750 First St. NE • Ste. 900 • Washington, D.C. 20002

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WMSC Commissioner Brief: W-0064 – Red Signal Overrun – Greenbelt Yard – September 15, 2020

Prepared for Washington Metrorail Safety Commission meeting on March 2, 2021

Safety event summary:

A Train Operator incorrectly repeated back instructions from an Interlocking Operator in Greenbelt Yard on September 15, 2020, and then followed the incorrect instructions rather than the instructions actually provided by the Interlocking Operator, which led to the Train Operator operating a four-car 7000-series consist past a red signal, trailing a switch.

The Train Operator repeated back a signal that did not exist, but that numerically would have been beyond the signal directed by the Interlocking Operator. The Train Operator then moved the train beyond the red signal where the Interlocking Operator had instructed the train to stop.

The Interlocking Operator attempted to correct the incorrect repeat back, but the Train Operator did not acknowledge the Interlocking Operator's correction.

The train was moving approximately 7 mph when it passed the red signal. The Train Operator stopped the consist approximately 565 feet past the red signal after trailing a switch, but did not report to the Interlocking Operator that they had passed a red signal or that they had trailed a switch until the Interlocking Operator contacted them due to a red signal alarm in the tower.

This Train Operator had a prior safety event at Alexandria Yard in March 2018 where they overran a red signal due to incorrect radio repeat back communication.

Interviews identified known radio communications issues in the Greenbelt Yard.

Probable Cause:

The probable cause of this red signal overrun is ongoing, unaddressed radio communications issues, the failure to ensure that all radio protocols, such as repeat backs, are properly followed by all Metrorail personnel, and a lack of territory familiarization.

Corrective Actions:

Rail Transportation developed a Lessons Learned document and will conduct radio communication compliance checks in rail yards.

The Train Operator was retrained on radio communication and received yard familiarization training.

WMSC staff observations:

Based on this and other events, the WMSC has increased monitoring of rail yard operations to identify areas of compliance and areas for safety improvement.

Interviews identified known radio communications issues in the Greenbelt Yard that Metrorail has not addressed. As the WMSC has identified in findings related to zero speed commands and the ROCC Audit, repeated failure to address issues undermines a positive safety culture. Metrorail must identify, encourage reporting of and address issues to promote safety.

The WMSC recently inspected the Greenbelt Yard and identified continuing radio communications challenges.

The WMSC investigation identified that the incorrectly repeated back signal does not exist, which suggests that Metrorail must improve familiarization training for personnel.

WMATA has an open Corrective Action Plan, FTA-RED-16-004-A, regarding proper radio communications.

Staff recommendation: Adopt final report.

Washington Metro Area Transit Authority

Department of Safety and Environmental Management (SAFE)

FINAL REPORT OF INVESTIGATION A&I E20350

Date of Event:	9/15/2020
Type of Event:	Red Signal Overrun
Incident Time:	21:53 hrs.
Location:	Greenbelt Yard, Track 15
Time and How received by SAFE:	22:06 hrs., On-Call Phone
WMSC Notification Time:	23:55 hrs.
Rail Vehicle:	L7272.7273-7065.7064-7216-7217.7141-7140T
Injuries:	None
Damage:	None

Greenbelt Yard – Red Signal Overrun

September 15, 2020

TABLE OF CONTENTS

Abbreviations and Acronyms

ARS	Audio Recording System
ATC	Automatic Train Control
CENV	Vehicle Program Services
CMNT	Office of Car Maintenance
MSRPH	Metrorail Safety Rules and Procedures Handbook
NOAA	National Oceanic Atmospheric Administration
NVR	Network Video Recording
ROCC	Rail Operations Control Center
RTRA	Office of Rail Transportation
SAFE	Department of Safety and Environmental Management
SMNT	Office of Systems Maintenance
TRST	Office of Track and Structures
WMATA	Washington Metropolitan Area Transit Authority

Executive Summary

On Tuesday, September 15, 2020, at approximately 21:50 hrs., a Greenbelt Yard Interlocking Operator assigned a Greenbelt Yard Train Operator to uncouple car 7064 from 7216 [L7272.7273-7065.7064-7216-7217.7141-7140T] and move the four (4) north (open end of the track) cars on Track 15. The Interlocking Operator gave the Train Operator a lead from E99-130 [lunar signal] to E99-160 [not beyond] no closer than ten (10) feet. The Interlocking Operator instructed the Train operator to reverse ends [change the direction of travel] behind the E99-150 signal to move train 7064-7065 into the Office of Car Maintenance (CMNT) Service and Inspection Shop for Preventative Maintenance processes.

Based on Audio Recording System (ARS) playback [radio and ambient], the Train Operator repeated back incorrect instructions. The Train Operator stated, "Signal E99-130, proceed through Signal E99-160, clear Signal E99-170 and reverse." The Interlocking Operator corrected the Train Operator and said, "Signal E99-160 then Signal E99-150." Based on ARS Ambient and radio playback, the Train Operator did not respond and proceeded without receiving confirmation. Based on Network Video Recording (NVR) System forward-facing playback, the Train Operator then proceeded to pass E99-130 lunar on Track 15, crossed over from Track 15 towards the Ladder Track, and passed E99-150 lunar signal. As the train approached E99-160 displaying a red signal aspect, the Train Operator proceeded to pass the signal, traversed switch 155 aligned in the normal position for a straight-through move for trains moving from the adjacent Track and subsequently trailing the switch.

The Interlocking Operator observed an indication on the interlocking board reflecting that the train had passed E99-160 signal red and immediately contacted the Train Operator to inform them they had passed E99-160 signal red; the Train Operator responded asking if they are clear. Switch 155 showed out of correspondence after this move.

Automatic Train Control (ATC) and the Office Track and Structures (TRST) personnel responded to Greenbelt Yard for a reported trailed switch condition on Switch #155. ATC inspected the switch and found no physical damage; ATC conducted Obstruction Tests with no anomalies identified, and at approximately 02:35 hrs. ATC returned Switch #155 to service.

Upon report of the red signal overrun, SAFE conducted an analysis of data collected, reviewed submitted documentation, and informal interviews with staff. Based on a review of the MSRPH, Train Operator was not in compliance with the following Operating Rules:

(1) Section 3 – Operating Rules: 3.67 – *Rail vehicles shall not be operated past or closer than a point of 10 feet in the approach of an interlocking signal or lamp displaying a red aspect, a red flag, or a dark interlocking signal unless authorized by Rail Operations Control Center (ROCC) or the Interlocking Operator and the move is consistent with customer safety as specified in Rule 3.1 ROCC or Interlocking Operator shall give permission to pass a red signal after the switches have been blocked or clamped for the required move per SOP #35. Rail vehicles shall be allowed to move on red signals with permission of ROCC and per rules 3.22, 3.29, and 3.79 of the MSRPH without clamping switches provided that the following three (3) conditions are met:*

a. The signal is not associated with pocket Track or turnout switch

b. Verbal communication that the signal is lunar and the switches are normal on the opposing Track.

c. The ROCC Assistant Superintendent approves the move.

(2) Section 3 – Operating Rules: 3.76 – *"Rail vehicles shall not be operated through improperly aligned Track switches.*

(3) Section 3 – Operating Rules: 3.18 – *"Employees shall not operate any vehicle in a reckless or unsafe manner."*

(4) Section 3 – Operating Rules: 3.77 – *"If a rail vehicle runs through an improperly aligned track switch, the operator shall stop the vehicle immediately, and report the occurrence to ROCC or the Interlocking Operator. All parties shall treat the situation as if the vehicle has derailed (SOP #9), and the vehicle shall not be moved. Subsequent movement of the affected rail vehicle shall not be undertaken until investigated and determined to be safe, by authorized personnel."*

The Train Operator moved their train without receiving 100 percent repeat back from the Interlocking Operator to ascertain if instructions were accurate and understood and acknowledged. This action is not in compliance with MSPRH Cardinal Rule *1.79 - Personnel shall not take any action until they are positive that all radio transmissions or receptions are heard, fully understood, and acknowledged. Individual radio transmissions shall, at all times, be repeated by the receiver so the transmitter can confirm the message was received completely and by the intended receiver. Whenever the transmitter has completed their transmission and is turning the airtime over to the receiving party for acknowledgment or reply, they are to end their communication with the word "over." Speed restrictions must always be acknowledged by each Rail Vehicle Operator, even when a blanket message is sent out from Central Control, through 100 percent word for word repeat back from the Rail Vehicle Operators to Central Control or the Tower."*

Based on the employees' record, the Train Operator had a previous red signal overrun event in conjunction with re-instruction for failing to comply with 100 percent word for word repeat back radio communication. The Train Operator completed the following refresher training as a result of the previous red signal overrun:

- March 26, 2018: Blue Line Familiarization Training
- March 26, 2018: Yellow Line Familiarization Training
- March 30, 2018: Radio Communication Course
- April 13, 2018: Train Operator Re-Instruction

The probable cause of this red signal overrun is ongoing, unaddressed radio communications issues, the failure to ensure that all radio protocols, such as repeat backs, are properly followed by all Metrorail personnel, and a lack of territory familiarization.

As a result of this investigation, SAFE makes the following recommendations:

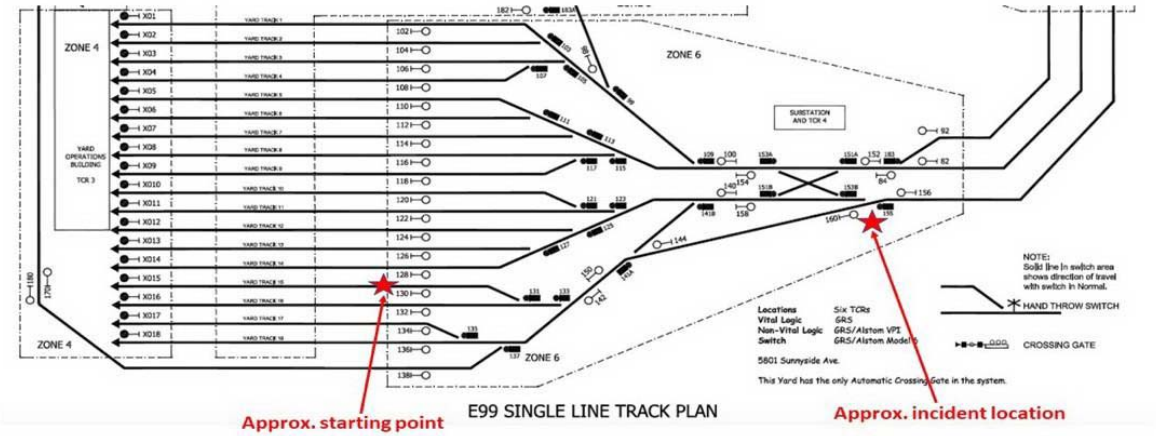
To Office of Rail Transportation (RTRA), SAFE recommends developing Lessons Learned and conduct radio communication compliance checks to ensure radio communications are aligned with the Interlocking Operator Procedure Manual and MSRPH.

To RTRA, Train Operator should undergo yard familiarization and re-training with an emphasis on radio communication.

Incident Site

Greenbelt Yard, Track 15, E99-160 Signal

Field Sketch/Diagram



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.

Investigative Methods

The investigative methodologies included the following:

- Physical Site Assessment
- Formal Interviews – SAFE interviewed two (2) individuals as part of this investigation. Interviews included persons present at, during, and after the incident, those directly involved in the response process. SAFE interviewed the following individuals :
    - Train Operator
    - Interlocking Operator

- Documentation Review – Collection of relevant work history information and process documentation contained in Metro systems of records. These records include:
    - Employee Training Procedures and Records
    - Employee 30-Day work history
    - Certifications
    - MSRPH
    - National Oceanic Atmospheric Administration (NOAA)

- System Data Recording Review – Collection of information contained in Metro Data Recording Systems. This data includes:
    - ARS playback [Radio and Phone Communications]

Investigation

Based on findings, at approximately 21:26 hrs., a Greenbelt Yard Interlocking Operator assigned a Yard Train Operator to uncouple open-end four (4) cars **[L7272.7273-7065.7064-**7216-7217.7141-7140T] from the 8-car consist positioned on Track 15. After uncoupling, the Interlocking Operator gave the Train Operator a lead from E99-130 lunar signal to no closer than 10 feet to E99-160 [not beyond] displaying a Red Signal indication and reverse ends [change the direction of travel] behind E99-150 signal for purposes of moving train 7064-7065 in the CMNT Service and Inspection Shop for Preventative Maintenance processes.

After the Train Operator received instructions, the Train Operator did not acknowledge the same directions given by the Interlocking Operator and stated to proceed up to Signal E99-170, which was beyond the location provided by the Interlocking Operator at Signal E99-160. The Interlocking Operator attempted to inform the Train Operator of the correct move and signal; however, Train Operator did not acknowledge. Train Operator proceeded to the location not authorized by the Interlocking Operator at Signal E99-170. The Interlocking Operator notified the Train Operator they passed a red signal.

As a result of the event, SAFE, ATC, and TRST personnel responded to Greenbelt Yard for a reported trailed switch condition on Switch #155. ATC inspected the switch and found no physical damage. ATC also conducted Obstruction Tests, which successfully passed. ATC returned Switch #155 to service at approximately 02:35 hrs.

Further ARS playback review verified, the Interlocking Operator gave specific instructions to the Train Operator, and the Train Operator repeat back was incorrect. Although the Interlocking Operator attempted to correct the Train Operator, the attempt was not successful. The Train Operator proceeded with the wrong instructions and passed the red signal.

Chronological Event Timeline

Based on ARS playback and Vehicle Program Services (CENV) Analysis:

Time	Description
21:51:17 hrs.	Car 7272 is keyed up. (CENV).
21:51:37 hrs.	Car 7272 takes a point of power and begins to move. (CENV).
21:51:57 hrs.	Interlocking Operator communicates to Train Operator that Signal E99-130 is lunar and to proceed up to Signal E99-160.
21:52:00 hrs.	Car 7272 passes the first lunar. Distance traveled approximately 200 feet at 6 mph. (CENV).
21:52:05 hrs.	The interlocking operator instructed the Train Operator to reverse via Signal E99-150 to drop off a two-car consist and pick up a two-car consist.
21:52:12 hrs.	Train Operator repeated instructions and stated, "the current location of Signal E99-130, proceed through Signal E99-160, clear Signal E99-170 and reverse."
21:52:21 hrs.	Interlocking Operator corrected Train Operator and stated, "Signal E99-160 then Signal E99-150." Note: The Train Operator never responded after this transmission.
21:52:28 hrs.	Car 7272 passes the second lunar. Distance traveled approximately 195 feet at 10 mph. (CENV).

21:53:00 hrs.	Car 7272 passes RED SIGNAL. Distance traveled approximately 500 feet at 7 mph. (CENV).
21:53:36 hrs.	Interlocking Operator reports to Train Operator; they have passed Signal E99-160 (Red).
21:53:41 hrs.	Car 7272 stops and Master Controller is placed it in Auto Store. Distance traveled approximately 565 past the red signal. (CENV).
21:53:43 hrs.	Train Operator asked Interlocking Operator if they are clear.
21:54:12 hrs.	Interlocking Operator reports to Train Operator, the block was to Signal E99-160 Red, and they have passed the red signal.
21:54:25 hrs.	Train Operator acknowledges they have passed the red signal at E99-160.

Network Video Recording (NVR)

Based on NVR System's forward-facing playback, the Train Operator proceeded to pass the E99-30 lunar on Track 15.

Train Operator crossed over from Track 15 towards the Ladder Track and passed E99-150 lunar signal.

As the Train Operator approached, E99-160 was displaying a red signal aspect; the Train Operator proceeded to pass the signal.

The Train Operator traversed switch 155, which was aligned in the normal position for a straight-through move for trains moving from the adjacent Track and subsequently splitting the switch.

Immediate Mitigation to Prevent Recurrence

- The Train Operator and Interlocking Operator were both removed from service.
- CMNT removed the consist from service for post-incident inspection.

Interview Findings

Based on the investigation launched into the Greenbelt Yard Red Signal event, SAFE conducted two (2) interviews via phone, including the investigation team and relevant Metro management. These interviews identified the following key findings associated with this event, as follows:

The Train Operator stated they were operating a two-car consist in the Greenbelt Yard for their first move of the day. The Train Operator's task was to bring the two-car consist into the CMNT Shop and pick up another two-car consist. While receiving instructions from the Interlocking Operator, the Train Operator did not fully understand the communication received, nor did they hear the Interlocking Operator attempting to correct it over the radio. The Train Operator stated the Greenbelt Yard has radio

transmission problems that have been reported but not resolved, and effective communications continue to be in issue.

Findings

- *The Train Operator did not follow the MSRPH by not confirming a red signal was lunar before passing. This action is not in compliance with MSRPH Section 3 – Operating Rules: #3.67 - Rail vehicles shall not be operated past or closer than a point of 10 feet in approach of an interlocking signal or lamp displaying a red aspect, a red flag, or a dark interlocking signal unless authorized by ROCC or the Interlocking Operator and the move is consistent with customer safety as specified in Rule 3.1. ROCC or Interlocking Operator shall give permission to pass a red signal after the switches have been blocked or clamped for the required move per SOP #35. Rail vehicles shall be allowed to move on red signals with permission of ROCC and per rules 3.22, 3.29, and 3.79 of the MSRPH without clamping switches provided that the following three (3) conditions are met:*
  The signal is not associated with a Pocket Track or turnout switch.
  Verbal communication that the signal is lunar and the switches are normal on the opposing Track.
  The ROCC Assistant Superintendent approves the move."

- The Train Operator moved their train without receiving 100 percent repeat back from the Interlocking Operator to ascertain if instructions were accurate and understood and acknowledged. This action is not in compliance with MSPRH Cardinal Rule *1.79 - Personnel shall not take any action until they are positive that all radio transmissions or receptions are heard, fully understood, and acknowledged. Individual radio transmissions shall, at all times, be repeated by the receiver so the transmitter can confirm the message was received completely and by the intended receiver. Whenever the transmitter has completed their transmission and is turning the airtime over to the receiving party for acknowledgment or reply, they are to end their communication with the word "over." Speed restrictions must always be acknowledged by each Rail Vehicle Operator, even when a blanket message is sent out from Central Control, through 100 percent word for word repeat back from the Rail Vehicle Operators to Central Control or the Tower."*

- The Train Operator had a previous red signal overrun event in conjunction with re-instruction for failing to comply with 100 percent word for word repeat back radio communication.

Communications

COMM performed an operational inspection and found there were no radio communication discrepancies in Greenbelt Yard.

Weather

At the time of the incident, NOAA recorded the temperature at 51° F with clear skies and no visibility concerns. SAFE has concluded that weather was not a contributing factor in this incident (Weather source: NOAA – Location: Greenbelt, MD.)

Human Factors

Fatigue

Based on SAFE's interview question related to Fatigue Factors and review of the Train Operator's and Interlocking Operator's 30-day work history, SAFE determined, the Train Operator's and Interlocking Operator's 30-day work schedules leading up to the incident were compliant with WMATA's Policy/Instruction 10.7/1 Hours of Service Limitations for Prevention of Fatigue. The Train Operator and Interlocking Operator 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 Toxicology Testing

After reviewing the Train Operator's and Interlocking Operator's post-incident testing results, it was determined that Train Operator and Interlocking Operator involved were not in violation of the Drug and Alcohol Policy and Testing Program 7.7. 3/5.

Probable Cause Statement

The probable cause of this red signal overrun is ongoing, unaddressed radio communications issues, the failure to ensure that all radio protocols, such as repeat backs, are properly followed by all Metrorail personnel, and a lack of territory familiarization.

SAFE Recommendations

SAFE recommends:

Based on the employees' record, the Train Operator has a previous red signal overrun event in conjunction with re-instruction for 100 radio communication repeat backs; therefore, SAFE recommends the Train Operator undergo yard familiarization re-training with an emphasis on radio communication.

To RTRA, SAFE recommends developing Lessons Learned and conduct radio communication compliance checks to ensure they are aligned with the Interlocking Operator Procedure Manual and MSRPH.

Appendix A - Interviews

Interview Details

Train Operator

This employee is a WMATA Train Operator with two and a half (2 ½) years of experience as a Train Operator, four (4) years of service as a Station Manager, and eight (8) years of service as a Bus Operator. The Train Operator certified in March 2020 and has no history of sleep issues to report.

Based on the SAFE interview, the Train Operator stated they were making their first move of the night, and they were instructed by the Interlocking Operator to proceed to a signal, key down, reverse and drop off deuce (two-car consist). The task was to drop off a deuce into the CMNT S&I Shop and pick up another deuce. The Train Operator stated they were certified and familiar with operating a 7K series consist. There were no reported or recognized mechanical problems with the consist by the Train Operator. Train Operator stated the only distraction at the time of the incident was the faulty radios. Train Operator said the Greenbelt Yard has a known issue of poor radio reception at times when asked to explain. They added this radio communication issue has been reported but has not been resolved. When asked about the specific transmission received from the Interlocking Operator stating to proceed to Signal E99-160 and reverse, the Train Operator said they heard the wrong thing and did not confirm by repeating back. The Train Operator concluded that if the radios were not faulty, they think this incident would not have occurred.

Interlocking Operator

This employee is a WMATA Interlocking Operator with ten (10) years of experience as an Interlocking Operator, two (2) years of service as Train Operator, and eighteen (18) months of service as a Bus Operator. The Interlocking Operator's last certification was in September 2020 and has no history of sleep issues to report.

Based on the SAFE interview, the Interlocking Operator stated they instructed the Train Operator to proceed to Signal E99-160, and the Train Operator repeated back the incorrect signal. As the Interlocking Operator attempted to correct the Train Operator, the Train Operator did not acknowledge the correct commands. The Interlocking Operator reported there were known communications in the Greenbelt Yard but added the Train Operator should have stopped at the red signal and attempted to contact the Interlocking Operator before proceeding. The Interlocking Operator stated they think the Train Operator's lack of attention contributed to this incident occurring.

Appendix B - Attachments

Attachment #1

ATC-1000

Form 1008 | Switch Obstruction Tests Data Sheet | Loc: E99 | Date: 09/16/2020

Switch		Point Opening		Switch Obstruction Test (1/4" gauge in point)				Switch Machine Internal and External Inspections (V)	Techs
				Verify Switch Not Locked (V)		Verify Switch Out Of Correspondence (V)			
No.	Type	N	R	N	R	N	R		
155	M6	4	4	V	V	V	V	V	252, 2381
									2432, 2468
									242

Remarks: Switch controller was adjusted. Switch 155 was trailed, now it is back in service

Signature: [redacted] Technician | [redacted] Emp No. | [redacted] Reviewing Supervisor | [redacted] Emp No.

Attachment #2

ATC-1000

FORM 1012AB-2
FIELD OFFICE COPY

Power Frequency (AC) Track Circuit Test Data Sheet

LOCATION: E 93
TEST DATE: 09/16/2020

TRACK CIRCUIT	FEED END			RELAY END			ALL SHUNT VERIFICATION TESTS (1012C)	REMARKS	
	XFORMER OUTPUT	FEED END RESISTOR	FEED END CURRENT	RELAY COIL VOLTAGE	RELAY END RESISTOR	RELAY END CURRENT		Adjustment / PMI / WO	Call Number and Tech Initials
	VAC	OHMS	AMPS	VAC	OHMS	AMPS	✓		
155 T	15.1	3	1.35	1.01	20	0.73	V		252, 2381
151 T	15.1	3	1.31	1.23	10	.873			2432, 2468
153 T	15.07	2	1.28	1.08	13	.796			255, 242
151-153 xT	16.27	3	1.23	1.09	13	.787			

Test Equipment (Mod/Ser/Due): Fluke 27 II Multimeter / T222958 / 10-25-21

Signatures: [redacted] Technician Emp No. [redacted] Reviewing Supervisor Emp No.

Form 1012AB-2b Rev.2.0 08/12/15

Attachment #3

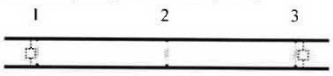
ATC-1000

Form 1012C | Track Circuit Shunt Verification Data Sheet | Date 09/16/2020

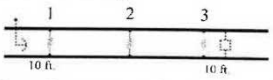
Place a (✔) in each column with successful test

Track Circuit		Verification Shunts				Technicians
Name	Type	1	2	3	4	
155T	AC	✓	✓			2381, 252
						2468, 2432.
						242.

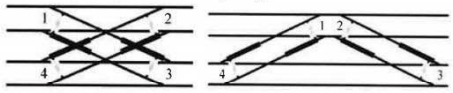
Audio Frequency Track Circuit (AFTC)



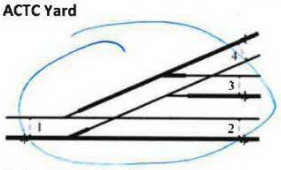
AFTC Interlocking



Power Frequency Track Circuit (ACTC)



ACTC Yard



✓

Series Track Circuit

Remarks: _____

Signatures: [redacted] Technician Emp No. [redacted] Reviewing Supervisor Emp No.

Form 1012C Rev. 2.0 8/12/15

Attachment #4

ATC-1000

Form 1003	Switch Detector and Route Locking Test	Intlk: E99	Date: 9/16/20

Detector Locking				Route Locking								
Switch				Route								
Number	Position	Track Circuit	Switch Remains Locked (✔)	Entrance Signal	Exit Signal	Track Circuits (Dropped in Sequence)						Switches Remain Locked (✔)	Conflicting Signals Prevented (✔)
155	N	155T	✓	156	160	155T						✓	✓
155	R	155T	✓	156	158	155T	153T					✓	✓
155	R	155T	✓	156	154	155T	153T	151/153 xT	151T			✓	✓
155	R			154	156								
155	R			158	156								
155	N			160	156								

Remarks: ROUTE TEST COULD NOT BE COMPLETED BECAUSE TRAIN WAS OCCUPYING APPROACH 154-156 158-156 160-156

Signatures: [redacted] Technician Emp No. [redacted] Reviewing Supervisor Emp No.

Form 1003 Rev 1.0 08/12/15

Attachment #5

ATC-1000

Form 1003	Switch Detector and Route Locking Test	Intlk: E99	Date: 9/18/20

Detector Locking				Route Locking									
Switch				Route									
Number	Position	Track Circuit	Switch Remains Locked (✔)	Entrance Signal	Exit Signal	Track Circuits (Dropped in Sequence)						Switches Remain Locked (✔)	Conflicting Signals Prevented (✔)
155	R	155T	✓	154	156	155T	153T	151/153 XT	151T			✓	✓
155	R	155T	✓	158	156	155T	153T					✓	✓
155	N	155T	✓	160	156	155T						✓	✓

Remarks:

Signatures: [redacted] Technician Emp No. [redacted] Reviewing Supervisor Emp No.

Form 1003 Rev 1.0 08/12/15

Attachment #6

ATC-3000

Form 3003 – Interlocking Inspection Data Sheet

Location: E99 Sw. 155 **Date:** 09/16/2020.

Step	Inspections	√	Observations	Remedial Actions
1.1	Interlocking HW not loose/missing; pin bonds/railhead bonds, and wiring intact/secured; SM wiring and HW	✓		
1.2	IJ's; Cadweld bonds not defective, broken or frayed	✓		
1.3	Gauge plate/switch rods insulators not defective	✓		
1.4	Loops in good condition and properly mounted	N/A		
1.5	Impedance bonds and fastenings intact/secure	N/A		
1.6	MCM rail clamps, CEMBRE connectors secure	✓		
1.7	Switch riser plates for adequate lubrication	✓		
1.8	Block Box equipment complete; Junction boxes	✓		
1.9	ATO Markers in good condition and secure	N/A		
2.1	Switch (and Derail) layout hardware – bolts, cotter pins, rail braces, etc., not missing, loose, damaged.	✓		
2.2	Point rail closure, excessive wear or damage - derailing device marked w/high visibility paint.	✓		
2.3	Jamb nuts on connecting throw rod, lock and point detector rods (or circuit controller rod) not loose.	✓		
2.4	Switch layout for excessive pumping or movement - both normal and reverse positions for single TO	✓		
2.5	Cable conduit and fittings in good condition	✓		
3.1	Jamb nuts and couplings (under snow covers) for throw rods, lock and point detector rods.	✓		
3.2	Switch Machine mounting bolts/fastenings secure	✓		
3.3	Switch numbering, switch covers, snow covers	✓		
3.4	Crank cover closed, secured w/lynch pins (if reqd.) and padlock(s) on machine cover(s)	✓		
4.1	Signal assembly hardware not missing/loose - signal mast, foundation, mounting bracket secure	✓		
4.2	Signal lens not discolored or broken; signal clearly identified on name plate	✓		
4.3	Signal aspects not dim or dark	✓		
4.4	Signal housings secured with padlocks	✓		

Remarks: 2381, 252, 2432, 2468, 242.

Signatures [redacted] Technician Emp No. [redacted] Reviewing Supervisor Emp No.

Form 3003 Revision 1.0 08/10/2015

Appendix C – Lessons Learned

Page 1 of 2

Office of Rail Transportation

OFFICE OF RAIL TRANSPORTATION

Looking back, to effectively move forward

Lessons Learned

September 24. 2020
Number: 2020-003

Greenbelt Division (E99) Red Signal Overrun/Trailed Switch via Poor Radio Communications

INCIDENT SUMMARY

On Tuesday, September 15, 2020, at approximately 9:50pm, an Interlocking Operator gave verbal instructions to a yard operator to uncouple cars 7064 from 7216 and move four (4) north cars from yard track #15 into 4 Blow Pit. The yard operator uncoupled the cars and informed Greenbelt Tower of the uncoupling. The Interlocking Operator then stated, "with a lunar at 130 you have a block to 160 red no closer than 10 feet and reverse clearing 150 signal." The yard Operator repeated back, "lunar at E99-130 I have an absolute block to E199-160 red, clear 170." The Interlocking Operator repeated the same initial instructions," with a lunar at 130 you have a block to 160 red no closer than 10 feet and reverse, clearing 150. The yard operator did not repeat back the 2nd radio communication from the Interlocking Operator and began moving the train. The Interlocking Operator observed an indication on the interlocking board that the train had passed E99-160 signal red. The Interlocking Operator immediately contacted the operator on the radio and informed her she passed 160 signal red. The operator stated, "so I'm clear?" At that time the Interlocking Operator informed the yard operator, her block was up to E99-160 signal red. Switch 155 showed out of correspondence after the move. The Interlocking Operator contacted ATC to investigate. ATC confirmed switch 155 was trailed. Upon investigation, the Interlocking Operator and the yard operator were removed from service and transported for post incident testing. Note: There were no reported injuries and/or damages to equipment.

ROOT CAUSE

During the time of the September 15 incident, the Interlocking Operator did not give proper communication and did not receive a proper repeat back from the yard operator. When the yard operator stated, "lunar at E99-130 I have an absolute block to E199-160 red clear 170." The Interlocking Operator should have corrected the mistake made by the yard operator by repeating back the correct instructions and receiving confirmation from the yard operator that the instructions were understood. The yard operator never repeated back the correct instructions from the interlocking operator and moved the train passing E99-160 signal red and trailing switch 155. After the switch was trailed the Interlocking Operator had the train secured behind switch 155 until the inspection was completed by ATC.

MSRPH RULES VIOLATED

MSRPH 1.79 Employees shall not take any action until they are positive that all radio transmissions or receptions are heard, fully understood and acknowledged. Individual radio transmissions shall be repeated by the receiver so the transmitter can confirm the message was received completely and by the intended receiver.

OR 3.6 All employees operating or working on or about the mainline or yard tracks shall immediately comply with the instructions issued by the Interlocking Operator or ROCC, consistent with customer safety as specified in **OR** 3.1

3.77 If a rail vehicle runs through an improperly aligned track switch, the operator shall stop the vehicle immediately, and report the occurrence to ROCC or the Interlocking Operator. All parties shall treat the situation as if the vehicle has derailed (SOP #9), and the vehicle shall not be undertaken until investigated and determined to be safe, by authorized personnel

What happened…	*What should have happened…*
The Interlocking Operator failed to properly communicate with the yard operator; and did not receive proper repeat back from yard operator.	Interlocking Operators must ensure all communications are understood and proper repeat backs are given before moving a train.
The yard operator failed to verify a lunar and correct rail alignment before moving the train; and failed to repeat back the instructions from the Interlocking Operator	Operators must verify their lunar signal and correct rail alignment before moving their trains. Operators must repeat back instructions from the Interlocking Operator to ensure communication is understood by both parties before any action is taken.
The yard operator failed to immediately notify the Interlocking Operator when the train went past the red signal	Operators must immediately notify the Interlocking Operator when overrunning a red signal and going over a misaligned switch in a rail yard

RTRA Lessons

Looking back,
to effectively move forward

RECOMMENDATIONS

- ✓ Communications/ 100%Proper Repeat backs are key to prevent incidents from occurring
- ✓ Rail vehicles shall not be operated past or closer than 10 feet in approach of an interlocking signal or lamp displaying a red aspect, a red flag, or a dark interlocking signal, unless authorized by ROCC or the Interlocking Operator and the move is consistent with customer safety as specified in Rule 3.1
- ✓ Emphasize that all operational personnel abide by Operating Rule 3.6 and 3.77 when operating trains.
- ✓ Ensure that all operational personnel comply with all Operating Rules, especially Cardinal Operating Rules.
- ✓ Always follow Rules/Procedures outlined in WMATA's MSRPH and Interlocking Operator Manual.