



***Federal Railroad Administration  
Office of Safety  
Headquarters Assigned  
Accident Investigation Report  
HQ-2006-98***

***Burlington Northern Santa Fe  
Casey, OK  
December 8, 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.***

1. Name of Railroad Operating Train #1 BNSF Rwy Co. [BNSF]			1a. Alphabetic Code BNSF			1b. Railroad Accident/Incident No. SF1206105			
2. Name of Railroad Operating Train #2 BNSF Rwy Co. [BNSF]			2a. Alphabetic Code BNSF			2b. Railroad Accident/Incident SF1206105			
3. Name of Railroad Responsible for Track Maintenance: BNSF Rwy Co. [BNSF]			3a. Alphabetic Code BNSF			3b. Railroad Accident/Incident No. SF1206105			
4. U.S. DOT_AAR Grade Crossing Identification Number			5. Date of Accident/Incident Month: 12 Day: 08 Year: 2006			6. Time of Accident/Incident 06:15: <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 N/A		10. Cars Releasing HAZMAT N/A		11. People Evacuated 0		12. Division SPRINGFIELD	
13. Nearest City/Town CASEY			14. Milepost (to nearest tenth) 468.1		15. State Abbr Code N/A OK		16. County PAWNEE		
17. Temperature (F) (specify if minus) 13 F		18. Visibility (single entry) Code 1. Dawn 3. Dusk 2. Day 4. Dark 1		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 Single Main Track			22. FRA Track Code Class (1-9, X) 4		23. Annual Track Density (gross tons in millions) 30.41		24. Time Table Direction Code 1. North 3. East 3		
<b>OPERATING TRAIN #1</b>									
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	
28. Speed (recorded speed, if available) Code R - Recorded E - Estimated 35 MPH R			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			
29. Trailing Tons (gross tonnage, excluding power units) 5655			j		N/A N/A N/A N/A		0		
31. Principal Car/Unit		a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	32. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.				
(1) First involved (derailed, struck, etc)		N/A	1	N/A	Alcohol		Drugs		
(2) Causing (if mechanical cause reported)		0	0	N/A	N/A		N/A		
					33. Was this consist transporting passengers? (Y/N) N				
34. Locomotive Units		a. Head End	b. Mid Train	c. Rear End	35. Cars		a. Freight	b. Pass.	c. Empty
		d. Manual	e. Remote				d. Freight	e. Pass.	f. Caboose
(1) Total in Train		2	0	0	(1) Total in Equipment Consist		74	0	0
(2) Total Derailed		1	0	0	(2) Total Derailed		7	0	0
36. Equipment Damage This Consist		656167		37. Track, Signal, Way, & Structure Damage		690000		38. Primary Cause Code T207	
								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 0	
								45. Conductor Hrs 4 Mi 0	
Casualties to:		46. Railroad Employees		47. Train Passengers		48. Other		49. EOT Device? 1. Yes 2. No 1	
Fatal		0		0		0		50. Was EOT Device Properly Armed? 1. Yes 2. No 1	
Nonfatal		N/A		0		0		51. Caboose Occupied by Crew? 1. Yes 2. No 2	
<b>OPERATING TRAIN #2</b>									
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 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			

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		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		Loade a. Freight b. Pass. c. Freight d. Pass. e. Caboose	
(1) Total in Train 0		0		0		0		(1) Total in Equipment Consist 0		0	
(2) Total Derailed 0		0		0		0		(2) Total Derailed 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				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		77. Was EOT Device Properly Armed? 1. Yes 2. No N/A	
Fatal 0		0		0		0		78. Caboose Occupied by Crew? 1. Yes 2. No		N/A	
Nonfatal 0		0		0		0					
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) N/A		81. Direction geographical 1. North 2. South 3. East 4. West		Code N/A		84. Position of Car Unit in Train N/A					
82. Position 1. Stalled on Crossing 2. Stopped on Crossing 3. Moving Over Crossing 4. Trapped		Code N/A		85. Circumstance 1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User		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		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 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		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) 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.  
HQ-98-  
2006.jpg

	<b>FRA FACTUAL RAILROAD ACCIDENT REPORT</b>	FRA File #	HQ - 2006 - 98
		Report	
<b>108. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC. INVOLVED.</b>		IIC ID#	73880

Note: The FRA was not at the scene of this derailment and BNSF did not make a sketch. This sketch was based on photographs supplied by BNSF, and FRA was not able to accurately determine the car numbers of derailed equipment. The position of the two locomotives is uncertain and therefore not shown in this sketch. It is known that two wheels of the lead locomotive, BNSF 5305, were derailed. This is the list of derailed equipment, in order from east to west: BNSF 5305 (lead locomotive); TTEX 354064; TTRX 360873; TTAX 554343; TTEX 353736; TTAX 653489; and RTTX 971547.

← End of bridge

↑ East To Tulsa, Oklahoma

Point of Derailment - Broken rail

Bridge Mile Post 468.1

E  
N  
S  
W

#### 109. SYNOPSIS OF THE ACCIDENT

At 0615 hours on December 8, 2006, eastbound BNSF train SLHMEM4-05A derailed near Casey, Oklahoma at MP 468.1 on the main track, Avard subdivision. The crew reported an undesired emergency brake application while traveling at 35 mph through a 40 mph slow order. The crew inspected their train and discovered that lead locomotive BNSF 5305 and the first through seventh cars had derailed, destroying a bridge. The lead locomotive BNSF 5305 had two wheels derailed, five cars were lying on their side, and two cars were derailed but standing upright. This location is on the Springfield Division approximately 40 miles west of Tulsa, Oklahoma. The weather was clear and the temperature was 13 degrees. The equipment damages totaled \$656,167 and the track damage was \$690,000. The cause of the accident was determined to be a broken rail caused by an internal rail defect (detail fracture).

#### 110. NARRATIVE

The following information was obtained from an investigation that was conducted by the Federal Railroad Administration.

##### Circumstances prior to the accident

The crew of BNSF train SLHMEM4-05A consisted of an engineer and a conductor. The crew went on duty at 2:15 a.m. CST on December 8, 2006, at Enid, Oklahoma. All crew members received the required off duty time prior to reporting for duty.

The train consisted of two locomotives and 74 loaded cars. The train was 7,106 feet in length with 5,655 trailing tons. SLHMEM4-05A departed Enid, Oklahoma at 3:05 CST on December 8, 2006, en route to Tulsa, Oklahoma. Time table direction for this train is east and the train was traveling primarily eastward before the accident.

As the train approached the accident site the engineer and conductor were in the lead locomotive.

The track west of the accident site is the end of a 2-degree nine minute left-hand curve, and the grade is descending for approximately 7900 feet, varying from 1 percent to .57 percent at the accident site. The track east of the accident site is tangent for approximately 2200 feet, including a timber bridge, and the grade is ascending at .80 percent.

##### The Accident

The SLHMEM04-5A was traveling eastbound at 35 mph within a 40 mph slow order at the time of the derailment. As the train approached milepost 468.1, the crew experienced an undesired emergency brake application. Upon inspecting the train, the crew discovered two wheels derailed on the lead locomotive BNSF 5305, the first through fifth cars derailed on their sides, and the sixth and seventh cars derailed but remained upright. The derailment destroyed the timber bridge at MP 468.1.

##### Analysis

On November 27, 2006, eleven days prior to the accident, Sperry Rail Services conducted an internal rail defect test on this portion of the Avard subdivision. The test crew consisted of Sperry Car 856 and a Sperry Chase Car. The Sperry Car 856 conducted the primary test and the Sperry Chase Car was used to perform confirming hand tests of potential internal rail defects. Sperry Car 856 indicated a possible defect at the same location where the derailment occurred, but the Sperry Chase Car did not detect a rail defect and marked the test as negative at this location.

A broken rail was found at the Point of Derailment (POD), and the rail sections were sent to the BNSF Technical Research & Development Laboratory in Topeka, Kansas for testing. The tests found that a 30 percent detail fracture was present in the rail at the POD, and concluded that this was the cause of the derailment. The tests also found an additional 10 percent detail fracture at another spot in the same rail.

##### Conclusion

The railroad was found to be in compliance with Federal Regulations. The railroad and the FRA agree that the cause of the derailment was a 30 percent detail fracture that resulted in a broken rail. The BNSF is no longer using Sperry Car 856 at the present time on the Springfield Division. Sperry Rail Services sent another Hand Test Technician to re-certify all locations where Sperry Car 856 indicated a possible defect and the Chase Car reported negative hand tests.

Probable Cause & Contributing Factors

The Federal Railroad Administration found that the probable cause of this derailment was a broken rail caused by an internal rail defect which was likely not detected during recent internal rail testing.