Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2008-17

Burlington Northern Santa Fe (BNSF)
Walshville, IL
February 8, 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-2008-17

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: SF0208111
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.: SF0208111
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 02 Day 08 Year 2008	7. Time of Accident/Incident: 08:20:00 ☑ 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
0	N/A	N/A	0	SPRINGFIELD

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
WALSHVILLE	73.9	N/A	IL	MONTGOMERY

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
38 F	2	1	3

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
UP CONNECTION TRACK	1	N/A	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	UKEEMAD021

29. Speed *(recorded speed, if available)* R - Recorded E - Estimated — Code	31. Method(s) of Operation *(enter code(s) that apply)*	31a. Remotely Controlled Locomotive?
10 MPH — R	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)*	0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter
30. Trailing Tons *(gross tonnage, excluding power units)*: 18945	Code(s): n N/A N/A N/A N/A	0

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	BNSF600220	87	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: N/A; Drugs: 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	36. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	1	(1) Total in Equipment Consist	142	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	21	0	0	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
$88,000.00	$24,643.00	M507	N/A

Number of Crew Members				Length of Time on Duty	
41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen	45. Engineer/Operator	46. Conductor
1	0	1	0	Hrs 6 Mi 50	Hrs 6 Mi 50

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 — 2

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 — Code	58. Method(s) of Operation *(enter code(s) that apply)*	58a. Remotely Controlled Locomotive?
N/A MPH — N/A	a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track	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

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
N/A	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	N/A	N/A

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)*	
	N/A

131. Total Number of Highway-Rail Crossing Users *(include driver)*	
	N/A

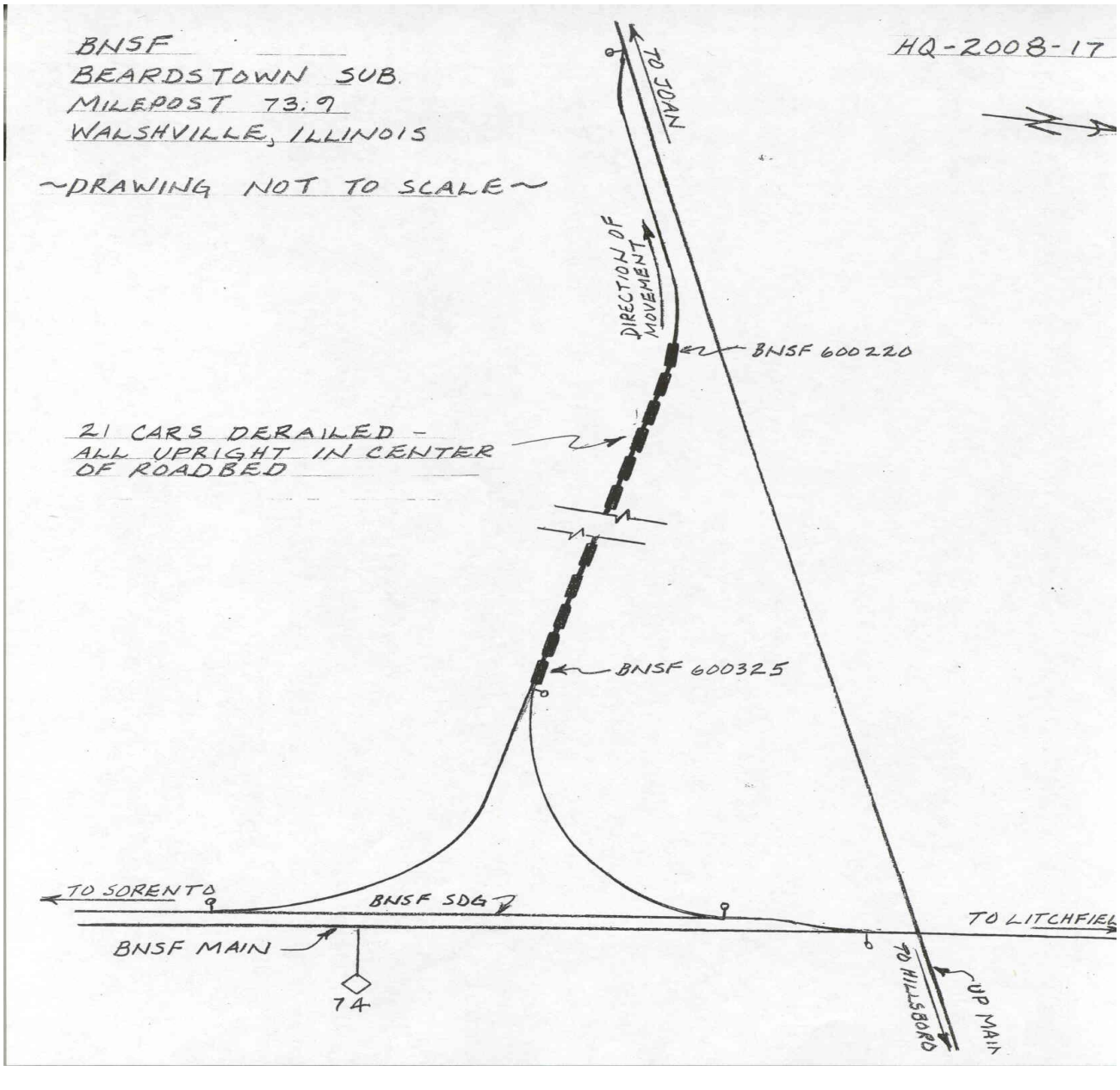
132. Locomotive Auxiliary Lights?	Code
1. Yes 2. No	N/A

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 February 8, 2008, at 8:20 a.m. CST BNSF Railway (BNSF) freight train U-KEEMAD0-21T operating westbound on the BNSF Beardstown Subdivision derailed 21 cars at milepost 73.9 on the Union Pacific (UP) Connection Track. The accident occurred near Walshville, Illinois on tangent track.

The derailed equipment consisted of 21 loads of iron ore (taconite). All of the derailed cars remained upright on the ties. The derailment caused both rails to roll out of the tie plates for approximately 680 feet. There were no injuries reported and no evacuation ordered. There was a total of $ 88,000 estimated equipment damage and $ 24,643 track damage.

The weather was clear and the ambient temperature was 38 ºF.

The probable cause of the derailment is undetermined

138. NARRATIVE

On February 8, 2008 at 1:30 a.m. CST the crew of BNSF 21T reported for duty at Beardstown, Illinois. The crew consisted of a locomotive engineer and a conductor. Beardstown was the home terminal for both crew members and both received more than the required statutory off-duty rest period prior to reporting for duty. The engineer had 28 hours 35 minutes rest and the conductor had 27 hours 15 minutes off duty rest time.

The assigned freight train consisted of three locomotives (one operating on the rear) and 142 loads of taconite. The train was 5,189 feet long with 18,945 trailing tons. BNSF 21T was scheduled to operate from Beardstown to East St. Louis, Illinois with no intermediate work. It received a Class III air brake test and departed Beardstown at 2:20 a.m.

As BNSF 21T approached the accident area, the engineer was seated at the controls on the north side of the leading locomotive. The conductor was seated on the south side of the same locomotive, reviewing his train orders.

BNSF 21T stopped at the East Siding Switch at Toland, lined the switch for the diverging route, proceeded approximately 200 feet to the East Wye Switch, and made a second diverging movement onto the east leg of the wye. The route continued through a trailing point switch onto the UP Connection Track, and then onto the UP Single Main Track.

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

The UP Connection Track connects the BNSF East Wye Track to the UP Single Main Track and is constructed with wood crossties and 136 pound continuous welded rail. At the point of derailment the track is tangent with a slight descending grade in the direction of train movement. The portion of wye track where the derailment occurred is owned and maintained by BNSF.

THE ACCIDENT

The head end of BNSF 21T had reached the UP Single Main Track and preceded approximately three tenths of a mile when an unintentional emergency application of the air brakes occurred, and the train came to a stop. The conductor walked toward the rear of the train to determine the cause of the emergency application. He discovered and repaired one broken knuckle, continued his inspection, and discovered another broken knuckle. At this point the conductor looked further back in the train and observed the derailed cars. After the conductor communicated with the engineer, the engineer notified the UP and BNSF dispatchers of the derailment. The conductor proceeded east surveying the derailed cars and subsequent track damage. The derailed equipment consisted of 21 loads of taconite, the 85th through 105th cars, from the head end of the train.

No hazardous materials were involved in the derailment and no evacuation was ordered. There was no response by emergency personnel.

ANALYSIS AND CONCLUSIONS

ANALYSIS - TOXICOLOGICAL TESTING:

This accident did not meet the criteria for 49 CFR Part 219 Subpart C Post Accident Toxicological Testing. The BNSF elected not to test under their post accident toxicological testing authority, since it also failed to meet their prescribed testing criteria.

ANALYSIS - TRACK:

The rail on the UP Connection Track had not been ultrasonically tested in the last four years. However, it was tested on February 11, 2008, after the derailment. One defect, a 10 percent detail fracture, was found. According to carrier records, no service failures have occurred on this track in the last four years.

A broken field weld located on the south rail at the extreme east end of the disturbed track was initially identified by the BNSF as the cause of the derailment. The suspect weld was sent to their Technical Research and Development Laboratory for analysis. The findings of this investigation concluded that the suspect broken weld was a result of the derailment and not the cause.

Track geometry measurements were recorded for 11 stations in the 155 feet prior to the disturbed track. Gage measurements at the stations ranged from 57 1/8 to 57 5/8 inches in this section of curved track. Cross -level at the same stations ranged from 4/16 to 10/16 inch, with the 4/16 inch measurement being at the last station coming out of the curve. All of these measurements complied with the FRA Track Safety Standards for Class 1 track. In addition, cross-level measurements were made every 31 feet for a distance of 775 feet after the rails had been replaced in the track. The greatest cross-level measurement was 1 5/8 inch, at station 3, and the greatest difference in cross-level within 62 feet was 1 ½ inch, from station 3 to station 5. Again, these measurements complied with the FRA Track Safety Standards for Class 1 track. There were no indications that track geometry was a factor in this derailment.

The track disturbed by the derailment began approximately 13 feet west of the switch point of the UP Connection Switch and proceeded westward approximately 725 feet, with the last 80 feet being in the spiral of a left-hand curve. The north rail had been rolled inward pulling the spikes on the field side completely out of the ties for approximately 75 feet and lifting the spikes for an additional 300 feet. Wheel marks were found on the field side web of the north rail indicating that at least one wheel had been over the rail.

Wheel marks were also found at a joint on the north rail where a wheel had crossed back over the rail from the north to the south. After being rolled inward, the north rail had then been set back upright and pushed north beyond the tie plates. In addition, the north rail had been shoved westward, out of a joint located approximately 12 feet west of the UP Connection Switch. The north rail was broken 200 feet west of the switch point and the rails bypassed and overlapped approximately 8 feet. Photographs, supplied by the BNSF, showed a gap in the north rail at the east end which appears to be significantly larger than the overlap at the west end. This appears to indicate that an additional break in the north rail had occurred and that a piece of rail at least 8 feet in length was unaccounted for.

The south rail had been rolled outward onto its side beginning at a point 13 feet west of the switch point and

continuing west for approximately 700 feet. The south wheels of the derailed cars were running on the edge of the overturned rail and on the ties inside of the rail.

CONCLUSION:

The point of derailment could not be determined due to the amount of damage caused by the derailment and subsequent re-railing of the cars.

Track geometry measurements taken at the scene complied with the FRA Track Safety Standards for the intended class. Track surface and gage were not causal factors in the derailment.

The rail suspected by BNSF to be the cause of the derailment was a result of the derailment, and not the cause. The possibility of a different broken rail as the cause of the derailment could not be ruled out due to the lack of information available.

ANALYSIS - MECHANICAL:

The BNSF investigating team determined that the first car to derail was the BNSF 600220. This car was number 85, the lead derailed car. A mechanical inspection of the BNSF 600220 was conducted and no exceptions were taken. This was the only car of the 21 derailed cars to be inspected.

Wheel measurements were taken from all derailed cars when they were re-wheeled. The BNSF mechanical department said that none of the wheels were found to be condemnable.

CONCLUSION:

No supporting evidence suggested that the BNSF 600220 was the first car to derail. Due to the lack of inspections of the remaining 20 derailed cars, mechanical conditions of the rail cars could not be eliminated as causal factors in the derailment.

ANALYSIS - EVENT RECORDER:

FRA analyzed event recorder data provided by BNSF for lead locomotive BNSF 4847 and Distributed Power Unit (DPU) 9670 located at the rear of BNSF 21T. The event recorder data prior to the derailment suggested that train handling was consistent with what would be expected for the train movements made. This data also suggested that the emergency application of the air brakes was induced by the train line, probably caused by the train separation. The data showed that at a point approximately 310 feet prior to the emergency brake application, the speed of BNSF 21T began to decrease as amperage increased. This suggests that the train began to derail a relatively short distance prior to this point, and as more cars derailed, the speed continued to decrease as amperage continued to increase.

BNSF 21T was being operated at a recorded speed of 10 mph when the derailment occurred. The connection track is designated as other than main track allowing trains to operate at restricted speed not to exceed 10 mph.

CONCLUSION:

Train speed and handling were not causal factors in this derailment.

ANALYSIS: - FATIGUE

FRA obtained fatigue related information, for the 10-day period preceding this incident including the 10-day work history (on duty/off duty cycles) for all of the employees involved.

CONCLUSION:

Upon analysis of that information FRA concluded fatigue was not probable for any of the employees.

PROBABLE CAUSE & CONTRIBUTING FACTORS

The physical evidence and markings on the rail at the derailment site indicated a wheel had been over the north rail starting at a point closely approximated by the locomotive event recorders as the point of derailment. With track geometry not being a factor, this evidence points toward a possible mechanical condition of one of the rail cars. The distance traveled after derailing as indicated by the event recorders points to the ninth derailed car from the head end as the first car derailed, or a car in close proximity. Due to the lack of mechanical inspections of 20 of the derailed cars, a mechanical cause could neither be confirmed nor eliminated.

The probable cause of the derailment is undetermined.