Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-54

Norfolk Southern (NS)
Columbus, Ohio
September 26, 2007

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.

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-54

1.Name of Railroad Operating Train #1: Norfolk Southern Railway Co.	1a. Alphabetic Code: NS	1b. Railroad Accident/Incident No.: 030432
2.Name of Railroad Operating Train #2: Norfolk Sourthern Railway Co.	2a. Alphabetic Code: NS	2b. Railroad Accident/Incident No.: 030432
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 Railway Co.	4a. Alphabetic Code: NS	4b. Railroad Accident/Incident No.: 030432
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 09 | Day 26 | Year 2007	7. Time of Accident/Incident: 04:30:00 ☐ AM ☑ PM

8. Type of Accident/Indicent (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	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
0	N/A	N/A	0	Lake

14. Nearest City/Town	15. Milepost (to nearest tenth)	16. State Abbr	16. State Code	17. County
Columbus	QZ002.00	N/A	OH	FRANKLIN

18. Temperature (F) (specify if minus)	19. Visibility (single entry) 1. Dawn 2. Day 3.Dusk 4.Dark — Code	20. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow — Code	21. Type of Track 1. Main 2. Yard 3. Siding 4. Industry — Code
40 F	2	2	2

22. Track Name/Number	23. FRA Track Class (1-9, X) — Code	24. Annual Track Density (gross tons in millions)	25. Time Table Direction 1. North 2. South 3. East 4. West — Code
East Drill / 216	0	N/A	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	27. Was Equipment Attended? 1. Yes 2. No — Code	28. Train Number/Symbol
7	1	LY34

29. Speed (recorded speed, if available) R - Recorded E - Estimated — Code	30. Trailing Tons (gross tonnage, excluding power units)	31. Method(s) of Operation (enter code(s) that apply)	31a. Remotely Controlled Locomotive?
0 MPH | N/A	N/A	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): 1 | N/A | N/A | N/A | N/A	0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter: 1

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	BNSF400415	23	yes
(2) Causing (if mechanical cause reported)	0	0	N/A

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

35. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	1	0	0	0	0
(2) Total Derailed	0	0	0	0	0

36. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	34	0	39	0	0
(2) Total Derailed	3	0	0	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
$54,000.00	$0.00	H702	N/A

Number of Crew Members

41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen
1	0	0	0

Length of Time on Duty

45. Engineer/Operator	46. Conductor
Hrs 2 Mi 45	Hrs 0 Mi 0

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	0	0	0

50. EOT Device? 1. Yes 2. No — N/A

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	54. Was Equipment Attended? 1. Yes 2. No — Code	55. Train Number/Symbol
7	1	LY35

56. Speed (recorded speed, if available) R - Recorded E - Estimated — Code	58. Method(s) of Operation (enter code(s) that apply)	58a. Remotely Controlled Locomotive?
3 MPH | E	a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track	0 = Not a remotely controlled; 1 = Remote control portable

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57. Trailing Tons (gross tonnage, excluding power units): N/A

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): 1 | N/A | N/A | N/A | N/A

2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: 1

59. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	E06139	1	no
(2) Causing (if mechanical cause reported)	N/A	0	N/A

60. 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

61. Was this consist transporting passengers? (Y/N): N

62. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	1	0	0	0	0
(2) Total Derailed	1	0	0	0	0

63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	5	0	24	0	0
(2) Total Derailed	0	0	1	0	0

64. Equipment Damage This Consist: $20,300.00

65. Track, Signal, Way, & Structure Damage: $51,000.00

66. Primary Cause Code: H702

67. Contributing Cause Code: H306

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
1	0	0	0

Length of Time on Duty

72. Engineer/Operator: Hrs 3 Mi 15

73. Conductor: Hrs 0 Mi 0

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	0	0	0
Nonfatal	0	0	0

77. EOT Device? 1. Yes 2. No | N/A

78. Was EOT Device Properly Armed? 1. Yes 2. No | N/A

79. Caboose Occupied by Crew? 1. Yes 2. No | N/A

OPERATING TRAIN #3

80. 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: N/A

81. Was Equipment Attended? 1. Yes 2. No | Code: N/A

82. Train Number/Symbol: N/A

83. Speed (recorded speed, if available) Code: R - Recorded; E - Estimated N/A MPH | 0

84. Trailing Tons (gross tonnage, excluding power units): N/A

85. 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): N/A | N/A | N/A | N/A | N/A

85a. 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: N/A

86. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	0	0	N/A
(2) Causing (if mechanical cause reported)	0	0	N/A

87. 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

88. Was this consist transporting passengers? (Y/N): N/A

89. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

90. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

91. Equipment Damage This Consist: $0.00

92. Track, Signal, Way, & Structure Damage: $0.00

93. Primary Cause Code: N/A

94. Contributing Cause Code: N/A

Number of Crew Members

95. Engineer/ Operators	96. Firemen	97. Conductors	98. Brakemen
0	0	0	0

Length of Time on Duty

99. Engineer/Operator: Hrs 0 Mi 0

100. Conductor: Hrs 0 Mi 0

Casualties to:	101. Railroad Employees	102. Train	103. Other
Fatal	0	0	0
Nonfatal	0	0	0

104. EOT 1. Yes 2. No | N/A

105. Was EOT Device Properly 1. Yes 2. No | N/A

106. Caboose Occupied by Crew? 1. Yes 2. No | N/A

Highway User Involved

107. A. Auto; B. Truck; C. Truck-Trailer.; D. Pick-Up Truck; E. Van; F. Bus; G. School Bus; H. Motorcycle; J. Other Motor Vehicle; K. Pedestrian; M. Other (spec. in narrative) | Code: N/A

108. Vehicle Speed (est. MPH at impact): N/A

109. geographical) 1.North 2.South 3.East 4.West | Code: N/A

Rail Equipment Involved

111. Equipment 1.Train(units pulling); 2.Train(units pushing); 3.Train (standing); 4.Car(s) (moving); 5.Car(s) (standing); 6.Light Loco(s) (moving); 7.Light(s) (standing); 8.Other (specify in narrative) | Code: N/A

112. Position of Car Unit in: 0

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110. Position	Code	113. Circumstance	Code
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	N/A	1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	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	N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

114c. State here the name and quantity of the hazardous materials released, if any.
N/A

115. Type Crossing Warning	1.Gates	4.Wig Wags	7.Crossbucks	10.Flagged by crew	116. Signaled Crossing (See instructions for codes)	Code	117. Whistle 1. Yes 2. No 3. Unknown	Code
	2.Cantilever FLS	5.Hwy. traffic signals	8.Stop signs	11.Other (spec. in narr.)				
	3.Standard FLS	6.Audible	9.Watchman	12.None				
Code(s)	N/A	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	119. Crossing Warning with Highway Signals 1. Yes 2. No 3. Unknown	Code	120. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown	Code
	N/A		N/A		N/A

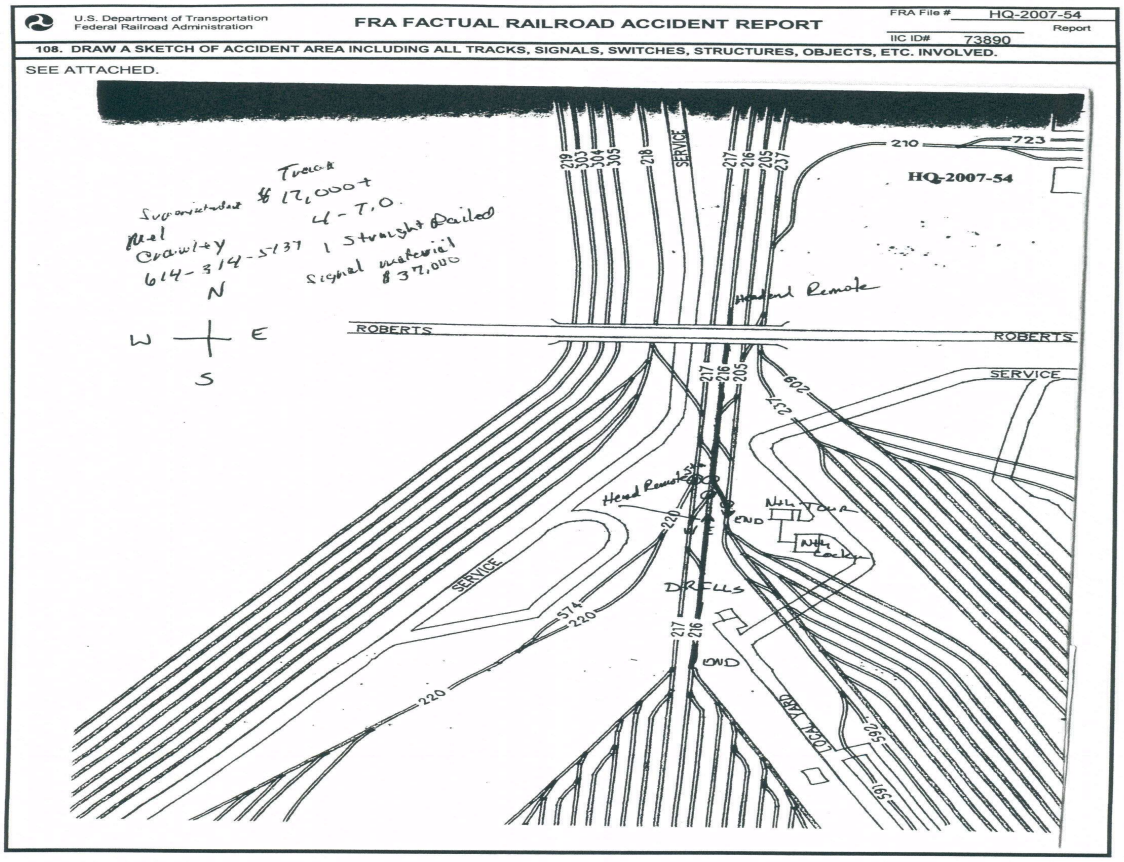
121. Age	122. Driver's Gender 1. Male 2. Female	Code	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative)	Code
0		N/A		N/A		N/A

125. Driver Passed Highway Vehicle 1. Yes 2. No 3. Unknown	Code	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		N/A

Casualties to:	Killed	Injured	127. Driver 1. Killed 2.Injured 3. Uninjured	Code	128. Was Driver in the Vehicle? 1. Yes 2. No	Code
				N/A		N/A
129. Highway-Rail Crossing Users	0	0	130. Highway Vehicle Property Damage (est. dollar damage)	0	131. Total Number of Highway-Rail Crossing Users (include driver)	0

132. Locomotive Auxiliary Lights? 1. Yes 2. No	Code	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No	Code
	N/A		N/A
134. Locomotive Headlight Illuminated? 1. Yes 2. No	Code	135. Locomotive Audible Warning Sounded? 1. Yes 2. No	Code
	N/A		N/A

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



137. SYNOPSIS OF THE ACCIDENT

On September 26, 2007, 4:30 p.m., a side collision occurred on the Norfolk Southern Railway Co. (NS), Lake Division, Dayton District, Mile Post QZ002.00, located in Buckeye Yard, Columbus, OH. At the time of the collision, the weather was cloudy; the temperature was 40° Fahrenheit.

The collision occurred in east drill track when the northbound movement of train LY35 consisting of one "remote control locomotive" (RCL) and 29 cars of mixed freight struck the southbound movement of train LY34, consisting of one "remote control locomotive" and 73 cars of mixed freight. The side collision resulted in one RCL and one empty gondola derailing in train LY35 and three covered hoppers containing corn meal derailing in train LY34.

No injuries were reported and there were no hazardous materials involved. Damages were estimated at $20,300 to the locomotive, $54,000 to the four freight cars and $51,000 to track & signals.

PROBABLE CAUSE

The collision was caused by the yardmaster improperly lining the remotely controlled #8 crossover switch into the movement of train LY34.

Timetable directions are used throughout this report unless otherwise noted.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT:

NORTH TOWER YARDMASTER

On September 26, 2007, after receiving a required statutory off-duty period in excess of eight hours, the Yardmaster was called for duty at 3:00 p.m. EDT and assigned to work the North Tower, located in Buckeye Yard, Columbus, Ohio. The North Tower Yardmaster is responsible for all train movements at the north end of Buckeye Yard and two "puller crews" assigned to move freight cars from the classification yard to the departure yard, in addition to performing other miscellaneous duties.

The "puller crews" assigned were designated as LY34 and LY35. Both were Remote Control Locomotives (RCL) assigned to work the north-end classification yard and departure tracks. Both yard movements were under the authority of the North Tower Yardmaster.

TRAIN LY35:

On September 26, 2007, after receiving a required statutory off-duty period in excess of eight hours, the Remote Control Operator (RCO) was called on duty at 3:15 p.m. EDT. The RCO was assigned to work "puller" job LY35 with locomotive NS 6139 at the north end of Buckeye Yard, Columbus OH.

TRAIN LY34:

On September 26, 2007, after receiving a required statutory off-duty period in excess of eight hours, the Remote Control Operator (RCO) was called on duty at 2:45 p.m. EDT. The RCO was assigned to work "puller" job LY34 with locomotive NS 6140 at the north end of Buckeye Yard, Columbus OH.

Prior to the collision, both LY34 and LY35 were in the classification yard preparing to move cars to the

departure yard.

When the LY34 RCO was ready to pull 73 cars out of the classification yard and move them to the departure yard, the Yardmaster instructed the LY34 to use the east drill track to pull north from the classification yard. The RCO mounted the rear car and activated his Operator Control Unit (OCU) to move the cut of cars northbound from the east classification yard directly onto the east drill track.

When the rear car passed the north-end of the classification yard, the RCO stopped the movement and dismounted. He started the movement north again by activating his OCU until the 73 cars cleared the number three remotely controlled crossover switch. He walked east toward the hand-throw switches in the departure yard to line his movement into the departure yard.

After the movement north was completed, the yardmaster radioed the RCO of LY34 that he was far enough for his north movement and that the cut of cars was going into departure yard track number five. The Yardmaster advised him of his car count and train length.

The number three, remotely controlled switch was lined by the Yardmaster for movement onto the departure yard lead concurrently with the LY34 RCO lining the manually operated switch in the departure yard for movement into number five departure track.

After the movement was lined, the RCO activated his OCU and proceeded south. The movement was operated slowly in order to safely couple into a cut of cars that were already in the departure track.

The LY35 RCO was ready to pull 29 cars from the classification yard and move them to the departure yard. The Yardmaster instructed the LY35 that he had permission onto the west drill track. The RCO mounted the rear car and activated his OCU to move north.

In order to proceed to the west drill track, the LY35 would need to move a short distance from the classification yard onto the east drill track; then diverge from the east drill track to the west drill track through the number eight crossover and proceed north on the west drill track.

The LY35 activated his OCU for movement north and proceeded toward the number eight crossover connecting the east drill track to the west drill track.

Approaching the accident area, the RCO of train LY35 was at the rear of his train, riding the 29th car. The RCO of LY34 was standing on the ground, about to make a coupling in number five departure track and was on the west side of his equipment. The Yardmaster controlling the movements of both trains was occupying North Tower.

In the area of the accident there are two tangent tracks known as the east drill track and the west drill track. Moving north from the classification yard along the east drill track and west drill track, there is a remotely controlled crossover left-handed switch connecting the east drill track and west drill track, known as number eight crossover, a second remotely controlled crossover switch connecting the west drill track to the east drill track known as number five crossover and a remotely controlled switch for reverse movement from the east drill track to the departure yard lead, known as number five crossover. The grade in the area is practically level

THE ACCIDENT:

Approaching the accident area, Train LY35 was being operated at an estimated speed of approximately three miles per hour. The RCO's view, of the leading end of his movement, was obstructed due to the length of his train, thus the misaligned switch and impending collision were not observed.

At approximately 4:30 p.m. Train LY35 collided into the side of Train LY34 on the east drill track at the number three crossover switch derailing one locomotive and four rail cars in both movements. The Yardmaster observed the collision and immediately made a radio transmission to stop all movements stating "that will do, that will do, damn."

After the side collision, the LY35 RCO dismounted the moving equipment and initiated his emergency controls

on the OCU. The LY34 RCO also initiated the emergency controls on the OCU and both movements stopped. The Yardmaster asked both RCO's over the radio if they were O.K. Both replied that, "they were good." The Yardmaster then informed Norfolk Southern (NS) Supervisors of the collision.

RCL locomotive number 6139 and one empty gondola derailed in Train LY35 as a result of the collision. Three cars were derailed in Train LY34. There were no hazardous materials involved and no injuries to any of the crewmembers involved.

ANALYSIS AND CONCLUSIONS:

ANALYSIS- OPERATING PRACTICES:

TRAIN LY35

The RCO was hired by the NS in May 2003 as a conductor, subsequently certifying as an RCO. He can be assigned to work either as a conductor or an RCO. He was last examined on the railroad's operating rules in 2007.

Efficiency Test Records show that within the last year, the employees were observed for the following rules by Supervision.

1042 Hearing Protection
RC2.9 Operating Equipment in a Motor Vehicle
104(b) Employee Operating Switch
1050(a) Situational Awareness

TRAIN LY34

The RCO was hired by the NS in March 2005 as a Conductor, subsequent certifying as an RCO. He can be assigned to work as a conductor or an RCO. He was last examined on the railroad's operating rules in 2006.

Efficiency Test Records show that within the last year, the employee was observed for the following rules by Supervision.

GR-38 Communication Safety / Job Briefings
1071 Dismounting Moving Equipment

YARDMASTER:

The Yardmaster was hired by the NS in March 1999 as a Conductor and was promoted in May 2000 to the position of Yardmaster. He was last examined on the railroad's operating rules in 2007.

Efficiency Test Records show that within the last year, the employees were observed for the following rules by Supervision.

Rule H Smoking in the Building
GR-27 Attention to Duty

Employee Records also indicate that during 2007, the Yardmaster was involved in a similar side collision incident involving two RCL switching movements. NS found the Yardmaster at fault for the misaligned switch and he was suspended for 15 days.

On October 2, 2007, FRA interviewed the Yardmaster at a local restaurant in Columbus, OH. During the interview, the Yardmaster stated that when Train LY35 was ready to pull his cars from the classification yard, "he lined the switches on his computer board and then instructed in Train LY35 that he had permission to occupy the west drill track." The Yardmaster observed the two trains collide at about 4:30 p.m. and the Yardmaster stated, that he realized that he set-up the wrong route and misinterpreted the computer screen."

While investigating the accident, FRA Inspectors observed the Yardmaster and RCL operations and

procedures and reviewed all guidance documents. Buckeye Yard Standard Operating Procedures include the NS Superintendent's Bulletin # 22 and the Procedure for Remote Control Locomotive Operations Guidelines 2.7.

Both documents state that all remote control movements are to be considered "shoving" movements regardless of direction or position of the RCL. All freight car switching movements from the classification yard into the drill tracks and then into the departure yard are made utilizing an RCL.

The RCO of switching movements out of the classification yard is required by NS management to walk the track southward to the rear car of the cut to check couplings and to remain at the rear car of the movement. Any attempt to walk back northward to check the route, power switches & crossovers and the yard road crossing are reportedly considered delay of operations by NS management.

Once they are ready to begin the movement, the RCO's radio the Yardmaster that they are prepared to pull north out of the class yard and onto the drill tracks at the north end of the yard. When the yardmaster informs the RCO that the switches for his route out of the class yard and onto the drill track are properly lined, the RCO commands the locomotive to begin the northward movement.

The RCO must rely solely upon the yardmaster to look out for misaligned switches, broken rail, obstructions on track or persons or equipment fouling the track. To accomplish this, the Yardmaster is provided an electronic computer screen schematic of the switch routes to and from the drill tracks from the class yard and departure yard that he controls and lines up remotely.

According to the Yardmaster, "The duties are multiple and they cannot observe the puller jobs 100 percent of the time." FRA observations made during this investigation, show as an example, the yardmaster's view of the west classification yard, the power switches & crossover tracks and the east drill track are obscured when trains or equipment occupies the east drill or departure yard main tracks. In addition, FRA notes, that the yardmasters have reported to NS management that the computer screen schematic is difficult to read at a glance since the tracks, crossovers and switch indicators are close together and may lead to mistaken perceptions of route alignments.

After obtaining permission to pull from the classification yard, the RCO rides the rear car of the movement out of the class yard, dropping off the movement at the north end of the yard to line switches for the movement back into the departure yard. From the position on the rear car of the cut, the RCO cannot see the leading end to protect the northbound shove movement.

Because of the Roberts Road bridge, neither the RCO nor the Yardmaster can see the last sections of the drill tracks. To address this, the railroad relies upon the Canac remote control locomotive track gauge transponder limiting system or Beltpack Pullback System Protection (PSP) to keep the trains from running off the end of the tracks.

This system of on board and track-side locomotive computer control informs the RCL operator that his movement northward is reaching the limit of the drill track. The transponder limiting notification is given to the RCL operator automatically by radio as the locomotive computer senses that it has entered a "zone" established by Global Positioning (GPS), the in-track transponders and a software map carried in the locomotive computer's memory.

Either the RCO will begin to slow and then stop the movement by remote control command, or failing the operator's input the PSP system will slow then stop the locomotive short of the end of track if it moves past the last transponder in the "zone." The PSP technology on the remote control locomotive and the drill tracks is also designed to initiate a full service application of the locomotive brake if the GPS and/or transponders fail to stay in communication with the locomotive. But should the PSP backups fail, however unlikely, everything then depends on the remote control operator to determine if the movement has gone too far and reached the end of drill track.

FRA Inspectors observed several unprotected shove-moves with remote control locomotives and NS has failed to take action consistent with recommendations outlined in Safety Advisory 2007-01. Monitoring of voice recordings and reviews of transcripts during the incident revealed numerous violations of the Part 220-Radio Standard and Procedures.

The Yardmaster and both RCO's were improperly identified during radio communications by their first names, with two of them having the same name, instead of utilizing short identification such as locomotive initial & number or station identification. The railroad was notified that a recommendation for civil penalty assessment will be submitted for violation of Title 49, Code of Federal Regulations, Part 220.

CONCLUSION:

By admission of the Yardmaster and through its subsequent accident investigation, FRA found that the primary contributing factor in the accident was the failure of the Yardmaster to properly line Train LY35 onto the "west drill track." This would have meant that the Yardmaster moves the number eight crossover to the reverse position, routing Train LY35 from the "east drill track" to the "west drill track." Instead, the switch was lined normal and into Train LY34, which was making a reverse move into the departure yard.

FRA also found that the RCO was riding the last car of the shoving move, which meant that the switch and the route could not be observed prior to the train reaching that point. In addition, though radio communication was not firmly established as a contributing cause in the accident, the transcript clearly shows that the communication between the Yardmaster and both RCO's was noncomplying.

ANALYSIS - MOTIVE, POWER & EQUIPMENT:

NS Train LY34 locomotive NS 6139 is an EMD diesel electric locomotive, Model SD-40-2, which was derailed at both ends, sustaining heavy damage to the front pilot plate (long hood end), the safety appliances (both corner stairways, vertical and horizontal hand rails) and ditch lights consistent with a sideswiping collision with other freight equipment. The brake cylinders and associated piping, horizontal hand railing and the fuel tank were heavily damaged on the right side of the locomotive as was the number one traction motor gear casing. The total initial damage estimate is $20,000 damage.

There were about 500 or more gallons of diesel fuel lost onto the ground as a result of the fuel tank being breached in the derailment. BBU Environmental of Lancaster, Ohio, was called to respond for fuel containment and clean up. There were no reports that the locomotive had any defective conditions or experienced any remote control equipment problems prior to the accident. All periodic attention and testing were within prescribed limits.

Empty gondola car, NS 194450, was the first car behind NS Locomotive 6139 in Train LY35 and was derailed on both ends of the car. They both sustained an estimated $300 damage. The LY34 southbound switching movement that was struck had three covered hopper cars loaded with corn meal that were derailed. ADMX 51192 sustained an estimated $15,000 damage; ADMX 51291 sustained an estimated $16,000 damage and BNSF 400415 was derailed and on its side with an estimated $24,000 damage. Most of the derailed equipment was re-railed by R. J. Corman company.

There were no indications that either RCL hauling the movements or any of the freight cars had any defective conditions that would have caused or contributed to this accident. A thorough investigation by FRA Inspectors assigned to the accident investigation team found however, that RCL NS 6140, which had been one of the two RCL's operating during the collision and subsequent derailment, was in defective condition account excessive brake cylinder piston travel.

CONCLUSION:

This was not a contributing factor in the accident though the railroad was notified that a recommendation for civil penalty assessment will be submitted for violation of the Federal Railroad Safety Standards.

ANALYSIS - TRACK:

There were no non-complying conditions identified with the track conditions in the accident area.

CONCLUSION:

Track conditions were not a contributing factor in the accident.

ANALYSIS - SIGNAL & TRAIN CONTROL

There were no non-complying conditions found with the Signal and Train Control Systems involved in the movement of trains(s) LY34 and LY35.

CONCLUSION:

All Signal and Train Control system involved in the movement of these trains functioned as designed and were not a contributing factor in the accident..

ANALYSIS - HAZARDOUS MATERIALS

There were no non-complying conditions identified with any hazardous materials transport vehicles moved by trains LY34 and LY35. .

CONCLUSION:

Hazardous Materials Transportation was not a contributing factor in this accident.

FINAL ANALYSIS AND CONCLUSION:

The Yardmaster failed to line train LY35 from number 43 classification track, through the number eight crossover track to the west drill track. Train LY35 was physically located in the east side of the classification yard on track number 43. When the Yardmaster authorized train LY35 to proceed northbound from classification track 43, the train proceed instead, onto the east classification lead to the east drill track and into the side of train LY34, whose train was shoving south into the departure yard.

NS failed to provide a person to protect the leading end of the shove movement that had an unobstructed view of the track and movement. NS management verbally directed the RCOs to operate the remote control locomotives from the rear car of the cut while pulling from the classification yard.

PROBABLE CAUSE & CONTRIBUTING FACTORS:

Cause code H306: Failure to have a person at the head end or person watching the lead end of a shove movement.

Primary cause code H702: FRA's investigation confirms the railroad's conclusion that the primary cause of the incident is attributed to the Yardmaster improperly lining the LY35 northbound switching movement. In a statement made to representatives of the FRA conducting an interview, the Yardmaster noted that he was at fault for the "misroute"