Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-58

Burlington Northern Santa Fe (BNSF)
Motley, Minnesota
October 12, 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-2007-58

1.Name of Railroad Operating Train #1: BNSF Rwy Co. [BNSF]	1a. Alphabetic Code: BNSF	1b. Railroad Accident/Incident No.: TC1007-111
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.: TC1007-111
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 10 | Day 12 | Year 2007	7. Time of Accident/Incident: 02:45:00 ☑ 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: 13

9. Cars Carrying HAZMAT	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
0	N/A	N/A	0	TWIN CITIES

14. Nearest City/Town	15. Milepost (to nearest tenth)	16. State Abbr	16. State Code	17. County
MOTLEY	140.9	N/A	MN	MORRISON

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
41 F	4	2	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
MOTLEY SIDING	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	ESUDBTM211

29. Speed (recorded speed, if available) R - Recorded E - Estimated — Code	30. Trailing Tons (gross tonnage, excluding power units)
39 MPH R	2674

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): f | j | n | 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)	BNSF 9846	1	N/A
(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
00	00

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	1
(2) Total Derailed	2	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	0	0	122	0	0
(2) Total Derailed	0	0	8	0	0

37. Equipment Damage — This Consist: $178,986.00

38. Track, Signal, Way, & Structure Damage: $143,500.00

39. Primary Cause Code: H220

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 5 Mi 0

46. Conductor: Hrs 5 Mi 0

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	2	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
6	2	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?
0 MPH E	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 | N/A | N/A | N/A | N/A

2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: 0

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

63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	0	103	0	0
(2) Total Derailed	0	0	8	0	0

64. Equipment Damage This Consist: $147,683.00

65. Track, Signal, Way, & Structure Damage: $0.00

66. Primary Cause Code: H220

67. Contributing Cause Code: N/A

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
0	0	0	0

Length of Time on Duty

72. Engineer/Operator: Hrs 0 Mi 0

73. Conductor: Hrs 0 Mi 0

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	0	0	0
Nonfatal	0	0	0

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

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

79. Caboose Occupied by Crew? 1. Yes 2. No: 2

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

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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

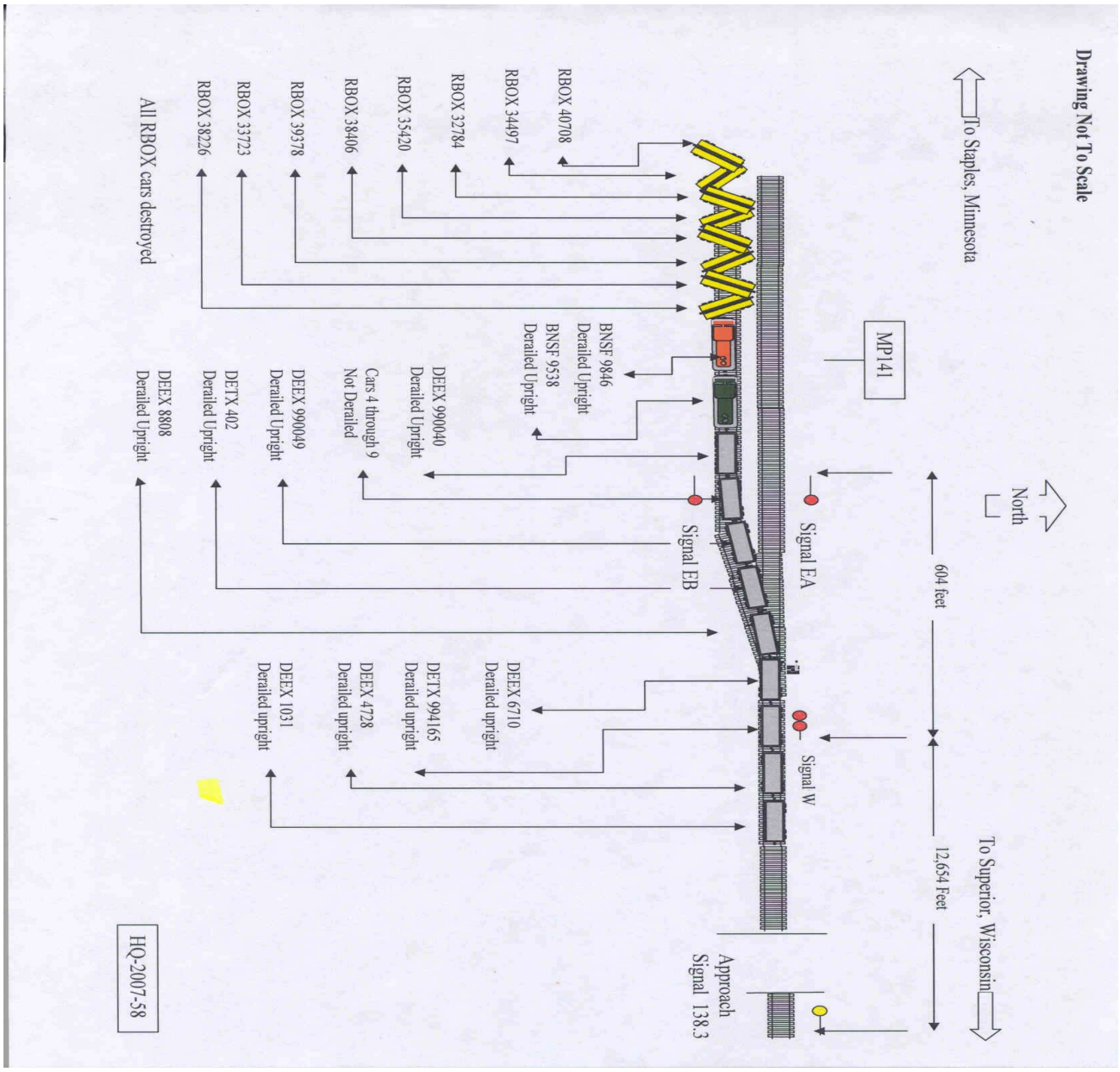
121. Age N/A	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify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

On October 12, 2007, at 2:45 a.m., CDT., westward Burlington Northern Santa Fe Railway Company (BNSF) empty unit coal train E-SUDBTM2-11 (E-SUDBTM2-11) operating west, collided with a standing cut of 103 empty cars stored on the siding track at East Motley, MN. The accident occurred in Motley, Minnesota, at BNSF Milepost (MP) 140.9 on the Brainerd Subdivision of the Twin Cities Division.

The conductor and locomotive engineer of E-SUDBTM2-11 suffered minor injuries. The two locomotives at the head end of the train both derailed but remained upright. Eight of the empty coal hopper cars derailed, with four destroyed and four damaged. The total damage to the westbound train was estimated at $322,486. Eight of the stored empty boxcars were derailed and destroyed. Total damages for the stored empty boxcars were $147,683. Neither the westbound train, nor the standing cut of cars, contained hazardous materials and there was no fire or evacuation.

At the time of the incident it was dark and cloudy. The wind was east southeast at three miles per hour (mph). The temperature was 41 °F.

PROBABLE CAUSE:

The accident occurred because the locomotive engineer and conductor failed to comply with rules and regulations regarding an approach signal indication and a stop signal indication. They allowed BNSF Unit Coal Train E-SUDBTM2-11 to pass an operative approach signal displaying an approach indication without reducing their train speed to 30 mph, or preparing to stop at the next signal.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

The crew of westward E-SUDBTM2-11 included a locomotive engineer and a conductor. They first went on duty at 9:45 p.m., on October 11, 2007, at Superior Yard in Superior, WI. The home terminal for this crew is Superior. Each crew member received more than the required statutory off duty period prior to reporting for duty.

Their assigned unit coal train consisted of three locomotives total. BNSF 9846 and BNSF 9538 were positioned at the head end and distributed power, locomotive BNSF 9605 was positioned at the rear of the train. BNSF E-SUDBTM2-11 consisted of 122 empty coal coal hopper cars, was 6,698 feet long, and weighed 2,674 tons. E-SUDBTM2-11 was scheduled to operate from Superior, to Dilworth, Minnesota. E-SUDBTM2-11 received an initial terminal air brake test at Superior Yard, and departed at 10:22 p.m.

As the train approached the accident area, the locomotive engineer was seated at the controls on the north side of the leading locomotive. The conductor was seated on the south side of the cab of the leading locomotive. The train was operating west on the single main track.

The method of operation at East Motley is Track Warrant Control (TWC) and Interlocking Rules. The area is under control of the BNSF Superior Train Dispatcher. In this area of the railroad, from east to west, there are two left curves and one right curve followed by 469 feet of tangent track to the absolute wayside signal. An operative approach signal is located approximately 12,645 feet before the absolute signal in a left hand curve.

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

THE ACCIDENT

The train was being operated at a recorded speed of 49 mph approaching the accident area. The train

approached operative approach signal 138.8. The locomotive engineer said he saw the operative approach signal light up yellow then turn green. The conductor said he also observed the operative approach signal light up yellow then turn green and noted the green signal aspect on his signal awareness form. The conductor called the Staples Subdivision Train Dispatcher to obtain a track warrant for their train movement beyond Staples, Minnesota. When the absolute signal at the east end of Motley came into view both the locomotive engineer and conductor observed that the signal was displaying a red (stop) aspect. The conductor called for the locomotive engineer to "dump the air." The locomotive engineer did not dump the air but responded "I've got it; I've done this before." The locomotive engineer and conductor saw that the switch turnout was aligned for the siding. The conductor was preparing to apply the emergency brake when the locomotive engineer put the train in emergency. The train crew got on the floor and braced themselves when they realized they were going to collide with boxcars stored on the siding. The train traversed the switch and entered the siding, striking a stored cut of empty boxcars. As a result of the collision, the two head end locomotives and eight cars of E-SUDBTM2-11 were derailed and eight of the stored boxcars on the siding were derailed. The locomotive engineer and conductor sustained minor bruises. The locomotive engineer dialed the 911 number on the radio, which alerted the dispatch center of an emergency, and the conductor performed a walking inspection of the train. An emergency responder transported the locomotive engineer to the rear of the train where he used the distributed power locomotive to pull the remainder of the train east to clear a road crossing. BNSF supervisory personnel arrived at the scene. The crew was transported to a hospital in Staples, Minnesota for toxicological blood and urine tests. The crew was then transported back to Motley, then on to Superior and was released from duty at 2:30 p.m.

BNSF signal personnel arrived at the scene and secured the interlocking instrument house and the approach signal instrument case. They contacted the Federal Railroad Administration (FRA) for permission to test the signal system. After receiving permission, they downloaded the information from the data recorders at both locations. Analysis of the data confirmed that the absolute signal had displayed a red aspect for the entire incident and the operative approach signal had displayed a yellow aspect during the entire incident. BNSF signal personnel performed operational tests of the signal system and concluded the system to be operating as intended. Signal personnel also tested and verified the inputs to the data recorders at both locations. Tests of the data recorder circuits confirmed the inputs were correct and operating as intended.

First responders from Motley Police Department and Fire Company assisted at the accident scene. Hulcher Services Inc. was dispatched to clear the accident site and rerail the railroad equipment.

ANALYSIS AND CONCLUSION

ANALYSIS:

Locomotive Engineer Operating Performance:

The locomotive engineer of E-SUDBTM2-11, a 55 year old male, was a certified locomotive engineer. He was in possession of a valid certification card at the time of the accident. He was promoted to a locomotive engineer in 2004, and has operated over the territory where the accident occurred on numerous occasions. He maintains that the operative approach signal at MP 138.8 displayed an approach signal indication then changed to a clear signal indication. The locomotive engineer said he was alert and not distracted from his duties.

The conductor of E-SUDBTM2-11, a 55 year old male, entered service for the BNSF in 1988, as a conductor. The conductor has operated over the territory where the accident occurred for 19 years. He maintains that as they approached East Motley, the operative approach signal lit and displayed an approach signal indication, then changed to a clear signal indication. He maintains that he and the locomotive engineer called the signal out to each other and he noted the clear indication on his signal awareness form. The conductor said he was alert and not distracted from his duties.

CONCLUSION:

The crew members of BNSF E-SUDBTM2-11 failed to comply with the stop signal indication at East Motley which caused the collision with the standing cut of cars on the siding track.

ANALYSIS

Locomotive Safety Devices:

The two lead locomotives of E-SUDBTM2-11 were BNSF 9846 and BNSF 9538, both units were equipped with a headlight, auxiliary lights, and an audible warning device, as required by Federal regulation. According to the locomotive engineer, these devices were functioning as intended prior to the accident. BNSF 9846 was equipped with an operating speed indicator and event recorder. The BNSF mechanical department downloaded the event recorder data from the lead locomotive, BNSF 9846. Analysis of the data disclosed that BNSF 9846 was traveling at 49 mph when the locomotive engineer instituted an emergency air brake application, and 39 mph when BNSF 9846 collided with the standing cut of cars. FRA reviewed the results of this analysis and concurred with the findings of the BNSF Staff.

CONCLUSION:

The locomotive safety devices were in compliance with Federal regulations.

SIGNAL & TRAIN CONTROL ANALYSIS:

The signal system at East Motley is an interlocked automatic siding. Train movements into and out of the siding are authorized by the BNSF Superior Dispatcher. The electric power operated switch turnout position is changed by a train crew member who must operate a request pushbutton located on either the entering siding signal or the leave siding signal. A train must first occupy a track circuit in approach to the signal, then the train crew member must operate the request pushbutton. Operation of the pushbutton requests the signal system to change the route. The request to the signal system causes the signals to change to a stop indication and start a timer for the required time elapse locking. After the required amount of time elapses, the electric power operated switch moves the track switch point turnout to the reverse position. When the electric power operated switch completes its movement, the appropriate signal can display an aspect to proceed. After a train trails through and clears the limits of the interlocking, the electric power operated switch restores the switch point turnout to the main track position. This eliminates the need for someone to manually restore the switch point position to normal.

The interlocking signal system micro-processor program gives priority to main line train movements. The interlocking signal system at East Motley includes an operative approach signal located 12,654 feet east of the East Motley interlocking westward home signal. An operative approach signal can display either an approach or clear aspect. A train approaching on a main track would normally receive a clear approach signal upon entering the limits of the signal system and a clear signal to move over a normal switch at East Motley interlocking. If a “leave siding” signal remains clear, with the switch points in the reverse position, and an opposing train approaches on the main track, the operative approach signal would display an approach indication and the siding signal will be changed to display a stop indication, and time locking will go in effect. After running the required amount of time, the electric power operated switch will operate to the normal switch point position, then the home signal will display an aspect to proceed.

Prior to the accident, the Motley siding was being used for the storage of empty boxcars. The signal maintainer for the territory stated that signal trouble was often reported at the interlocking. Investigation usually showed the trouble was caused by cars stored on the siding occupying the approach track circuit for the signal system. The railroad had installed portable derails on the siding track. However, placement of the derails still allowed cars to occupy the approach track circuit. This was not detected due to the requirement to also activate the pushbutton to request a route.

On the day before the accident, a Loram Switch Grinder was operating at East Motley interlocking. During a grinding procedure, the switch grinder occupied and shunted a track circuit in the switch turnout, within the interlocking. The combination of the shunted track circuit in the switch turnout and the occupancy of the siding approach track circuit by the stored cars, caused the signal system to establish a route from the siding track to the main track. Subsequent train movements did not cancel the route. A relief signal maintainer was dispatched and found the stored cars occupying the approach track circuit to the East Motley interlocking. The relief signal maintainer notified the BNSF Superior dispatcher that the cars would have to be moved.

BNSF provided event recorder data downloads from the interlocking signal system at East Motley and from the operative approach signal at MP 138.8. The data indicates that E-SUDBTM2-11 received only an

approach signal indication at operative approach signal 138.8 and the absolute signal at East Motley interlocking displayed a stop indication during the entire incident.

The locomotive engineer and the conductor on E-SUDBTM2-11 reported no sight problems with seeing signal indications prior to the incident.

BNSF signal personnel inspected and tested the signal system immediately after the accident. Data from event recorders located at East Motley interlocking and the operative approach signal at MP 138.8 were downloaded and analyzed. Event recorder indication inputs from East Motley interlocking and the operative approach signal at MP 138.8 were verified to be correct. Signal tests and event recorder download data indicated the signal system functioned as designed. The preview of the operative approach signal at MP 138.8 and the absolute signal at East Motley interlocking were unobstructed.

On Wednesday October 24, 2007, BNSF signal personnel performed inspections and tests of the signal systems at East Motley interlocking and the operative approach signal at MP 138.8 with an FRA signal and train control inspector monitoring. FRA noted no exceptions to the equipment tested and the wayside signal system functioned as designed.

CONCLUSION:

The signal systems at the approach signal located at MP 138.8 and East Motley interlocking functioned as designed at the time of the incident.

ANALYSIS:

Toxicological Testing:

The accident met the Federal threshold pursuant to Title 49 Part 219, Subpart C, Post Accident Toxicological Testing. BNSF conducted post accident toxicology testing on crew members of BNSF E-SUDBTM2-11. The results of the toxicology tests were negative for both employees.

CONCLUSION:

Impairment was not a factor.

Fatigue Analysis:

FRA reviewed the 10-day work history of the crew members involved.

Fatigue Conclusion:

FRA found that the locomotive engineer and conductor assigned to train E-SUDBTM2-11 may have been working at a diminished level of effectiveness due to fatigue, which may have contributed to the cause of the accident. The conductor of train E-SUDBTM2-11 had been diagnosed with sleep apnea and was being treated as of the time of the accident.

PROBABLE CAUSE & CONTRIBUTING FACTORS:

The accident occurred because the locomotive engineer and conductor failed to comply with rules and regulations regarding an approach signal indication and a stop signal indication. They allowed E-SUDBTM2-11 to pass an operative approach signal displaying an approach indication without reducing their train speed to 30 mph, or preparing to stop at the next signal. The crew members of BNSF E-SUDBTM2-11 failed to comply with the stop signal indication at East Motley which caused the collision with the standing cut of cars on the siding track.