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WMSC Commissioner Brief: W-0094 – Improper Vehicle Movement – King St. Station – February 18, 2021

Prepared for Washington Metrorail Safety Commission meeting on August 3, 2021

Safety event summary:

The operator of a train departing King Street Station toward Franconia-Springfield Station incorrectly moved the train toward Huntington Station on February 18, 2021 at approximately 9:59 p.m.

This train was designated as a Yellow Line train, and appeared in the Advanced Information Management (AIM) system as a Yellow Line train (with faint blue stripes) due to the long-term shutdown of the Blue Line for a construction project that had closed Arlington Cemetery Station, routing all trains to or from Franconia-Springfield Station over the Yellow Line.

The Train Operator told the Rail Operations Control Center (ROCC) that their destination was Franconia-Springfield Station, which the ROCC acknowledged without a 100 percent repeat back. The Train Operator departed King Street Station and followed a route that had been set toward Huntington Station. The Train Operator did not identify the rail alignment, signal aspect or other signage that indicated the route was set toward Huntington Station until after the train had followed the incorrect path. For a correct route, the signal would have been flashing to indicate a diverging (turning) route, the lit signage at the station platform would have indicated the route was set toward the Blue Line, and the rail would have been aligned for such a move. Instead, the signal was solid lunar (white) to indicate a straight-through move, and signage for the operator at the station platform would have shown the route was set toward the Yellow Line.

In the ROCC, the Button Controller had also assumed responsibilities as the radio controller approximately four minutes before this event due to the Radio Controller attending a safety briefing. The controller said over the radio that they thought the train was supposed to be going to Huntington Station. The train was allowed to continue to Eisenhower Avenue Station so that customers could board a train in the opposite direction back to King Street Station to connect with a different train to reach Van Dorn Street and Franconia-Springfield stations.

Metrorail did not remove the Train Operator or controller from service for drug and alcohol testing.

Probable Cause:

The probable cause of this event was a lack of radio discipline, insufficient physical characteristics training for field personnel such as train operators, and inadequate supervisory oversight to ensure compliance with radio protocols and to provide support for a controller bearing an unusually excessive workload.

Corrective Actions:

The ROCC is examining contingencies in the event one controller cannot continue their responsibilities, to allow for controllers to continue their specific and separate radio and buttons responsibilities.

Metrorail's Safety Department plans to work with Automatic Train Control departments to determine whether alternative line junction signals could even more clearly indicate an intended route.

The Train Operator and the controller who set the incorrect route underwent retraining.

WMSC staff observations:

This event is one of several that the WMSC has observed that suggest there may be insufficient physical characteristics training for at least some Metrorail personnel to properly understand and identify critical elements of territory that they work on or may work on. The WMSC is further assessing this issue through ongoing inspection and audit work.

This event occurred during an extended Blue Line shutdown, which created a long-term unusual operational environment that changed typical visual cues for ROCC controllers. As demonstrated in the AIM snapshots in the report, this train displayed as mainly yellow, with only pale blue lines that suggested the destination of Franconia-Springfield Station. In a normal operating environment, a train with a destination of Franconia-Springfield Station would display in blue to represent the Blue Line, while a train destined for Huntington Station would display in yellow to represent the Yellow Line. A quick glance from a controller at the yellow indication could have contributed in a high-workload environment to mistakenly thinking the train's destination was Huntington Station. Metrorail could consider display changes, recurring reminders to controllers during track work, or other steps as part of the future planning process for shutdowns or other unusual service patterns.

Elements of ROCC controller training, certification and staffing are under review or improvement through a number of open corrective action plans (CAPs) related to WMSC findings, including findings from the ROCC Audit issued in September 2020. Among those CAPs are requirements for adequate staffing in the ROCC for current duties and, later, to incorporate appropriate breaks, training and emergency support into regular schedules.

Metrorail has a separate open CAP related to radio communication. Although there has been significant improvement over the last several years, it is imperative that Metrorail continue to improve radio discipline even after that CAP is closed.

Staff recommendation: Adopt final report.

Washington Metro Area Transit Authority

Department of Safety and Environmental Management (SAFE)

FINAL REPORT OF INVESTIGATION A&I E21071

Date of Event:	2/18/2021
Type of Event:	Improper Movement of any Rail Vehicle on the Mainline or in a Yard, Including Over Improperly Aligned Switch(es)
Incident Time:	21:59 hours.
Location:	King Street Station, Track 2
Time and How received by SAFE:	22:19 hours. SAFE On-Call Phone
WMSC Notification Time:	23:23 hours.
Responding Safety Officers:	WMATA SAFE: No WMSC: No Other: N/A
Rail Vehicle:	Train ID 358
Injuries:	None
Damage:	None
Emergency Responders:	RTRA Supervisor
SMS I/A	20210223#91959

King Street Station

Improper Movement of any Rail Vehicle

on the Mainline or in a Yard, Including Over Improperly Aligned Switch(es)

February 18, 2021

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Abbreviations and Acronyms

AIMS	Advanced Information Management System
ARS	Audio Recording System
CCTV	Closed-Circuit Television
CM	Chain Marker
ERT	Emergency Response Team
MSRPH	Metrorail Safety Rules and Procedures Handbook
NOAA	National Oceanic and Atmospheric Administration
PM	Prime Mover
ROCC	Rail Operations Control Center
RTC	Rail Traffic Controller
SAFE	Department of Safety and Environmental Management
SMS I/A	Safety Measurement System Incidents/Accidents

Executive Summary

On Tuesday, February 18, 2021, at 21:58 hours, Train ID 358 Train Operator, standing by at the C97-06 signal, contacted the Radio Rail Traffic Controller (RTC) and reported they were standing by at King Street Station, Track 2, and their destination was Franconia-Springfield Station. The Radio RTC did not provide a 100% repeat back but acknowledged the Train Operator. The Radio RTC stated that a Lunar would be provided at the C97-06 signal. At Approximately 21:59 hours, the Train Operator contacted the Radio RTC and stated they had a Franconia-Springfield destination dialed into their console and had incorrectly accepted a lead to Huntington Station.

Before the incident occurred, the Radio RTC assumed duties as the Button RTC and maintained duties as the Radio RTC simultaneously. The Radio RTC was then responsible for all duties. The Radio RTC assumed duties due to the initial Button RTC attending a safety briefing.

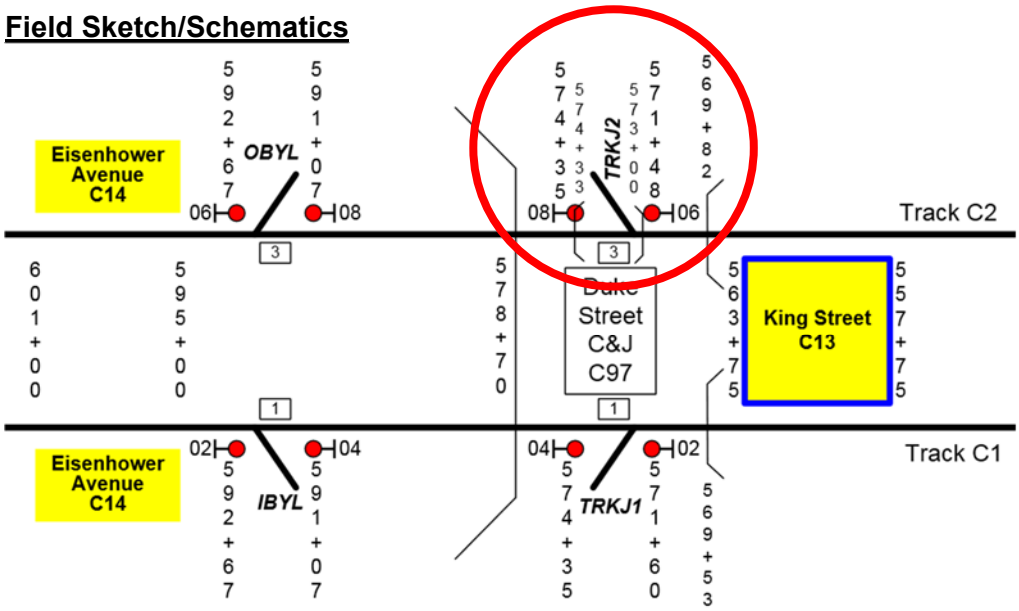
The Radio RTC stated that they thought the Train Operator reported their final destination as Huntington Station. After the Train Operator confirmed they reported their destination as Franconia-Springfield Station, the Radio RTC instructed the Train Operator to continue to Eisenhower Avenue Station to allow customers whose destination was Van Dorn Station or Franconia Springfield Station to exit at Eisenhower Avenue Station, board the next inbound revenue train on Track 1. At 22:18 hours, Train ID 306 Train Operator serviced Eisenhower Avenue Station, Track 1, picking up any incident customers from Train ID 358. Train ID 351 Train Operator picked up the incident customers at King Street Station, Track 2 and continued in revenue service to Franconia-Springfield Station. There were no injuries as a result of this incident.

The probable cause of this Improper Movement of any Rail Vehicle on the Mainline or in a Yard, including Over Improperly Aligned Switch(es) event was due to human error on the part of the Train Operator and the Radio RTC. The Radio RTC and Train Operator failed to follow MSRPH General Rule 1.79. The Radio RTC thought the Train Operator stated their destination was Huntington Station and not Franconia Springfield but never gave the Train Operator a 100 percent word for word repeat back of the radio transmission. The Train Operator should not have taken any action since there was not a 100 percent repeat back from the Radio RTC. Also, the Train Operator failed to follow MSRPH Section 3 Operating Rule 3.76. The Train Operator should have identified that the switch was not properly aligned in the direction that they had requested and verified the flashing lunar.

Incident Site

King Street, Track 2

Field Sketch/Schematics



Purpose and Scope

The purpose of this incident investigation and candid self-evaluation is to collect and analyze available facts, determine the probable cause(s) of the incident, identify contributing factors, and make recommendations to prevent a recurrence.

Investigation Process and Methods

Upon receiving the notification of the Improper Movement of any Rail Vehicle on the Mainline or in a Yard, Including Over Improperly Aligned Switch(es) at King Street Station on February 18, 2021, SAFE dispatched a cross-functional team to assess the scene and conduct the subsequent investigation. SAFE team members worked with relevant WMATA subject matter experts to review the incident's facts and data.

Investigation Methods

The investigative methodologies included the following:

- Physical Site Assessment
- Formal Interviews – SAFE interviewed two individuals as part of this investigation. Interviews will include persons present during and after the incident, those directly involved in the response process, and Managers responsible for the process. SAFE interviewed the following individuals:
    - Train Operator

- Buttons RTC

- Informal Interviews – Collected through conversations with individuals during the investigation to provide background and supporting information.

- Documentation Review – A collection of relevant work history information and process documentation contained in Metro systems of record. These records include:
  - Employee Training Procedures & Records
  - Certifications
  - The 30-Day work history review
  - Metro Safety Rules and Procedures Handbook (MSRPH)
  - National Oceanic Atmospheric Administration (NOAA) data review

- System Data Recording Review – Collection of information contained in Metro Data Recording Systems. This data includes:
  - Audio Recording System (ARS) playback include OPS 3 and Assistant Superintendent desk (Phone Communications)

Investigation

On Tuesday, February 18, 2021, at 21:58 hours, Train ID 358 Train Operator, standing by at the C97-06 signal, contacted the Radio Rail Traffic Controller (RTC) and reported they were standing by at King Street Station, Track 2, and their destination was Franconia-Springfield Station. The Radio RTC did not provide a 100% repeat back but acknowledged the Train Operator. The Radio RTC stated that a Lunar would be provided at the C97-06 signal. At approximately 21:59 hours, the Train Operator contacted the Radio RTC and stated they had a Franconia-Springfield destination dialed into their console and had incorrectly accepted a lead to Huntington Station.

The Radio RTC stated that they thought the Train Operator reported their final destination as Huntington Station. After the Train Operator confirmed they reported their destination as Franconia-Springfield Station, the Radio RTC instructed the Train Operator to continue to Eisenhower Avenue Station to allow customers whose destination was Van Dorn Station or Franconia Springfield Station to exit at Eisenhower Avenue Station, board the next inbound revenue train on Track 1. At 22:18 hours, Train ID 306 Train Operator serviced Eisenhower Avenue Station, Track 1, picking up any incident customers from Train ID 358. Train ID 351 Train Operator picked up the incident customers at King Street Station, Track 2 and continued in revenue service to Franconia-Springfield Station. There were no injuries as a result of this incident.

Chronological Audio Recording System (ARS) Timeline

A review of ARS playback, i.e., phone and radio communications, revealed the following timeline:

Time	Description
21:54:35 hrs.	Radio RTC: Assumed duties as the Button RTC. [Radio]
21:58:12 hrs.	Train ID 358 Train Operator: Contacted the ROCC and reported they were standing by King Street Station, Track 2, with Franconia-Springfield Station as their destination. [Radio]

21:58:17 hrs.	Radio RTC: Responded to Train ID 358 "It's coming to you 358". [Radio]
21:59:17 hrs.	Train ID 358 Train Operator: Reported to the Radio RTC that they took the lead in the direction of Huntington. Radio RTC: Instructed Train ID 358 to continue to Eisenhower Avenue. [Radio]

**Note: Times above may vary from other system's timelines based on clock settings. SAFE investigations from the ARS include OPS 3.

Advanced Information Management System (AIMS)

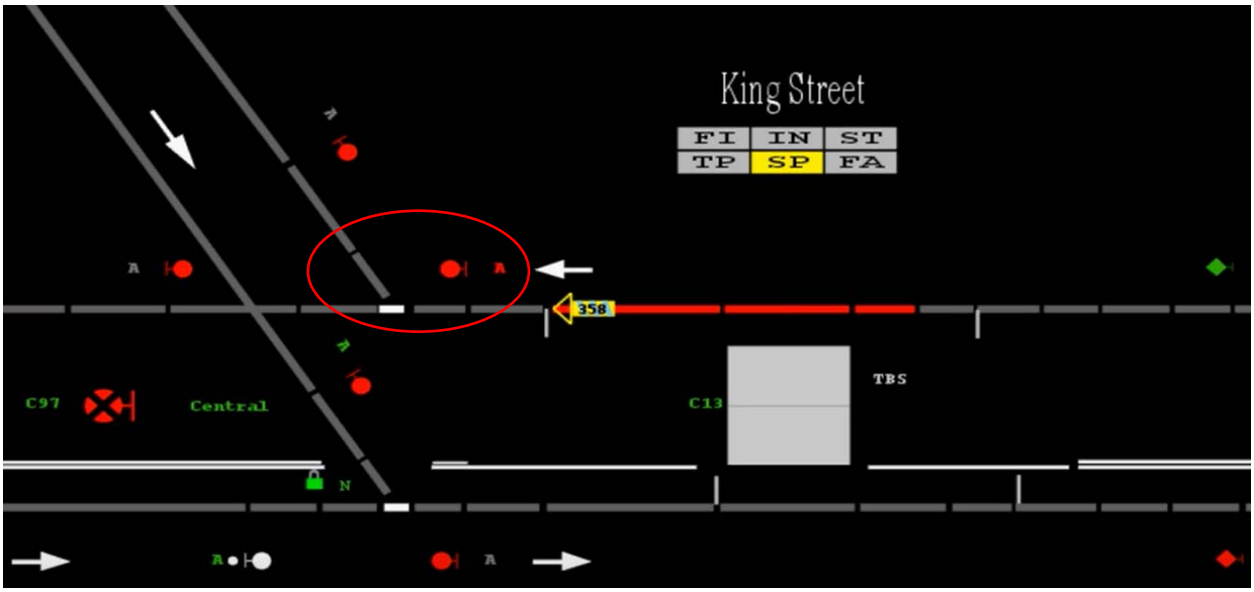


Diagram 1: Train ID 358 holding at the C97-06 signal.

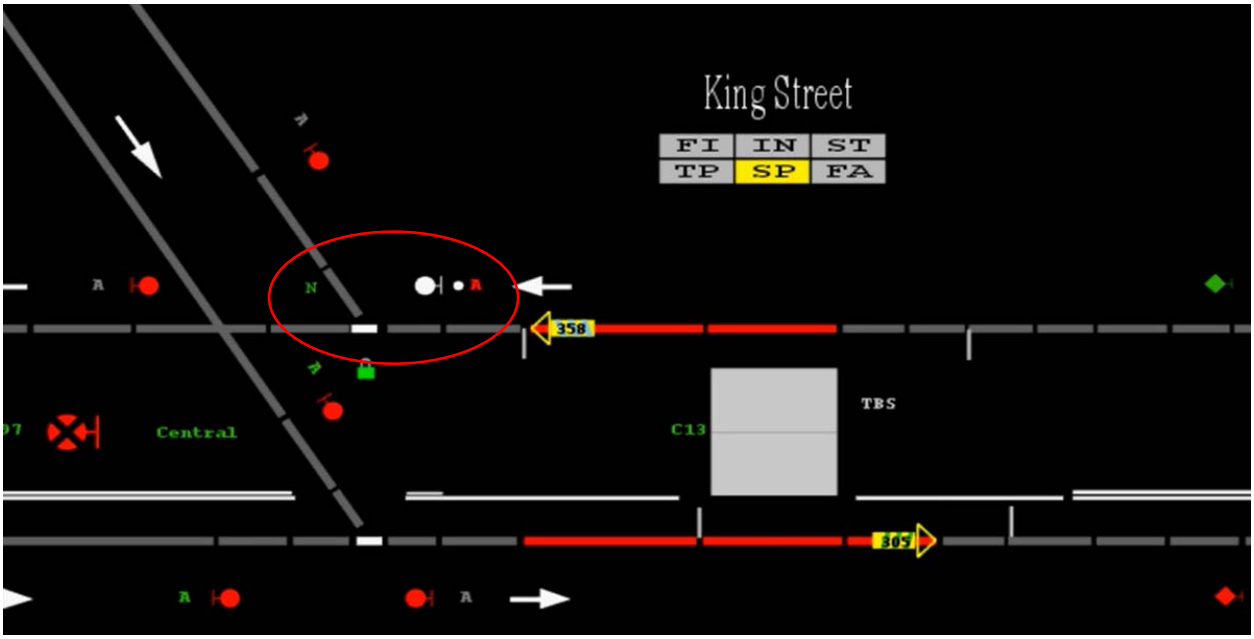


Diagram 2: Lunar set by the Radio RTC at the C97-06 signal for a straight-through move.

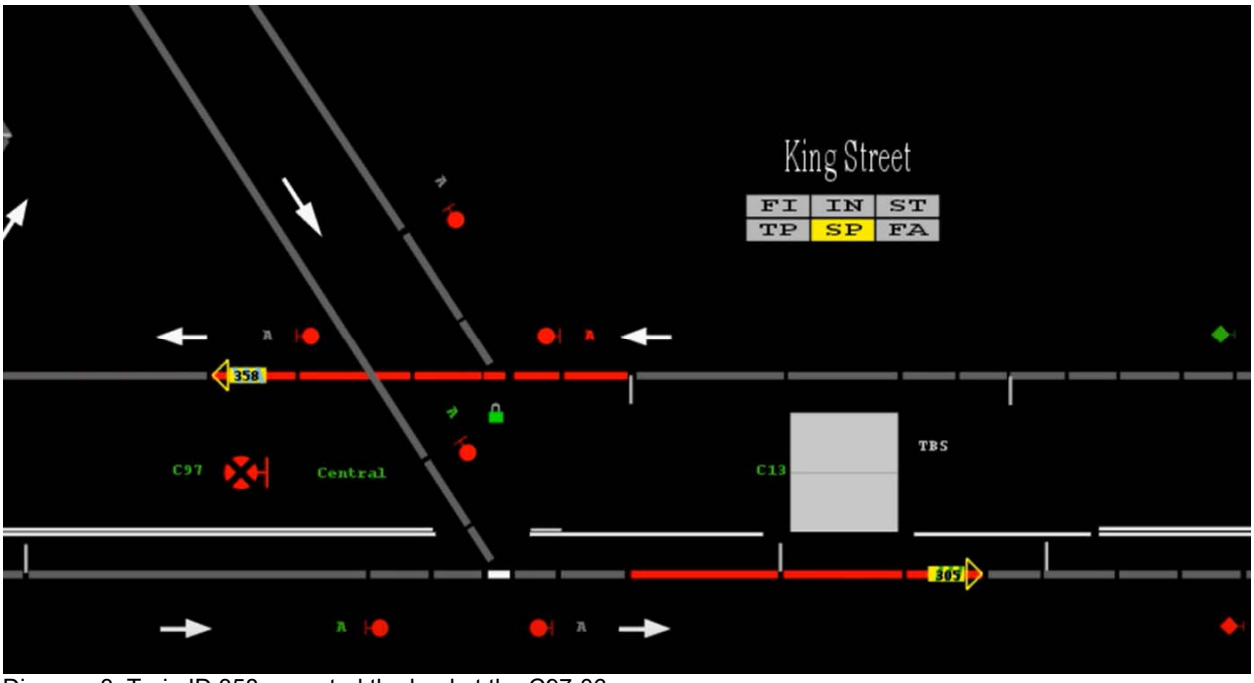


Diagram 3: Train ID 358 accepted the lead at the C97-06.

Interview Findings

Based on the investigation launched into the incident, SAFE conducted two virtual interviews, including the investigation team and relevant Metro management. These interviews were conducted one week after the event and identified the following key findings.

The Radio RTC assumed duties as the Button RTC and maintained duties as the Radio RTC simultaneously. The Radio RTC was then responsible for all duties. The Radio RTC assumed duties due to the initial Button RTC attending a safety briefing.

Findings

- Radio RTC assumed duties as the Button RTC.
- Radio RTC did not provide radio communications 100% repeat back to Train ID 358 to verify the destination.
- The Train Operator did verify the correct alignment prior to the movement of their train.
- The Train Operator did not verify that C97-06 signal was flashing, indicating a diverging route and accepted the incorrect lead.
- The Train Operator did not observe the platform sign that notifies Train Operators of their destination.

Weather

At the time of the incident, NOAA recorded the temperature at 24° F and clear. SAFE has concluded that weather was not a contributing factor in this incident (Weather source: NOAA – Location: Alexandria, VA.)

Human Factors

Fatigue

The incident data was evaluated, and no evidence of fatigue was detected from the available data. We evaluated conditions at the time of the incident to distinguish whether evidence of fatigue was present. No sign of fatigue was indicated by the available data. No indications of fatigue were evident from the data. The employees reported feeling fully alert at the time of the incident. The employees reported experiencing no symptoms of fatigue in the time leading up to the incident.

Since fatigue evidence and risk factors were not present, the biomathematical fatigue modeling application (SAFTE-FAST Web SFC) was not applied.

Post-Incident Toxicology Testing

The Train Operator and Radio RTC involved in this event were not removed from service; there was no Post-incident Toxicology Test performed.

Probable Cause Statement

The probable cause of this Improper Movement of any Rail Vehicle on the Mainline or in a Yard, including Over Improperly Aligned Switch(es) event was due to human error on the part of the Train Operator and the Radio RTC. The Radio RTC and Train Operator failed to follow MSRPH General Rule 1.79. The Radio RTC thought the Train Operator stated their destination was Huntington Station and not Franconia Springfield but never gave the Train Operator a 100 percent word for word repeat back to verify the radio transmission. The Train Operator should not have taken any action since there was not a 100 percent repeat back from the Radio RTC. Also, the Train Operator failed to follow MSRPH Section 3 Operating Rule 3.76. The Train Operator failed to identify that the switch was properly aligned in the direction that they requested and verify the flashing lunar.

Recommendations/Corrective Actions

The following are the recommendations and corrective actions identified as a result of this investigation. These recommendations and corrective actions are tracked using WMATA's Safety Measurement System Incidents/Accidents (SMS I/A) Module and are verified by SAFE upon completion. The responsible department is identified in the corrective action code. Refer to the SMS I/A module for additional information.

Corrective Action Code	Description
91959_SAFECAPS_RTRA_001	Train Operator should undergo remedial training emphasizing procedures during the verification process after receiving a lunar alignment.
91959_SAFECAPS_ROCC_002	Radio RTC should undergo remedial training emphasizing radio communication procedures.
91959_SAFECAPS_SAFE_003	SAFE should work with ATC to explore alternative options for line junction signals to clearly indicate the intended route for the train operators.
91959_SAFECAPS_ROCC_004	ROCC should provide for contingencies if one RTC becomes overburdened can cannot maintain their responsibilities, while maintaining the separate RTC roles.

Appendix A - Interview Summaries

Rail Transportation (RTRA)

Train Operator

The Train Operator is a WMATA employee with one year of experience as a Train Operator and two years of service as a Bus Operator.

Based on the SAFE interview, the Train Operator reported that after servicing King Street Station, they were holding at the C97-06 signal red and contacted the Radio RTC for a lunar. The Train Operator stated that they notified the Radio RTC that their destination was Franconia-Springfield Station and was told to standby for their lunar. The Train Operator stated that when they saw the lunar, they accepted the lead; as the Train Operator proceeded the train, they reported that they realized they were headed in the direction of Eisenhower Avenue Station. The Train Operator stated that they stopped their train and notified the Radio RTC that they were heading in the direction of Huntington Station. The Train Operator reported that the Radio RTC stated they thought they reported a destination of Huntington Station. The Train Operator reported that they reiterated that their destination was Franconia-Springfield Station. The Train Operator then stated that the Radio RTC instructed them to make announcements to the customers and continue to Eisenhower Avenue Station and service the station. The Train Operator stated that they continued in service to Huntington Station before departing back to Franconia-Springfield Station. The Train Operator stated that when they received the lunar, they did not verify that it was flashing and accepted the lead; the Train Operator also stated that they did not observe the platform sign that notifies the operator in the direction they are going in. The Train Operator attributes the incident to an oversight on their part by not verifying a flashing lunar and rail alignment prior to moving their train.

Rail Operations Control Center (ROCC)

Radio Rail Traffic Controller

The Radio RTC is a WMATA employee with three years of experience as a Train Operator, three years of experience as an RTC, and 15 years of service in various positions as Bus Operator, Train Operator, and Interlocking Operator.

Based on the SAFE interview, the Radio RTC assumed duties as the Button RTC and maintained duties as the Radio RTC simultaneously. The Radio RTC was then responsible for all duties. The Radio RTC assumed duties due to the initial Button RTC attending a safety briefing. While on the radio, the Radio RTC stated that Train ID 358 contacted them and reported that they were holding at the C97-06 signal; the Radio RTC stated that they thought the Train Operator reported that their destination was Huntington Station and instructed the Train Operator to standby for their lunar. The Radio RTC reported that they did not issue a repeat back to the operator because they were sure they heard the Train Operator state that their destination was Huntington Station. The Radio RTC stated that they manually set the lunar in the direction of Huntington Station; the Radio RTC then stated that the Train Operator reported that they had

to Huntington Station after they had accepted the lead. The Radio RTC verified the destination of the Train Operator, which they thought was Huntington Station and realized the train had a destination code for Franconia-Springfield Station. The Radio RTC instructed the Train Operator to continue to Eisenhower Avenue Station. The Radio RTC reported that they instructed a revenue train inbound to Eisenhower Avenue Station, Track 1, to allow customers to exit Train ID 358 on Track 2.