

## 6.2.2 Hazard Investigation

WMATA investigates identified hazards in accordance with sections 8.4, 10.3 and 11.2.c of the TOC PS/P. Bus related hazards are investigated in accordance with this section. The extent of the hazard investigation depends on the complexity of the hazard and the preliminary categorization of the hazard. SAFE will begin an initial investigation upon notification of the existence of a hazardous condition. SAFE's awareness of a hazard can occur from any of the sources described in section 6.2.1 and exhibit 6-3.

### 6.2.2.1 Notification of TOC of Hazardous Conditions

During the hazard investigation process, if it is determined that a hazardous condition exists, that meets the following criteria as stated in section 10.6, "Requirements for Notification of TOC," of the TOC PS/P:

- I-A (Catastrophic/Frequent)
- II-A (Critical/Frequent)
- III-A (Marginal/Frequent)
- I-B (Catastrophic/Probable)
- II-B (Critical/Probable)
- I-C (Catastrophic/Occasional)

The CSO will immediately notify the responsible department head, the ESC, GM/CEO and the TOC Chair or designated TOC representative (for rail hazards only, by phone and e-Mail) within two (2) hours of the determination that the hazard meets the above criteria. Note: Exhibit 6-5: Risk Assessment Matrices categorizes hazards that meet the above referenced criteria as "Unacceptable". SAFE will provide regular e-Mail status updates to TOC regarding the resolution of the unacceptable hazardous condition.

To ensure that WMATA appropriately notifies TOC of all hazardous conditions affecting rail safety or security that are not necessarily assigned the Hazard Risk Index meeting the above criteria, SAFE shall also notify TOC of all hazardous conditions and incidents that meet the criteria listed in Exhibit 6-4 that is required by section 10.6 of the TOC PS/P and WMATA/TOC MOU.

### Exhibit 6-4: TOC Incident / Hazard Notification and Reportability

Incident / Hazard Type	Notification	TOC will review reports and adopt investigation
Fatality within 30 days	2 hours by phone	Yes
Two or more injuries requiring immediate medical attention away from the scene	2 hours by phone	Yes
Property damage equal to or more than \$25,000	2 hours by phone	Yes
Evacuation of a train or facility for life safety reasons, or of a train for any reason if not at a station platform including self evacuation.	2 hours by phone	Yes
Derailment of any powered vehicle on the mainline, or any train in a yard	2 hours by phone	Yes
A collision with an individual, any other vehicle, or a fixed object	2 hours by phone	Yes
Red signal violation / overrun	2 hours	Yes
Train encroachment or overrun into work zone	2 hours	Yes
Opening of vehicle side doors during train movement	2 hours	Yes
Fallen or dragging equipment from a rail vehicle	2 hours	Yes
Employee or patron electrical shock over 200 volts	2 hours by phone	Yes
Passenger falls from vehicle onto right-of-way	2 hours	Yes
Stranding of passengers on a train for more than 15 minutes	2 hours	No, unless requested
Other actions or malfunctions that could have resulted in significant injuries or damage	2 hours	No, unless requested
Speed restriction or track closure due to infrastructure damage or weather conditions	2 hours	No, unless requested
Fire in or on Metrorail property, including stations, the right-of-way, yards, and shops (including no evacuation)	2 hours	No, unless requested
Vehicle side door opening on the wrong side or off station platforms	1 business day	No, unless requested
Mainline rail breaks/cracks	1 business day	No, unless requested
Other incidents or hazards involving workers in a right of way	1 business day	No, unless requested
All hazards that WMATA gives a severity/frequency rating of 1A-C, 2A-B, or 3A	1 business day	No, unless requested

The TOC shall be notified of all other hazards via the monthly hazard log submission.

Notification of the TOC (rail hazards only) will be in accordance with the WMATA/TOC MOU and section 8.1 of the TOC PS/P and include the following information:

- Name/title of the WMATA representative reporting the hazard
- Method of notification
- Time of notification
- Time and date of hazard occurrence
- Location of hazard being reported
- Description of how the hazard was recognized and reported; to include 1) how the hazard was identified; 2) who reported the hazard, and 3) the date and time that SAFE was notified of the hazard
- Potential number of customers or employees exposed to the hazard
- Description of the hazard and the immediate corrective action(s) taken
- Initial evaluation of the hazard, using the criteria included in SSPP section 6.2.4

A written hazard report must be submitted to the TOC no later than three (3) business days after a hazardous condition meeting the above criteria is identified.

Upon completion of the unacceptable hazardous condition investigation process, SAFE will submit a draft final hazardous condition investigation report to the responsible executive manager, the ESC, the GM/CEO and to the TOC [rail hazards only]. If the investigation report is not completed within 30 calendar days, an interim status report will be provided to the TOC (rail hazards only), no later than 30 calendar days after the identification of the hazardous condition. Once the hazardous condition report is approved by the TOC (rail hazards only), SAFE will submit a final hazardous condition report including the TOC approved CAP (rail hazards only) to the GM/CEO (bus and rail), the TOC (rail hazards only) and to the responsible WMATA executive (AGM/BUS) for bus related hazards, and as applicable, (AGM/TIES) for implementation.

Hazards that do not meet the above criteria, or are not determined to be unacceptable, are investigated with the appropriate degree of detail determined by the HMP Coordinator and are reported in the Hazard Management Module of SMS. Upon identification of a hazard, WMATA will have 45 calendar days (TOC PS/P, section 11.2.c) to develop a CAP (rail hazards only) to correct identified deficiencies for TOC's review and approval (rail hazards only). A hazard that can be immediately mitigated will not require a CAP (TOC PS/P, section 11.2.f).

### **6.2.3 System Safety Analysis**

Hazard analysis encompasses a set of methodologies that first searches throughout the system for the potential to do harm. Having found such hazards, further analysis attempts to control any hazard at an acceptable level. However, to do so first requires an understanding of the causes of the hazards.

Hazard analysis attempts to determine the set of primary events in the hazard generation process. Upon identification of these events and completion of the analysis,



WMATA (SAFE, RTRA, RTTO, TIES, or BUS, BMNT) will undertake to develop a resolution that will mitigate, control or eliminate the generation of hazards in ways that can reduce their risk to an acceptable level.

Hazard analysis also attempts to reduce the severity of accident events by introducing protective devices and equipment, procedures and/or forms of system modifications that reduce injury and the amount of property damage in an accident event.

While identifying every hazard is virtually impossible, there are two methods for orderly identification of hazards: inductive and deductive analysis. The inductive hazard identification process consists of an analysis of system components to identify their respective failure modes and the effects they will have on the total system. This process assumes the failure of single elements or events and, through analysis, determines the potential consequential effects on the system or subsystem. The deductive hazard identification process involves defining an undesired effect (e.g., collision, fire) and then deducing the possible conditions or system component faults (or combinations of them) that are necessary to cause the undesired effect.

The historical rail and bus passenger accident experience data, available through SMS, will be a reliable source of input information to aid both the inductive and the deductive processes.

#### **6.2.4 Hazard Categorization**

Included in this section is the method that WMATA uses for the categorization of all identified hazards. Hazards are normally categorized in terms of severity and probability of occurrence.

##### **6.2.4.1 Hazard Severity**

Hazard severity is a subjective determination of the worst case that could be anticipated to result from human error, design inadequacies, component failure or malfunction. The categories of hazards based on the MIL-STD-882-C are as follows:

**Category 1: Catastrophic** – operating conditions are such that human error, design deficiencies, element, subsystem or component failure or procedural deficiencies may cause death or major system loss and require immediate termination of the unsafe activity or operation.

**Category 2: Critical** – operating conditions are such that human error, subsystem or component failure or procedural deficiencies may cause severe injury, severe occupational illness or major system damage and require immediate corrective action.

**Category 3: Marginal** – operating conditions are such that they may result in minor injury, occupational illness or minor system damage and are such that human error, subsystem or component failures can be counteracted or controlled.



**Category 4: Negligible** – operating conditions are such that human error, subsystem or component failure or procedural deficiencies will result in less than minor injury, occupational illness or less than minor system damage.

The categorization of hazards is consistent with risk-based criteria for severity; it reflects the principle that not all hazards pose an equal amount of risk to personal safety.

#### **6.2.4.2 Hazard Probability**

The probability of a particular event or a specific hazard occurring may be defined as a non-dimensional ratio of the number of times that a specific event occurs to the total number of trials in which this event will occur during the planned life expectancy of a system. Generally, hazard probability is described qualitatively in potential occurrences per units of time, miles, trips/runs or passengers carried. A hazard probability may be derived from the analysis of transit system operating experience, evaluation of WMATA safety data, the analysis of reliability and failure data, or from historical safety data from other passenger rail systems or bus systems. (See exhibit 6-4)



Probability of Occurrence of a Hazard			
Description	Probability Level	Frequency For Specific Item(s) (Events/Hour)	Selected Frequency For Fleet or Inventory (Multiple of Single Items)
Frequent	A	Likely to occur frequently (Greater than $10^{-3}$ )	Continuously experienced ( $10^{-2}$ ). MTBE is less than 1000 operating hours
Probable	B	Will occur several times in the life of the item ( $10^{-5}$ to $10^{-3}$ )	Will occur frequently in the system ( $10^{-3}$ ). MTBE is equal to or greater than 1000 operating hours and less than 100,000 operating hours.
Occasional	C	Likely to occur sometime in the life of an item ( $10^{-6}$ to $10^{-5}$ )	Will occur several times ( $10^{-4}$ ). MTBE is equal to or greater than 100,000 operating hours and less than 1,000,000 operating hours.
Remote	D	Unlikely but possible to occur in the life of an item ( $10^{-7}$ to $10^{-6}$ )	Unlikely but can be expected to occur ( $10^{-6}$ ). MTBE is greater than 1,000,000 operating hours and less than 100,000,000 operating hours.
Improbable	E	So unlikely, it can be assumed occurrence may not be experienced (Less than $10^{-7}$ )	Unlikely to occur, but possible ( $10^{-7}$ ). MTBE is greater than 100,000,000 hours.

\*MTBE = Mean time between events

**Exhibit 6-5**



### 6.2.5 Hazard Risk Assessment

WMATA has adopted a system for assessing the level of risk for each identified hazard to determine what action(s) must be taken to correct or document the hazard risk. This risk assessment system has been incorporated into the formal system safety analysis that enables the ESC decision-makers to understand the amount of risk involved in accepting the hazard in relation to the cost (schedule, cost, operations) to reduce the hazard to an acceptable level.

The Risk Assessment Matrix (see exhibit 6-5) identifies the Hazard Risk Index (HRI) based upon hazard category and probability and the criteria for defining further actions based upon that index.

HAZARD FREQUENCY	SEVERITY CATEGORY 1	SEVERITY CATEGORY 2	SEVERITY CATEGORY 3	SEVERITY CATEGORY 4
Frequent (A)	1A	2A	3A	4A
Probable (B)	1B	2B	3B	4B
Occasional (C)	1C	2C	3C	4C
Remote (D)	1D	2D	3D	4D
Improbable (E)	1E	2E	3E	4E

Hazard Risk Index	Criteria by Index
1A, 1B, 1C, 2A, 2B, 3A	Unacceptable
1D, 2C, 2D, 3B, 3C	Undesirable – Management (ESC) decision
1E, 2E, 3D, 3E, 4A, 4B	Acceptable with ESC review
4C, 4D, 4E	Acceptable without review

**Exhibit 6-6: Risk Assessment Matrices**



Follow-up actions resulting from the risk assessment will be as follows:

**Unacceptable:** The hazard must be mitigated in the most expedient manner possible before normal service may resume. Interim corrective action may be required to mitigate the hazard to an acceptable level while the permanent resolution is in development.

**Undesirable:** A hazard at this level of risk must be mitigated unless a documented decision to manage the hazard until resources are available for full mitigation is issued by the CSO and forwarded to TOC (rail hazards only) for review and approval or disapproval.

**Acceptable with review:** The CSO must determine if the hazard is adequately controlled or mitigated as is.

**Acceptable without review:** The hazard does not need to be reviewed by the ESC and does not require further mitigation or control.

The Risk Assessment Process is used to prioritize hazardous conditions and focus available resources on the most serious hazards requiring resolution.

#### 6.2.6 Hazard Resolution

Hazard resolution is defined as the analysis and subsequent actions taken to reduce to the lowest level practical, the risk associated with an identified hazard. Hazard resolution is not synonymous with hazard elimination. In a bus and rail transit environment, there are some hazards, which are impossible to eliminate and others, which are highly impractical to eliminate. Reduction of risk to the lowest practical level can be accomplished in a variety of ways from protective and warning devices to special procedures.

Resolution of hazards will utilize the results of the Risk Assessment Process. The objectives of the hazard resolution process are:

1. Identify areas where hazard resolution requires a change in the system design, installation of safety devices or development of special procedures;
2. Verify that hazards involving interfaces between two or more systems have been resolved; and
3. Verify that the resolution of a hazard in one system does not create a new hazard in another system.

The ESC and SAFE will use the following methodologies to assure that system safety objectives are implemented throughout design, construction, procurement, and operations and those hazards are eliminated or controlled:





1. Design out or design to minimize hazard severity. To the extent permitted by cost and practicality, identified hazards will be eliminated or controlled by the design of equipment, systems and facilities.
2. Hazards that cannot reasonably be eliminated or controlled through design will be controlled to the extent practicable to an acceptable level through the use of fixed, automatic, or other protective safety design features or devices. Provision will be made for periodic functional checks of safety devices and training for employees to ensure that system safety objectives are met.
3. When design and safety devices cannot reasonably nor effectively, eliminate or control an identified hazard, safety warning devices will be used (to the extent practicable) to alert persons to the hazard.
4. Where it is impossible to reasonably eliminate or adequately control a hazard through design or the use of safety and warning devices, procedures and training will be used to control the hazard. Precautionary notation will be standardized and safety-critical issues will require training and certification of personnel.

#### **6.2.6.1 Hazard Resolution Management and Tracking**

Resolution of identified hazards will be managed by SAFE, in collaboration with the responsible department, and approved and monitored by the CSO or ESC. The SMS Hazard Management Module will be used for tracking identified hazards and the hazard resolution process. The SMS Hazard Management Module includes the following information as required by section 10.5, "Hazard Tracking," of the TOC PS/P:

- Hazard description
- Immediate mitigation (if needed)
- Origin of hazard (e.g., accident investigation, capital project hazard analysis, employee safety committee)
- Date hazard was identified
- Hazard analysis results (frequency and severity, hazard score, depending on analysis method)
- Proposed permanent hazard resolution
- Hazard resolution verification/follow-up activities
- Date hazard closed
- Responsible investigator or SAFE Hazard Lead and Organizational Subject Matter expert
- Other relevant information

Additional documentation, such as Corrective Action Plans (CAPs), shall be developed for those hazards requiring complex and multifaceted resolutions. The determinations of SAFE or the ESC are submitted to the ESC for hazard resolution through implementation of the TOC (rail hazards only via SMS access) approved recommendations. SAFE manages the hazard resolution process through the SMS



Hazard Management Module, to which TOC has access. The GM/CEO, ESC the affected or involved department heads, and the TOC (rail hazards only, via SMS access) will be kept informed of the status of hazard resolution activities by SAFE.

### **6.2.7 Coordinating with the TOC Regarding the Hazard Management Process**

The SMS Hazard Management Module will be formatted to show at a minimum, all open/current hazards. TOC has access to SMS and the Hazard Management Module. WMATA will provide TOC with an electronic copy of the Monthly Hazard Log during the first full week of every month.

### **6.2.8 Corrective Action Plan Development Process**

**Note:** The Corrective Action Plan process described herein applies to Corrective Action Plans that are developed under the requirements of: SSPP Element 6.0, “Hazard Management Program”; SSPP Element 10.0, “Accident and Incident Notification, Reporting and Investigation”; and SSPP Element 12.0, “Internal Safety and Security Audit Program.”

TOC requires WMATA to develop Corrective Action Plans (CAPs) in response to findings and recommendations related to the safety of the Metrorail system. CAPs are required for safety issues, deficiencies and nonconformance with the SSPP, policies, procedures and rules identified by findings and recommendations from the following activities:

- **TOC Triennial On-Site Safety and Security Reviews**

Upon notification of the findings of the draft final report, or receipt of the draft final report, WMATA will have 45 calendar days to develop a CAP to address all findings, including: identified areas of concern and deficiencies. WMATA will often be able to develop a single CAP that will address more than one finding simultaneously.

- **Accident/Incident Investigations**

TOC generally “deputizes” WMATA (SAFE) to conduct accident investigations on the TOC’s behalf, and “formally adopts” the WMATA investigation report as its own. However, regardless of whether WMATA or TOC conducts an accident investigation, the investigation report may contain findings and recommendations related to deficient conditions or other safety issues identified during the investigative process. Not all accident investigations will result in the formation of recommendations and not all accident reports will generate CAPs. Findings of recommendations from investigations regarding identified deficiencies, safety issues or nonconformance with the SSPP, policies, rules or procedures must be addressed through the CAP process. The development of CAPs will be the primary responsibility of WMATA, with assistance provided by TOC, as may be



required. WMATA will include proposed CAPs to be considered for TOC approval as part of the Draft Final accident/incident investigation report. Alternatively, WMATA may indicate corrective actions already taken to address a given deficiency, directly in the draft final accident/incident investigation report. Finally, as mentioned above, there may be cases of investigations that result in no findings or recommendations, and in such cases, WMATA should explicitly indicate in writing to TOC that no corrective actions have been taken or will be forthcoming.

If the National Transportation Safety Board (NTSB) conducts an investigation at WMATA, it may issue a formal report with recommendations to the transit agency. Should this occur, the transit agency should review the recommendations and determine their appropriateness. Unless TOC and WMATA agree that a specific recommendation is inappropriate; WMATA will develop and implement a CAP to address the recommendation.

- **Hazard Investigations**

WMATA may initiate, or TOC may specifically request, the investigation of a hazard. Generally, WMATA will conduct such investigations; however, regardless of whether WMATA or TOC conducts a hazard investigation, the investigation report should contain findings and recommendations related to deficient conditions or other safety issues identified during the investigative process. In either case, the development of CAPs will be the primary responsibility of WMATA, with assistance provided by TOC, as may be required. Upon TOC receipt of the final hazard investigation report, WMATA will have 45 calendar days to develop a CAP to address any identified findings and recommendations. Alternatively, WMATA may indicate corrective actions already taken to address a given deficiency, directly in the final hazard investigation report.

- **Internal Safety and Security Audits and Reviews**

If WMATA finds areas of non-conformance during incremental internal safety and security audits of the SSPP or SEPP, those areas of non-conformance must be addressed by a CAP. The CAP must be developed within 30 days of the audit or review.

- **Other Sources**

TOC may require WMATA to develop one or more CAPs to address findings and recommendations made because of peer reviews, American Public Transportation Association (APTA) reviews, and other external reviews. Additionally, if TOC becomes aware of a safety issue by some other means in the course of the implementation of the oversight program, such an issue will be brought to the immediate attention of appropriate WMATA management so that WMATA can prepare an appropriate CAP. The timeframe for the CAP will be



specified in written notification from TOC. A hazard that can be immediately mitigated will not require a CAP.

#### **6.2.8.1 Development of Corrective Action Plans**

Each CAP must include the following information:

- Identify noted finding and its source
- Process, plan, or mechanism to address and resolve finding or recommendation
- Target date for implementation of plan of action
- Department(s) and specific person(s) who will be responsible for implementation
- Hazard rating

The objective of a CAP is to address the original finding or recommendation that generated it. TOC's approval of a CAP depends on how effectively the proposed CAP addresses the original finding or recommendation. Effective CAPs are achievable, measurable, assigned to an individual (not just a department or office), and include a realistic target date for completion. CAPs are not conditional, nor are they recommendations to consider from one WMATA department to another (i.e., SAFE to TIES). CAPs are statements of specific actions that will be implemented by the responsible person and organization. TOC expects that WMATA will effectively implement all CAPs according to the proposed timeframe established by the target date. Many CAPs are short-term and address issues that are simple to resolve. Other CAPs, are long-term, and may require WMATA to expend a high level of effort and resources to address over a period that could span years. There is no penalty for keeping a CAP "open" long-term; however, TOC must be able to verify that it is being implemented appropriately. In this event, TOC receives documentation including status reports, intermediate milestones, and other information from WMATA demonstrating progress. Additionally, and particularly for long-term CAPs that may be resource-intensive, WMATA will consider interim or temporary steps where resources may not be immediately available. TOC shall evaluate the appropriateness of CAP alternatives on a case-by-case basis.

When WMATA must develop a CAP to address a finding or recommendation generated by one of the above-described processes, WMATA must forward the written CAP to TOC, either electronically or in hard copy, for review and approval. TOC will notify WMATA whether it approves, conditionally approves, or is unable to approve the CAP within 30 calendar days after receipt of the CAP. For immediate or other significant safety hazards, WMATA need not wait for TOC approval to take action or immediate hazard mitigation measures. In cases where TOC is unable to approve a proposed CAP, TOC will work with WMATA on a case-by-case basis to help formulate an acceptable CAP.



### **6.2.8.2 CAP Implementation, Verification, and Completion**

WMATA must adhere to the stated approach and timeframe specified in the CAP. To verify implementation and completion of a CAP, TOC will either obtain documents clearly demonstrating that the CAP has been effectively implemented, or conduct an on-site, in-person verification. TOC reserves the right to request specific documents to verify CAP implementation and completion on a case-by-case basis. Section 11.2 of the TOC PS/P provides details on the type of verification information or documentation that must be provided by WMATA for the following categories of CAPs:

- Rules and procedures compliance
- Maintenance of rail vehicles, systems, facilities and equipment
- Engineering
- Training/qualification/certification
- SSPP, SEPP, and other plans, policies, and procedures

### **6.2.8.3 CAP Tracking**

TOC monitors CAP implementation through its access to the SMS Hazard Management Module. SAFE will collaborate with TOC to ensure that the SMS Hazard Management Module contains the most current information. CAP status will be formatted to show, at a minimum, all open/current CAPs and all CAPs that were closed within the last 30 days. WMATA closes its ISSA CAPs internally and separately from TOC closing them, as opposed to a singular closure process for all other CAPs. TOC will review CAP status independently, and will review selected CAP items with WMATA during various in-person meetings as needed.

### **6.2.8.4 Corrective Action Plan Technical Review Entity Process**

TOC and WMATA established the Corrective Action Plan Technical Review Entity (CAPTURE) process as a regular, in-person meeting intended to facilitate TOC verification of completion of CAPs. Unless specifically stated otherwise by the TOC Chair, CAPTURE meetings will take place monthly, at a time and location agreed upon by TOC and WMATA. Appropriate WMATA representatives from SAFE, RTRA, RTTO, and TIES will attend as needed to discuss CAP implementation and to provide verification documentation to TOC that CAPs have been effectively implemented. TOC members and consultant staff will be present at CAPTURE meetings to help verify CAP implementation and completion, and to receive status updates and progress reports on CAPs of a long-term nature.



## 7.0 Managing Safety in System Modification

### 7.1 System Modification

#### 7.1.1 TIES

The Engineering Modification Instruction (EMI) process is the method utilized to assure that safety is not adversely affected by rail system modifications not subject to the System Safety and Security Certification Process. This includes evaluation and assurance that a proposed modification does not adversely affect a system, vehicle, equipment or facility previously certified under the System Safety and Security Certification Process. The SAFE Deputy Chief, Rail Safety will ensure that the required safety analysis is performed on the proposed modification to identify hazards that might arise because of implementation of the proposed modification. The Deputy Chief, Rail Safety will ensure that identified hazards are entered into the Hazard Management Process. OAP 200-6, *Engineering Modification Instruction*, (January 21, 2010) defines the process for initiating, evaluating, processing, and implementing modifications or improvements to rail systems, vehicles, facilities, and equipment. A final EMI package is compiled for final review and approval, by managers of affected offices including: SAFE, RTRA, RTTO, TRST, CMNT, SMNT, CENI, CENV, TTDC and QAAW. QAAW and TTDC monitor final implementation and performance of the modification.

Any proposed configuration change, except IT and CENI project management design changes, will be initiated by an EMI, and coordinated with RTTO, RTRA, SAFE, CENI, CENV, TRST, SMNT, CMNT, QAAW and CFO with documentation, including hazard analysis results, provided to support the economic or functional reasons for the changes. EMIs that involve a change to WMATA's standards shall be submitted to the Design Control Board for approval and inclusion in the standards. IT changes will be processed in accordance with WMATA *Policy/Instruction 6.6, EDP Security* and *IT Standard 7.0*. Configuration changes will be routed through the WMATA Design Control Board for review and approval in accordance with WMATA *Policy/Instruction 4.14/2, Design Control Board* and *Policy/Instruction 4.10/3, Configuration Control Management*.

#### 7.1.2 BMNT

The BMNT/BENG Bus Change Review Committee (BCRC) meets monthly to review proposed changes to as-built configurations of Metrobus systems and equipment. The committee authorizes temporary change notices (TCNs) for testing changes and makes recommendations as to final disposition to the Chief Engineer and Managing Director of Maintenance. The committee maintains and distributes Change Notices (CNs) and Field Change Notices (FCNs) with an Engineering Modification Instruction (EMI) to the Shop and Division Superintendents. The BCRC is composed of individuals appointed by the Chief Engineer and the Managing Director, BMNT. In addition to BMNT/BENG chairpersons, and members, a member from SAFE, Procurement, Quality Assurance and Training are also in attendance at these meetings. The quorum requires 2/3<sup>rd</sup> of the members be present at all meetings. Approval of any changes requires a 3/4<sup>th</sup>



majority of the members present. All dissenting views are made part of the BCRC recommendations.

This method ensures that safety is not adversely affected by Bus system modifications.

## 7.2 New Systems/New Equipment

Safety assurance of new systems, equipment and vehicles begins with the basic design and in the development of specifications to ensure that, safety requirements and standards are incorporated. Safety Design Reviews (see Section 5.4.3, System Safety Design Review, page 70) are held to ensure that proposed designs meet safety requirements and are consistent with the requirements of *Policy/Instruction 4.10/3, Configuration Control Management*. Consideration is given to such items as system interfaces, human factors, environmental conditions, isolation of energy sources, materials compatibility, use and long-term storage of critical materials, emergency response capability, including emergency egress and rescue paths, fire sources and measures for protection, equipment layout, lighting requirements, and maintenance requirements. In these reviews, maximum use is made of existing data, reliability analyses, and other applicable design analyses and information. Hazard analyses or evaluations are conducted on test plans, procedures, and related test equipment; operational plans, procedures, and related operational support equipment; demonstration and evaluation plans, procedures, and related support equipment; and on maintenance plans, procedures, and related maintenance equipment. Results of these analyses or evaluations are used to verify the required safety level or to identify the necessary changes for incorporation into the safety provisions.

Testing is performed on critical components and assemblies as indicated in safety reviews to identify hazards. The SAFE Deputy Chief, Rail Safety ensures that Identified rail related hazards are entered into the Hazard Management Process for resolution. The SAFE Deputy Chief, Bus and MetroAccess Safety ensures that bus related hazards are entered into the Hazard Management Process for resolution. The inherent safety of equipment and its impact on WMATA as a system is demonstrated during system testing and demonstration activities.

WMATA is planning to implement a program to provide configuration control of the technical documents relating to the WMATA Metrorail and Metrobus infrastructure. A pilot has been established to demonstrate the feasibility of utilizing the Documentum software program for this purpose. The initial phase was in the systems engineering aspects of the Metro Matters Traction Power Update project. In addition to providing any WMATA employee web based access to the as-built electrical documents associated with this project, it also provided advanced document search capabilities with the addition of Metadata/attribute information associated with each technical document, plus it established basic file folder structures and user privilege levels. Additionally, user features are also planned, such as a graphical user interface and an electronic document review and approval process.



The methodologies and business processes developed under OAP 200-06 to direct TIES EMI's are, broadly speaking, extensible throughout WMATA. In order to do so, WMATA is initiating a Product Life Cycle Management ("PLM") program in 2014. This program will be responsible for:

- Implementing a PLM software tool to track asset design and configuration data from design or purchase of an asset to retirement;
- Working with all WMATA operational and engineering units to document (if necessary), reengineer as appropriate, and implement their processes for configuration management;
- Assure availability of configuration management and related data to all interested parties in the authority.

This program's charter and schedule are scheduled for review and approval in the first quarter of 2014. The program's steering committee will include a representative from Safety to assure compliance with the SSPP.





## 8.0 Safety and Security Certification

### 8.1 Overview

Safety and Security Certification (SSC) is the process of verifying that certifiable elements and items comply with a formal list of safety and security requirements developed for major construction, rehabilitation or vehicle procurement projects. Certifiable elements are those project elements that, as determined through hazard analysis and/or threat and vulnerability assessments, can affect the safety and security of customers, employees, emergency responders or the public. The requirements are defined by design criteria, contract specifications, applicable codes, industry safety, and security standards. SSC is applied to projects that may reasonably be expected to pose hazards or security risks to WMATA passengers, employees and emergency response personnel. SSC is accomplished through a collaborative effort between SAFE and the applicable Project Team, which may include representatives from other WMATA departments as well as Project contractors.

It is imperative that the SSC process is completed and all “unacceptable” and “undesirable” hazards and security risks, associated with the use of a new or rehabilitated system or facility are eliminated or effectively controlled prior to the start of in-service use. SSC of operational and non-operational elements for any new or rehabilitated rail line segment or rail related system or opening of a rail related facility must be fully completed prior to entering the pre-revenue demonstration phase of the project. The pre-revenue demonstration phase must be started a minimum of 30 days in advance of the anticipated opening date. This timeframe is required to allow RTRA, RTTO, TIES, SAFE and TOC to conduct an operations readiness review of the system or facility being placed into service. When establishing an opening date for the rail line segment, system, passenger vehicle use, or facility, this timeframe must be considered. Non-rail related facilities, vehicles, equipment, or systems are not permitted to be placed into service prior to the issuance of the Safety and Security Certificate.

The Safety and Security Certification Plan (SSCP) ensures:

- That design and operating hazards and security vulnerabilities are identified, evaluated and properly controlled or mitigated, prior to the commencement of passenger service;
- That all safety and security critical elements are evaluated for compliance with the identified safety and security requirements during the design, construction, installation, testing, and start-up phases of a project; and
- That WMATA systems are operationally safe and secure for customers, employees, emergency personnel and the public, prior to entering or re-entering after modification, revenue service or use by WMATA personnel.



The scope of the SSC process encompasses equipment, vehicles, facilities, including rehabilitation projects and operating and maintenance plans and procedures, including emergency response procedures:

- **Facilities:** Operations and maintenance facilities, bus bays and rail stations, Roadway, Park and Ride facilities, signal and communications systems buildings
- **System Elements:** Vehicles, voice and data communications, signal systems, grade crossings, third rail power, power substations, intrusion detection systems, fare vending machines
- **Equipment Maintenance and Inspection Training:** Maintenance facilities, automatic train control, communication systems, third rail power and substations, fiber optics, vehicles, automatic fare card collection equipment and mechanical equipment
- **Operations and Emergency Training:** Vehicle operators, field supervisors, OCC controllers, vehicle mechanics automatic train control technicians, communications technicians, automatic fare card collection equipment technicians, third rail power and substation technicians and mechanics, track inspectors, repairers and laborers, jurisdictional law enforcement, fire department and emergency medical personnel
- **Operations Plans and Procedures:** Emergency Preparedness Plans, rulebooks, standard operating procedures, emergency and contingency procedures.

## 8.2 Safety and Security Certification Plan

The *WMATA Safety and Security Certification Plan (SSCP)* (March 2012) is the document that implements the SSC program and process. The SSCP is intended to ensure compliance with the applicable regulatory codes: *Code of Federal Regulations* title 49, part 633, *Project Management Oversight*; *Code of Federal Regulations* title 49, part 659, *Rail Fixed Guideway Systems*; *State Safety Oversight* and *FTA Circular, C 5800.1*, August 1, 2007.

A project specific SSCP should be developed and implemented during the preliminary design phase of the project, for WMATA major capital projects of \$100 Million or more that receive FTA funding. Examples of project specific SSCPs are new vehicle procurements or system extensions.

## 8.3 Safety and Security Certification Process

The Safety and Security Certification Process consists of the following ten major steps that begin with system planning and design and continue into the start of revenue service.



- Step 1 Develop safety and security design criteria
- Step 2 Identify safety and security certifiable elements and prepare certifiable Items List (CIL) of safety and security requirements
- Step 3 Review compliance with design criteria conformance checklist
- Step 4 Perform construction specification conformance
- Step 5 Identify additional safety and security test requirements
- Step 6 Perform safety systems tests (normally as part of contractual requirements)
- Step 7 Monitor and verify that systems integration tests have been conducted
- Step 8 Manage "Open Items" from the Safety Critical Items List (SCIL)
- Step 9 Verify operational readiness
- Step 10 Issue overall safety and security certificate  
Issue safety and security verification report  
Conduct follow-up and final project closeout

The SSC process provides traceable verification that safety-critical (see Appendix C: Glossary of Terms) and security systems, subsystems, procedures and training programs have been reviewed for compliance with applicable transit related safety and security requirements.

A Safety and Security Certification Review Committee (SCRC) is established to oversee implementation of the SSC process and for ensuring that certifiable levels of operational safety and security items are completed and verified prior to the start of new revenue service, or the placement of rehabilitated facilities and systems into service/use. The SCRC is comprised of the CSO (or designee), who is the Chair, WMATA executives and senior managers, involved in and/or responsible for, or the end user of the products of the project and a TOC representative. The SCRC is a subcommittee of the ESC. The SCRC is involved in the Hazard Management Process of the project and reviews all identified unacceptable and undesirable hazards and the resolution of such hazards. The SCRC forwards the resolution of identified unacceptable and undesirable hazards to the ESC, which approves the hazard resolution and forwards the resolution for unacceptable hazards to the TOC for its review and approval. The TOC performs SSC reviews in accordance with section 15 of the TOC PS/P.

The CSO and/or ESC reviews and approves proposed restrictions, exceptions or acceptable equivalencies to be added to the Safety and Security Certificate, only when absolutely necessary, in the event a portion of the system will not be available on time or if equipment to be placed into service is not complete. Such approved restrictions, exceptions or acceptable equivalencies will be assigned completion dates, at which time they will expire. The completion of the work and the resulting removal of the restrictions, exceptions or acceptable equivalencies will be closely monitored by the ESC via the SCRC. The Final Safety and Security Certificate for the project will be issued when the work, on the affected portion of the system or the equipment, is completed and it is verified that the hazard or discrepancy is permanently resolved and approved restrictions, exceptions or acceptable equivalencies may be removed.



The Safety and Security Certification Verification Report and the final Safety and Security Certificate are reviewed and approved by the SCRC. The report summarizes the safety and security certification effort and the readiness of the line segment, facility, or system to be placed into service; an annotated matrix of the Critical Items List indicating the status (open/closed) of each item; Open Items List; and recommended actions and schedule for permanently closing out all open items, restrictions, and approved temporary measures. The report includes copies of the certification checklists, Certificates of Compliance for each certifiable element, and the System Safety and Security Certification document. The Final Safety and Security Certificate is signed by the CSO and the GM/CEO. This document certifies that all facilities, vehicles, equipment and procedures function in a safe and secure manner and that the facilities, systems, equipment, or vehicles are safe and secure for revenue service or use by the Authority. The Safety and Security Certification Verification Report and the Final Safety and Security Certificate for rail projects are submitted to the TOC for its review.

The CSO, subject to the GM/CEO's approval, can apply the requirements of the SSCP to any project that is not covered by *Code of Federal Regulations* title 49, Part 633. Resource availability is considered when making these determinations.

## 8.4 BUS Safety Certification

Bus Engineering (BENG) Safety Certification is the process of verifying that certifiable elements comply with a formal list of safety and security requirements developed for bus procurement projects. Certifiable elements are those project elements that can affect the safety and security of customers, employees or the public. The requirements are defined by design criteria, contract specifications, industry safety and security standards.

The BENG Safety Certification Process includes the following:

- Safety Certifiable Checklist which lists the inspection item, the requirement/specification for that item, the inspection instruction, actual findings, the name of the safety officer who performed the inspection, date inspected and remarks that include any discrepancies found and the date the discrepancy was resolved.
- Pre-delivery Configuration Audit is a guide for inspection on at least one bus (first article) for each order and is performed by the on-site inspector.
- Certificate of Compliance from the bus manufacturer signifying that all applicable safety and security requirements have been completed and the indicated buses can be placed into service. This document is signed by the Chief Safety Officer, AGM- Bus Services, Chief-MTPD, DGM-Operations and the General Manager.

The above documents are attached to a memorandum from the Managing Director, BMNT through the AGM-Bus Services and is sent to the CSO-Safety seeking a Certificate of Compliance for a designated fleet of buses. Once approval is received, the buses are then placed in revenue service.



## 9.0 Safety Data Acquisition

### 9.1 Safety Data Overview

SAFE is implementing a Safety Measurement System (SMS) to collect and analyze safety data and generate safety reports for distribution to executive, senior and middle management and TOC (rail data only). The SMS was implemented for BUS July 1, 2010. Implementation for RTRA, RTTO, TIES, and MACS is now complete. The SMS is the application used by BUS, MACS, and RTRA, RTTO and TIES to enter and manage all accident and incident data. The SMS integrates the data from existing WMATA enterprise applications, ensuring that SAFE has access to the safety related data of all WMATA departments. SMS applications for hazard management are under development for safety and security audits and OSHA compliance, hazard identification and hazard mitigation and hazard tracking. The SMS will be used to track the implementation and closure of corrective actions to eliminate or control hazards. One capability of the SMS is to notify, automatically, via e-Mail, the appropriate SAFE staff and departmental staff of any required action regarding a hazard.

The following are sources of data, integrated through the SMS that SAFE utilizes to collect data and identify hazards for entry into the Hazard Management Process:

- Reports and observations from operators and other field personnel regarding hazards associated with Authority vehicles, schedules, routes, policies and procedures
- Information, experiences, and ideas from support departments
- Observations of facilities and operations hazards, by administrative personnel.
- Results from drills, exercises and emergency response to accidents and incidents
- Formal hazard analyses using the inductive process by analyzing system components to identify failure modes and effects on the system and personnel. Failure modes include conditions such as doors or switches failing to open or close, or acting improperly or inadequately. Examples of formal hazard analyses include Preliminary Hazard Analysis (PHA), Operating Hazard Analysis (OHA) and Failure Modes and Effects Analysis (FMEA).
- Formal hazard analysis using the deductive process to identify sequential and concurrent conditions, which are required to support a specific operation or task. An example of this type of analysis is the Fault Tree Analysis and TapRoot® analysis.
- SAFE conducts inspections and audits of facilities and equipment to identify and document safety, environmental and industrial hygiene hazards on a proactive



basis. The criticality of hazards identified during inspections is determined by SAFE and is included in the inspection report. Most hazards identified during inspections are corrected or mitigated in a short period. If hazards are identified, which might be system-wide or that would require design work and special funding, they would be entered into the SMS Hazard Management Module by SAFE and tracked to completion.

- TRST, SMNT, CMNT, BMNT, ELES, QAAW, CQAL and PLNT perform preventative maintenance and periodic inspections and audits in accordance with established procedures described in SSPP Elements 14 and 15. Inspection information is entered into the maintenance application MAXIMO. MAXIMO is used by TIES and BMNT to generate work orders for repair work on vehicles, equipment and facilities. Reliability and failure data is also generated from MAXIMO. SAFE data analysts have access to this information and review it daily as a source for identifying hazards. MAXIMO is also integrated into the SMS.
- SAFE can access the General Orders and Track Rights System (GOTRS) to review planned work on the rail system. Reports can be generated from GOTRS by SAFE to evaluate work sites and review how work sites were established by TRST, SMNT and contractor forces. Because ROCC enters daily controller notes and actions directly into GOTRS, SAFE can generate reports to evaluate compliance with SOPs and work rules by those crews performing work in the rail system. In this manner, SAFE can identify hazards, rules and SOP violations for follow-up action and for entry into the Hazard Management Process.
- SAFE staff may use TapRoot® software to review accidents to identify the root cause of the accidents, identify and analyze hazards and develop corrective action plans. TapRoot® will also be integrated into the SMS.
- RTTO's Blackberry based application is used to perform ride checks of train operators by RTTO field supervisors. Each supervisor conducts five (5) ride checks per day. This data is incorporated into the SMS, which allows RTTO supervisors to notify SAFE of hazards and allows SAFE to review the data for purposes of hazard identification. Identified hazards are then entered into the Hazard Management Process by SAFE personnel.
- The Customer Service Branch receives comments, complaints and commendations from Metro customers and the public. Safety related issues are forwarded to SAFE for evaluation and follow-up action. SAFE determines if this information should be entered into the Hazard Management Process and if so, tracks the hazard to resolution.
- The Workers' Compensation and Third Party Claims database is also integrated into the SMS and is another source of data used to identify hazards. The SAFE data analyst reviews this information daily and enters identified hazards into the Hazard Management Process.



- SMS also provides access to safety related data in Trapeze (route planning and scheduling) and various People Soft applications, including training records applications.

BOCC, ROCC, MACS OCC, and MTPD Communications provide accident and incident notification to SAFE via an automated, wireless-based text messaging system; e-Mail incident reporting system; and telephone contact of SAFE personnel on a 24/7 basis. Notifications are made to SAFE in accordance with the criteria set forth in SSPP section 10.2, the *WMATA Incident and Accident Investigation Policy*, P/I No.10.4/0; and the FTA National Transit Database (NTD) reporting criteria. In addition to those criteria, BOCC and ROCC report any accident, through the SMS, that results in the rendering of first aid and/or the transport to a medical facility of one or more passengers. SAFE utilizes this information from initial notifications, in conjunction with SMS reporting, as a starting point for its collection of accident and injury data and reports.

SAFE develops the required reports to provide safety management information to executive and senior management and to the WMATA Board Safety and Security Committee and the TOC.

## **9.2 Access to Data Reports Prepared by SAFE**

SAFE produces and distributes the following reports throughout the Authority to communicate safety data to all levels of the organization:

- Internally Distributed Reports
  - Rail Passenger and Transit Facility Occupant Injuries
  - Bus Accidents – Report of passenger and collision accidents by type
  - Reports of employee injuries by type and cause are forwarded to regional safety officers for distribution to the managers of their assigned facilities.
  - Safety Performance Reports  
A Safety Performance report is submitted quarterly and annually to the WMATA Board Safety and Security Committee and TOC. The report provides accident rate data regarding bus and rail passengers. Employee and contractor lost time injury data in the construction and industrial areas are reported.
  - Monthly Safety Report  
This report is submitted monthly to the GM/CEO and ESC. This report includes the activities performed by SAFE staff for the previous month, safety performance data, and it tracks the progress of accident investigations, internal safety and security audits and hazard resolution.



- Daily Accident/Incident Reporting  
Accidents and Incidents are recorded daily by RAIL and BOCC in SMS.
- Reports Submitted to External Agencies
  - FTA – National Transit Database  
Requires monthly and real-time reporting of incidents
  - Tri-State Oversight Committee  
Annual report of internal safety and security audits, Preliminary Accident, Incident and Unacceptable Hazardous Condition Reports and Chronology of Events, Accident/Incident/Unacceptable Hazardous Condition Investigation Oversight Record, Monthly Management Report and Quarterly Accident and Unacceptable Hazardous Condition Summary Reports.
  - APTA – Annual Summary of Bus Data  
Includes operations, maintenance and accident data, submitted as part of a competition among transit bus operators for an annual safety award.





## **10.0 Accident/Incident Notification, Investigation and Reporting**

### **10.1 Overview**

Investigations are performed in accordance with the WMATA, *Incident and Accident Investigation Policy*, P/I No. 10.4/0 and the TOC PS/P. Under *Code of Federal Regulations* title 49, part 659.33 (accident notification) and part 659.35 (investigation), *Rail Fixed Guideway Systems; State Safety Oversight*, the TOC is required to conduct investigations of those accidents and incidents of which it is notified. These requirements are defined in the TOC PS/P in section 8.1 and hazardous conditions are defined in section 10.2. In accordance with section 9.0 of the TOC PS/P: WMATA may investigate TOC reportable accidents and hazards on behalf of the TOC; TOC may conduct the investigation; another agency may conduct the investigation; or the investigation may be jointly conducted by TOC and WMATA. Unless otherwise noted, in accordance with section 9.0 of the TOC PS/P, the standard method for accident/incident investigation will be for WMATA (SAFE) to conduct the incident or accident investigation on the TOC's behalf.

The ESC and its subcommittees review investigation reports of accidents and incidents defined in section 9.2. NTSB recommendations and TOC approved corrective action plans are tracked to completion by SAFE and reviewed by the ESC and WMATA Board Safety and Security Committee as appropriate.

At the discretion of the chair of the ESC (CSO), an ad hoc investigation committee may be assigned to perform accident or hazardous condition investigations, as an expansion of the SAFE investigation.

SAFE responds to and performs independent investigations of accidents defined in section 9.2, and serious injuries, major fires, yard derailments and as directed by the CSO. The data collected is provided to an ad hoc investigation committee, if established by the CSO, to assist with the investigation.

SAFE evaluates accident and incident reports provided by all departments and provides the appropriate level of investigation and/or follow-up to ensure that the required corrective action is implemented.

### **10.2 Accident/Incident Notification Criteria**

WMATA must notify TOC of all accidents and incidents that meet the requirements of section 8.1, of the TOC PS/P, "Notification Procedures for Accident/Incidents." (See Exhibit 6-4, page 100).



### **10.3 Internal Accident/Incident Notification Procedure**

SAFE shall be notified (within 10 minutes) of the types of accidents/incidents listed in section 10.2 and of other accidents and incidents as stipulated in the *WMATA Incident and Accident Investigation Policy*, by the ROCC, MOC, and MTPD Central Communications. BOCC, MACS OCC, and MTPD will notify SAFE of bus/paratransit related fatalities, bus/paratransit collisions with persons, bus/paratransit fires and bus/paratransit collisions resulting in property damage equal to or exceeding \$25,000. Notifications shall be made to the SAFE On-call Safety Officer. SAFE issues a monthly on-call schedule to OCC, MOC, and MTPD and provides additional contact information for SAFE personnel.

### **10.4 External Accident/Incident Notification Procedure**

If an accident occurs that meets any of the criteria in section 8.1 of the TOC PS/P, the SAFE Manager, Rail Safety or the Deputy Chief, Rail Safety must notify the TOC Chair (or a designated TOC representative) by phone or via wireless mobile device within two (2) hours of the accident's occurrence. Where WMATA shares track with the general railroad system, it is subject to the FRA notification requirements and shall notify TOC within two (2) hours of an incident for which WMATA must also notify the FRA (via the National Response Center [NRC]). If WMATA is unable to contact the TOC Chair or designated TOC representative by phone, WMATA must try other TOC members until someone is contacted. If WMATA is unable to contact any TOC members, they may leave a message as a voice mail or on a pager. In addition to a phone call, WMATA must provide a written e-Mail notification to all TOC members and to TOC's consultant.

WMATA must provide the following information as the initial 2-hour verbal and e-Mail notification to TOC:

- Caller's name and contact phone number
- Time and date of accident/incident
- Type of accident/incident
- Location and direction of travel of incident
- Transit vehicle identifying information, including: line, direction and vehicle number
- Information about any other vehicles involved
- Number of persons injured and requiring medical attention away from the scene and number of fatal injuries
- Estimated property damage (in dollars)
- Description of the accident/incident
- Description of accident investigation activities completed and anticipated in the short term
- Status of investigation by WMATA and any other investigating agencies, and whether or not the accident has been or will be reported to another oversight agency such as the NTSB



- Preliminary determination of cause, if available

WMATA will also generally notify TOC of certain incidents, hazards, and events that WMATA and TOC agree are severe enough to warrant such notification, even if they do not meet the notification criteria listed above. TOC will work with WMATA on a case-by-case basis to determine if such incidents, hazards, and events merit an investigation and associated reporting.

SAFE notifies the NTSB, via the National Response Center (NRC) (800-424-0201), no later than two (2) hours after an accident that results in the following:

- A passenger or employee fatality or serious injury to two or more crew members or passengers requiring admission to a hospital;
- The evacuation of a passenger train;
- Damage to a tank car or container resulting in release of hazardous materials or involving evacuation of the general public; or
- A fatality at a grade crossing.

SAFE notifies the NTSB, via the NRC, no later than four (4) hours after an accident, which does not involve any of the circumstances above but which results in the following:

- Damage (preliminary estimate) of \$150,000 or more for repairs or the current replacement cost, to railroad and non-railroad property; or
- Damage of \$25,000 or more to a passenger train and railroad and non-railroad property.

## **10.5 Accident/Incident Investigation Procedures**

In accordance with section 9.2, of the TOC PS/P, the TOC may authorize WMATA to conduct an accident/incident investigation on the TOC's behalf. Unless otherwise noted, this will be the standard method for accident/incident investigation, that is, WMATA shall generally assume responsibility for the investigation of accidents and incidents unless specifically noted otherwise by TOC. As stated above, TOC must review and formally adopt WMATA's accident and incident investigation procedures.

Accidents and incidents affecting or occurring in the Metrorail, Metrobus and MetroAccess systems are investigated in accordance with the *WMATA Incident and accident Investigation Policy*, P/I No.10.4/0. All accidents and incidents are investigated. The degree of formality during the process of accident/incident investigation is directly dependent upon its severity. RISK, Third Party Liability, investigates all accidents for adjudicating claims arising from such accidents. Bus Service Operations Managers investigate all bus accidents. MetroAccess supervisors investigate MetroAccess accidents. At the discretion of the CSO or at the request of the AGM/ACCS, SAFE may conduct investigations of major MetroAccess accidents including those resulting in fatalities and multiple hospitalizations.



### **10.5.1 Investigations of Fatalities, Derailments, Collisions, or Fires Resulting in Property Damage Exceeding \$25,000.00**

Accidents and incidents meeting the criteria set forth in section 8.1 may be investigated by an ad hoc investigation committee as determined by the CSO. SAFE and/or the “GO Team” are the primary field investigative arms of an ad hoc investigation committee.

### **10.5.2 TOC Conducts Investigation**

TOC, at its discretion, and depending upon the particular circumstances of the accident, may choose to conduct an investigation of the accident utilizing its own personnel or a TOC authorized consultant. All TOC authorized accident investigation personnel are granted authority under the TOC SSO Program to conduct an investigation and evaluate records, materials, data, analysis, and other information, which is pertinent to the investigation. WMATA will provide to the TOC investigation team the resources and information necessary to conduct the investigation in an effective and efficient manner. The TOC on-site team will wait until WMATA and/or other emergency response personnel have secured the accident scene before commencing its on-site accident investigation. TOC reserves the right to request that WMATA hold the accident scene to the maximum extent feasible until the arrival of the TOC accident investigation team. TOC will assess physical evidence of the accident scene including, but not limited to damage and debris analysis, skid mark analysis, and the use of measurements, diagrams and photographs. TOC accident investigation personnel will conduct field analysis, operational surveys, interviews, record checks, data analysis, and other on-site and off-site tasks that may be necessary for a comprehensive investigation. TOC will also assess compliance with operating rules and procedures; conduct follow-up interviews (if required); analyze employee records and the results of post-accident drug and alcohol tests; and conduct vehicle and equipment inspections. TOC will comply with the American Public Transportation Association (APTA's) *Operating Practices Standard RT-OP-002-02: Recommended Process for Performing Rail Transit Accident/Incident Investigations*.

### **10.5.3 NTSB Conducts Investigation**

The NTSB may investigate a reportable event to achieve its primary function to promote safety in transportation. In such case, the NTSB is responsible for the investigation; the determination of facts, conditions, and circumstances; the cause or probable cause or causes; and recommendations to reduce the likelihood of recurrence of an accident or incident.

In the event of a NTSB investigation, TOC should participate as an official party to the investigation, and WMATA should conduct its investigation and investigate on TOC's behalf. TOC will support the NTSB as a member of its party system. WMATA shall provide TOC with a copy of all written correspondence to the NTSB concerning a reportable event or investigation and shall provide TOC a copy of all NTSB reports and any recommendations concerning the event or its investigation, upon receipt by



WMATA. TOC will assist the NTSB by providing information requested about WMATA critical practices and other matters as appropriate.

#### **10.5.4 Joint Investigations Conducted by TOC and WMATA**

WMATA and TOC may choose to conduct a joint investigation of the accident. WMATA and TOC may use WMATA's procedures, TOC's procedures, or a combination of the two procedures to investigate the accident. The procedures to be used must be established prior to the investigation and agreed upon by both WMATA and TOC. The resulting report becomes TOC's report of the accident as required by the SSO Rules.

### **10.6 Accident/Incident Reporting and Documentation**

For rail related accident investigations, SAFE must comply with the TOC requirements in section 9.0 of the TOC PS/P. SAFE is also responsible for investigating and preparing comprehensive accident investigation reports for bus accidents, MetroAccess accidents, employee accidents, contractor employee accidents (as determined by the CSO) and environmental incidents. *The WMATA Incident and Accident Investigation Policy P/I No. 10.4/0* and the *WMATA Contractor Safety and Environmental Manual (2011)* provide guidance for these investigations.

#### **10.6.1 TOC Requirements**

Accident/incident investigation reports, comprised of reports from operations, maintenance, as appropriate, and SAFE investigation documentation as appropriate, must be sent to the TOC according to the following schedule:

- **Initial Notification:**

Basic information about the reportable accident/incident must be transmitted verbally and via e-Mail to the TOC, as set forth in section 8 of the TOC PS/P.

- **Preliminary Report:**

As soon as possible after the accident/incident, but within three (3) business days, WMATA must fax, e-Mail, or hand-deliver preliminary written information, including any investigation summary information, preliminary reports from field personnel and other available information to the TOC.

- **Investigation Status Report:**

The TOC may request from WMATA, a report indicating the status of an investigation, including any significant new reports or report components, and any preliminary investigation conclusions within 10 days of the accident/incident. If the investigation process is not complete within 30 calendar days of the occurrence, WMATA must submit an Investigation Status Report including an



adjusted schedule for the completion of the investigation. WMATA will implement an investigation status tracking system that will send e-mail alerts to SAFE management about upcoming due dates for investigation reports in an effort to provide more timely investigation status.

- **Draft Final / Final Accident-Incident Investigation Report:**

At the conclusion of its investigation, WMATA must submit to the TOC a draft final accident or incident report authored by SAFE or its authorized representative. At a minimum, the draft final written report must meet all of the requirements set forth in section 9.1 of the TOC PS/P (the information included below). The TOC will work with WMATA to close accident/incident investigations with consideration of needed investigative processes, including (but not limited to) transportation investigations, derailment reports, police investigations, medical examiner reports, and other required materials to close an accident/incident investigation.

All draft final accident/incident reports produced for the TOC (and referenced throughout this section) must contain, at a minimum, the information contained in the list below [from *Code of Federal Regulations* title 49, part 659.35 (d)]:

- Description of investigation activities
- Identification of causal and contributing factors
- Corrective action plan to prevent recurrence, and to address a specific finding, recommendation, or other conclusion of the report. (This may comprise corrective actions already taken, in which case no further corrective action plans may need to be developed.)

More information may be included, based on WMATA's accident investigation procedures or external recommendations (such as APTA *Accident Investigation Procedure Standards*, RT-SOP-002-02). The TOC may request more information in order to gain information about a particular accident/incident or about accident information trends.

Unless the TOC specifically requests that WMATA's designated safety and/or security staff produce their own accident investigation report, WMATA may use multiple documents (e.g., field reports, analyses, logs) to fulfill the report content requirements in this section. WMATA may also use a summary report to help fulfill the reporting requirements in this section.

In cases where non-SAFE reports are used to make up the draft final accident report, or where SAFE's summary report is the only available document, all of the content requirements in this section must still be met.

SAFE staff may use a summary report to outline the draft final accident/incident report content, or to highlight its location in other departments' reports. This



summary report may be a completed, hand-written form, a database report, or some similar document. SAFE representatives are encouraged to review the format of such reports with the TOC to ensure that their content is sufficient to address TOC (and FTA) requirements.

For “high severity” accidents, generally including those listed below, the TOC will require that SAFE issue a formal written report. These accidents/incidents will include, but not limited to the following:

- Accidents with a significant number of injuries
- Accidents with fatalities
- Accidents which, upon preliminary report, involve a seemingly significant unmitigated, unidentified, or non-quantified risk
- Accidents/incidents involving vehicle, infrastructure, rules, or systems anomalies that have caused or could cause significant loss
- Accidents/incidents where a more independent investigation is deemed necessary

As part of this investigation methodology, the TOC may explicitly request a formal SAFE report containing all factual, investigative, and corrective action information. Alternatively, the TOC may request, or WMATA may suggest, that a SAFE memorandum or other document be used to address specific issues or information deficiencies in operating, maintenance, or engineering reports. Formal reports will generally require additional and/or more detailed information than a standalone summary report.

If the TOC requires more information, it will notify WMATA. TOC may periodically provide WMATA with a copy of the TOC Accident/Incident Tracking Database to outline what accident/incident report documentation has been received and what additional documentation it requests of WMATA for each open accident/ incident.

If the TOC requests changes to the report, WMATA shall revise the draft final report according to a period to be determined jointly by TOC and WMATA on a case-by-case basis. If the TOC does not require more information, TOC may formally approve a Draft Final investigation report, including any associated reports, conclusions, and corrective actions, in accordance with the TOC approval process in section 4.2.5 of the TOC PS/P. Upon receipt of the TOC approval for the draft final report, WMATA will remove the draft watermark and create a final version of the report. The final report will include a transmittal cover letter to the TOC with the CSO’s signature. The TOC will in turn transmit an official letter adopting the Final Report. WMATA will then attach the TOC’s approval or adoption letter to the final report and consider the incident investigation closed.

In the event that significant safety issues identified by TOC or WMATA in the course of an accident or incident investigation remain unresolved, TOC may



elevate such concerns to the highest levels of the respective TOC jurisdictional agencies, the WMATA GM/CEO, and the WMATA Board of Directors.

For investigations performed directly by TOC, within 45 calendar days of completion of the on-site and off-site accident investigation requirements, the TOC investigation team will prepare a draft accident investigation report. The draft accident investigation report will be provided to WMATA for its review. Comments will be due to TOC 30 calendar days after initial receipt of the draft report.

Any urgent findings/hazards identified will be brought to the immediate attention of WMATA so that WMATA can prepare and implement the appropriate response.

In the event that the NTSB conducts an investigation and the NTSB releases preliminary findings and recommendations from its investigation, TOC is authorized to participate in any discussions and reviews with WMATA and the NTSB. TOC and WMATA will review the NTSB findings, draft report, and draft final report, and make a determination of whether or not to adopt the NTSB report and recommendations. Should the NTSB recommendations be adopted by TOC as its own, WMATA shall implement the recommendations. If TOC does not formally adopt the NTSB investigation report as its own, TOC will prepare its own report. WMATA will then develop and implement TOC approved CAPs required from the TOC investigation report. The decision of the TOC not to adopt a NTSB investigation report as its own does not preclude WMATA from independently evaluating, accepting and implementing the NTSB recommendations.

### **10.6.2 WMATA Requirements**

All employees having a direct knowledge of an accident or incident must file a written report as required by the MSRPH and BSEH. Accidents and incidents are investigated by SAFE, and the office involved, in accordance with WMATA Policy/Instruction 10.4/0, *Incident and Accident Investigation*. Rail accidents and incidents are reported and investigated in accordance with the TOC PS/P. Reports are submitted for evaluation to SAFE, which in turn may conduct additional investigations when required.

All accident and incident reports are reviewed by SAFE and the involved office to determine cause, identify corrective actions, and make recommendations, to prevent recurrence.

All accident and incident reports are evaluated to determine any additional actions that are required, to initiate response to any recommendations that require action by departments other than the involved office, and to determine if additional investigation is required.





Information regarding accidents, incidents and system operation is obtained through the following reports:

- Reports generated from the Safety Measurement System
- SAFE maintains and distributes a computerized OSHA 300 Occupational Injury and Illness Report
- Risk Management reports regarding Workers' Compensation and Third Party Claims generated from the Sedgwick database

## **10.7 Corrective Action Resulting from Accident Investigations**

The corrective action process is described in SSPP section 6.2.8

## **10.8 Coordination with State Oversight Agency**

WMATA coordination with TOC, regarding accident investigation, notification, reporting, audit findings, hazard investigation, notification, reporting and resolution and development and management of corrective actions is described in detail in sections 10.1 through 10.7.



## 11.0 Emergency Management

### 11.1 Responsibilities for Emergency Management

The WMATA Office of Emergency Management (OEM) is part of MTPD, and works to support all WMATA departments as needed. All of the goals and activities of OEM involve safety as the top priority and therefore blend with SAFE's responsibilities and activities.

WMATA emergency management focuses on the preparedness, response, recovery, and mitigation of incidents and regional special events that affect WMATA transit operations. When events or incidents occur that impede WMATA's normal transit operations, the impact can cause transportation issues from a very localized to a regional scale. Effective emergency management minimizes these adverse impacts to transit operations, which also minimizes negative impacts to the National Capital Region transportation network.

Emergencies may be caused by natural phenomena or because of human generated incidents and may range from minor service disruptions to mass casualty incidents. During all emergencies, WMATA's first priority remains the same, preserve life safety. When an emergency results in the need for medical assistance or, in certain cases of fire alarms, WMATA relies on jurisdictional Fire and EMS Departments to respond. The Fire and EMS Departments are the region's trained experts in assessing fire or hazmat hazards, providing medical assistance, and performing extraction, recovery, and triage tasks at the incident scene. During minor emergencies without injuries or critical safety issues to passengers and employees, WMATA works with its depth of internal resources to resolve the incident to maintain safe and normal operations. It is important to note that WMATA, like any transit agency, effectively handles minor incidents or delays that occur in a transit system on a routine basis (such as a bus being taken out of service or a mechanical malfunction on a train). However, there are special events and incidents that can create a significant impact to transit operations and may sometimes require the need for external resources.

In the event of severe weather, major emergencies, natural disasters and other larger scale incidents, WMATA has an Emergency Operations Center (EOC) designed for effective emergency management. This EOC includes information technology and communications tools for coordinating resources and managing the emergency from Metro's perspective. The management of this EOC works in concert with the *WMATA Emergency Operations Plan*.

Emergency preparedness includes: providing transit fire/life safety and emergency management training to WMATA employees and first responders, revising emergency plans, ensuring policies and procedures work in concert with WMATA emergency management practices, frequent public outreach events, presentations to transit and first response partners, equipment testing and maintenance and community involvement.



Planning and community involvement are primary ways in which WMATA fosters partnerships with regional first responders which strengthens WMATA emergency management practices. WMATA coordinates its emergency planning efforts with the agencies/groups described below.

### **11.1.1 Metropolitan Washington Council of Governments**

The Metropolitan Washington Council of Governments (COG) was formed in 1957, by elected officials, from the major cities and counties in the metropolitan Washington area. These officials recognized the need to develop a region-wide consensus to solve major area problems. Today, COG is the only metropolitan-wide governmental organization concerned with all aspects of metropolitan activity in the metropolitan Washington area. COG works toward solutions to such regional problems as crime, traffic congestion, fire, medical emergencies, natural and human-generated disasters, inadequate housing, air pollution, and inadequate commercial and employment opportunities. Many of these activities involve WMATA, especially in the area of fire and life safety.

WMATA emergency management personnel regularly participate in several COG committees/subcommittees including the COG Fire Chief's Committee, Passenger Rail Safety Subcommittee, Heavy Rail Safety Subcommittee, the RESF-1 Transportation Committee, and the Emergency Manager's Committee, the Regional Planners Subcommittee, and the Critical Infrastructure Protection Working Group. COG is a forum in which WMATA can coordinate with regional partners and voice issues, concerns, or solutions for the region. Due to COG efforts, WMATA has been involved with several regional exercises. Additionally, WMATA contributed to the revision of the *Metro Rail Transit Fire/Rescue Emergency Procedures Policy Agreement* approved by all jurisdictional Fire Chief's and WMATA's GM/CEO in November 2011.

#### **11.1.1.1 Passenger Rail Safety Subcommittee, Heavy Rail Safety Subcommittee**

The Passenger Rail Safety Subcommittee meets in the even numbered months while the Heavy Rail Safety Subcommittee meets in the odd numbered months. The Passenger Rail Safety Subcommittee is comprised of fire officials from the jurisdictions, COG staff, MTPD/OEM staff and RTRA and RTTO staff. The Heavy Rail Safety Subcommittee includes representatives from OEM, COG, AMTRAK, CSX, MARC and VRE. These subcommittees provide means for fire/rescue departments and WMATA to work together on Metro-related fire emergency equipment, procedures and emergency preparedness. The subcommittee also advises the Fire Chiefs on fire safety issues that arise within the rail and bus systems. WMATA recognizes the subcommittees' role in direct support to WMATA in the area of fire protection, life safety and emergency response. The major functions of the subcommittees are to:

- Provide liaison among personnel from fire/rescue departments and the staff of WMATA;
- Increase the efficiency of WMATA related fire/rescue services operational programs;



- Develop, update and maintain policies and procedures dealing with WMATA fire protection and life safety;
- Provide technical assistance and expertise in the development of equipment and systems for fire protection and rescue operations; and
- Provide liaison for fire service training programs and provide technical assistance and expertise in development of training for response to WMATA emergencies.

The subcommittees are informed prior to any planned change in WMATA configuration, which could adversely affect the safety of fire/rescue personnel or require substantial change in procedures for emergency response.

## **11.2 Fire Protection, Equipment and Life Safety Agreements**

These agreements describe the features of Metrorail systems and equipment required for compliance with pertinent statutes, and ordinances and regulations of the various jurisdictions served by WMATA. The agreements establish the criteria by which the acceptability of WMATA facilities and equipment are to be assessed and evaluated by the jurisdictions in which WMATA facilities are located.

## **11.3 Metrorail Transit Fire/Rescue Emergency Procedures Policy Agreement**

The *Metrorail Transit Fire/Rescue Emergency Procedures Policy Agreement* is a body of procedures developed by the regional Fire Chiefs of the greater Washington metropolitan area along with WMATA. These procedures outline the concepts used in emergency operation to ensure the safety of customers, WMATA employees and fire/rescue personnel during emergencies involving the Metrorail system.

These procedures provide for the coordination and performance of specific duties to mitigate rail emergencies in the Metrorail system. They are not intended to serve as the only set of governing procedures for WMATA or any jurisdictional fire service. The purpose is to provide a foundation on which specific and related operational procedures may be developed and implemented by WMATA and each responding fire/rescue service agency. As noted in section 11.1.1 this agreement was revised and re-issued in November 2011.

*(Copies of the aforementioned agreements are available from MTPD/OEM)*

## **11.4 Coordinated Schedule**

All OEM staff coordinates daily activities using a master calendar (Google) available from any internet connection. The calendar includes schedules for, WMATA departmental emergency response training, external agency emergency response training, exercises, drills, meetings and OEM staff leave. The calendar is maintained by all OEM staff that may access and input training as it is requested by jurisdictional partners or other Metro departments. OEM participates in a daily conference call at



0730 Hours to review all scheduled activities on the coordinated calendar. This daily call provides an opportunity for OEM to further coordinate and resolve any scheduling issues.

## **11.5 Coordination with Regional Emergency Management Organizations**

MTPD/OEM works closely with jurisdictional Emergency Operations Centers to ensure an effective level of preparedness and response to Metrorail, Metrobus, and MetroAccess, regional emergencies and special events. MTPD/OEM personnel are assigned to the District of Columbia Emergency Management Operations Center during emergencies and major events when found necessary and when staff is available. MTPD/OEM liaises with emergency management personnel concerning WMATA bus, paratransit and rail operations. MTPD/OEM will serve as the WMATA liaison between key agencies responsible for regional evacuation and coordination.

## **11.6 Emergency Plans**

OEM is responsible for the development and management of emergency plans including the *Emergency Operations Plan* (EOP) and relevant annexes and the *Continuity of Operations Plan* (COOP).

The EOP outlines the established processes for managing large-scale incidents/emergencies and special events. The EOP is organized by emergency support functions (ESF) and includes annexes specific to certain threats and hazards (i.e., pandemic diseases and terrorism). This plan is scheduled to be reviewed, exercised, and updated annually.

## **11.7 Continuity of Operations Plans**

The Continuity of Operations Plan (COOP) addresses the emergency response and recovery in the event that the use of the Bus and Rail Operational Control Centers and WMATA Headquarters building is lost. New primary BOCC and ROCC have been established at CTF. Currently there are back-up facilities for the Emergency Command Center and back-up communication facilities for the bus and rail OCC and MTPD communications at JGB. MACS OCC backup facilities are at CTF and JGB as well. The COOP is scheduled to be reviewed, exercised, and updated annually.

## **11.8 Emergency Procedures**

Bus and rail emergencies, which endanger life, health, property, or revenue service, require response in accordance with WMATA rulebooks. Metrorail emergency response procedures are grouped together in the MSRPH. The MSRPH is distributed to all employees who are assigned to work on the Metrorail system. The MSRPH is scheduled for revision and republication every two years. Modifications to existing rules and SOPs, or new rules and SOPs can be developed, distributed for review,



concurrence and approval via the Special Order process. The new or modified rule or SOP is incorporated into the MSRPH at the next revision and republication. Bus emergency response procedures are issued in addition to the *Bus Standard Operating Procedures*.

## 11.9 Emergency Training

OEM manages and maintains the Emergency Response Training Facility (ERTF) located at CTF. The FRA collaborated with WMATA to establish the first rail car Roll-Over Simulator in the United States to provide training to first responders for WMATA, MARC, VRE and AMTRAK incidents. Annually, WMATA trains over 3,000 local and state public safety personnel, federal law enforcement officers, and military counter-terrorism personnel. The facility is available as scheduled to WMATA departments and external agencies for emergency response training, Metro familiarization and other specialized training.

The group requesting training and use of the ERTF works with OEM staff to perform a needs assessment and develop a custom training session, exercise, or drill.

MTPD/OEM provides emergency preparedness and facility and equipment familiarization training for employees and Federal, state, and local emergency first responders at its ERTF. This facility houses a mock tunnel in which realistic emergency exercises are conducted with emergency first responders. Familiarization training is also conducted in the Metrorail and Metrobus facilities and in Metrorail yards and of Metrorail and Metrobus vehicles.

### 11.10 Emergency Exercises

Metro is involved with many drills and exercises throughout the year. Exercises and drills are ongoing and a large part of Metro's preparedness and partnerships with regional first responders. A minimum of one large inter-agency exercise focused on a Metro emergency or incident is planned and conducted annually. To distinguish a large-scale exercise from other training (and for the purposes of tracking corrective actions). OEM defines a large-scale exercise as:

- 1) A drill or exercise including WMATA staff/employees and three or more local, state, and/or Federal partners
- 2) A drill or exercise taking place within the Metro system or at the Emergency Response Training Facility

A large-scale exercise allows Metro staff and jurisdictional first responders to practice and enhance emergency response and recovery skills based on a Metro incident or emergency scenario. OEM takes the lead role in coordinating this exercise for Metro. Occasionally, one or several agencies approach Metro about hosting an exercise on Metro infrastructure or at Metro facilities. Metro works to accommodate such requests



as best as possible acknowledging the benefit for all involved. While a partner agency may serve as the exercise lead, Metro plays a major role in the exercise planning and execution.

A “hotwash” or debriefing is held immediately or soon after the exercise. In addition, the agency leading the drill is typically responsible for creating the After Action Report and sharing it with participants. Metro reviews the After Action report in search of pertinent “strengths” and “areas for improvement.” Metro’s identified “areas for improvement” will become corrective actions if they have not yet been corrected. These corrective actions will be submitted to the TOC for review and adoption and tracked through the TOC Security Corrective Action Plans matrix by MTPD. The status of Metro’s large-scale exercises is recorded in the “MTPD Exercise Tracking List” maintained by OEM. Any safety hazards identified during the emergency exercises are submitted to SAFE for entry into the Hazard Management Process.

Funding is a major factor in the type and extent of Metro’s annual large-scale exercise. OEM is involved in COG and researches grant or other funding opportunities for these types of exercises. The degree of large-scale exercise is largely based on the funding available to support it. This may explain why one year Metro may have an extensive large-scale drill followed by a more modest exercise the next year.



## 12.0 Internal Safety and Security Audit Program

### 12.1 Overview

TOC PS/P section 6.0 requires that WMATA conduct comprehensive and continuous internal safety and security audits to evaluate the quality and effectiveness of the implementation of the SSPP. *WMATA Safety Rules and Procedures No. 2.3/2; Internal Safety and Security Audit Procedure*, provides guidelines for conducting the Internal Safety and Security Audit (ISSA) Process. This ISSA program also complies with the internal safety and security auditing requirements of the FTA regulation, *Code of Federal Regulations* title 49, part 659, *Rail Fixed Guideway Systems; State Safety Oversight*.

The CSO has been delegated specific responsibilities by the GM/CEO for monitoring the effectiveness of the implementation of the SSPP by the responsible departments. The ISSA process is the primary method used by the CSO to achieve those responsibilities. The ISSA process provides executive and senior management with a mechanism for verifying and documenting that the key elements of the organization are performing the specified safety and security functions and responsibilities.

The OIG will periodically, audit a WMATA function or activity that is an element of the SSPP independently from the ISSA process. SAFE reviews these reports for applicability to SSPP requirements and as a potential source for hazard identification.

### 12.2 Scope of Activities

All WMATA safety activities and programs related to the Metrorail system are subject to planned, periodic and regularly scheduled safety and security audits throughout the life cycle of the rail transit system. The safety and security audit procedures and checklists evaluate the effectiveness of the implementation of the twenty-one (21) elements of the SSPP and the seven (7) required elements of the SEPP. Metro's Department of Bus Services participates in the voluntary Bus System Safety Management Program administered through the American Public Transportation Association (APTA).

The organizational units and functions, including SAFE, that are subject to the ISSA process are identified in the *Safety Responsibilities and Activities Matrix* in SSPP exhibit 5-1.

### 12.3 Internal Safety and Security Audit Process

WMATA will perform comprehensive and continuous internal safety and security audits of its rail operations and those of appropriate WMATA contractors for compliance with the WMATA SSPP in accordance with the ISSA process, detailed in *WMATA Safety Rules and Procedures No. 2.3/2, Internal Safety and Security Audit Procedure*.





### **12.3.1 Integrity of the Safety and Security Audit Process**

SAFE manages the ISSA process. To maintain the independence and integrity of the ISSA process the CSO will work in cooperation with the Chief, MTPD. MTPD will provide auditing per this procedure of the implementation of those elements for which SAFE is responsible; conversely, SAFE will perform ISSA audits of the areas for which MTPD has implementation responsibility. Historically, the OIG conducts audits of certain programs for which SAFE has responsibility for implementing including environmental management and hazard communication.

The CSO may also retain the services of a qualified consultant to perform any or all of the duties prescribed herein under his or her direction and management. The CSO may also wish to provide expertise with contracted safety specialists with technical knowledge in particular areas for the enhancement of the safety and security audit team.

### **12.3.2 Cycle/Schedule**

WMATA will perform comprehensive and ongoing internal safety and security audits of its rail operations and those of appropriate WMATA contractors, for compliance with the WMATA SSPP, in accordance with the ISSA procedure, at least once every three years. Over a three-year period, all twenty-one (21) elements of the SSPP must be audited at least once. The three-year schedule showing the schedule for each department or contractor safety and security audit shall be reviewed and updated as necessary by October 1 of each year. A copy of the schedule shall be given to each department and contractor to be audited and to the TOC. The internal safety and security audit schedule (with any updates) is also included as an attachment to the Annual Internal Safety Audit Report submitted to the TOC prior to February 1 of each year.

Safety and security audits will be scheduled by the SAFE lead safety and security auditor, with the department to be audited, at least 30 days in advance of the mutually acceptable date. The lead safety and security auditor will officially notify the CSO of the date(s) of the audit, and provide supporting documentation, including document request and locations of the audit. The lead safety and security auditor also notifies the TOC at this time. TOC reserves the right to audit and approve WMATA's internal safety and security audits as conducted.

NOTE: No Bus internal or external audits are addressed in this document.

### **12.3.3 Checklists and Procedures**

Each internal safety and security audit will be conducted in accordance with a set of safety and security audit checklists prepared by the safety and security audit team and lead safety and security auditor before the on-site safety and security audit is begun. These safety and security audit checklists are prepared with the assistance of



documentation provided by the department to be audited, depending upon availability of such documentation. It is incumbent on all departments to formally document all required plans, programs, processes, protocols, methodologies and procedures in order that the documentation can be reviewed for this critical requirement of the ISSA process and for compliance with the SSPP. The checklists will also be developed in accordance with the principles of system safety, internal system safety and security auditing and the SSPP. The CSO shall ensure this checklist is submitted to the TOC prior to each scheduled safety and security audit per the TOC PS/P section 6.2.

#### **12.3.4 Safety and Security Audit Reporting**

The safety and security audit team shall prepare a preliminary internal safety and security audit report following the completion of the on-site safety and security audit. The internal safety and security audit report will include: 1) a narrative describing the safety and security audit process, activities, events and participants; 2) safety and security audit findings and recommendations; 3) proposed corrective action plans (CAPs) for identified deficiencies and areas of non-compliance; and 4) the completed safety and security audit checklists. The preliminary internal safety and security audit report is submitted to the TOC for its review and approval. The report will be approved (possibly with comments), conditionally approved, or TOC will state that it is “unable to approve” at formal TOC meetings or teleconferences according to the process detailed in section 4.2.5 of the TOC PS/P.

Once the TOC provides written approval of the CAPs, the internal safety and security audit report is finalized by SAFE and the final internal safety and security audit report is submitted to the GM/CEO by the CSO for approval. The GM/CEO approved final internal safety and security audit report, including the TOC approved Caps, are forwarded to the responsible executive (and/or contractor manager) within 90 days of the on-site internal safety and security audit, for implementation of the CAPs and recommendations. The CSO ensures that the final internal safety and security audit report and the TOC approved CAPs are submitted to the TOC as an “incremental internal safety and security audit report,” as defined in section 6.2 of the TOC PS/P.

The safety and security auditors’ recommendations for correcting deficiencies identified by the safety and security audit will be included in the internal safety and security audit report. However, the audited department or contractor has the ultimate responsibility for developing, approving and implementing an appropriate Corrective Action Plan meeting the approval of the GM/CEO, the CSO and ultimately the TOC. When corrective action is required, participation by SAFE or the safety and security audit team might be needed to examine the scope and extent of the underlying causes that led to the safety and security audit findings and recommendations.

The CSO will ensure that designated SAFE personnel monitor and follow-up on the implementation of the CAPs, and assist the department in tracking the CAPs to closure. The CSO will ensure that the CAPs included in all incremental ISSA reports are included as part of the annual report to the TOC as required by the TOC PS/P. WMATA



closes its ISSA CAPs internally and separately from TOC closing them, as opposed to a singular closure process for all other CAPs.

The ISSA process should be a positive, cooperative process. In the event of disagreements with safety and security audit report findings or recommendations, the lead safety and security auditor will attempt to resolve the issues. In the event this is not successful, the CSO will work with the responsible executive to resolve outstanding issues. When necessary, issues or disagreements will be elevated to the ESC for final determination. Implementation of the CAPS generated from the ISSA findings and recommendations will be tracked via the Hazard Management Module of the SMS. A CAPS report will be provided to TOC and discussed during the monthly meetings per the TOC PS/P, section 4.2.

### **12.3.5 Annual Safety and Security Audit Reporting**

By February 1 of each year, WMATA will submit an annual safety and security audit report to TOC that documents the internal safety and security audits conducted in the previous year in accordance with section 6.3 of the TOC PS/P.

The WMATA annual report will include:

- A summary of the internal safety and security audits conducted for the previous year
- The completed internal safety and security audit checklists
- Findings and recommendations of the internal safety and security audit
- Suggested corrective actions to address the findings in accordance with CAP requirements
- A progress status of WMATA's three year schedule and potential obstacles with meeting the schedule
- The status of all findings, recommendations, and corrective actions resulting from the audits conducted that year
- Any challenges or issues experienced by SAFE or MTPD in implementing the Internal Safety and Security Auditing Program

Within 45 calendar days of receipt of the report, TOC will approve, conditionally approve, or state that it is "unable to approve" the report in a written response. If TOC does not approve the report, WMATA will have 15 calendar days to address noted deficiencies and requested changes in the report and submit a revised report to TOC. TOC, at its discretion, may arrange for a meeting with WMATA to discuss the noted deficiencies and requested changes.

In the event WMATA objects to a noted deficiency or requested change from TOC, it shall state its objections and suggest alternatives within 15 calendar days. TOC and WMATA shall audit the objections, suggested alternatives, and agree to an appropriate course of action within 15 calendar days. The revised and updated report shall be



submitted to TOC for audit and approval within 30 calendar days after agreement on a course of action.

The annual safety and security audit report may be delivered to TOC in a format agreed to by the TOC Chair (electronic or hard copy). However, the report must be submitted in an unalterable format with all required approval signatures visible.

Along with the report, WMATA must also submit to TOC a letter signed by the GM/CEO certifying that WMATA complies with the SSPP and SEPP. This certification letter must describe compliance with all of the provisions contained in the SSPP and SEPP, and not just those elements that were subjected to internal safety and security audits in the previous year. For areas not in compliance, the transit agency is required to identify the activities to be undertaken to achieve compliance.

### **12.3.6 Coordination with the TOC**

SAFE coordinates the various aspects of the internal safety and security audit with TOC as described in sections 12.3.2 through 12.3.5. The CAP process is detailed in SSPP section 6.2.8

### **12.3.7 Safety and Security Audit Completeness**

The internal safety and security audit process is intended to be complete and comprehensive. SAFE is responsible for ensuring that all twenty-one (21) elements of the SSPP are reviewed in each three-year cycle and each element is comprehensively evaluated.

In addition to WMATA's approved SSPP, the safety and security audit team shall use standard operating procedures (SOPs), other pertinent documents and principles of system safety and security as a basis for preparing a set of safety and security audit checklists before beginning the on-site safety and security audit. Some typical examples of these procedures and other pertinent documents reviewed during the safety and security audits include:

- System operating rule book (*Metrorail Safety Rules and Procedures Handbook [MSRPH]*), Special Orders, Permanent Orders, Temporary Orders, written instructions, bulletins and procedures, *MTPD General Orders and Standard Operating Procedures*
- Safety-related *Operations Administrative Procedures (OAPs)*
- Manufacturers' and WMATA maintenance and operations manuals and procedures for vehicles, track and signals
- Training curricula and materials
- WMATA and departmental standard and emergency operating procedures (SOPs/EOPs)
- System design criteria and project engineering procedures for extensions and modifications



- Records and documentation of safety related events, tasks, processes, procedures, activities and policies
- Previous internal and external safety and security audit reports
- Corrective Action Plans
- NTSB accident investigation reports, other agency peer review reports
- All other documentation needed to verify safety and security related activities, programs and policies



## 13.0 Rules and Procedures Compliance and Review

### 13.1 Overview

Standard Operating Procedures, Operating Rules, and General Safety Rules, which are incorporated into the MSRPH, BSEH, the *MetroAccess Operator Handbook*, the *Safety Rules and Procedures* and the RWPM provide for safe operations and maintenance of the Metrorail, Metrobus and MetroAccess systems. *WMATA Policy Instruction P/I 1.15/0, Rule Book Management*, establishes procedures for development, revision, maintenance, management, and enforcement of rulebooks. The ESC provides oversight and executive management and review of this process to ensure consistency and the integrity of the rules and procedures modification process. These revisions are made on an as-needed basis. The ESC Worksafe Subcommittee is charged with, in part, ensuring Metro modal rulebooks are developed, written, communicated and followed in a consistent manner. The MSRPH is scheduled to be reviewed and revised every two years. Special Orders, Permanent Orders or Temporary Orders are issued as interim measures until permanent changes are made in the MSRPH. In order to ensure the appropriate level of executive management oversight, the MSRPH, RWPM, BSEH, and Special Orders, Permanent Orders, Temporary Orders and Change Orders that modify or are intended to permanently establish rules and procedures are issued under the authority and signature of the GM/CEO.

### 13.2 Review of Rules and Procedures

The effectiveness of the MSRPH is evaluated via spot audits by SAFE and as part of the incident and accident investigation process. SAFE's Hazard Management Program includes the review of rules and procedures during the hazard analysis process. Supervisors and managers evaluate compliance with and the adequacy of the MSRPH and make recommendations for modifications or additions as part of their review of Incident Reports filed by employees. SAFE also reviews the Incident Reports and recommends corrective action or modification of rules and procedures as required. SAFE's accident and incident investigations include a review of applicable rules and procedures as part of the investigation analysis. Adherence to the MSRPH is determined in the conclusions section of accident and incident investigation reports and recommendations include the need for MSRPH, RWPM, and BSEH modification or the need for retraining of employees on the MSRPH, RWPM and BSEH.

P/I No. 1.15/0, *Rule Book Management*, section 4.04, requires that Executive Managers/Directors/General Superintendents ensure risk assessment is conducted and used to prioritize the development training and compliance of rules and procedures and to identify Cardinal Rules. P/I No. 1.15/0, section 4.07 requires that SAFE provide guidance to the offices performing the risk assessment of rules and procedures. P/I No. 1.15/0, section 5.01, "Initiating Rules and Procedures," provide that Local Safety Committees can make recommendations for changes to a rulebook based on:



- Employee suggestions
- Local investigations
- Safety conversations
- Hazard analysis

In addition, P/I No. 1.15/0, section 5.02, “Rule Book Change Evaluation,” requires that the Local Safety Committee make a determination if change will improve safety or operations and whether or not the change is urgent using the Risk Assessment Matrix (P/I No. 1.15/0, appendix D).

### 13.3 Process for Ensuring Rules Compliance

Operations employees are tested on their knowledge of the MSRPH and RWPM during initial training and refresher training.

CQAL also conducts spot audits of MSRPH compliance of RTTO and RTRA employees, BSEH compliance of BUS employees and MetroAccess Operator Handbook compliance of MACS contractors. Maintenance groups have daily discussion of rules and procedures during “Tool Box” meetings. Applicable rules and procedures are also discussed when work is assigned.

*WMATA Policy Instruction P/I 1.15/0, Rule Book Management*, section 5.08, “Compliance,” requires all offices to develop a quality control program to ensure compliance to rules and procedures, including the RWPM. The quality control program shall include the following elements:

- Rule Prioritization – evaluate which activities pose greatest risk of injury, service disruption or customer dissatisfaction (review appendix D of P/I 1.15/0 to help prioritize).
- Roles and Responsibilities – identify who shall be responsible for administering the elements of the quality control program.
- Compliance Checks – identify the activities and associated rules to be monitored for compliance based on *WMATA Policy Instruction P/I 1.15/0, Rule Book Management*, section 5.08 (a) and
  - Determine the frequency of compliance monitoring with increased frequency for Cardinal Rules and dangerous activities;
  - Establish the process/guidelines on how to conduct the compliance checks;
  - Document the results;
  - Monitor observations of employees performing their duties;
  - Monitor activities during the same time work is conducted, to include nights, weekends and holidays (locations and times should be varied); and
  - Conduct monitoring safely, without putting evaluators, employees, contractors, customers, or equipment at risk.



## **13.4 Compliance Techniques: Operations and Maintenance Personnel**

Refresher RWPM and MSRPH safety training is required of RTTO personnel on an annual basis. All new RTTO and TIES employees are provided RWP safety training as part of the New Employee Orientation Program. Employees, who fail either the examination or practical, are reassigned to duties that do not require work on the ROW, until the employee attains a passing score on the examination and/or practical, respectively.

RTTO's Blackberry based application is used to perform ride checks of train operators by RTTO field supervisors. Each supervisor conducts five (5) ride checks per week. This data is incorporated into the SMS, which allows RTTO supervisors to notify SAFE of hazards and allows SAFE to review the data for purposes of hazard identification. Identified hazards are then entered into the Hazard Management Process by SAFE personnel.

SAFE can access the General Orders and Track Rights System (GOTRS) to review planned work on the rail system. Reports can be generated from GOTRS by SAFE to evaluate work sites and review how work sites were established by TRST, SMNT and contractor forces. Because ROCC enters daily controller notes and actions directly into GOTRS, SAFE can generate reports to evaluate compliance with SOPs and work rules by those crews performing work in the rail system. In this manner, SAFE can identify hazards, rules, SOP and RWPM violations for follow-up action and for entry into the Hazard Management Process.

System-wide issues regarding MSRPH and RWPM compliance are entered onto the SMS Hazard Management Module for evaluation, resolution and tracking to closure. SAFE performs inspections and audits of compliance with the MSRPH, RWPM and BSEH. Special emphasis campaigns are performed to monitor compliance and enforcement with RWPM safety rules and procedures.

## **13.5 Compliance Techniques: Supervisory Personnel**

Supervisors are required to ensure that employees perform their assigned duties in compliance with the MSRPH, RWPM, and BSEH, OAPs and other procedures and instructions. Disciplinary procedures consistent with union contracts are used to enforce compliance with established rules and procedures.

## **13.6 Documentation of Rule Compliance**

*WMATA Policy Instruction P/I 1.15/0, Rule Book Management*, section 5.08(e), "Record Keeping," requires that the departments maintain accurate compliance records. Records shall be kept both on observations and on action taken to correct observed deficiencies:





- Establish a tracking system (i.e., forms, electronic applications) to document and control compliance checks and corrective action activity. The tracking system shall provide status of the activity (e.g., open, closed, in-progress).
- Observers shall be trained in the method of collection and proper documentation of the observation.
- Establish retention time for each record and cite retention requirements in the program.

SAFE maintains the ROW Safety Inspection Matrix to document discrepancies and nonconformance with the MSRPH and RWPM identified during its safety inspections.

This matrix is forwarded to responsible departments and requires the departments to implement corrective action to mitigate discrepancies and ensure future compliance. SAFE tracks the corrective action to completion. SAFE also performs follow-up inspections of ROW worksites. Hazards identified during these ROW safety inspections are entered into the Hazard Management Process by the Safety Officer who performed the inspection.

Supervisors maintain the required documentation of enforcement actions consistent with WMATA disciplinary procedures and union contracts. P/I No. 1.15/0, section 5.08 (d), "Corrective Action to Address Non-compliance," establishes requirements for compliance and enforcement action.

### **13.7 Monthly Submission of Rule Compliance Data to TOC**

WMATA submits tabulated summaries of all the SAFE, supervisor, quality assurance, and quality control checks performed each month to TOC. The tabulations include, at a minimum, the following information:

- How many checks were performed in the course of one month
- Which specific rule(s) were checked
- Results of the rule checks

The tabulations should include all of the checks performed by:

- Supervisors
- Quality assurance personnel
- SAFE personnel

The summaries also include the Quality Control Reports generated for the month, all memoranda circulated among CQAL, RTTO supervisors, and other pertinent WMATA personnel regarding the results of rule compliance checks.



## **14.0 Facilities and Equipment Inspection**

### **14.1 Overview**

Safety Inspections of WMATA's facilities are made by maintenance technicians, supervisors, safety officers and managers, to detect and correct unsafe conditions and deteriorating equipment conditions to ensure the safe passage of trains, safety for employees, public safety (including pedestrians and bicyclists), to minimize unnecessary disruptions to revenue service and to ensure compliance with regulations.

### **14.2 Facilities and Equipment Subject to Inspection**

Inspection requirements are based upon standards and regulations of the following agencies:

- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA)
- District of Columbia, Occupational Safety and Health Division
- Maryland, Division of Labor and Industry, Occupational Safety and Health Service
- Virginia, Labor and Industry Department, Occupational Safety and Health Division
- U.S. Department of Transportation, Federal Railroad Administration (FRA) Regulations and Motor Carrier Safety Regulations (MCSR)
- Local jurisdictions served by WMATA (building and fire codes)

In addition, where the jurisdictions have adopted federal safety laws and regulations, the following national consensus standards may be applicable to WMATA facilities:

- National Electrical Code
- Underwriters Laboratory Standards
- National Fire Protection Association Standards
- American National Standards Institute (ANSI) Standards
- American Conference of Governmental Industrial Hygienists (ACGIH) Standards
- Equipment manufacturers' operational standards
- Recommended standards and guidelines of the National Institute for Occupational Safety and Health (NIOSH)

In addition to maintenance and support facilities, the following facilities are inspected: train control rooms, communications rooms, power substations, tiebreaker stations and rail stations. Equipment inspected includes systems equipment, electrical equipment, communication equipment, mechanical equipment, safety equipment, escalators and elevators. Vehicles inspected include rail cars, track maintenance vehicles, buses and non-revenue (service) vehicles. Infrastructure subject to inspection includes track, aerial structures, bridges and tunnels.



### **14.3 Regular Inspection and Testing**

Track inspections of the mainline rail system are performed by trackwalkers twice each week with no more than two-day intervals between inspections. A riding inspection by maintenance managers is conducted on a monthly basis per OAP 208.1, *Track Maintenance Management; Maintenance of Way*. Discrepancies and anomalies are recorded and scheduled for repair by the track repair group. If serious deficiencies are identified, immediate repairs are initiated or speed reductions/restrictions are imposed until repairs can be made.

Daily Safety Tests (DST) are performed by CMNT technicians on each rail car. Any identified deficiencies are corrected prior to the car being released for revenue service.

Train Control Rooms are visually inspected every day to check the condition of ATC equipment and to detect conditions not normally monitored by monitoring systems, i.e., environmental conditions, presence of water, structural integrity, and housekeeping.

Interlocking Inspections are performed daily to verify the proper condition of ATC wayside Interlocking equipment and associated track equipment.

Rail stations are inspected by the station manager in accordance with *Metrorail Station Standard Operations Procedure # 1*. Deficiencies are reported to OCC and MOC and entered in the Maintenance Log.

Buses are inspected on a daily basis, as they proceed through the service lane, to identify defective safety equipment. Bus operators perform pre-trip and post-trip inspections and submit Shop Cards to report defective safety equipment at the conclusion of their shifts and buses are not returned to service until such items are repaired.

Bus stops are inspected annually by the Bus Stop Information Program to ensure accessibility for pedestrians and that bus stop information cases are readable from the sidewalk or roadside.

### **14.4 Checklists**

Checklists are developed from procedures manuals, standards and manufacturers' manuals and are used to perform and document the inspections described above.

### **14.5 Coordination with Hazard Management Process**

Most deficiencies identified during the inspections referenced above are repaired, prior to the equipment being placed in revenue service; or interim repairs are made to mitigate the hazard until permanent repairs are made. SAFE is notified of deficiencies by ROCC, MOC, BOCC or the responsible office. Deficiencies that are determined to be hazards with system-wide implications or that require design and long-term resolution



are entered into and managed by the Hazard Management Process. Resolutions are then tracked to closure by SAFE.



## 15.0 Maintenance Audits/Inspections

### 15.1 Systems and Facilities Subject to Maintenance Program

SSPP section 3.3 describes the major equipment and facilities of the Metrorail system along with the organization responsible for performing facility and equipment maintenance and maintenance audits and inspections. Each responsible organization maintains its maintenance and inspection manuals for each facility and all equipment. Preventive maintenance inspections (PMIs) are performed in accordance with manufacturers' requirements. Checklists are used to perform the PMIs. CQAL and QAAW conduct periodic maintenance audits of facilities and equipment, utilizing checklists, in accordance with the *WMATA Quality Assurance Program Manual*. PMI schedules and the resultant data are maintained and tracked in the MAXIMO database for all facilities and equipment. QAAW tracks and analyzes data to monitor trends to ensure quality and reliability of equipment and facilities. Reports are prepared and provided to TIES managers to identify the need for improvements in maintenance quality and reliability processes and practices. The major safety related systems that require regular maintenance inspections along with the responsible organization are described below.

TRST preventative maintenance inspections are made in accordance with the WMATA Track Maintenance Standards; Maintenance and Inspection Manual WMATA – 1000. These track inspections include:

- All mainline tracks, in an assigned section will be inspection on foot, two times each week with an interval of at least one calendar day. Inspections can be suspended in the event of weather that causes unsafe, slippery or low visibility conditions. A riding inspection can be performed of the affected segment with supervisory authorization.
- Secondary Tracks will be inspected once per month.
- Gauge Measurement of the entire system quarterly.
- Geometry car performing a quarterly inspection
- Inspections of curves and spirals every four (4) months to assess super elevation and gauge either by walking or by the Track Geometry Vehicle.
- Inspection for internal defects in rail shall be made once a year with equipment capable of detecting defects in the rail proper as well as within the joint bar area. Currently these inspections are performed five (5) times per year.
- Dynamically loaded structures such as aerial structures, bridges, and parking garages are inspected annually.
- Static structures such as tunnels, stations, and retaining walls are inspected biennially.



Rapid transit car preventive maintenance inspections are made by CMNT in accordance with the following:

- Periodic preventative maintenance inspections in accordance with manufacturers' recommendations
- Periodic inspections specified by CENV and QAAW to ensure that all components/services meet or exceed manufacturers' recommendations
- Walk-around inspection checklist
- Visual inspection by operator

Automatic Train Control (ATC) preventative maintenance inspections are made by ATC technicians, supervisors and managers, in compliance with regulations, manufacturer guidelines and established maintenance standards. All discrepancies found during these inspections are reported, documented and corrected as soon as reasonably possible. These inspections/audits include:

- Twice-daily evaluation of mainline track circuits to proactively search for loss of shunt defects, utilizing the ATC Loss of Shunt Tool (software). In the event a loss of shunt condition is identified, immediate action must be taken to ensure that train operators approaching the defect area operate in manual and reduce train speed to no greater than braking distance within line of sight. SAFE and the Assistant Chief Engineer, ATC are notified by ROCC of each such loss of shunt condition as soon as train operations are protected. SAFE tracks loss of shunt defects through the Hazard Management Process.
- Audio Frequency and Interlocking AC Track Circuit Shunt Tests and Track Circuit Detection Signal Tests are performed quarterly. Track circuit adjustment is performed after corrective maintenance or disarrangement.
- Interlockings are inspected weekly and switch obstruction tests are performed monthly to ensure reliability and to provide safe passage for revenue trains and work vehicles.
- Vital Safety Circuits receive a locking test once a year, in accordance with FRA regulations, to verify their integrity. This includes approach, time, route, traffic and switch locking.
- Vital Relay Testing is performed every four years, per FRA regulations, to verify the integrity of all vital relays used in the ATC system.
- Intrusion Detection and Warning (IDW) system tests and inspections are performed annually to ensure reliability of the IDW system.

Bus Inspections – Inspection of bus support systems, facilities and equipment are made in accordance with appropriate maintenance manuals and procedures, which conform to the jurisdictional motor vehicle inspection code for the District of Columbia, Maryland



and Virginia departments of motor vehicles. In addition, a “B” Inspection, which includes safety related equipment, is performed on each bus every two weeks.

## **15.2 Resolution of Audit/Inspection Findings**

Serious hazardous conditions that are identified during the above inspections are immediately corrected and the conditions are documented in accordance with the responsible organizations’ procedures and practices. In the event a hazard cannot be immediately corrected, it is reported to SAFE and is managed and resolved in accordance with SSPP section 6.0, “Hazard Management Process.” SAFE then tracks the resolution to closure.

SAFE has access to audit, inspection and repair information in MAXIMO that allows SAFE to identify trends and possible repetitive events that should be addressed in the Hazard Management Process.

## **15.3 Checklists**

Each organization performing PMI audits and inspections develops and uses checklists based on manufacturers’ manuals, applicable procedures, standards and regulations and the MSRPH or BSEH.



## 16.0 Training and Certification Review/Audit

### 16.1 Overview

Instruction in safe methods of operation and safety procedures is included in manuals, handbooks, and other documentation developed for the training and certification of operations and maintenance personnel. Training systems have been developed, by each department (DGMO, RTRA, TIES, BUS, MTPD, CSCM, CHOS, HR, DGMA/CFO, IT, and PLJD), which includes in-house classroom training, on-the-job training and testing. Each department is responsible for establishing safety-training requirements, in conjunction with SAFE. SAFE teaches the occupational and environmental safety training at the Safety Training Academy at CTF or at WMATA facilities and maintenance shops. SAFE has primary responsibility for developing and providing formal corporate safety training courses. The Human Resources Training and Organization Development Branch (T&OD) maintains central records of safety training for all employees. Supervisors are notified by the system when required training is due. Supervisors and employees are required to review periodically, training records to ensure that the required training and certifications are being completed by employees.

SAFE evaluates and audits (as part of the ISSA) departmental safety training programs and provides technical expertise as necessary. Identification of protective devices and emergency equipment is included in the training documentation and instruction. In addition, safety posters, bulletins and notices are used as appropriate to enhance safety awareness during all phases of system operations.

Proficiency demonstrations and certifications are required of all operations and maintenance personnel. Safety concerns are incorporated in briefings given to personnel prior to their working with equipment or in facilities.

Contractors are responsible for ensuring compliance with the most stringent provisions of the applicable occupational safety and health statutes and regulations of the District of Columbia, State of Maryland, Commonwealth of Virginia or political subdivision in which the work is being performed, and the U. S. Department of Labor OSHA standards. The contractor shall submit a construction safety plan to WMATA's representative for review prior to commencement of work. The contractor shall, within five (5) days after receipt of Notice to Proceed (NTP), submit through WMATA's representative, to SAFE, a request for the Authority to schedule and conduct safety instruction at the earliest possible time for all contract personnel who will be engaged in the performance of contract work on or above the Roadway. The Authority will schedule and conduct RWP training for all contractors' work forces. Contractor training and certification must be renewed annually. The contractor shall not perform work at the contract site(s) on or above the Roadway, until all personnel of the contract work force have attended the RWP training and have been furnished evidence of attendance. The contractor shall follow all applicable MSRPH and RWPM rules and procedures while working in the operating rail system. For any work within Start-Up limits, all contractors' personnel shall receive WMATA Start-Up Lockout/Tagout training prior to commencing





the work. Other training may include, but not be limited to, Confined Space Training. Copies of training documents shall be forwarded to SAFE prior to work.

## 16.2 Employee Safety

Safety training is conducted by SAFE, MTPD, RTRA, ROQT, RTTO, BUS, TIES, TRES, RADS, OPMS, PRMT, IT and CFO. Each department is responsible for establishing training requirements and assuring that the necessary training is accomplished. The following courses are provided:

- New Employee Orientation

All new employees and all employees who receive a promotion must attend mandatory safety training including: depending on the job assignment either Emergency Response Awareness Training for Non-operating Personnel or Roadway Worker Protection Training (RWP) for operating personnel; Personal Protective Equipment; multiple modules of Hazard Communication; and Blood Borne Pathogen Training. All employees receive training on the *System Safety Program Plan*, Hazard Management Program and basic Hazard Communication.

- First Aid and CPR Training

First Aid, CPR and Automatic External Defibrillator (AED) training is provided to station managers and other employees as required by class specification. MTPD personnel receive such training at the Police Training Academy and refresher training during mandatory in-service retraining. The American Red Cross or other nationally accredited courses and instruction methodologies are used for First Aid, AED and CPR.

- Special Safety Presentations

Special safety training presentations are made at work locations to instruct employees on methods to prevent traffic, passenger, and employee accidents.

- Hazardous Materials/Hazard Communication Training

All maintenance and support personnel who are required to use chemicals and hazardous or toxic substances are trained in the safe use of such substances. Employees who move to new positions are provided training in the use of any new chemicals that they may be assigned to use by the supervisor.



- Safety Related Operations and Maintenance Training
  - Categories of safety related work include train operators, bus operators, non-revenue (service) vehicle and equipment operators, maintenance of way employees, rail car maintenance employees, elevator and escalator maintenance employees, BMNT employees and police officers. Safety training is embedded in all of the technical and operations training courses provided to these categories of employees.
  - Safety training is conducted on Metrorail and Metrobus procedures and rules. Copies of WMATA's standard operating procedures and safety rules are given to all employees who work on the rail and bus system.
  - All new train operators are given the Train Operator Training Course, which covers rules, procedures, and actual train operation with an instructor. Each new train operator candidate is certified by RTTO with both written and practical testing to validate operational readiness and knowledge of operating and safety rules and procedures. Annually, each train operator is given a refresher course on the rules and procedures. All train operators are re-certified every two years with written and practical testing by RTRA, through the Performance Standardization Program. Each person who fails the annual examination is given special retraining. The preparation, administration, and maintenance of these examinations and related records are the responsibility of the employee's department/office. Supervisors perform "ride checks" on train operators to assess knowledge of train operations and the MSRPH.
  - All new bus operators are provided the Bus Operator Training Course, which includes traffic regulations, rules, procedures, bus simulator time and hands-on seat time in a bus with an instructor. Bus operators must have a commercial driver's license (CDL). Bus operators are provided annual refresher training, which includes time in the bus simulator. Supervisors perform "ride checks" on bus operators to assess knowledge of bus operations and the rules and procedures.
  - All new MACS contractor operators are provided the Paratransit Operator training course. No CDL is required. Annual refresher training is provided, and WMATA contractor supervisors perform "ride checks" and observations of operator performance.

- Safety Rules and Procedures Training

RTTO, RTRA, ROQT, TIES, OPMS, IT, TRES, MTPD, PRMT, TTDC, TSMT, and BUS personnel are trained to perform in accordance with the safety rules and procedures applicable to their office. TTDC provides job familiarization training to craft employees which includes an overview of basic job safety and applicable



MSRPH rules. All new SMNT, TRST and CMNT (2200+) Employees receive new hire familiarization training from TTDC which covers, MSRPH, Safety, Maximo (where applicable), and initial craft training.

The rules and procedures for each office are established by the appropriate office and coordinated with SAFE. Violations of Metrorail or Metrobus rules, regulations, and/or procedures may result in disciplinary action (cautions, retraining, reprimand, disqualification, suspensions, or dismissal) in accordance with the rulebooks, policies and the union contract.

- Emergency Preparedness Training

Employees are provided training in: system security (National Transit Institute course), SOPs regarding hazardous materials, bomb threats and unknown substance response incidents and emergency preparedness for non-operating employees, as part of New Employee Orientation, technical training and ongoing training programs.

- Managing Metro Emergencies

Personnel from jurisdictional law enforcement, fire departments and transportation departments are provided training in their role to manage traffic and pedestrian flow in the event of a major Metrorail service delay.

- SAFE and/or OEM are responsible for the following employee safety training activities:

- Training adequacy, uniformity and comprehensiveness

Training content is monitored and suggestions for improvement are provided to operating offices.

- New Employee Orientation

Employee orientation is conducted for all new WMATA employees to familiarize them with the Authority's programs and policies, including the safety program and to establish employee responsibilities under the Authority's safety program. SAFE responsibilities include basic MSRPH introduction.

- Industrial Hygiene Training and Education

Employees who use or come in contact with chemical, physical or biological hazards receive training in hazard mitigation, industrial hygiene principles and in the care and use of personal protective equipment. SAFE, T&OD, HR/Medical Services and Compliance Branch and MTPD



provide training in the proper handling of biologically contaminated materials such as tools, syringes and clothing.

- WMATA Safety Management Course

All managers and supervisors are required to attend this five-day course presented by SAFE. It is intended to provide the knowledge of OSHA regulations, WMATA safety policies, procedures and practices, to enable managers and supervisors to develop effective safety programs at their facilities and work areas.

- Employee RWP Safety Training

All new and existing employees of WMATA who will perform work on the Metrorail system ROW are required to attend an initial RWP safety training class conducted by ROQT that has been approved by SAFE, prior to beginning work. Employees are certified by written test and receive a certification card from SAFE. RWP Safety Training is conducted by TSMT (for non-Operations personnel) and SAFE (for contractors). TSMT provides the majority of the RWP Training. Successful completion of refresher training is required every three years.

- OSHA Required Safety Training

The following required OSHA training courses are identified in the training database for each job classification as required by employee position descriptions and work assignments:

- |                                                     |                                    |
|-----------------------------------------------------|------------------------------------|
| ▪ Personal Protective Equipment                     | ▪ Environmental Compliance Officer |
| ▪ Respiratory Protection                            | ▪ Hazardous Waste Management       |
| ▪ Hearing Conservation                              | ▪ DOT Hazardous Materials          |
| ▪ Hazard Communication                              | ▪ Electrical Safety                |
| ▪ Permit Entry Confined Space                       | ▪ Fall Protection                  |
| ▪ Confined Space Awareness                          | ▪ Aerial Lifts                     |
| ▪ Powered Industrial Truck                          | ▪ Cranes                           |
| ▪ Hazardous Waste Operations and Emergency Response | ▪ Powered Work Platforms           |
| ▪ First Responder – Operations                      | ▪ Fire Extinguisher Training       |
|                                                     | ▪ Lockout/Tagout                   |
|                                                     | ▪ Other courses as necessary       |



- Emergency Preparedness Training

All non-operating employees are provided Emergency Response Awareness Training as part of New Employee Orientation. Existing non-operating personnel are also provided this training by their assigned departments. Operating employees are provided emergency response training, "Warning Signs" developed by the National Transit Institute. This training is provided by the departments to which employees are assigned.

As part of the Train Operators Course and refresher courses, train operators are provided emergency response training in the ERTF to give them realistic experience of responding to emergencies. Station managers are provided similar training as a part of their training and refresher training courses. Bus and rail employees are also provided fire extinguisher training, where they actually extinguish a fire using an extinguisher.

- Non-WMATA Employee RWP Safety Training

All employees of WMATA contractors and others who perform work on the Metrorail system are required by contract to attend a RWP safety training class overseen by SAFE prior to beginning work.

### **16.3 Contractor Safety**

All contractors who perform work on, or interface with the operating system are required by contract to ensure that supervisors and assigned employees attend RWP training. Each contract also requires compliance with applicable Federal and state OSHA regulations. Contractors must submit to project management, required safety training certifications and documentations of course completion that are pertinent to the work to be performed under the contract. SAFE reviews the certifications and documentation for validity and to ensure currency of the training. SAFE performs regular safety inspections and audits of contractor work sites to review training records and assess contractor safety compliance. Deficiencies are brought to the attention of contractors' project managers for corrective action.

### **16.4 Record Keeping**

All training records for employees and contractor safety training are maintained in an automated database administered by T&OD.

### **16.5 Compliance with Training Requirements**

Training requirements for each position and employee are included in the training database. Audits can be performed using the database to review training records of individual employees to determine compliance with training requirements. Each



employee record indicates which courses are required and which have been completed. Periodic notifications are sent to supervisors if required courses are not completed within the required period.

... training employees are provided...  
 ... as part of New Employee Orientation...  
 ... also provided the training...  
 ... periodic notification...  
 ... required period...

... This Operator Course...  
 ... required...  
 ... periodic notification...  
 ... required period...

... periodic notification...  
 ... required period...

### 1.5.3 Operator Safety

... periodic notification...  
 ... required period...

### 1.5.4 Report Writing

... periodic notification...  
 ... required period...

### 1.5.5 Compliance with Training Requirements

... periodic notification...  
 ... required period...



## 17.0 Configuration Management

### 17.1 Overview

A Configuration Management Plan is vital to WMATA to ensure, as much as possible, that the configuration of all WMATA property, vehicle, equipment and systems design elements, operations and maintenance documents, and safety and security documents are accurately and completely documented. Section 12 of the TOC PS/P, "WMATA System Safety Program Plan" requires that WMATA establish a configuration management process that ensures, as much as possible, that all rail transit property, equipment, systems design, elements, and safety and security documents are accurately maintained.

Configuration Management is defined as the effective control of the arrangement and operation of a facility, system, equipment or vehicle to ensure compliance with approved and/or accepted technical requirements and other governing criteria. Control of configuration of facilities, systems, vehicles and equipment begins during development of the final design and extends through construction, start-up, and operations concluding with deactivation of the facility, system, vehicle or equipment.

*WMATA Policy/Instruction (P/I) No. 4.10/3, Configuration Control Management* establishes authority and responsibility to manage the configuration of all WMATA (Metro) infrastructures: Metrorail facilities and Metrobus facilities. The AGM/TIES and the Chief Engineer, Infrastructure Services (CENI) is responsible for the implementation of this policy. The configuration of the Metrorail and Metrobus infrastructure is represented in the following documents: As-Built Drawings, Engineering Modification Instructions, In-Service/As-Is Drawings, shop drawings, catalog cuts, and O&M manuals.

The Chief Engineer, Vehicles (CENV) is responsible for configuration control of rail vehicles. The Chief Bus Engineer (BENG) is responsible for the configuration control of the Metrobus fleet with proposed changes to as-built configurations being reviewed, tested, approved or denied by the BENG Bus Change Review Committee.

Any changes to an individual sub-system or a fleet/inventory-wide change should be recorded on as-built drawings in a timely and effective manner.

The five (5) basic program elements that comprise the Configuration Management Program are 1) program management, 2) technical requirements, 3) change control, 4) document control and 5) audits and self-assessments. CENI implements the five program elements to maintain consistency among design requirements, design configuration, physical configuration and a facility's documentation. The program elements are integrated throughout the organization both functionally and organizationally. Program management elements of the Configuration Management Program direct the development and implementation of a Configuration Management Program for WMATA. The Configuration Management Program requirements flow down



into implementing procedures and other engineering documents that provide detailed directions and work instructions.

The plan would initially provide an electronic technical document library of WMATA's major assets that support bus and rail operations. Examples of the types of documents the library would hold are operation and maintenance manuals, calculations, agreements, specifications, cut sheets, in-service condition drawings, shop drawings, licenses, deeds and plats.

The primary function of the library would be to provide controlled access to the documents and to make sure the latest version of the documents were always available. The library would maintain at least two (2) sets of documents and possibly three (3) sets for some documents. The first set would be in native format, the second set would be in the viewing format that is planned to be Adobe Portable Document Format (PDF). The third set could be some form of XML data. The majority of users would only use the documents for viewing and only a select few users would be able to make changes to the documents. The configuration management software would provide a full audit trail of document revisions, approvals and publishing.

WMATA is planning to implement a program to provide configuration control of the technical documents relating to the WMATA Metrorail and Metrobus infrastructure. A pilot has been established to demonstrate the feasibility of utilizing the Documentum software program for this purpose. The initial phase was in the systems engineering aspects of the Metro Matters Traction Power Update project. In addition to providing any WMATA employee web based access to the as-built electrical documents associated with this project, it also provided advanced document search capabilities with the addition of Metadata/attribute information associated with each technical document, plus it established basic file folder structures and user privilege levels. Additionally, user features are also planned, such as a graphical user interface and an electronic document review and approval process.

The methodologies and business processes developed under OAP 200-06 to direct TIES EMIs are, broadly speaking, extensible throughout WMATA. In order to do so, WMATA is initiating a Product Life Cycle Management ("PLM") program in 2014. This program will be responsible for:

- Implementing a PLM software tool to track asset design and configuration data from design or purchase of an asset to retirement;
- Working with all WMATA operational and engineering units to document (if necessary), reengineer as appropriate, and implement their processes for configuration management;
- Assure availability of configuration management and related data to all interested parties in the authority.





This program's charter and schedule are scheduled for review and approval in the first quarter of 2014. The program's steering committee will include a representative from Safety to assure compliance with the SSPP.

## 17.2 Process for Change

The Design Control Board (DCB) is responsible for establishing, maintaining and promulgating architectural and engineering criteria and standards for the design, construction, reconstruction, maintenance, and operation of the Metro system. The DCB consists of one representative from TIES, MTPD and SAFE. Requests for change (RFC) will contain a description of the proposed change, justifications for change and supporting documents. The DCB will review the proposal and, if approved, will release the RFC, and authorize other actions necessary for implementation for the approved changes. Any department may appeal decisions of the Design Control Board. The GM/CEO has final appeal decision. *WMATA Policy/Instruction No. 4.14/3; Design Control Board*, controls infrastructure modifications. OAP 200-2006, *Engineering Modification Instruction* is used to control changes in rail cars, track and systems.

## 17.3 Authority for Change

Authority for change to the architectural and engineering criteria and standards for the design, construction, maintenance and operation of the Metrorail system and Metrobus facilities is governed by *WMATA Policy/Instruction No. 4.10/3; Configuration Control Management* and *P/I No. 4.14/2; Design Control Board*. The AGM/TIES is responsible for establishing the Design Control Board and for maintaining a database necessary for change control and problem tracking. The DGMO is responsible for ensuring compliance with the policy by each operating department, and for forwarding all rail related requests to the Design Control Board for action. CENI is responsible for maintaining the original copy of the WMATA Standard Drawings, Design Drawings, Design Criteria and Standard Specifications. CENI is responsible for making revisions and modifications to electrical, mechanical and system documents. CENV is responsible for making revisions and modifications to rail vehicle documents. BMNT, Bus Engineering is responsible for making revisions and modifications to bus documents.



## 18.0 Employee and Contractor Safety Program

### 18.1 Occupational Safety and Health

WMATA industrial, maintenance and construction activities must comply with Federal, state and local occupational safety and health (OSHA) laws, standards and regulations, including *Code of Federal Regulations* title 29, part 1904, *Record Keeping*, title 29, part 1910, *General Industry Standards* and title 29, part 1926, *Construction Standards*. SAFE utilizes applicable consensus standards, including those established by the American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA). These standards shall apply to both employees and contractors. In addition, the contractor is responsible for all subcontractors, suppliers or other persons working under his/her direction to comply with all safety requirements. Industrial activities include industrial, maintenance and support functions of BTRA, BMNT, CFO (TRES-RCF), HR, RADS, ODEV, OPMS, PRMT, MTPD, RTTO and RTRA. During training, emphasis is placed on the proper use of hazardous chemicals and personal protective equipment. Required personal protective equipment is provided with management and supervision enforcing its proper use. Employees have the responsibility to use and properly maintain all required protective equipment. In addition to engineering and administrative controls, procedures are established for the control of all hazardous materials, processes and other hazards in the industrial environment.

On-the-job training conducted by all departments emphasizes preventive occupational safety and health practices. SAFE has primary responsibility to develop and provide formal safety and environmental training courses for employees. It is the responsibility of each manager and supervisor of all WMATA departments to ensure a safe and healthful work environment for all employees assigned to activities under their direction.

Each manager and supervisor is responsible for having knowledge of and ensuring compliance with all applicable Federal and state OSHA laws, standards and regulations. Although the OSHA Act stipulates that employees are responsible for complying with OSHA standards, the employer is legally responsible and held accountable for the employees' compliance. Procedures are established that facilitate disciplinary action against those individuals who fail to comply with applicable OSHA laws, standards and regulations. Examples of types of employee actions that should be subject to disciplinary action are failure to use/wear required personal protective equipment, failure to follow proper chemical handling procedures and the unauthorized modification of safety equipment and devices.

SAFE uses posters to promote safety awareness and increase support of safety activities. Safety awareness posters are developed and distributed for display in highly visible areas throughout the workplace.



### **18.1.1 Personal Protective Equipment**

Appropriate personal protective equipment (PPE) is provided and is required to be used by WMATA personnel. This equipment is evaluated and approved by SAFE, prior to procurement by the using organization. SAFE has been provided access to certain PRMT databases to monitor purchases of personal protective equipment. Management and supervision of BTRA, BMNT, CFO (TRES-RCF), RADS, TIES, RTTO, RTRA and IT are responsible for providing the necessary personal protective equipment and enforcing employees use of the equipment. Individual employees who are required to wear SAFE approved safety work boots and shoes must provide their own shoes that comply with OSHA regulation *Code of Federal Regulations* title 29, part 1910.136, "Foot Protection." Many employees are provided a uniform or tool allowance, which can be used to purchase safety shoes.

PRMT shall implement the required quality control procedures to ensure that, only personal protective equipment, previously reviewed and approved by SAFE, is accepted by the receiving storerooms.

Selection of police equipment including body armor, weapons and chemical agents is the responsibility of the Chief of MTPD. SAFE assists MTPD in selection of personal protective equipment for use against Bloodborne Pathogens and weapons of mass destruction.

### **18.1.2 Hazard Communication Program**

The objective of this program is to ensure employee safety in the use of chemicals and hazardous materials and to ensure compliance with Federal and state hazard communication standards (Right-To-Know Laws) and applicable jurisdictional fire and building codes. The fundamental requirements of the Federal, Virginia and Maryland Right-To-Know laws/standards are included in the WMATA *Safety Rules and Procedures* No. 4.2/1, *Hazard Communication Program*. By December 1, 2013, employers must train their employees on how to read the new GHS formatted safety data sheets and labels.

### **18.1.3 Safety and Industrial Hygiene Studies and Reviews**

SAFE is responsible for monitoring facility compliance with applicable OSHA standards (*Code of Federal Regulations* title 29, part 1910, *General Industry Standards* and title 29, part 1926, *Construction Standards*) and applicable state and local codes and standards. SAFE personnel work with managers and supervisors to develop programs to assist in ensuring a safe and healthful work environment. SAFE performs periodic safety audits of inspections performed by facility personnel. SAFE develops and maintains procedures for the following programs: Confined Spaces, Bloodborne Pathogens, Hazard Communication, Hearing Conservation, Respiratory Protection, Lockout/Tagout and Personal Protective Equipment.



Industrial hygiene studies are conducted to evaluate the degree of employee (and customer) exposure to chemical and physical agents encountered in the work environment, including the office environment. The initial assessments are utilized to determine the necessary corrective action, including implementation of engineering and administrative controls and/or the required use of personal protective equipment. Comprehensive reports of the industrial hygiene study are submitted to the responsible office director. Industrial hygiene studies are performed on a hazard priority basis. The priority is established by SAFE, through an evaluation of the work processes, including type of work performed, types of chemicals or hazardous materials used to which persons are exposed, frequency and duration of exposure and number of employees (or patrons) exposed. An example of high priority exposures are:

- Work involving exposure to asbestos
- High airborne concentrations of lead, silica and other particulate and aerosols
- Organic solvents
- High noise levels

In addition, high priority is given to employee or customer concerns and requests for assistance from the HR Medical Director.

SAFE enters hazards identified through these reviews into the Hazard Management Process for resolution.

#### **18.1.4 Medical Surveillance**

SAFE assists the Medical Services and Compliance Branch of HR to identify abnormal conditions in the workplace and to determine causes of occupational injuries and illnesses. SAFE identifies at-risk positions requiring medical surveillance and works with HR/Medical Services and Compliance Branch to monitor employee exposure to chemical and physical hazards within acceptable guidelines and/or regulatory limits.

#### **18.1.5 Processes to Assess Safety Training Effectiveness**

SAFE provides mandatory safety training for employees in accordance with OSHA requirements. Employees are tested on their knowledge of the course material upon completion of the course. Supervisors are required to assess employee knowledge of regulatory requirements during performance of work tasks and provide refresher training as necessary. SAFE field personnel perform spot checks of employee and supervisor knowledge of regulatory safety requirements as part of their facility and work site inspections and audits and recommend that employees and supervisors be provided refresher training as required.

### **18.2 Working on or Near Rail Transit Controlled Property**

All WMATA employees, who work on or near the Metrorail system, receive employee RWP safety training during New Employee Orientation. In addition, all current WMATA



employees were provided training on the new RWP course. Testing is performed to ensure that employees know and understand the requirements. Employees who do not pass the test are not permitted to work on or near the ROW. Successful completion of RWP refresher training is required every three years. In addition, depending on their assignment, employees are provided job specific safety training in their technical, maintenance, or operations training programs. TIES, RTTO, RTRA, ROQT and MTPD employees and all employees who work on or near the rail system are provided training in the MSRPH and are tested on it annually or biennially. The safety training programs are described in section 16.2.

All contractors who perform work on, or interface with the operating systems are required by contract to ensure that supervisors and assigned employees attend training on RWP. This training course is presented by ROQT in cooperation with SAFE.

An examination is provided at the end of the RWP training session. Only those who receive a passing grade on the test (75%) are authorized to work on the ROW. The Contractor's employee identification badge (I.D.), issued by WMATA, includes a RWP-trained endorsement, for those who received the training and passed the examination. A contractor employee found on the ROW without the approved contractor's employee I.D. badge, with the RWP-trained endorsement, is considered a trespasser and is subject to prosecution. WMATA employees, who are assigned to monitor contractor work, and escort contractor employees on the ROW, are required to check contractor I.D. badges to ensure that they have the RWP-trained endorsement. A contractor employee who does not have the endorsement, shall not be permitted to work on the ROW. WMATA employees, including inspectors, escorts and SAFE are authorized to remove a contractor from a worksite if he/she demonstrates a lack of knowledge and understanding of the applicable MSRPH and RWPM rules and procedures. SAFE conducts periodic inspections of contractor ROW worksites and other worksites to assess knowledge of and compliance with the MSRPH, RWPM and applicable OSHA regulations. Identified hazards are into the SMS Hazard Management Module.

### **18.3 Contractor Compliance with Required Safety Programs**

SAFE, in coordination with CENI, and the contractor, administer construction safety as required by the *WMATA Construction Safety and Environmental Manual* (Revised 2011) and contract specification safety requirements. The referenced documents contain requirements concerning contractor safety programs and qualifications of safety superintendents. These include applicable Federal (OSHA), state and local safety requirements. The contractors are required to have required OSHA programs in place as applicable to the work required by the contract. Documentation of required programs is part of the contract submission process. The contractor is responsible for ensuring that its employees comply with OSHA regulations and WMATA rules and procedures. Contracts require compliance with specific OSHA regulations and employee safety programs as applicable to the work being performed. SAFE reviews and approves contractor site safety superintendents. SAFE conducts regular inspections of contractor worksites to assess contractor employee knowledge of and compliance with regulatory



and contract requirements. Deficiencies are brought to the attention of contractors' project managers for corrective action. SAFE conducts follow-up inspections to ensure implementation of corrective action. Identified hazards are entered into the SMS Hazard Management Module.

### 4.3 Contractor Compliance with Required Safety Programs

SAFE is required to ensure that all contractors working on the system are compliant with all applicable safety regulations. This includes the Federal Occupational Safety and Health (OSHA) regulations, the District of Columbia Occupational Safety and Health (DC-OSHA) regulations, and the WMATA safety program. SAFE is required to ensure that all contractors are aware of and comply with all applicable safety regulations. This includes the Federal Occupational Safety and Health (OSHA) regulations, the District of Columbia Occupational Safety and Health (DC-OSHA) regulations, and the WMATA safety program. SAFE is required to ensure that all contractors are aware of and comply with all applicable safety regulations. This includes the Federal Occupational Safety and Health (OSHA) regulations, the District of Columbia Occupational Safety and Health (DC-OSHA) regulations, and the WMATA safety program.



## 19.0 Hazardous Materials

Safe is responsible for developing procedures that ensure compliance with the hazardous materials standards by all WMATA employees.

The chemical, hazardous material and Material Safety Data Sheet (MSDS) review process is incorporated into the *WMATA Safety Rules and Procedures*, Procedure No. 4.2/1, *Hazard Communication Program*. All chemicals and hazardous materials used by WMATA employees or in the WMATA operating system shall be evaluated and approved by SAFE prior to use or testing of the product, in accordance with the *Hazard Communication Program*.

The using organization must ensure that SAFE has reviewed and has submitted written approval of requested chemicals, prior to procurement, including procurement utilizing blanket orders, petty cash, purchase cards, construction specifications or equipment specifications. PRMT does not process requests for chemical products without a written approval from SAFE and an approved MSDS number on file for that product. PRMT shall implement the required quality control procedures to ensure that only chemical and hazardous materials, previously reviewed and approved by SAFE and assigned a unique MSDS number, are accepted by the receiving storerooms. Substitutes for chemical products and hazardous materials shall have prior SAFE review and approval.

All users of any approved product must read the Evaluation/MSDS Approval prior to using the product and follow all instructions and precautions. SAFE may conduct site visits where chemicals are being used to ensure that workers are aware of the hazards and that they are using the proper PPE.

Access to the approved MSDSs is available through the SAFE Intranet Website. Departments whose employees use hazardous chemicals and materials may also have links from their departmental Websites to the MSDS Website.



## 20.0 Drug and Alcohol Abuse

The HR/Medical Services and Compliance Branch has primary responsibility for administering a Substance Abuse Testing Program in accordance with *Code of Federal Regulations* title 49, part 40, *Procedures for Transportation Workplace Drug and Alcohol Testing Programs* and title 49, part 655: *Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations*. *WMATA Policy/Instruction No. 7.21/4, Drug and Alcohol Testing Program* establishes requirements and responsibilities for administering the required programs.

HR/Medical Services and Compliance Branch monitors the program of each department and ensures that employees in safety sensitive positions who are returning to work from the program have been medically certified to do so. The major goal of the Substance Abuse Policy is to ensure a safe operating environment for the public and WMATA employees. The primary purpose of the Employee Assistance Program is to refer employees to the appropriate medical and/or rehabilitation treatment and counseling. The objective is to help them resolve their substance abuse problems, with the goal of returning them to their full productive job capacity.

HR/Medical Services and Compliance Branch has the primary responsibility for the verification of compliance with the Substance Abuse/EAP Program through random and post-incident testing and medical certification of capability of return to duty for employees and contractor employees assigned to safety sensitive positions. The Safety-Sensitive Contractor Compliance Monitoring Section of the Medical Services and Compliance Branch monitors the Drug and Alcohol Testing Program for WMATA's safety-sensitive Contractors to ensure Metro's compliance with FTA regulations.





## 21.0 Procurement

### 21.1 Overview

The following factors are considered by the organization (user) requesting procurement of the equipment, vehicles, systems, or facilities in deciding what, if any safety requirements are to be included. PRMT will ensure that all equipment and materials identified by the using organization or SAFE as safety critical will be coordinated through SAFE. Compatibility will be assured with the safety features, design, and procedures of the existing Metro system through:

- Requirements that modifications involving procurement or the procurement of new equipment cannot occur unless SAFE has determined whether safety certification will occur.
- Incorporation of “fail-safe” principles when failures would cause a catastrophic event resulting in injury to personnel, damage to equipment, or inadvertent operation of critical systems.
- Avoidance, elimination, or reduction of identified safety hazards by design change, safety devices, and parts or materials selection.
- Location of equipment components so that access by personnel during operation, maintenance repair, or adjustment activities do not require exposure to hazards; e.g., electrical shocks, burns, sharp edges or points, and dangerous or toxic materials.
- Design to minimize severe damage to equipment or injury to personnel in the event of an accident.
- Avoidance of undue exposure to physiological stresses, which might cause errors leading to an accident.
- Provision of suitable warning and caution notes in instruction for operation assembly, maintenance, and repair, and distinctive markings for personal protection on hazardous components, equipment, and facilities.
- PRMT, CENI, and CENV working with CQAL and QAAW and BMNT working with CQAL to develop quality control procedures in accordance with the WMATA Quality Assurance Program Manual that include the evaluation of new materials and equipment to ensure compatibility with existing equipment and systems.
- PRMT, CENI and CENV working with CQAL and QAAW and BMNT working with CQAL to develop quality control procedures, in accordance with the WMATA Quality Assurance Program Manual, to ensure that defective parts are not introduced into the system. Material Discrepancy Reports are used to document and track defective parts, when such items are identified. PRMT works with the responsible vendor to resolve defective parts issues.

Basic safety and user requirements are included in procurement specifications and coordinated with appropriate offices. As new facility, system, or equipment specifications are proposed, responding contractors are required to resolve hazards, in accordance with the following prioritized list:



- Design for minimum hazard:  
The major effort during the design phase of a contract shall be to select appropriate safety design features (e.g., fail-safe, redundancy).
- Safety Devices:  
Hazards, which cannot be eliminated through design, shall be reduced to an acceptable level with appropriate safety devices.
- Warning Devices:  
Where it is not possible to preclude the existence or occurrence of a hazard, devices shall be employed for the timely detection of the condition and the generation of an effective warning signal.
- Special Procedure:  
Wherever it is not possible to reduce the magnitude of an existing or potential hazard through design or the use of safety and warning devices, the development of special procedures to control the hazard shall be required.

Specifications include the requirement that contractors who provide systems, subsystems, or equipment that affect safe movement of vehicles or passenger and employee safety, establish and maintain a system safety program in accordance with a WMATA-approved system safety program plan, which defines objectives, tasks, procedures, schedules, and data submittals for the safety activities that will be performed by the contractor. The contractor's system safety program plan and supporting documentation are reviewed and approved by the Contracting Officer's Authorized Representative (AR), subject to review and approval by SAFE.

Specifications also include the requirement for a contractor Quality Control Program and Quality Assurance Program in accordance with the WMATA Quality Assurance Program Manual.

## **21.2 Procurement of Chemicals and Hazardous Materials**

All chemicals and hazardous materials are procured in compliance with chapter 6.3, "Inventory Communication Tools" of the WMATA *Maintenance and Materials Policy and Procedure Manual*, June 2008 and the WMATA *Safety Rules and Procedures*, Procedure No. 4.2/1, *Hazard Communication Program*. All chemicals and hazardous materials must have a MSDS that is reviewed and approved by SAFE prior to use by Authority employees or by contractors on Authority property.

The use of Purchase Cards for chemical and hazardous materials purchases must comply with section 8.0, "Transaction Procedures," 8.01 (g) and section 10.09 of the *WMATA Purchase Card Guidelines*. Only chemicals and hazardous materials with a previously approved MSDS may be procured with a Purchase Card.



## 21.3 Inspection of Contractor Equipment, Vehicles, Work and Deliverables

All equipment and vehicles that a contractor intends to use in the Metrorail system or on Authority property must be evaluated and approved by the Contracting Officer's Technical Representative (COTR) and subject to review and approval by SAFE, prior to use.

The *WMATA Contracting Officer's Technical Representative Guide*, (January 2008), requires the COTR to perform inspections of contractor work and deliverables prior to acceptance. The purpose of inspection is to determine whether a completed product or service complies with the requirements of the contract and can, therefore, be accepted. The extent of inspection varies with the dollar value of the contract and the product or service procured.

At a minimum, the Authority COTR is required to inspect contractor deliveries in order to determine whether:

- The proper type or kind of supplies were provided
- The correct quantity of supplies was provided
- Any changes or deviations from contract requirements exists
- The product operates as intended
- There are no signs of spoilage or age deterioration
- The item is properly identified or marked
- Appropriate packaging was provided

Inspection Methods of the contract deliverables by the COTR include:

- Sensory and dimensional checks
- Performance or physical tests
- Quality tests

Nonconformance with the contract specifications is unacceptable if it adversely affects:

- System safety, or the safety and health of the product user
- Reliability, durability, or performance
- Interchangeability of parts or assemblies
- Any other basic objective of the contract

The COTR documents inspections findings and informs the Contractor in a timely manner. Issues are resolved in accordance with the contract provisions.



## 21.4 Inspection of Inventory Material

TIES *Administrative Procedure 113-05, QAAW Receiving Inspection Policy and Procedures*, December 11, 2009, defines and establishes processes for acceptance of any rail system materials, parts, tools and equipment prior to being entered into inventory at the Metro Supply Facility. This procedure is to prevent the unintended use of any materials, parts, tools and equipment that do not meet the established criteria and specifications established by TIES.



## Appendix A - References



FTA, NTSB, FRA and APTA have stressed the safety aspects of rapid transit programs and the need for a formal approach to safety management in documents one (1) through six (6). Documents seven (7), eight (8) and nine (9) address OSHA Standards. Document ten (10) was used as a guideline in preparing the document.

1. Tri-State Oversight Committee. *TOC Program Standards and Procedures*. Washington, DC: September 2012.
2. U.S. Department of Transportation, Federal Transit Administration. *Code of Federal Regulations*, title 49, part 659, *Rail Fixed Guideway Systems; State Safety Oversight; Final Rule*. Washington, DC: GPO, April 29, 2005.
3. U.S. Department of Transportation, Federal Transit Administration. *Code of Federal Regulations*, title 49, part 659, *Rail Fixed Guideway Systems; State Safety Oversight Reference Guide*. Washington, DC: June 22, 2005.
4. U.S. Department of Transportation, Federal Transit Administration. *Implementation Guidelines for Code of Federal Regulations*, title 49, part 659. Washington, DC: March 2006.
5. U.S. Department of Transportation, Federal Transit Administration. *Resource Toolkit for State Oversight Agencies Implementing Code of Federal Regulations*, title 49, part 659. Washington, DC: March 2006.
6. U.S. Department of Transportation, Federal Transit Administration. *Handbook for Transit Safety and Security Certification*. Washington, DC: November 2002.
7. U.S. Department of Labor, Occupational Safety and Health Administration. *Code of Federal Regulations*, title 29, part 1910, *Safety and Health Standards for General Industry*. Washington DC: 2012.
8. U.S. Department of Labor, Occupational Safety and Health Administration. *Code of Federal Regulations*, title 29, part 1926, *Safety and Health Standards for Construction*. Washington, DC: 2012.
9. U.S. Department of Labor, Occupational Safety and Health Administration. *Code of Federal Regulations*, title 29, part 1904, *Standards for Record Keeping*. Washington, DC: 2012.
10. University of Chicago Press. *The Chicago Manual of Style*. 15th ed. Chicago: University of Chicago Press, 2003.



## Appendix B - Acronym Glossary



AC	Alternating Current
ACCS	Department of Access Services
AED	Automated External Defibrillator
AGM/ACCS	Assistant General Manager, Access Services
AGM/BUS	Assistant General Manager, Department of Bus Service
AGM/IT	Assistant General Manager, Information Technology
AGM/PLJD	Assistant General Manager, Department of Planning and Joint Development
AGM/TIES	Assistant General Manager, Transit Infrastructure and Engineering Services
AMTRAK	National Railroad Passenger Corporation's intercity passenger train service
ANSI	American National Standards Institute
APCA	Air Pollution Control Act
APTA	American Public Transportation Association
AR	Authorized Representative of the Contracting Officer
ATC	Automatic Train Control System
ATO	Automatic Train Operation System
ATP	Automatic Train Protection System
ATS	Automatic Train Supervision System
BMNT	Office of Bus Maintenance
BOCC	Bus Operations Control Center
BSEH	Department of Bus Service Employees' Handbook
BTRA	Office of Bus Transportation
BUS	Department of Bus Service
CAP	Corrective Action Plan
CCTV	Closed Circuit Television System
CDL	Commercial Driver's License
CENI	Office of Chief Engineer, Infrastructure
CENV	Office of Chief Engineer, Vehicles
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFO	Department of Finance, Chief Financial Officer
CFR	Code of Federal Regulations
CIT	Construction, Inspection and Testing
CMNT	Office of Rail Car Maintenance
CNG	Compressed Natural Gas
COG	Metropolitan Washington Council of Governments
COMM	Office of Communications
COOP	Continuity of Operation Plan
COUN	Office of General Counsel
CPO	Office of Performance
CPR	Cardiopulmonary Resuscitation
CSCM	Department of Customer Service, Communications and Marketing
CSO	Chief Safety Officer
CSX	Rail Based Transportation Company





CQAL	Office of Corporate Quality Assurance (SAFE)
CWA	Clean Water Act
DCB	Design Control Board
DDOT	District of Columbia Department of Transportation
DCO	Deputy Environmental Compliance Officer
DGMA/CFO	Deputy General Manager, Administration-Chief Financial Officer
DGMO	Deputy General Manager, Operations
DOT	Department of Transportation
DST	Daily Safety Test
EAC	Equipment Advisory Committee
EAP	Employee Assistance Program
ECO	Environmental Compliance Officer
ECT	Executive Correspondence Team
ELES	Office of Elevators and Escalators
ELT	Executive Leadership Team
EMI	Engineering Modification Instruction
EMIH	Office of Environmental Management and Industrial Hygiene
EMS	Emergency Medical Services
EOP	Emergency Operations Plan
EPCRA	Emergency Planning and Community Right-To-Know Act
ERTF	Emergency Response Training Facility
ESC	Executive Safety Committee
ETEC	Emergency Tunnel and Evacuation Carts
ETS	Emergency Trip Stations
F&I	Fire and Intrusion Alarm System
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FY	Fiscal Year
GM/CEO	General Manager/Chief Executive Officer
HOMT	Heavy Overhaul Maintenance
HR	Department of Human Resources
IDW	Intrusion Detection and Warning System
IG	Office of Inspector General
IPLN	Intermodal Strategic Planning
IRP	Infrastructure Renewal Program
IRPG	Office of Infrastructure Renewal Programs
ISSAP	Internal Safety and Security Audit Process
IT	Department of Information Technology
MACS	Office of MetroAccess Service
MARC	Maryland Area Regional Commuter Train Service
MAXIMO	IBM Asset Management Software
MCSR	Motor Carrier Safety Regulations
MDOT	Maryland Department of Transportation
MOC	Maintenance Operations Center



MOSH	Maryland Occupational Safety and Health
MREL	Media Relations
MSDS	Material Safety Data Sheets
MSF	Metro Supply Facility
MSRPH	Metrorail Safety Rules and Procedures Handbook
MTPD	Metro Transit Police Department
NCA	Noise Control Act
NCR	National Capital Region
NCTA	National Capital Transportation Agency
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NHTSA	National Highway Traffic Safety Administration
NRC	National Response Center
NTD	National Transit Database
NTP	Notice to Proceed
NTSB	National Transportation Safety Board
OAP	Operations Administrative Procedures
OCC	Operations Control Center
ODEV	Office of Organizational Development
OEM	Office of Emergency Management
OIG	Office of Inspector General
OPMS	Office of Operations Management Services
OSHA	Occupational Safety and Health Administration
PA	Public Address System
PABX	Private Automatic Branch Exchange
PARK	Office of Parking
PERS	Passenger Emergency Reporting System
P/I	Policy/Instruction
PIDS	Passenger Information Display System
PLJD	Department of Planning and Joint Development
PLNT	Office of Plant Maintenance
PME	Precision Measurement Equipment
PMI	Preventative Maintenance Inspection
PREL	Public Relations
PRMT	Office of Procurement and Materials
PSPC	Public Safety Policy Committee of Washington Metropolitan Council of Governments
QAAW	Office of Quality Assurance and Warranty
RCRA	Resource Conservation and Recovery Act
RFC	Requests for Change
RISK	Office of Risk Management
ROCC	Rail Operations Control Center
ROCS	Rail Operations Control System
ROQT	Office of Rail Operations Quality Training
RWP	Roadway Worker Protection
RTRA	Office of Rail Transportation



RTTO	Office of Train Operations
S&I	Service and Inspection
SAFE	Department of Safety and Environmental Management
SARA	Superfund Amendments and Reauthorization Acts
SMNT	Office of Rail System Maintenance
SMS	Safety Measurement System
SOP	Standard Operating Procedures
SRP	Safety Rules and Procedures
SSCP	Safety and Security Certification Plan
SSO	State Safety Oversight
SSPP	System Safety Program Plan
STDS	System Time Distribution System
TIES	Department of Transit Infrastructure and Engineering Services
TOC	Tri-State Oversight Committee
TPC	Third Party Claims
TRST	Office of Track and Structures
TSCA	Toxic Substances Control Act
TTY	Teleprinter System
UPS	Uninterruptible Power Supply
VADRPT	Virginia Department of Rail and Public Transportation
VDOT	Virginia Department of Transportation
VOSH	Virginia Occupational Safety and Health Service
VRE	Virginia Railway Express
WMATA	Washington Metropolitan Area Transit Authority
XML	Extensible Markup Language



## Appendix C - Glossary of Terms



The following is a glossary of terms used in this System Safety Program Plan. Note: Definitions are taken from the APTA Publication “Moving People Safely”, unless otherwise indicated.

**[Bus]** and **[Rail]** indicate that the terms are specific to a bus or rail function, respectively.

**Accident** - An unforeseen event or occurrence that results in injury or property damage.

**Advertised Run [Bus]** – A new vacant run posted on the board at all divisions for bidding by any operator who desires it. (WMATA)

**Alight** – To disembark from a vehicle. (WMATA)

**Automatic Train Control (ATC) System [Rail]** – The ATC system consists of three control subsystems and a computerized Central Control Facility. The three control subsystems are Automatic Train Operation (ATO), Automatic Train Protection (ATP), and Automatic Train Supervision (ATS). Each performs its own particular functions independently of the other two to a certain extent. The operations of the three subsystems are coordinated through the computer at Operations Control Center to achieve an integrated system. (WMATA)

**Automatic Train Operation (ATO) [Rail]** – That subsystem within the ATC system that performs functions normally performed by the train operator. These functions are regulation of acceleration rate, speed, rate of deceleration, programmed stopping, and door control in conjunction with ATP and the Train-to-Wayside Communication System. (WMATA)

**Automatic Train Protection (ATP) [Rail]** – That subsystem within the ATC System that enforces safe operation of the system. It imposes speed limits both to maintain train separation and to operate trains in accordance with civil speed restrictions. At interlockings, ATP ensures that train movement is permitted only when a route is available through the interlockings, and the switches are safely locked in position. In all cases where two or more trains request the use of a single segment of track or interlockings, the ATP prevents occupancy by more than one train. (WMATA)

**Automatic Train Supervision (ATS) [Rail]** – The ATS subsystem controls and supervises the routing and scheduling of the trains. ATS also supervises and controls the transit system mechanical support and electrical power facilities. (WMATA/GRS)

**Block [Rail]** – A section of track of defined limits, the use of which is governed by interlocking signals and cab signals under control and protection of the ATC System.



**Block, Absolute [Rail]** – A section of track between two specific locations into which no train is permitted to enter a section that is occupied by another train. This absolute block is established and governed by the Operations Control Center when necessary, due to a carborne malfunction (e.g., ATP or Braking) or ATC failure. (WMATA)

**BLOCK NUMBER [Bus]** – A letter/number combination assigned to a segment of a bus schedule and displayed in the right front window of a bus. (WMATA)

**Boarding** – To embark on a vehicle. (WMATA)

**Characteristics, Operating** – Those quantitative, measurable parameters pertinent to a specific system, subsystem, device or component that provide definition of performance.

**Clearances [Rail]** – The distance between specified points along the track and specified points on moving vehicles.

**Configuration Management** – The effective control of a facility's as-built arrangement and operation to ensure compliance with approved and/or accepted technical requirements and other governing criteria.

**Construction Safety** – The optimum degree of safety within the constraints of effectiveness, time, and cost through specific application of safety management techniques throughout all phases of construction.

**Contract Service [Bus]** – An arrangement whereby a Metrobus is reserved for regular transportation without cost to riders. Contract service is paid by an agency or government, e.g., Department of Defense, Alexandria City Schools. (WMATA)

**Crash Safety** – A system characteristic that allows the system occupants to survive the impact of a crash and to evacuate the system after potentially survivable accidents.

**Crash Worthiness** – The capacity of a vehicle to act as a protective container and energy absorber during impact conditions.

**Crossover [Rail]** – Two turnouts, with track between the frogs, arranged to form a continuous passage between two parallel tracks. (FTA)

**Cutback [Bus]** – A turn back short of the regular destination. (WMATA)

**Deadheading [Bus]** – A bus in non-revenue service, marked "NOT IN SERVICE". (WMATA)

**Degradation** – Falling from an initial level to a lower level in quality or performance.



**Dragging The Line [Bus]** – Operating a bus so that it is behind the scheduled time of the following bus. (WMATA)

**Emergency** – A situation that is life threatening or which causes damage on or in any transit facility, train way, or vehicle.

**Exclusive Bus Lane [Bus]** – The right hand lane along major bus routes that is reserved during peak hours of operation for buses, taxi cabs, and cars turning right. (WMATA)

**Express Bus [Bus]** – Buses serving outlying areas with limits on where they can pick-up and discharge passengers. (WMATA)

**Fail-Safe (Safety)** – A characteristic of a system and its elements, the object of which is to ensure that any fault or malfunction, will not result in an unsafe condition.

**Fail-Safe Design** – A design principle in which each of the elements which make up a system is analyzed to determine the potential consequence of failure of that element, alone or in combination with any or all other elements of the system, to ensure that a failure or a combination of failures will not result in an unsafe condition.

**Failed Component** – A component that has ceased to perform its intended function.

**Failure** – An inability to perform an intended function.

**Failure Analysis** – The logical systematic examination of a system to identify and analyze the probability, causes and consequences of potential and real failure.

**Failure Assessment** – The process by which the cause, effect, responsibility and cost of an incident (reported problem) in the transit system is determined and reported.

**Failure, Human** – Failure due to human error.

**Failure Management** – Decision, policies and planning which identify and provide alternate measures to operate around potential failures in a safe manner. (WMATA)

**Failure Mode and Effect Analysis (FMEA)** – An inductive procedure in which potential malfunctions are identified and then analyzed as to their possible effects.

**Fault Tree Analysis** – A deductive process that graphically presents undesired events to determine possible causes of that event.

**Follower [Bus]** – The bus scheduled behind another bus. (WMATA)



**Frog, Track [Rail]** – A track structure used at the intersection of two running rails to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other. (FTA)

**Hazards** – Any real or potential condition that can cause injury or death, or damage to or loss of equipment or property.

**Hazard Analysis** – An analysis performed to identify hazardous conditions for the purpose of their elimination or control.

**Hazard Severity (MIL-STD 882)** – Hazard severity is defined to provide a qualitative measure of the worst credible mishap resulting from personnel error, environmental conditions, design inadequacies, procedural efficiencies for system, subsystem or component failure or malfunction as follows:

- **Category I – Catastrophic.** Death or system loss.
- **Category II – Critical.** Severe injury, severe occupational illness, or major system damage.
- **Category III – Marginal.** Minor injury, minor occupational illness, or minor system damage.
- **Category IV – Negligible.** Less than minor injury, occupational illness or system

**Hazard Probability (MIL-STD 882)** – The probability that a hazard will occur during the planned life expectancy of a system, expressed in potential occurrences per unit of time, events, population, items, or activity.

**Hazard Resolution** – The analysis and subsequent actions taken to reduce to the lowest level practical, the risk associated with an identified hazard.

**Headway [Bus]** – The time between buses operating on the same route. (WMATA)

**Headway [Rail]** – The time separation between two trains, both traveling in the same direction on the same track, measured from the time the head end of the leading train passes a given reference point to the time the head end of the train immediately following passes the same reference point. (FTA)

**Incident** – An unforeseen event or occurrence that does not result in injury or property damage.

**Interlocking [Rail]** – An arrangement of signals and signal appliances associated with turnouts, crossovers and pocket tracks so interconnected that their movements must succeed each other in proper sequence. (WMATA)





**Kiosk** - An octagonal structure located at each entrance to a station that serves as the hub of communications for the station. (WMATA)

**Line [Bus]** – The route a bus is scheduled to operate. (WMATA)

**Local [Bus]** – A bus that stops for either boarding or discharging passengers at every stop on the route. (WMATA)

**Mainline** – Track over which passenger service is operated. (FTA)

**Mode 1 (Automatic) [Rail]** – Train operation with train under ATO control with ATP monitoring and protection. (WMATA)

**Mode 2 (Manual with ATP Cutout) [Rail]** – Train operation under manual (train operator) control without ATP monitoring and protection. This mode is not permitted unless passengers are evacuated from the train and an Absolute Block is established to allow train movement. (WMATA)

**Notice to Operators (NTO) [Bus]** – Rules, regulations and special instructions posted on the bulletin boards at each bus division. (WMATA)

**Operations Control Center (ROCC) [Rail]** – The place where train control and train supervision is accomplished for the entire transit system.

**Owl Service [Bus]** – Metrobus service between midnight and 5:00 a.m. (WMATA)

**Peak Hours** – Those weekday (excluding national holidays) periods normally associated with the AM and PM rush. (WMATA)

**Personnel, Operating [Rail]** – Those employees of a transit system having direct and supervisory responsibility for the movement of trains, embodying both on-board and wayside duties. (WMATA)

**Pre-Trip Inspection [Bus]** – A standard operating procedure outlining the necessary steps to inspect a bus for possible safety defects prior to entering revenue service. (WMATA)

**Rail Fixed Guideway System** – Any light, heavy, or rapid rail system, monorail, inclined plane, funicular, trolley, or automated guideway that is: (1) included in FTA's calculation of fixed guideway route miles or receives funding under FTA's formula program for urbanized areas; and (2) not regulated by the Federal Railroad Administration. (FRA)

**Rail Rapid Transit System** – An electrified fixed guideway transportation system utilizing steel rails, usually for operating on an exclusive grade-separated Roadway for the mass movement of passengers within a city or metropolitan area and consisting of



its fixed way, transit car vehicles and other rolling stock, power system, maintenance facilities and other stationary and movable apparatus and equipment and its operating practices and personnel.

**Regular Run [Bus]** – A scheduled combination of trips whose total time guarantees, equals, or exceeds payment for the number of hours specified as a day's work. (WMATA)

**Revenue Service** – The transportation of passengers.

**Risk Management** – The management of hazard probability and severity so that possible loss is minimized. (MIL-STD 882B)

**Route Number [Bus]** – That number assigned to a run for identification purposes. (WMATA)

**Safe** – Secure from danger or loss.

**Safety and Security Certification** – A system that provides traceable verification that all safety-critical and security systems, subsystems, procedures and training programs have been reviewed for compliance with all applicable transit-related safety and security requirements prior to the commencement of passenger service or normal operations.

**Safety Critical** – A designation placed on a system, subsystem, element, component, device or function denoting that satisfactory operation or implementation is mandatory to safety assurance. (WMATA)

**Safety Design Reviews** – Reviews performed by SAFE to: assess the compliance of facility or equipment design with safety, fire, and environmental regulations and requirements in specifications and to ensure that the safety of existing WMATA equipment is not degraded by the addition of new facilities or equipment, as part of the configuration management process. Safety design reviews are normally an integral part of engineering design reviews to minimize overlapping responsibilities. Safety design reviews are performed by SAFE on all new TIES construction, and TIES infrastructure renewal program (IRP) projects, joint development, adjacent construction projects and vehicle procurement.

**Safety Measurement System** – The Safety Measurement System (SMS) is a set of tools that allow the Department of Safety and Environmental Management (SAFE) to measure the overall system safety of WMATA. This set of tools provides both WMATA and SAFE a means to manage safety incidents, safety hotline reports, and hazards through modules of SMS by doing the following:

- Reducing paperwork;
- Eliminating redundant work efforts;
- Centralizing safety critical data;



- Direct tracking of identified problems; and
- Improved communication from the field to management and safety personnel.

**Safety Oversight** – The FTA *Fixed Guideway Systems; State Safety Oversight* regulation, *Code of Federal Regulations* title 49, part 659, requires that states in which a rail fixed guideway system operates, designate a state oversight agency to be responsible for overseeing the rail fixed guideway system’s safety practices. (FTA)

**Signal [Rail]** – A means of communicating direction or warning.

**Signal, Cab [Rail]** – A signal in the train operator’s cab that indicates prevailing speed commands, and conveys ATC system aspects.

**Signal, Interlocking [Rail]** – A visual wayside signal containing color-coded lights which governs movements into or within interlocking limits.

**Subsystem** – A defined portion of a system that is in turn composed of subsystems, component parts, or both. (WMATA)

**Station [Rail]** – A place designated for the purpose of loading and unloading passengers.

**Switch, Track [Rail]** – a pair of switch points with their fastenings and operation rods providing the means for establishing a route from one track to another.

**System** – A composite of people, procedures and equipment operating in a specific environment to accomplish a specific operation or task.

**System Safety** – The application of operating, technical, and management techniques and principles to the safety aspects of a system throughout its life to reduce hazards to the lowest level possible through the most effective use of available resources.

**System Safety Analysis** – A formalized method of identifying and eliminating or controlling system hazards. (WMATA)

**System Safety Engineering** – The application of scientific and engineering principles during the design, development, manufacture and operation of a system to meet or exceed established safety goals.

**System Safety Management** – An element of management that defines the System Safety Program requirements and ensures the planning, implementation and accomplishment of system safety tasks and activities consistent with the overall WMATA requirements. (MIL-STD 882)

**Terminal [Bus]** – The end of a route where a bus will wait until its scheduled return trip. (WMATA)



**Third Rail [Rail]** – A rail mounted on insulators alongside the running rail that provides traction power for train operation.

**Train [Rail]** – A consist of one or more pairs of cars combined into an operating unit.

**Train Identification [Rail]** – A method of identifying trains using information such as train number, destination, length, or a combination of these elements. This may be accomplished automatically for such functions as routing.

**Train Operator [Rail]** – That person on board a train having direct and immediate control of the movement of a train.

**Train Car, Rail, Rapid, [Rail]** – An electrically propelled passenger carrying rail vehicle characterized by high acceleration and braking rates for frequent stops, and fast loading and unloading.

**Transit System Fail-Safe** – The integration of the design, procedures, people and all other elements of a transit system using the principles of fail safety and system safety in such a manner that equipment failures or personnel errors, or combinations of both, shall not result in an increased hazard level.

**Trippler [Bus]** – Scheduled work for an operator whose total pay time is less than that specified for a regular run. (WMATA)

**Turnout [Rail]** – An arrangement of a switch and frog with closure rails by means of which trains may be diverted from one track to another. (FTA)

**Unsafe Condition** – Any condition that endangers human life or property.

**Vital Function** – A system, subsystem, equipment or component that provides a function critical to safety.

**Yard, Storage [Rail]** - A system of tracks within defined limits for making up trains and storing transit cars. (FTA)



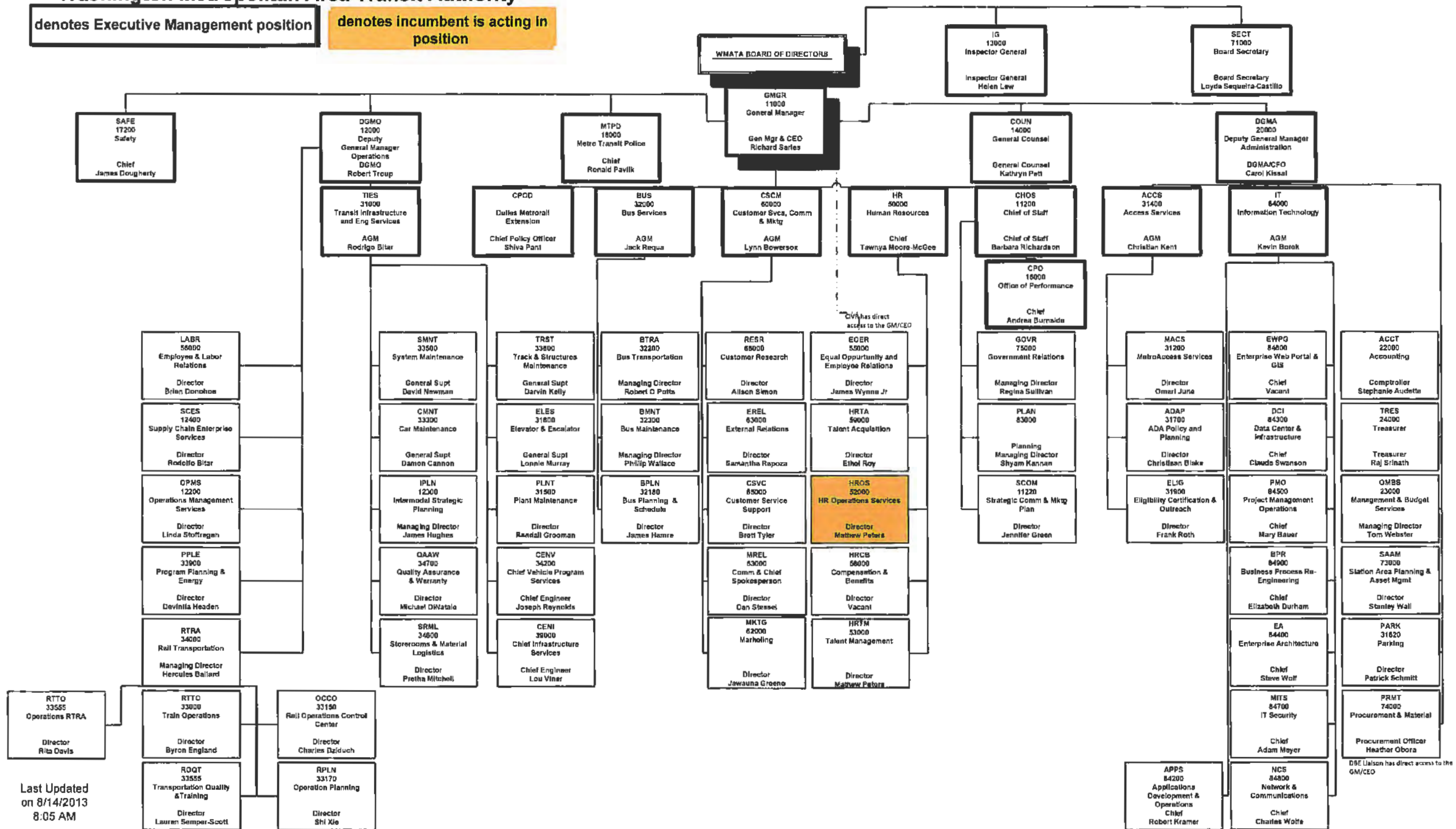


## Appendix D - WMATA Organization Chart

# Washington Metropolitan Area Transit Authority

denotes Executive Management position

denotes incumbent is acting in position

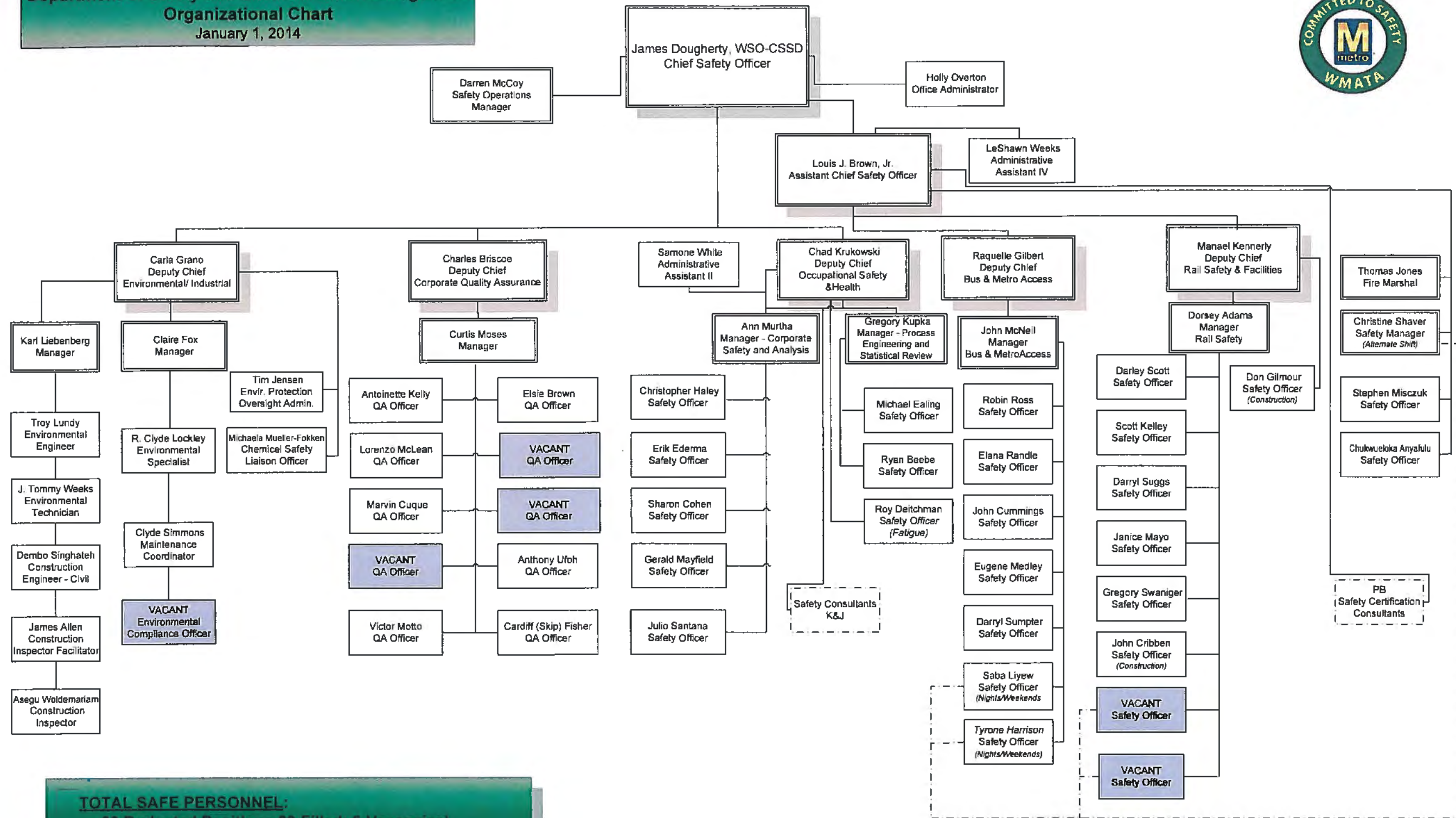


Last Updated on 8/14/2013 8:05 AM

WMATA Organization Chart

## Appendix E - SAFE Organization Chart

**Department of Safety and Environmental Management**  
**Organizational Chart**  
 January 1, 2014



**TOTAL SAFE PERSONNEL:**  
 66 Budgeted Positions 60-Filled; 6-Vacancies  
 [Effective January 1, 2014]

**SAFE Organization Chart**