Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-05

Burlington Northern Santa Fe (BNSF)
Jasper, Alabama
January 25, 2006

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-2006-5

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: SF0106113
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: BNSF Rwy Co. [BNSF]	3a. Alphabetic Code: BNSF	3b. Railroad Accident/Incident No.: SF0106113
4. U.S. DOT_AAR Grade Crossing Identification Number:	5. Date of Accident/Incident: Month 01 / Day 25 / Year 2006	6. Time of Accident/Incident: 10:15: ☐ 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
0	0	0	0	Springfield

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Jasper	693.5	N/A	AL	WALKER

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
36 F		4		1		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
single main		4	35.5		2

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: 1

26. Was Equipment Attended? 1. Yes 2. No — Code: 1

27. Train Number/Symbol: MEMB JR124

28. Speed (recorded speed, if available) R - Recorded E - Estimated: 20 MPH — Code: R

29. Trailing Tons (gross tonnage, excluding power units): 9066

30. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; g. Automatic block; h. Current of traffic; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; m.Special instructions; n. Other than main track; o. Positive train control; p. Other (Specify in narrative) Code(s): e, N/A, N/A, N/A, N/A

30a. 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; 2. South 4. West: 0

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	33	no
(2) Causing (if mechanical cause reported)	0	0	N/A

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	5	0	0	0	0
(2) Total Derailed	0	0	0	0	0

35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	66	0	20	0	0
(2) Total Derailed	20	0	10	0	0

36. Equipment Damage — This Consist: 311794

37. Track, Signal, Way, & Structure Damage: 325000

38. Primary Cause Code: H599

39. Contributing Cause Code: M599

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	0	1	0

Length of Time on Duty

44. Engineer/Operator: Hrs 11 Mi 40

45. Conductor: Hrs 11 Mi 40

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 — 1

50. Was EOT Device Properly Armed? 1. Yes 2. No — 1

51. Caboose Occupied by Crew? 1. Yes 2. No — 2

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: N/A

53. Was Equipment Attended? 1. Yes 2. No — Code: N/A

54. Train Number/Symbol: N/A

55. Speed (recorded speed, if available) R - Recorded E - Estimated: N/A MPH — Code: N/A

57. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track

57a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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56. 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): 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)	N/A	N/A	N/A
(2) Causing (if mechanical cause reported)	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

63. Equipment Damage This Consist: N/A

64. Track, Signal, Way, & Structure Damage: N/A

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
N/A	N/A	N/A	N/A

Length of Time on Duty

71. Engineer/Operator: Hrs N/A Mi N/A

72. Conductor: Hrs N/A Mi N/A

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

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 — Code: N/A
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)

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

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

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

86a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: N/A
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

83. Equipment — Code: N/A
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)

84. Position of Car Unit in Train: N/A

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

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

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

87. Type of Crossing Warning — Code(s): N/A | N/A | N/A | N/A | N/A | N/A | N/A
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

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

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

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

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

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

93. Driver's Age: N/A

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

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

96. Driver — Code: N/A
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)

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

98. View of Track Obscured by (primary obstruction) — Code: N/A
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

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	N/A	N/A

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

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

102. Highway Vehicle Property Damage (est. dollar damage): N/A

103. Total Number of Highway-Rail Crossing Users (include driver): N/A

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

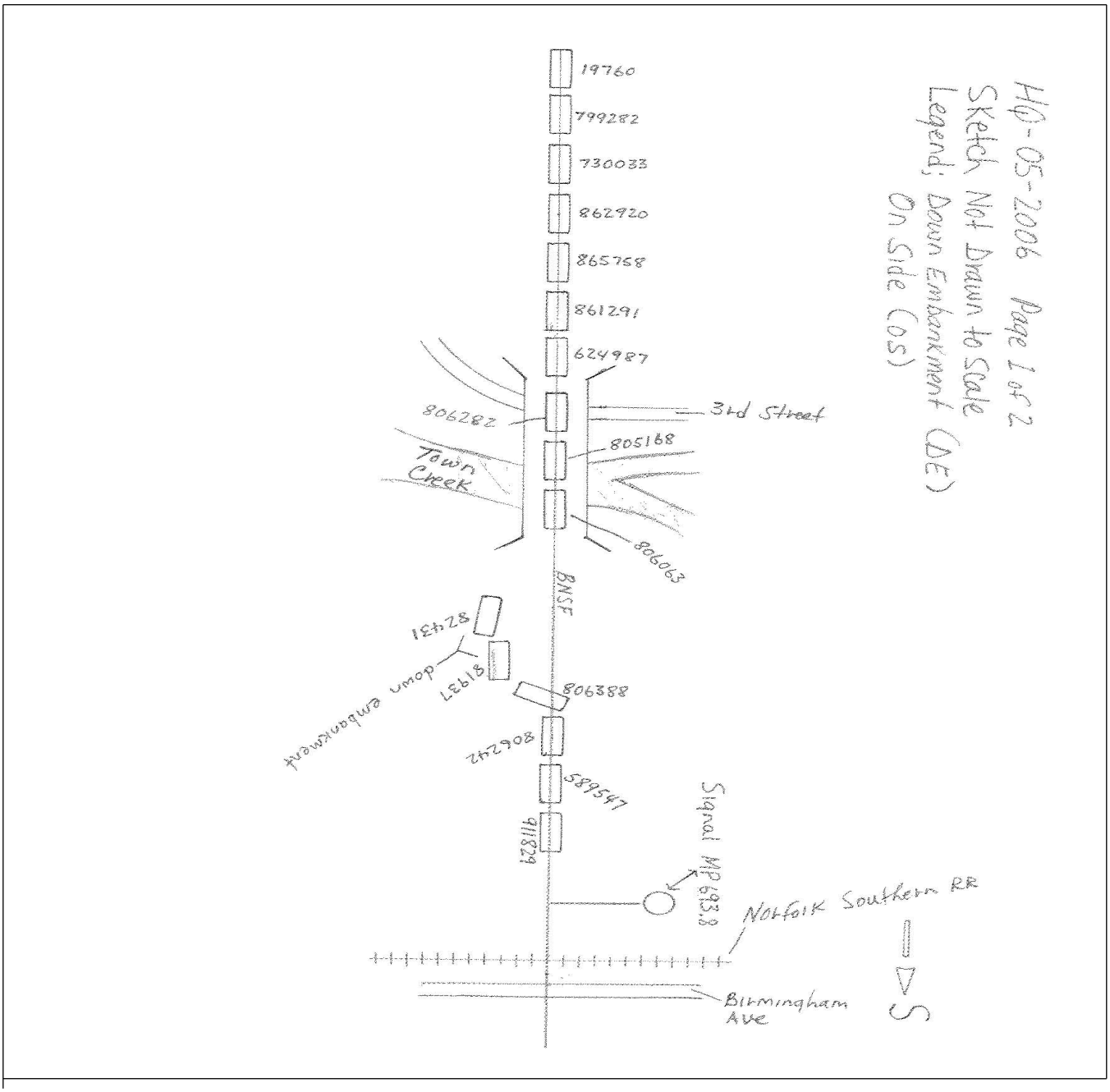
105. Locomotive Auxiliary Lights Operational? — Code: N/A
1. Yes 2. No

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

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

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

HQ-05-2006 sketch_Page_1.jpg



109. SYNOPSIS OF THE ACCIDENT

On January 25, 2006, about 10:15 p.m. Central Standard Time (CST), Burlington Northern Santa Fe (BNSF) southbound Train M MEMBIR1-24 consisting of five locomotives, 66 loads, and 20 empty cars derailed 30 cars at milepost (MP) 693.5 at Jasper, Alabama (AL). The train was operating on the Springfield Division, Birmingham Subdivision originating at Memphis, Tennessee (TN) with an intermediate crew change point at Amory, Mississippi (MS) and a final destination at Birmingham, AL.

The train crew consisted of a locomotive engineer and conductor. They reported for duty at BNSF Yard in Amory, MS at 10:35 a.m., on January 25, 2006, having 25 hours 15 minutes of rest. The train departed Amory Yard at 11:52 a.m., and was 6,099 feet in length with 9,066 trailing tons.

The engineer said descending the first grade after departing Amory, the train experienced a run-in while operating in dynamic braking. He made adjustments at the next grade by going into dynamic braking earlier and the train did not experience another run-in until prior to the accident.

The engineer said the rear of his train had just cleared the 30 miles per hour (mph) speed restriction when he felt buff forces shove the train forward. He continued reducing dynamic braking and placed the dynamic brake handle to set-up position. Then, an undesired train line emergency brake application occurred. At the time of the derailment, the train was being operated at 30 mph.

BNSF reported $311,794 car damage, $250,000 track damage, and $75,000 bridge (decking) damage.
There were no hazardous material cars in the train, no injuries, and no evacuation ordered.

At the time of the derailment, it was dark, the weather was clear, and the temperature was 36 ºF.

The probable cause is train make-up, code H599.

Contributing factors to the accident: a combination of track curvature, grade, number of cars with hydraulic cushioning units, and number of locomotive dynamic brake axles, code M599.

110. NARRATIVE

Circumstances Prior to the Accident

The crew of Train M MEMBIR1-24 included a locomotive engineer and conductor. They went on duty at 10:35 a.m., at Amory, MS, which is a crew change point. Both crew members received more than the statutory off duty period prior to reporting for duty. They were called to operate Train M MEMBIR1-24 southbound to Birmingham, AL, a distance of about 121 miles.

At 10:11 a.m., Train M MEMBIR1-24 arrived in Amory Yard on Track No. One and remained intact with hauling locomotives attached. The inbound engineer reported no problems with the train except that the rear locomotive would lose horse power at times. The outbound engineer took control of the train, performed an inspection of the locomotives, and proceeded to release the air brakes. He observed an increase in brake pipe pressure using the head-end device before departing Amory Yard at 11:52 a.m.

The engineer said at the first descending grade leaving Amory Yard, the train experienced a run-in while operating in dynamic braking. He made adjustments at the next grade by going into dynamic braking earlier and the train did not experience another run-in until the accident. As the southbound train approached the accident area, MP 693, the engineer was seated at the controls on the west side of the leading locomotive and the conductor was seated on the east side of the locomotive cab.

At the accident location, trains operate on single main line track. The method of operation is Traffic
Control (TC). The track consists of 136 lbs. continuous welded rail on concrete ties. Approaching the derailment site there is a curve measuring 1,523 feet that continues to the point of derailment (POD). The track grade is descending at 1-percent for six-tenths of a mile to the POD. The maximum authorized speed at this location is 45 mph, however, the rear of the train was clearing a 30 mph speed restriction.

The railroad time table direction of this train was south, geographic direction is southeast. Timetable direction is used throughout this report.

The Accident

The train was being operated at 30 mph, zero pounds per square inch (PSI) brake pipe reduction, and in dynamic braking approaching the accident area. According to the engineer, he was slowly reducing dynamic braking when he felt buff forces shove the train forward. When the dynamic brake handle reached set-up position, an undesired train line emergency brake application occurred. At the time of the derailment, the train was traveling at 30 mph. When the emergency brake application occurred the train speed was 20 mph. Both speeds were recorded by the event recorder of the controlling locomotive.

Train M MEMBIR1-24 came to a stop at MP 694.2, and the engineer notified the train dispatcher of the emergency brake application. The conductor exited the locomotive BNSF 4403 to inspect the train. The train dispatcher notified the engineer via radio that the Jasper Police Department reported derailed flatcars on the Town Creek railroad bridge. The conductor could not complete the train inspection because he and the engineer were nearing the end of their hours of service. They were transported by company van to the rail depot in Jasper.

The BNSF road master from Jasper and the assistant general mechanical foreman from Birmingham investigated the derailment. They discovered 20 loads and 10 empty cars, the 28th through the 57th in the consist, had derailed at MP 693.5. An empty flat car, PTTX 911829, was the first derailed car. It remained upright and south of the Town Creek railroad bridge. The other 29 derailed cars were located south and north of the bridge.

The following re-railing contractors were at the accident scene on January 26th.

1. RJ Corman/Memphis arrived 4 a.m. (2 sidebooms, 1 front-end loader).
2. Hulcher/Memphis arrived 6 a.m. (2 sidebooms, 1 front-end loader).
3. Steel City Crane/Birmingham arrived 6:30 a.m. (1 120-ton crane) (2 120-Ft Snorkel Lifts).
4. Crane Works/Birmingham arrived 9:30 a.m. (1 85-Ton Crane).

Analysis and Conclusion

Company records revealed that the track was inspected twice weekly and was last inspected January 24, 2006. No defects were recorded.

The event recorder data from the controlling locomotive, BNSF 4403, was downloaded by a BNSF road foreman. The event recorder disclosed that the engineer was using dynamic braking and no train line braking at the time of the derailment. At the time of the emergency brake application, the dynamic brake handle was in set-up position and the engineer was changing from dynamic braking to power. The BNSF operating department and FRA mechanical reviewed the download and took no exception to how the engineer was operating the train.

The POD was MP 693.5, which was in a right hand 3.5 degree curve. The rear 85 percent of the train was on a 1 percent descending grade and the front 15 percent was on a .57 percent ascending grade. Sixty-five percent of the cars had hydraulic cushioning devices, which added about 50 feet of additional length and slack to the train.

Five locomotives with 30 axles of dynamic braking is capable of producing a great amount of retarding force in the train. The first 23 cars in the train were loads equipped with hydraulic cushioning units. The 24th through the 30th cars were empties. The 31st through the 47th cars were loads and 27 of the remaining 39 cars were loads.

The 28th car, which was the first car to derail, was an empty flat car in a group of seven empty cars, positioned between two large groups of loads. This car was lifted off the rail by buff forces. The event recorder showed the engineer operated his train within the guideline of BNSF operating rules. FRA concludes because train handling was not a factor, train make-up was the primary cause of this accident. However, FRA believes contributing factors to the derailment were a combination of track curvature, grade, number of cars with hydraulic cushioning units, and number of locomotive dynamic brake axles.

Probable Cause

The probable cause of the derailment, as determined by the investigation conducted by the Federal Railroad Administration, was train make-up, code H599.

Also, FRA noted the contributing factors to the accident: a combination of track curvature, grade, number of cars with hydraulic cushioning units, and number of locomotive dynamic brake axles, code M599.