



***Federal Railroad Administration  
Office of Safety  
Headquarters Assigned  
Accident Investigation Report  
HQ-2008-18***

***Norfolk Southern (NS)  
Chattanooga, TN  
February 13, 2008***

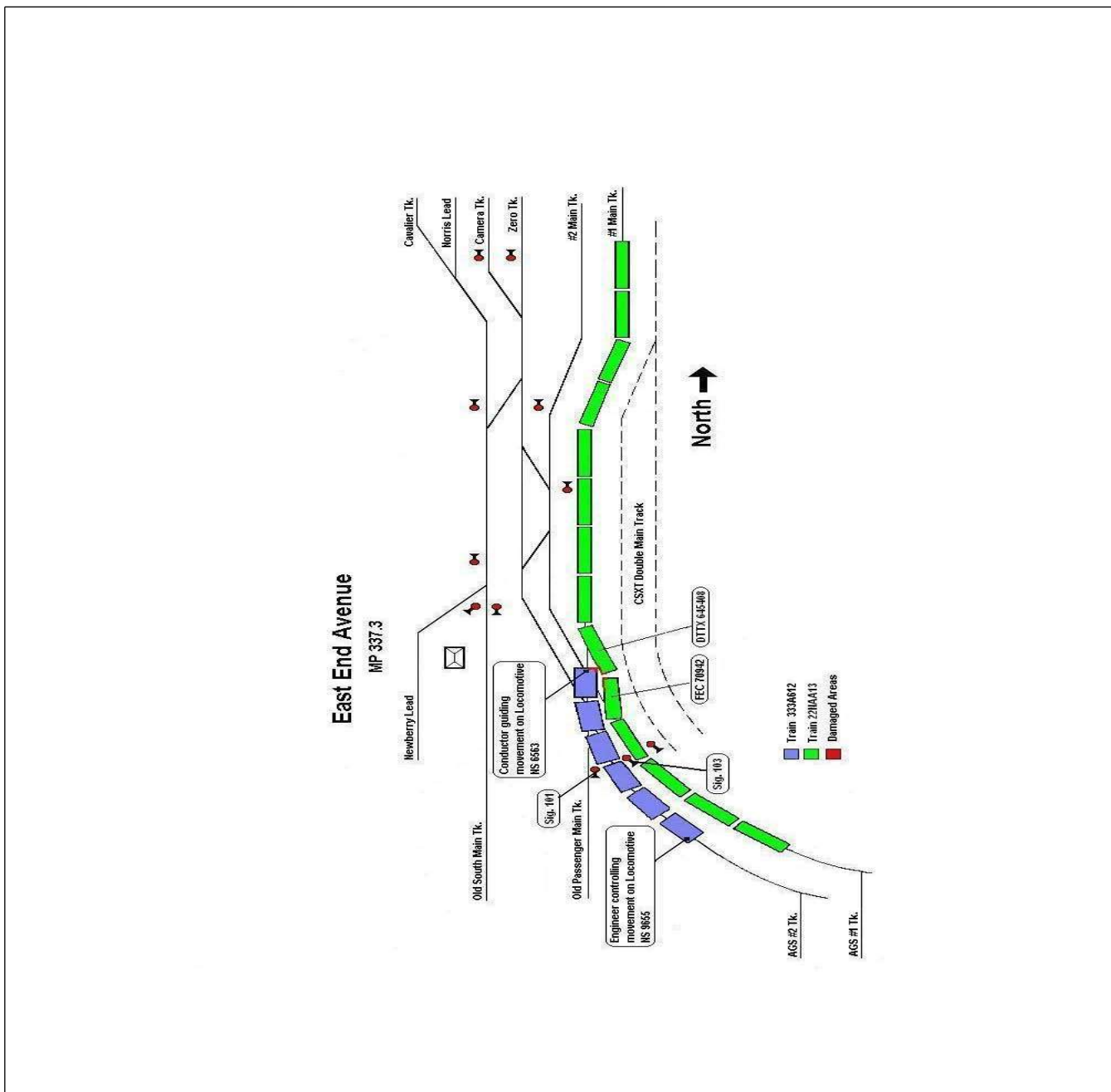
***Note that 49 U.S.C. §20903 provides that no part of an accident or incident report made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.***

1. Name of Railroad Operating Train #1 Norfolk Southern Corp. [NS ]		1a. Alphabetic Code NS		1b. Railroad Accident/Incident No. 31902	
2. Name of Railroad Operating Train #2 Norfolk Southern Corp. [NS ]		2a. Alphabetic Code NS		2b. Railroad Accident/Incident No. 31902	
3. Name of Railroad Operating Train #3 N/A		3a. Alphabetic Code N/A		3b. Railroad Accident/Incident No. N/A	
4. Name of Railroad Responsible for Track Maintenance: Norfolk Southern Corp. [NS ]		4a. Alphabetic Code NS		4b. Railroad Accident/Incident No. 31902	
5. U.S. DOT_AAR Grade Crossing Identification Number		6. Date of Accident/Incident Month 02 Day 13 Year 2008		7. Time of Accident/Incident 02:35: <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM	
8. Type of Accident/Incident (single entry in code box)		1. Derailment 2. Head on collision 3. Rear end collision		4. Side collision 5. Raking collision 6. Broken Train collision	
		7. Hwy-rail crossing 8. RR grade crossing 9. Obstruction		10. Explosion-detonation 11. Fire/violent rupture 12. Other impacts	
		13. Other (describe in narrative)		Code 04	
9. Cars Carrying HAZMAT 0		10. HAZMAT Cars Damaged/Derailed N/A		11. Cars Releasing HAZMAT N/A	
		12. People Evacuated 0		13. Division Central	
14. Nearest City/Town Chattanooga		15. Milepost (to nearest tenth) 337.3		16. State Abbr Code N/A TN	
		17. County HAMILTON			
18. Temperature (F) (specify if minus) 38 F		19. Visibility (single entry) Code 1. Dawn 3. Dusk 2. Day 4. Dark 4		20. Weather (single entry) Code 1. Clear 3. Rain 5. Sleet 2. Cloudy 4. Fog 6. Snow 3	
		21. Type of Track Code 1. Main 3. Siding 2. Yard 4. Industry 1			
22. Track Name/Number AGS #1		23. FRA Track Code Class (1-9, X) 3		24. Annual Track Density (gross tons in millions) 25	
		25. Time Table Direction Code 1. North 3. East 2. South 4. West 1			
OPERATING TRAIN #1					
26. Type of Equipment Consist (single entry)		1. Freight train 2. Passenger train 3. Commuter train		4. Work train 5. Single car 6. Cut of cars	
		7. Yard/switching 8. Light loco(s) 9. Maint./inspect.car		A. Spec. MoW Equip. Code 8	
		27. Was Equipment Attended? Code 1. Yes 2. No 1		28. Train Number/Symbol 333A612	
29. Speed (recorded speed, if available) Code R - Recorded E - Estimated 8 MPH R		30. Trailing Tons (gross tonnage, excluding power units) N/A		31. Method(s) of Operation (enter code(s) that apply) a. ATCS b. Auto train control c. Auto train stop d. Cab e. Traffic f. Interlocking g. Automatic block h. Current of traffic i. Time table/train orders j. Track warrant control k. Direct traffic control l. Yard limits m. Special instructions n. Other than main track o. Positive train control p. Other (Specify in narrative) Code(s) e N/A N/A N/A N/A	
		31a. Remotely Controlled Locomotive? 0 = Not a remotely controlled 1 = Remote control portable 2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter 0			
32. Principal Car/Unit (1) First involved (derailed, struck, etc) NS 6563		a. Initial and Number 1		b. Position in Train N/A	
(2) Causing (if mechanical cause reported) 0		c. Loaded (yes/no) 0		33. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box. Alcohol Drugs N/A N/A	
		34. Was this consist transporting passengers? (Y/N) N/A			
35. Locomotive Units		a. Head End 6		Mid Train b. Manual 0 c. Remote 0	
(1) Total in Train		Rear End d. Manual 0 e. Remote 0		36. Cars (1) Total in Equipment Consist 0	
(2) Total Derailed 0				a. Freight 0 b. Pass. 0 c. Freight 0 d. Pass. 0 e. Caboose 0	
37. Equipment Damage This Consist \$4,500.00		38. Track, Signal, Way, & Structure Damage \$28,500.00		39. Primary Cause Code H221	
		40. Contributing Cause Code N/A			
Number of Crew Members				Length of Time on Duty	
41. Engineer/Operators 1		42. Firemen 1		43. Conductors 1	
		44. Brakemen 0		45. Engineer/Operator Hrs 3 Mi 5	
46. Conductor Hrs 3 Mi 5					
Casualties to:		47. Railroad Employees 0		48. Train Passengers 0	
Fatal		49. Other 0		50. EOT Device? 1. Yes 2. No 2	
Nonfatal 1				51. Was EOT Device Properly Armed? 1. Yes 2. No N/A	
				52. Caboose Occupied by Crew? 1. Yes 2. No N/A	
OPERATING TRAIN #2					
53. Type of Equipment Consist (single entry)		1. Freight train 2. Passenger train 3. Commuter train		4. Work train 5. Single car 6. Cut of cars	
		7. Yard/switching 8. Light loco(s) 9. Maint./inspect.car		A. Spec. MoW Equip. Code 1	
		54. Was Equipment Attended? Code 1. Yes 2. No 2		55. Train Number/Symbol 22NAA13	
56. Speed (recorded speed, if available) Code R - Recorded E - Estimated 0 MPH R		57. Method(s) of Operation (enter code(s) that apply) a. ATCS b. Auto train control c. Auto train stop d. Cab e. Traffic f. Interlocking g. Automatic block h. Current of traffic i. Time table/train orders j. Track warrant control k. Direct traffic control l. Yard limits m. Special instructions n. Other than main track Code(s) e N/A N/A N/A N/A		58a. Remotely Controlled Locomotive? 0 = Not a remotely controlled 1 = Remote control portable	

57. Trailing Tons (gross tonnage, excluding power units)		5589		c. Auto train stop d. Cab e. Traffic f. Interlocking		i. Time table/train orders j. Track warrant control k. Direct traffic control l. Yard limits		o. Positive train control p. Other (Specify in narrative) Code(s)		2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter		0					
59. Principal Car/Unit		a. Initial and Number		b. Position in Train		c. Loaded(yes/no)		60. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.					Alcohol		Drugs		
(1) First involved (derailed, struck, etc)		FEC 70942		27		yes							N/A		N/A		
(2) Causing (if mechanical cause reported)		0		0		N/A		61. Was this consist transporting passengers? (Y/N)					N/A				
62. Locomotive Units		a. Head End		Mid Train		Rear End		63. Cars		Loaded		Empty		e. Caboose			
				b. Manual		c. Remote				a. Freight		b. Pass.		c. Freight		d. Pass.	
(1) Total in Train		2		0		0		(1) Total in Equipment Consist		28		0		2		0	
(2) Total Derailed		0		0		0		(2) Total Derailed		2		0		0		0	
64. Equipment Damage This Consist		\$35,000.00		65. Track, Signal, Way, & Structure Damage		\$0.00		66. Primary Cause Code		H221		67. Contributing Cause Code		N/A			
Number of Crew Members				Length of Time on Duty													
68. Engineer/Operators		69. Firemen		70. Conductors		71. Brakemen		72. Engineer/Operator		73. Conductor							
0		0		0		0		Hrs 0 Mi 0		Hrs 0 Mi 0							
Casualties to:		74. Railroad Employees		75. Train Passengers		76. Other		77. EOT Device?		78. Was EOT Device Properly Armed?							
Fatal		0		0		0		1. Yes 2. No   N/A		1. Yes 2. No   N/A							
Nonfatal		0		0		0		79. Caboose Occupied by Crew?		1. Yes 2. No							
OPERATING TRAIN #3																	
80. Type of Equipment Consist (single entry)		1. Freight train		4. Work train		7. Yard/switching		A. Spec. MoW Equip. Code		81. Was Equipment Attended?		Code		82. Train Number/Symbol			
		2. Passenger train		5. Single car		8. Light loco(s).		N/A		1. Yes 2. No		N/A		N/A			
		3. Commuter train		6. Cut of cars		9. Maint./inspect.car											
83. Speed (recorded speed, if available)		Code		85. Method(s) of Operation (enter code(s) that apply)				85a. Remotely Controlled Locomotive?									
R - Recorded		N/A		a. ATCS		g. Automatic block		m. Special instructions		0 = Not a remotely controlled		1 = Remote control portable		2 = Remote control tower			
E - Estimated		N/A		b. Auto train control		h. Current of traffic		n. Other than main track		3 = Remote control transmitter - more than one remote control transmitter		N/A		N/A			
84. Trailing Tons (gross tonnage, excluding power units)		N/A		c. Auto train stop		i. Time table/train orders		o. Positive train control									
				d. Cab		j. Track warrant control		p. Other (Specify in narrative)									
				e. Traffic		k. Direct traffic control		Code(s)									
				f. Interlocking		l. Yard limits		N/A									
86. Principal Car/Unit		a. Initial and Number		b. Position in Train		c. Loaded(yes/no)		87. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.					Alcohol		Drugs		
(1) First involved (derailed, struck, etc)		N/A		N/A		N/A							N/A		N/A		
(2) Causing (if mechanical cause reported)		N/A		N/A		N/A		88. Was this consist transporting passengers? (Y/N)					N/A				
89. Locomotive Units		a. Head End		Mid Train		Rear End		90. Cars		Loaded		Empty		e. Caboose			
				b. Manual		c. Remote				a. Freight		b. Pass.		c. Freight		d. Pass.	
(1) Total in Train		N/A		N/A		N/A		(1) Total in Equipment Consist		N/A		N/A		N/A		N/A	
(2) Total Derailed		N/A		N/A		N/A		(2) Total Derailed		N/A		N/A		N/A		N/A	
91. Equipment Damage This Consist		N/A		92. Track, Signal, Way, & Structure Damage		N/A		93. Primary Cause Code		N/A		94. Contributing Cause Code		N/A			
Number of Crew Members				Length of Time on Duty													
95. Engineer/Operators		96. Firemen		97. Conductors		98. Brakemen		99. Engineer/Operator		100. Conductor							
N/A		N/A		N/A		N/A		Hrs N/A Mi N/A		Hrs N/A Mi N/A							
Casualties to:		101. Railroad Employees		102. Train		103. Other		104. EOT		105. Was EOT Device Properly							
Fatal		N/A		N/A		N/A		1. Yes 2. No   N/A		1. Yes 2. No   N/A							
Nonfatal		N/A		N/A		N/A		106. Caboose Occupied by Crew?		1. Yes 2. No							
Highway User Involved								Rail Equipment Involved									
107. C. Truck-Trailer. F. Bus J. Other Motor Vehicle Code		A. Auto D. Pick-Up Truck G. School Bus K. Pedestrian		B. Truck E. Van H. Motorcycle M. Other (spec. in narrative)   N/A				111. Equipment		3. Train (standing)		6. Light Loco(s) (moving)		Code			
								1. Train(units pulling)		4. Car(s)(moving)		7. Light(s) (standing)		N/A			
								2. Train(units pushing)		5. Car(s)(standing)		8. Other (specify in narrative)					
108. Vehicle Speed (est. MPH at impact)		N/A		109. geographical Code		1. North 2. South 3. East 4. West   N/A		112. Position of Car Unit in		N/A							

110. Position 1. Stalled on Crossing 2. Stopped on Crossing 3. Moving Over Crossing 4. Trapped				Code N/A	113. Circumstance 1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User				Code N/A		
114a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither				Code N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither				Code N/A		
114c. State here the name and quantity of the hazardous materials released, if any. N/A											
115. Type Crossing 1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig Wags 5. Hwy. traffic signals 6. Audible Warning 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (spec. in narr.) 12. None				Code N/A	116. Signaled Crossing (See instructions for codes)				Code N/A	117. Whistle Ban 1. Yes 2. No 3. Unknown	
Code(s)				N/A	N/A	N/A	N/A	N/A	N/A	N/A	
118. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach				Code N/A	119. Crossing Warning with Highway Signals 1. Yes 2. No 3. Unknown				Code N/A	120. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown	
121. Age N/A		122. Driver's Gender 1. Male 2. Female		Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown				Code N/A	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop	
125. Driver Passed Highway Vehicle 1. Yes 2. No 3. Unknown				Code N/A	126. View of Track Obscured by (primary obstruction) 1. Permanent Structure 2. Standing Railroad Equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicle 7. Other (specify in narrative) 8. Not obstructed				Code N/A		
Casualties to:			Killed	Injured	127. Driver 1. Killed 2. Injured 3. Uninjured				Code N/A	128. Was Driver in the Vehicle? 1. Yes 2. No	
129. Highway-Rail Crossing Users			N/A	N/A	130. Highway Vehicle Property Damage (est. dollar damage)				N/A	131. Total Number of Highway-Rail Crossing Users (include driver)	
132. Locomotive Auxiliary Lights? 1. Yes 2. No				Code N/A	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No				Code N/A		
134. Locomotive Headlight Illuminated? 1. Yes 2. No				Code N/A	135. Locomotive Audible Warning Sounded? 1. Yes 2. No				Code N/A		

136. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC., INVOLVED.



## 137. SYNOPSIS OF THE ACCIDENT

On February 13, 2008, at 2:35 a.m. EST, northbound Norfolk Southern (NS) Train 333A6-12, consisting of six locomotives, struck the side of standing NS Train 22NAA-13 consisting of two locomotives and 30 cars. The accident occurred at NS control point, East End Avenue, in Chattanooga, TN milepost (MP) 337.3 on the NS Central Division and Chattanooga Terminal Subdivision. The collision resulted in the derailment of two freight cars (the 26th and 27th head cars) in NS Train 22NAA-13. None of the locomotives on NS Train 333A6-12 derailed.

The conductor of NS Train 333A6-12 was injured when he jumped from the platform of the locomotive he was standing on prior to the collision with Train 22NAA13. He was taken by ambulance to Erlanger Hospital in Chattanooga, TN and was evaluated as having a deep bruise, abrasions, and muscle strain. He was prescribed pain medication and other medicines and was released back to duty.

There were no hazardous materials involved in the accident. Damages were estimated at \$39,500 for equipment and \$28,500 for track and signal.

The weather at the time of the accident was cloudy and dark with a temperature of 38 °F.

The probable cause of the accident was the failure of the NS train crew to comply with the stop signal indication for AGS No. 2 Track at the East End Avenue control point.

## 138. NARRATIVE

## CIRCUMSTANCES PRIOR TO THE ACCIDENT

## NS Train 333A6-12

NS Train 333A6-12 was a set of locomotives moving from the Chattanooga Diesel Shop to the forwarding yard of Debutts Yard at Chattanooga in preparation to depart with freight cars to Birmingham, AL. The train crew reported for duty at Chattanooga on February 12, 2008 at 11:30 p.m., which is their away from home terminal. The crew consisted of a locomotive engineer, a locomotive engineer trainee (LET) and a conductor. All men received the required statutory eight hour rest period prior to going on duty. After obtaining their paperwork and having a job briefing, the train crew boarded the locomotives and received instructions from the Main Tower at Debutts Yard to follow NS Train 180T6-13 out of the diesel shop to East End Avenue and then back into the forwarding yard (via "Zero" track) to their freight cars.

The engineer was seated at the control console on the west side of the locomotive. The LET was seated on the east side at the window and the conductor was seated in the center fold-down seat as they departed the diesel shop.

## NS Train 22NAA-13

NS Train 22NAA-13 is a regularly scheduled train which operates from Sheffield, AL, MP 401.1A. The crew consisted of an engineer and conductor who parked the train at 8:05 p.m. on February 12, 2008. NS-Train 22NAA-13 consisted of two locomotives, NS 2722 and UP 5156, and 30 cars. The train was 5,947 feet in length with a gross weight of 5,589 tons. The train was standing unattended waiting on a crew from the Georgia Division to take it further.

The method of operation in this area is by signal indication of a Traffic Control System (TCS).

The track in the area of East End Avenue is level. However, there is a right hand three degree curve in

approach to and ending at the northward absolute signals for both, Track AGS No. 1 and Track AGS No. 2. The maximum authorized speed for trains in this area is 20 miles per hour (mph) according to the NS Central Division Western Region Timetable Number 1, dated June 10, 2002.

On page 118 of the NS Central Division Western Region Timetable, the direction of traffic in the area of the Chattanooga Terminal is East/West. However, for the purpose of maintaining consistency with the train crew and to maintain clarity, the directions of North and South will be used in this report. The train crew involved in the accident operates north and south on their assigned territory; the Chattanooga Terminal being the north most part of their territory. Copies of reports and written statements obtained from the railroad along with interview statements from the train crew will all be consistent by using the north/south directions.

Previously, NS Train 180T6-13 had gone through East End Avenue and went south to the Main Street control point and then went through the Wye Track to turn the locomotives around. The train was to return back by way of the Old Passenger Main Track route through the East End Avenue onto the "Zero" track. (NS Train 180T6-13 was not involved in the accident, but its activities are included in this report because they support the instructions that were given to the crew of NS Train 333A6-12 and help to explain why the signals were displayed as they were based on the chronological series of events which preceded the accident.)

## THE ACCIDENT

As NS Train 333A6-12 approached East End Avenue from the diesel shop, they had a restricting signal indication to proceed onto Track AGS No. 2. They stopped the movement at the south end of the control point to allow the conductor to dismount. The movement proceeded southward and the conductor stopped it again just south of the northbound signal at East End Avenue on AGS No. 2 Track. The conductor then remounted the last locomotive to direct the movement northward and was standing on the platform under the headlight.

After about a minute, the CT Dispatcher lined the signal for NS Train 180T6-13 to come north from the Old Passenger Main track. The conductor of NS Train 333A6-12 called the restricting signal being displayed for the Old Passenger Main track to the engineer and said the route was clear for 12 cars. The engineer requested confirmation of the signal, and upon confirmation, acknowledged the restricting signal and clearance distance and began shoving the locomotives northward.

After about 250 feet of movement, the conductor noticed the switch point moving in front of the locomotive as they advanced forward and told the engineer to stop the movement. Subsequently, the lead locomotive turned toward the standing NS Train 22NAA-13 on AGS No. 1 Track. The movement did not stop soon enough to avoid colliding with the train on the adjacent track. The lead locomotive pushed the 27th head car (FEC 70942) toward the east and derailed the north truck of the car along with the south truck of the 26th head car (DTTX 645408) of NS Train 22NAA-13. Both cars were leaning but not overturned.

Just before the movement collided with the standing train, the conductor jumped from the platform of Locomotive NS 6563 sustaining some leg, hip, and back injuries.

CSX Transportation (CSX) has tracks alongside the NS in this area and the leaning cars were causing a close clearance on the CSX No. 1 Main track. Safety was provided for CSX trains by notifying CSX of the accident and potential clearance hazard. CSX managers arrived at the site to protect their train movements and to provide on-track safety for the clean-up crews working on or about the CSX tracks.

## ANALYSIS AND CONCLUSIONS

### ANALYSIS: - FAITGUE

FRA obtained fatigue related information, for the 10-day period preceding this incident including the 10-day work history (on duty/off duty cycles) for all of the employees involved.

### CONCLUSION:

Upon analysis of that information FRA concluded that one or more of the employees may have been working at a diminished level of safety (effectiveness) due to mental and/or physical attributes associated with fatigue,

which may have contributed to the cause of the accident.

#### ANALYSIS: - SIGNALS

The Federal Railroad Administration (FRA) arrived at the accident site at about 8 a.m. on February 13, 2008, and observed the northbound control signal on the AGS No. 2 track displaying a red "Stop" indication while the train was standing at the point of collision. FRA observed the lead locomotive of NS Train 333A6-12 in contact with the 26th and 27th head cars of Train 22NAA13 on AGS No. 1 Track at East End Avenue control point.

The method of operation through the control point is by signal indication of a Traffic Control System. The NS operates trains over a double main track with other yard and auxiliary tracks connecting at this control point. There are five northward and six southward absolute signals governing train movements into and through the East End Avenue control point.

The FRA Signal and Train Control Inspector observed NS signal forces as they conducted extensive tests involving the signals and switches at the East End Avenue control point. The signals of the control point are operated by D.C. non-coded track and underground line circuits. The CT Dispatcher in Knoxville, TN controls the switches and signals at East End Avenue with a CAD control machine. The signals are all color-light type dwarf signals capable of displaying a red or yellow aspect or indication: Red = Stop; Yellow = Restricting. No exceptions were noted during the tests and inspections conducted on the signal system at East End Avenue.

About 9:15 a.m. on February 13, 2008, the locomotives were withdrawn from the point of collision and were positioned at the location where they would have been prior to moving northward near the northbound signal on AGS No. 2 Track. This served as a partial re-enactment during daylight hours. The view of the crew from the controlling locomotive on the south end of the train was obstructed by the locomotives and the train standing on AGS No. 1 Track. The signal for AGS No. 2 Track was not visible from the locomotive on the south end of NS Train 333A6-12.

Raw data gathered from the Harmon Logic Controller in the East End Avenue bungalow indicated that the dispatcher requested the northbound signal for the Old Passenger Main track (signal 101) to be lined for NS Train 180T6-13 and not the signal for AGS No. 2 Track (signal 103) for NS Train 333A6-12. The data matched the information on the visual playback for the CT Dispatcher's control machine.

The data downloaded from the controlling Locomotive NS 9655 event recorder shows that the engineer used throttle positions Idle, 1 and 2 in the process of moving the train from the stopped position south of East End Avenue to the point of collision. The train accelerated to eight mph before the controlled stop and subsequent collision. The speed at the time of collision was estimated to be five mph by railroad managers who were at the site.

#### CONCLUSION:

Inspections and tests of the East End Avenue control point disclosed neither malfunction nor failure of the signals, which would cause the northward controlled signal on AGS No. 2 Track to display an unintended signal indication. By observing the signals while lined for train movements, signal 101 is clearly associated with the Old Passenger Main Track for which it governs movement. Likewise, signal 103 is associated with AGS No. 2 Track for which it governs movement. The conductor mistakenly called the "Restricting" signal indication to his left (signal 101) for his train instead of the one on the right (signal 103) which was "Stop". The signal on the left was intended for Train 180T613 coming from turning around at the Wye Track on the Old Passenger Main track.

#### PROBABLE CAUSE AND CONTRIBUTING FACTORS:

Based on statements from the conductor of NS Train 333A6-12, supported by extensive testing of the signal system, the probable cause of the accident was the failure of the NS train crew to comply with the northbound stop signal indication at the East End Avenue signal governing movement on AGS No. 2 Track.

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