Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-87

Burlington Northern Santa Fe (BNSF)
Mason, North Dakota
October 3, 2005

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-2005-87

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: TC1005102
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident: N/A
3.Name of Railroad Responsible for Track Maintenance: BNSF Rwy Co. [BNSF]	3a. Alphabetic Code: BNSF	3b. Railroad Accident/Incident No.: TC1005102
4. U.S. DOT_AAR Grade Crossing Identification Number:	5. Date of Accident/Incident: Month 10 / Day 03 / Year 2005	6. Time of Accident/Incident: 11:58: ☑ AM ☐ PM

7. 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): 01

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
0	0	0	0	Twin Cities

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Mason	33.8	N/A	ND	CASS

17. Temperature (F) (specify if minus)	18. Visibility (single entry) 1. Dawn 2. Day 3.Dusk 4.Dark	Code	19. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow	Code	20. Type of Track 1. Main 2. Yard 3. Siding 4. Industry	Code
58 F		2		1		1

21. Track Name/Number	22. FRA Track Class (1-9, X)	Code	23. Annual Track Density (gross tons in millions)	24. Time Table Direction 1. North 3. East	Code
Main		4	15.1		3

OPERATING TRAIN #1

25. Type of Equipment Consist (single entry)	A. Spec. MoW Equip.	Code	26. Was Equipment Attended? 1. Yes 2. No	Code	27. Train Number/Symbol
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		1	1	1	GFINSTL902

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

29. Trailing Tons (gross tonnage, excluding power units): 15288

30. 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

30a. 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

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	51	yes
(2) Causing (if mechanical cause reported)	BNSF471793	51	yes

32. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
0	1

33. Was this consist transporting passengers? (Y/N): N

34. 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	5	0	0	0	0
(2) Total Derailed	0	0	0	0	0

35. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	107	0	0	0	0
(2) Total Derailed	33	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
1578781	510450	E59C	N/A

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	N/A	1	1

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 4 Mi 58	Hrs 4 Mi 58

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	0

49. EOT Device? 1. Yes 2. No: 1

50. Was EOT Device Properly Armed? 1. Yes 2. No: 1

51. Caboose Occupied by Crew? 1. Yes 2. No: N/A

OPERATING TRAIN #2

52. Type of Equipment Consist (single entry)	A. Spec. MoW Equip.	Code	53. Was Equipment Attended? 1. Yes 2. No	Code	54. Train Number/Symbol
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		N/A	N/A	N/A	N/A

55. Speed (recorded speed, if available) R - Recorded E - Estimated: 0 MPH; Code: N/A

57. 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

57a. Remotely Controlled Locomotive?
0 = Not a remotely controlled; 1 = Remote control portable

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56. 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

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	0	N/A	N/A
(2) Causing (if mechanical cause reported)	0	N/A	N/A

59. 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

60. Was this consist transporting passengers? (Y/N): N/A

61. 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

62. 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

63. Equipment Damage This Consist: 0

64. Track, Signal, Way, & Structure Damage: 0

65. Primary Cause Code: N/A

66. Contributing Cause Code: N/A

Number of Crew Members

67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

71. Engineer/Operator: Hrs 0 Mi 0

72. Conductor: Hrs 0 Mi 0

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	0	0	0
Nonfatal	0	0	0

76. EOT Device? 1. Yes 2. No: N/A

77. Was EOT Device Properly Armed? 1. Yes 2. No: N/A

78. Caboose Occupied by Crew? 1. Yes 2. No: N/A

Highway User Involved

79. Type: 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

80. Vehicle Speed (est. MPH at impact): N/A

81. Direction geographical) 1.North 2.South 3.East 4.West — Code: N/A

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

86a. 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

Rail Equipment Involved

83. 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

84. Position of Car Unit in Train: N/A

85. Circumstance: 1. Rail Equipment Struck Highway User; 2. Rail Equipment Struck by Highway User — Code: N/A

86b. Was there a hazardous materials release by 1. Highway User 2. Rail Equipment 3. Both 4. Neither — Code: N/A

86c. State here the name and quantity of the hazardous materials released, if any.
N/A

87. Type of 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

88. Signaled Crossing Warning (See instructions for codes) — Code: N/A

89. Whistle Ban 1. Yes 2. No 3. Unknown — Code: N/A

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

91. Crossing Warning Interconnected with Highway Signals 1. Yes 2. No 3. Unknown — Code: N/A

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

93. Driver's Age: 0

94. Driver's Gender 1. Male 2. Female — Code: N/A

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

96. 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

97. Driver Passed Standing Highway Vehicle 1. Yes 2. No 3. Unknown — Code: N/A

98. 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

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	0	0

99. Driver Was 1. Killed 2.Injured 3. Uninjured — Code: N/A

100. Was Driver in the Vehicle? 1. Yes 2. No — Code: N/A

102. Highway Vehicle Property Damage (est. dollar damage): 0

103. Total Number of Highway-Rail Crossing Users (include driver): 0

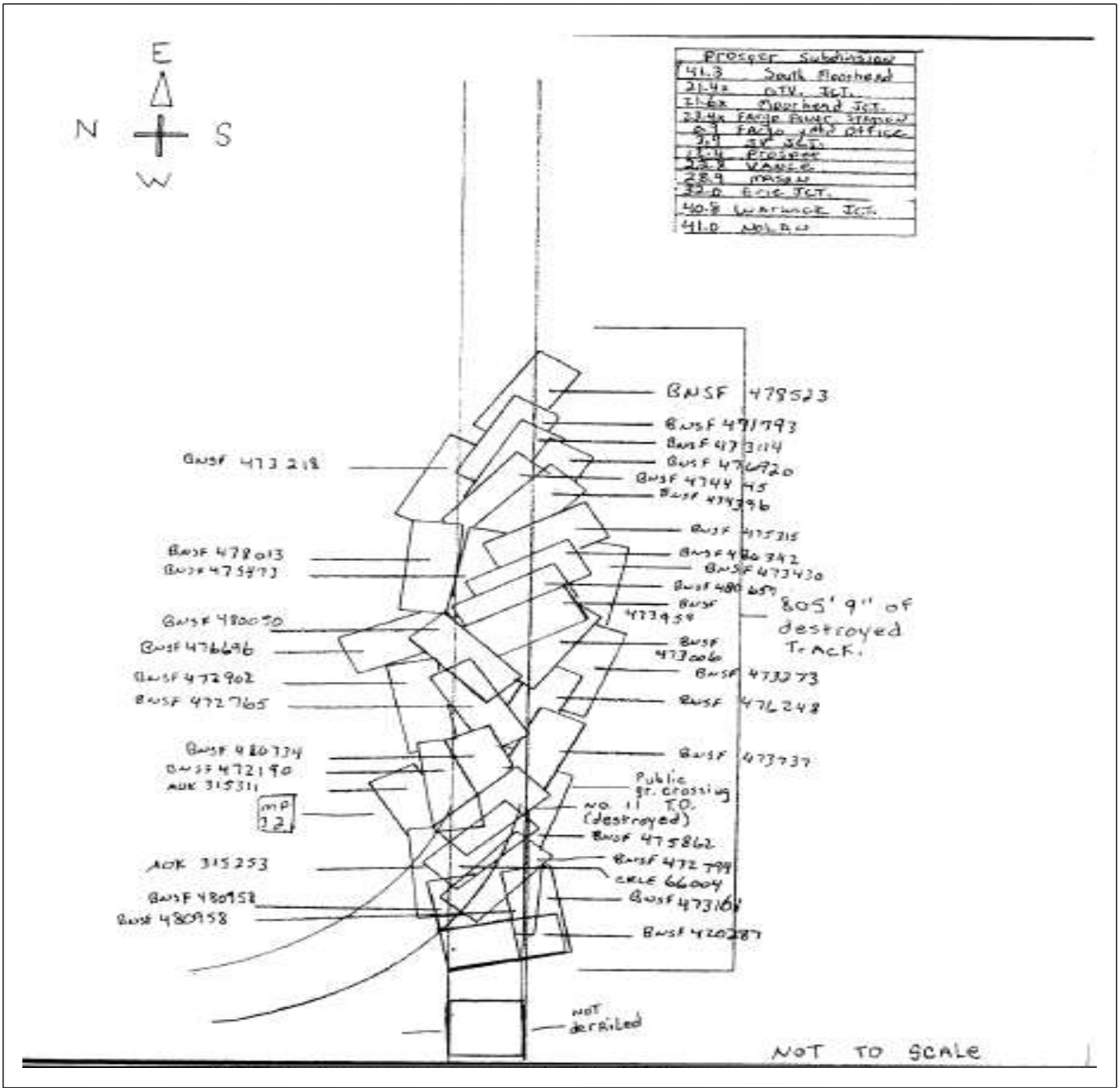
104. Locomotive Auxiliary Lights? 1. Yes 2. No — Code: N/A

105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No — Code: N/A

106. Locomotive Headlight Illuminated? 1. Yes 2. No — Code: N/A

107. Locomotive Audible Warning Sounded? 1. Yes 2. No — Code: N/A

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



109. SYNOPSIS OF THE ACCIDENT

An eastbound BNSF Railway Company (BNSF) freight train derailed on October 3, 2005, at 11:58 a.m., CDT. The accident occurred approximately 5 miles west of Mason, North Dakota, on a single main track, at milepost 33.8, on the Twin Cities Division, Prosper Subdivision.

The train consisted of five locomotives and 107 loaded cars. The 46th car behind the locomotives derailed as it was traveling east on tangent track. The train continued eastward for approximately 9020 feet and when it passed over a main line turnout an additional 32 cars derailed. It was determined that the 45th through the 77th cars behind the locomotives derailed.

There were no injuries to the train crew and no hazardous materials involved.

The railroad estimated that there was track damage of $504,950, signal damage (track-side warning detector) of $5,500, and equipment damage of $1,578,781.

At the time of the derailment it was 58° F and clear.

The probable cause of the accident was “other axle and journal bearing defects” (CAR). The roller bearing adapter became dislodged from the truck side and the top of the roller bearing. The roller bearing adapter then sheared off the three roller bearing cap screws, allowing the roller bearing cap and truck side frame to drop off the roller bearing and make contact with the rail and crossties.

110. NARRATIVE

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

Circumstances Prior to the Accident

The crew of Train Symbol G-FINSTL9-02 consisted of a locomotive engineer, a conductor, and a brakeman. They first went on duty at 7:00 a.m., CDT, October 3, 2005, at Dilworth Yard in Dilworth, Minnesota. This was the home terminal for all crew members, and all received more than the statutory off duty period, prior to reporting for duty.

The crew was transported to Finley, North Dakota, where another crew previously added two locomotives and 27 loaded cars to the train.

The assigned freight train then consisted of five locomotives, 107 loaded cars, 15,288 trailing tons, and was 6782 feet in length. It was a grain train scheduled to travel from Finley, North Dakota to Dilworth, Minnesota, a distance of 72.15 miles.

On October 3, 2005, a Class 1 air brake test and daily locomotive inspection was conducted at Finley, ND. The train departed Finley at approximately 10:10 a.m. on October 3, 2005.

As the train approached the derailment area, the locomotive engineer was seated at the controls on the right (south) side of the leading locomotive. The conductor was seated on the left (north) side, and the brakeman was seated in the center of the cab of the leading locomotive.

Interviews conducted by the Federal Railroad Administration (FRA) revealed the trip was uneventful prior to the derailment.

Approaching the derailment site from the west traversing eastward, there is tangent track for approximately 2.3 miles in length, followed by a 1-degree 32-minute curve to the right, approximately 2112 feet in length, followed by tangent track for approximately 1450 feet in length to the point of derailment (POD). The derailment occurred on tangent track and the derailed car was dragged for approximately 1.7 miles, where an additional 32 cars derailed. The track is tangent beyond the accident site for approximately 32 miles. The approach to the POD (milepost 33.8) has a descending grade of 0.60-percent.

The Accident
Train G-FINSTL9-02 was traveling timetable and geographical direction east on single main track at a recorded speed of 46 mph while approaching the POD. The speed was recorded by the event recorder of the controlling locomotive. The maximum authorized speed for the Prosper Subdivision is 49 mph, as designated by the current BNSF Timetable No. 2, dated Wednesday, November 17, 2004.

As the train was traveling eastward the train went into an emergency brake application and came to a stop. It was later determined that the derailed car had been derailed for approximately 9020 feet. When the derailed car struck a turnout at milepost 31.95, an additional 32 cars derailed.

After coming to a stop, the engineer notified the train dispatcher. The conductor and brakeman walked back to inspect the train and determined that the 45th through the 77th cars behind the locomotives had derailed.

Further investigation of the derailment determined that the initial POD was at milepost 33.8, on tangent track. Approximately 1340 west of the POD an end cap and an end cap screw for a roller bearing were found about 20 feet south of the south rail. The above mentioned pieces had started two small fires and were still warm to

the touch when found. Further investigation of the POD showed that something other than a wheel was on the ground. The marks on the ties were wider than wheel marks. When all information was compiled, it was determined that the marks were made by the truck side frame of the first derailed car.

The three person train crew did not report any injuries.

There were no hazardous materials involved, and no evacuations were required. All cars derailed were transporting grain.

There were no local emergency responders dispatched to the accident scene.

Analysis and Conclusions

The accident met the criteria for FRA Post Accident Toxicology Testing, as required under Title 49 CFR, Part 219, Subpart C. The crew was blood and urine tested at an Occupational Health Services Collection Facility. One crew member tested positive for Cannabinolds. The other two crew members tested negative.

An inspection of the data print out from the lead locomotive event recorder indicated that the train was being operated at 46 mph at the location of the POD. The event recorder also indicated no unusual events related to train handling.

Probable Cause

The FRA determined that the probable cause of the derailment was “other axle and journal bearing defects (CAR)”. The roller bearing adapter became dislodged from the truck side and the top of the roller bearing. The roller bearing adapter then sheared off the three roller bearing cap screws, allowing the roller bearing cap and truck side frame to drop off the roller bearing and make contact with the rail and crossties.