Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-17

Burlington Northern Santa Fe (BNSF)
Degraw, Nebraska
April 8, 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-2007-17

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: PR0407100
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.: PR0407100
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 04 | Day 08 | Year 2007	7. Time of Accident/Incident: 07:30: ☑ 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	Powder River

14. Nearest City/Town	15. Milepost (to nearest tenth)	16. State Abbr	16. State Code	17. County
Northport	6.	N/A	NE	MORRILL

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
24 F	2	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
Main Track No 1	4	100	3

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	CATMCSS022

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?
23 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): 16870	Code(s): e | 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)	FEPX 60402	40	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	118	0	0	0	0
(2) Total Derailed	20	0	0	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
1035175	235125	T001	T204

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	46. Conductor
Hrs 4 Mi 35	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 — 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	63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	N/A	N/A	N/A	N/A	N/A	(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	(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	90. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	N/A	N/A	N/A	N/A	N/A	(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	(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	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	N/A					

116. Signaled Crossing (See instructions for codes)	Code	117. Whistle 1. Yes 2. No 3. Unknown	Code
	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

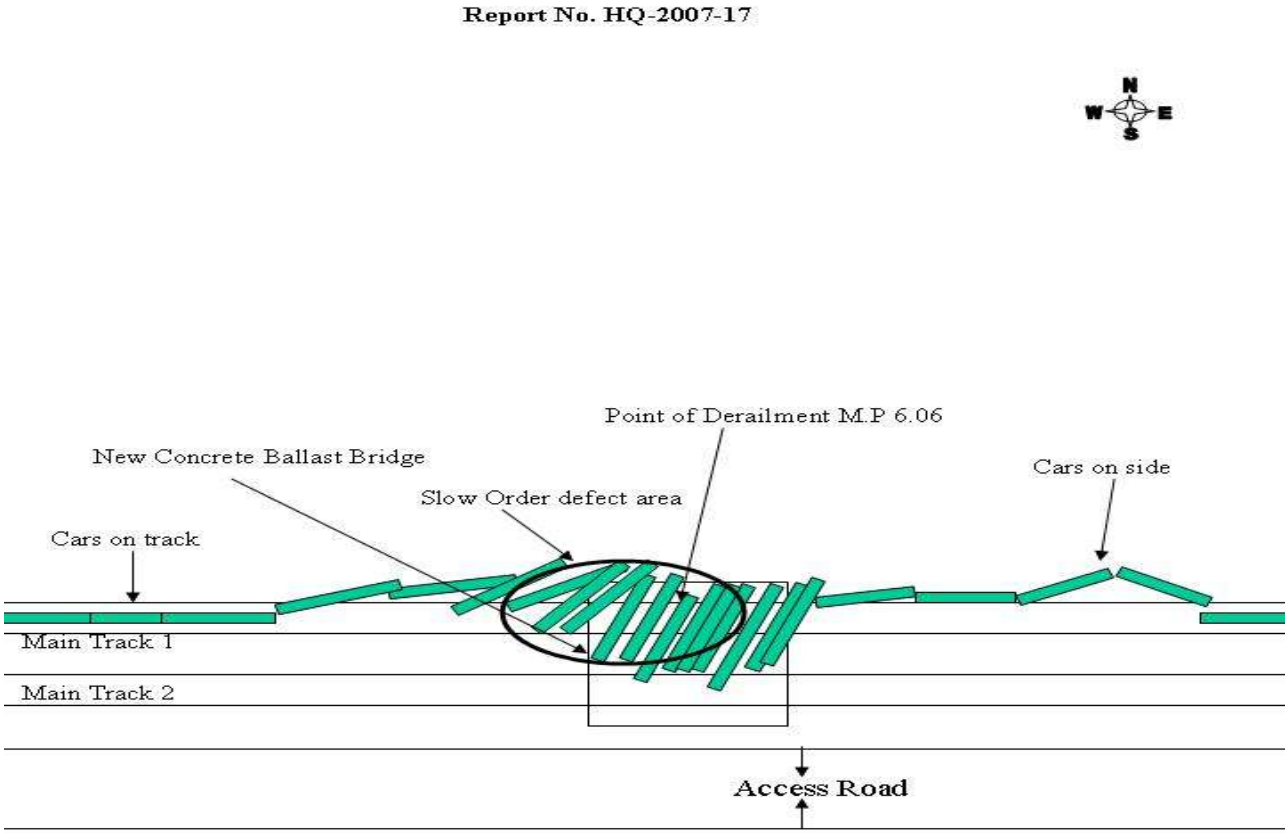
121. Age	122. Driver's Gender 1. Male 2. Female	Code	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative)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

An eastbound BNSF Railway Company (BNSF) loaded coal train derailed on April 8, 2007, at 07:30 a.m., m.d.t. The derailment occurred near Northport, Nebraska, at milepost (MP) 6.0, on the Valley Subdivision, of the Powder River Division.

Train Symbol CATMCSS022A consisted of three lead locomotives pulling 118 cars. A total of 20 cars, line numbers 37 through 56, derailed. No injuries or hazardous materials were involved. The BNSF train crew was taken for an FRA Post Accident D&A test.

The derailment happened on main Track No. 1, damaging the bridge of both main Track No. 1 and main Track No. 2. The train was traveling through a temporary 25 mph speed restriction. Cost estimates incurred to the equipment, track and structures total $1,270,300.

At the time of the accident, it was daylight with cloudy skies and an estimated temperature of 24 degrees Fahrenheit.

The probable cause is roadbed settled or soft, with a contributing factor of a broken field weld.

138. NARRATIVE

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

Circumstances Prior to the Accident

The operating crew of the eastbound loaded coal train, Train Symbol CATMCSS022A, consisted of a locomotive engineer and a conductor. They first went on duty at 2:55 a.m., m.d.t., on April 8, 2007, at Guernsey, Wyoming. Alliance, Nebraska, is the home terminal for the crew members. The crew received more than the statutory off-duty period at their away-from-home terminal prior to reporting for duty.

Their assigned freight train consisted of three locomotives in lead with 118 loaded coal cars. It weighed 16,870 tons and was 6,493 feet long. A set and release air brake test was performed at Guernsey, Wyoming, and accepted by the operating crew before heading to their home terminal and routine crew changing point in Alliance. No other air brake test was required at Guernsey. The last Class I air brake test required was preformed by the car department personnel in Lincoln, Nebraska, during its westbound trip. The train symbol as an empty was E-CSSATM 020A; this is an extended haul train. This train was inspected as an empty consist in Lincoln and traveled to Caballo Mine in northern Wyoming, where it was loaded and commenced the return trip to Lincoln for its next scheduled air test.

The crew made no switching stops prior to the derailment. The engineer stated that the train did stop at MP 8.0, just west of a crossing approach waiting for a signal. At that time, he stepped off the train and took fuel readings. Then when they received their signal to proceed, the train headed for Alliance.

As the eastbound loaded coal train approached the accident site, the engineer was seated at the control panel on the south side of the leading locomotive, monitoring the locomotive controls. The conductor was in his seat on the north side of the leading locomotive.

The railroad timetable direction of the train was east; the geographic direction was also east. Timetable directions and milepost locations are used throughout this report.

The track was tangent in the area of the accident. There is a 0.50-percent descending grade from MP 7.13 to a descending grade of .00 at MP 5.54. This is an area of double main track and is made up of wood ties and 132-lb. RE CF 1985 on main Track No. 1 and 141-lb. RE VT RMSM 2006 on newly laid main Track No. 2, both having continuous-welded rail (CWR). At the new bridge location at MP 6.06 on main Track No. 1, the rail was new 136-lb. REVT RMSM 2006.

As the eastbound coal train approached the accident area, the train crew reported that their trip had been uneventful and their train was operating normally. The engineer had applied some dynamic breaking to slow for a speed restriction located at MP 6.4 to MP 6.0. The slow order had been placed on the area of a recently built bridge. This bridge had been built in February of 2007. The slow order was in regard to surface conditions on the west approach. The train crew members said they felt a noticeable, but gentle dip while passing over the derailment location.

The Accident

At the time of the accident, the train was traveling on main Track No. 1 at a recorded speed of 23 mph, as indicated by the event recorder. The train crew had slowed for a slow order of 25 mph placed by a track inspector on March 31, 2007. The maximum authorized speed on the main track through the derailment area is 50 mph in accordance with Power River Division Timetable No. 8, effective November 29, 2006.

At approximately 7:30 a.m., the engineer was slowly reducing his dynamic braking when seconds later, the train went into a train-induced undesired emergency application of the train's air brake system. The engineer stated the head-end of the train consist was at approximately MP 5.6, 4-tenths of a mile east of the point of derailment. The crew then had a good idea that they were on the ground. The engineer called the dispatcher and reported the undesired stop. A track inspector showed up at the scene and picked up the conductor. Upon inspection, the conductor reported to the engineer that cars were de-railed accordion style at the area of the bridge, MP 6.06. The bridge had noticeable damage, with coal spilled out in all directions. The derailment had also damaged and fouled main Track No. 2. The rail cars were laid parallel to the track on the north side of main Track No. 1, east of the bridge approach. At the bridge location and west, the cars were laid accordion style fouling the adjacent main track to the south.

Approximately 280 feet of wood panels were replaced on the main Track No. 1, plus a 40-foot wood panel was replaced on main Track No. 2. Temporary ballast deck side boards were placed. The track was back in service by approximately 2:30 a.m., April 9, 2007. There was an approximate cost of $235,125 in track, signal, and bridge damage, with equipment damages at $1,035,175. The total damages were $1,270,300.

Analysis and Conclusions

Analysis

The train crew was sent for post accident toxicological testing at Bridgeport, Nebraska Hospital. The Federal Railroad Administration (FRA) Post-Accident Forensic Toxicology Report indicated that the employees had negative test results. Both crew members were properly rested. A review of the crew's work history using the Fatigue Avoidance Scheduling Tool (FAST) was preformed and noted that fatigue was probable for both crew members, but train handling is not being considered as a contributing factor. The event recorder indicated proper train handling and compliance with the operating rules.

The ballast deck bridge was newly installed on February 15, 2007. At that time, the maintenance crews laid two 40-foot, wood track panels across the bridge, with the panels meeting in the center of the bridge. On the east approach, two transition rails were installed to connect the 132-lb. RE CF 1985 with the new 136-lb. RE VT RMSM 2006, on February 16, 2007. On February 17, a total of six welds were done on the panels, two at the middle joints of the bridge, and two on each of the north and south transition rails of the east approach. On March 3, 2007, one transition rail was installed and welded on the west approach of the south rail. On March 19, one transition rail was installed and welded on the west approach of the north rail.

On March 31, a BNSF track inspector with over 30 years experience was called to inspect the track due to a report of rough track at MP 6.4 on main Track No. 1. The inspector went and inspected the area of MP 6.4. He saw nothing at that location, but at MP 6.06, he did notice a profile off the west approach. He measured the profile and placed a 25 mph slow order on the location, but did not keep track notes. This was the last inspection he made in this area, his inspection territory had been changed. The last inspection prior to the derailment at this location, was made on April 7, the day before the incident. The inspector conducting that inspection has 2 years as a relief track inspector. He was inspecting from main Track No. 2. He did a visual inspection at the slow ordered location due to a train sitting on that piece of track. He said he did not see anything of concern that the 25 mph restriction wouldn't cover. The last geometry car inspection was made on January 11, 2007, which two yellow flag defects were recorded within the general area, but that was prior to the replacement of the bridge in February 2007. Rail Detector Car HRZ123 conducted its last inspection before the derailment on March 28, 2007, and no defects were detected in the area of the derailment site.

Approximately 40 feet of the north rail was not recovered. From the other recovered rails, two sections were sent for analysis to the BNSF Technical Research and Development, in Topeka, Kansas. The examination of the one-rail sections with a Boutet weld revealed a small amount of head batter. The other section of rail was missing the rail head, which was most likely broken and lost during the derailment. The failure occurred at the rail-weld interface. The inspection of the fracture faces indicate that the fracture initiated at the weld-base fillet, most likely at a small surface imperfection. No inclusions or fatigue growth were noted at the failure origin.

The specific description of the rail section wasn't provided in this analysis, but was provided by the Roadmaster of the territory. The rail sections were both new 136-lb. RE VT RMSM 2006 and the north rail of the two panels welded at the center of the bridge.

Conclusion

The BNSF Technical Research and Development Analysis Report stated in it's conclusion that the rail-end batter indicates that the rail weld failed before the derailment, due to poor tie support. No other failed rail was recovered. The report indicates a previous track geometry test car, BNSF STR 478, marked areas near the point of derailment for track dips (profile). This Analysis Report was closed out with a primary cause code of T001 Roadbed Settled or Soft, with a contributing factor of T204 Broken Rail-Weld. The poor tie support was due to the roadbed that was soft and had settled to allow excessive rail head profile to develop. The poor support caused extreme forces at the rail-weld interface which caused the failure.

Probable Cause

As a result of the post accident investigation performed by the Federal Railroad Administration it was found that the

derailment was caused by the following probable causes: Probable Cause - T001 Roadbed Settled or Soft, with a contributing factor of T204 Broken Rail-Weld.