

Federal Railroad Administration Office of Safety Headquarters Assigned Accident Investigation Report HQ-2005-100

Burlington Northern Santa Fe (BNSF) Ft. Morgan, Colorado November 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 TRANSI FEDERAL RAILROAD ADM	'ORTAT NISTRA'	ION TION	FRA FA	ACTUA	L RAI	LROAD AG	CCIDENT R	REPORT	I	FRA File	# <u>HQ-20</u>	<u>05-100</u>				
1.Name of Railroad Operating Trai BNSF Rwy Co. [BNSF]	n #1					1a. Alphabetic	Code BNSF	1b	Railroad Accident/Incident No. PR1105102							
2.Name of Railroad Operating Train	1 #2					2a. Alphabetic	Code	2b.	Railroad A	ccident/In	cident					
N/A						1	N/A		1	N/A						
3.Name of Railroad Responsible for	: Track Ma	aintenan	ce:			3a. Alphabetic	Code	3b	. Railroad A	ccident/I	ncident No.					
BNSF Rwy Co. [BNSF]	Idantifiaa	tion Mus	uh on				BNSF		<b>T</b> : C t	PR11051	02					
4. U.S. DOI_AAR Grade Crossing	Identifica	tion Nur	nber			5. Date of Acci Month	dent/Incident	6. Year	Time of Ac	cident/Ind	cident					
						11	05	2005	10:	10:10: AM 🖌 PM						
7. Type of Accident/Indicent 1. I	Derailment		4. Side c	ollision	I	7. Hwy-rail c	rossing 10.	Explosion-deto	n-detonation 13. Other							
(single entry in code box) 2. H	lead on co	llision	5. Raking	g collision	1	8. RR grade c	8. RR grade crossing 11. Fire/violent rupture ( <i>describe in narrative</i> )									
3. F	lear end co	ollision	6. Broke	n Train co	ollision	9. Obstruction	n 12.	Other impacts	01							
8. Cars Carrying 9. HA HAZMAT 0	9. HAZMAT Cars Damaged/Derailed 0				Releasing T	g 0	11. People Evacuated		0	12. Divis	ion Powder Ri	iver				
12 Naarast Citu/Town				14. Mile	epost		15 State	1	6 County							
Fort Mo		(to n	nearest ter 4	nth) 63.4	Abbr N/A	Code CO	to. County	MORGAN								
17. Temperature (F) 18.	Visibility	(sing	gle entry)	Code	19. We	eather (single	entry)	Code	20. Type of Track			Code				
(specify if minus) 34 F	n 3.D	)usk Dorte	4	1.	Clear 3. Rai	in 5.Sleet	1	1. M	1. Main 3. Siding		1					
21 Track Name/Number	2. Day	4.1	Jark	22 FP A	Z.	Cloudy 4. Fog	g 6.Snow	k Density	2. 13	2. Yard 4. Indust		Celle				
21. Hack Walle/Ivullion	ainTrac	k	Clas	ss (1-9, X)	) 5	(gross tons millions)	in 73.43	24. 1111	1. North 3. East							
					OPER A	ATING TRA	IN #1		-							
25. Type of Equipment 1. Frei	ght train	4. W	ork train 7.	Yard/swi	itching	A. Spec. MoV	V Equip. Code	26. Was Equ	ipment (	Code 2	7. Train Nu	mber/Symbol				
Consist (single entry) 2. Pass	enger trai	n 5. Sii	ngle car 8.	Light loc	co(s).	•		Attended	ended?							
3. Con	muter trai	n 6. Cu	t of cars 9.	. Maint./in	spect.car		1	1. Yes	2. No	1	CJRMI	HOH062				
28. Speed (recorded speed, if avail	able) Co	de   30	. Method(s) of	of Operation	on (e	enter code(s) t	<i>hat apply)</i>	ations	30a. Rem	otely Con	trolled Loc	omotive?				
F - Estimated 40 MP	н R	b	. Auto train o	control h	of traffic	n. Other than ma	in track	1 = Remote control portable								
	control	2 = Remote control tower														
29. Trailing Tons (gross tonnage	,	d	l. Cab	j.	.Track wa	irrant control	p. Other (Speci	fy in narrative)	ative) 3 = Remote control							
1701	0	e f	. Traffic	k	. Direct tr	raffic control	Code(	s)	remote of	tter - mor control tra	e than one ansmitter	1.				
1/01	3			5 I.		115	e N/A N	/A N/A N/A	1			0				
31. Principal Car/Unit a. I	nitial and I	Number	b. Positio	on in Trair	n c. Le	oaded(yes/no)	32. If railroad enter the r	employee(s) tes	sted for drug	/alcohol u	use,	Director				
(1) First involved (derailed, struck, etc)	N/A			12		yes	the approp	priate box.	ie positive i		N/A	N/A				
(2) Causing ( <i>if mechanical</i>	0			0		N/A	33. Was this	consist transpo	rting passen	gers? (Y/	N)	N				
34. Locomotive Units a. I	Mid 7	Frain	Re	ar End	35 Cars		I	Loaded	E	Empty						
1	End b. Manual c. Rem		c. Remote	d. Manua	l c. Rem	note 55. Cars		a. Freigh	nt b. Pass.	c. Freigl	ht d. Pass.	e. Caboose				
(1) Total in Train	2	0	0	0	2	(1) Total i	in Equipment Co	onsist 128	0	0	0	0				
(2) Total Derailed	0	0	0	0	0	(2) Total I	Derailed	22	0	0	0	0				
36. Equipment Damage		37. Tra	ack, Signal, V	Way,	20.4500	38. Prima	ry Cause		39. Cont	ributing C	Cause					
This Consist 3020	942	&	Structure Da	mage	294500	Code T207 Code N/A										
N	embers	1 42 Day	a1.000.00		10	Length o	of Time on D	1 Time on Duty								
Operators 1	erators 1 0 1				0	44. Engin	Hrs 6	Mi 25	+5. CON	Hrs	6	Mi 25				
Convoltion to: 46 Doilmood 1	Zeenloweer	45.55	1	10.0	~ ~ ~	40 EOT I	Tills ©	WII 25	50 Was FOT Device Property Arm							
	25 TO: 40. Kaliroad Employees 47. Train Passengers 48. Other						es 2. No	2	1. Yes 2. No   2							
				0		51. Caboose Occunied						2				
Fatal 0			0		0	51. Caboo	ose Occupied by	Crew?								
Fatal   0     Nonfatal   N/A	1		0		0	51. Caboo	ose Occupied by 1. Yes	Crew? 2. No				N/A				
Fatal   0     Nonfatal   N/A	1		0	01	0 0 PERAT	51. Caboo	ose Occupied by 1. Yes #2	Crew? 2. No	, ,			N/A				
Fatal     0       Nonfatal     N/A       52. Type of Equipment     1. Freig	sht train	4. Wo	0 0 ork train 7.	Ol	0 0 PERAT	51. Caboo ING TRAIN A. Spec. MoW	bose Occupied by 1. Yes #2 / Equip. Code	Crew? 2. No 53. Was Equi	ipment C	ode 54	4. Train Nu	N/A mber/Symbol				
Fatal     0       Nonfatal     N/A       52. Type of Equipment     1. Freig       Consist (single entry)     2. Pass       3. Com     3. Com	sht train	4. Wo n 5. Sin	0 0 ork train 7. agle car 8.	Ol Yard/swit Light loco	0 0 PERATI tching o(s).	51. Caboo ING TRAIN A. Spec. MoW	<pre>bose Occupied by 1. Yes #2 / Equip. Code by(A)</pre>	Crew? 2. No 53. Was Equi Attended	ipment C	lode 54	4. Train Nu	N/A mber/Symbol				
Fatal     0       Nonfatal     N/A       52. Type of Equipment Consist (single entry)     1. Freig 2. Pass 3. Com       55. Speed (recorded enced if unit)	sht train enger train muter train	4. Wo n 5. Sir n 6. Cu de 1 57	0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ol Yard/swit Light loce Maint./ins	0 0 PERATI tching o(s). spect.car	51. Caboo	1. Yes #2 / Equip. Code N/A hat apply)	Crew? 2. No 53. Was Equi Attended 1. Yes	ipment C ? 2. No   N   57a Rem	lode 54	4. Train Nu N/2	N/A mber/Symbol A omotive?				
Fatal     0       Nonfatal     N/A       52. Type of Equipment     1. Freig       Consist (single entry)     2. Pass       3. Corr     3. Corr       55. Speed (recorded speed, if avail       R - Recorded	ght train enger train muter train able) Co	4. Wo n 5. Sir n 6. Cu de 57	0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ol Yard/swit Light loco Maint./ins of Operatio	0 PERATI tching o(s). spect.car on (e z, Automa	51. Caboo	#2 / Equip. Code // A / Kapply) M.Special instruct	Crew? 2. No 53. Was Equi Attended 1. Yes ctions	ipment C ? 2. No $ $ N 57a. Rem 0 = Not a	ode 54	4. Train Nur N/A atrolled Loc	N/A mber/Symbol A omotive?				

DEPARTMEN FEDERAL RA	NT OF TR	ANSP ADMI	ORTAT NISTRA	TION TION	FRA FA	ACTUA	L RAILI	ROAD AC	CUI	DENT I	REPO	ORT	F	RA File #	<u>HQ-200</u>	<u>5-100</u>		
56. Trailing Tons (gross tonnage, excluding power units)					c. Auto train stop i. Time table/tr d. Cab j.Track warran e. Traffic k. Direct traffic				ain orders o. Positive train control t control p. Other ( <i>Specify in narrative</i> ) c control					2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter				
59 Drin cinel Con						f. Interlocking 1.Yard			N/A	N/A   1	N/A	A N/A N/A						
58. Principal Car	/Unit	a. Ii	nitial and	Number	iber b. Position in Train c			ded(yes/no) 59. If railroad employee(s) tes					ed for drug positive i	Drugs				
(1) First involved (derailed, stri	u uck, etc)		N/2	A	N/A			N/A	the appr	opriate	box.		N/A	N/A				
(2) Causing (if cause repo	f mechanic orted)	cal	N/2	A		N/A		N/A	V/A 60. Was this consist transporting passengers? (Y/N)						[)	N/A		
61. Locomotive U	Jnits	a. He E	ead and b. 1	Mid Manual	Train Rear End c. Remote d. Manual c. Remote			62. Cars Loaded Empty a. Freight b. Pass. c. Freight d. Pas							npty   d. Pass.	e. Caboose		
(1) Total in 7	Train	N/	'A	N/A	A N/A		N/A	(1) Total in	n Equipment Consist N/A N/A N/A						N/A	N/A		
(2) Total De	railed	N/	N/A N/z		N/A	N/A	N/A	(2) Total Derailed		ed		N/A	N/A	N/A	N/A	N/A		
63. Equipment Da This Consis	amage t	N/A	A	64. Tr	ack, Signal, Structure Da	Way, amage	N/A	65. Primar Code	65. Primary Cause Code N/A 66. Contributing Cause Code						iuse	N/A		
		Nu	umber of	Crew Me	w Members							Length of	Time on D					
67. Engineer/	ngineer/ 68. Firemen			69. Co	nductors	70. Br	rakemen	71. Engineer/Operator 72. Conductor						NT/A	Mi NYA			
	N/	N/A			N/A		N/A	76 507 5	Hrs	N/A	Mi	N/A		Hrs	N/A	MI N/A		
Casualties to:	73. Ra	ilroad E	mployee	s 74. Tra	in Passenge	rs 75. Ot	her	- 1 N	76. EOT Device? 77. Was EOT Device							Armed?		
Fatal		N/A			N/A		N/A	78 Cohoo		2. NO		N/A	1.	IN/A				
Nonfatal		N/A			N/A		N/A	_ /8. Caboo	1.	Cupied b Yes	y Crew	2. No				N/A		
				Rail Equipment Involved														
79. Type	ick Trailer	E D		LOthe	. M		Code	83. Equip	83. Equipment									
A. Auto D. Pic	ıcle	5.1rain (standing)     0.Light Loco(s) (moving)       1.Train(units pulling)     4.Car(s) (moving)     7.Light(s) (standing)									1							
B. Truck E. Var	narrative)	N/A 2.Train(units pushing) 5.Car(s) (standing) 8.Other (specify in narrative)									N/A							
80. Vehicle Spe	I N/A	84. Positio	o4. Pusition of Car Unit in Train N/A															
82. Position	ai impaci)	101ul 2.5	ouur 5.East	4. WEST	Code	85. Circun	85. Circumstance											
1.Stalled on	r Crossing	. N/A	1. Rail Ed	quipm	ent Struc	k High	way User											
4. Trapped							IN/A	2. Rail Ed	2. Kan Equipment Struck by Fighway User 86b. Was there a hazardous materials release by									
soa. was the highway user and/or rail equipment involved in the impact transporting hazardous materials?							Code	800. was t										
1. Highway Us		N/A	1. High	way U	User 2.	Rail E	quipment	3. Both	4. Neithe	r	N/A							
86c. State here the	e name and	quantity	y of the h	azardous	materials re	eleased, if	any.											
87 Type of 1	Gates		Wig Wa	nge	7 Cross	bucks 1	0 Flagged by	/ crew	88 S	ionaled (	rossin	o Warnino	Code	89 Whis	tle Ban	Code		
Crossing 2.Cantilever FLS 5.Hwy. traffic signals 8.Stop signs							1.Other (spe	c. in narr.)	(5	See instru	ctions j	for codes)	code	1. Ye	s	code		
Warning 3	Standard F	FLS 6	.Audible		9.Wate	hman 12	2.None											
Code(s)	N/A	N/A	N	/A	N/A	N/A	N/A na Warning	N/A	IV/A determined Code 02 Crossing I					AV Streat				
1. Both Sides Volume Vo							Highway S	ignals	cu	Code	92.0	Lights or Special Lights						
2. Side of Vehicle Approach							1. Yes No					1. Yes 2 No						
5. Opposite Side of Vehicle Approach					N/A	3	. Unknown	N/A 3. Unknown								N/A		
93. Driver's 94. Driver's Gender Code 95. Driver Drove Behind						Behind or	in Front of T	rain Code	in Code 96. Driver						on Crossin	Code		
Age     1. Male     and Struck or       N/A     2. Female     N/A						. No	n N/A	N/A         3. Did not Stop         5. Other (specify in narrative)							N/A			
97. Driver Passed	d Standing	C	ode 98	B. View o	f Track Obs	cured by	(primary of	struction)								Code		
Highway Veh	cture	e 3. Passing Train 5. Vegetation 7. Other (specify in narrative)									DT/A							
1. Yes         2. No         3. Unknown         IV/A         2. S           101. Casulties to Highway-Rail         1					iding Railro	ad Equipn	nent 4. Top	ography 6.	raphy 6. Highway Vehicle 8. Not obstructed						,	Code		
Crossing Users Kille				ed	Injured	1. Killed	1 2.Injured 3	. Uninjured	Uninjured   N/2			1. Yes 2. No				N/A		
N/A N/A 102. F							Highway Vehicle Property Damage 103. Total Number of Highway						Highway-	Rail Cross	ing Users			
104. Locomotive	Auxiliary I	.ights?				(est.	aottar dama Code	ge) 105. Locor	motiv	e Auxilia	ry Lioł	ts Operatio	nal?		N/A	Code		
1. Yes 2. No							N/A	1. Yes 2. No						N/A				
106. Locomotive	Headlight I	Ilumina	ted?				Code	Code 107. Locomotive Audible Warning Sounded?							Code			
1. Yes 2. No								1.	1. Yes 2. No							N/A		

108. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC., INVOLVED. HQ-2005-100 Sketch.jpg



109. SYNOPSIS OF THE ACCIDENT

Westbound coal Train Symbol CJRMHOH062A derailed 22 cars on November 5, 2005, at 10:10 p.m., Mountain Standard Time (MST). The accident occurred near Fort Morgan, Colorado, at milepost 463.4 on the BNSF Railway Company's (BNSF) Brush Subdivision, Powder River Division. The Brush Subdivision is utilized by BNSF to operate approximately 8 manifest, 2 Amtrak passenger trains, and 20 coal trains per day.

The train was operating on the main track at a recorded speed of 40 mph as it was passing over the east siding switch, when the train experienced an emergency application of the air brake system. It was discovered the 10th through 31st cars from the front of the train had derailed.

There were no injuries or release of hazardous material as a result of the accident. The weather at the time of the accident was clear and 34 °F. Reportable monetary damages are estimated at \$597,142. Toxicological testing was not conducted as the federal post-accident testing criteria was not met. The investigation indicates that the derailment was caused by a broken rail due to internal detail fractures.

## 110. NARRATIVE

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

Circumstances Prior to the Accident

The crew of Train Symbol CJRMHOH062 included a locomotive engineer and conductor. They first went on duty at 3:45 p.m. MST, November 5, 2005, at Sterling, Colorado. This was the home terminal for the conductor and Denver, Colorado, is the home terminal for the engineer. All crew members received more than the statutory off-duty period, prior to reporting for duty.

Their assigned freight consisted of 2 head end locomotives, 2 distributed power locomotives, 128 loaded coal cars, and 0 empty cars. It was 6,795 feet in length, and weighed 17,018 tons. Upon departing from Sterling, the train was scheduled to travel to Denver, Colorado. There were no required inspections or air brake tests performed on the train at Sterling. Train Symbol CJRMHOH062 departed Sterling at 5 p.m. MST. As the westbound train approached the accident area, the locomotive engineer was operating the train from

As the westbound train approached the accident area, the locomotive engineer was operating the train from the engineer's seat at the locomotive control stand of the lead locomotive, located on the north side of the locomotive. The conductor was positioned in the conductor's seat on the south side of the locomotive. The terrain on which the accident occurred is a tangent main line track, slightly elevated due to road bed being

built on a 0.2 percent ascending grade, with 136-lb continuous-welded rail (CWR). The ties are timber and the rail is secured to the ties with tie plates and cut spikes, and the rail is box anchored according to BNSF standards.

The railroad timetable direction was west. The geographical direction was west. Timetable directions are used throughout this report.

The Accident

The train was traveling at 40 mph recorded speed approaching the derailment site. The maximum authorized speed for coal trains in this area is 60 mph as designated in current BNSF Timetable No. 6. Speeds were recorded by the event recorder of controlling Locomotive No. BNSF 8821. The engineer indicated that at or near the point of derailment, he thought he ran over something. He stated that it felt like rocks had been placed on the rail and the train was running over them at the time of the derailment. Shortly after, the train went into an emergency train brake application. It was then discovered that the 10th through 31st head cars

## had derailed.

Analysis and Conclusions

Analysis

During the investigation, data was examined from a surrounding impact load detector and the previous hot box detector that the derailed train had passed. There were no indications prior to the derailment area to suggest that dragging equipment or damaged wheels contributed to the accident. A hot box detector located approximately 20 miles east and a wheel impact detector located approximately 32 miles west of the accident site did not reveal any condemnable wheels for this train. The wheel impact detector west of the accident site did not reveal any condemnable wheels for other trains.

The event recorder data from lead Locomotive No. BNSF 8821 did not indicate any signs of poor train handling. The data indicated that the train was traveling within the required speed limits, in throttle position No. 8, with no air brakes or dynamic brakes applied, at the time of the derailment.

BNSF's division chief engineer stated the track was last inspected by a hi-rail vehicle on

November 4, 2005, with no exception taken in this area. The last ultrasonic rail detection test through this area was on October 10, 2005, and the last geometry car survey was on

October 7, 2005. BNSF officials did not recall any defects noted in the immediate area during these inspections. The rail was also tested by a Herzog Detector Car on August 31, 2005, with no indications of a defect.

The BNSF conducted an inspection and analysis of a broken rail found at the derailment site at their Test Research and Development laboratory in Topeka, Kansas. The result of that test indicated the cause of the broken rail to be the result of two separate internal detail fractures. The detail fractures originated from subsurface shelling of the rail section. The final laboratory report has been forwarded to the Federal Railroad Administration (FRA) and is attached.

## Conclusion

The BNSF was in full compliance with their own, and all applicable Federal standards. BNSF laboratory analysis of the derailment concurred with field observations and determinations by BNSF and FRA investigators.

Probable Cause and Contributing Factors

The FRA determined the probable caused of this derailment to be T207, Broken Rail - Detail fracture from shelling or head check.