



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

***Accident Investigation Report  
HQ-2013-03***

***BNSF Railroad Company (BNSF)  
Crawford, NE  
February 7, 2013***

***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. PR0213101
2. Name of Railroad Operating Train #2 BNSF Railway Company	2a. Alphabetic Code BNSF	2b. Railroad Accident/Incident No. PR0213101

**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. PR0213101
2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident 2/7/2013	4. Time of Accident/Incident 9:22 AM
5. Type of Accident/Incident Rear End Collision		
6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT
		9. People Evacuated
		10. Subdivision Powder River
11. Nearest City/Town Crawford	12. Milepost (to nearest tenth) 416.2	13. State Abbr. NE
		14. County DAWES
15. Temperature (F) 40 °F	16. Visibility Day	17. Weather Clear
		18. Type of Track Main
19. Track Name/Number Main Track No 1	20. FRA Track Class Freight Trains-40, Passenger Trains-60	21. Annual Track Density (gross tons in millions) 38.12
		22. Time Table Direction West

## OPERATING TRAIN #1

1. Type of Equipment Consist: Light Loco(s)				2. Was Equipment Attended? Yes		3. Train Number/Symbol KCWFCWF207				
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 15 MPH		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: N/A Method of Operation/Authority for Movement: N/A Supplemental/Adjunct Codes: Q, N/A										
7. Principal Car/Unit (1) First Involved (derailed, struck, etc.)		a. Initial and Number BNSF5993	b. Position in Train 1		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 0	Drugs 0
(2) Causing (if mechanical, cause reported)		0	0				9. Was this consist transporting passengers? No			
10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)										
11. Cars (Include EMU, DMU, and Cab Car Locomotives.)										
12. Equipment Damage This Consist 50000										
13. Track, Signal, Way & Structure Damage 0										
14. Primary Cause Code H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.										
15. Contributing Cause Code										
Number of Crew Members					Length of Time on Duty					
16. Engineers/Operators 1		17. Firemen 0		18. Conductors 0		19. Brakemen 0		20. Engineer/Operator Hrs: 6 Mins: 22		21. Conductor Hrs: 0 Mins: 0
Casualties to:		22. Railroad Employees		23. Train Passengers		24. Others		25. EOT Device? Yes		26. Was EOT Device Properly Armed? Yes
Fatal		0		0		0				
Nonfatal		0		0		0				N/A
27. Caboose Occupied by Crew?										
28. Latitude					29. Longitude					

# FRA FACTUAL RAILROAD ACCIDENT REPORT

## OPERATING TRAIN #2

1. Type of Equipment Consist: Freight Train			2. Was Equipment Attended? Yes		3. Train Number/Symbol ELRTETM004	
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 3389		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	
0 MPH					Code 0	

6. Type of Territory

Signalization:  
N/A

Method of Operation/Authority for Movement:  
N/A

Supplemental/Adjunct Codes:  
Q, N/A

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>		BNSF9959	138			0	0
(2) Causing <i>(if mechanical, cause reported)</i>		0	0		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		e. Caboose
	b. Manual	c. Remote	d. Manual	e. Remote	a. Freight		b. Pass.	c. Freight	d. Pass.		
(1) Total in Train	2	0	0	0	1	(1) Total in Equipment Consist	0	0	135	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	0	0	0

12. Equipment Damage This Consist 54000		13. Track, Signal, Way & Structure Damage 0	
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14. Primary Cause Code  
H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

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: 4	Mins: 12	Hrs: 4	Mins: 12
Casualties to:		22. Railroad Employees	23. Train Passengers	25. EOT Device?		26. Was EOT Device Properly Armed?	
Fatal		0	0	Yes		No	
Nonfatal		0	0	27. Caboose Occupied by Crew?			
				N/A			

28. Latitude	29. Longitude
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## 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? N/A		8b. Was there a hazardous materials release by N/A	
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 N/A		10. Signaled Crossing Warning	11. Roadway Conditions N/A
12. Location of Warning N/A		13. Crossing Warning Interconnected with Highway Signals N/A	14. Crossing Illuminated by Street Lights or Special Lights N/A
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	0	0	22. Was Driver in the Vehicle?
24. Highway Vehicle Property Damage ( <i>est. dollar damage</i> )	25. Total Number of Vehicle Occupants ( <i>including driver</i> )		
26. Locomotive Auxiliary Lights? N/A		27. Locomotive Auxiliary Lights Operational? N/A	
28. Locomotive Headlight Illuminated? N/A		29. Locomotive Audible Warning Sounded? N/A	

**SYNOPSIS**

On Thursday, February 7, 2013, at 9:22 a.m., MST, a westbound BNSF Railway Company (BNSF) helper set, operating under Train Symbol K-CWFCWF2-07 (Train 1), struck the rear end of a BNSF empty coal train operating under Train Symbol E-LRTETM0-04 (Train 2). The rear end collision occurred approximately six miles east of Crawford, Nebraska at approximately mile post (MP) 416.2 on Main Track No. 1 on the BNSF Powder River Division, Butte Subdivision. Train 1, consisting of two locomotives, collided with the distributive power unit (DPU) of Train 2. As a result of the collision, the lead locomotive of the striking train, as well as the DPU and four rear cars of Train 2 were damaged. There was no equipment derailed and there was no release of hazardous materials as a result of the collision. The damages to locomotives totaled \$100,000, and equipment damages were \$4,000. Total FRA reportable damages were \$104,000.

There were no injuries as a result of the collision.

At the time of the accident, it was daylight and the weather was clear. The temperature was 40° F.

**Probable Cause and Contributing Factors:**

The Federal Railroad Administration's investigation (FRA) determined the probable cause of the accident was Cause Code H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

**NARRATIVE**

Circumstances Prior to the Accident

Striking Train Symbol BNSF Train K-CWFCWF2-07 (Train 1)

The helper crew of Train 1 consisted of one locomotive engineer. The engineer went on duty at 3 a.m., MST, on February 7, 2013, in Crawford, NE, which is the home terminal for the employee. His assignment was to help trains over the Crawford Hill. Prior to being called to work, the engineer was off duty for 17 hours and 10 minutes; this is more than the required statutory off-duty rest period. His assigned manifest consisted of two locomotives. A Locomotive Daily Inspection had been completed in Alliance, NE on February 6, 2013, at 8 a.m., MST, by BNSF mechanical personnel. According to the interview, the engineer aboard Train 1 performed a locomotive air brake test at approximately MP 410, then started down the hill. The engineer didn't take any exceptions to the way the locomotives handled prior to the accident. While proceeding down the hill, he received a restricted signal at the intermediate grade signal at MP 414.9 at a recorded speed of 14 miles per hour (mph). The locomotive event recorder download revealed the speed of Train 1 increased from 14 mph to 20 mph after passing the signal requiring restricted speed. The engineer stated that he looked down the track and it looked clear. He then looked down at his General Track Bulletins to verify the flag position on an upcoming Form B. The General Track Bulletin issued to Train 1 revealed that the location of the Track Bulletin Form B was 6.5 miles from the point of impact. At approximately MP 416.0, Train 1 came around the 3-degree curve, with a sight distance of approximately 720 feet on a 1.3-percent descending grade, at a recorded speed of 20 mph. As he approached the accident site, the engineer was seated at the controls of the leading locomotive on the north side with the locomotive in dynamic brake. His trip was uneventful prior to the collision. No communication was noted on the audio playback between Trains 1 and 2 prior to the incident.

On the BNSF Powder River Division, Butte Subdivision, the method of operation is a Traffic Control System (TCS) double main track. The maximum authorized speed from MP 414.1 to MP 418.8 is 25 mph, as designated in the current Powder River Division Timetable No. 10, dated May 18, 2011. A Track Bulletin Form B was in effect from 9:30 a.m. until 2:30 p.m., from MP 422.7 to MP 422.9.

In the area where the collision occurred, there is a 3-degree, right-hand curve at approximately MP 416.0 with a sight distance of approximately 720 feet and a 1.3-percent descending grade. All signals in the vicinity are visible with no vegetation obstruction.

The railroad timetable and geographic direction is west and timetable direction is used throughout this report.

Train Symbol E-LRTETM0-04 (Train 2)

The crew of Train 2 consisted of an engineer and a conductor. They were called for duty in Alliance, NE at 5:10 a.m. for train symbol E-LRTETM0-04. Both crew members received more than the statutory off-duty period for rest prior to reporting for duty. Their assignment was to take the empty coal train from Alliance, NE to Edgemont, SD.

Their assigned train consisted of two lead locomotives, 135 empty coal cars and a distributive power unit (DPU) on the rear. The train was 7,388 feet long with 3,389 trailing tons. The engineer was seated at the controls of the locomotive on the north side of the lead locomotive and the conductor was seated on the south side of the lead locomotive.

According to the interviews, aside from some initial terminal delay in Alliance, the crew on Train 2 felt that they were having an average trip. It took them 4 hours and 12 minutes to get to the location where the accident took place. All signals were working properly and the weather wasn't a factor when they went down the hill. At the time of the accident, they were stopped waiting for the local to finish working on main track 1 and to meet another train. Their trip was uneventful until the collision.

The Accident

Train 1

At 9:22 A.M., Train 1, traveling at a recorded speed of 15 mph, struck the DPU of Train 2 at MP 416.2, near Crawford, Nebraska. According to the interviews, the engineer of Train 1 was coming around the corner when he looked up and saw the DPU of Train 2. The locomotive event recorder download indicated that he initiated the emergency air brake application at a recorded speed of 20 mph. After initiating the emergency brake application, Train 1 traveled 80 feet before impacting the rear of Train 2 at a recorded speed of 15 mph. The locomotive event recorder download from the DPU of Train 2 indicated that Train 2 was shoved 11 feet after impact. The locomotive event recorder download from the lead unit of Train 1 revealed that the locomotive consist traveled 48 feet after impact.

There were no injuries as a result of the collision.

Train Symbol E-LRTETM0-04 (Train 2)

According to interviews, after feeling the impact of the collision, the crew on Train 2 noticed that the train went into emergency and they had an alarm on the DPU. The crew then looked back to the rear of the train and saw a black cloud. The conductor immediately broadcast emergency over the radio and dialed 911. The crew was notified of the incident by the engineer on the striking train via the radio. There were no injuries as a result of the collision.

Analysis and Conclusions

Analysis - FRA Post-Accident Toxicological Testing: Post-Accident Forensic Toxicology Reports indicate the engineer of Train 1 had negative test results.

Conclusion: Intoxication was not a factor.

Analysis - Fatigue Analysis: FRA uses an overall effectiveness rate of 77.5 percent as the baseline for fatigue analysis, which is equivalent to a blood alcohol content (BAC) of 0.05. At or above this baseline, we do not consider fatigue as probable for any employee. Software sleep settings vary according to information obtained from each employee. If an employee does not provide sleep information, FRA uses the default software settings.

FRA obtained fatigue related information, including a 10-day work history, for the 3 employees involved in this accident, including the engineer on Train 1 and both crew members assigned to Train 2.

Conclusion: Upon analysis of that information, FRA concluded fatigue was not probable for the locomotive engineer assigned to Train 1 or for either of the train crew members assigned to Train 2.

Analysis- Locomotive Engineer Operating Performance: The lead locomotive of Train 1 was equipped with a speed indicator and event recorder as required. The recorder data was downloaded and analyzed by FRA and BNSF officials.

Conclusion: The locomotive engineer was not in compliance with applicable railroad operating and train handling requirements. The engineer was unable to stop within half the range of vision after passing a signal requiring movement at restricted speed as required by General Code of Operating Rules Rule 9.11 Movement from Signal Requiring Restricted Speed.

Analysis-Operational Testing: The test results for 2012 for the engineer of Train 1 were provided to the FRA. The engineer was stop tested on six occasions with no exceptions.

Conclusion: The BNSF had properly monitored their employees in the field and inadequate operational testing was not an issue.

Analysis-Interviews: The engineer on Train 1 and both the engineer and conductor on Train 2 were interviewed after the accident by the FRA.

Conclusion: The engineer of Train 1 stated that he felt the primary cause of the accident was lack of focus. The engineer of Train 1 was not in compliance with applicable

Conclusion: The engineer of Train 1 stated that he felt the primary cause of the accident was lack of focus. The engineer of Train 1 was not in compliance with applicable operating and train handling requirements. The engineer and conductor on Train 2 were stopped at the time of the impact and were in compliance with all applicable operating and train handling requirements.

Analysis-Inspection of Train Braking Systems: All locomotives involved in the accident had the air brakes checked after the accident and no air brake defects were noted.

Conclusion: The locomotive air brake system on Train 1 worked properly and was not a factor in the collision.

Analysis - Signal Tests/ Inspections Performed and Results: Signal inspection of the last two signal aspects were reviewed by FRA and BNSF. A brief synopsis was provided by BNSF for each intermediate signal.

#### 413.2 Intermediate

09:02:57 Train 2 signal at 413.2 intermediate westbound green  
09:02:58 Train 2 goes by 413.2 intermediate westbound  
09:08:37 helper unit gets on east track of the 413.2 intermediate  
09:13:18 Train 2 gets west of 414.9 intermediate  
09:13:22 413.2 intermediate goes to yellow  
09:13:57 Train 1 goes by 413.2 westbound with a yellow

#### 414.9 Intermediate

09:02:09 Train 2 on east track of 414.9  
09:07:57 Train 2 goes by 414.9 intermediate westbound with a flashing yellow  
(Train 2 occupies west track at 414.9 the remainder of the time until after collision.)  
(414.9 intermediate westbound is red entire time until collision)  
09:13:04 Train 1 goes by 413.3 intermediate and is in 414.9 east track  
09:19:48 Train 1 goes completely by 414.9 intermediate with a westbound red signal. 414.9 east track comes up Train 2.

Conclusion: The FRA concurred with the BNSF that the signal system was working properly and was not a causal factor in the accident.

Overall Conclusion: The railroad was in compliance with BNSF and FRA standards. The signal system and the train's air brake system functioned properly. The data reviewed from the event recorder and from the interview process revealed that the engineer of Train 1 was not in compliance with applicable railroad operating and train handling requirements. It was determined that the engineer was not attentive to his job-related duties pertaining to the requirements of restricted speed.

#### Applicable Rules and Regulations:

##### General Code of Operating Rules

##### 9.11 Movement from Signal Requiring Restricted Speed

When a train passes a signal requiring movement at restricted speed, the train must move at restricted speed until its leading wheels have passed the next governing signal. When leaving block system limits, trains operating on the main track must move at restricted speed for two miles or until leading wheels pass the opposing derailment signal.

##### 6.27 Movement at Restricted Speed

When required to move at restricted speed, movement must be made at a speed that allows stopping within half the range of vision short of:

- Train.
  - Engine.
  - Railroad car.
  - Men or equipment fouling the track.
  - Stop signal.
- or
- Derail or switch lined improperly.

When a train or engine is required to move at restricted speed, the crew must keep a lookout for broken rail and not exceed 20 MPH. Comply with these requirements until the leading wheels reach a point where movement at restricted speed is no longer required.

#### Probable Cause and Contributing Factors:

The Federal Railroad Administration's investigation determined the probable cause of the accident was Cause Code H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.