



## Washington Metrorail Safety Commission

### **Metrorail's ineffective and insufficient Automatic Train Control (ATC) Room inspection, maintenance and cleaning program**

**August 4, 2022**

A WMSC inspection on March 28, 2022 identified urgent safety concerns in the Friendship Heights Station Train Control Room (TCR). The WMSC communicated this urgent safety concern to Metrorail on March 29, 2022 and required Metrorail to take immediate action to address the safety concerns. These immediate required actions included protecting the train control equipment, measuring air and environmental quality, cleaning the room and equipment, conducting preventive maintenance inspections in the room, identifying and addressing the source(s) of water intrusion, and addressing the ceiling deterioration in the room. The WMSC also initiated a broader review of Metrorail's TCR maintenance records and practices, including records of inspections, maintenance, and repairs at the Friendship Heights Station TCR from January 1, 2019 through March 29, 2022, a spot check of TCR cleaning records systemwide for March 1, 2022 through March 29, 2022 and any Metrorail records of water intrusion or environmental contamination in TCR rooms from January 1, 2021 to March 29, 2022. The WMSC also conducted additional field inspections of TCRs including at Franconia-Springfield, King Street, Rosslyn, Pentagon, Farragut West, and Waterfront stations.

As described below, Metrorail completed most initial actions related specifically to the Friendship Heights Station TCR by mid-May, with the exception of permanent air conditioning and duct replacement which Metrorail determined required extensive engineering design and a construction procurement. Temporary cooling was put in place.

However, WMSC follow up in July and August 2022 demonstrates that Metrorail did not follow through on all safety commitments made in April and May 2022, including not continuing and completing special safety inspections of all TCRs and not beginning similar special inspections of other similar rooms. Metrorail had stated these special safety inspections included safety department personnel and personnel from departments responsible for equipment in each room. Upon the WMSC raising these concerns, Metrorail stated on August 2, 2022 that it would schedule and complete these special safety inspections. Metrorail then provided a planned schedule of inspections for the remaining TCRs that commits to resuming these inspections on August 9, 2022 and completing the special inspection of all TCRs (and reinspections of some TCRs inspected in April and May) by mid-September 2022. Metrorail also committed to later conducting these safety inspections of similar rooms such as Traction Power Substations and Communications Rooms. Also on August 2, 2022, Rail Infrastructure Maintenance and Engineering (RIME) stated that they had not taken any additional action to ensure inspections are conducted according to procedures and that safety issues are properly documented, communicated and resolved. This is despite the WMSC's inspections and records reviews described below, and Metrorail's safety department initial special inspections described in more detail below, identifying safety issues and problems that had not been addressed as required by Metrorail procedures.

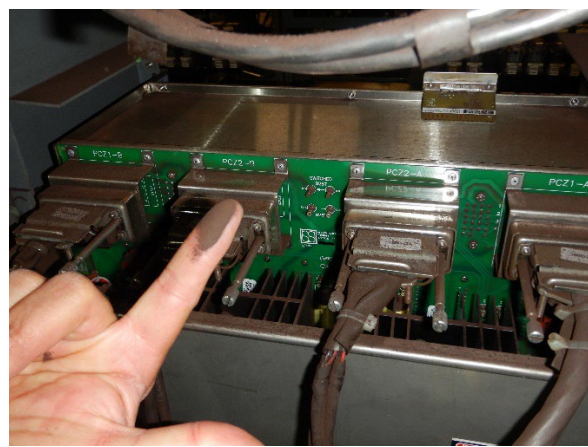
Also after the WMSC's follow up, Metrorail's Engineering and Architecture (ENGA) progressed a proposal on August 2, 2022 for further internal Metrorail review that would include new duct work



and a new air handler for the Friendship Heights Station TCR and neighboring rooms while sealing and capping the existing significantly deteriorated duct work in place.

### WMSC inspections

Although Metrorail procedures<sup>1</sup> require weekly cleaning of each TCR, on March 28, 2022 the WMSC found the Friendship Heights Station TCR and its equipment covered in dust and other debris. The deteriorating ceiling in this room, including exposed rusting rebar and other materials, appeared to be at least one source of this debris. This ceiling deterioration exposed the room to the floor above where there is an AC Switchboard Mechanical Equipment room. The TCR also had water leaks, some of which were being caught by buckets placed by Metrorail personnel, and other evidence of water intrusion. Metrorail had placed plastic over some equipment at some point in the past due to water leaks onto the equipment, but that plastic sheeting had deteriorated and was not an effective permanent mitigation. Air conditioning duct work was also deteriorated.



The water intrusion and debris were on, around and near vital automatic train control (ATC) equipment. This equipment is considered “vital” because its proper functioning is essential for the protection of human life because it provides for safe train operations by, among other things, detecting track occupancy and preventing collisions. The equipment in this room had a layer of dust and debris, which could interfere with the equipment’s safe operation and lead to a collision, loss of life, or other safety event.

On March 29, 2022, the WMSC advised Metrorail of the urgent safety concerns at the Friendship Heights Station TCR identified in the WMSC’s inspection, and the WMSC required Metrorail to protect the vital equipment in that TCR from dust and water intrusion, to take actions to protect personnel who enter the TCR, to clean the TCR and all equipment, and to conduct and provide documentation of preventive maintenance inspections to ensure the equipment is in working order. The WMSC also required Metrorail to identify and address the source of water intrusion, to address the ceiling deterioration and to ensure the ability of the ceiling to support any equipment above the

<sup>1</sup> Including ATC 1000, Testing and Inspection of ATC Apparatus and Systems, Rev 4.0, May 6, 2021, TCR Room Weekly Inspection – Form 1020.



TCR. Metrorail acknowledged receipt of the urgent safety concern on March 29, 2022, and on April 1, 2022, provided a list of actions that had or would be taken in response, and the timeframe for those actions.

Following the WMSC's inspection results on March 28, 2022, the WMSC conducted additional inspections of TCRs through May 2022. The inspections of locations including Franconia-Springfield, King Street, Rosslyn, Pentagon, Farragut West and Waterfront stations TCRs demonstrated that the conditions at the Friendship Heights Station TCR were not isolated to that location. The WMSC communicated these conditions of accumulated dust on train control equipment, failing or inoperative heating, ventilation and air conditioning (HVAC) units, and standing water in underground conduit housing various electronic and electrical circuitry associated with the train control equipment to the Metrorail personnel accompanying the WMSC and to other Metrorail personnel as part of the continued follow-up on the March 28, 2022 inspection results and required actions.

The accumulation of dust and debris on equipment, the long-term water intrusion into rooms, the failing HVAC ductwork or nonexistent air filtration systems, and the collapsing or otherwise damaged structural elements show that Metrorail has allowed these conditions in TCRs to deteriorate over time. The long-term nature of this deterioration is further demonstrated by the WMSC's records reviews related to the Friendship Heights TCR that are described below.

## **Background**

Protecting vital systems from dust, water, and other contaminants has long been recognized as critical to life safety in rail operations. The performance of vital systems is critical to ensuring safe Metrorail train operations.

The failure of vital systems in a TCR was at the center of the investigation of the collision of two Red Line trains near Fort Totten Station on June 22, 2009 where nine people died and 52 were injured, and the related precursor near-collisions near Rosslyn Station in 2005 (National Transportation Safety Board (NTSB) investigation report RAR-10/02).

Improperly maintained equipment, dust and moisture can create "an alternative path for coded signals to travel from a transmitter impedance bond to a receiver bond without going through the rails (and thus bypassing any rail shunt). This alternative path could be completed through direct contact between loose wires and through the corrosion that can ground the terminals" (NTSB RAR10/02). This can create a wrong side failure (the opposite of the fail-safe design).

The NTSB investigation report stated, "the accident did not result from the actions of an individual but from the "accumulation of latent conditions within the maintenance, managerial and organizational spheres" making it an example of a "quintessential organizational accident."

Metrorail has more than 100 TCRs across the system. Each TCR contains, among other assets, equipment racks containing track circuit modules and other associated equipment that identify the location of trains and of fixed work zones. The equipment is used as part of the Automatic Train Control (ATC) system and ATC subsystems such as Automatic Train Protection (ATP) and Automatic Train Operation (ATO). These subsystems rely on the functionality of the equipment in



each TCR. Metrorail procedures require that these rooms and equipment be maintained in a state of good repair and cleanliness to ensure that this vital train control equipment functions as intended.

ATP is the vital subsystem designed to provide protection against collision by ensuring the safe separation of trains. Although not currently in use by Metrorail, ATO is another ATC subsystem that relies on ATP and other features to automatically control train movement and station stops. With brief exceptions, Metrorail has not used ATO since the Fort Totton collision in 2009.

Metrorail has conducted some work toward restoring auto doors and automatic train operation with the stated goal of restoring one or both of the systems on a limited basis. The WMSC's [ATC Audit issued in May 2021](#) included a finding that Metrorail has continued efforts to restore ATO without following its safety certification process. The WMSC also issued [a finding on August 13, 2021](#) regarding Metrorail not consistently following its safety certification process, which leads to project activation and use without proper hazard identification and mitigation, putting Metrorail customers, personnel and first responders at risk. Metrorail is in the process of implementing corrective action plans (CAPs).

### **Metrorail records show safety requirements not completed, lack of required equipment**

Metrorail's ATC-1000 manual requires cleaning and inspection of the train control rooms and equipment at least weekly.<sup>2</sup> This includes checking track circuit modules and cleaning as needed, and cleaning racks and other equipment. However, Metrorail inspection records reviewed by the WMSC show that Metrorail is not documenting obvious safety issues, and safety issues that were documented are not being addressed with permanent mitigations by Automatic Train Control Maintenance (ATCM) personnel and personnel in other departments with responsibilities for the condition of the rooms. In addition, a comparison of records to actual conditions identified during WMSC inspections, demonstrates that Automatic Train Control (ATC) and other Metrorail personnel are not ensuring that equipment and rooms are maintained properly.

Some frontline personnel told the WMSC that they had given up on the limited cleaning that they had done in TCRs like the one at Friendship Heights Station because no action was being taken to repair the deficiencies causing dust and debris to build up on the equipment on a continuing basis.

Metrorail personnel, including frontline personnel, supervisors and management, appeared to be completely unaware of a procedure in Metrorail's ATC-1000 Manual requiring detailed inspection of individual circuit cards on a regular basis (in addition to weekly TCR cleaning). Instead, Metrorail personnel repeatedly stated that they only conduct surface cleaning and rely primarily on the equipment covers, which are intended to at least somewhat limit dust and debris that enters the chassis. However, at the Friendship Heights Station TCR, Metrorail staff allowed covers to remain off. Metrorail stated this was due to the excessive heat in the room due to the non-functioning HVAC system.

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<sup>2</sup> Original equipment manufacturer (OEM) manuals specify to clean the equipment as required, but no less than annually with tools such as a soft brush, cloths, and compressed air.



The existing circuit card board inspection procedure (ATC 1000 – 1027 Hitachi/Ansaldo ATP Inspection and Test), marked as new in May 2021, requires the individual removal and checking of receiver and relay driver circuit cards once every 180 days (approximately 6 months), and the checking of all Automatic Train Protection (ATP) Cards once every 730 days (approximately two years). WMSC review of Metrorail’s Maximo maintenance management system records found no evidence that Metrorail had recorded or scheduled even one such inspection and testing activity under this procedure during the full year since this procedure was in effect. The WMSC provided Metrorail with the opportunity to provide any such records, but Metrorail did not provide any.

The WMSC also identified that at least some ATC personnel assigned to perform this work were not provided the special cloths and compressed air specified by the OEM as being necessary to properly clean and maintain the equipment and circuit cards in the TCR rooms. Metrorail personnel told the WMSC that they had raised this safety concern to management before. This includes the tools needed to clean connections, terminal strips and other aspects of the equipment racks that are critical to the safe operation of the ATC system as a whole. Regular cleaning can reduce the risk of system failure, can help ensure that resources are appropriately allocated as specified by Metrorail’s Public Transportation Agency Safety Plan (PTASP), and can limit the need to fully remove circuit cards and retest track circuits outside of regularly scheduled preventive maintenance.

The OEM manuals provide the specifications for the cleaning and maintenance process, including the required tools, however Metrorail management had not provided these tools or the procedures for use to ensure the equipment functions properly.

Metrorail provided the WMSC with a memorandum in May 2022 that indicated Metrorail does not routinely have the required tools to or processes perform its cleaning procedures. The part number for at least one of the tools, compressed air cans, was listed as “TBD”, and the memorandum stated that ATC Maintenance would need to contact Metrorail’s safety department to identify proper personal protective equipment for this task.

Metrorail had stated at that time that it would take steps to obtain this equipment, however, on August 2, 2022, Metrorail stated that it had not obtained and was not in the process of obtaining any new cleaning equipment, and that Metrorail did not need any “new technologies.”

### **Records review**

The WMSC reviewed records from 2019 through 2022 pertaining to the Friendship Heights Station TCR. A ceiling collapse was noted in February 2019, and a work order was opened. The technician took photos. The ceiling had not been addressed in spring 2022, three years later.

Dirty AF800W circuit cards were noted on March 26, 2019, but no work order was opened. A July 2020 work order noted water leakage. Several inspection notes stated that the HVAC system was out of service, but no work orders were opened. Metrorail’s ATC manuals require all rooms to have an effective HVAC system to support the equipment and personnel by “controlling the temperature in the TCR sufficiently.”

The WMSC also reviewed records from March 2022 pertaining to TCRs systemwide. This included a work order for a Red Line TCR that stated the dirt had permanently fused to the floor. Three other



Red Line inspection reports mentioned dirty floors, and several identified missing equipment or required electrical plans; however, no work orders were opened due to those inspections. Other inspection reports also indicated deficiencies but did not note any remedial action nor include a work order being opened.

March 2022 records on other lines included deficiencies such as missing or expired fire extinguishers, lamps/bulbs/indication lights that were inoperative, and broken HVAC systems, but no work orders were opened for those items. The records included several reports of rooms that required deep cleaning, and several instances in which the racks and equipment were noted as needing to be cleaned, but no work order was opened. In at least two instances, a technician noted that Metrorail had not provided the necessary vacuum cleaner to do the required cleaning. For example, at Court House Station on the Orange and Silver Lines, a technician noted racks that were dusty and covered with black soot and noted that an electronic-friendly vacuum cleaner was required for proper cleaning, but no work order was opened. The records also showed missing manuals and reference documents, but no work order was opened.

On the Green Line, there were several reports of missing covers on track circuit modules, track circuit modules being dirty, and track circuit modules being removed due to overheating, but no corresponding work orders were opened.

These systemwide TCR inspection records for March 2022 show that Metrorail personnel are not completing regular inspection reports and activities in each room as required by Metrorail's ATC 1000 manual, and there is ineffective supervisory oversight to ensure that hazards are properly identified, mitigated, and addressed.

Records included forms that were not reviewed and signed by supervisors as required. This is despite the ATC Maintenance (ATCM) Maintenance Control Policy requiring supervisors to spend at least 50 percent of their time in the field for tasks such as checking work quality and compliance. Lack of oversight of work in the field and review of the outcomes of that work by supervisors and management prevents supervisors and managers from identifying issues requiring elevation and taking the steps necessary to ensure that safety issues are addressed as specified by Metrorail policy.

Inspection and preventive maintenance activities, including TCR cleaning and the identification of any deficiencies, are intended to mitigate hazards. Each time these activities are not properly conducted and documented, it increases the safety risk for Metrorail riders, personnel, and systems.

One explanation offered by Metrorail management for these long-term deficiencies in TCRs as exemplified by the significant amounts of dust and debris on equipment, the long-term water intrusion into rooms, the failing HVAC ductwork or nonexistent air filtration systems, and the collapsing or otherwise damaged structural elements was that at least some of the issues had been raised from one department to another and had then not been addressed. Despite repeated requests for any supporting documentation for these statements, Metrorail did not provide any evidence that this was the case. Metrorail as an organization did not effectively identify and mitigate these hazards.



These current lapses in managerial, maintenance and organizational areas are similar to the “accumulation of latent conditions within the maintenance, managerial and organizational spheres” identified in the NTSB’s description of the 2009 Fort Totten collision as a “quintessential organizational accident.”

### **Further Metrorail actions in April and May 2022**

During the week of April 11, 2022, Metrorail stated that it had determined that disintegrating duct work was one source of the dust and debris in the Friendship Heights Station TCR, and that it would assess options for an air scrubber and HVAC system duct repair to at least maintain the air quality and equipment in the room in the near term, while longer term repairs to re-engineer the damaged ceiling to the room are planned.

On April 19, 2022, Metrorail stated that it had done work coordinating across multiple departments to begin to address water intrusion in the Friendship Heights Station TCR and the structural issues surrounding the room. Metrorail stated that it was not certain how to clean the track circuit modules, and whether that cleaning was something Metrorail could actually do. Metrorail said this to the WMSC despite the original equipment manufacturer (OEM) manual stating this cleaning is necessary and Metrorail’s own procedures calling for regular cleaning by Metrorail employees. Metrorail stated it was waiting for verification from the OEM and ATC engineers that the equipment was safe to continue using.

Metrorail also stated on April 27, 2022, that ATC Engineering was working on establishing criteria for cleanliness of ATC equipment in the rooms, and therefore to define what cleaning is required. It is not clear why new criteria are needed when cleaning requirements are already specified in Metrorail procedures and OEM manuals.

On May 11, 2022, Metrorail stated that, despite the requirements provided in OEM manuals to keep the equipment clean for proper operations, that the protective coating on circuit boards ensures that the equipment is safe and operates properly even with significant water intrusion, dust and dirt. However, this protective coating is meant to serve as a protection of last resort against minor dust or debris, and also does not account for the contact areas between these cards and the racks where the cards are plugged in.

Relying on the coating in lieu of cleaning and protecting the equipment does not comport with Metrorail’s own safety requirements, industry best practices for safety, nor the OEM’s requirements to ensure safe operations. And it represents a lack of appreciation for the vital, life safety critical role of this equipment.

### **Metrorail special safety inspections**

In response to the WMSC’s identification of the disrepair at Friendship Heights Station and the associated actions the WMSC required, and after the WMSC began a broader review of TCR conditions and practices, Metrorail’s safety department began special inspections of other TCRs that identified additional safety and cleanliness deficiencies. The safety department stated in April and May 2022 that it would complete these inspections of all TCRs systemwide beginning with the inspection of underground TCRs. Metrorail’s TCR inspections of 57 TCRs at underground stations in



April and May 2022 confirmed water intrusion (including extensive water intrusion at Bethesda and Medical Center stations), improper material and equipment storage, failing or inoperative HVAC systems adding dust or contaminants to the rooms, and fire extinguishers that are beyond their required inspection date, among other issues.<sup>3</sup>

As of May 11, 2022, Metrorail's safety department had identified at least 94 safety issues related to underground train control rooms during the inspections initiated after the WMSC raised these safety issues in March, including dust in the Metro Center Station TCR, and water intrusion, electrical safety, and fire code concerns at multiple locations. They also observed other issues such as improperly stored materials, a technician signing off on an out-of-date fire extinguisher, improperly installed, damaged and broken air conditioning systems and disconnected and damaged HVAC ducts, a cement beam falling apart, and dust in some rooms. Metrorail's Quality Assurance, Internal Compliance & Oversight (QICO) department also participated in field assessments of TCRs and communications rooms that identified rusting, signs of water intrusion, and ceiling cracks.

Despite these inspections of underground TCRs demonstrating systemic safety gaps, Metrorail stopped these special inspections in May 2022 and did not conduct any further inspections as Metrorail had told the WMSC it would. Metrorail did not resume these inspections until the WMSC raised this issue in late July 2022. At that time, when the WMSC asked for the results of additional inspections and what additional inspections were planned, Metrorail stated that it had conducted 57 inspections resulting in 94 findings. When the WMSC asked why the number had not changed since May, Metrorail stated it had not conducted any additional inspections. Metrorail also stated that structural assessments would be done under a multi-year capital program. This capital program is only in preliminary planning stages, so field work is not yet getting underway.

Due to the WMSC following up on this issue, on August 2, 2022, Metrorail provided a schedule of special TCR safety inspections that it now plans to complete as it originally committed to, and Metrorail stated that it expects to later continue these special safety inspections in other rooms such as Traction Power Substations, Tie-Breaker Stations, Communications Rooms and other ancillary rooms. The schedule specifies that remaining TCRs will be inspected, and a group of TCRs originally inspected in April or May will be reinspected, between August 9, 2022 and September 15, 2022.

Metrorail has said that it will incorporate the necessary TCR repairs identified by the special safety inspections into an already progressing capital project for replacement of equipment in specific TCRs; however, it is troubling that notable and obvious safety issues had not been incorporated into the project before, even when they had been listed on inspection forms.

The safety department's involvement after the WMSC raised this issue has contributed to Metrorail taking initial steps toward identifying and rectifying some safety deficiencies; however, it is indicative of Metrorail's organizational dysfunction that the organizational units that have primary responsibility for this equipment and the rooms that house it allowed the deficiencies to develop and remain in the

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<sup>3</sup> The WMSC identified and required Metrorail to develop a corrective action plan addressing fire extinguisher compliance as part of the Emergency Management and Fire and Life Safety Audit issued in February 2022.





first place. Despite the obvious nature of these safety issues to anyone who may have observed them, corrective actions were only initiated due to the WMSC's involvement and direction.

### **Open Corrective Action Plans (CAPs)**

Metrorail is currently implementing corrective action plans to address several findings issued in the WMSC's May 2021 Audit of Automatic Train Control (ATC), Signals and Signal Machines Planning, Inspection, Maintenance and Training. These include that WMATA is not conducting all inspections and maintenance required by its ATC manuals, which themselves contain incorrect or incomplete information and outdated references, that WMATA does not have a standardized process to prioritize and advance ATC capital projects, and that some test forms, work orders or data sheets are not completed or are not completed with the required level of detail.

Metrorail has committed to completion dates for each of these CAPs in 2022, however the information uncovered by the WMSC's oversight activities described above indicates that further action is needed to reach the basic level of stewardship required for vital equipment. The records show that even when frontline personnel properly identified safety deficiencies, Metrorail management did not address those deficiencies. Supervisors and management must provide active oversight to ensure that required procedures are carried out and that safety issues are addressed.

### **Conclusion**

Maintaining assets in a state of good repair ensures that these assets are fit for purpose. This is a fundamental stewardship responsibility of an entity such as WMATA. This is especially true for assets that include vital train control equipment. Metrorail is failing in its stewardship of the vital equipment designed to ensure safe train movement.



## Order of the

### Washington Metrorail Safety Commission

On this day, August 4, 2022, the Washington Metrorail Safety Commission ("WMSC") issues the following order regarding Washington Metropolitan Area Transit Authority ("WMATA") Metrorail Automatic Train Control (ATC) systems:

WHEREAS, the WMSC has identified Metrorail's safety deficiencies related to ATC systems, specifically Train Control Rooms (TCRs);

WHEREAS, the WMSC is the designated State Safety Oversight Agency for the WMATA Rail System, as required by 49 U.S.C. § 5329(e)(3)(C);

WHEREAS, the WMSC's powers are established by the Washington Metrorail Safety Commission Interstate Compact (P.L. 115-54; 131 Stat. 1093) ("WMSC Compact"), passed into law by the Commonwealth of Virginia, State of Maryland, and District of Columbia and approved by Congress on August 22, 2017;

WHEREAS, among the powers granted to the WMSC under the WMSC Compact is the authority to "require, review, approve, oversee, and enforce the adoption and implementation of any Corrective Action Plans that the Commission deems appropriate" WMSC Compact § 30(c);

WHEREAS, among the powers granted to the WMSC under the WMSC Compact is the authority to "Take such other actions as the Commission may deem appropriate consistent with its purpose and powers." WMSC Compact § 31(f); and

WHEREAS, WMSC Bylaws Art. VI.C.1. and VI.C.6.a authorize the Chief Executive Officer to issue directives to WMATA, and to issue directives to create and implement a corrective action plan and to conduct a hazard analysis

**IT IS HEREBY ORDERED** that WMATA will:

1. By October 31, 2022, document and complete ATC quarterly inspections (ATC-1000 1021) of each TCR, specifically including documenting, as specified in the procedure, that: "All ATP modules, associated equipment and wiring is securely mounted, clean, and properly labeled." Metrorail must inform the WMSC of hazards that are identified and associated mitigations.
2. Resume, complete and document its special safety inspections of each TCR as specified by the schedule provided to the WMSC on August 2, 2022. Metrorail must keep the WMSC apprised of progress, inspection results, and any schedule adjustments. Metrorail must also provide the WMSC with the progress on mitigating each identified issue on at least a quarterly basis until the issues are resolved.
3. Develop and implement a corrective action plan in accordance with the requirements of WMSC Program Standard Section 9.C to address the following finding:

**Finding:** Metrorail has an ineffective and insufficient inspection, maintenance and cleaning program for Automatic Train Control equipment, particularly including a lack



of required tools, procedural compliance, and supervisory oversight for care of vital equipment housed in train control rooms, and is not maintaining the structural integrity of these ancillary rooms.

**Minimum Corrective Action:**

- a) Metrorail must train ATC personnel to properly complete all inspections and maintenance specified by Metrorail procedures, and must ensure that these inspections and maintenance activities are properly carried out.
- b) Metrorail must train supervisors on their role to ensure that preventive maintenance activities are properly conducted and accurately documented, and to ensure that, when necessary, identified issues are properly escalated. This must include field observations in compliance with Metrorail's ATCM Maintenance Control Policy requirement that supervisors spend at least half of their duty day in the field checking to ensure that procedures are properly being carried out and any safety issues are being properly identified and addressed.
- c) Metrorail must determine and obtain sufficient quantities of all maintenance equipment required to complete its documented procedures, including the equipment needed to clean equipment in TCRs and similar facilities as specified by Metrorail procedures and OEM manuals.
- d) When obtained, Metrorail must provide training on and any necessary specific procedures and safety requirements for use of that equipment to frontline and supervisory personnel
- e) Metrorail must develop, implement, and provide training on required processes and procedures to ensure that ancillary rooms such as TCRs are properly maintained. This must include the interdepartmental and cross-disciplinary hazard identification, hazard mitigation and planning necessary to address any issues with structural and ceiling integrity, water intrusion, HVAC, and other items.
- f) Metrorail must provide training to all personnel responsible for conducting, overseeing and acting upon the results of inspections in the WMATA Rail System on the importance of identifying, recording and communicating hazards to ensure that those hazards are appropriately mitigated.
- g) Metrorail must ensure that information from inspections and preventive maintenance is captured and stored in a timely fashion in a centralized maintenance management system that allows for ongoing hazard and trend identification, analysis and resolution. This must include storage of all associated data sheets and notations in a way that is accessible to all relevant personnel, and in a way that Metrorail can reliably conduct data trending, analysis and prioritization. Metrorail must conduct and act upon that data analysis, trending and hazard identification on an ongoing basis. This must include the effective incorporation of ongoing data analysis and hazard



identification into Metrorail's capital improvement program project identification, scoping, planning and implementation processes.

**FURTHER:**

In accordance with WMSC Program Standard section 10.B.2, the WMSC will conduct an in-depth review of Metrorail's Automatic Train Operation (ATO)-8 Car Precision Station Stopping (PSS) Auto Doors project.

In accordance with Program Standard Section 10.B.2, this means that WMATA may not activate ATO or Auto Doors in passenger service until the WMSC concurs that Metrorail has conducted its safety certification process properly, including implementing any mitigations or corrective actions.

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Washington Metrorail Safety Commission