



***Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch***

***Accident Investigation Report
HQ-2014-1015***

***BNSF Railway Company (BNSF)
Casselton, ND
November 13, 2014***

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, 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.

TRAIN SUMMARY

1. Name of Railroad Operating Train #1 BNSF Railway Company	1a. Alphabetic Code BNSF	1b. Railroad Accident/Incident No. TC-1114-110
2. Name of Railroad Operating Train #2 BNSF Railway Company	2a. Alphabetic Code BNSF	2b. Railroad Accident/Incident No. TC-1114-110

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance BNSF Railway Company	1a. Alphabetic Code BNSF	1b. Railroad Accident/Incident No. TC-1114-110
2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident 11/13/2014	4. Time of Accident/Incident 5:35 PM
5. Type of Accident/Incident Derailment		
6. Cars Carrying HAZMAT 6	7. HAZMAT Cars Damaged/Derailed 1	8. Cars Releasing HAZMAT 0
	9. People Evacuated 0	10. Subdivision KO
11. Nearest City/Town Casselton	12. Milepost (to nearest tenth) 30.000	13. State Abbr. ND
	14. County CASS	
15. Temperature (F) 15 °F	16. Visibility Dusk	17. Weather Clear
	18. Type of Track Main	
19. Track Name/Number Main Track Two	20. FRA Track Class Freight Trains-60, Passenger Trains-80	21. Annual Track Density (gross tons in millions) 68.83
		22. Time Table Direction East

OPERATING TRAIN #1

1. Type of Equipment Consist: Freight Train		2. Was Equipment Attended? Yes		3. Train Number/Symbol H-PASBRC9-09A							
4. Speed (recorded speed, if available) R - Recorded 30 MPH E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 8649		6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter						
					Code 0						
6. Type of Territory Signalization: <u>Signaled</u> Method of Operation/Authority for Movement: <u>Signal Indication</u> Supplemental/Adjunct Codes: <u>Q</u>											
7. Principal Car/Unit (1) First Involved (derailed, struck, etc.)		a. Initial and Number TILX 220143	b. Position in Train 14	c. Loaded (yes/no) no	8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.						
					Alcohol 0						
					Drugs 0						
(2) Causing (if mechanical, cause reported)		NA	0	no	9. Was this consist transporting passengers? No						
10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)		a. Head End	Mid Train		Rear End	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded		Empty		
		b. Manual	c. Remote	d. Manual	e. Remote		a. Freight	b. Pass.	c. Freight	d. Pass.	e. Caboose
(1) Total in Train		2	0	0	0	0	(1) Total in Equipment Consist 61	0	24	0	0
(2) Total Derailed		0	0	0	0	0	(2) Total Derailed 17	0	1	0	0
12. Equipment Damage This Consist 939338			13. Track, Signal, Way & Structure Damage 300000								
14. Primary Cause Code T207 - Broken Rail - Detail fracture from shelling or head check											
15. Contributing Cause Code											
Number of Crew Members						Length of Time on Duty					
16. Engineers/Operators		17. Firemen		18. Conductors		19. Brakemen		20. Engineer/Operator		21. Conductor	
1		0		1		0		Hrs: 7 Mins: 55		Hrs: 7 Mins: 55	
Casualties to:		22. Railroad Employees		23. Train Passengers		24. Others		25. EOT Device?		26. Was EOT Device Properly Armed?	
Fatal		0		0		0		Yes		Yes	
Nonfatal		0		0		0		27. Caboose Occupied by Crew?		No	
28. Latitude 46.902892000				29. Longitude -97.259819000							

OPERATING TRAIN #2

1. Type of Equipment Consist: Freight Train				2. Was Equipment Attended? Yes		3. Train Number/Symbol U-CNCFYN4-11A					
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 4315		6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter					Code 0	
6. Type of Territory											
Signalization: <u>Signaled</u>											
Method of Operation/Authority for Movement: <u>Signal Indication</u>											
Supplemental/Adjunct Codes: <u>Q</u>											
7. Principal Car/Unit		a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	8. If railroad employee(s) tested for drug/ alcohol use, enter the number that were positive in the appropriate box.			Alcohol	Drugs		
(1) First Involved <i>(derailed, struck, etc.)</i>		BNSF 808285	3	yes				0	0		
(2) Causing <i>(if mechanical, cause reported)</i>		0	0	no	9. Was this consist transporting passengers?			No			
10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train		Rear End		11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded		Empty		
		b. Manual	c. Remote	d. Manual	e. Remote		a. Freight	b. Pass.	c. Freight	d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	0	(1) Total in Equipment Consist	1	0	100	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	1	0	11	0	0
12. Equipment Damage This Consist 480256			13. Track, Signal, Way & Structure Damage 0								
14. Primary Cause Code T207 - Broken Rail - Detail fracture from shelling or head check											
15. Contributing Cause Code											
Number of Crew Members					Length of Time on Duty						
16. Engineers/Operators	17. Firemen		18. Conductors		19. Brakemen	20. Engineer/Operator		21. Conductor			
1	0		1		0	Hrs: 2	Mins: 5	Hrs: 2	Mins: 5		
Casualties to:	22. Railroad Employees		23. Train Passengers		24. Others	25. EOT Device?		26. Was EOT Device Properly Armed?			
Fatal	0		0		0	Yes		Yes			
Nonfatal	0		0		0	27. Caboose Occupied by Crew?				No	
28. Latitude 46.902892000			29. Longitude -97.259819000								

CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved	
1. Type		5. Equipment	
2. Vehicle Speed (<i>est. mph at impact</i>)	3. Direction (<i>geographical</i>)	6. Position of Car Unit in Train	
4. Position of Involved Highway User		7. Circumstance	
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials?		8b. Was there a hazardous materials release by	
8c. State here the name and quantity of the hazardous material released, if any.			
9. Type of Crossing Warning 1. Gates 4. Wig wags 7. Crossbucks 10. Flagged by crew 2. Cantilever FLS 5. Hwy. traffic signals 8. Stop signs 11. Other (<i>spec. in narr.</i>) 3. Standard FLS 6. Audible 9. Watchman 12. None		10. Signaled Crossing Warning	11. Roadway Conditions
12. Location of Warning		13. Crossing Warning Interconnected with Highway Signals	14. Crossing Illuminated by Street Lights or Special Lights
15. Highway User's Age	16. Highway User's Gender	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train	18. Highway User
19. Driver Passed Standing Highway Vehicle		20. View of Track Obscured by (<i>primary obstruction</i>)	
Casualties to:	Killed	Injured	21. Driver was
23. Highway-Rail Crossing Users		24. Highway Vehicle Property Damage (<i>est. dollar damage</i>)	22. Was Driver in the Vehicle?
26. Locomotive Auxiliary Lights?		25. Total Number of Vehicle Occupants (<i>including driver</i>)	
28. Locomotive Headlight Illuminated?		27. Locomotive Auxiliary Lights Operational?	
		29. Locomotive Audible Warning Sounded?	

10. Signaled Crossing Warning

- 1 - Provided minimum 20-second warning
- 2 - Alleged warning time greater than 60 seconds
- 3 - Alleged warning time less than 20 seconds
- 4 - Alleged no warning
- 5 - Confirmed warning time greater than 60 seconds
- 6 - Confirmed warning time less than 20 seconds
- 7 - Confirmed no warning
- N/A - N/A

Explanation Code

- A - Insulated rail vehicle
- B - Storm/lightning damage
- C - Vandalism
- D - No power/batteries dead
- E - Devices down for repair
- F - Devices out of service
- G - Warning time greater than 60 seconds attributed to accident-involved train stopping short of the crossing, but within track circuit limits, while warning devices remain continuously active with no other in-motion train present
- H - Warning time greater than 60 seconds attributed to track circuit failure (e.g., insulated rail joint or rail bonding failure, track or ballast fouled)
- J - Warning time greater than 60 seconds attributed to other train/equipment within track circuit limits
- K - Warning time less than 20 seconds attributed to signals timing out before train's arrival at the crossing/island circuit
- L - Warning time less than 20 seconds attributed to train operating counter to track circuit design direction
- M - Warning time less than 20 seconds attributed to train speed in excess of track circuit's design speed
- N - Warning time less than 20 seconds attributed to signal system's failure to detect train approach
- O - Warning time less than 20 seconds attributed to violation of special train operating instructions
- P - No warning attributed to signal systems failure to detect the train
- R - Other cause(s). Explain in Narrative Description

SKETCHES

HQ-2014-17 Sketch

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #
HQ-2014-17

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

Delete Sketch

U-CNCFYN4-11

1. BNSF 808285
2. CTCX 717804
3. CTCX 717792
4. CTCX 717879
5. CTCX 717926
6. CTCX 717918
7. CTCX 716949
8. CTCX 717011
9. CTCX 717018
10. CTCX 716979
11. CTCX 717003
12. CTCX 717878

H-PASBRC9-09

12. TILX 220143
13. BNSF 761776
14. SRY 9197
15. SRY 9237
16. SRY 9066
17. SRY 9325
18. SRY 9043
19. TR 19394
20. TTZX 86916
21. TBOX 662712
22. BNSF 561132
23. TTZX 87223
24. BNSF 561357
25. TR 873965
26. TTZX 864176
27. CRLE 119531
28. TBOX 663543
29. TBOX 660227

NOT TO SCALE

SYNOPSIS

On Thursday, November 13, 2014, at 5:35 p.m., (CST), eastbound BNSF Railway (BNSF) freight train H-PASBRC9-09A, consisting of two head end locomotives, 85 freight cars (61 loads and 24 empties) derailed 18 cars (consist positions 12 through 29) while traveling on Main Track Number Two (2), at a recorded speed of 30 mph. The derailment occurred approximately 25 miles west of Fargo, North Dakota (ND) at milepost 30.0 on the BNSF's KO Subdivision, of the Twin Cities Division just west of the town of Casselton. The derailment occurred near the head end of the train resulting in one of the cars, the 12th railcar (TILX 220143), which was in consist position 12, derailling in the foul of Main Track Number One (1).

Westbound BNSF Empty Crude Oil Train U-CNCFYN4-11A consisting of two head end locomotives and 101 cars collided, at a recorded speed of 3 mph, with the derailed rail car fouling Main Track 1 and derailed the head 12 cars in their train behind the two locomotives (consist positions three through 14). After the collision, no petroleum crude oil or hazardous materials were released from the 11 empty tank cars and 1 hazardous empty car from the H-PASBRC9-09A.

There was no evacuation and no civilian injuries were reported. There were no injuries to either of the two train crew's.

The railroad damages reported were; \$1,419,594 for equipment damages and \$300,000 for track, signal, way and structure damages for a total reported damages of \$1,719,594. This is an Amtrak route and this was not a PTC preventable accident.

At the time of the accident it was dusk and clear, with a light northwest wind. The temperature was 15° F.

The Federal Railroad Administration's (FRA) investigation determined the probable cause of the accident was due to a broken rail - FRA Accident/Incident code T207 (Detail Fracture from shelling or head check).

NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT:

BNSF Train H-PASBRC9-09A

The crew of eastbound BNSF Railway (BNSF) Train H-PASBRC9-09A went on duty at 9:40 a.m., CST, on November 13, 2014, at BNSF's Minot General Office Building (GOB), in Minot, North Dakota. The two-man crew consisted of an engineer and a conductor. This was the home terminal of the Conductor and the Engineer. All crew members had received more than the statutory off-duty period prior to reporting for duty. After collecting the necessary paperwork, the crew boarded their train out in front of BNSF's GOB. Their assigned freight train consisted of two head-end locomotives, 61 loaded cars, and 24 empty cars (85 total cars). It was 5,862 feet in length, and had 8,649 trailing tons. The crew was assigned to operate the train from Minot to Dilworth, Minnesota, a distance of approximately 203 miles. The train had received a Federal Railroad Administration (FRA) Class 1 air brake test-initial terminal inspection at Havre, Montana, on November 12, 2014.

Upon boarding their train the crew was debriefed by the inbound crew. The in-bound crew said they had experienced no en route handling problems with the train. After relieving the inbound crew and assuming control of the train they departed Minot on signal indications. As the eastbound train approached the accident area, the Engineer was seated at the controls on the south side of the leading locomotive and the Conductor was seated on the north side in the conductor's chair.

BNSF Train U-CNCFYN4-11A

The crew of westbound BNSF empty petroleum crude oil Train U-CNCFYN4-11A included a locomotive engineer and a conductor. They went on duty at 3:30 p.m., CST, November 13, 2014, at the Dilworth Yard Office in Dilworth, Minnesota. This was the away-from-home terminal of the Conductor and the Engineer and both crew members had received more than the statutory off-duty period prior to reporting for duty. Their assigned freight train consisted of two head-end locomotives, one loaded car, and 100 empty cars (100 empty petroleum crude oil cars with buffer car on the head-end). It was 6,136 feet in length and had 4,315 trailing tons. The train was scheduled to travel 201 miles from Dilworth to Mandan, North Dakota, with this crew. The crew reviewed their paperwork, job briefed, safety briefed, waited for another crew, then boarded a van out to their train at Milepost (MP) 27 on Main Track 1. Once the crew arrived at their train they verified the air slip and that FRA's Class 1 air brake test-initial terminal inspection had been completed and verified the locomotive daily inspection cards were completed. They departed MP 27 at restricted speed with the instructions that they were to meet an eastbound train before leaving the KO Subdivision and traversing on to the Jamestown Subdivision.

As the westbound 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 in the conductor's chair.

BNSF's KO Subdivision is multiple main track territory (Main Tracks 1 and 2); signaled for train movement on either track in either direction. The method of operation in the area of the accident/incident is by signal indications of a traffic control system (TCS) controlled by a BNSF dispatcher located in Fort Worth, Texas. Per BNSF's Twin Cities Division Timetable Number 5, dated August 22, 2012, in the area of the accident/incident the maximum authorized timetable speed is 60 mph, with a permanent 40 mph head-end restriction between MP 27 and MP 28.

The track in the vicinity of the accident site is predominantly composed of rail sections of 132-pound continuous welded rail (CWR). The rail is fastened to conventional wood cross ties through double-shouldered tie plates with one anchor and one rail spike on each side of the rail. Approaching from the west the track is tangent and the average grade is .1-percent descending on the 1-mile of track prior to accident/incident site. The derailment of BNSF Train H-PASBRC9-09 occurred on Main Track 2 with that CWR rail being laid in 1984. The portion of rail that was discovered to be defective was the north rail of Main Track 2.

The railroad timetable direction for Train H-PASBRC9-09A was east and the empty crude oil train was west. The geographic direction was east for the H train and west for the empty crude oil unit train. Timetable directions are used throughout this report.

THE ACCIDENT/INCIDENT:

BNSF Train H-PASBRC9-09A

As the train approached the derailment site traveling eastward at a recorded speed of 30 mph, the Engineer and the Conductor did not observe any problems with the track or feel any rough track conditions in the locomotive cab while traveling through the derailment site. The maximum authorized speed for mixed freight trains at the derailment location is 60 mph, as designated in the current BNSF Twin Cities Timetable Number 5, dated August 22, 2012. The Engineer and the Conductor stated they felt a tug, as the train experienced an undesired emergency brake application. The train crew called out the emergency via the radio. The Conductor got a ride back to inspect the train and decided it was not safe to stay back there so he returned to the head-end.

The investigation revealed that the lead locomotives and the first 11 railcars traversed through the derailment site and remained on the track. The twelfth through the twenty-ninth car behind the locomotives were derailed in accordion style and had fouled Main Track 1 and derailed westbound Train U-CNCFYN4-11A.

BNSF TRAIN U-CNCFYN4-11A

As the train approached the derailment site traveling at a recorded speed of 3 mph, the Engineer and the Conductor did not observe any problems with the track or feel any rough track conditions in the locomotive cab while traveling through the derailment site or see anything wrong with passing Train H-PASBRC9-09A. The Engineer and the Conductor stated they were moving slowly and waiting for the train to clear KO Junction when they heard the passing train call via radio that their train was in emergency. The crew suddenly felt a tug on their train and then noticed that they had experienced an undesired emergency brake application.

The Conductor walked back to inspect his train and noticed the head 11 cars behind the lead locomotives were all derailed and leaning towards the north.

POST ACCIDENT INVESTIGATION:

On November 13, 2014, the Federal Railroad Administration (FRA) began an investigation of this accident/incident. FRA's Region 8 management assigned a Railroad Safety Specialist (Chief Inspector) as Investigator/Inspector-in-charge (IIC) of this investigation. They had an Operating Practices inspector, Hazardous Material inspector, Motive Power and Equipment inspector, Track Inspector, Signal Inspector, and a Track Integrity specialist to assist the IIC.

The following analysis and conclusions as well as any possible contributing factors and the probable cause in this report represent the findings of FRA's investigation.

ANALYSIS AND CONCLUSIONS:

Analysis- FRA Post-Accident Toxicological Testing:

The accident/incident met the criteria for FRA Post-Accident Toxicology Testing, as required under Title 49 Code of Federal Regulations Part 219, Subpart C.

Conclusion: Both crews were blood and urine-tested at Sanford Medical Center in Fargo, North Dakota. Test results were negative for all crew members of both trains.

Analysis- Crew Fatigue:

FRA obtained fatigue related information, including a 10-day work history, for the members of each train crew.

Conclusion:

Upon analysis of that information FRA concluded that fatigue was not probable for any of the employees.

Upon analysis of that information FRA concluded that fatigue was not probable for any of the employees.

Analysis- Locomotive Event Recorder:

Downloads of the Locomotive Event Recorder from the leading locomotive of Train H-PASBRC909A and the lead locomotive of Train U-CNCFYN4-11A were obtained and analyzed by FRA.

Conclusion:

FRA's analysis of the locomotive event recorder downloads concurred with BNSF's analysis. The speed of the H-PASBRC9-09A when an undesired emergency brake was initiated and the ensuing derailment occurred was 30 mph. The speed of Train U-CNCFYN4-11A was reviewed from the lead locomotive was at 3 mph. FRA's analysis noted that both train crews properly handled their train.

Analysis - Rail Detector Car:

FRA obtained rail detector data for MP 29-31 of Main Track 2 from Herzog HRZ134.

Conclusion: After examination, FRA was able to determine that there were four defects found and all four were re-mediated and/or protected at this location, prior to the accident/incident. These defects were unrelated to the accident/incident.

PROBABLE CAUSE:

FRA's post-accident investigation determined the probable cause of the accident was due to a broken rail - FRA Accident/Incident code T207 (Detail Fracture from shelling or head check).