Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-05

Burlington Northern Santa Fe (BNSF)
Columbus, Kansas
January 30, 2007

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-2007-5

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: SF0107129
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident No.: N/A
3.Name of Railroad Operating Train #3: N/A	3a. Alphabetic Code: N/A	3b. Railroad Accident/Incident No.: N/A
4.Name of Railroad Responsible for Track Maintenance: BNSF Rwy Co. [BNSF]	4a. Alphabetic Code: BNSF	4b. Railroad Accident/Incident No.: SF0107129
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 01 | Day 30 | Year 2007	7. Time of Accident/Incident: 11:20: ☐ AM ☑ PM

8. 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) — Code: 01

9. Cars Carrying HAZMAT	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
14	4	0	0	Springfield

14. Nearest City/Town	15. Milepost (to nearest tenth)	16. State Abbr	16. State Code	17. County
Columbus	146.9	N/A	KS	CHEROKEE

18. Temperature (F) (specify if minus)	19. Visibility (single entry) 1. Dawn 2. Day 3.Dusk 4.Dark — Code	20. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow — Code	21. Type of Track 1. Main 2. Yard 3. Siding 4. Industry — Code
10 F	4	2	1

22. Track Name/Number	23. FRA Track Class (1-9, X) — Code	24. Annual Track Density (gross tons in millions)	25. Time Table Direction 1. North 2. South 3. East 4. — Code
Single Main	2	16.36	1

OPERATING TRAIN #1

26. 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	27. Was Equipment Attended? 1. Yes 2. No — Code	28. Train Number/Symbol
	1	1. Yes	HTULKCK130

29. Speed (recorded speed, if available) — Code: R (R - Recorded, E - Estimated) 13 MPH

30. Trailing Tons (gross tonnage, excluding power units): 8404

31. 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

31a. 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

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	ATW90055	49	no
(2) Causing (if mechanical cause reported)	0	0	N/A

33. 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

34. Was this consist transporting passengers? (Y/N): N

35. 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

36. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	49	0	78	0	0
(2) Total Derailed	6	0	18	0	0

37. Equipment Damage — This Consist: 141999

38. Track, Signal, Way, & Structure Damage: 263000

39. Primary Cause Code: M507

40. Contributing Cause Code: N/A

Number of Crew Members

41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen
1	0	1	0

Length of Time on Duty

45. Engineer/Operator: Hrs 8 Mi 0

46. Conductor: Hrs 8 Mi 0

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	0	0	0

50. EOT Device? 1. Yes 2. No: 1

51. Was EOT Device Properly Armed? 1. Yes 2. No: 1

52. Caboose Occupied by Crew? 1. Yes 2. No: N/A

OPERATING TRAIN #2

53. 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	54. Was Equipment Attended? 1. Yes 2. No — Code	55. Train Number/Symbol
	N/A	N/A	N/A

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

58. 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

58a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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57. 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

59. 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

60. 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

61. Was this consist transporting passengers? (Y/N) N/A

62. 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

63. Cars	Loaded a. Freight	Loaded 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

64. Equipment Damage This Consist N/A

65. Track, Signal, Way, & Structure Damage N/A

66. Primary Cause Code N/A

67. Contributing Cause Code N/A

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

72. Engineer/Operator Hrs N/A Mi N/A

73. Conductor Hrs N/A Mi N/A

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

77. EOT Device? 1. Yes 2. No N/A

78. Was EOT Device Properly Armed? 1. Yes 2. No N/A

79. Caboose Occupied by Crew? 1. Yes 2. No N/A

OPERATING TRAIN #3

80. 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

81. Was Equipment Attended? 1. Yes 2. No Code N/A

82. Train Number/Symbol N/A

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

84. Trailing Tons (gross tonnage, excluding power units) N/A

85. 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) N/A N/A N/A N/A N/A

85a. 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 N/A

86. 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

87. 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

88. Was this consist transporting passengers? (Y/N) N/A

89. 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

90. Cars	Loaded a. Freight	Loaded 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

91. Equipment Damage This Consist N/A

92. Track, Signal, Way, & Structure Damage N/A

93. Primary Cause Code N/A

94. Contributing Cause Code N/A

Number of Crew Members

95. Engineer/ Operators	96. Firemen	97. Conductors	98. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

99. Engineer/Operator Hrs N/A Mi N/A

100. Conductor Hrs N/A Mi N/A

Casualties to:	101. Railroad Employees	102. Train	103. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

104. EOT 1. Yes 2. No N/A

105. Was EOT Device Properly 1. Yes 2. No N/A

106. Caboose Occupied by Crew? 1. Yes 2. No N/A

Highway User Involved

107. 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)

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

109. geographical) Code N/A
1.North 2.South 3.East 4.West

Rail Equipment Involved

111. 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)

112. Position of Car Unit in N/A

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110. Position	Code	113. Circumstance	Code
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	N/A	1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	N/A
114a. 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	N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

114c. State here the name and quantity of the hazardous materials released, if any.
N/A

115. Type Crossing Warning	1.Gates	4.Wig Wags	7.Crossbucks	10.Flagged by crew	116. Signaled Crossing (See instructions for codes)	Code	117. Whistle 1. Yes 2. No 3. Unknown	Code
	2.Cantilever FLS	5.Hwy. traffic signals	8.Stop signs	11.Other (spec. in narr.)				
	3.Standard FLS	6.Audible	9.Watchman	12.None				
Code(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

118. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach	Code	119. Crossing Warning with Highway Signals 1. Yes 2. No 3. Unknown	Code	120. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown	Code
	N/A		N/A		N/A

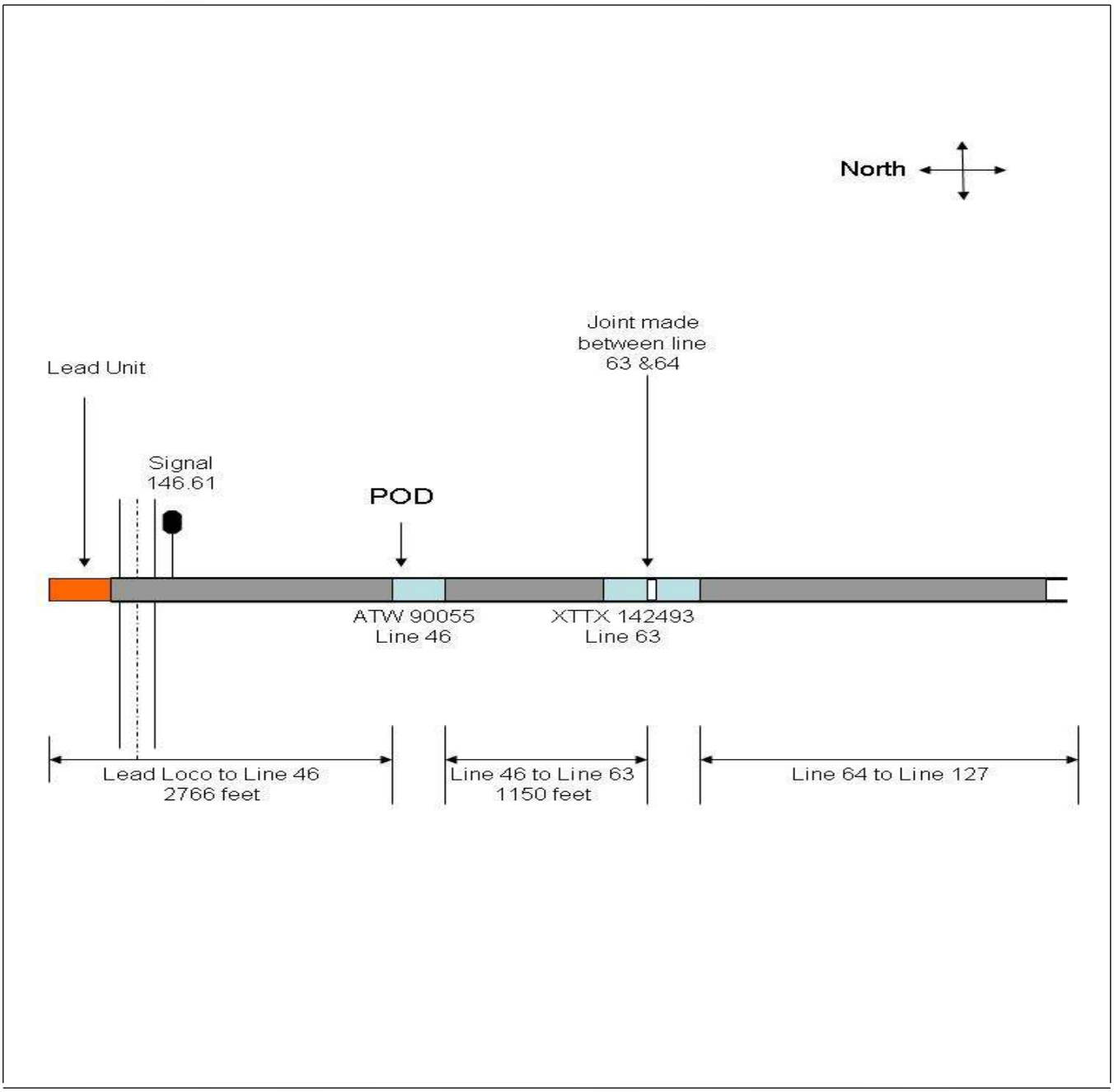
121. Age	122. Driver's Gender 1. Male 2. Female	Code	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative)	Code
N/A		N/A		N/A		N/A

125. Driver Passed Highway Vehicle 1. Yes 2. No 3. Unknown	Code	126. 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		N/A

Casualties to:	Killed	Injured	127. Driver 1. Killed 2.Injured 3. Uninjured	Code	128. Was Driver in the Vehicle? 1. Yes 2. No	Code
				N/A		N/A
129. Highway-Rail Crossing Users	N/A	N/A	130. Highway Vehicle Property Damage (est. dollar damage)	N/A	131. Total Number of Highway-Rail Crossing Users (include driver)	N/A

132. Locomotive Auxiliary Lights? 1. Yes 2. No	Code	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No	Code
	N/A		N/A
134. Locomotive Headlight Illuminated? 1. Yes 2. No	Code	135. Locomotive Audible Warning Sounded? 1. Yes 2. No	Code
	N/A		N/A

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



137. SYNOPSIS OF THE ACCIDENT

On January 30, 2007, at about 11:20 p.m. Central Standard Time (c.s.t.), northbound BNSF Railway Company (BNSF) Train Symbol H-TULKCK1-30A, which originated at Tulsa, Oklahoma, and terminated in Kansas City, Kansas, derailed 24 cars, lines 44 through 67 which included 4 empty hazardous materials tank cars; however, nothing was reported leaking and there were no injuries. The derailment occurred at milepost 146.6 on single main track on the Springfield Division, Afton Subdivision in the town of Columbus, Kansas.

The conditions at the time were cloudy and calm with a temperature of 10 degrees Fahrenheit on tangent track with a 0.5 percent ascending grade.

Equipment damages were estimated at $141,999 and track damages were estimated at $263,000 for a total of $404,999, with $48,000 (not reportable) for re-railing costs.

After extensive investigations efforts by both the FRA and BNSF, no probable cause could be determined.

138. NARRATIVE

Circumstances Prior to the Accident:

The crew of Train Symbol H-TULKCK1-30A consisted of a locomotive engineer and a conductor. They went on duty at 3:20 p.m., c.s.t., January 30, 2007, at the BNSF Tulsa, Oklahoma, Yard, which is the home terminal for both of the crew members. The engineer had been off duty since 11:25 a.m., on January 29, 2007, and the conductor had been off duty since 6:15 a.m., on January 27, 2007. Both of the employees had received more than the statutory off-duty period, prior to reporting for duty.

Prior to departure, Train Symbol H-TULKCK1-30A, which consisted of mixed freight, received a Class I brake test and inspection at the Tulsa Yard on January 30, which was completed by the carmen at 4:22 p.m. Departing from Tulsa at 4:25 p.m., Train Symbol H-TULKCK1-30A consisted of 3 locomotives and 79 cars; 43 loaded and 36 empty with 6,223 trailing tons, and 4,499 feet in length. This train was scheduled to set out and pick up cars at Columbus en route to Kansas City, Kansas.

The railroad timetable direction of the train was north. The main line in Columbus is tangent track with a 0.5 percent ascending grade, and there was a 25 mph speed restriction due to tie conditions.

After Train Symbol H-TULKCK1-30A arrived Columbus at 8:54 p.m., on January 30, the crew aboard Locomotive No. BNSF 7664 left 64 cars with the air brakes set on the main line; they then brought the head 15 cars with them to make an 11 car set out, keeping the head 4 cars coupled to the rear locomotive. They then coupled up to 59 cars on Track No. 623. The conductor walked to the rear of the fill cars coupling up the air hoses. He then placed a gauge on the rear of the fill cars, and the engineer made a 20-pound reduction. The conductor then made his air brake test which lasted 17 minutes and 20 seconds, according to the event recorder download.

After the brakes were released on the fill cars, the crew made their way back over to the main line, first in a northern direction and traveling over a gated grade crossing, then reversed the movement in a southerly direction returning to where the 64 cars were previously left. The conductor was riding the rear car of the fill in a southerly movement, and stopped movement 86 feet prior to the standing cars on the main line. He then dismounted and instructed the engineer to back up to make the coupling. The conductor stated the car they coupled into the standing cars with, had an end-of-car cushioning unit, and it did not go all the way in at the time of the coupling, which would indicate a smooth coupling, (2 mph according to the download).

After the conductor coupled the two remaining air hoses, the air was restored to the train line and the conductor started back to the head-end of his train when he heard a loud "pop." He walked back to where the joint was made, but did not see anything unusual. He then continued his way back to the lead locomotive on the west side of the mainline while the engineer performed a continuity test.

The Derailment:

About 2 minutes and 14 seconds after Train Symbol H-TULKCK1-30A started to pull north and traveled about 1,396 feet at a maximum recorded speed of 13 mph in throttle position 7, the train experienced an undesired emergency air brake application. The speed was recorded to be 11 mph at the time the undesired emergency air brake application occurred; this is also believed to be the point at which the train derailed as indicated by the rise in amperage seen on the event recorder download.

There was a 25 mph speed restriction placed between milepost (MP) 102.6 and 148.5 on May 5, 2005, due to the poor tie conditions, and this was scheduled to be removed on April 6, 2007. The last track inspection was conducted on January 30, 2007, and no defects were noted.

According to a report from the BNSF Network Operations Center (NOC) warm bearing desk in Fort Worth, Texas, at about 12:05 a.m., on January 31, 2007, the crew reported lines 44 through 67 had been derailed, including 4 hazardous material tank cars containing residue; however, nothing was reported to be leaking.

Analysis and Conclusion:

Analysis
An inspection was performed on the cars which had already been re-railed and were placed in a siding. Car No. ATW 90055 was observed with the center-of-car cushioning unit in a defective condition which would not allow the center sill to return to its normal position. This car was also the first car derailed according to the BNSF officials on the scene shortly after the derailment. However, it was not clear if the cushioning unit was defective prior to the derailment or was a consequence of the derailment. All other cars seemed to have "normal" damage occurring from a derailment of this type and no obvious truck or wheel defects were noted. Therefore, since the main line track is tangent with very little grade, this would point to a track related derailment.
The event recorder download from the lead locomotive did not reveal any unusual train handling that would cause the derailment.

After Train Symbol H-TULKCK1-30A arrived at Argentine Yard in Kansas City, Kansas, on February 2, 2007. FRA conducted an inbound inspection on the cars that had departed Columbus. Of the remaining 103 cars, 13 were found to be defective for a defect ratio of 12.6 percent and all but 3 were air brake related.

All evidence discovered at the derailment including event recorder download, portions of rail, and the center-of-car cushioning unit, was sent to the BNSF lab in Topeka, Kansas, for analysis.

There was no post accident toxicological testing done as a result of this derailment.

Conclusion
There was no clear evidence of the probable cause of the derailment discovered at the site. All evidence discovered at the derailment including the event recorder download, portions of rail, and the center-of-car cushioning unit was sent to the BNSF lab in Topeka, for analysis. The event recorder, all portions of rail and the center-of-car cushioning unit were throughly analyzed at the site and BNSF lab. Despite these extensive investigative efforts of the FRA and the BNSF lab analysis, no probable cause could be determined.

Probable Cause & Contributing Factors:

M-507 Investigation complete, cause could not be determined. Despite extensive investigative efforts of the FRA and the BNSF lab analysis, no probable cause could be determined.