Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-80

Burlington Northern Santa Fe
Abbott, NE
October 18, 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-2006-80

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: NE1006108
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.: NE1006108
4. U.S. DOT_AAR Grade Crossing Identification Number:	5. Date of Accident/Incident: Month 10 / Day 18 / Year 2006	6. Time of Accident/Incident: 05:57: ☑ 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	Nebraska

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Cario	105.7	N/A	NE	HALL

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
33 F		4		6		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 Track #2		4	113.5		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: 1

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

27. Train Number/Symbol: CBTM CNR01 6

28. Speed (recorded speed, if available) Code: R - Recorded; E - Estimated 45 MPH: R

29. Trailing Tons (gross tonnage, excluding power units): 18999

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	76	yes
(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/A

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	0	0	0	1	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	134	0	0	0	0
(2) Total Derailed	31	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
1278235	432500	T204	N/A

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	45. Conductor
Hrs 0 Mi 57	Hrs 0 Mi 57

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) Code: R - Recorded; E - Estimated 0 MPH: 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)	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)	2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter
0			N/A N/A N/A N/A N/A	N/A

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	59. 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	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	62. Cars	Loade a. Freight	Loade 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

63. Equipment Damage This Consist	64. Track, Signal, Way, & Structure Damage	65. Primary Cause Code	66. Contributing Cause Code
0	0	N/A	N/A

Number of Crew Members				Length of Time on Duty	
67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen	71. Engineer/Operator	72. Conductor
0	0	0	0	Hrs 0 Mi 0	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?	77. Was EOT Device Properly Armed?	78. 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

79. Type	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

80. Vehicle Speed (est. MPH at impact)	81. Direction geographical) 1.North 2.South 3.East 4.West	Code
0		N/A

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

86a. 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

Rail Equipment Involved

83. 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

84. Position of Car Unit in Train
0

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

86b. Was there a hazardous materials release by	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	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	Code
1. Yes 2. No 3. Unknown	N/A

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

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

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

93. Driver's Age	94. Driver's Gender	Code
0	1. Male 2. Female	N/A

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

96. 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

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

98. 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

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

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

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

102. Highway Vehicle Property Damage (est. dollar damage)	103. Total Number of Highway-Rail Crossing Users (include driver)
0	0

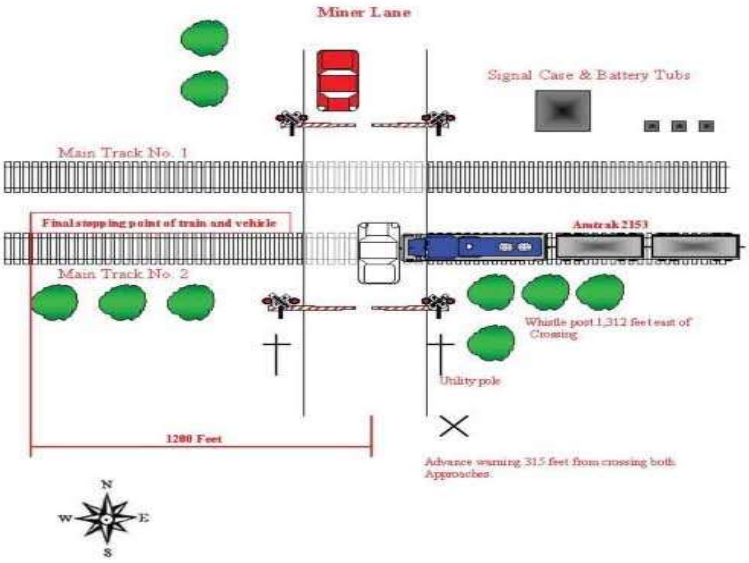
104. Locomotive Auxiliary Lights?	Code
1. Yes 2. No	N/A

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

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

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

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



109. SYNOPSIS OF THE ACCIDENT

An eastbound BNSF Railway Company (BNSF) coal train derailed 31 cars on October 18, 2006, at 5:57 a.m. (CDT). The accident occurred 6.1 miles east of Cairo, Nebraska, at milepost (MP) 105.7, on the BNSF Ravenna Subdivision.

There were no injuries or hazardous material spills as a result of the derailment. Total damages reported for the derailment were $1,710,735.

At the time of the accident, it was dark with light snow and a temperature of 33 degrees Fahrenheit.

The probable cause of the derailment is being ruled as T204 - Broken weld (field).

110. NARRATIVE

Circumstances Prior to the Accident

The train crew of Train Symbol CBTMCNR0-16 consisted of an engineer and conductor. They first went on duty at 5 a.m., CDT, October 18, 2006, at Ravenna, Nebraska. This was their away terminal, and both had received more than the statutory off-duty period prior to reporting for duty.

Their assigned train consisted of one locomotive on the head-end, 134 loaded coal cars, and a remote unit on the rear-end. The train was 7,113 feet long with 18,999 trailing tons. This crew was scheduled to take the train to Lincoln, Nebraska.

The train had received a Class 1 air brake test 8 days prior to the derailment. This test was performed by BNSF mechanical personnel in Alliance, Nebraska, on October 10, 2006, when this cycle train was an empty heading to Wyoming to be loaded. According to BNSF mechanical officials, this train sat at Ardmore, South Dakota, for 5 days after receiving their Class 1 air brake test. This was for train spacing purposes before continuing to the plant October 15, to be loaded. The train kept its same power and remained on air continuously.

There was no work performed en route after departing, and the trip was uneventful for the 22 miles leading up to the derailment.

As the eastbound train approached the accident area, the locomotive engineer was seated at the controls on the south side of the lead locomotive. The conductor was seated on the north side of the same locomotive.

The track at and leading up to the point of derailment (POD) is tangent and on a level grade. It is constructed of 132-pound continuous-welded rail (CWR) on concrete ties, except for the area across a ballast deck bridge, which is 136-pound conventional jointed rail on wood crossties. This jointed rail was because of panels laid across the bridge during a recent construction project. The joints had been staggered and were scheduled to be welded in the near future. There are no other switches, turnouts, bridges, or culverts in the immediate area.

The railroad timetable direction and geographical direction of the train is east.

The Accident

The train was being operated at 45 mph approaching the derailment area. According to the train crew, they did not observe or feel anything unusual prior to this area. The speed at the time of the derailment was also 45 mph. Both speeds (approaching and at the time of derailment) were recorded by the event recorder of the controlling locomotive. Maximum authorized speed for this track is 60 mph. Maximum authorized speed for this train was 50 mph because it exceeded the 100-ton threshold per operative brake, as designated in current BNSF Nebraska Division Timetable.

Just after traversing a bridge, the train experienced an undesired emergency application of the air brake system, where upon it was discovered the 75th through 105th head cars had derailed.

Immediately following the accident, the train crew immediately contacted a westbound train coming at them on main Track No. 1 and told them they were in emergency. The westbound quickly brought their train down to restricted speed and were able to stop well short of the derailed cars that were fouling main Track No. 1. The conductor of the derailing train then walked back and found the derailed cars.

As a result of the derailment, there was damage to both ballast deck bridges located on Main Track Nos. 1 and 2. After the derailed cars were cleared, the bridge was found to be structurally sound and not the cause of the derailment. The damage was limited to the walkways and ballast retainers.

Analysis and Conclusions

Analysis

The two crew members of Train Symbol CBTMCNR0-16 were FRA mandatory post-accident toxicologically tested because this accident exceeded the $1 million major accident threshold. The test results obtained from the FRA Alcohol and Drug Control Program Manager were negative.

The event recorders for both locomotives revealed nothing inconsistent with normal train handling at or prior to the time of the derailment.

The last ultrasonic rail detection test through this area was on August 29, 2006, and the last geometry car survey with the railroad's Car No. 80 was on September 6, 2006, with no defects noted in the immediate area. The track was inspected by hi-rail vehicle on October 16, 2006, with no exceptions taken in the area. Track inspection records revealed that this track was inspected well within the required frequency the month prior to the accident, with no exceptions noted in the immediate area.

A suspect piece of rail (at a Orogo-thermit field weld) was recovered from the accident and sent to the BNSF's Technical Research and Development Lab in Topeka, Kansas, for analysis. The weld was 132/136 compromise weld and had leaving head batter on the rail consistent with this type of derailment cause.

The suspect piece had small "hot tears," 1-1/8 in length and extending approximately 1/8 inch into the rail. These tears were located along the base of the rail at the edge of the weld in the heat affected zone. Hot tears are caused by non-uniform cooling or movement of the weld during the cooling process. The mate to this fracture was not recovered from the derailment sight to determine receiving head batter.

This weld was made on October 3, 2006, and according to the BNSF welding report, there was no rail added or subtracted. The welder who made this particular weld said there was nothing he recalled as being unusual during the process and felt he had sufficient time to make it.

No suspicious mechanical equipment was found in the wreck or during clean-up activities.

Conclusion

The railroad was in compliance with their own and all applicable FRA standards. There were no witnesses to the accident.

The data reviewed from the event recorder ruled out train handling as a cause. There were no marks found on the rail or ties prior to the pile-up. There were also no track components, i.e. bridges, turnouts, grade crossings in the point of derailment (POD) area that could have contributed to the cause. There was no grade and curvature in the area that would have contributed to the cause. No marks were found on the flange or tread of the wheels of the one locomotive and 75 cars that made it over this area to suggest they encountered anything prior to the derailment. The last hotbox/dragging equipment detector at MP 107.3 had no exceptions taken

Probable Cause and Contributing Factors

The Federal Railroad Administration found that the catastrophic nature of this derailment substantiates the evidence found in the broken field weld. The probable cause of this derailment is determined as T204 - Broken weld (field).