Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2008-70

Burlington Northern Santa Fe (BNSF)
Luther, OK
August 22, 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-2008-70

1.Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
BNSF Rwy Co. [BNSF]	BNSF	TX-0808113
2.Name of Railroad Operating Train #2	2a. Alphabetic Code	2b. Railroad Accident/Incident No.
N/A	N/A	N/A
3.Name of Railroad Operating Train #3	3a. Alphabetic Code	3b. Railroad Accident/Incident No.
N/A	N/A	N/A
4.Name of Railroad Responsible for Track Maintenance:	4a. Alphabetic Code	4b. Railroad Accident/Incident No.
Stillwater Central RR Co., Inc. [SLWC]	SLWC	D532508
5. U.S. DOT_AAR Grade Crossing Identification Number	6. Date of Accident/Incident: Month 08 | Day 22 | Year 2008	7. Time of Accident/Incident: 02:37:21 ☐ 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
13	8	8	35	Texas

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr / Code	17. County
Luther	512.0	N/A / OK	OKLAHOMA

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
92 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	2	9.768	4

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	TULTPL9-22

29. Speed *(recorded speed, if available)* R - Recorded; E - Estimated: 19 MPH — Code: R

30. Trailing Tons *(gross tonnage, excluding power units)*: 10271

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): j | 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)*	THRX 5945	30	yes
(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	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	77	0	33	0	0
(2) Total Derailed	14	0	0	0	0

37. Equipment Damage — This Consist: $542,064.00

38. Track, Signal, Way, & Structure Damage: $210,975.00

39. Primary Cause Code: T102

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 4 Mi 35

46. Conductor: Hrs 4 Mi 35

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: N/A 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)*	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. 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 N/A

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110. Position 1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	Code N/A	113. Circumstance 1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	Code 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	Code N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither	Code N/A
114c. State here the name and quantity of the hazardous materials released, if any. N/A			

115. Type 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	116. Signaled Crossing *(See instructions for codes)*	Code	117. Whistle Ban 1. Yes 2. No 3. Unknown	Code
Code(s) N/A 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 N/A	119. Crossing Warning with Highway Signals 1. Yes 2. No 3. Unknown	Code N/A	120. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown	Code N/A

121. Age N/A	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	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

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

Casualties to:	Killed	Injured	127. Driver 1. Killed 2.Injured 3. Uninjured	Code N/A	128. Was Driver in the Vehicle? 1. Yes 2. No	Code 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 N/A	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No	Code N/A
134. Locomotive Headlight Illuminated? 1. Yes 2. No	Code N/A	135. Locomotive Audible Warning Sounded? 1. Yes 2. No	Code N/A

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

Sorry, the report can not display the file.

137. SYNOPSIS OF THE ACCIDENT

On August 22, at 2:37 p.m. CST westbound Burlington Northern Santa Fe Railway (BNSF) freight train H-TULTPL9-22A containing various hazardous materials rail cars and general freight derailed approximately 3 miles northeast of Luther, Oklahoma. The incident occurred on the Sooner Subdivision at Milepost 512.0. There were no reported injuries or fatalities to the train crew or general public. The track is owned by the State of Oklahoma and is managed by the Stillwater Central Railroad Company (SLWC).

At the time of the accident the weather was 92°F and clear.

Fourteen rail cars derailed including eight tank cars containing Petroleum Crude Oil, P. G. III, Class 3, UN # 1267. Of the eight tank cars derailed, three were breached in the side of the tank shell (TILX 193325, UTLX 201925, & TILX 194831). All of the remaining derailed tank cars leaked product through the man-way cover. The spilled product caught fire and caused tank car UTLX 201925 to explode. The resulting fire and explosion caused considerable media attention and a local evacuation was ordered.

The evacuation was ordered by the local Fire Officials at about 3:00 p.m. on August 22nd and 14 families (approximately 35 people) were removed. The evacuees were permitted to return to their residences at about 7:30 p.m. on the same day. Emergency responders elected to allow the fire to burn off. The last small fire burning inside tank car TILX 193325 was extinguished by local fire departments at 11:30 a.m. on Saturday, 23 August.

BNSF reports $542,064 damage to rail cars. SLWC reports $210,975 damage to track.

The derailment was caused by irregular cross level of the track. An FRA Track Inspector issued a track defect for cross-level deviation in excess of Federal Standards in the area of the derailment.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT:

BNSF freight train H-TULTPL9-22A originated in Tulsa, OK. The initial terminal train air brake test was successfully conducted. The train departed Tulsa at 3:30 a.m. on August 22. The originating crew reached their maximum allowable hours on duty and stopped the train at Stroud, OK.

The relief Oklahoma City based crew consisted of an Engineer and a Conductor. Both relief crew members came on duty at 10:05 a.m. CST on August 22. Both crew members received the required statutory off duty rest period.

The relief crew picked up the train at Stroud, OK. They received their job brief and were told that the train was running smoothly. They noted the brake pressure, confirmed the track warrant was valid then departed Stroud, OK. The crew reported that the train operated smoothly from Stroud, Oklahoma to the accident site.

As the train approached the accident site the Conductor was sitting on the left (South) side of the lead locomotive and was talking with the SLWC dispatcher about the ambient temperature and the upcoming 10 mph speed restriction starting at Milepost 517. The Engineer was sitting on the right (North) side of the lead locomotive and was running in throttle position number 3. The Engineer had not been using the brake but was allowing the train to gradually slow down from 22 mph. The Engineer reported using very little brake from the pickup point to the accident site.

THE ACCIDENT:

The train crew reported having just completed communications with the SLWC dispatcher when they felt the train surge twice. Before the Engineer could react to apply the brakes the train went into emergency.

After the train stopped the Conductor walk back to the second locomotive and could see smoke. He then uncoupled the train from the locomotives and pulled up to the next available highway/rail grade crossing. The

crew members contacted the SLWC dispatcher and their supervisor to advise them of the accident.

There were no reported injuries or fatalities to the train crew or general public.

The local fire officials ordered an evacuation at about 3:00 p.m. on August 22, and 14 families (approximately 35 people) were removed from their homes. All of the evacuees were permitted to return to their residences at about 7:30 p.m. on the same day.

Emergency responders elected to let the fire burn off. The last small fire burning inside tank car TILX 193325 was extinguished by local fire departments at 11:30 a.m. on Saturday August 23.

Fourteen rail cars of the 110 car BNSF train derailed. The 14 cars were in position 30 through 44 of the BNSF train consist. Of those 14 cars, eight were tank cars containing Petroleum Crude Oil, Class 3, UN 1267, P. G. III. These eight tank cars were the only hazardous materials involved in the accident. All eight tank cars leaked their contents and three of the eight were breached in the side of the tank shell. The resulting fire and explosion gained media attention and caused the evacuations of local residents.

BNSF reported $542,064 damage to rail cars. SLWC reported $210,975 damage to track.

ANALYSIS AND CONCLUSIONS:

ANALYSIS: - BNSF ENGINEER AND TRAIN OPERATIONS

The event recorder data reflected that the train gradually slowed from 22 mph down to 19 mph at the time of the accident. The train was in a tangent section coming off of a .89-percent descending grade and entering a .67-percent incline grade. The speed limit on this section of track is 25 mph.

The point of derailment was determined by physical evidence to be at track mile post 512.

CONCLUSION:

The engineer operated the train in compliance with all railroad rules and FRA Standards.
The train was in good operating condition and operating properly. The crew was operating the train according to existing operating rules and train handling requirements.

ANALYSIS: - FATIGUE

Fatigue Analysis information was collected from BNSF crew members. “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 software settings.”

CONCLUSION:

FRA concluded that fatigue was not a probable factor for the two crew members.

ANALYSIS: - SLWC TRACK:

FRA and BNSF were both involved in taking track measurements after the derailment. The FRA Track Safety Inspector cited one track defect near the POD where the difference in cross level was 2 7/16 inches. This measured geometry did not conform to FRA Standards.

CONCLUSION:

The track had a documented Federal defect near the point of derailment. The FRA, BNSF and SLWC agree that the derailment was caused by irregular track cross level.

PROBABLE CAUSE AND CONTRIBUTING FACTORS:

The probable cause of the accident was a 2 7/16 inch difference in cross level in the track near the point of derailment.