
# *Federal Railroad Administration*
# *Office of Safety*
# *Headquarters Assigned*
# *Accident Investigation Report*
# *HQ-2008-03*

## *Norfolk Southern Corporation (NS)*
## *Torrance, PA*
## *January 4, 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.***

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

# FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2008-03

| | | |
|---|---|---|
| 1.Name of Railroad Operating Train #1: Norfolk Southern Corp. [NS ] | 1a. Alphabetic Code: NS | 1b. Railroad Accident/Incident No.: 031465 |
| 2.Name of Railroad Operating Train #2: Norfolk Southern Corp. [NS ] | 2a. Alphabetic Code: NS | 2b. Railroad Accident/Incident No.: 031465 |
| 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.: 031465 |
| 5. U.S. DOT_AAR Grade Crossing Identification Number: | 6. Date of Accident/Incident: Month 01 \| Day 04 \| Year 2008 | 7. Time of Accident/Incident: 12:30:00 ☐ 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: 03

| 9. Cars Carrying HAZMAT | 10. HAZMAT Cars Damaged/Derailed | 11. Cars Releasing HAZMAT | 12. People Evacuated | 13. Division |
|---|---|---|---|---|
| 24 | 1 | 1 | 0 | Pittsburgh |

| 14. Nearest City/Town | 15. Milepost *(to nearest tenth)* | 16. State Abbr | 16. State Code | 17. County |
|---|---|---|---|---|
| Torrance | PT296.3 | N/A | PA | WESTMORELAND |

| 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 |
|---|---|---|---|
| 38 F | 2 | 1 | 1 |

| 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 |
|---|---|---|---|
| #1 Main | 4 | 49 | 4 |

## 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 |
|---|---|---|
| 1 | 1 | 11AC204 |

| 29. Speed *(recorded speed, if available)* R - Recorded E - Estimated | Code | 31. Method(s) of Operation *(enter code(s) that apply)* | 31a. Remotely Controlled Locomotive? |
|---|---|---|---|
| 13 MPH | R | 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)* | 0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter |

30. Trailing Tons *(gross tonnage, excluding power units)*: 9060

Code(s): d | N/A | N/A | N/A | N/A

31a. Remotely Controlled Locomotive?: 0

| 32. Principal Car/Unit | a. Initial and Number | b. Position in Train | c. Loaded *(yes/no)* |
|---|---|---|---|
| (1) First involved *(derailed, struck, etc)* | NS E07546 | 1 | N/A |
| (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 | 36. Cars | Loaded a. Freight | Loaded b. Pass. | Empty c. Freight | Empty d. Pass. | e. Caboose |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Total in Train | 3 | 0 | 0 | 2 | 0 | (1) Total in Equipment Consist | 64 | 0 | 28 | 0 | 0 |
| (2) Total Derailed | 1 | 0 | 0 | 0 | 0 | (2) Total Derailed | 0 | 0 | 0 | 0 | 0 |

| 37. Equipment Damage This Consist | 38. Track, Signal, Way, & Structure Damage | 39. Primary Cause Code | 40. Contributing Cause Code |
|---|---|---|---|
| $50,000.00 | $200.00 | H222 | H605 |

Number of Crew Members

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

Length of Time on Duty

| 45. Engineer/Operator | 46. Conductor |
|---|---|
| Hrs 4 Mi 25 | Hrs 4 Mi 25 |

| Casualties to: | 47. Railroad Employees | 48. Train Passengers | 49. Other |
|---|---|---|---|
| Fatal | 0 | 0 | 0 |
| Nonfatal | 1 | 0 | 0 |

50. EOT Device? 1. Yes 2. No: 1

51. Was EOT Device Properly Armed? 1. Yes 2. No: 1

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 |
|---|---|---|
| 3 | 1 | 227C102 |

| 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? |
|---|---|---|---|
| 0 MPH | R | 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 |

DEPARTMENT OF TRANSPORTATION
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# FRA FACTUAL RAILROAD ACCIDENT REPORT

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| 57. Trailing Tons *(gross tonnage, excluding power units)* | c. Auto train stop<br>d. Cab<br>e. Traffic<br>f. Interlocking | i. Time table/train orders<br>j.Track warrant control<br>k. Direct traffic control<br>l.Yard limits | o. Positive train control<br>p. Other *(Specify in narrative)* Code(s) | 2 = Remote control tower<br>3 = Remote control transmitter - more than one remote control transmitter |
|---|---|---|---|---|
| 2896 | | | d N/A N/A N/A N/A | 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)* | DTTX742189 | 13 | yes | | N/A | N/A |
| (2) Causing *(if mechanical cause reported)* | 0 | 0 | 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 | 63. Cars | Loaded a. Freight | Loaded b. Pass. | Empty c. Freight | Empty d. Pass. | e. Caboose |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Total in Train | 2 | 0 | 0 | 0 | 0 | (1) Total in Equipment Consist | 13 | 0 | 0 | 0 | 0 |
| (2) Total Derailed | 0 | 0 | 0 | 0 | 0 | (2) Total Derailed | 1 | 0 | 0 | 0 | 0 |

| 64. Equipment Damage This Consist | 65. Track, Signal, Way, & Structure Damage | 66. Primary Cause Code | 67. Contributing Cause Code |
|---|---|---|---|
| $198,734.00 | $0.00 | H222 | H605 |

Number of Crew Members / Length of Time on Duty

| 68. Engineer/ Operators | 69. Firemen | 70. Conductors | 71. Brakemen | 72. Engineer/Operator | 73. Conductor |
|---|---|---|---|---|---|
| 1 | 0 | 1 | 0 | Hrs 6 Mi 30 | Hrs 6 Mi 30 |

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

| 77. EOT Device? | 78. Was EOT Device Properly Armed? | 79. Caboose Occupied by Crew? |
|---|---|---|
| 1. Yes 2. No 1 | 1. Yes 2. No 1 | 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 | 81. Was Equipment Attended? | Code | 82. Train Number/Symbol |
|---|---|---|---|---|---|
| | | N/A | 1. Yes 2. No | N/A | N/A |

| 83. Speed *(recorded speed, if available)* | Code | 85. Method(s) of Operation *(enter code(s) that apply)* | | | 85a. Remotely Controlled Locomotive? |
|---|---|---|---|---|---|
| R - Recorded<br>E - Estimated N/A MPH | 0 | a. ATCS<br>b. Auto train control<br>c. Auto train stop<br>d. Cab<br>e. Traffic<br>f. Interlocking | g. Automatic block<br>h. Current of traffic<br>i. Time table/train orders<br>j.Track warrant control<br>k. Direct traffic control<br>l.Yard limits | m.Special instructions<br>n. Other than main track<br>o. Positive train control<br>p. Other *(Specify in narrative)* Code(s) N/A N/A N/A N/A N/A | 0 = Not a remotely controlled<br>1 = Remote control portable<br>2 = Remote control tower<br>3 = Remote control transmitter - more than one remote control transmitter N/A |
| 84. Trailing Tons *(gross tonnage, excluding power units)* 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)* | 0 | 0 | N/A | | N/A | N/A |
| (2) Causing *(if mechanical cause reported)* | 0 | 0 | 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 | 90. Cars | Loaded a. Freight | Loaded b. Pass. | Empty c. Freight | Empty d. Pass. | e. Caboose |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Total in Train | 0 | 0 | 0 | 0 | 0 | (1) Total in Equipment Consist | 0 | 0 | 0 | 0 | 0 |
| (2) Total Derailed | 0 | 0 | 0 | 0 | 0 | (2) Total Derailed | 0 | 0 | 0 | 0 | 0 |

| 91. Equipment Damage This Consist | 92. Track, Signal, Way, & Structure Damage | 93. Primary Cause Code | 94. Contributing Cause Code |
|---|---|---|---|
| $0.00 | $0.00 | N/A | 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 |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | Hrs 0 Mi 0 | Hrs 0 Mi 0 |

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

| 104. EOT | 105. Was EOT Device Properly | 106. Caboose Occupied by Crew? |
|---|---|---|
| 1. Yes 2. No N/A | 1. Yes 2. No N/A | 1. Yes 2. No N/A |

## Highway User Involved

| 107. | Code |
|---|---|
| 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)* | N/A |

| 108. Vehicle Speed *(est. MPH at impact)* | 109. *geographical)* 1.North 2.South 3.East 4.West | Code |
|---|---|---|
| N/A | | N/A |

## Rail Equipment Involved

| 111. Equipment | Code |
|---|---|
| 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)* | N/A |

| 112. Position of Car Unit in |
|---|
| N/A |

| 110. Position | Code |
|---|---|
| 1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped | N/A |

| 113. Circumstance | Code |
|---|---|
| 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? | Code |
|---|---|
| 1. Highway User 2. Rail Equipment 3. Both 4. Neither | N/A |

| 114b. Was there a hazardous materials release | Code |
|---|---|
| 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 |
|---|---|---|---|---|
| | 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 |

| 116. Signaled Crossing *(See instructions for codes)* | Code |
|---|---|
| | N/A |

| 117. Whistle | Code |
|---|---|
| 1. Yes 2. No 3. Unknown | N/A |

| 118. Location of Warning | Code |
|---|---|
| 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach | N/A |

| 119. Crossing Warning with Highway Signals | Code |
|---|---|
| 1. Yes 2. No 3. Unknown | N/A |

| 120. Crossing Illuminated by Street Lights or Special Lights | Code |
|---|---|
| 1. Yes 2. No 3. Unknown | N/A |

| 121. Age | 122. Driver's Gender | Code |
|---|---|---|
| N/A | 1. Male 2. Female | N/A |

| 123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train | Code |
|---|---|
| 1. Yes 2. No 3. Unknown | N/A |

| 124. Driver | Code |
|---|---|
| 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)* | N/A |

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

| 126. View of Track Obscured by *(primary obstruction)* | Code |
|---|---|
| 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 | N/A |

| Casualties to: | Killed | Injured |
|---|---|---|
| 129. Highway-Rail Crossing Users | N/A | N/A |

| 127. Driver | Code |
|---|---|
| 1. Killed 2.Injured 3. Uninjured | N/A |

| 128. Was Driver in the Vehicle? | Code |
|---|---|
| 1. Yes 2. No | N/A |

| 130. Highway Vehicle Property Damage *(est. dollar damage)* |
|---|
| N/A |

| 131. Total Number of Highway-Rail Crossing Users *(include driver)* |
|---|
| N/A |

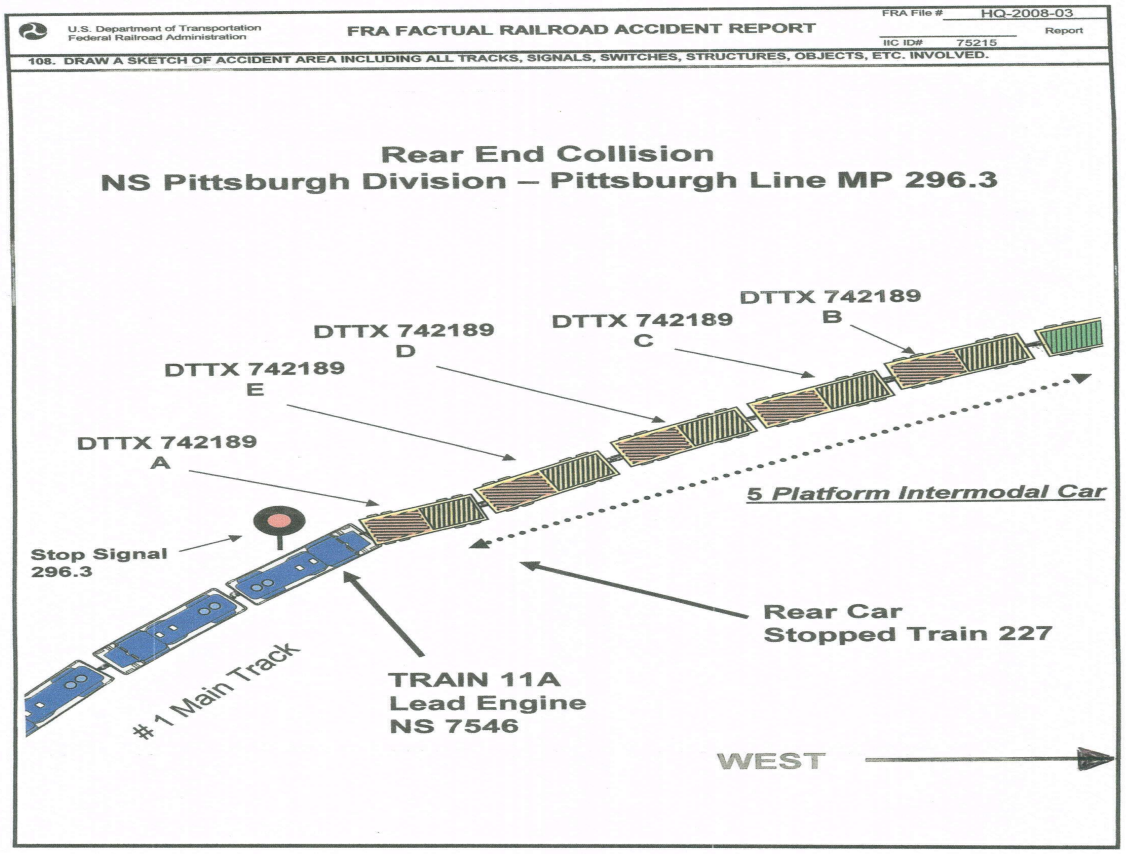
| 132. Locomotive Auxiliary Lights? | Code |
|---|---|
| 1. Yes 2. No | N/A |

| 133. Locomotive Auxiliary Lights Operational? | Code |
|---|---|
| 1. Yes 2. No | N/A |

| 134. Locomotive Headlight Illuminated? | Code |
|---|---|
| 1. Yes 2. No | N/A |

| 135. Locomotive Audible Warning Sounded? | Code |
|---|---|
| 1. Yes 2. No | N/A |

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



137. SYNOPSIS OF THE ACCIDENT

Westbound Norfolk Southern (NS) freight train 227C1-02, with assisting helper locomotives, collided with the rear of stopped NS train 11AC2-04. The rear end collision impact derailed the last car of the stopped train and the lead locomotive of the moving train. The rear end collision occurred at 12:30 pm EST, January 4, 2008 in a remote mountainous area of Pennsylvania between the communities of Bolivar and Torrance on the NS Pittsburgh Line at Milepost (MP) 296.3 in Westmoreland County.

A railroad conductor was taken to a nearby hospital and treated for injuries received after jumping from the locomotive prior to the collision. A highway box container, loaded with gallon cans of paint, was destroyed causing paint to leak onto the ground. Emergency response personnel used absorbent material to soak up the paint. The nearby Conemaugh River was not affected and the leak did not result in any evacuations. The derailment blocked both main tracks of the NS Pittsburgh Main Line. Main Track # 2 was cleared of the wreckage and eastward rail traffic resumed at 9:45 p.m. Passengers of a westward Amtrak passenger train were bussed from Altoona to Pittsburgh. Eighteen NS freight trains were delayed.

Equipment damage was $248,734 with track damage set at $200. No Signal Damage occurred.

At the time of the accident it was daylight with sunshine and scattered clouds. The temperature was 36 degrees F and the wind was gusting from the southwest at 10 to 15 MPH. Six to eight inches of old snow remained on the ground.

PROBABLE CAUSE:

The accident was caused by the NS crew's failure to comply with a block signal displaying a restricted proceed indication. The crew also failed to comply with the indication of an approach signal, and the requirements of restricted speed.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

NS TRAIN 227C102:

The crew of NS Intermodal Train 227C1-02 included a locomotive engineer and conductor. The crew first went on duty at 6:00 am EST on January 4, 2008 in their home terminal at Harrisburg, Pennsylvania. The employees live in the Harrisburg area and operate trains between Harrisburg and Conway, Pennsylvania. All employees had received more than the required statutory off duty rest period prior to reporting for duty.

NS Train 227C1-02 consisted of two locomotives, NS 7621 and NS 8958, and 13 loaded intermodal cars. Ten of the cars were 5-well articulated cars, two cars were 3-unit cars, and one car was a single conventional container flat car. Four cars contained a total of six containers with hazardous material. The train was 3,293 feet in length with 2,896 trailing tons. NS Train 227C1-02 was equivalent in length to a conventional 57 car train. End-of-Train Device (EOTD) # 42079 was attached to the last car. A Class 1 Air Brake Test was performed in Harrisburg at 7:32 am EST prior to departure.

NS STANDING TRAIN 11AC2-04:

The crew of NS Freight Train 11AC2-04 included a locomotive engineer, locomotive engineer trainee, conductor, and conductor trainee. NS Train 11AC2-04 was also assisted by a two person helper engine crew on the rear of the train. All employees had received more than the required statutory off duty rest period prior to reporting for duty.

The locomotive engineer had 9 years of railroad service and worked the last two years as a locomotive engineer. The conductor was hired in October 2005 and had been a promoted conductor for two years. The engineer trainee had three years of railroad experience and started training as an engineer two months prior to the accident. The conductor trainee had been in the training program for two months. The 11AC2-04 train

crew first went on duty at 8:05 am EST at Rose Yard in Altoona, Pennsylvania. The commute time from each employee's home to Rose Yard was twenty to thirty-five minutes.

HELPER CREW (Designated C8A):

The locomotive engineer had 33 years of service and worked as a locomotive engineer since 1991. The helper conductor had 33 years of service. The helper crew first went on duty at 8:00 am EST at Rose Yard. All employees had received more than the required statutory off duty rest period prior to reporting for duty.

NS Train 11AC2-04 consisted of three locomotives, NS 7546, NS 6676 & NS 3039, and 64 loaded and 28 empty rail cars totaling 92 rail cars. NS Train 11AC2-04 consist included 11 loaded and 13 empty residue hazardous material cars. The train was 6,927 feet in length with 9,060 trailing tons. Train 11AC2-04 was also equiped with EOTD # 71454. NS engines 3344 & NS 3362 were the rear helper locomotives.

Carrier records indicate a Class 1 Air Brake Test was performed on the 92 car train January 3, 2008 at Pavonia Yard near Camden, New Jersey.

NS outbound train 11AC2-04 and C8A rear helper crews received Dispatcher Bulletins AE1 3397, AW2 2843, CP3 3055, PW2 4045, SUP 0005, 7S4 1331 at Altoona. The bulletins contained a 25 MPH speed restriction on # 1 and # 2 Main Tracks at CP Conpit, and stop orders for engineering department employees working on # 2 and # 3 Main Tracks at CP Conpit and # 1 Main Track at CP Trobe. NS Train 11AC2-04 was restricted to 50 MPH by Timetable Special Instructions. A 40 MPH permanent speed restriction was in effect for freight trains just prior to the derailment site between MP 295 and MP 296.

NS Train 11AC2-04 arrived in Altoona about one hour after the outbound crew's call time. The train stopped on # 2 Main Track at Control Point (CP) Works at MP 235.7. NS inbound train crew reported no problems with the train during their trip. The NS outbound crew reviewed the train documentation and air brake slip. The engineer and engineer trainee inspected the locomotives. The lead two locomotives were working but the third locomotive was tagged as not good for power. The daily locomotive inspection and cab signal inspection records were also checked.

The rear helper crew of C8A, boarded their locomotives on # 3 Relay Track. The two helper locomotives were attached to the rear of train 11AC2-04 near the Rose Yard Office at CP Homer (MP 234). The engineer reported no problems with the helper locomotives. A second two unit helper (NS Engine 3368 lead) was also added to the head-end of the train prior to departing CP Works. An air brake test was performed after the lead and rear helper engines were attached. Westward trains leaving Altoona must climb a heavy 1.6 % to 2.28 % mountain grade from Altoona to Gallitizin Summit at MP 247.6.

NS Train 11AC2-04 crossed from # 2 to # 3 Main Track at CP Works and departed Altoona at 9:45 am with the lead helper engineer at the controls of the train. Train 11AC2-04 proceeded westward up the mountain on # 3 Main Track to CP UN at MP 248.5 where the train crossed from # 3 to # 4 Main Track. The train received clear signal indications from Altoona to CP MO. NS Train 11AC2-04 stopped at CP MO for the lead helper crew to detach their locomotives. The rear helper remained attached.

The locomotive engineer trainee assumed control of the train at CP MO. NS Train 11AC2-04 departed CP MO with a clear signal indication and crossed from # 4 Main Track back to # 3 Main Track continuing westward on a maximum 1.05 % descending grade between Gallitizin and Johnstown, Pennsylvania. The crew reported an approach signal indication at Summer Hill (MP 263.7). The engineer trainee stopped the train east of the westward signal bridge at CP South Fork. (MP 266)

The train dispatcher contacted the crew of train 11AC2-04 via radio and told the crew they would be held at South Fork for NS Train 227C1-02 to pass on Track #2 Main Track (NS Train 11AC2-04 was stopped on #3 Main Track). The dispatcher also told the 11AC2-04 crew they would be following NS Train 227C1-02. NS Train 227C1-02 crossed from # 2 to # 1 Main Track at South Fork. NS Train 11AC2-04 crossed from # 3 to # 1 Main Track at South Fork after receiving a medium clear cab signal indication. The train continued west reporting clear signals until receiving an approach cab signal indication at MP 286.7. The engineer of NS Train 11AC2-04 called the signal display over the radio and the rear helper crew acknowledged the approach signal indication (the train's engineer took over operation of the train at approximately MP 280). The engineer throttled down and went to full dynamic brake. A short while later the cab signal display went to clear with the

wayside signal at Conpit also displaying a clear signal indication. Train speed was kept to 25 MPH until the rear of the train had passed through the slow order area in the Conpit Interlocking at MP 290.6. Dispatcher train movement records indicate that NS Train 11AC2-04 passed by Conpit at 12:20 pm EST.

The engineer was seated at the engineer's consol on the west/right front side of the lead locomotive; the engineer trainee was sitting in a jump seat behind the engineer and toward the center of the locomotive cab; the conductor trainee was sitting in the left front seat; and the conductor was seated behind the conductor trainee in the left rear seat.

The helper crew was operating from their trailing/eastward headed locomotive. The helper engineer was seated at the control console on the right front side of the locomotive and the conductor was seated in the left rear seat. Both employees were facing east.

The Pittsburgh Line in mostly river grade from MP 291 to MP 293 increasing to .03 % ascending grade westward between MP 293 and MP 296. The collision occurred in the full body of a 2 degree right hand curve at NIP 296.3. The ascending grade increases to just under .30 % between MP 296 and MP 297.

THE ACCIDENT

NS TRAIN 227C1-02:

NS Train 227C1-02 had been stopped 10 minutes before it was struck by NS Train 11AC2-04. The crew was contacted by the train dispatcher, via radio, at Conpit and told they would be stopping behind two westbound trains at CP Pack (MP 300.5). The head end of NS Train 227C1-02 was stopped at MP 297 with its rear car stopped one car length west of MP 296.3. The air brakes were applied. The crew of NS train 227C1-02 was thrown from their seats by the impact. Reportedly they were not inured.

NS TRAIN 11AC2-04:

The engineer of NS Train 11AC2-04 throttled up to Run 8 position after the helper reported the train clear of the 25 MPH speed restriction at Conpit. The engineer said his train was heavy and he was attempting to get the train back to its authorized speed of 50 MPH.

NS Train 11AC2-04 had a clear signal indication at MP 292.8 and received an approach signal indication on both the cab signal display and wayside signal at MP 294.5. The recorded train speed was 43 MPH. The cab signal display went to a restricting signal indication at MP 295.5. Event recorder data shows the train air and dynamic brakes were not applied for nearly a half mile beyond the restricting cab signal indication. The speed was 40 MPH. The crew of NS Train 11AC2-04 was unable to stop before striking the rear of stopped NS Train 227C--02 at MP 296.3

The four employees on the lead end of NS Train 11AC2-04 and the two crew members aboard Helper consist C8A underwent 49 CFR Part 219 Subpart C toxicalogical testing at a nearby hospital.

CAR DAMAGE & HAZARDOUS MATERIALS:

The last car in NS Train 227C1-02 was a loaded five unit articulated deep-well intermodal container car and the last platform held two loaded 20 foot containers in the bottom well with an empty 40 foot container on top. One of the 20 foot containers displayed flammable placards.

The collision split the last platform of the articulated deep-well car shoving the empty top 40 foot container and the loaded/placarded 20 foot container off the car towards the south side of the train. The impact caused severe damage to the placarded container crushing one gallon cans of palletized paint. Paint spilled over a 20 by 30 foot area at the collision site. NS estimated 100 gallons of paint leaked from the containers. Car damage was $198,734.

RESPONDERS:

REACT Environmental Services managed the clean-up and salvage the container loads of paint. An emergency response summary was provided. R.J.Corman Company provided off track equipment for

rerailing rail cars and track and structure repair.

LOCOMOTIVE DAMAGE:

The first and third axles on the lead truck of NS Train 11AC2-04 locomotive NS 7546 derailed. The unit sustained structural damage to the front pilot assembly. Locomotive damage was $50,000.

ANALYSIS AND CONCLUSIONS:

Authority for main track movement is via NORAC Rule 261 (track signaled in both directions) and Cab Signal System Rules (550 through 563). General Signal Rules are also in effect.

An NS equipment identification (AEI) scanner, located near New Florence, shows NS Train 227C1-02 went by the scanner at 11:58 a.m. and NS Train 11AC2-04 passed the scanner at 12:18 pm EST. The scanner is located about 10 miles prior to the collision site. Crew interviews and NS train 227C1-02 lead locomotive event recorder confirmed that the train was stopped 10 minutes before the collision.

Carrier radio voice logs show that NS Train 227C1-02 called an approach signal on # 1 track at MP 294 at 12:10 p.m. An NS Equipment Detector announced 'no defects track one' at 12:11 p.m. EST after NS Train 227C1-02 passed the detector at MP 294.6. (Time logs of equipment detectors, locomotive event recorders, and radio communication may vary slightly but elapsed time between events remains constant.)

Carrier radio logs indicate NS Train 11AC2-04 identified the following signals:

| | |
|---|---|
| MP 292.8 | Clear 12:24:46 pm EST |
| MP 294.5 | Approach 12:27:30 pm EST |
| NW 295.5 | Restricting (cab signal) 12:29:25 pm EST |

The NS equipment detector at MP 294.6 made another announcement at 12:29:49 p.m. EST indicating 'track one no defects' after NS Train 11AC2-04 passed the same detector. One additional communication was recorded at 12:29:41 p.m. EST stating 'Train 227V1-02 just cleared the signal and made a stop.'

The helper contacted the head end of NS Train 11AC2-04 at 12:29:41 p.m. EST asking about 'a dropped cab signal.' The crew of NS Train 11AC2-04 responded "down to restricting in the cab." The last radio communication between the helper crew and the head end crew of NS Train 11AC2-04 was logged at 12:23:55 p.m. EST when the helper crew said the rear of NS Train 11AC2-04 was by the speed restriction at Conpit. The helper crew said they never heard the calling of the approach signal.

NS Train 227C1-02 speed at MP 294.5 was 43 MPH as indicated by the event recorder from the lead locomotive at MP 7546. The throttle was reduced from the Run #8 position to the Run #2 position before the lead engine had passed the wayside approach signal. The throttle was reduced to idle after passing the signal. Train speed increased to 44 MPH. The cab signal display went to a restricting signal indication at MP 295.5 about 5000 feet west of the approach signal. Train speed was recorded at 44 MPH and the throttle was in the idle position. The throttle remained in the idle position another 35 to 40 seconds as the train moved an additional 2,600 feet beyond the point of receiving the restricting cab signal indication. Train speed had reduced to 40 MPH. A train crew member initiated an emergency train air brake application about 10 seconds later. The event recorder log shows the dynamic and locomotive brakes being fully applied several seconds following the initial emergency application. NS Train 11AC2-04 went another 1,533 feet after full emergency before striking the rear car of stopped NS Train 227C1-02. The recorded speed at impact was 13 MPH. The last car of Train 227C1-02 was located 53 feet west of wayside number board signal 296.3. NS Train 11AC2-04 stopped approximately 9,671 feet west of the location where first receiving the approach signal indication.

The helper engines remained in the Run #7 throttle position until 48 seconds before the emergency application with the helper engineer reducing his throttle to the Run #2 position just several seconds before the train went into emergency. The event recorder of NS Locomotive 3362 recorded the speed at 40 MPH.

The conductor on NS Train 11AC2-04 jumped from the lead locomotive several seconds before impact. He

landed on the north side of the train along # 2 Main Track. Subsequent to being transported, he was treated and released from a nearby hospital. He sustained a concussion, head, chin and arm lacerations, a broken thumb and bruises to his arms and legs. He received staples for the head laceration and a prescription for pain medication.

The conductor trainee called the approach signal indication but the conductor could not remember if the helper crew responded. The conductor said he heard the engineer call the restricting cab signal indication to the helper crew; he believes the helper crew responded, but was not sure of the response.

The conductor acknowledged seeing the approach and restricting signals indications. He said the train speed was coming down but not as fast as he wanted. He remembered hearing the locomotive's dynamic brakes. The conductor said the train came around a bend, he thought he saw a rear end marker and he pulled the emergency brake valve. He saw the rear of NS Train 227C1-02 and knew they were going to collide.

The engineer acknowledged seeing the approach and restricting signal indications. He said he throttled down after seeing the approach signal indication and was attempting to use the curves and (ascending) railroad grade to slow the train. The engineer said his cab signal display dropped to a restricting indication at MP 295; he called the signal to the helper, via radio, and went to full dynamic brake application. He indicated the helper crew acknowledged the signal indication.

The lead engineer said the curves usually bring the train speed right down, with or without the helper locomotives, but NS Train 11AC2-04 did not slow quite as fast as usual. He said he heard someone from the crew of NS Train 227C1-02 announce over the radio they were stopped. The engineer said his train rounded several s-curves and he observed the rear of the stopped train. NS Train 11AC2-04 was estimated to be 13 to 15 car lengths east of the westbound signal when the engineer placed the train into emergency and the crew braced themselves for the collision. The most restrictive indication of Signal 296.3 is 'proceed at restricted speed.' The signal continued to display the indication following the collision. The collision occurred in a two degree right hand curve.

FRA interviewers asked the engineer what was required by an approach signal indication and he replied "approach the next signal prepared to stop." The engineer was asked about what a restricting signal indication required and he replied he would have "used the air to stop" if he knew Train 227C1-02 was stopped. He said he usually operates slower. The crew members said they knew Train 227C1-02 was ahead but the train dispatcher did not tell the 11AC2-04 crew that he (the dispatcher) would be instructing the train to stop.

The engineer and engineer trainee said the extended range dynamic brakes on their lead locomotives were working properly. The third locomotive was isolated. Cycle braking (combination of air brakes and dynamic brakes) was used when coming west down the mountain from MO. The engineer had not used the air brakes since assuming control of the train. The engineer said he thought he and the conductor placed the train into emergency at the same time.

Employees on the lead engine said they called the cab and wayside signals to each other while the conductor trainee had been calling the signals over the radio. Employees say carrier rules do not require a radio reply from the helper crew. Crew members said there was a little more radio chatter than usual because of engineering forces working at Conpit. The engineer and engineer trainee believe the four man crew in the operating cab of the locomotive was a contributing factor in the collision.

ANALYSIS - TRACK GRADE & CURVATURE:

Preceding the collision site and track description at the collision site at MP 296.3 the Pittsburgh Line is river grade with mostly 0.0 % grade westward between MP 291 and MP 293 increasing to a 0 .03 % ascending grade westbound between MP 293 and MP 296. The westbound grade increases to about 0.30 % between MP 296 and MP 297. The line has two 2-degree curves and one 3.3-degree curve between MP 291 and MP 294.5. The rail line has four curves between MP 294.5 and MP 296.1 including a half mile 4-degree right curve beginning at MP 294.9 changing to a half mile 4.3-degree left curve beginning at MP 295.5 and continuing to MP 296.1. The derailment site was located in a remote mountainous area along the Conemaugh River.

The collision occurred in the full body of a 2 degree right hand curve with the super elevation measuring 2 1/2

inches. This location has a .3% ascending grade. Track # one consists of 136 pound continuous welded rail (CWR), supported by wood ties and granite rock ballast. Double shoulder tie plates measuring 18 by 7 3/4 inches are located on the high side of the curve and 14 by 7 3/4 inches are located on the low side of the curve. Spiking pattern is one rail holding spike inside and out and one anchor spike inside and out on both high and low sides of the curve. The anchor pattern consisted of every other tie box anchored using a standard spring type anchor. Track damage was determined to be $200.

CONCLUSION:

Track grade & curvature preceding and at the derailment site was not a factor in the collision.

ANALYSIS - SIGNAL SYSTEM:

NS TRAIN 11AC2-04 crew employees, interviewed by FRA inspectors, reported that locomotive cab signals and wayside signals were working properly. One employee reported some visibility problem because of the bright sun-light. The daily cab signal inspection record for lead locomotive NS 7546 reveals that the system was functioning with a confirmed penalty application test. The inspection was performed in Reading, Pennsylvania at 6:00 a.m. January 4, 2008.

The method of train operation on the Pittsburgh Line between Control Point (CP) Conpit and CP Pack at MP 300.5 is Traffic Control System (TCS), Rule 261, Wayside and Cab Signaled territory. Trains are under the direction of a NS Train Dispatcher, located in the NS Dispatch Center in Greentree, PA. The signal system between CP Conpit and CP Pack utilizes color light wayside signals, coded DC track circuits, vital relays and electronic invertors for the Cab signaling. The lead locomotive, NS 7546, utilizes Ultra Cab H onboard Cab signal equipment.

An NS signal supervisor interviewed the NS Train 11AC2-04 crew following the collision. He was told the signals were operating properly up to and at the time of impact. NS signal personnel conducted tests on the system. Signal cases and equipment where sealed at the wayside signal location NW 296.3, (accident site), CAB signal cut-section at MP 295.5, and the wayside signal at MP 294.6. An FRA signal inspector also conducted an inspection of the system. NS personnel were observed performing multiple tests and maintenance records were reviewed. It was determined the the signaling system was operating as intended. NS reported no damage to the signaling system.

CONCLUSION:

The signaling system was operating as intended and was not a factor.

ANALYSIS - POST ACCIDENT TRAIN AIR BRAKE AND LOCOMOTIVE INSPECTIONS:

NS mechanical personnel conducted an air brake inspection of all 92 cars in NS Train 11Ac2-04 prior to the train being removed from the collision site. Results indicate that 91 of the 92 brakes were operative in the full service brake position.

Reports indicate that 92 day inspections of NS Train 11AC2-04 and C8A helper locomotives were current. Daily inspections were also current. NS Locomotive 3039 was not loading, the unit was isolated, and the locomotive was tagged indicating the problem.

CONCLUSION:

There were no problems with the operative locomotives. Inspections were current and car air brakes were operable. Equipment and braking systems were not a factor in the collision.

ANALYSIS - ENGINEER CERTIFICATION AND TRAINING:

Locomotive engineer certificates, hearing & vision testing, driver license checks and other training were current and in compliance with 49 CFR Part 240. The lead engineer's qualification certificate was issued 1/1/2008 with his latest check ride monitoring event recorded on 7/3/2007. No exceptions were recorded on the carrier evaluation document. Supervisors also reviewed an event recorder download on 5/16/2007 with

no exceptions noted. The helper engineer's certificate was issued 11/1/2006 with his latest check ride monitoring event recorded on 2/16/2007. Carrier evaluation documents show one exception relative to terminal pre-trip preparation. The student engineer's certificate was issued 10/1/2007.

NS suspended the engineer certifications of the NS Train 11Ac2-04 and C8A locomotive engineers and locomotive engineer trainees pending the outcome of an investigation. (49 CFR Part 240.217)

CONCLUSION:

Engineer training, monitoring rides, and certification was current and not a factor in the collision.

ANALYSIS - OPERATING RULES & TRAINING:

Carrier records show all employees received the following training in 2007:
Operating Rules, Class 1 Air Brake Instruction, Hazmat, Signal, and Security Awareness Training.

CONCLUSION:

Training was current and not a factor in the collision.

ANALYSIS - EMPLOYEE WORK RECORDS & DISCIPLINE:

Two employees have in excess of 30 years rail service. No major operating rule violations or personal injuries were discovered in the review of carrier records.

CONCLUSION:

Work history and discipline issues were not a factor in the collision.

ANALYSIS - EFFICIENCY TESTING:

NS records indicate supervision conducted 594 efficiency tests over a six month period of the six employees on NS Train 11AC2-04 and the C8A helper crew. Testing consisted of
204 observations and 390 tests. Three failures were reported; one failure was relative to the wearing of personal protective equipment and two failures were noted for a helper crew not properly calling a signal. Testing was conducted with-in the guidelines of the NS Efficiency Testing Program.

FRA focused on speed and signal compliance for the portion of the Pittsburgh Line that extends between Altoona and Pittsburgh. Reportedly 103 speed and signal tests were conducted on the NS Train 11AC2-04 and C8A employees in the six month period from July 4, 2007 through January 4, 2008. NS supervisors exceeded the minimum plan requirements for engineer testing in Category I Testing, (approach & stop signal tests), Category 2 Testing, (restricted speed tests), and Category 3 Testing (Speed restriction tests).

The tests were conducted on the Pittsburgh and Harrisburg Divisions. Employees may work on more than one division. The Pittsburgh Line Subdivision extends from Pittsburgh to Harrisburg, Pennsylvania. A total of 13,977 speed and signal related operational tests were recorded during 2007 for all employees working on the entire length of Pittsburgh Line between Harrisburg and Pittsburgh. Supervisors made an additional 4,834 speed and signal compliance observations of all employees.

NS supervisors conducted nine efficiency tests at Conpit (MP 290.6) from July through December 2007 in the vicinity of the collision site. Conpit was the closest location to the MP 296.3 derailment site where efficiency tests were conducted. Eighteen tests were performed at MP 265, six tests at MP 266, two tests at MP 274.4, two tests at MP 288 and one test at MP 289.

CONCLUSION:

Carrier efficiency testing does not appear to be a factor in the collision.

ANALYSIS - 49 CFR PART 219 SUBPART C TESTING:

The FRA Post-Accident Forensic Toxicology Result Reports indicates the six employees tested had negative test results. The employees underwent testing at Conemaugh Hospital in Johnstown, PA.

CONCLUSION:

FRA Post Accident Testing of employees had negative results. Intoxication or drug use was not a factor.

ANALYSIS - FATIGUE:

FRA obtained fatigue related information, including a ten day work history for the six employees involved in the collision.

CONCLUSION:

Crew fatigue was not a factor in the collision.

ANALYSIS -APPLICABLE NORAC OPERATING RULES:

Medium Speed - Not exceeding 30 MPH (Page 7 definitions)

Rule # 80- Restricted speed requires controlling the movement to permit stopping within one half the range of vision short of other trains or railroad equipment, obstructions, switches not properly lined, derails set in the derailing position and any signal requiring a stop.

Rule # 80.1- (System Section Northern Region Timetable 3) Freight trains must not exceed 15 MPH when operating at restricted speed.

Rule # 94(a)- Employees qualified on the operating rules and located on the leading engine or car must be on the lookout for signals affecting the movement of their train. They must communicate to each other in a clear manner the name of each signal. Any change in signal must be communicated.

(3rd paragraph) When a train is not operated in accordance with the requirements of a signal indication or restriction, qualified employees located on the leading engine or car must communicate with the engineer immediately. If necessary, they must stop the train.

Rule # 94.1- (System Section Northern Region Timetable 3) A crew member on the controlling locomotive will communicate, by radio, the name and location of each signal affecting movement as soon as the signal becomes clearly visible.

Rule # 245- Unexpected signal changes — If a train operating on a signal indication more favorable than approach encounters a stop signal stop and proceed, or restricting signal, the train must: (1) comply with the signal indication consistent with good train handling, unless conditions require an emergency brake application.

Rule # 285- Approach Signal - Proceed prepared to stop at the next signal. Trains exceeding medium speed must begin reduction to medium speed as soon as the engine passes the approach signal.

Dispatcher Bulletin # SUP 0005 dated Sept 4, 2003 Item 003 requires all employees to discuss requirements of NORA Rule 285, Approach Signal as part of job briefing.

Rule # 290- Restricting Signal - Proceed as restricted speed until the entire train has cleared all interlocking and spring switches. If signal is an interlocking or CP signal and the leading wheels have: 1) passed a more favorable fixed signal, or 2) entered non-signaled DCS Territory.

Rule # 291- Restricted Proceed Signal — Proceed at restricted speed until the entire train has cleared all interlocking and spring switches (if signal is an interlocking or CP signal) and the leading wheels have: (1) passed a more favorable fixed signal, or (2) entered non-signaled DCS territory. In cab signal system territory, trains with operative cab signals must not increase their speed until they have run one train lengths or 500

feet (whichever distance is greater) past a location where a more favorable cab signal was received. (Rule revised May 23, 2005 on NS territory governed by NORA Operating Rules) The change is a continuing reissue item and is located in NS Operations Bulletin # 1, effective January 1, 2008, Item 16.

Rule # 553- (When a cab signal changes to restricting between fixed signals the engineer must take action to at once reduce to restricted speed.

Rule # 956- Observing signals; moving engine — Engine service employees will be responsible for the observance of all signals and for controlling movements accordingly. To prevent injury to persons, damage to property and lading, and to avoid collisions and derailments they must: (I) regulate the speed of their train, and (2) exercise discretion, care and vigilance in moving their train.

CONCLUSION:

Carrier has specific rules and procedures in place. Train crew employees failed to comply with signal indications and requirements of restricted speed.

ANALYSIS - NS CAUSE CODES AND REPORTING:

Norfolk Southern listed the primary cause code of the derailment as H222 - Automatic block or interlocking signal displaying other than a stop indication-failure to comply, and listed a contributing cause code of H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

NS, following a carrier investigation, terminated the employment of all NS Train 11Ac2-04 and C8A employees except the conductor trainee who was not a qualified employee.

CONCLUSION:

NS cause codes correspond with FRA findings.

OVERALL CONCLUSIONS:

The helper crew did not hear or acknowledge an approach signal. The lead crew failed to determine if the helper crew heard the calling of the approach signal. The lead engineer throttled down but did not place the dynamic brake controller to the 'set-up position'. The helper engineer continued to shove in the Run #7 throttle position for an additional mile. Carrier rules require train speed to be reduced to medium speed (30 MPH) as soon as the lead engine passes the signal. The rule also requires trains to approach the next signal prepared to stop. Train speed was not reduced and slightly increased. NS Train 11AC1-02 cab signal display went to restricting at MP 295.5; the helper started to throttle down with speed still at 40 MPH. The event recorder shows another 35 to 40 seconds passed before the lead engineer went to dynamic brake. (The recorder indicates this was about the same time the train was placed into emergency). Engine air brakes went to full application but maximum dynamic braking current did not have a chance to fully develop because of the emergency air brake application and relatively short distance to impact. Carrier cab signal rules require the engineer to take action at once to reduce to restricted speed when receiving a restricting cab signal indication. (At 40 MPH the train continued moving at 58.61 feet per second).

PROBABLE CAUSE AND CONTRIBUTING FACTORS:

As a result of the investigation FRA concurred with the Norfolk Southern's findings that the crew of NS Train 11AC2-04 failed to comply with a block signal displaying a restricted proceed indication. The crew also failed to comply with an approach signal indication and the requirements of restricted speed. (FRA Cause Codes) H222 - Failure to comply with automatic or interlocking signal displaying other than a stop signal and contributing code H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking siignal.