

Federal Railroad Administration Office of Safety Headquarters Assigned Accident Investigation Report HQ-2005-69

Burlington Northern Santa Fe (BNSF) Blacktail, Montana August 26, 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 TRA	ANSPORT	ATION
FEDERAL RAILROA	D ADMIN	VISTRATION	(FRA)

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # <u>HQ-2005-69</u>

1. Name of Railroad Operating Train #1 1a. Alphabetic Code 1b. Railroad Accident/Incident No.										
	1b. Railroad Accident/Incident No.									
BNSF Rwy Co. [BNSF] BNSF MT0805105	MT0805105									
2. Name of Railroad Operating Train #2 2a. Alphabetic Code 2b. Railroad Accident/Incident No.	2b. Railroad Accident/Incident No.									
N/A N/A N/A										
3. Name of Railroad Responsible for Track Maintenance (single entry) 3a. Alphabetic Code 3b. Railroad Accident/Incident No.										
BNSF Rwy Co. [BNSF] BNSF MT0805105										
4. U. S. DOT-AAR Grade Crossing Identification Number 5. Date of Accident/Incident 6. Time of Accident/Incident										
N/A 08 26 2005 $09:18:$ AM X	PM									
7. Type of Accident/Incident 1. Derailment 4. Side collision 7. Hwy-rail crossing 10. Explosion-detonation 13. Other	Code									
(single entry in code box) 2. Head on collision 5. Raking collision 8. RR grade crossing 11. Fire/violent rupture (describe in)	01									
3. Rear end collision 6. Broken Train collision 9. Obstruction 12. Other impacts narrative) 8. Cars Carrying 9. HAZMAT Cars 10. Cars Releasing 11. People 12. Division										
HAZMAT Damaged/Derailed HAZMAT Evacuated										
0 0 0 Montana										
13. Nearest City/Town 14. Milepost 15. State 16. County										
Blacktail 1158.3 MT FLATHEAD										
17. Temperature (F) 18. Visibility (single entry) Code 19. Weather (single entry) Code 20. Type of Track	20. Type of Track Code									
(specify if minus) 1. Dawn 3. Dusk 1. Clear 3. Rain 5. Sleet 1. Main 3. Siding										
59 F 2. Day 4. Dark 2 2. Cloudy 4. Fog 6. Snow 1 2. Yard 4. Industry 21 Track Name/Number 22 FRA Track Code 23 Annual Track 24 Time Table Direction	Code									
Class (1-9, X) Density (gross tons 1. North 3.East										
Main Track 2 2 in millions) 32.49 2. South 4. West	4									
OPERATING TRAIN # 1										
25. Type of Equipment 1. Freight train 4. Work train 7. Yard/switching A. Spec. MoW Equip. Code 26. Was Equipment Code 27. Train Number/Symbol										
Consist (single entry) 2. Passenger train 5. Single car 8. Light loco(s). Attended?	122									
28. Speed (recorded speed, if available) Code 30. Method(s) of Operation (enter code(s) that apply) 30a. Remotely Controlled Locomotive	925									
a. ATCS g. Automatic block m. Special instructions 0= Not a remotely controlled opera	tion									
E - Estimated D Auto train control h. Current of traffic n. Other than main track rules 1 = Remote control portable transm 2 - Depute control h. Current of traffic	itter									
22 MPH R c. Auto train stop 1. Time table/train orders o. Positive train control $2 = Remote control tower operation29. Trailing Tons (gross tonnage, d. Cab signals i. Track warrant control p. Other (specify in narrative) 3 = \text{Remote control portable}$	ers o. Positive train control 2 = Remote control tower operation 3 = Remote control portable									
excluding power units) e. Traffic control k. Direct traffic control Code(s) transmitter - more than one										
f. Interlocking l. Yard limits e N/A N/A N/A N/A remote control transmitter	0									
31. Principal Car/Unit a. Initial and Number b. Position in Train c. Loaded (yes/no) 32. If railroad employee(s) tested for drug/alcohol use,										
(1) First involved BNSF472460 63 ves enter the number that were positive in Alcohol	Drugs									
(derailed, struck, etc) the appropriate box. N/A	N/A									
(2) Causing (<i>if mechanical</i> 0 0 N/A 33. Was this consist transporting passengers ? (Y/N)										
cause reported)	N									
34. Locomotive Units a. Freight b. Manual c. Remote d. Manual e. Remote a. Freight b. Pass. c. Freight d. Pass.	e. Caboose									
	0									
(1) I otal in Irain 2 0 0 0 2 (1) I otal in Equipment Consist 111 0 0 0	0									
(2) Total Derailed 0 0 0 0 0 (2) Total Derailed 26 0 0 0	0									
36. Equipment Damage 37. Track, Signal, Way, 38. Primary Cause 39. Contributing Cause This Consist & Structure Damage Code Code										
\$557,908.00 \$271,600.00 T108	N/A									
Number of Crew Members Length of Time on Duty										
40. Engineers/ 41. Firemen 42. Conductors 43. Brakemen 44. Engineer/Operator 45. Conductor										
Operators 1 0 1 0 Hrs: 9 Mins: 17 Hrs: 9 Min	Hrs: 9 Mins: 17									
Casualties to: 46. Railroad Employees 47. Train Passengers 48. Other 49. EOT Device? 50. Was EOT Device Property Am	50. Was EOT Device Property Armed?									
Fatal 0 0 1. Yes 2. No 1 1. Yes 2. No	1. Yes 2. No 1									
Nonfatal 0 0 0 1. Yes 2. No	· · · · ·									
N/A										
OPERATING TRAIN # 2										
52. Type of Equipment 1. Freight train 4. Work train 7. Yard/switching A. Spec. MoW Equip. Code 53. Was Equipment Code 54. Train Number/Symbol										
3. Commuter train 6. Cut of cars 9. Maint/inspect. car N/A 1. Yes 2. No N/A N/A										
55. Speed (recorded speed, if available) Code 57. Method(s) of Operation (enter code(s) that apply) 57a. Remotely Controlled Locomotive?										
R - Recorded a. ATCS g. Automatic block m. Special instructions 0= Not a remotely controlled operation										
E - Estimated 0 MPH N/A c. Auto train stop i. Time table/train orders o. Positive train control 2 = Remote control tower operation										
56. Trailing Tons (gross tonnage, d. Cab signals j. Track warrant control p. Other (specify in narrative) 3 = Remote control portable										
excluding power units) e. Traffic control k. Direct traffic control Code(s) transmitter - more than one										
$\begin{bmatrix} I. Interlocking & I. Yard limits \\ 0 \end{bmatrix} = \begin{bmatrix} N/A & N/A & N/A & N/A \end{bmatrix}$ remote control transmitter	N/A									

FORM FRA F 6180.39 (Revised July 2003)

DEPARTMENT OF TRANSPORTATION FEDERAL RAILROAD ADMINISTRATION (FRA)

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # <u>HQ-2005-69</u>

OPERATING TRAIN # 2 (CONTINUED)																
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.																
(1) First involved	(1) First involved								e	enter the number that were positive in					Drugs	
(derailed, struck, etc)	(derailed, struck, etc)		0		0		N/A		tl	the appropriate box.				N/A	N/A	
(2) Causing (if mechanical cause reported) 0			0		0			N/A 60.Was this cor		onsist transporting passengers ? (y/n)				N/A		
61. locomotive Units	61. locomotive Units a. Head End b		Mid 7 b. Manual	Frain c. Remote	Rear End		62.0	Cars	I		Loaded Empt		ty d. Pass.	e. Caboose		
(1) Total in Train		0	0	0	0	0	((1) Total in Equip	otal in Equipment Consist		0	0	0	0	0	
(2) Total Derailed		0	0	0	0	0	((2) Total Derailed			0	0	0	0	0	
63. Equipment Damage 6 This Consist			64. Track, Sig & Structur	nal, Way, e Damage	e to			65. Primary Cause Code 66. Contributing Cause Code			ibuting Cause	· · · · · · · · · · · · · · · · · · ·				
	3	Number of	Crew Members		1	50		N/A N/A N/A							N/A	
67. Engineers/	68. Fire	men	69. Conducto	ors	70 Brakemen			71 Engineer/Operator 72 Conductor								
Operators		0				0								0 Mi		
		0				0		1115. ()	winis.	0	Hrs: () Mi			ned?	
Casualties to:	73. Rai	llroad Employees	74. Train Pa	ssengers	75. Other)	76.	76. EOT Device?		N/A	1. Yes 2. No			N/A		
Nonfatal		0	()	0)	78.	78. Caboose Occupied by Crew?				2. No	No I			
		Highway U	ser Involve	1	1					Rail	Equipmer	nt Involve	d			
79. Type C. Truck	-Trailer	F. Bus	J. Othe	r Motor Vehic	le	Code	83. I	83. Equipment 3 Train (standing) 6 Light Loco(s) (moving) Code							Code	
A. Auto D. Pick-	Up Truck	G. School Bus	K. Ped	estrian			1.	1. Train (units pulling) 4. Car(s) (moving) 7. Light Loco(s) (standing)								
B. Truck E. Van		H. Motorcycle	M. Oth	er (spec. in	narrative)	N/A	2. Train (units pushing) 5. Car(s) (standing) 8. Other (specify in narrative) N/A								N/A	
80. Vehicle speed		8	1. Direction	(geographic	al)	Code	84. Position of Car Unit in Train									
(est. MPH at impact) 0 1. North 2. South 3. East 4. West N/A						0										
82. Position					85.0	85. Circumstance							Code			
1. Stalled on Crossing 2. Stopped on Crossing 3. Moving Over Crossing 4. Trapped N/A							1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User N									
86a. Was the highway user and/or rail equipment involved					86b.	86b Was there a hazardous materials release by							Code			
in the impact transporting hazardous materials?																
1. Highway User 2. Rail Equipment 3. Both 4. Neither 86c. State here the name and quantity of the bazardous materials released, if any. 86c. State here the name and quantity of the bazardous materials released, if any.								N/A								
				-			N/A									
87. Type of 1.	87. Type of 1. Gates 4. Wig Wags 7. Crossbucks 10. Flagged by crew				88. Signaled Crossing Warning Code 89. Whistle Ban								Code			
Crossing 2.	Cantilever Fl	LS 5. Hwy. tr	affic signals	8. Stop signs	11. Other	t (spec. in	narr.)				1. Yes					
warning 5.	Standard FL.	s 6. Audible		9. watenman	12. INOILE		(See instructions for codes) 2. No									
Code(s) N/A	N/2	A N/A	N/A	N/A	N/A	N/2	A				N/A		3. Unknown		N/A	
90. Location of Warning			Code	91. Cro	ssing Warning h Highway Si	g Interconnec ignals	ted		Code	92. G	ights or Spec	inated by Str cial Lights	eet		Code	
1. Both Sides						0						0				
2. Side of venicle Approach 3. Opposite Side of Vehicle Approach			1	2. No							1. 1es 2. No				1	
of opposite of a concrete reprivation		N/A	3.	3. Unknown				N/A		3. Unknown				N/A		
93. Driver's	93. Driver's 94. Driver's Gender 95. Driver Drove Behind or in Front of Train					Code	96. Drive	er					Code			
Age	Age and Struck or was Struck by Second Train				in	1. Drove around or thru the Gate 4. Stopped on Crossing							1			
0	1. Ma 2 Eon	ie nale	1/A	1. Yes	2. No	3. Unk	nown	NT/A	2. Sto	opped and	then Proceede	ea 5.	Other (sp	ecify in	NI/A	
97. Driver Passed Standin	97. Driver Passed Standing 98. View of Track Obscured by (primary				obstruct	tion)	5.01	a not btop			nai	rrative)				
Highway Vehicle	Highway Vehicle Code 1. Permanent Structure 3. Pase					ssing Tra	ain	5. Vegetat	ion		7. Other	(specify	in narrative)	Code		
1. Yes 2. No 3. Unknown N/A 2. Standing Railroad Equipment 4. Top				pography	ography 6. Highway Vehicles 8. Not obstructed						N/A					
Casualties to: Killed Injured 99. Driver Was 1. Killed 2		er Was	Code 100. Was Driver in the Vehicle?						Code							
		lled 2. Inj	jured	3. Uninjured	N	/A	1. Ye	es	2. No	-in a D	N/A					
101. Highway-Rail Crossing Users 0			0	102. Highway Vehicle (est. dollar dam		e Property Damage 103. Total Number of Highway-Rail Crossing Users (include driver) 0					using Users					
104. Locomotive Auxiliary Lights? Code 105. Locomotive Auxiliary Lights Operational? Code								Code								
	1 Yes 2 No N/A			N/A	1. Yes 2. No						N/A					
106. Locomotive Headlig	ht Illuminate	ed?				Code	107	. Locomotive Au	dible Warni	ing Sounde	d?				Code	
1. Yes			2. No			N/A	1. Yes 2. No				N/A					

DEPARTMENT OF TRANSPORTATION FEDERAL RAILROAD ADMINISTRATION (FRA)



109. SYNOPSIS OF THE ACCIDENT

On Friday August 26, 2005, at 9:15 a.m., Mountain Daylight Time (MDT), a westbound BNSF Railway Company (BNSF), freight train symbol, G-HWMKAL9-23, derailed near Blacktail, Montana. The accident occurred on the BNSF Montana Division, Hi Line Subdivision, Main Track 2, at milepost 1158.30 about 59 miles east of Whitefish, Montana.

As a result of the derailment, twenty-six (26) loaded cars derailed.

There was no injuries, no release of hazardous material and no evacuation. The railroad reported a total of \$829,508 damages (\$557,908 for equipment and \$271,600 for track and structure).

The probable cause of the accident was a track mis-alignment.

At the time of the accident it was daylight and clear. The temperature was 59 degrees.

110. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

On August 26, 2005, after completing a statutory off-duty period, a train crew consisting of an engineer and conductor went on duty at 00:01a.m., MDT in Havre, Montana. The crew was assigned to operate the train from Havre to Whitefish, a distance of about 256 miles.

The train consisted of two locomotives, 111 loads with 0 empties and two distributive power at the rear of the train. The train had 15,685 trailing tons and was 6,655 feet in length.

The crew boarded the train in Havre and departed at 1:00 a.m., MDT.

The train approached the accident geographically west and BNSF timetable west, which is consistent with BNSF Timetable directions. Timetable directions will be used throughout this report. The engineer was seated at the controls, on the right (north) side of the locomotive. The conductor was seated on the left (south) side of the locomotive.

Approaching the accident site from the east at about milepost 1157.45 on Main Track 2, there is in succession a 1,300 feet tangent, a 1,550 foot 7-degree 32-minute right curve, a tangent about 1,230 feet, a 1,100 feet 7-degree 52-minute curve to the left at the point of derailment (POD) followed by 350 feet of tangent exiting the curve. The grade is 1.48 descending.

In the accident area trains operate on two main tracks of a Traffic Control System (TCS) controlled by a dispatcher in Fort Worth, Texas. The maximum authorized speed for freight trains is 25 miles per hour (mph).

THE ACCIDENT

According to the printout of the locomotive event recorder the train was being operated at 22 mph while the train approached the accident area and again when a train line induced emergency airbrake application occurred.

According to the engineer, as the train approached the accident area on Main Track 2 he observed the concrete ties were clean and exposed. As the train traversed over the POD the engineer heard grinding sounds, then a train line induced emergency airbrake application occurred.

According to the engineer, after the train came to a stop he instructed the conductor to walk towards the rear of the train and start setting handbrakes and retainer valves.

The train derailed at about milepost 1158.3 in a7-degree 52-minute curve.

ANALYSIS AND CONCLUSION

This accident did not meet Title 49 CFR, Part 219, Subpart C, Post Accident Toxicological Testing.

According to the engineers interview, he observed the concrete ties were very clean and exposed as he approached the accident area.

As a result of the accident, the 61st, 65th, 68th through 71st and 73th through 97th cars from the leading end of the train were derailed standing upright and on their sides. Main Track 2 had 1,200 feet of track damaged and Main Track 1 had 600 feet of track damage.

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

The investigation determined a BNSF mini-tie gang had been replacing concrete ties throughout the length of the curve on August 25, 2005. About one hundred seventy-five (175) concrete ties had been installed in the curve, at milepost 1158.3.

During the tie installation and ballast regulating, flat spots (mis-alignments) developed through the curve at three locations. The BNSF gang foreman was instructed by the BNSF General Director of Maintenance to correct the mis-alignments and regulate a full shoulder of ballast to the curve before leaving on August 25, 2005. The gang corrected the mis-alignments but did not regulate the ballast sections to fill in the shoulder and tie cribs, which resulted in voids being left in the ballast shoulder and cribs at various locations around the curve.

The investigation determined BNSF failed to protect the recently disturbed track at milepost 1158.3 with the appropriated speed restriction per the BNSF Engineering Instructions, which states in part... "when the track has been disturbed, as outlined in Table 4-1, and you have not properly applied the anchors and restored the ballast section, protect the track with a 10 MPH speed restriction".

The investigation determined freight trains were allowed to operate at a maximum BNSF Timetable speed of 25 mph without the ballast sections being restored after the BNSF had completed their work on August 25, 2005.

The air temperature had dropped to about 37 degrees during the night of August 25, 2005 creating excessive rail tensile forces that was intensified by the BNSF not restoring the ballast sections to the track and allowing the track to be stabilized.

The investigation determined, in combination;

- disturbing the track with the tie installation and track lining,
- the ballast sections not being restored to CWR constructed track,
- the BNSF not protecting the recently disturbed track with the appropriate speed restriction and;
- the tensile forces during the night,

resulted in a track mis-alignment causing the leading wheel of the trailing truck of the BNSF 472460 to climb the rail resulting in the derailment.

During the investigation it was also determined, the BNSF failed to comply with their own Engineering Instructions 8.2; General ballast section requirements that states in part... When building new track, or re-ballasting or surfacing existing track, ensure that the ballast section complies with the BNSF standard plan. Refer to the standard plan for typical ballast section for each type of track. Follow these general ballast section requirements and;

3. Properly dress ballast behind maintenance work and;

4. Refer to the FRA Track Safety Standards (TSS) 213.103 for additional

requirements.

During the investigation it was determined, the BNSF failed to follow the minimum FRA TSS, Part 213.103 "Ballast; General" which states in part... Unless it is otherwise supported, all track shall be supported by material which will restrain the track laterally, longitudinally, and vertically under dynamic loads imposed by railroad rolling equipment and thermal stress exerted by the rails and maintain proper track crosslevel, surface, and alinement.

During the investigation it was determined, the BNSF failed to follow the minimum FRA TSS for CWR Procedures Part 213.119 "Continuous welded rail (CWR); general." that states in part...Procedures which address the monitoring of CWR in curved track for inward shifts of alinement toward the center of the curve as a result of disturbed track and procedures which control train speed on CWR when maintenance work, track rehabilitation, track construction, or any other event occurs which disturbs the roadbed or ballast section and reduces the lateral or longitudinal resistance of the track.

Following the Blacktail derailment, the BNSF issued a maintenance alert to all maintenance of way (MOW) employees with corrective action instructions for disturbed track.

BNSF has been assessed a recommended violation for "Failure to comply with written CWR procedures", as prescribed by FRA Title 49 CFR, Part 213.119 "Continuous welded rail (CWR); general.

The investigation concluded, BNSF did not comply with the minimum FRA and BNSF railroad operating rules for temporary speed restriction and procedures for disturbed track after disturbing CWR during maintenance and replacement.

PROBABLE CAUSE

The probable cause was "Track alignment irregular other than buckled/sunkink" (T108).