



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

***Accident Investigation Report  
HQ-2013-30***

***BNSF Railway Company (BNSF)  
Keithville, LA  
December 30, 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. GC1213121
2. Name of Railroad Operating Train #2 Union Pacific Railroad Company	2a. Alphabetic Code UP	2b. Railroad Accident/Incident No. 1213LV016

**GENERAL INFORMATION**

1. Name of Railroad or Other Entity Responsible for Track Maintenance Union Pacific Railroad Company	1a. Alphabetic Code UP	1b. Railroad Accident/Incident No. 1213LV016
2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident 12/30/2013	4. Time of Accident/Incident 6:28 AM
5. Type of Accident/Incident Head On Collision		
6. Cars Carrying HAZMAT 0	7. HAZMAT Cars Damaged/Derailed 0	8. Cars Releasing HAZMAT 0
		9. People Evacuated 0
10. Subdivision Lufkin		
11. Nearest City/Town KEITHVILLE, LA	12. Milepost (to nearest tenth) 218.5	13. State Abbr. LA
		14. County CADDO
15. Temperature (F) 38 °F	16. Visibility Dawn	17. Weather Cloudy
18. Type of Track Siding		
19. Track Name/Number Siding	20. FRA Track Class Freight Trains-40, Passenger Trains-60	21. Annual Track Density (gross tons in millions) 18.44
		22. Time Table Direction North



## OPERATING TRAIN #2

1. Type of Equipment Consist: Freight Train				2. Was Equipment Attended? Yes		3. Train Number/Symbol MPBSR 30							
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code E	5. Trailing Tons (gross excluding power units) 6901		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>N/A</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>		CSXT 5348	1	no			0	0					
(2) Causing <i>(if mechanical, cause reported)</i>		CSXT 5348	1	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		3	0	0	0	0	(1) Total in Equipment Consist 38	0	54	0	0		
(2) Total Derailed		3	0	0	0	0	(2) Total Derailed 1	0	0	0	0		
12. Equipment Damage This Consist 608774			13. Track, Signal, Way & Structure Damage 74184										
14. Primary Cause Code H702 - Switch improperly lined													
15. Contributing Cause Code H799 - Use of switches, other (Provide detailed description in narrative)													
Number of Crew Members				Length of Time on Duty									
16. Engineers/Operators	17. Firemen	18. Conductors		19. Brakemen		20. Engineer/Operator			21. Conductor				
2	0	1		0		Hrs: 3	Mins: 48		Hrs: 3	Mins: 48			
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 32.000000000			29. Longitude -94.000000000										

**CROSSING INFORMATION**

<b>Highway User Involved</b>				<b>Rail Equipment Involved</b>			
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 N/A	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train N/A			18. Highway User N/A	
19. Driver Passed Standing Highway Vehicle N/A		20. View of Track Obscured by ( <i>primary obstruction</i> ) N/A					
Casualties to:		Killed	Injured	21. Driver was N/A		22. Was Driver in the Vehicle? N/A	
23. Highway-Rail Crossing Users 0		0	24. Highway Vehicle Property Damage ( <i>est. dollar damage</i> ) 0			25. Total Number of Vehicle Occupants ( <i>including driver</i> ) 0	
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			

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

**SYNOPSIS**

Synopsis

On December 30, 2013, at 6:28 a.m., CST, a southbound Union Pacific (UP) freight train, MPBSR 30, traveling at a recorded 28 miles per hour, collided head-on with a standing northbound BNSF Railway (BNSF) freight train, E-MLMNAMO-16A. The collision occurred at Milepost (MP) 218.5 on UP's Houston Service Unit, Lufkin Subdivision, in the town of Keithville, Louisiana.

There were no fatalities, minor injuries to the BNSF student engineer, no injuries to the UP train crew, no hazardous materials released, and no evacuation. The collision resulted in the damage and derailment of 2 locomotives and 11 cars on BNSF and 3 locomotives and 1 car on UP. The estimated monetary damage to mechanical equipment, signal system, and track structure was \$1,945,961.00.

At the time of the incident, the weather was dawn, cloudy, and a temperature of 38 degrees Fahrenheit.

The head-on collision was caused by a human factors event resulting in a switch improperly positioned and is listed in the FRA Factual Railroad Accident Report as Accident Cause Code H702, "Switch improperly lined." With northbound BNSF Train E-MLMNAMO-16A occupying the siding and southbound UP Train MPBSR 30 approaching, the Conductor of BNSF's train operated the switch at MP 218.5 and changed it from the normal position for mainline movement to the reverse position causing the collision with his standing train.

The FRA investigation determined the conductor of BNSF E-MLMNAMO-16A had lost his situational awareness, i.e. from the results of his fatigue analysis and interview statements, creating potential impairment that could have affected his judgment and the proper use of switches. This contributing cause is listed in the FRA report as Contributing Cause Code H799, "Use of switches, other".

**NARRATIVE**

Narrative

Circumstances Prior to the Accident

Crew - BNSF Train E-MLMNAMO-16A: One locomotive engineer, one conductor, and one student engineer. They went on duty at 10:00 p.m., CST, on December 29, 2013, in Longview, Texas, and were transported to Martin Lake Junction to receive their train. Prior to reporting for duty, each crew member received more than the statutory off-duty period.

Crew - UP Train MPBSR 30: One locomotive engineer, one conductor, and one student engineer. They went on duty at 2:40 a.m., CST, on December 30, 2013, at the Riverfront Yard in Bossier City, Louisiana. Prior to reporting for duty, each crew member received more than the statutory off-duty period.

Consist - BNSF Train E-MLMNAMO-16A: Two locomotives on the head-end and two distributed power units (DPU) on the rear of the train with 0 loads and 124 empties. The train was 6,572 feet long and weighed 2,978 tons. An extended haul Class 1 brake test was made at Martin Lake Junction, Texas, prior to departure. There were no changes in route.

Consist - UP Train MPBSR 30: Three locomotives with 38 loads and 54 empties of mixed freight. The train was 5,783 feet long and weighed 6,901 tons. The train received an extended haul Class 1 brake test by UP's Car Department at Pine Bluff, Arkansas. There were no changes in route.

Southbound UP Train MPBSR 30 with CSXT 5348 in the lead and controlling position received the required equipment inspections and testing prior to departing the terminal at Riverfront Yard. Traveling on the main track under track warrant authority they departed at 5:45 a.m., CST. The Engineer was at the controls of the locomotive, the Conductor was seated on the east side of the compartment in the front seat and the Student Engineer on the east side of the compartment in the rear seat. Since BNSF Train E-MLMNAMO-16A was not occupying the main track at Keithville, Louisiana, the crew of UP Train MPBSR 30 was not made aware of their presence. As the train approached Keithville at 48 mph, the Engineer observed the reflection of his headlight from the windshield of the train sitting on the siding. Upon seeing the switch stand target indicating the switch was in the reverse position and would cause his train to strike the standing train in a head-on collision, he placed the train into an emergency brake application and yelled at his crew telling them of the danger.

Northbound BNSF Train E-MLMNAMO-16A with BNSF 9735 in the lead and controlling position received the required equipment inspections and testing prior to departing Martin Lake Junction. Traveling under track warrant authority they entered the siding at Keithville, placing their train clear of the main track. The Engineer remained at the controls of the locomotive, the Student Engineer who became ill shortly before the incident was in the trailing locomotive resting and the Conductor was in a carry-all near the hand-throw switch at Milepost 218.5. Waiting for southbound UP Train MPBSR 30 to pass their location, the Conductor dozed off and after about one hour woke after hearing his Engineer on the radio. Shortly afterwards he heard an approaching train at the nearby wayside scanner and positioned the switch from mainline movement to the siding. The repositioning of the switch was normally a past practice when northbound BNSF trains were located on the mainline. As the train neared his location he realized that the switch was in the wrong position with insufficient time to correct and that the approaching train would strike his train sitting in the siding in a head-on collision. He then yelled at the carryall driver of the impending accident.

The track alignment and grade approaching the accident site between MP 219.6 to 218.5, is straight, but undulating, varying from 1.06-percent descending to 0.90-percent descending with 0.10-percent descending at the accident location.

Both trains were operating in an Automatic Block Signal (ABS) System on a single, main track. The signal system consists of color-light type signals controlled by electronic track circuits and hand-throw switches, with movements directed by a dispatcher located in Spring, Texas. The method of operation is by traffic warrant control. The maximum authorized speed is 70 mph for freight trains. This is not an Amtrak route. The progression of signal aspects displayed from Stop to Proceed is: Red to Flashing Red, to Yellow to Flashing Yellow, to Flashing Yellow to Green.

The railroad timetable direction of UP Train MPBSR 30 was south and the railroad timetable direction of BNSF Train E-MLMNAMO-16A was north. Timetable directions are used throughout this report.

The Accident

Prior to impact, the crew members of UP Train MPBSR 30 prepared for the collision with the Engineer in his seat and the Conductor and Student Engineer bracing themselves on the floor near the rear locomotive cab door. The Conductor of BNSF Train E-MLMNAMO-16A ran past the carryall to avoid being struck, the Engineer exited out the back door of the locomotive cab and the Student Engineer was resting in the trailing locomotive and unaware of the impending accident. Following the emergency brake application of UP Train MPBSR 30, train speed was reduced as recorded in the lead locomotive from 48 mph to 28 mph at impact with the point-of-derailment at MP 218.5. The maximum authorized speed for UP Train MPBSR 30 was 50 mph.

BNSF Train E-MLMNAMO-16A: When the movement stopped, the Engineer returned to the cab of the locomotive and immediately initiated a 911 call to UP's dispatcher. After the initial contact he then went to the trailing locomotive searching for the Student Engineer finding him alert and conscious with a gash on his head. He then searched and shortly afterwards found his Conductor who was uninjured, but wide-eyed and very distraught.

UP Train MPBSR 30: When the movement stopped, the Engineer immediately initiated a 911 call to UP's dispatcher. While shaken all crew members were alert and uninjured. The Engineer having initially heard over the radio that BNSF's Conductor was missing exited the locomotive and assisted in the search.

Keithville emergency services and law enforcement personnel quickly responded and railroad personnel were dispatched to the accident site to provide assistance to their employees and investigate the cause of the incident.

There were no fatalities, minor injuries to BNSF's Student Engineer who was treated and released, no injuries to UP's train crew, with no hazardous materials released and no evacuation. The collision resulted in the damage and derailment of two locomotives and 11 cars on BNSF and three locomotives and 1 car on UP.

Analysis and Conclusions

Analysis - Toxicological Testing

This accident met the criteria for Title 49 Code of Federal Regulations (CFR) Part 219, Subpart C, Post-Accident Toxicological Testing. The Engineer, Conductor, and Student Engineer for BNSF Train E-MLMNAMO-16A were tested under Federal Railroad Administration (FRA) guidelines for the use of alcohol and drugs. The Engineer, Conductor, and Student Engineer for UP Train MPBSR 30 were tested under company authority for reasonable cause. The results were negative for all crew members of both trains.

Conclusion: Drug or alcohol use was not a factor in this collision.

Analysis - Fatigue Analysis

FRA uses an overall effectiveness rate of 77.5 percent as the baseline for fatigue analysis, which is equivalent to blood alcohol content 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, from all employees involved in this accident.

Conclusion:

BNSF E-MLMNAMO-16A Fatigue was probable for the three employees

BNSF E-MLMNAMO-16A Fatigue was probable for the three employees  
UP MPBSR 30 Fatigue was not probable for the three employees

#### Analysis - Train Crew Performance

UP Train MPBSR 30: Investigative interviews with the train crew and review of the event recorder data for Lead Locomotive CSXT 5348, found the Locomotive Engineer's actions to be consistent with safe and proper train handling procedures.

BNSF Train E-MLMNAMO-16A: Investigative interviews with the train crew found the Conductor's actions to be inconsistent with safe practices and requirements and FRA 49 CFR Part 218, Subpart F and companion railroad operating rule, General Code of Operating Rules 8.2, "Position of Switches."

Conclusion: The actions of BNSF Train E-MLMNAMO-16A's Conductor contributed to the cause of the accident.

#### Analysis – Motive, Power and Equipment (MP&E)

FRA's MP&E and UP's Mechanical Department personnel inspected records and performed field investigations of locomotives and cars for any contributing factors.

Conclusion: No issues were found.

#### Analysis – Track Structure

FRA's Track and UP's Maintenance-of-Way personnel inspected records and performed field investigations of the track structure for any contributing factors.

Conclusion: No issues were found.

#### Analysis – Signal System

FRA's Signal and Train Control and UP's Signal Department personnel inspected records and performed field investigations of the ABS System for any contributing factors.

Conclusion: No issues were found.

#### Overall Conclusion

#### Probable Cause and Contributing Factors

The head-on collision was caused by a human factors event resulting in a switch improperly positioned and is listed in the FRA Factual Railroad Accident Report as Accident Cause Code H702, "Switch improperly lined." With northbound BNSF Train E-MLMNAMO-16A occupying the siding and southbound UP Train MPBSR 30 approaching, the Conductor of BNSF's train operated the switch at MP 218.5 and changed it from the normal position for mainline movement to the reverse position causing the collision with his standing train.

The FRA investigation determined the conductor of BNSF E-MLMNAMO-16A had lost his situational awareness, i.e. from the results of his fatigue analysis and interview statements, creating potential impairment that could have affected his judgment and the proper use of switches. This contributing cause is listed in the FRA report as Contributing Cause Code H799, "Use of switches, other".