. On-time PM compliance reports are generated by the department on a monthly basis. Records showing calibration requirements and due dates for specific pieces of equipment are maintained at individual shops.

CMNT Supervisors complete 12-Point Safety and Health Inspection Checklists on a regular basis to identify industrial safety issues and hazards in shop facilities. The audit team observed that different versions of the checklists are in use in different shops, which CMNT interviewees attributed to a document control issue.

### **Department of Safety and Environmental Management (SAFE) / Quality Assurance, Internal Compliance & Oversight (QICO)**

QICO Quality Assurance Officers conduct audits of WMATA maintenance processes, evaluating the effectiveness of PM activities, personnel issues, and procedural deficiencies identified in the specific shops under review. QICO develops and circulates completed audit reports to management personnel from impacted departments so that deficiencies may be tracked, and conducts follow-up verification activities before audits are closed.

SAFE personnel administer and support a variety of ongoing initiatives related to shop safety. SAFE Safety Officers review log books stored at each shop to ensure that 12-Point Safety and Health Inspection Checklists have been completed. Safety Officers also conduct Detailed Safety Inspections (DSIs) of WMATA shops. DSIs include photographs of defects and hazardous conditions alongside a narrative report of issues identified during each inspection. Deficiencies are resolved through immediate actions or result in generation of a work order; most deficiencies relate to minor housekeeping issues. DSIs are shared with CMNT and PLNT for tracking and resolution of issues; an example DSI report was shared with TOC for review.

SAFE's Environmental Management and Industrial Hygiene (EMIH) group is responsible for developing policies and procedures to ensure WMATA remains compliant with environmental management regulations, as well as providing training and technical assistance in these areas to WMATA departments. These responsibilities include management of WMATA's intranet Safety Data Sheet (SDS) database and search functions.

WMATA personnel may search WMATA's list of approved chemicals and submit requests for new materials to EMIH for review via an intranet form. If an item is requested and does not already appear in the database as approved or rejected, EMIH will conduct a review of the request and either approve or reject the requested item within approximately 15 business days; TOC verified that EMIH is quickly evaluating materials and responding to requesters. The system generates an automatic email to the requester indicating whether the material was approved, declined, or rejected; all WMATA employees have a WMATA email account from which to receive these notices. If the requested item is approved by EMIH, it is added to the master database of approved substances available on the intranet site. The approval package includes a SDS as well as labels which may be printed and applied to bottles or packages of the substance.

Hazardous substances are sometimes removed from circulation if concerns are raised by WMATA personnel or if the substance is no longer being utilized by any department. In these instances, EMIH indicates the substance as "obsolete" in the intranet database; when indicated as such, it may no longer be purchased by Procurement. Listings for obsolete substances in the database include the date of approval, date of removal from the database, and the name of the approved product which has replaced the obsolete substance.

All WMATA employees receive hazardous materials training during New Employee Orientation. The module on hazardous materials includes a demonstration of how to

access SDS data on the WMATA intranet. Additional specialized training is provided to employees who routinely work with chemicals, including a two-hour HazComm course.

WMATA provided examples of industrial hygiene studies in response to potential issues or employee complaints.

Each WMATA facility has an Environmental Compliance Officer (ECO) and several Deputy Environmental Compliance Officers (DCOs) who are responsible for ensuring compliance with environmental regulations. In WMATA S&I shops, the ECO is typically the highest ranking CMNT manager, with managers from other departments such as PLNT and Track and Structures (TRST) serving as DCOs. ECOs and DCOs are provided with a copy of WMATA's Environmental Standard Operating Procedures Manual, and conduct weekly and monthly inspections which are retained on site and shared with EMIH. WMATA provided reports showing consistent completion of DCO reviews of shop conditions. ECOs and DCOs receive a two-day initial training course with annual refresher training (provided at the EMIH annual meeting). Initial training includes a field component where participants are trained on how to complete facility inspections. EMIH tracks ECO and DCO training in WMATA's Electronic Learning Management (ELM) system by recording the training as a certification, allowing the ELM system to generate automatic reminders that retraining is due.

Not all SAFE-administered training courses include a formal assessment component. SAFE personnel stated that WMATA is in the process of developing assessments for all classes.

### **Maintenance Facility Inspections**

The audit team conducted inspections of WMATA S&I Shops at New Carrollton, Brentwood, and Shady Grove, accompanied by personnel from SAFE, CMNT, and PLNT. All hazards identified during the inspections were pointed out to WMATA personnel at the time of discovery, documented, and discussed. In many instances, hazards were rectified immediately by the WMATA personnel present. TOC recommends that WMATA inspect all S&I Shops that were not inspected by the TOC team during the audit for deficiencies similar to those identified in this report and correct them as necessary.

Significant hazards, as well as systemic housekeeping issues which were identified at multiple facilities or in multiple instances in one facility, are identified in the Findings section of this report. Minor housekeeping issues which do not warrant a CAP for resolution appear in Appendix A - Hazards Identified During Maintenance Facility Inspections.

### **Relevant FTA Findings**

TOC observed several issues during the audit which were consistent with findings from the 2014 TOC Triennial Audit of Shop Safety and Equipment Inspections. Findings from the previous review remained open under the TOC at the time of the transition to FWSO



oversight in 2015, and were subsumed and reissued under FTA findings via Safety Directive 16-2. At the time of the 2017 audit, some of the FTA CAPs associated with TOC findings from the 2014 Shop Safety audit remained open. These deficiencies continued to exist during the TOC's 2017 audit but will not be reissued as new, duplicate findings. FTA's findings and recommended actions, along with the associated TOC Shop Safety findings, are listed for reference below.

**FTA Finding R-4-27-A: Documented maintenance procedures and standard operating procedures are not implemented as required.**

FTA Required Action: For all major departments with inspection and maintenance responsibilities for critical infrastructure, WMATA must establish and/or update a preventive maintenance and inspection testing quality audit process to ensure compliance with established maintenance and testing practices, and to monitor missed or incomplete preventive maintenance activities and/or inspections.

Associated TOC Findings from 2014 TOC Triennial Audit of Shop Safety and Equipment Inspections:

- Finding of NC 1: PLNT does not have inspection procedures to guide technicians' preventive maintenance inspections.
- Finding of NC 3: CMNT inspections have procedures but no guiding checklists to confirm steps taken or measurements recorded.
- Finding of NC 4: There is no maintenance plan identifying all assets and their preventive maintenance techniques and procedures.

**FTA Finding TOC-OSP-15-006: Incompatible hazardous materials were not stored separately at multiple Service and Inspection shop locations.**

FTA Required Action: WMATA must separate incompatible hazardous materials into their respective compatible flammable storage cabinets, and take steps to ensure continued compliance such as reinstruction of personnel, and emphasis during upcoming Car Maintenance 12-point shop inspections.

Associated TOC Findings from 2014 TOC Triennial Audit of Shop Safety and Equipment Inspections:

- Finding of NC 9: Incompatible hazardous materials were not stored separately at multiple S&I locations.

TOC's observations related to the absence of formal documentation for OJT offered by PLNT, development of OJT materials, and tracking of training received by frontline personnel were consistent with an open Required Action in response to Finding R-16 from FTA Safety Directive 15-1.

**Finding R-16: Technical Training for operations and maintenance departments is under-resourced and fractured, currently provided by five different departments and IT, is insufficiently directed and resourced, and relies significantly on on-the-job-training (OJT) which is informal and lacks oversight.**

FTA Required Action R-2-16-d: WMATA must establish formal guidance for maintenance employees responsible for providing on-the-job training.

### **New TOC Findings**

**Finding 1: It is unclear from completed CMNT 12-Point Safety and Health Inspection Checklists whether issues identified during inspections were resolved.**

Completed checklists do not indicate whether deficiencies were rectified immediately, tracked to resolution through a work order number, or remained unresolved. While work order numbers associated with inspections are sometimes logged in “call-in” books at each shop, CMNT should update the inspection form to ensure that corrective actions are listed for each deficiency identified during the inspection.

**Finding 2: Outdated versions of the 12-Point Safety and Health Inspection Checklist are in use at some shops.**

Completed checklists submitted to the audit team indicate that Revisions 2, 4, and 5 of the 12-Point Safety and Health Inspection Checklist were in use at Alexandria, West Falls Church, and Branch Avenue during the same period from September to December of 2016. CMNT should ensure that the current, complete version of the 12-Point Checklist is in use at all shops.

**Finding 3: Some safety training courses administered by SAFE do not include a formal testing/assessment component.**

Per Section 18.1.5 of the WMATA SSPP, employees should be tested on their knowledge of course material upon completion of all courses. WMATA should ensure that assessments are developed for all safety training courses and that completed assessments are retained in employee training files.

**Finding 4: PLNT PM records in Maximo do not provide a clear indication when a Supervisor conducted QC for a particular item.**

PLNT management stated that when PLNT Supervisors complete QC on maintenance, they check a box on the PM checklist completed by the maintenance technician. However, there is no corresponding indication in Maximo that QC was completed for each item, making it difficult to determine the scope and nature of QC activities, or whether the check identified discrepancies. There are no checklists utilized by Supervisors during QC activities. PLNT should consider developing a Supervisor QC inspection checklist and

altering Maximo inputs so that information on completed QC may be viewed and extracted in reports.

**Finding 5: PLNT Supervisors are not routinely conducting QC for two PMs per week as required under SOP 209-07.**

PLNT SOP 209-07 requires that PLNT supervisors QC at least two PMs per week to ensure the quality and completeness of inspections and repairs. Records of QC activities completed by a sample of PLNT Supervisors indicate that QC activities currently fall below this target. QC for CM procedures is also taking place but is not explicitly required under the same PLNT SOP. PLNT should ensure that all Supervisors conduct QC activities as required under existing SOPs, and consider modifying SOP 209-07 to include a requirement for QC of CM activities.

**Finding 6: Some PLNT CM work orders which have been open in Maximo for prolonged periods do not list an updated status of repair activities or describe mitigation measures.**

While PLNT management could research the factors preventing PLNT from closing its oldest CM work orders, Maximo records for the CMs did not always provide an indication of the reasons they remained open. Several work orders dating from March, July, and October of 2016 related to hanging power cables, a misaligned lift, and tunnel ventilation equipment were listed as open and either missing updates or shown as waiting on parts and quotes for extended periods of time. The Maximo entries did not describe mitigation measures implemented to manage hazards from improperly-functioning equipment until corrective maintenance can be completed. PLNT should ensure that all CM work orders include information on the current status of repair activities, responsible individuals and departments, and temporary mitigating measures related to the defect identified.

**Finding 7: PLNT PM checklists do not indicate whether deficiencies were corrected or resulted in a new work order.**

TOC reviewed PM records for overhead cranes, jib cranes, and hoists for 2016 at Brentwood, Shady Grove, and West Falls Church S&I facilities. Completed checklists do not indicate whether deficiencies were rectified immediately, tracked to resolution through a work order number, or remained unresolved. PLNT should update the checklists to ensure that corrective actions are listed and the loop is closed for each deficiency identified during the inspection.

**Finding 8: PLNT preventive maintenance procedures and checklists are not prepared by WMATA Engineering.**

According to WMATA interviewees, PLNT develops the majority of its maintenance procedures and checklists using resources from within the department. As a maintenance department, PLNT is responsible for carrying out maintenance processes and procedures developed by qualified engineering personnel, rather than independently developing

technical documents related to maintenance. Development of technical documentation, including procedures and checklists, is the responsibility of Engineering; a core function of WMATA's Engineering Department is providing technical support to WMATA's maintenance groups. WMATA should ensure that development of all technical documentation for the PLNT maintenance program is facilitated by Engineering.

**Finding 9: CMNT has regularly deferred or skipped monthly and quarterly PMs for wheel lathes, drill presses, and slings.**

The TOC requested 2016 CMNT PM records from the slings and lift tables at West Falls Church, and the drill press and wheel lathe at West Falls Church, Brentwood, and Shady Grove. A review of CMNT monthly and quarterly PM records for shop equipment showed that numerous inspections appear to have been skipped. In 2016, wheel lathe PM records for Brentwood show that monthly inspections were missed in April, May, and August, and no quarterly inspections were completed for the year. In the same year, the wheel lathe at Shady Grove does not appear to have undergone monthly inspections for February, March, May, June, September, and December. Drill press PM records for Brentwood in 2016 show that the first four monthly PMs were all closed at once in April of 2016. At West Falls Church, sling PM records show that PMs were deferred in several months. WMATA should ensure that all monthly and quarterly PMs are completed according to schedule and establish processes to ensure that no PMs are skipped or deferred. WMATA should also consider a manpower assessment to determine the number of personnel it needs to remain compliant with its requirements for effective and on-time inspections.

**Finding 10: Some CMNT tools remain in calibration due logs in consecutive months.**

CMNT SOP 3.05, Precision Measuring Devices, Shop Equipment, and Special Tools, states that calibration activities should not be carried from month to month. CMNT should take steps to ensure that all tools are calibrated within prescribed windows as outlined in SOP 3.05.

**Finding 11: Portable jacks with lapsed annual inspections were present on a New Carrollton shop floor, with no tags or labels indicating that they have been removed from service.**

Annual inspections for the portable jacks in question were last completed in May of 2014. The jacks were not actively in use, and shop personnel stated that they have not been used since the inspections lapsed, but no tags or labels were present to warn personnel that the equipment must not be used. WMATA should ensure that all shop equipment which has not been inspected according to prescribed timelines is removed from service and clearly labeled as not to be used.

**Finding 12: Eyewash tank labels in multiple shops listed conflicting installation and/or expiration dates.**

Conflicting dates on eyewash tanks and caps made it difficult to determine whether tanks had been in active use for longer than the 6-month maximum. Certain opened tanks included one expiration date on the bottle label and another conflicting date on the bottle lid. Before being opened, eyewash water tanks may remain available for use until passing the manufacturer's expiration date listed on each tank. In some instances, manufacturer's tags with expiration dates were covered or removed. After a water tank is opened, it can be used during the next six-month period or until reaching the manufacturer's expiration date, whichever comes sooner. The tank must be discarded after the manufacturer's expiration date even if it was never opened. Eyewashes were also in need of cleaning, and cleaning should be part of PM inspections. WMATA must clarify procedures for maintenance and labeling of eyewash tanks to ensure that tanks are replaced every 6 months and outdated tanks are removed from service according to required timelines.

**Finding 13: Multimeters without “No Calibration Required” labels were identified at multiple shops.**

Per, CMNT SOP 3.05, Precision Measuring Devices, Shop Equipment, and Special Tools, a “No Calibration Required” label should be affixed to all shop equipment which is exempt from calibration requirements. CMNT should ensure that all shop tools not requiring calibration are labeled properly as required under SOP 3.05.

**Finding 14: Shop pits without fall barriers / guardrails were present in both the Brentwood and New Carrollton shops.**

29 CFR 1910.23 calls for pits higher than 4 feet to be protected, as of 1984. In the Brentwood and New Carrollton facilities, there are no safety devices to protect maintenance personnel from fall hazards associated with working near open shop pits. The New Carrollton facility was built after this requirement, and the Brentwood facility should also comply due to the potential hazard of employees or equipment to fall into the pit. WMATA should ensure that appropriate measures are taken to protect personnel from the fall hazards present in these locations.

**Finding 15: Exit signage for nearby doors was not visible from certain areas of the Brentwood shop floor.**

Exit signage was missing from two exit doors (along the 9A south track and at the loading dock). Exit signs for doors on the Brentwood shop floor were sometimes located an excessive distance above or beside the doors, which could make it difficult to identify exits during an emergency event. Exit signage could not be viewed from locations perpendicular to the doors along the outer edge of the shop. Per National Fire Protection Association (NFPA) standard 14.14.1.2.1, exits shall be marked by a sign that is readily visible from any direction of exit access. Per NFPA 14.14.2.1, a sign showing the direction of travel shall be placed in every location where the direction of travel to reach the nearest exit is not apparent. PLNT reported that exit signage was expected to be reinstalled as part of a Brentwood Yard capital project underway.

**Finding 16: A wheel boring machine at the Brentwood shop was leaking a significant amount of coolant and oil, and oil-soaked rags were present on the floor around the machine.**

The improperly functioning machine, and unsafe mitigation measures completed by shop personnel, presented fire and slipping hazards. During the audit closeout, WMATA personnel indicated that the machine had been taken out of service as March 23, 2017. WMATA should ensure that the Brentwood wheel boring machine is repaired and/or replaced, and that processes are established to remove improperly-functioning shop equipment from service.

**Finding 17: At Shady Grove, work was being performed on 7000-series rail cars on scaffolding in close proximity to the ceiling-mounted stinger power rail, with the scaffold wheels unlocked and immediately adjacent to the edge of an open shop pit.**

The scaffolding, recently deployed in certain WMATA S&I shops, was designed to allow access to HVAC equipment on the roof of 7000-series cars. The metal scaffolding stood within several inches of the ceiling-mounted stinger power rail, and the work crew was separated from the rail by a small, unmarked orange net. The scaffold straddled an open shop pit beneath the train which was being maintained, and its unlocked wheels were at risk of falling into the pit.

*Plans, Procedures, and Regulations Cited in TOC Findings: WMATA 2015 System Safety Program Plan, CMNT 12-Point Safety and Health Inspection Checklists, PLNT SOP 209-07: Prioritizing and Documenting Maintenance Work, CMNT SOP 3.05: Precision Measuring Devices, Shop Equipment, and Special Tools, 29 CFR 1910.23, National Fire Protection Association Standards 14.14.1.2.1 and 14.14.2.1*

### Persons Interviewed

- ██████████ SAFE
- ██████████ CMNT
- ██████████ SAFE
- ██████████ CMNT
- ██████████ SAFE
- ██████████ PLNT
- ██████████ QICO
- ██████████ QICO
- ██████████ SAFE
- ██████████ PLNT
- ██████████ PLNT
- ██████████ EMIH/SAFE
- ██████████ EMIH/SAFE

- [REDACTED] PLNT
- [REDACTED] PLNT
- [REDACTED] CMNT
- [REDACTED] SAFE
- [REDACTED] HRTM
- [REDACTED]
- [REDACTED]
- [REDACTED]

## Documents Reviewed

- Office of Plant Maintenance Maintenance Management Plan - Jan 1, 2016
- PLNT OJT Tracking Logs
- PLNT provided weekly fire life safety report (open work orders).
- PLNT Training and Certification Report
- Sample PLNT EMI – Tunnel Fans
- PLNT Annual Maintenance Report and Maintenance Trend Analysis Reports
- PLNT Supervisor QC Reports
- PLNT SOP 209-07: Prioritizing and Documenting Maintenance Work (3/1/2017)
- 2016 PLNT Crane PMs for West Falls Church, Shady Grove, and Brentwood
- 2016 PLNT Hoist PMs for West Falls Church, Shady Grove, and Brentwood
- 2016 PLNT Train Wash PMs for West Falls Church, Shady Grove
- WMATA Safety Rules and Procedures Manual - Hazard Communication Program - Procedure 8.0 - Oct. 30, 2015
- Shop Equipment Preventative Maintenance Job Plans (various)
- SOP 3.05 Procedures for Precision Measuring Devices Shop Equipment and Special Tools
- PLNT S&I Procedures - Fire Extinguisher / Dry Standpipe
- PLNT S&I Checklists (various)
- 12-Point Safety and Health Inspection Checklists - Sept-Dec 2016 West Falls Church, Alexandria, Sept - Nov 2016 Branch Ave
- "Branch Avenue Facility Safety Inspection Punch Lists, Sept-Nov 2016, Alexandria Facility Safety Inspection Punch Lists Sept-Dec 2016
- List of Completed CM Work Orders for WFC, Alexandria, and Branch Ave Facilities
- List of Open CM Work Orders for WFC, Alexandria, and Branch Ave Facilities
- WMATA Construction Safety and Environmental Manual - March 2013
- WMATA Environmental Management Policy Manual - July 2013
- PLNT Asset List - BMSS Asset PMs and Schedule
- CMNT Asset Lists (Maximo extract) for Shady Grove, West Falls Church, Brentwood
- HAZWOPER Refresher Training Completion Certificates (various)
- Globally Harmonized System Hazard Communication Labeling Poster
- Using Chemicals SDS Poster - 1/28/16

- SDS Access for Employees Toolbox Talk, SDS Directions - 1/14/15
- Metro Homepage SDS Access Did You Know Info Sheet - 1/25/16
- Sample of 2016 PM records for wheel lathe, sling, and drill press equipment at Shady Grove, Brentwood, and West Falls Church
- Sample of QICO/QAAW Quality Audit Reports



## **Appendix A – Hazards Identified During Maintenance Facility Inspections**

*Note: Hazards identified in the Findings are not repeated in these lists. TOC requests that the rest of S&I facilities that were not inspected by TOC as part of this audit be inspected by WMATA personnel for similar deficiencies identified at the three inspected facilities listed below and if found the deficiencies be corrected.*

### New Carrollton “Old” S&I Facility

- There was an unlabeled, 62.5-pound yellow tank on the floor
- There was no flammable material cabinet in the building, and several containers with flammables were out on surfaces while not being used
- There were oily rags placed in open bins rather than in an oily rag receptacle
- Black pallets blocked a breaker box on the west side of the shop

### New Carrollton S&I Facility

- A first aid kit outside the office area on the main level had many supplies missing
- There were isolated occurrences of unlabeled bottles containing liquids
- A fire extinguisher between tracks 20N and 19N was blocked
- There were fluorescent bulbs stored on high shelves in open boxes
- In the basement, a plow was blocking electrical panels
- Hoist enclosure room gates were open (corrected immediately)
- There were flammables out in the basement area

### Brentwood S&I Facility

- A breaker box and stinger panel at track 8/9S was blocked by bulb storage
- There were fluorescent bulbs stored on high shelves in open boxes
- A fire extinguisher was missing from beneath a fire extinguisher location sign near track 9A-S
- Rubber was coming up on the floor, creating a potential trip hazard, around the base of a power stop button stand at track 9N
- Welding screens were stacked against metal rods leaning precariously against a pillar
- High voltage gloves were not inspected every shift as required (according to the inspection log)
- A truck tailgate was covering a fire pull station near track 10
- A blue storage cabinet on wheels was moved in front of a power switch box at track 11N
- Oily rags in the basement were not placed in contained oily rag receptacles
- In the basement, an extension cord led from an outlet to a surge protector; the surge protector should be plugged directly into the outlet

### Shady Grove S&I Facility

- There were unlabeled bottles present at work stations, and unlabeled sprayers on the floor near the car wash
- There were flammables out and unused at work stations
- A multi-outlet surge protector was plugged into another multi-outlet surge protector plugged into a wall outlet at a desk.
- A power strip led into an employee's locked/inaccessible locker rather than a visible outlet
- Breaker boxes were blocked by equipment in two locations (both corrected immediately)
- A fire extinguisher along the 6N track had not received its March 2017 inspection
- There was a broken chair (potential for injury) in the basement (thrown away immediately)
- A storeroom fire extinguisher had missed its January-March 2017 inspections