Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-102

Norfolk Southern (NS)
Bluestone, West Virginia
November 20, 2005

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-2005-102

1.Name of Railroad Operating Train #1: Norfolk Southern Corp. [NS]	1a. Alphabetic Code: NS	1b. Railroad Accident/Incident No.: 023028
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident: N/A
3.Name of Railroad Responsible for Track Maintenance: Norfolk Southern Corp. [NS]	3a. Alphabetic Code: NS	3b. Railroad Accident/Incident No.: 023028
4. U.S. DOT_AAR Grade Crossing Identification Number:	5. Date of Accident/Incident: Month 11 / Day 20 / Year 2005	6. Time of Accident/Incident: 07:24:00 ☐ AM ☑ PM

7. 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): 01

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
11	1	0	0	Pocahontas

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Bluestone	N373.6	N/A	WV	MERCER

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

21. Track Name/Number	22. FRA Track Class (1-9, X)	Code	23. Annual Track Density (gross tons in millions)	24. Time Table Direction 1. North 3. East	Code
Main 1		2	37.9		3

OPERATING TRAIN #1

25. 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	26. Was Equipment Attended? 1. Yes 2. No	Code	27. Train Number/Symbol
	1	1		194U220

28. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	30. Method(s) of Operation (enter code(s) that apply)	30a. Remotely Controlled Locomotive?
20 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: 0

29. Trailing Tons (gross tonnage, excluding power units): 9657

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

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	12	no
(2) Causing (if mechanical cause reported)	NS 487966	13	yes

32. 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

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

34. 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	3	0	0	1	0
(2) Total Derailed	0	0	0	0	0

35. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	75	0	17	0	0
(2) Total Derailed	13	0	7	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
370450	100000	E39C	N/A

Number of Crew Members				Length of Time on Duty	
40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen	44. Engineer/Operator	45. Conductor
N/A	0	1	0	Hrs 8 Mi 54	Hrs 8 Mi 54

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	0

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

50. Was EOT Device Properly Armed? 1. Yes 2. No: N/A

51. Caboose Occupied by Crew? 1. Yes 2. No: N/A

OPERATING TRAIN #2

52. 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	53. Was Equipment Attended? 1. Yes 2. No	Code	54. Train Number/Symbol
	N/A	N/A		N/A

55. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	57. Method(s) of Operation (enter code(s) that apply)	57a. Remotely Controlled Locomotive?
0 MPH	N/A	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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56. Trailing Tons (gross tonnage, excluding power units): 0

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

2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: N/A

58. 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

59. 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

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

61. 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

62. 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

63. Equipment Damage This Consist: 0

64. Track, Signal, Way, & Structure Damage: 0

65. Primary Cause Code: N/A

66. Contributing Cause Code: N/A

Number of Crew Members

67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen
0	0	0	0

Length of Time on Duty

71. Engineer/Operator: Hrs 0 Mi 0

72. Conductor: Hrs 0 Mi 0

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	0	0	0
Nonfatal	0	0	0

76. EOT Device? 1. Yes 2. No: N/A

77. Was EOT Device Properly Armed? 1. Yes 2. No: N/A

78. Caboose Occupied by Crew? 1. Yes 2. No: N/A

Highway User Involved

79. Type: 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

80. Vehicle Speed (est. MPH at impact): 0

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

82. Position: 1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped. Code: N/A

86a. 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

Rail Equipment Involved

83. 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

84. Position of Car Unit in Train: 0

85. Circumstance: 1. Rail Equipment Struck Highway User; 2. Rail Equipment Struck by Highway User. Code: N/A

86b. Was there a hazardous materials release by: 1. Highway User 2. Rail Equipment 3. Both 4. Neither. Code: N/A

86c. State here the name and quantity of the hazardous materials released, if any.
N/A

87. Type of Crossing Warning: 1.Gates; 2.Cantilever FLS; 3.Standard FLS; 4.Wig Wags; 5.Hwy. traffic signals; 6.Audible; 7.Crossbucks; 8.Stop signs; 9.Watchman; 10.Flagged by crew; 11.Other (spec. in narr.); 12.None

Code(s)							
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

88. Signaled Crossing Warning (See instructions for codes) Code: N/A

89. Whistle Ban 1. Yes 2. No 3. Unknown. Code: N/A

90. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach. Code: N/A

91. Crossing Warning Interconnected with Highway Signals 1. Yes 2. No 3. Unknown. Code: N/A

92. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown. Code: N/A

93. Driver's Age: 0

94. Driver's Gender 1. Male 2. Female. Code: N/A

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

96. 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: N/A

97. Driver Passed Standing Highway Vehicle 1. Yes 2. No 3. Unknown. Code: N/A

98. 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

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	0	0

99. Driver Was 1. Killed 2.Injured 3. Uninjured. Code: N/A

100. Was Driver in the Vehicle? 1. Yes 2. No. Code: N/A

102. Highway Vehicle Property Damage (est. dollar damage): 0

103. Total Number of Highway-Rail Crossing Users (include driver): 0

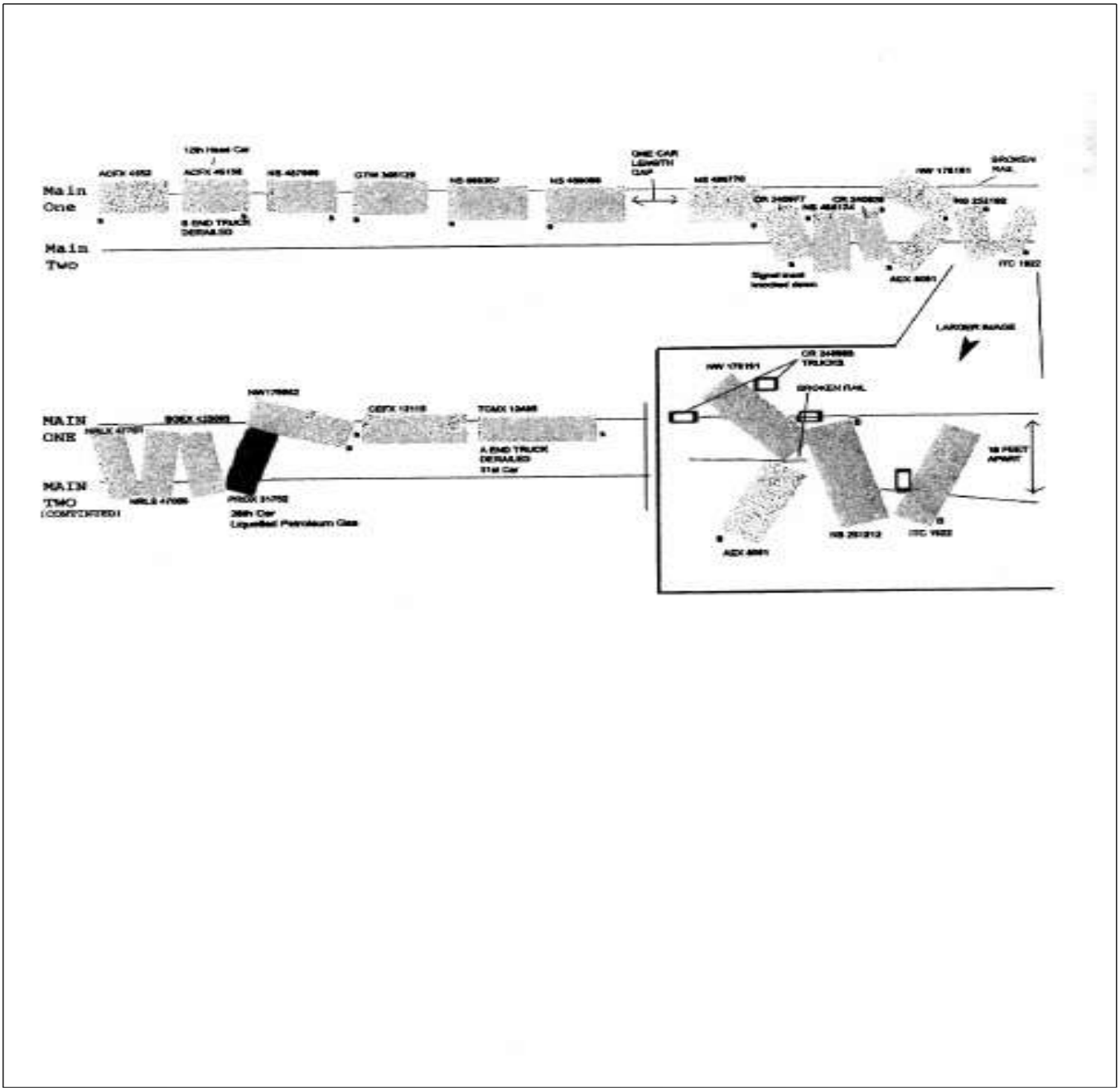
104. Locomotive Auxiliary Lights? 1. Yes 2. No. Code: N/A

105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No. Code: N/A

106. Locomotive Headlight Illuminated? 1. Yes 2. No. Code: N/A

107. Locomotive Audible Warning Sounded? 1. Yes 2. No. Code: N/A

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



109. SYNOPSIS OF THE ACCIDENT

An eastbound NS freight train en route to Bluefield, WV experienced an undesired emergency brake application and derailed a total of twenty cars on November 20, 2005, at 7:24 p.m. EDT. The derailment occurred at Bluestone, WV, at NS Milepost 373.6, on the NS Pocahontas Division.

There were no injuries to the train crew. One of the twenty cars that derailed contained hazardous material. There was no release of the hazardous material into the environment. No evacuation order was enacted. The total equipment damage for this train consist is $370,450. The total track, signal, way & structure damage is $100,000.

At the time of the derailment the sky was dark and cloudy. The temperature was 57 degrees F. Winds averaged 3.6 mph from the west and southwest.

The derailment was caused by high rail roll out in a 5.3 degree left hand curve under constant buff force of 140,000 lbs due to high lateral forces resulting from inability of a railcar coupler to slew as a result of improper repairs that allowed heavy contact with the car's striker plate.

The bell housing into which the drawbar fits caused the drawbar to bind into the striker plate on the high cube car NS 487966 loaded with auto parts. Position #13 in the train, the defective car caused the derailment of cars beginning with the car in position #12 through the 31st car.

110. NARRATIVE

Circumstances Prior to the Accident

Train 194 East included a locomotive engineer and a conductor at the head end. There was also a locomotive engineer at the rear of the train to perform "pusher" (helper) service.

The crew at the head end first went on duty at 10:30 a.m. EDT, November 20, 2005, at the Norfolk Southern (NS) Portsmouth Ohio Terminal. They were assigned to Train 194 East, which was a freight train scheduled to travel to Bluefield, WV. The engineer at the "pusher" (helper) end of the train was called to report to the NS Bluefield West Virginia Terminal at 1:05 p.m. EDT, November 20, 2005. The engineer of the pusher equipment proceeded west to Sandy Huff, where the pusher equipment was coupled to the rear of the train. All crew members received the required rest prior to reporting for duty.

The crew that departed the NS Portsmouth Ohio Terminal relieved the former Train 194 East crew, who indicated that the train was properly tested and ready for departure. The end of train (EOT) device was properly armed, and the NS mechanical department personnel at the Portsmouth Service Building said the train was okay to leave. The crew departed Portsmouth, Ohio at 11:25 a.m. EDT with locomotives NS 6161, WC 7551, NS 5360 and 92 cars (75 loads, 17 empties). The crew noted they would need to pick up a pusher (rear helper locomotive). The trip was described by the crew as uneventful from Portsmouth, OH. The engineer had no problem handling the train and no defects had been reported by any of the trackside equipment detectors, according to the conductor. The crew mentioned their train experienced an undesired brake application when they stopped to pick up the pusher at Sandy Huff, at about 4:50 p.m. EDT, but felt this was because they had been traveling several hours without stopping.

The pusher service equipment and engineer, added to the train at Sandy Huff, represented the only change to the train en route to Bluefield, WV. The pusher equipment consisted of three locomotives; NS 2520, NS 6645, and NS 9554. The pusher service engineer operated from locomotive NS 9554. The other locomotives were shut down for fuel conservation from Bluefield, WV en route to Sandy Huff. The pusher engineer was permitted to push the train with only eight axles, reference Pocahontas Division Timetable #4, Special Instruction PO-L-248-1: No more than equivalent of 8 conventional powered axles may be used when pushing a mixed time freight or empty train. Therefore, the engineer providing pusher service operated with power from one locomotive. When the pusher service was added to the train at Sandy Huff, the train service brake line was slow pumping to 75 psi, which the crew attributed to a drop in outdoor temperature.

As the eastbound train approached the derailment area, the locomotive engineers at the head of the train and at the pusher end were seated at the controls of their respective locomotives. The conductor was seated opposite the engineer in the leading locomotive at the head end.

In this area of the railroad, the head end of the train was ascending a grade of 0.60 percent, and crossing from Main 1 to Main 2 through the east crossover at Bluestone. The derailment occurred in a 5.3 degree left hand curve, still on the 0.60 ascending grade. The derailed cars were in the 40 feet of tangent track on the west end of the 5.3 degree curve. The middle of the train was in a 11.4 degree compounding to 9.1 degree right hand curve, which was ascending a 0.60 percent grade on the east end and descending a 1.10 percent grade on the west end of the curve. The bottom of this grade was on a bridge crossing over the Bluestone River.

The railroad timetable and geographic direction of the train was east. The crew was facing east as indicated in the timetable. The timetable and geographic direction (east) is used throughout this report.

The Accident

Train 194 East was being operated at 23 mph approaching the accident area. At the time the accident occurred, the train was being operated at 20 mph. Both speeds were recorded by the event recorder of the controlling locomotive. The maximum authorized speed for mixed freight trains is 25 mph, as designated in the current NS Pocahontas Division Timetable Number 4.

The head end of the train was going by the signal at Bluestone, crossing from Main 1 track to Main 2 track (Milepost N373.6), when the train experienced an undesired emergency brake application. The engineer of the lead locomotive recalled traveling about 22 mph, and easing off the dynamic brake. He knew immediately that something was wrong by the way the train came to an instant stop. He announced the emergency over the radio, and then called the dispatcher to report the emergency. Meanwhile, the conductor walked back to inspect the train and informed that 20 cars, the 12th through the 31st, had derailed, and both main lines were blocked. The conductor reported that one of the derailed cars was a hazardous material tank car, but it remained intact. There were no injuries to the train crew, no release of hazardous material, and no evacuation of the area. The crew was not taken for drug or alcohol testing.

Analysis and Conclusion

The locomotives were equipped with speed indicators and event recorders as required. The relevant event recorders were downloaded by NS supervision and analyzed at Bluefield, WV. The analysis disclosed that the locomotive engineers were in compliance with all applicable railroad operating and train handling requirements. Extensive computer modeling of the train was conducted by the railroad's research and test department. This analysis revealed that a defect with the car in the 13th position in the train caused the derailment of cars beginning with the car in the 12th position through the 31st car. FRA reviewed the results of the analysis, and concurred with the conclusion.