



## **WMSC Commissioner Brief: W-0086 – Improper Vehicle Movement – Red Line – December 30, 2020**

*Prepared for Washington Metrorail Safety Commission meeting on June 29, 2021*

### **Safety event summary:**

At 5:20 a.m. on Wednesday, December 30, 2020, a Rail Operations Control Center (ROCC) controller allowed non-revenue Train 115 moving toward Glenmont Station to proceed toward a Roadway Maintenance Machine (RMM) that was waiting to enter the Brentwood Rail Yard. The RMM, Prime Mover 46, had been given an absolute block which means that no other vehicles are supposed to be in that segment of track. This is intended to protect against collisions.

PM-46 had originally been heading toward Glenmont Yard, however at 5 a.m., when the unit was at Van Ness Station, the ROCC directed the unit's equipment operator to instead exit mainline tracks at Brentwood Yard to limit impacts on revenue service as the system opened to riders for the day. PM-46 arrived at the Brentwood Yard entrance at approximately 5:20 a.m. The Equipment Operator contacted the Brentwood Yard Interlocking Operator to request permission to enter the yard, and the Interlocking Operator instructed the Equipment Operator to standby while a train was dispatched from the yard.

At 5:25 a.m., the ROCC button controller who had just come on duty at 5:17 a.m. utilized the Advanced Information Management (AIM) System to remove the prohibit exit (a protective measure) at signal B03-04 and set a lunar (proceed) signal at B03-02 to allow Train 115 to enter NoMa-Gallaudet U station while PM-46 was still stopped just beyond the station waiting to enter Brentwood Yard. The ROCC radio controller then gave Train 115 permission to enter the platform at NoMa-Gallaudet U Station.

The vehicles came within approximately 1,200 feet of each other without required safety protections in place.

Another ROCC controller observed this safety event from a different console and notified the ROCC Superintendent.

The controller who had removed the protective measures was removed from service for post-event testing.

At 5:26 a.m., after Train 115 improperly entered into the block held by PM-46, the Interlocking Operator granted PM-46 an absolute block into the yard.

### **Probable Cause:**

The probable cause of this event was Metrorail's lack of effective safety culture including management's focus on prioritizing revenue service over other responsibilities in the ROCC including responsibilities related to safety rules and procedures. A lack of shared information between the ROCC and the Yard Tower, insufficient handoff, and a lack of effective processes contributed to this event.

### **Corrective Actions:**

Metrorail retrained the rail traffic controller involved in this event.

### **WMSC staff observations:**

While not listed as a specific corrective action related to this event, Metrorail has since begun to roll out its required Safety Management System (SMS) specified in its Public Transportation Agency Safety Plan (PTASP) in the ROCC



since this event occurred. SMS includes an effective safety culture where everyone from frontline workers through supervisors and managers to the top of the organization share in a commitment to safety and continuous improvement. This rollout and Metrorail's other required actions tied to the WMSC's ROCC's findings are intended to improve these areas where Metrorail has historically had deficiencies.

This event highlights the importance of coordination and understanding between the Interlocking Operators in Yard Towers and ROCC controllers to ensure shared situational awareness in areas of shared control.

**Staff recommendation:** Adopt final report.



Washington Metro Area Transit Authority

Department of Safety and Environmental  
Management (SAFE)

**FINAL REPORT OF INVESTIGATION A&I E20513**

<b>Date of Event:</b>	12/30/2020
<b>Type of Event:</b>	Improper Movement of any Rail Vehicle on the Mainline or in a Yard, Including Over Improperly Aligned Switch(es)
<b>Incident Time:</b>	05:30 hrs.
<b>Location:</b>	Union Station, Track 1
<b>Time and How received by SAFE:</b>	07:43 hrs. SAFE On-call Phone
<b>WMSC Notification Time:</b>	09:21 hrs.
<b>Responding Safety Officers:</b>	WMATA SAFE: No WMSC: No Other: N/A
<b>Rail Vehicle:</b>	Train ID 115 and Prime Mover
<b>Injuries:</b>	None
<b>Damage:</b>	None
<b>Emergency Responders:</b>	N/A
<b>SMS I/A Number</b>	20201230#91088

Union Station – Improper Movement of any Rail Vehicle  
on the Mainline or in a Yard, including Over Improperly Aligned Switch(es)

December 30, 2020

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## Abbreviations and Acronyms

<b>AIMS</b>	Advanced Information Management System
<b>ARS</b>	Audio Recording Service
<b>MSRPH</b>	Metrorail Safety Rules and Procedures Handbook
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>PM</b>	Prime Mover
<b>ROCC</b>	Rail Operations Control Center
<b>RTC</b>	Rail Traffic Controller
<b>SAFE</b>	Department of Safety and Environmental Management
<b>SMS I/A</b>	Safety Measurement System Incidents/Accidents

## **Executive Summary**

On Wednesday, December 30, 2020, at approximately 05:00 hrs., the Radio Rail Traffic Controller (RTC) instructed Prime Mover (PM) 46 to continue on from Van Ness Station on an absolute block with a final destination to Brentwood Yard. At approximately 05:20 hrs., PM-46 arrived at B99-06 signal awaiting to enter Brentwood Yard. The overnight Button RTC provided protection for PM-46, which included a red signal at B03-02 signal, and a prohibit exit at B03-04 signal. At 05:17 hrs, the dayshift Button RTC relieved the overnight Button RTC and was given a turnover. At approximately 05:25 hrs., Non-revenue Train ID 115 destined for Glenmont Station was approaching NoMa-Gallaudet U Station while PM-46 continued to stand by at B99-06 signal awaiting entrance into the Brentwood Yard. Further contributors include time management within the ROCC. The Button RTC accepted the turnover from the overnight Buttons RTC and did not utilize their login to access AIMS. The dayshift Button RTC removed the prohibited exit from the B03-04 signal and set a lunar at B03-02 signal to allow Train ID 115 access to NoMa-Gallaudet U Station.

ROCC management removed the Button RTC from service and transported them for post-incident testing. Based on post-incident toxicology testing, SAFE determined the employee complied with the Drug and Alcohol Policy and Testing Program 7.7.3/6. No injuries resulted from this incident.

The probable cause of the Improper Train Movement event at Union Station on December 30, 2020, was lack of adherence to MSRPH written rules and procedures. The Button RTC removed the prohibit exit and provided a lunar to Train ID 115, subsequently resulting in Train ID 115 entering NoMa-Gallaudet U Station. The Button RTC assumed that PM-46 would have accessed the rail yard by the time Train ID 115 entered the NoMa-Gallaudet U Station platform.

Further contributing to this incident, "the Buttons RTC wanted to be proactive in the train movement based on stories they heard about prior practices of the importance of revenue service and not having revenue trains holding for an extended period."

The dayshift Button RTC was not in compliance with Metrorail Safety Rules and Procedures Handbook (MSRPH) Rule section 15.5.8.2, which states: *The ROCC Supervisor shall use interlocking signals adjacent interlocking locations or stations in the direction of travel as the block's limits. If an interlocking is located between the two limits of the absolute block and the interlocking signal aspect indicates "Stop," the train must stop prior to the signal and call ROCC before continuing to its destination;* And Rule section 15. 5.8.3, which states: *The absolute block shall be moved progressively forward as the train ahead clears the limits of the intermediate interlocking location or station to be used as an absolute block limit. This shall continue until the Class 2 Vehicle arrives at the work location, signal, or yard destination.*

An analysis of data collected from systems of record and the results of interviews with staff, human factors failures occurred in this incident.

## **Incident Site**

Union Station, Track 1

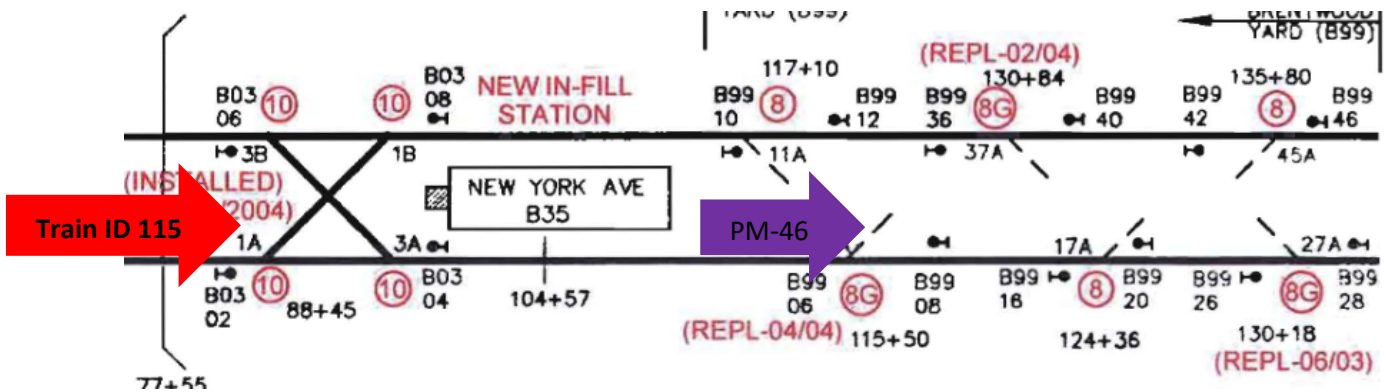
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Incident Date: 12/30/2020 Time: 05:30 hours.  
Final Report – Improper movement of any  
rail vehicle on the mainline or in a yard, including over  
improperly aligned switch(es)  
E20513

Drafted By: SAFE 703 – 02/27/2021
Reviewed By: SAFE 704 – 03/01/2021
Approved By: SAFE 70 – 03/01/2021

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## 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 notification of the Improper Movement of any Rail Vehicle on the Mainline or in a Yard, Including Over Improperly Aligned Switch(es) at Union Station on December 30, 2020, 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. SAFE will interview the following individuals:
  - Two Button Rail Traffic Controllers
  
- 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
  - Two Button Rail Traffic Controllers' Certifications
  - The Two Button Rail Traffic Controllers' 30-Day work history
  - Metrorail Safety Rules and Procedures Handbook (MSRPH)
  - National Oceanic and Atmospheric Administration (NOAA) data
  - Safety Measurement System Incidents/Accidents (SMS)
  
- System Data Recording Review – Collection of information contained in Metro Data Recording Systems. This data includes:
  - Audio Recording System (ARS) playback (Radio and Phone Communications)
  - Advance Information Management System (AIMS).

## **Investigation**

On Wednesday, December 30, 2020, PM-46 was traversing mainline tracks with a final destination of Glenmont Yard. At approximately 05:00 hrs., the Radio RTC instructed PM-46 to continue on from Van Ness Station on an absolute block with a final destination to Brentwood Yard due to revenue trains entering the mainline. At approximately 05:20 hrs., PM-46 arrived at B99-06 signal awaiting to enter the Brentwood Yard. The overnight button RTC provided protection for PM-46, which included a red signal at the B03-02 signal and a prohibit exit at the B03-04 signal. At 05:17 hrs, the dayshift Button RTC relieved the overnight Button RTC and was given a turnover.

At approximately 05:25 hrs., Non-revenue Train ID 115 destined for Glenmont was approaching NoMa-Gallaudet U Station while PM-46 continued to stand by B99-06 signal awaiting entrance into the Brentwood Yard. The Button RTC removed the prohibited exit from the B03-04 signal and set a lunar at B03-02 signal to allow Train ID 115 access to NoMa-Gallaudet U Station. The Rail Operations Control Center (ROCC) Superintendent was notified of the incident by another RTC who observed the incident from another console. Upon investigation utilizing the Advanced Information Management System (AIMS), the ROCC Superintendent confirmed the rail vehicle's improper movement.



Subsequently, the Button RTC was removed from service and transported for post-incident testing.

Based on SAFE's investigative findings, SAFE determined the Button RTC set the lunar at Union Station; B03-02 signal to allow Train ID 115 to proceed to NoMa-Gallaudet U Station. This action allowed Train ID 115 Train Operator to proceed behind PM-46 without protection. PM-46 was holding on Track 1 B99-06 signal waiting to enter Brentwood Yard. Also, the overnight Button RTC established a prohibit exit at Union Station B03-04 signal to ensure the dayshift Buttons RTC could not set a complete lead, which provides additional protection to the PM Unit.

The Button RTC was not in compliance with several Metrorail Safety Rules & Procedures Handbook (MSRPH) Rule section 15.5.8.2, which states: *The ROCC Supervisor shall use interlocking signals adjacent interlocking locations or stations in the direction of travel as the block's limits. If an interlocking is located between the two limits of the absolute block and the interlocking signal aspect indicates "Stop," the train must stop prior to the signal and call ROCC before continuing to its destination.* And Rule section 15. 5.8.3, which states: *The absolute block shall be moved progressively forward as the train ahead clears the limits of the intermediate interlocking location or station to be used as an absolute block limit. This action shall continue until the Class 2 Vehicle arrives at the work location, signal, or yard destination.*

### **Chronological Audio Recording System (ARS) Timeline**

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

Time	Description
05:00:15 hrs.	<u>Radio RTC</u> : Notified PM-46 they will be given an absolute block to Brentwood Yard due to revenue trains entering the mainline. <u>Overnight Button RTC</u> : Provided a lunar at B03-02 signal and a prohibit exit at B03-04 signal for additional protection for PM-46. [Radio] and [AIMS]
05:17:12 hrs.	Overnight Button RTC was relieved by the dayshift RTC and gave them a turnover. [Ambient]
05:20:20 hrs.	PM-46 arrived at B99-06 signal waiting to enter Brentwood Yard. [AIMS]
05:20:51 hrs.	<u>PM-46</u> : Contacted the Interlocking Operator requesting permission to enter the rail yard due to ROCC being unable to allow them to go to their original destination at Glenmont Yard. [Ambient]
05:21:11 hrs.	<u>Interlocking Operator</u> : Instructed PM-46 to standby while they dispatch a train from the rail yard. [Ambient]
05:26:10 hrs.	<u>Interlocking Operator</u> : Provided PM-46 a lunar at B99-06 signal and granted an absolute block to B99-48 signal.
05:25:50 hrs.	<u>Dayshift Button RTC</u> : Removed the prohibit exit at B03-04 signal and set a lunar at B03-02 signal to allow Train ID 115 to enter NoMa-Gallaudet U Station; PM-46 was still waiting to enter the Brentwood Yard. [AIMS]
05:25:50 hrs.	<u>Radio RTC</u> : Instructed Train ID 115 Operator to hold on the platform at NoMa-Gallaudet U Station. <u>Train 115: Operator</u> : Requested permission for a permissive block to the 8-car marker Track 1. <u>Radio RTC</u> : Provided Train ID 115 Operator a permissive block to the 8-car marker and instructed the Train Operator to hold on the platform. [Radio]

\*\*Note: Times above may vary from other system's timelines based on clock settings.

Investigation included ARS phone recordings from OPS 1 and ambient recordings from the Rail Operations Control Center.

## Advanced Information Management System (AIMS)

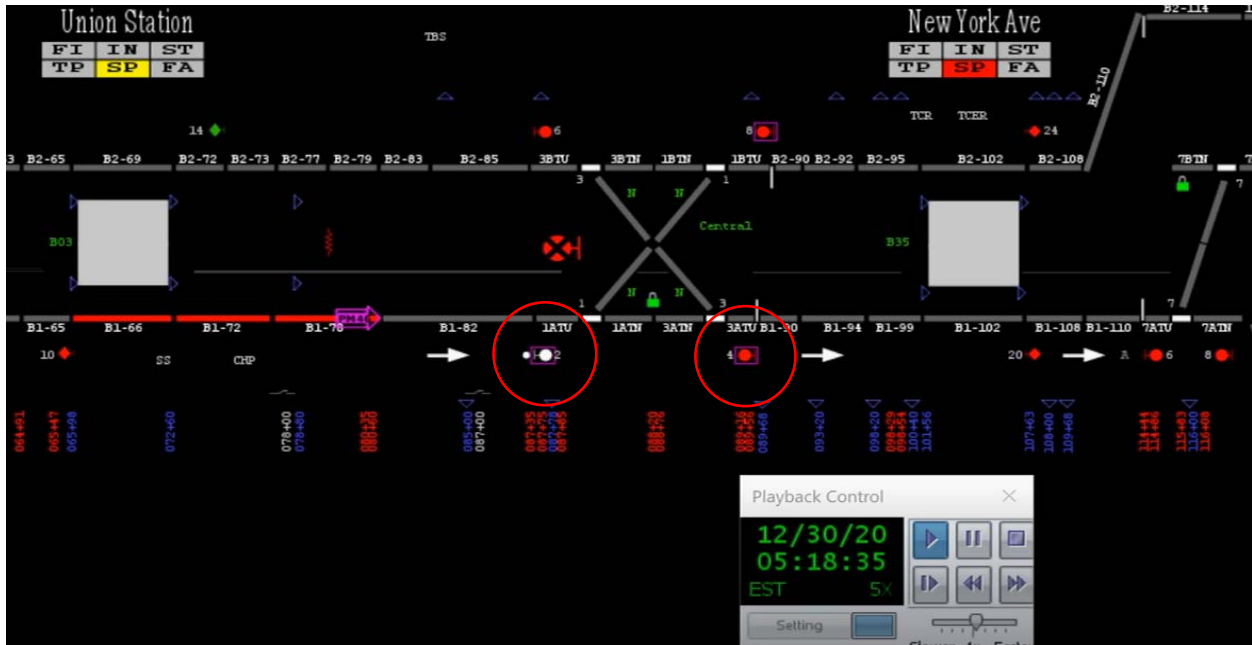


Figure 1: AIMS indication showing PM-46 with a Lunar at B03-02 signal and a prohibit exit at B03-04 signal.

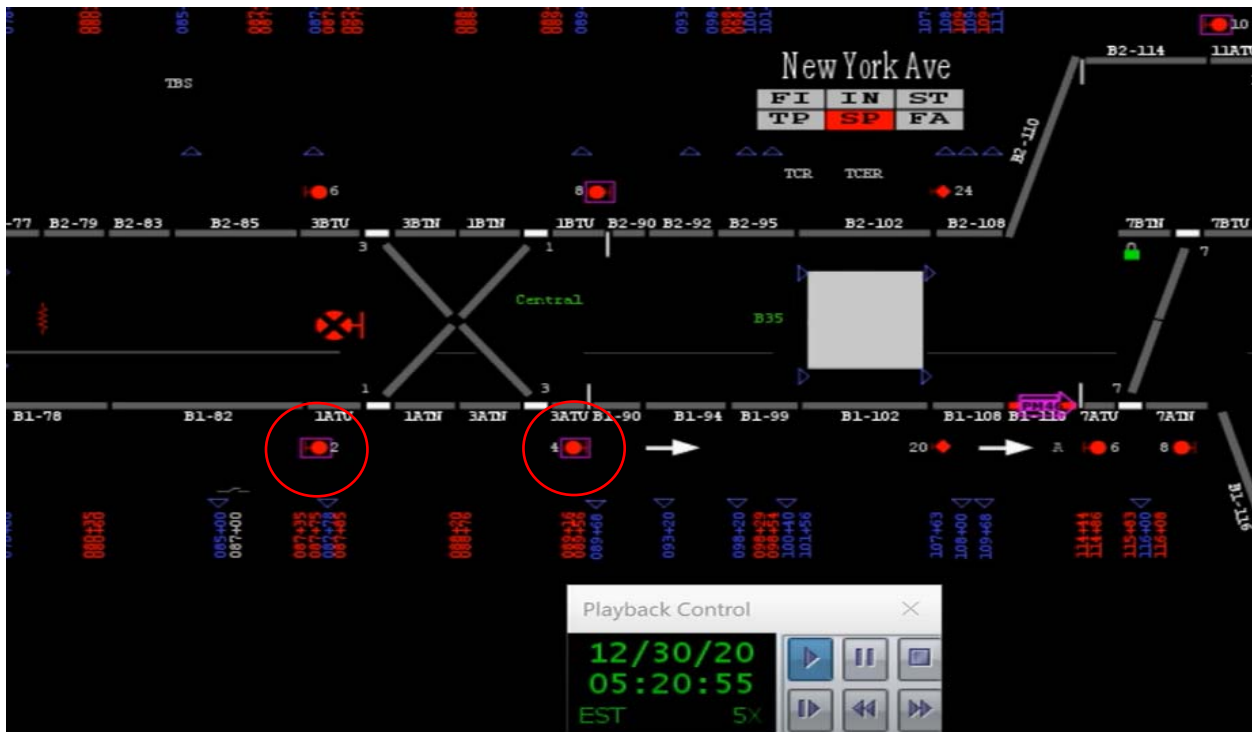


Figure 2: AIMS indication showing PM-46 standing by B99-06 signal waiting to enter the Brentwood Yard. A red aspect is provided at the B03-02 signal and a prohibit exit at the B03-04 signal.

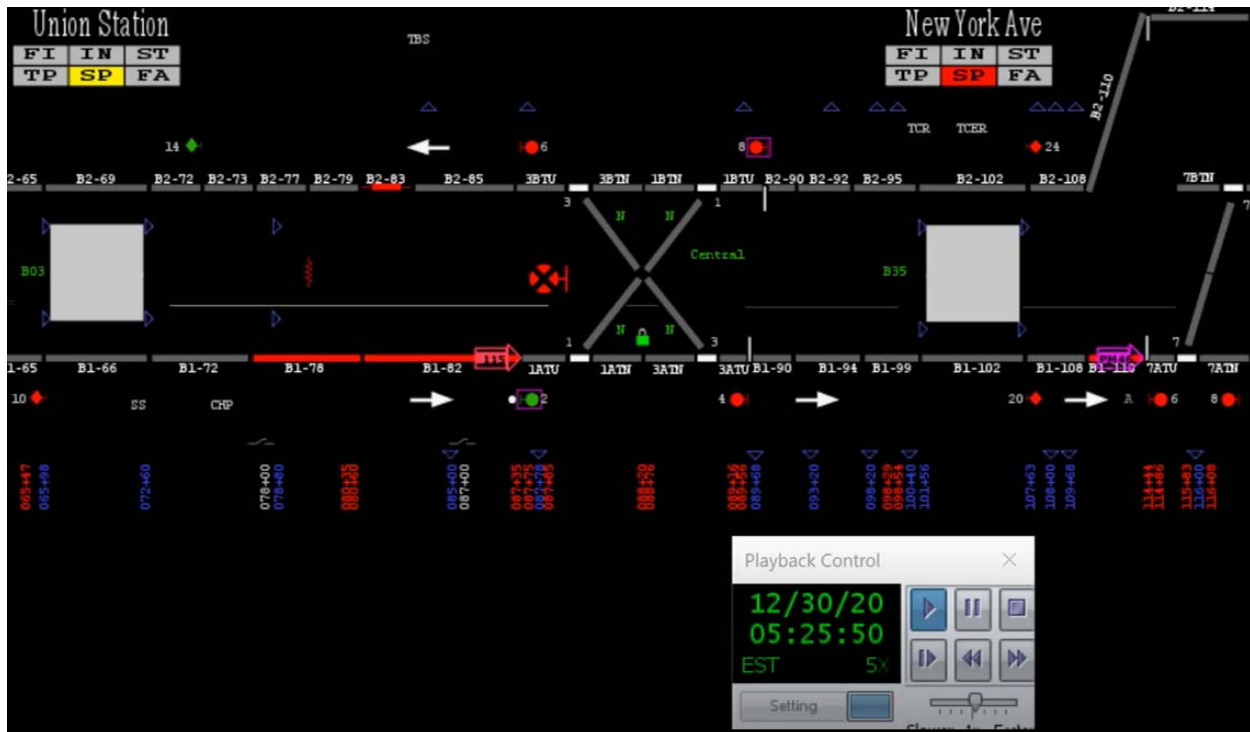


Figure 3: AIMS indication showing that the Button RTC removed the prohibit exit on B03-04 signal to allow Train ID 115 access to NoMa-Gallaudet U Station.

## Interview Findings

Based on the investigation launched into the Improper Movement of any Rail Vehicle on the Mainline or in a Yard, Including Over Improperly Aligned Switch(es) at Union Station event, SAFE conducted two interviews via Microsoft Teams, which included the investigation team and relevant Metro management. These interviews were conducted over a two-week span after the event and identified the following key findings associated with this event, as follows:

The overnight Button RTC reported they provided a single lunar at B03-02 signal to ensure that when PM-46 passed the B03-02 signal, the signal would drop red; they also provided a prohibit exit at the B03-04 signal. The overnight Button RTC reported they were relieved around 05:30 hours. They stated they provided the dayshift Button RTC with a turnover that included PM-46 and their destination to Brentwood yard during their turnover process. The overnight Button RTC stated that after the turnover, they departed ROCC and did not stay at the console to watch the dayshift Button RTC log into their AIM.

The dayshift Button RTC reported they accepted the turnover; however, they did not utilize their login to access AIMS. The Button RTC stated they had a lapse in judgment due to keeping the train moving to their destination of Glenmont Station for an on-time dispatch. The Button RTC removed the prohibit exit and provided a lunar to Train ID 115. The Button RTC reported that it assumed that PM-46 would have accessed the rail yard by the time Train ID 115 entered the NoMa-Gallaudet U Station platform. The Button RTC stated that at no time did they feel rushed by management. They wanted to be proactive in the train movement based on stories they heard about prior practices of the importance of revenue service and having revenue trains dispatched on time from the terminals.

## **Findings**

- The AIMS indication showed PM-46 with a Lunar at B03-02 signal, and a prohibit exit at B03-04 signal.
- The AIMS indication showed the Button RTC removed the prohibit exit on the B03-04 signal to allow Train ID 115 access to NoMa-Gallaudet U Station.
- The AIMS indication showed PM-46 standing by B99-06 signal waiting to enter the Brentwood Yard. A red aspect is provided at the B03-02 signal and a prohibit exit at the B03-04 signal.
- The dayshift Button RTC was not in compliance with MSRPH Rule section 15.5.8.2, which states: *The ROCC Supervisor shall use interlocking signals adjacent interlocking locations or stations in the direction of travel as the block's limits. If an interlocking is located between the two limits of the absolute block and the interlocking signal aspect indicates "Stop," the train must stop prior to the signal and call ROCC before continuing to its destination;* and Rule section 15. 5.8.3, which states: *The absolute block shall be moved progressively forward as the train ahead clears the limits of the intermediate interlocking location or station to be used as an absolute block limit. This shall continue until the Class 2 Vehicle arrives at the work location, signal, or yard destination.*

## **Weather**

At the time of the incident, NOAA recorded the temperature at 37° F and clear. SAFE has concluded that weather was not a contributing factor in this incident (Weather source: NOAA) – Location: Washington, DC.)

## **Human Factors**

### **Fatigue**

The employee's 30-day work schedule leading up to the incident was compliant with WMATA's Policy/Instruction 10.6/1 Hours of Service Limitations for Prevention of Fatigue. It did not present a significant risk of impairment due to fatigue. Based on employee interviews, there were no personal factors present that would have increased the likelihood of fatigue-related impairment. The employees had no history of sleep issues to report.

### **Post-Incident Toxicological Testing**

After reviewing the Button RTC's post-incident testing results, SAFE determined the employee complied with the Drug and Alcohol Policy and Testing Program 7.7.3/6.

## **Probable Cause Statement**

The probable cause of the Improper Train Movement event at Union Station on December 30, 2020, was lack of adherence to MSRPH written rules and procedures. Further contributors were noted to include on-time performance culture within the ROCC. The Button RTC accepted the turnover from the overnight Buttons RTC and did not utilize their login to access AIMS. The Button RTC removed the prohibit exit and provided a lunar to Train ID 115, subsequently resulting in Train ID 115 entering NoMa-Gallaudet U Station while PM-46 held at B99-06 signal. The Button RTC assumed that PM-46 would have accessed the rail yard by the time Train ID 115 entered the NoMa-Gallaudet U Station platform.

Further contributing to this incident, "the Buttons RTC wanted to be proactive in the train movement based on stories they heard about prior practices of the importance of revenue service and not having revenue trains holding for an extended period."

The dayshift Button RTC was not in compliance with MSRPH Rule section 15.5.8.2, which states: *The ROCC Supervisor shall use interlocking signals adjacent interlocking locations or stations in the direction of travel as the block's limits. If an interlocking is located between the two limits of the absolute block and the interlocking signal aspect indicates "Stop," the train must stop prior to the signal and call ROCC before continuing to its destination.* And Rule section 15. 5.8.3, which states: *The absolute block shall be moved progressively forward as the train ahead clears the limits of the intermediate interlocking location or station to be used as an absolute block limit. This shall continue until the Class 2 Vehicle arrives at the work location, signal, or yard destination.*

## **SAFE Recommendations**

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.

<b>Corrective Action Code</b>	<b>Description</b>
90453_SAFECAPS_ROCC_001	RTC should undergo re-training emphasizing Train/Unit movement procedures.

## Appendices

### Appendix A – Interview Summaries

#### Button Rail Traffic Controller (Dayshift)

This employee is a WMATA Rail Traffic Controller with two years of service: one year as a Rail Traffic Controller and one year of service as a Rail Traffic Controller Student. The RTC's last certification was in June 2020, and has no history of sleep issues to report.

Based on the SAFE interview, the Button RTC reported that when they arrived on duty, they had prior knowledge they were to report to the Button console on OPS 1. The Button RTC stated they received their turnover from the overnight Button RTC and during their turnover, the overnight Button RTC stated that PM-46 would be going to Brentwood Yard for storage. The Button RTC reported they accepted the turnover; however, they did not utilize their login to access AIMS. The Button RTC said when they assumed the console, they observed Train ID 115 in approach to NoMa-Gallaudet U Station. The Button RTC stated they had a lapse in judgment due to them wanting to keep the train moving to their final destination of Glenmont Station. The Button RTC removed the prohibit exit and provided a lunar to Train ID 115. The Button RTC reported that they assumed that PM-46 would have accessed the rail yard by the time Train ID 115 entered the NoMa-Gallaudet U Station platform. The Button RTC reported that they were approached by the ROCC Superintendent and removed from service. The Button RTC stated that at no time did they feel rushed by management. They wanted to be proactive in the train movement based on stories they heard about prior practices of the importance of revenue service and not having revenue trains holding for an extended period.

#### Button Rail Traffic Controller (Overnight)

This employee is a WMATA Rail Traffic Controller with three years of service: one year as a Student Rail Traffic Controller and two years of service as a Rail Traffic Controller. The RTC's last certification was in September 2020, and has no history of sleep issues to report.

The overnight Button RTC stated PM-46 had an original Glenmont rail yard destination based on the SAFE interview. However, due to their yard destination distance [Glenmont] and revenue trains on mainline. The Radio RTC instructed PM-46 to store their Unit in the Brentwood yard. The overnight Button RTC reported they provided a single lunar at B03-02 signal to ensure that when PM-46 passed the B03-02 signal, the signal would drop red; they also provided a prohibit exit at the B03-04 signal. The overnight Button RTC reported they were relieved around 05:30 hours. They stated they provided the on-coming Button RTC with a turnover that included PM-46 and their destination to Brentwood yard during their turnover process. The overnight Button RTC stated that after the turnover, they departed ROCC and did not stay at the console to watch the dayshift Button RTC log into their AIM.