Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-30

Burlington Northern Santa Fe (BNSF)
Lake Side, Nebraska
May 17, 2006

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-2006-30

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: PR05066109
2.Name of Railroad Operating Train #2: BNSF Rwy Co. [BNSF]	2a. Alphabetic Code: BNSF	2b. Railroad Accident/Incident: PR05066109
3.Name of Railroad Responsible for Track Maintenance: BNSF Rwy Co. [BNSF]	3a. Alphabetic Code: BNSF	3b. Railroad Accident/Incident No.: N/A
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident: Month 05 / Day 17 / Year 2006	6. Time of Accident/Incident: 08:30: ☑ 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): 03

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

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Lakeside	345.5	N/A	NE	SHERIDAN

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
62 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
Single Main		4	205.3		3

OPERATING TRAIN #1

25. 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	26. Was Equipment Attended? 1. Yes 2. No	Code	27. Train Number/Symbol
	1	1. Yes	1	CATM SUD093

28. Speed (recorded speed, if available) R - Recorded E - Estimated			Code
E - Estimated	23	MPH	R

29. Trailing Tons (gross tonnage, excluding power units): 17569

30. Method(s) of Operation (enter code(s) that apply)

a. ATCS	g. Automatic block	m.Special instructions	
b. Auto train control	h. Current of traffic	n. Other than main track	
c. Auto train stop	i. Time table/train orders	o. Positive train control	
d. Cab	j.Track warrant control	p. Other (Specify in narrative)	
e. Traffic	k. Direct traffic control	Code(s)	
f. Interlocking	l.Yard limits	e, i, m, 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	1	N/A
(2) Causing (if mechanical cause reported)	N/A	N/A	N/A

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

Alcohol	Drugs
0	0

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	2	0	0	0	1
(2) Total Derailed	2	0	0	0	0

35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	123	0	0	0	0
(2) Total Derailed	3	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
1238150	43000	H221	H605

Number of Crew Members

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

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 4 Mi 0	Hrs 4 Mi 0

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

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

OPERATING TRAIN #2

52. 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	53. Was Equipment Attended? 1. Yes 2. No	Code	54. Train Number/Symbol
	1	1. Yes	1	CRWM KCM09

55. Speed (recorded speed, if available) R - Recorded E - Estimated			Code
E - Estimated	0	MPH	R

57. Method(s) of Operation (enter code(s) that apply)

a. ATCS	g. Automatic block	m.Special instructions
b. Auto train control	h. Current of traffic	n. Other than main track

57a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable: 3

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56. Trailing Tons (gross tonnage, excluding power units)	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)	2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter
18732			e i m N/A N/A	0

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	59. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.	Alcohol	Drugs
(1) First involved (derailed, struck, etc)	BNSF 5752	135	N/A		0	0
(2) Causing (if mechanical cause reported)	0	N/A	no	60. Was this consist transporting passengers? (Y/N)	N	

61. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	1	(1) Total in Equipment Consist	132	0	0	0	0
(2) Total Derailed	0	0	0	0	1	(2) Total Derailed	4	0	0	0	0

63. Equipment Damage This Consist	64. Track, Signal, Way, & Structure Damage	65. Primary Cause Code	66. Contributing Cause Code
791090	0	H221	H605

Number of Crew Members				Length of Time on Duty	
67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen	71. Engineer/Operator	72. Conductor
1	0	1	0	Hrs 3 Mi 15	Hrs 3 Mi 15

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 | 2

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 — 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)

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

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

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

86a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: N/A
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

83. 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)

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

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

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

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

87. Type of Crossing Warning — Code(s): N/A N/A N/A N/A N/A N/A N/A
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

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

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

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

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

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

93. Driver's Age: N/A

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

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

96. Driver — Code: N/A
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)

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

98. View of Track Obscured by (primary obstruction) — Code: N/A
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

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	N/A	N/A

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

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

102. Highway Vehicle Property Damage (est. dollar damage): N/A

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

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

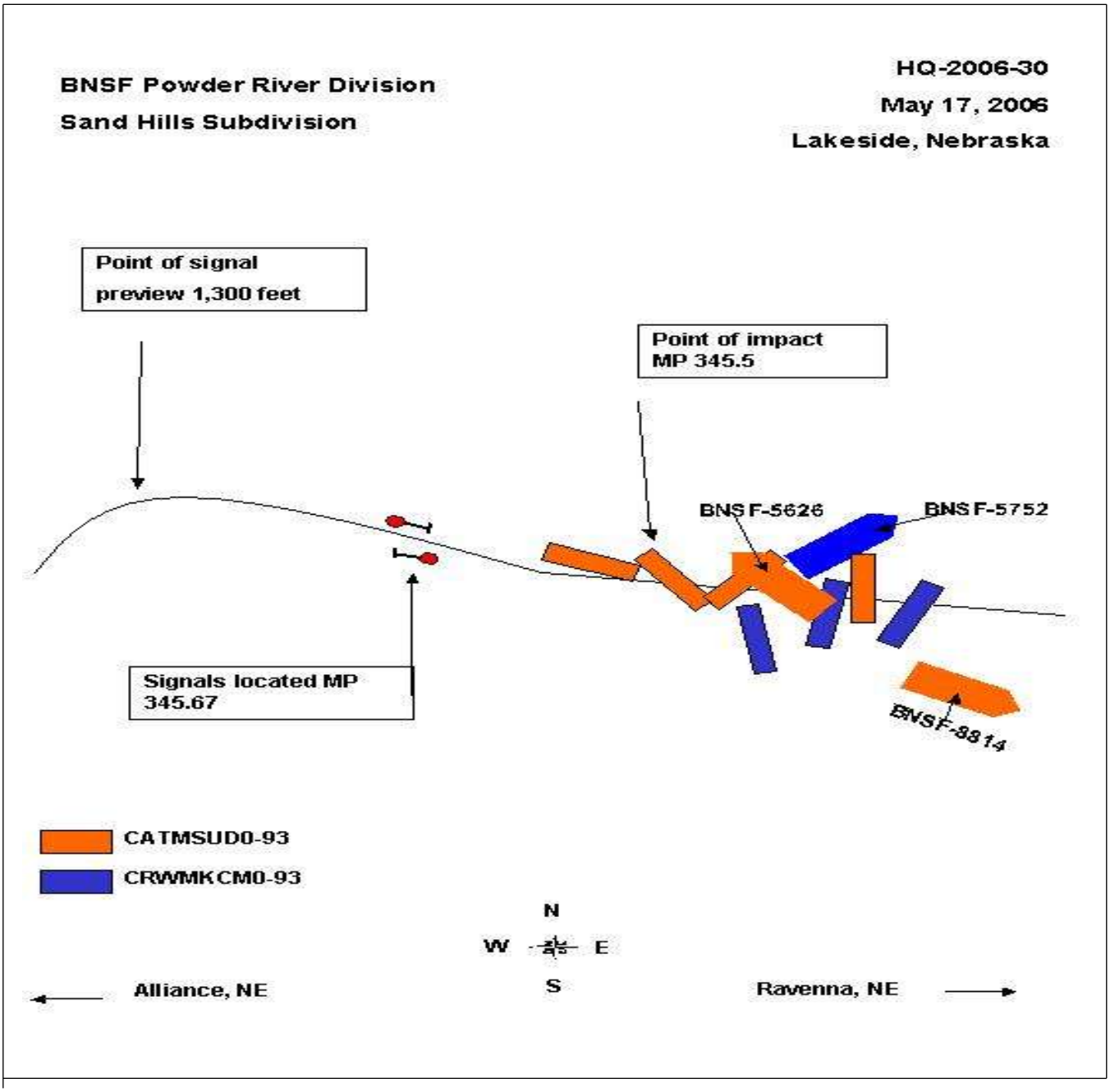
105. Locomotive Auxiliary Lights Operational? — Code: N/A
1. Yes 2. No

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

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

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

HQ-2006-30_Sketch.jpg



109. SYNOPSIS OF THE ACCIDENT

On May 17, 2006, at approximately 8:30 a.m. MDT, a rear-end collision occurred between two eastbound BNSF Railway Company (BNSF) freight trains operating on the BNSF Powder River Division, Sand Hills Subdivision, at Lakeside, Nebraska, milepost 345.5 (Near Alliance, Nebraska.)

The method of operation consists of a Traffic Control System (TCS) arranged to govern movements in either direction across areas of both double and single main track, along with timetable/train orders and special instructions. The TCS is controlled by an operator in the BNSF's Network Operation Center (NOC) located in Fort Worth, Texas.

The maximum authorized speed across the area is 60 mph, with a 50 mph restriction for loaded coal trains. Both trains involved in this accident were loaded coal trains. The accident occurred on an area of single main track just west of Lakeside, where double main track begins.

The weather conditions at the time of the accident were clear, daylight, and the temperature was about 62 °F. Damages are estimated at $2.1 million dollars. The two-member train crew of the striking train underwent toxicology testing according to FRA post-accident testing requirements. Both crew members were treated and later released with minor and non life-threatening injuries. There were no hazardous materials released from the rail equipment; however, there were approximately 2,500 gallons of diesel fuel released from the fuel tank of BNSF 8814, the lead locomotive of the striking train.

Immediately prior to the collision, eastbound coal Train Symbol C-RWMKCM0-93 was stopped at Lakeside (milepost 344) waiting on a signal to go from single track to double main Track No. 2. A following train, Train Symbol C-ATMSUD0-93 traveling eastbound on single main track, struck the rear end of the stopped train at milepost 345.5. A review of the event recorder data indicated the striking train was traveling at 38 mph when an emergency application of the train brakes was initiated. The emergency application of the brakes was initiated approximately 1,300 feet prior to impact and slowed the train to an estimated speed of 23 mph, at the time of the collision.

A post-accident interview with the crew of Train Symbol C-ATMSUD0-93 revealed they observed a "flashing yellow" at the absolute signal at Antioch, MP 349.27. The next signal, intermediate signal at MP 347.42, was either "flashing yellow" or "yellow." The engineer stated he "could not remember for sure", and the conductor stated he did not observe or call the signal because he was looking at an order of an upcoming Form “B.”

Both crew members reported observing the next intermediate signal at MP 345.67 and stated it was displaying "red." The engineer stated it was at this time when he placed the train’s air brake system into emergency. He stated he observed the rear DPU locomotive of standing Train Symbol C-RWMKCM0-93 a short time later, which was approximately 1,050 feet beyond the red signal. He then exited from the locomotive cab through the rear door behind the engineer’s controls and jumped from the right side of the locomotive a short distance later. The conductor reported remaining in the cab of the locomotive and positioned himself behind the conductor's desk on the left side of the locomotive, bracing himself for the collision.

Both intermediate signals located at milepost 349.27 and 347.42 were equipped with data recorders. Both recorders were functioning at the time of the accident and indicated the intermediate signal at MP 349.27 displayed a "flashing yellow" for Train Symbol C-ATMSUD0-93 and a "yellow" at MP 347.42 prior to their train encountering the "red" at MP 345.67. All post-accident signal tests conducted indicated the signal system was functioning as intended.

The probable cause of the accident was the failure of the crew of eastbound Train Symbol C-ATMSUD0-93 to operate their train in accordance with signal indication.

110. NARRATIVE

Circumstances Prior to the Accident

Train Symbol C-RWMKCM0-93

On May 17, 2006, at 5:15 a.m, the crew of Train Symbol C-RWMKCM0-93 went on duty at their home terminal of Alliance. The crew consisted of a conductor and an engineer, both of which had received the required statutory off-duty period prior to reporting for duty. They departed Alliance at approximately 6:32 a.m., after receiving the required track warrants, track bulletins, and other documents needed for their trip. No inspections or air brake tests were required prior to their departure and none were performed. The train consisted of two locomotives in the lead, BNSF 5788 and BNSF 5906, 132 loaded coal cars, 0 empties, a total of 18,732 trailing tons, and was 7,007 feet in length, with distributed power unit (DPU) BNSF 5752 positioned at the rear.

Train C-ATMSUD0-93

On May 17, 2006, at 4:30 a.m., the crew of Train Symbol C-ATMSUD0-93 went on duty at their home terminal of Alliance. The crew consisted of a conductor and an engineer, both of which had received the required statutory off-duty period prior to reporting for duty. They departed Alliance at approximately 7:05 a.m., after receiving the required track warrants, track bulletins, and other documents needed for their trip. No inspections or air brake tests were required prior to their departure and none were performed. The train consisted of two locomotives in the lead, BNSF 8814 and BNSF 5626, 123 loaded coal cars, 0 empties, a total of 17,569 trailing tons, and was 6,529 feet in length, with DPU BNSF 9636 positioned at the rear.

The crew reported being delayed for approximately 30 minutes due to congestion after leaving Alliance, after which they observed a "flashing yellow" at the absolute signal at Antioch, MP 349.27, for their movement eastbound. The next intermediate signal, at MP 347.42, was either "flashing yellow" or "yellow", they "could not remember for sure." The next intermediate signal, at MP 345.67, was "red."

Track grade is relatively level from MP 347 to point of impact. Curvature from MP 347 is tangent to MP 346.4 with a right-hand, 2-degree, 7-minute curve to MP 346.15. Track continues tangent to MP 345.9 with a left-hand, 2-degree, 3-minute curve to MP 345.6 and then tangent to point of accident.

The Accident

At approximately 7:52 a.m., after being held for approximately 30 minutes account congestion, eastbound Train Symbol C-ATMSUD0-93 passed the absolute signal displaying a “flashing yellow” aspect at MP 349.2 Antioch, NE from main Track No. 2 to single main track.

The train passed the next intermediate signal, milepost 347.42, a short time later at approximately 39 mph. The engineer mistakenly thought the signal aspect was also a “flashing yellow” aspect. Downloads performed by BNSF signal employees verified the signal aspect was in fact a “yellow” aspect, requiring the train to be prepared to stop at the next signal (milepost 345.67). Trains exceeding 30mph must immediately reduce to that speed. During interviews with both engineer and conductor of C-ATMSUD0-93, they stated ‘they must have missed the signal’ or were ‘focusing on the previous “flashing yellow” signal.’

The next intermediate signal located at milepost 345.67 displayed a red aspect requiring the train to stop and proceed at restricted speed. The preview of this signal is limited to approximately 1,300 feet due to the curvature of the track and is further blocked by the sand hills in the area. Upon observing the red aspect, the engineer initiated an emergency application of the train’s air brake system. A short time later the crew observed the rear DPU of stopped Train Symbol C-RWMKCM0-93, approximately 1,050 feet beyond the red signal. The engineer reported that he exited the door immediately behind the engineer’s control stand

and jumped from the right-hand side of the locomotive a short distance later while still traveling at an estimated speed of 25 mph. The conductor reported positioning himself behind the conductor's desk on the left-hand side of the locomotive and bracing himself for the collision.

Impact with the stopped train occurred a short time later at a recorded speed of 23 mph. As a result of the impact, striking Train Symbol C-ATMSUD0-93 derailed two locomotives, BNSF 8814 and BNSF 5626, along with the three lead cars, CEFX 41589, 42962, and 43113. Standing Train Symbol C-RWMKCM0-93 derailed DPU BNSF 5752 and four cars, TXUX 990553, 95109, 990035, and 50579. Lead Locomotive No. BNSF 8814 of the striking train derailed on it's side. The remaining locomotives and cars remained upright.

Analysis and Conclusions

Inspections and testing of the signal system were performed by representatives from the BNSF accompanied by the FRA. No exceptions were taken with the signal system as it was found to be functioning properly and as intended. Downloads from the event recorders located at intermediate Signals 349.27 and 347.42 indicated they displayed a "flashing yellow" aspect and a "yellow" aspect, respectively. All recorded data available indicates the signal system was functioning properly.

The FRA conducted interviews with the crew members of striking Train Symbol C-ATMSUD0-93 in an effort to further develop activities and events that led to the accident. The two crew members' initial statements indicate that the conductor alleges while passing the signal at MP 347.42, he was distracted with a Form B restriction 10 miles ahead of their location. Both the engineer and conductor stated they were not following a BNSF operating rule requiring them to verbally acknowledge each signal aspect. When asked by the FRA what caused the accident, both conductor and engineer stated, "lack of acknowledging signal aspects in the locomotive cab and loss of situational awareness due to being distracted by the track bulletin Form B ahead."

FRA post-accident toxicological testing was performed on the crew members of both trains. The results were negative on all employees.

A train ride observation was performed by the FRA on May 18, 2006, at 8:30 a.m. The purpose was to observe the preview for signals located at MPs 349.27, 347.42, and 345.67, respectively. The preview of the intermediate signal at MP 349.27 is 2,500 feet. Both crew members agree this signal displayed a "flashing yellow" aspect.

The preview of the next intermediate signal at MP 347.42 is restricted by track curvature and the sand hills terrain, and is limited to approximately 1,750 feet. This signal displayed a "yellow" aspect; however, neither crew member could positively state they remember seeing it nor what it displayed. Based on the speed they were traveling (38 mph) at this location, and the distance of the preview, this signal would have only been observable for approximately 30 seconds prior to their train passing it.

The preview of the next intermediate signal at MP 345.67 is also restricted by the curvature of the track and the sand hills of the local terrain, and is limited to approximately 1,300 feet. Based on the speed the train was traveling when this signal could have been observed, it was already too late for them to stop either short of the signal or the rear of the train stopped 1,050 feet beyond.

Probable Cause and Contributing Factors

The crew of Train Symbol C-ATMSUD0-93 failed to comply with the signal indication of the intermediate signal at MP 347.42, which was displaying a "yellow" aspect. BNSF Signal Rule 9.1.8 named "Approach" requires trains to, "Proceed prepared to stop before reaching next signal, trains exceeding 30 mph immediately reduce to that speed." The crew was neither prepared to stop before reaching the next signal, nor did they immediately reduce their train's speed to 30 mph as required by the rule.

In addition, the crew of Train Symbol C-ATMSUD0-93 failed to comply with the signal indication of the intermediate signal at MP 345.67, which was displaying a "red" aspect. BNSF Signal Rule 9.1.14 named "Stop and Proceed" requires trains to, "Stop, then proceed at restricted speed." The crew was unable to stop before reaching this signal even though the engineer initiated an emergency application of the train's air brake system almost immediately upon observing the red aspect. The train continued beyond the signal at a speed in excess of restricted speed and collided with the rear of Train Symbol C-RWMKCM0-93.

The primary cause of the accident is H221: Automatic block or interlocking signal displaying a stop indication - failure to comply. The contributing cause is H605: Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.