Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-78

Burlington Northern Santa Fe
Grand Island, NE
December 9, 2007

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-78

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: NE1207104
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.: NE1207104
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 12 Day 09 Year 2007	7. Time of Accident/Incident: 09:55: ☐ 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	Nebraska

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
Grand Island	94.4	N/A	NE	HALL

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
9 F	4	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	4	223	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	CCRMKCL057

29. Speed *(recorded speed, if available)* — Code: R - Recorded; E - Estimated: 46 MPH — R

30. Trailing Tons *(gross tonnage, excluding power units)*: 17498

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)*	KCLX595174	41	yes
(2) Causing *(if mechanical cause reported)*	KCLX595208	44	yes

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	124	0	0	0	0
(2) Total Derailed	35	0	0	0	0

37. Equipment Damage — This Consist: $2,060,042.00

38. Track, Signal, Way, & Structure Damage: $470,000.00

39. Primary Cause Code: E54C

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 2 Mi 25

46. Conductor: Hrs 2 Mi 25

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 - 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

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-78

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

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-78

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 N/A	117. Whistle 1. Yes 2. No 3. Unknown	Code N/A
Code(s)	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

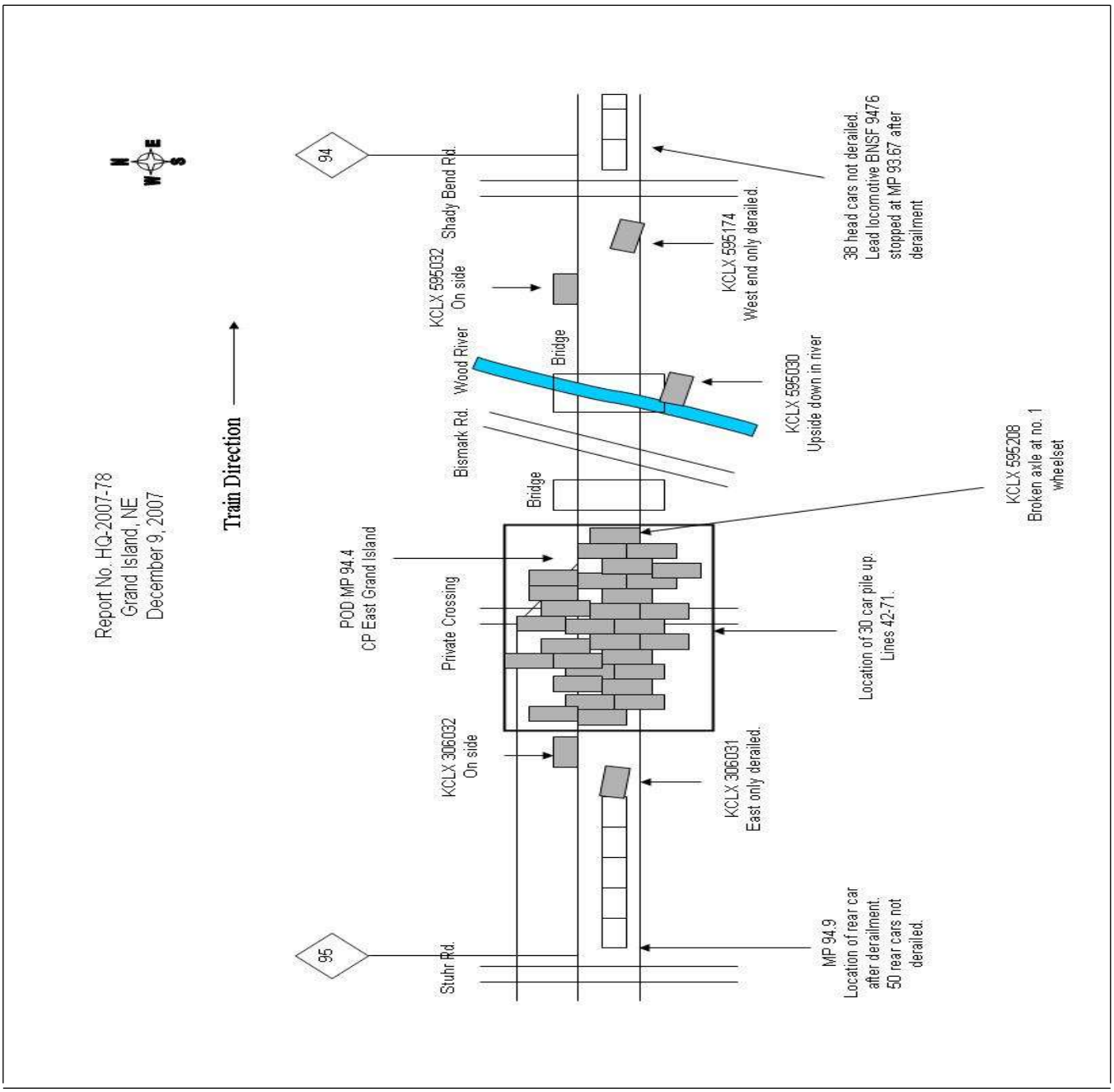
121. Age N/A	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other *(specify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



137. SYNOPSIS OF THE ACCIDENT

A Burlington Northern Santa Fe Railway Company (BNSF) eastbound loaded coal train derailed on December 9, 2007, at 9:55 p.m., CST. The accident occurred in the town of Grand Island, Nebraska, at milepost (MP) 94.4, on the BNSF Nebraska Division, Ravenna Subdivision.

There were no injuries or hazardous material spills as a result of the derailment. Total damages reported for the derailment totaled $2,530,042.

At the time of the accident, it was dark and clear with a temperature of 9 °F.

PROBABLE CAUSE:

The cause of the derailment has been determined as equipment failure- E54C - journal fracture, new cold break.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

The crew of BNSF Train C-CRMKCL0-57A included a locomotive engineer and a conductor. They first went on duty at 7:30 p.m., CST, December 9, 2007, at Ravenna, Nebraska. This is the away-from-home terminal for both crew members, and both received more than the required statutory off-duty rest period prior to reporting for duty.

The assigned freight train consisted of two locomotives and 124 loaded coal hopper cars. It was 6,729 feet long and weighed 17,498 tons. The train was destined for Amsterdam, Missouri. A required Class I train air brake test was performed at Lincoln, Nebraska, on December 7, 2007, identified as westward BNSF Train E-KCLCAM0-66A. This train is designated as an extended haul train by the BNSF. Westward BNSF Train E-KCLCAM0-66A departed Lincoln on December 7, 2007. After loading at the mine in the Powder River Basin in Wyoming, the train was re-designated as eastward BNSF C-CRMKCL0-57A. There were no changes made to the consist after receiving the Class I air brake test at Lincoln.

As the eastbound train approached the accident area, the locomotive engineer was seated at the controls on the south side of the leading locomotive. The conductor was seated on the north side of the leading locomotive.

The track at, and leading up to the point of derailment (POD), is on a near level grade. It is constructed of 136 lb. Continuous Welded Rail (CWR) on concrete ties. At the POD, there is a No. 20 turnout with the trailing point in the direction of movement. There are two culverts in the accident area. The first located at MP 94.34 is a reinforced concrete pipe tile culvert. The second located at MP 94.29 is a concrete pipe tile culvert. Neither culvert incurred any structural damage.

THE ACCIDENT:

The train was being operated at a recorded speed of 46 mph approaching the accident area. At the time of

the accident the train was also traveling at 46 mph. Speeds were recorded by the event recorder of the controlling locomotive. The maximum authorized speed for this train is 50 mph, as designated in the current BNSF Timetable No. 6.

At 9:55 p.m., CST, December 9, 2007, BNSF Train C-CRMKCL0-57A was traveling eastward at MP 94.02. The engineer was seated at the control stand and the conductor was seated at his normal position in the cab when a train line initiated emergency air brake application brought the head-end of the train to a stop at MP 93.67. The accident resulted in the derailment of 35 cars including the 39th through 74th head cars of the train. The weather was dark and clear with a temperature of 9 °F; visibility was unrestricted approaching the accident area.

ANALYSIS AND CONCLUSIONS

ANALYSIS

BNSF and FRA personnel responded to the accident; they both conducted inspections of the track and equipment following the accident. A download of the event recorder was analyzed by the BNSF and FRA to determine if train handling contributed to the cause of the accident.

Post-accident toxicology testing of the crew was conducted. BNSF officials determined that the accident was a “major” accident as defined by Federal regulations.

CONCLUSION: Crew members test results were negative and officials concluded that they did nothing to contribute to the cause of the 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 that one or more of the employees may have been working at a diminished level of safety (effectiveness) due to mental and/or physical attributes associated with fatigue, which may have contributed to the cause of the accident.

ANALYSIS: EQUIPMENT

The last ultrasonic rail detection test through this area was conducted on December 3, 2007. No defects were noted in the accident area. The track was inspected by hi-rail vehicle on December 9, 2007, with no exceptions taken in the area. BNSF and FRA analyzed readouts from the last dragging equipment and warm bearing detectors. The dragging equipment detector located at milepost 126.4 produced no alarms. The warm bearing detector located at milepost 134.8 produced no alarms.

Post accident evaluation of the equipment made by BNSF and FRA produced a E54C - journal fracture, new cold break. The wheel-set and its components were shipped to the BNSF Laboratory in Topeka, Kansas, for further analysis.

The following information is taken from the BNSF’s Technical Research and Development Physical Test Laboratory report for Project ID 2007121704.

Information taken from the wheel-set:

Axle Ends	209T065, MRF 11 89, TF31910, YALXB V-12 CAF-L 3/96	
Locking Tab	BNCX R 03 06 RBXM	
Hub	4TRX96C	
Wheel Info.	01 96 GK C CH36 53970	01 96 GK C CH36 53953

The Class F 100-ton axle was manufactured by Standard Forged Products - McKees Rocks, Pennsylvania, in November 1989. The current wheels were mounted on the axle by TRX-C (the identification of this shop was researched but could not be found) in April 1996 ; new or reconditioned bearings would have been applied at this time also. The current bearings were mounted on the axle by BNSF at Havelock, Nebraska, in March 2006, at which time the wheels were turned but not de-mounted from the axle.

BNSF Laboratory Report Project ID 2007121704 Subheading Conclusions/Recommendations states, “This axle failed via rotational bending fatigue due to a fatigue crack in the base of the journal fillet. The amount of fatigue (80 percent old break) before rapid final failure supports that it was the cause of the derailment. The wheelset was likely ground to remove corrosion pitting in the journal fillet; however it should be noted that it is possible all fatigue cracks were not removed and/or not discovered at the Havelock Wheel Shop.

As noted this assembly was processed at the Havelock Wheel shop as a turned wheel-set. Therefore, the journals were not required to be magnaflux tested per Rule 1.18 of MSRP
G-II. It is recommended all Class F 100-ton axles on turned wheel-sets be magnaglo inspected in the journals and journal fillet areas prior to being released at Havelock in the future.

In addition, this matter will be brought to the attention of the WABL Committee for a rule change requiring this practice at all wheelshops. Presently, some wheelshops are magnaglo testing journals, journal fillets, and axle bodies on turned 100-ton wheel-sets per customers request only.”

CONCLUSION:

The data reviewed from the event recorder ruled out train handling as a cause. There were no failed track components found in the accident area and no defects had been identified in the area through routine inspections. There was no grade and curvature in the area that would have contributed to the cause. Post accident toxicology testing was performed with the results being negative.

All findings and post accident analysis substantiates a E54C - journal fracture, new cold break.

PROBABLE CAUSE AND CONTRIBUTING FACTORS

The derailment was caused by an E54C - journal fracture, new cold break.

Although fatigue was found to be “probable” for both the engineer and conductor of the train involved in the derailment, it is not considered to be a contributing factor in the cause.