



***Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-70***

***Burlington Northern Santa Fe (BNSF)
Bear, Nebraska
August 27, 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 # <u>HQ-2005-70</u>	
1. Name of Railroad Operating Train #1 BNSF Rwy Co. [BNSF]				1a. Alphabetic Code BNSF		1b. Railroad Accident/Incident No. NE0805107	
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. 0805LA027	
4. U.S. DOT_AAR Grade Crossing Identification Number				5. Date of Accident/Incident Month: 08 Day: 27 Year: 2005		6. Time of Accident/Incident 07:55: <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM	
7. Type of Accident/Incident (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 0		9. HAZMAT Cars Damaged/Derailed 0		10. Cars Releasing HAZMAT 0		11. People Evacuated 0	
						12. Division Nebraska	
13. Nearest City/Town Tecumseh				14. Milepost (to nearest tenth) 165.1		15. State Abbr Code N/A NE	
17. Temperature (F) (specify if minus) 65 F		18. Visibility (single entry) Code 1. Dawn 3. Dusk 2. Day 4. Dark 2		19. Weather (single entry) Code 1. Clear 3. Rain 5. Sleet 2. Cloudy 4. Fog 6. Snow 1		20. Type of Track Code 1. Main 3. Siding 2. Yard 4. Industry 1	
21. Track Name/Number Main Track				22. FRA Track Code Class (1-9, X) 4		23. Annual Track Density (gross tons in millions) 110.36	
						24. Time Table Direction Code 1. North 3. East 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? Code 1. Yes 2. No 1	
						27. Train Number/Symbol CBTMLRT107	
28. Speed (recorded speed, if available) Code R - Recorded 50 MPH R E - Estimated		30. Method(s) of Operation (enter code(s) that apply) a. ATCS g. Automatic block m. Special instructions b. Auto train control h. Current of traffic n. Other than main track c. Auto train stop i. Time table/train orders o. Positive train control d. Cab j. Track warrant control p. Other (Specify in narrative) Code(s) e. Traffic k. Direct traffic control f. Interlocking l. Yard limits		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		0	
29. Trailing Tons (gross tonnage, excluding power units) 19227							
31. Principal Car/Unit		a. Initial and Number		b. Position in Train		c. Loaded (yes/no)	
(1) First involved (derailed, struck, etc)		N/A		69		yes	
(2) Causing (if mechanical cause reported)		KPLX1071		69		yes	
						32. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.	
						Alcohol 0 Drugs 0	
						33. Was this consist transporting passengers? (Y/N) N	
34. Locomotive Units		a. Head End		Mid Train		Rear End	
				b. Manual c. Remote		d. Manual c. Remote	
(1) Total in Train		3		0 0		0 0	
(2) Total Derailed		0		0 0		0 0	
						35. Cars	
						a. Freight b. Pass. c. Freight d. Pass. e. Caboose	
						(1) Total in Equipment Consist 135 0 0 0 0	
						(2) Total Derailed 39 0 0 0 0	
36. Equipment Damage		This Consist 2027911		37. Track, Signal, Way, & Structure Damage 586000		38. Primary Cause Code E07C	
						39. Contributing Cause Code N/A	
Number of Crew Members				Length of Time on Duty			
40. Engineer/Operators N/A		41. Firemen 0		42. Conductors 1		43. Brakemen 0	
						44. Engineer/Operator Hrs 4 Mi 10	
						45. Conductor Hrs 4 Mi 10	
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? Code 1. Yes 2. No N/A	
						54. Train Number/Symbol N/A	
55. Speed (recorded speed, if available) Code R - Recorded 0 MPH N/A E - Estimated		57. Method(s) of Operation (enter code(s) that apply) a. ATCS g. Automatic block m. Special instructions b. Auto train control h. Current of traffic 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 (1) First involved (derailed, struck, etc) 0		a. Initial and Number 0		b. Position in Train 0		c. Loaded(yes/no) N/A		59. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box. Alcohol N/A Drugs N/A	
(2) Causing (if mechanical cause reported) 0		0		0		N/A		60. Was this consist transporting passengers? (Y/N) N/A	
61. Locomotive Units		a. Head End		Mid Train b. Manual c. Remote		Rear End d. Manual c. Remote		62. Cars	
(1) Total in Train 0		0		0		0		(1) Total in Equipment Consist 0	
(2) Total Derailed 0		0		0		0		(2) Total Derailed 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				Length of Time on Duty					
67. Engineer/Operators 0		68. Firemen 0		69. Conductors 0		70. Brakemen 0		71. Engineer/Operator Hrs 0 Mi 0	
72. Conductor Hrs 0 Mi 0									
Casualties to:		73. Railroad Employees		74. Train Passengers		75. Other		76. EOT Device? 1. Yes 2. No N/A	
Fatal 0		0		0		0		77. Was EOT Device Properly Armed? 1. Yes 2. No N/A	
Nonfatal 0		0		0		0		78. Caboose Occupied by Crew? 1. Yes 2. No N/A	
Highway User Involved						Rail Equipment Involved			
79. Type C. Truck-Trailer. F. Bus J. Other Motor Vehicle A. Auto D. Pick-Up Truck G. School Bus K. Pedestrian B. Truck E. Van H. Motorcycle M. Other (spec. in narrative) Code N/A						83. Equipment 3. Train (standing) 6. Light Loco(s) (moving) 1. Train(units pulling) 4. Car(s)(moving) 7. Light(s) (standing) 2. Train(units pushing) 5. Car(s)(standing) 8. Other (specify 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						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						86a. Was there a hazardous materials release by Code N/A			
86b. 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						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 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.) Warning 3. Standard FLS 6. Audible 9. Watchman 12. None Code(s) 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 4. Stopped on Crossing 2. Stopped and then Proceeded 5. Other (specify in narrative) 3. Did not Stop 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 3. Passing Train 5. Vegetation 7. Other (specify in narrative) 2. Standing Railroad Equipment 4. Topography 6. Highway Vehicle 8. Not obstructed Code N/A					
101. Casualties 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.
nosketch.
bmp

**No Sketch
Included
With This
Incident**

109. SYNOPSIS OF THE ACCIDENT

On August 27, 2005, at 7:55 a.m. CST, eastbound BNSF freight Train Symbol C-BTMLRT1-07, consisting of 3 locomotives and 135 loaded coal cars and operating at a recorded speed of 50 mph, derailed 39 loaded coal cars at milepost 165.1 of the Nebraska Division, St. Joseph Subdivision. The accident occurred approximately 4.7 miles northwest of Tecumseh, Nebraska. The 66th through 104th head cars derailed as a result of this accident.

At the time of the accident, the weather was daylight and clear with a temperature of 65 °F.

Track and signal damage was reported at \$586,000 and equipment damage at \$2,027,911. These costs totaled \$2,613,911.

Probable cause is dragging equipment (E07C). Markings found on the concrete ties to the field side of the south rail indicated equipment dragging from the point of derailment back approximately 1,500 feet prior to and all the way up to the point of derailment. The point of derailment was at the switch located at West Bear. It was at this point that the dragging equipment caught the switch structure resulting in the derailment.

110. NARRATIVE

Circumstances Prior to the Accident

The crew of Train Symbol C-BTMLRT1-07A included a locomotive engineer and a conductor. They first went on duty at 3:45 a.m. CST, August 27, 2005, at the BNSF Hobson Yard in Lincoln, Nebraska. This was the home terminal for the crew members, and all received more than the statutory off duty period, prior to reporting for duty.

Their assigned freight train consisted of three locomotives and 135 loaded coal cars. It was 7,388 feet long with 19,172 trailing tons. The train was scheduled to travel to Tecumseh, Kansas, where it would be unloaded. The train received a Class I air brake test at Guernsey, Wyoming, on August 24, 2005. The train also received a Class IA air brake test performed by mechanical department personnel at Lincoln on August 27, 2005, and departed at 6:10 a.m. There were no changes made to the consist after departing Lincoln.

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

In this area of the railroad there are in succession, a 0-degree 30-minute curve to the left of about 3,700 feet, followed by a tangent of 2,950 feet to the point of the accident and 5,400 feet beyond. The grade is undulating in this area with a 0.37 percent ascending grade for about 1,060 feet prior to the point of accident. The grade is 0.39 percent descending after the point of accident for about 1,480 feet.

The railroad timetable direction of the train was east. The geographic direction was southeast. Timetable directions are used throughout this report.

The Accident

The train was being operated at 50 mph approaching the accident area and at the time of the accident. Speeds were recorded by the event recorder of the controlling locomotive. The maximum authorized speed for loaded coal trains is 50 mph, as designated in the current BNSF Timetable No. 5.

At 7:55 a.m. CST, on August 27, 2005, Train Symbol C-BTMLRT1-07A was traveling eastward at milepost 165.1, at a recorded speed of 50 mph. The engineer was seated at the control stand and the conductor was seated at his normal position in the cab when a trainline initiated emergency air brake application brought the head end of the train to a stop, at milepost 163.9. The accident resulted in the 66th head car through the 104th head car derailed at milepost 165.1. The weather was daylight and clear with a temperature of 65 °F. Visibility was unrestricted approaching the accident area.

Track and signal damage was reported at \$586,000 and equipment damage at \$2,027,911. These costs totaled \$2,613,911.

Analysis

Railroad personnel responded to the accident. BNSF conducted inspections of the track and equipment following the accident. A download of the event recorder was analyzed by the BNSF and FRA to determine if train handling contributed to the cause of the accident.

Post-accident toxicology testing of the crew was conducted. Results were negative.

FRA made observations of the track structure from the point of derailment back approximately 1,500 ft., examining markings found on the ties.

FRA made observations of derailed equipment after such equipment had been cleared from the track. There was no evidence of truck component failure found on any of the derailed cars.

BNSF and FRA analyzed readouts from the last traversed failed equipment, dragging equipment, and wheel load impact detectors (WILD). The failed equipment detector located at milepost 183.1 and the dragging equipment detector located at milepost 166.7 produced no alarms. The WILD detector located at Bingham, Nebraska, approximately 300 miles prior to the derailment, detected the 68th head car (KPLX 1115) having a high impact reading of 109 kips. Set-out criteria for BNSF eastbound alarms is 113 kips. No impact affected rail was found at the accident site.

FRA was informed by BNSF that no prior signal failures were reported at West Bear Station prior to the accident.

No FRA tests or inspections of the non-derailed equipment were conducted.

All post accident analysis focused on markings found on the concrete ties, specifically, on the field side of the south rail. The markings began approximately 1,500 ft. prior to the point of derailment and continued up to the point of derailment. These marks were located 7 inches out from the base of the rail and 10 inches in from the outside, of the ties. The marks were parallel to the rail and perpendicular to the end of the tie. The marks were uniform in that each mark had similar characteristics. Post accident analysis could not isolate the dragging equipment to a specific car. BNSF responders stated that these markings were found with a layer of fresh powder, caused by the impact to the concrete, and that the markings were not found past the point of derailment. These observations indicated to the BNSF that no prior train caused the markings found on the ties.

Conclusions

The railroad was in full compliance with their own, and all applicable Federal regulations.

Post accident analysis focused on markings found on the ties prior to and up to the point of derailment. These markings indicated that equipment was dragging prior to the point of derailment. At the point of derailment, milepost 165.1, there is a No. 20 turnout. It was at this switch (West Bear) that the dragging equipment caught the track structure resulting in the derailment.

Post accident inspections and observations of the track, equipment, and train operations revealed no other causal or contributing causal factors.

Probable Cause & Contributing Factors

The accident occurred due to dragging equipment (E07C). Evidence of dragging equipment was found approximately 1,500 feet prior to and all the way up to the point of derailment. The point of derailment was at the switch located at West Bear. It was at this point that the dragging equipment caught the switch structure resulting in the derailment.