Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2008-65

Burlington Northern Santa Fe (BNSF)
Brenham, TX
July 28, 2008

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-2008-65

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: GC-0708126
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.: GC-0708126
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 07 | Day 28 | Year 2008	7. Time of Accident/Incident: 06:00: ☐ 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
4	4	0	0	Gulf Division

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
Brenham	126.0	N/A	TX	WASHINGTON

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
97 F	2	1	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. West — Code
Single Main Track	3	79.13	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	MLARALT527

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

30. Trailing Tons *(gross tonnage, excluding power units)*: 3056

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)*	BNSF484857	5	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
0	0

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	2	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	12	0	50	0	0
(2) Total Derailed	0	0	24	0	0

37. Equipment Damage — This Consist: $300,782.00

38. Track, Signal, Way, & Structure Damage: $87,500.00

39. Primary Cause Code: T199

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 6 Mi 30

46. Conductor: Hrs 6 Mi 30

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)* R - Recorded; E - Estimated: 0 MPH — Code: 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)*	0	0	N/A
(2) Causing *(if mechanical cause reported)*	0	0	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	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

63. Cars	Loaded a. Freight	Loaded 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

64. Equipment Damage This Consist: $0.00

65. Track, Signal, Way, & Structure Damage: $0.00

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
0	0	0	0

Length of Time on Duty

72. Engineer/Operator: Hrs 0 Mi 0

73. Conductor: Hrs 0 Mi 0

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	0	0	0
Nonfatal	0	0	0

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 0

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)*	0	0	N/A
(2) Causing *(if mechanical cause reported)*	0	0	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	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

90. Cars	Loaded a. Freight	Loaded 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

91. Equipment Damage This Consist: $0.00

92. Track, Signal, Way, & Structure Damage: $0.00

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
0	0	0	0

Length of Time on Duty

99. Engineer/Operator: Hrs 0 Mi 0

100. Conductor: Hrs 0 Mi 0

Casualties to:	101. Railroad Employees	102. Train	103. Other
Fatal	0	0	0
Nonfatal	0	0	0

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. 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

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

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

Rail Equipment Involved

111. 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

112. Position of Car Unit in 0

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

113. Circumstance	Code
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?	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

114b. Was there a hazardous materials release	Code
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
	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

116. Signaled Crossing *(See instructions for codes)*	Code
	N/A

117. Whistle Ban	Code
1. Yes 2. No 3. Unknown	N/A

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

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

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

121. Age	122. Driver's Gender	Code
0	1. Male 2. Female	N/A

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

124. 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

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

126. 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

Casualties to:	Killed	Injured
129. Highway-Rail Crossing Users	0	0

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

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

130. Highway Vehicle Property Damage *(est. dollar damage)*
0

131. Total Number of Highway-Rail Crossing Users *(include driver)*
0

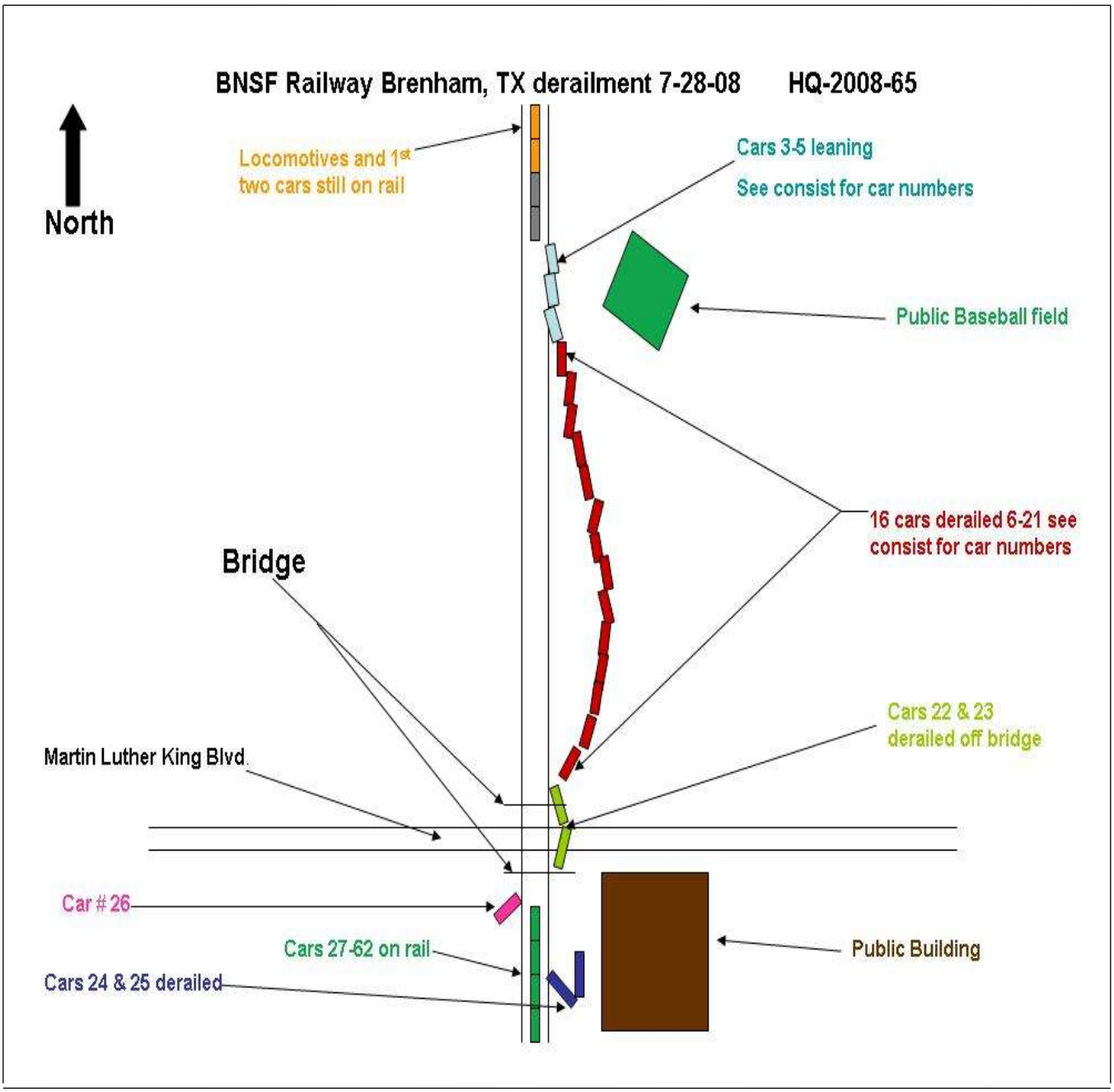
132. Locomotive Auxiliary Lights?	Code
1. Yes 2. No	N/A

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

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

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

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



137. SYNOPSIS OF THE ACCIDENT

On July 28, 2008 at 6:00 p.m. CDT northbound Burlington Northern Santa Fe (BNSF) freight train M-LARALT5-27 derailed at milepost 126 on the Main Track. This location is located in downtown Brenham, Texas on the BNSF Railway Galveston Sub-division of the Gulf Division.

The third through twenty-sixth freight cars of the sixty-two car train behind two locomotives derailed. The twenty-four cars that derailed were all empty hopper cars. There were no casualties and no release of hazardous materials involved. Monetary damages are $300,782 for equipment and $87,500 for track and signals. Total damages amounted to $388,282.

At the time of the derailment it was daylight with clear skies and the temperature was 97° F.

The BNSF Officials listed the cause of the derailment as FRA cause code T199; other track geometry defects; cross level and irregular track alignment.

The probable cause determined by the FRA is cause code T199; other track geometry defects; cross level alignment and muddy ballast.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

The crew of BNSF Railway freight train M-LARALT5-27 consisted of an engineer and a conductor. The crew went on duty at 11:30 a.m. CDT on July 28, 2008 at Galveston, Texas and was transported by van to Alvin, Texas where BNSF train M-LARALT5-27 was located. The train crew performed an initial terminal air brake test prior to leaving Alvin, Texas. Both crew members had received more than the required statutory off duty rest period prior to reporting for duty.

Their assigned BNSF freight train M-LARALT5-27 consisted of two locomotives, 12 loaded hopper cars and fifty empty hopper cars. The train was 3,750 feet in length and weighed 3,058 tons; no cars were set out or picked up while the train was en route. The train was scheduled to travel to Temple, Texas.

As the train approached the derailment area from the south it was traveling at a recorded speed of 28 mph. The maximum authorized speed for freight trains on this track segment is 30 mph as designated in the current BNSF Railway Timetable No. 6. The engineer was seated on the seat provided near the control stand on the east side of the lead and controlling locomotive. The conductor was seated on the seat provided on the west side of the locomotive and directly across from the engineer. The engineer stated that as he approached the interlocker he placed the throttle in the idle position with no air reduction or dynamic braking and was operating at 28 mph when the crew experienced an unexpected emergency train air brake application.

In this area of the railroad there are in succession a tangent 1660 feet in length, followed by a 3 degree 10 minute curve to the left about 790 feet in length, followed by a tangent 1840 feet in length, followed by a 3 degree curve to the left about 60 feet in length to the point of derailment and continuing north for an additional 840 feet in length. The grade of the railroad at the (POD) is .50 percent descending as you approach from the south. The railroad time table direction of the train and the geographic direction are both north.

THE ACCIDENT

BNSF Train M-LARALT5-27 was being operated at 28 mph approaching the derailment area according to the event recorder. The maximum authorized speed for freight trains on this track segment is 30 mph as designated in the current BNSF Railway Timetable # 6. According to the train crew they did not observe or feel anything unusual prior to the derailment.

The crew stated that the train experienced an emergency application of the train air brake system approximately 30-35 cars beyond the interlocker located at milepost 126. After the train went into emergency the conductor looked out his side window and noticed that the train had derailed. The lead locomotive stopped about 2,600 feet north of the interlocker. The two locomotives and the first two cars were still coupled and on the rail, followed by the third rail car through the twenty-sixth cars which were derailed. Of the 24 cars derailed, 4 of the cars contained a residue of hazardous materials; there were no hazardous materials released and no evacuations were ordered. The derailment occurred in the downtown area of Brenham, Texas.

After the engineer notified the dispatcher that the train had experienced an emergency train air brake application near milepost 126, the conductor inspected the train and discovered the derailed cars. The engineer advised the dispatcher that there were no injuries.

The derailment resulted in no injuries to the general public, emergency response personnel, or railroad employees. The Brenham Fire Department, Brenham local police and Washington County Sheriff were notified by National Response Center and responded to secured area.

ANALYSIS AND CONCLUSIONS

ANALYSIS - TOXICOLOGICAL TESTING:

The BNSF Railway performed Toxicological Testing under their own authority for both the conductor and engineer. This accident did not meet the requirements for FRA Post-Accident Toxicological Testing per Rule 49 CFR Part 219, Subpart C.

CONCLUSION:

The results of the tests were negative for both crew members and intoxication was not considered a casual factor.

ANALYSIS - EVENT RECORDER:

FRA analyzed event recorder data provided by BNSF Officials for the lead locomotive - BN 4747. This data suggested that the emergency application of the train air brakes was induced by the train line as a result of the train separation. The data showed that speed, amperage, throttle, and air brake pressure was constant until the unintentional emergency train brake application occurred. The engineer was operating BNSF Train M-LARALT5-27 at 28 mph with the throttle position in idle when he experienced an emergency application of the train air brake system. The speed was reduced from 28 mph to zero in about one-half mile. The data indicates that there were no exception noted to the engineer's handling characteristics prior to the emergency brake application.

CONCLUSION:

Train handling was not a casual factor in the derailment.

ANALYSIS - FATIGUE:

FRA uses an overall effectiveness rate of 77.5 percent as the baseline for fatigue analysis, which is equivalent to blood alcohol content (BAC) of 0.05. At or above this baseline, we do not consider fatigue as probable for any employee. Software sleep settings vary according to information obtained from each employee. If an employee does not provide sleep information, FRA uses the default settings.

FRA obtained fatigue related information including a 10-day work history for both employees involved in this accident, the locomotive engineer and the conductor of BNSF train M-LARALT5-27.

CONCLUSION:

FRA concluded fatigue was not a probable casual factor for the conductor or the engineer.

ANALYSIS - TRACK:

The point of derailment occurred in the first 60 feet of a 3 degree curve to the left. The track structure consisted of 136 lb# Continuous Welded Rail (CWR) constructed on wood crossties. The ballast section consisted of rock; however, numerous locations of the ballast were muddy and not effectively supporting the track structure. The maximum timetable train speed for this location is 30 mph, FRA Class 3 track.

The BNSF Officials took track measurements of the derailment area on the morning of July 29, 2008. Although no measurements exceeded the FRA Track Safety Standards for Class 3 Track, there was a warp of 1 5/16" near the POD. On July 30, 2008 the FRA took track measurements of the interlocker located 60 feet south of the POD. The interlocker was out of alignment 1 7/16" and had a profile of 1". In addition there were numerous locations of muddy ballast. Some of these muddy ballast spots had profile deviations up to 1". This was the general condition of the track from the south up to the general derailment area.

The BNSF geometry car tested the track geometry on June 13, 2008. The test produced no exceptions noted in the derailment area.

The BNSF track supervisor inspected the track on July 27, 2008. No exceptions or track defects were noted.

OVERALL CONCLUSION:

Information obtained from the event recorder indicates train handling was not an issue, nor was crew fatigue a factor. Track measurements indicate the track complied with the Track Safety Standards for FRA Class 3 Track. Although track measurements indicate that the track was in compliance for FRA Track Safety Standards for Class 3 Track, there were irregular surface and alignment conditions due to the numerous locations of muddy ballast.
All these conditions would contribute to excessive lateral and vertical movement.

The cause of the derailment was FRA cause code T199; a combination of irregular surface and alignment conditions.

PROBABLE CAUSE AND CONTRIBUTING FACTORS:

The Federal Railroad Administration determined that the cause of this derailment was T199; irregular cross level, irregular alignment, and muddy ballast in the track.