Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-40

Burlington Northern Santa Fe (BNSF)
Casselton, North Dakota
May 5, 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-2005-40

1.Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
BNSF Rwy Co. [BNSF]	BNSF	TC0505104
2.Name of Railroad Operating Train #2	2a. Alphabetic Code	2b. Railroad Accident/Incident
N/A	N/A	N/A
3.Name of Railroad Responsible for Track Maintenance:	3a. Alphabetic Code	3b. Railroad Accident/Incident No.
BNSF Rwy Co. [BNSF]	BNSF	TC0505104

4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident (Month / Day / Year)	6. Time of Accident/Incident
	05 / 05 / 2005	02:15: ☐ 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
Casselton	28.5	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
77 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 2		4	62.18		4

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: 1

26. Was Equipment Attended? 1. Yes 2. No — Code: 1

27. Train Number/Symbol: GEDU KAL90 3

28. Speed (recorded speed, if available) — R - Recorded; E - Estimated: 36 MPH — Code: R

29. Trailing Tons (gross tonnage, excluding power units): 14912

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)				
e	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	59	yes
(2) Causing (if mechanical cause reported)	0	0	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	3	0	0	0	0
(2) Total Derailed	0	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	107	0	0	0	0
(2) Total Derailed	25	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
1111439	419312	T109	N/A

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	0	1	0

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 1 Mi 45	Hrs 1 Mi 45

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): 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: A

53. Was Equipment Attended? 1. Yes 2. No — Code: 1

54. Train Number/Symbol: N/A

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

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

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2005-40

56. Trailing Tons (gross tonnage, excluding power units): 0

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): p | N/A | N/A | N/A | N/A

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

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

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

Alcohol	Drugs
0	0

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

63. Equipment Damage This Consist: 150000

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

65. Primary Cause Code: T109

66. Contributing Cause Code: N/A

Number of Crew Members

67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen
1	0	1	0

Length of Time on Duty

71. Engineer/Operator: Hrs 7 Mi 15

72. Conductor: Hrs 7 Mi 15

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	0	0	0
Nonfatal	1	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: 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): 0

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: 0

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	N/A

88. Signaled Crossing Warning (See instructions for codes) Code:

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

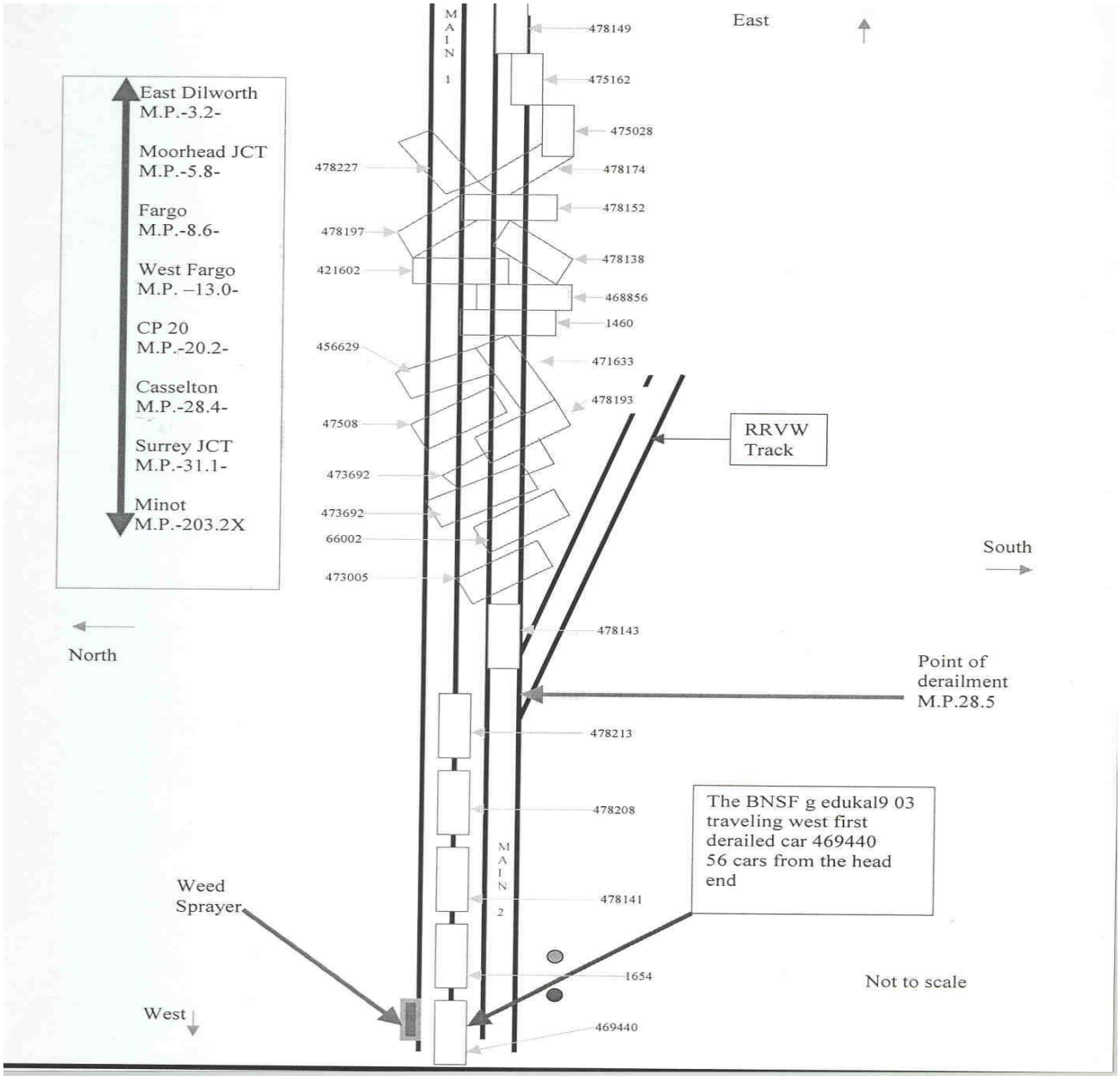
105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No. Code: N/A

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.

HQ40sketch.jpg



109. SYNOPSIS OF THE ACCIDENT

A westbound BNSF Railway Company (BNSF) freight train derailed on May 5, 2005, at 2:15 p.m., CDT. The derailment occurred west of Casselton, North Dakota, on Main 2 track, at milepost 28.5, on the Twin Cities Division, KO Subdivision.

The train consisted of three locomotives and 107 loaded grain cars. The 56th car in the consist derailed as it passed over the Red River Valley & Western Railroad Company junction switch and a general derailment of the following 24 cars ensued. The first car that derailed went north toward Main 1 track and struck a weed spray truck, contracted by BNSF and owned by "Right A Way Applicators" (RAW). The RAW spray truck was on Main 1 track.

There were no injuries to the train crew. The operator and passenger of the spray truck were transported to a hospital in Fargo, North Dakota, approximately 25 miles to the east. The operator was admitted for minor injuries and released the same day. The passenger sustained minor injuries and was not admitted to the hospital.

There was a small amount of weed poison and diesel fuel spilled from the spray truck. There were no evacuations.

The railroad estimated that there was track damage of $419,312 and equipment damage of $1,111,439.

The contractor (RAW) estimated damages of $150,000 to their spray truck.

At the time of the accident it was 77 °F and clear.

The probable cause of the accident was "track alignment irregular (buckled/sunkink)".

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-EDUKAS9-03 included a locomotive engineer and a conductor. They first went on duty at 12:30 p.m., CDT, May 5, 2005, at the Dilworth, Minnesota Yard, the away from home terminal for the crew. The home terminal for the engineer and the conductor is Minot, North Dakota. Prior to reporting for duty, both received a required statutory off-duty period.

Their assigned freight train consisted of three locomotives, 107 loaded cars, 14,912 trailing tons, and was 6,623 feet in length. It was a grain train traveling from Dilworth, Minnesota, to Minot, North Dakota, a distance of 254.2 miles.

When westbound train, G-EDUKAS9-03, got to milepost 20.2, the dispatcher had the train cross over from Main 1 track to Main 2 track because the weed spray truck was working on Main 1 track.

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

Approaching the accident site from the east traversing westward both main tracks are tangent for several miles and tangent for several miles beyond the accident location. There is a right hand number 20 turnout at the Point of Derailment (POD). The turnout is the junction for the Red River Valley & Western Railroad Company (RRVW). The track at this location turns to the south. The derailment occurred on a trailing point movement through the switch of the turnout. The grade in the area of the accident is virtually level.

In the accident area, trains operate on double main tracks under the authority of a Traffic Control System(TCS). Other than train movements, such as the spray truck, operation on the main tracks are under the authority of Track and Time. The BNSF System Special Instructions No.10, effective April 3, 2005 and BNSF Twin Cities Division Timetable No.1, effective January 20, 2002, authorizes a maximum speed of 60 mph, FRA Class 4 track. Because of a derailment at the same location on December 30, 2004, a temporary 40 mph speed restriction, FRA class 3, was in place. The timetable and geographic direction the train was traveling was west.

After completing an off duty period, a BNSF track inspector reported for duty at Fargo, North Dakota, on May 5, 2005. The employee was instructed to provide on track protection for the RAW weed spray truck from Fargo (milepost 7) to Surrey Junction (milepost 31.1). He was also instructed to inspect the track section on both main tracks between the same limits. The RAW truck was contracted to spray the track section between these limits.

The track inspector received main track authority on Main 1 track from the BNSF dispatcher in Fort Worth, Texas, then placed his hi-rail truck on the track ahead of the weed spray truck for westbound movement. The track inspector had come to a stop at milepost 28.6 and the RAW weed spray truck was coming to a stop 200 feet behind him when the accident occurred.

The Accident

The locomotive engineer stated the trip was uneventful approaching the accident site. He also stated that there were no problems with the operation of the train. While approaching, and at the time the accident occurred, the train was being operated at 36 mph. This speed was recorded on the lead locomotive event recorder.

According to the train crew the accident occurred at approximately 2:15 p. m., CDT.

The locomotive engineer first became aware of the derailment after a train induced emergency brake application occurred. When the crew felt the brake application, they looked back and saw a cloud of dust.

After coming to a stop, the conductor notified the dispatcher that the train had derailed. The track inspector immediately called the train crew on the radio and advised them that the derailed cars had struck the spray truck. The conductor then instructed the dispatcher to call an ambulance.

Further examination of the scene noted that 25 cars had derailed. The initial point of derailment was at milepost 28.5 at the Red River Valley & Western Railroad Company junction switch. The derailment happened on Main 2 track. The first car derailed struck the RAW weed spray truck on Main 1 track. The driver of the spray truck was trapped inside the cab of the truck for approximately one hour.

Cass County Sheriff's Department, Casselton Ambulance Service, and Casselton Fire Department responded to the accident. Life Flight Service was activated at the request of the Casselton Fire Department, but was not used. After the driver was extricated from the truck he was transported by ambulance to Merritt Care Center in Fargo, North Dakota, where he was treated for minor injuries and released. The passenger in the RAW weed spray truck was examined by Emergency Medical Technicians from the Casselton Fire Department then transported in an ambulance to the same hospital. Having received only minor scrapes and bruises, the passenger was not admitted to the hospital.

All of the 25 derailed cars contained soy beans. There was a small amount of weed poison and a small amount of diesel fuel spilled from the truck as a result of the accident. There were no evacuations.

Analysis and Conclusion

FRA Post Accident Toxicology Testing, as required under Title 49 CFR, Part 219, Subpart C, was conducted on the train crew. The results were negative.

An inspection of the data print out from the locomotive event recorder indicated no unusual events related to train handling.

On December 30, 2004, there had been a previous derailment on Main 2 track at milepost 28.5, caused by a journal (roller bearing) failure from overheating. As a result of that derailment there were 11 (39 foot) track panels installed on Main1 track. In addition, there were 26 (39 foot) track panels installed on Main 2 track. There is not a record of the actual or estimated amount of rail added in this derailment location. BNSF engineering officials estimate the total length of the track panels placed in the derailment area was 1040 feet on Main 2 track. The 136 lb. track panels were installed on December 31, 2004. BNSF engineering officials estimate that the temperature when the panels were installed was approximately 15 °F.

On February 15, 2005, a number 20 turnout was installed at milepost 28.5 on Main 2 track, connecting it to the Red River Valley & Western Railroad Company main track. This turnout was installed in the section of track where the derailment panels had been installed on December 31, 2004. The length of the turnout installed was 252 feet in length and was 136 lb. rail. There is not a record of rail added or removed when the turnout was placed. The track foreman stated that there was no rail added, but it was agreed upon by him and the roadmaster that the rail needed to be adjusted (rail removed) at a later date. The track foreman stated he thought he came back later and adjusted the rail at this location. There is no record of his activity as required by BNSF CWR procedures.

The turnout was surfaced twice by a surfacing crew immediately after it was installed. The track foreman, surfacing crew foreman, and surfacing equipment operator each stated that every time the switch area of the turnout was surfaced the stock rails would rise out of the switch plates, allowing for inadequate securement of the stock rails. They also stated that they had a hard time getting the stock rails placed back in the switch plates, which suggests there was too much rail in the track section. The surfacing crew foreman stated that he recorded the temperature on the day of surfacing day as 38°F.

On February 17, 2005, a BNSF welder made a thermite weld on the north rail just west of the switch on Main 2 track. He showed on the BNSF "Combined Rail Adjustment Report" that one-quarter inch of rail was added at this location.

On May 1, 2005, a BNSF track inspector inspected Main 2 track. He traversed the track with a hi-rail truck during the inspection. On May 3, 2005, the track inspector again inspected Main 2 track but did not traverse it. On May 05, 2005, while traversing Main 1 track, the track inspector conducted an inspection of Main 2 track. This was the last inspection prior to the derailment which occurred shortly after. All inspections revealed no defective conditions in the area of the derailment.

On May 02, 2005, a surfacing crew surfaced the track section on both ends of the number 20 turnout at milepost 28.5. The surfacing crew foreman stated that he just surfaced the approaches to the switch. He did not surface the switch area, because he feared that the stock rails might rise out of the switch plates as they did during the two previous times that surfacing was conducted. The surfacing crew foreman placed a 25 mph slow order at this location for two tonnage trains after it was surfaced, per BNSF policy. After the two tonnage trains operated the slow order was raised to 40 mph.

According to the BNSF Engineering Instructions Chapter 6, Rail, revised November 1, 2004, in Table 6-3 on page 6-17, the neutral temperature of the rail where the above activity took place, was drastically lowered from 90 °F (BNSF standards) to 15 °F. On December 31, 2004, when the 1040 feet was installed on Main 2 track, about 5-3/4 inches of rail was added. On February 15, 2005, when the turnout panel was installed on Main 2 track, one-half inch of rail was added. On February 17, 2005, a thermite weld was made on the north rail at this location, adding one-quarter inch of rail. On May 5, 2005, when the derailment occurred, the air temperature was 77 °F. There was approximately 4-1/4 inches too much rail in the track at this location for this temperature.

When the stock rails rose out of the switch plates each time it was disturbed by surfacing, should have been an indication that there was too much rail in the track section.

Probable Cause

The fra determined that the probable cause of the derailment was "track alignment irregular (buckled/sunkink)" at the switch location of the turnout, milepost 28.5 on Main 2 track. The BNSF's failure to follow their own CWR procedures for maintaining the neutral temperature of the rail and the recording of rail added or removed from the main line may have been a contributing factor.