Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-21

BNSF (BNSF)/Fort Worth & Western (FWW)
Dublin, Texas
March 6, 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-2005-21

1.Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
BURLINGTON NORTHERN SANTA FE CORPORATION	BNSF	TX0305101
2.Name of Railroad Operating Train #2	2a. Alphabetic Code	2b. Railroad Accident/Incident
N/A	N/A	N/A
3.Name of Railroad Responsible for Track Maintenance:	3a. Alphabetic Code	3b. Railroad Accident/Incident No.
BNSF Rwy Co. [BNSF]	BNSF	N/A
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident: Month 03 / Day 06 / Year 2005	6. Time of Accident/Incident: 04:16: ☐ 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
7	4	1	0	SYSTEM

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
DUBLIN	89.3	N/A	TX	ERATH

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
59 F		2		3		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		3	1.153		4

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: 1

27. Train Number/Symbol: HALTB AR306

28. Speed (recorded speed, if available) R - Recorded E - Estimated: 34 MPH; Code: R

29. Trailing Tons (gross tonnage, excluding power units): 9803

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): j 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	56	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
0	0

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	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	78	0	26	0	0
(2) Total Derailed	18	0	1	0	0

36. Equipment Damage This Consist: 472391

37. Track, Signal, Way, & Structure Damage: 113000

38. Primary Cause Code: H504

39. Contributing Cause Code: T205

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 6 Mi 45

45. Conductor: Hrs 6 Mi 45

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: 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: N/A

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

54. Train Number/Symbol: N/A

55. Speed (recorded speed, if available) R - Recorded E - Estimated: 0 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): 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	Loade a. Freight	Loade 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:

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

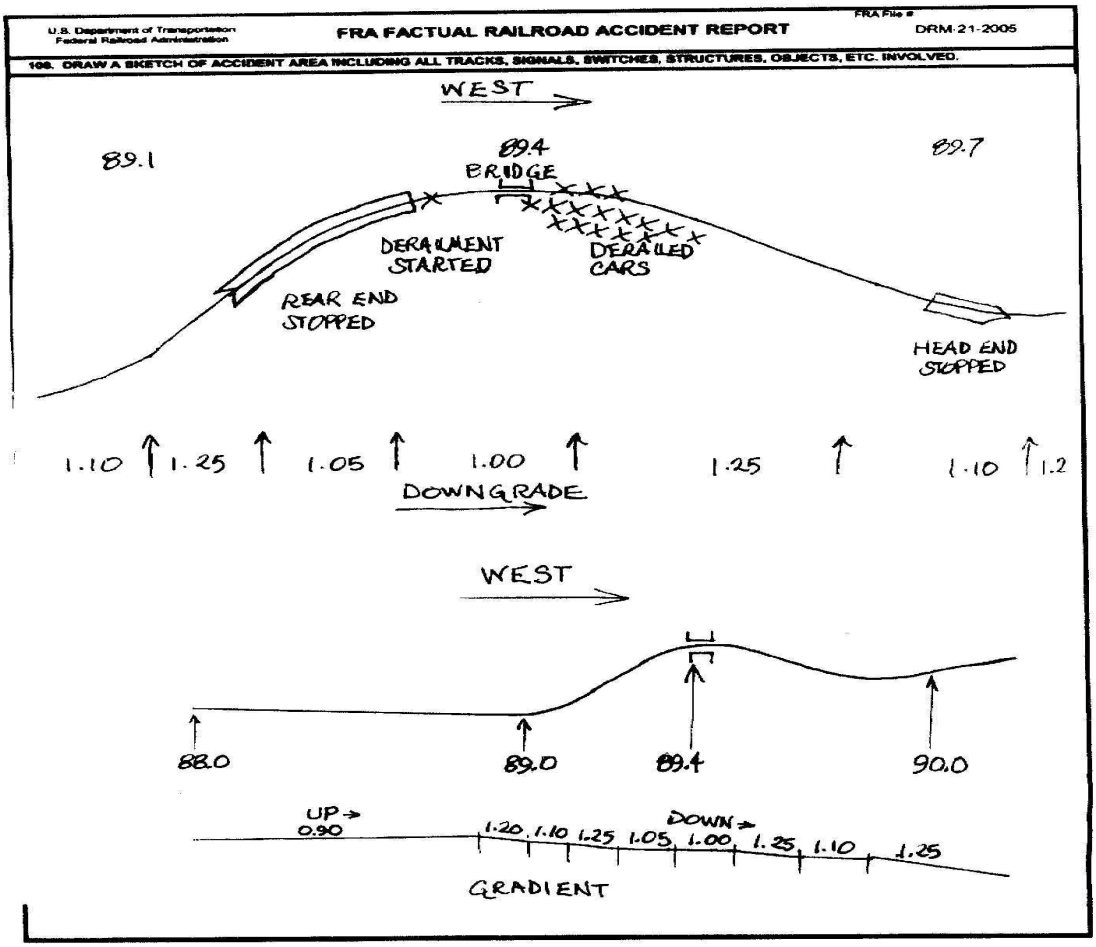
105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No. Code: N/A

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.

DRM-21-2005.jpg



109. SYNOPSIS OF THE ACCIDENT

On Sunday, March 6, 2005, at 4:16 PM CST, while moving westbound in rain, BNSF mixed freight train H-ALTBAR-3-06, engine BNSF 5051 experienced a strong run-in and then an undesired emergency application of the train air brakes, derailing nineteen cars and destroying a bridge. There were no injuries but one tank car released hazardous materials. No evacuation was called. The cause of the derailment was train make-up. There was an empty flat car in the middle of the 9803 ton train that incurred excessive buff force which forced the car off the track.. Contributing cause was defective cross ties at the sight of the derailment that allowed the excessive force to turn over the rail on the outside of the curve.

110. NARRATIVE

The derailment occurred on the single main track of the Fort Worth and Western Railroad, Dublin Subdivision, at MP 89.3, Dublin, Erath County, Texas. Method of operation is TWC, and maximum speed is 40 MPH for freight trains with a temporary 25 mph restriction between MP 91.3 and MP 91.5. FWWR Timetable No.3 dated March 9, 2003 was in effect. The profile of the main track at MP 89.3 is undulating, with 3 degree 48 minute curve to the right on a descending grade that varies from 1.25% to 1.00% to 1.25% to 1.10% to 1.25% traveling westbound. The weather was raining and 59 degrees.

BNSF Railway Texas Division freight train H-ALTBAR-3-06 (BNSF 5051 West), which operates between Alliance Yard and Sweetwater, Tx. over the FWWR Dublin Division, consisted of three units and 104 cars, with train weight totaling 9803 tons and a length of 6474 feet.

The crew on duty at the time of the accident consisted of a locomotive engineer and a conductor. The engineer was hired July 18, 1994 as a welder, promoted to conductor April 9, 1998, and engineer April 18, 2003, his last rules test was June 14, 2004, and his last efficiency test was December 20, 2004. The conductor was hired March 20, 1969 as a welder and promoted to conductor April 9, 1998, his last rules test was March 25, 2004, and his last efficiency test was February 28, 2005. The crew was operating on a line that they were qualified on but did not regularly run over. Also, both the engineer and conductor stated that they normally operated manifest and inter-modal trains and were not as familiar operating heavy mixed freight trains.

They both were on duty at Alliance Yard on Sunday, March 6, 2005 at 9:30 AM after statutory rest of 17 hours and 30 minutes for the engineer and 70 hours and 45 minutes for the conductor. Their work orders included notification that the train had received a Class 1 Inspection and Air Brake Test at Alliance at 9:45 AM March 6, 2005.

H-ALTBAR-3-06 departed from Alliance Yard at 10:45 AM CST and traveled west on the Dublin Subdivision without incident. The train possessed a track warrant from MP 3 (at the north end of the Dublin Sub) to Ricker (at the south end) on the main track. As the train approached Dublin the engineer was seated at the controls and the conductor was seated on the opposite side of the controlling unit.

The engineer stated that he was moving at 28 mph in throttle position Dynamic 6 as the head end of the train crested a hill and approached a lefthand curve. He moved to Dynamic 8, and then set 6 lbs of air as the train entered a righthand curve descending the 1.25% grade onto a bridge where the grade eases to 1.00%. After the remainder of the train crested the hill it continued to gain speed so he set 3 more lbs of air and then felt a strong run-in. After a second run-in the air brakes went into emergency and the train stopped approximately 1/4 mile further. The speed at the time of derailment was recorded at 34 mph.

The conductor walked back along the train to assess the situation and discovered that the 56th car from the engine had derailed and the rail was torn up. The rear of the train was not immediately visible. He continued toward the rear and found that the 56th through 74th cars were derailed and the bridge at the bottom of the dip was destroyed. There were no injuries but one tank car containing crude oil was leaking.

The engineer and conductor stated that they queried the trainmaster at Alliance about the train’s makeup when reviewing their paperwork and pointed out the empty flat car placed in the middle of the train with the heaviest cars placed toward the rear. They were told that the computer generated train profile showed that the train was approved to go. The empty flat car was BNSF 231045 and was reported on the consist at 82 tons. Closer inspection reveals that the empty container car consists of three platforms - in effect three empty cars weighing 27 tons each - coupled to eleven auto rack cars equipped with sliding draw heads, that are followed by thirty-three more heavy cars weighing 4069 tons at the rear of thetrain.

The train list shows the following from front to rear:

3 Locomotives - 6 axle 4400hp each

37 loads and 20 empties 4685 tons
1 empty container flat car 82 tons
44 loads and 3 emptiesl 5037 tons.

In effect, the train was made up as follows:
3 -6 axle locomotives 13,200 hp
37 loads and 20 empties 4685 tons
1 platform 27 tons
1 platform 27 tons
1 platform 27 tons
44 loads and 3 empties 5037 tons

Both the engineer and conductor involved in the derailment were drug and alcohol tested and both employees returned negative results.

Factors contributing to the accident were:

1) Train Makeup; an empty flat car was placed as the 56th car in the 9803 ton train with 44 loaded cars weighing 5037 tons placed behind. My inspection shows that empty flat car BNSF 231045 is a three platform double stack container car and each platform rides on it's own wheels. It is in effect three 27 ton flat cars for train handling purposes. This car was followed by eleven tri-level auto rack cars that provided excessive slack action whenever the train increased or decreased speed. This, coupled to the fact that 27 cars placed further to the rear weighed between100 to 141 tons created a whiplash effect while operating on the undulating terrain. Had this been considered, the train should have been made up with the empty flat car placed further back in the train.

2) Excessive slack action due to eleven auto rack cars with sliding drawheads in middle of heavy train placed 57 through 67 made train handling on the undulating terrain extremely difficult.

3) Train handling: a train of this weight and length with the heaviest weight on the rear could better have been operated utilizing the train air brake and not relying as heavily on the dynamic brake. The resistance from the head end created by increasing dynamic braking while on a downgrade caused the heavy rear end of the train to compress the sliding draw heads on the eleven auto racks and increased the buff forces that were applied against the lighter flat car and pushed the car off the track on the curve. Train air braking could have prevented the degree of force pushing against the flat car by retarding the forward advance of the rear of the train through applying and releasing the train air brake.

4) Crew qualifications: The engineer had twenty-five months' service as an engineer and was not regularly used on this territory or on this type of train. Additionally, the engineer incurred two efficiency test failures for excessive speed during the past nine months; one for exceeding maximum timetable speed and one for exceeding a temporary speed restriction. At the time of the accident the engineer was attempting to reduce his train speed from 28 mph to 25 mph to comply with a temporary speed restriction two miles ahead.

The FRA determined that the cause of the accident was determined by BNSF to be H504 excessive buffing or slack action due to train make-up. Contributing cause was defective or missing cross ties, T205.