



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

***Accident Investigation Report
HQ-2013-17***

***Union Pacific (UP)
Hays, KS
July 16, 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 Union Pacific Railroad Company	1a. Alphabetic Code UP	1b. Railroad Accident/Incident No. 0713DV008
2. Name of Railroad Operating Train #2 Union Pacific Railroad Company	2a. Alphabetic Code UP	2b. Railroad Accident/Incident No. 0713DV008
3. Name of Railroad Operating Train #3 Union Pacific Railroad Company	3a. Alphabetic Code UP	3b. Railroad Accident/Incident No. 0713DV008

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. 0713DV008	
2. U.S. DOT Grade Crossing Identification Number		3. Date of Accident/Incident 7/16/2013	4. Time of Accident/Incident 1:17 AM	
5. Type of Accident/Incident Other Impacts				
6. Cars Carrying HAZMAT 35	7. HAZMAT Cars Damaged/Derailed 5	8. Cars Releasing HAZMAT 0	9. People Evacuated 20	10. Subdivision Sharon Springs Sub
11. Nearest City/Town Hays		12. Milepost (to nearest tenth) 288.9	13. State Abbr. KS	14. County ELLIS
15. Temperature (F) 70 °F	16. Visibility Dark	17. Weather Clear		18. Type of Track Yard
19. Track Name/Number 740		20. FRA Track Class Freight Trains-25, Passenger Trains-30		21. Annual Track Density (gross tons in millions) 26.2
				22. Time Table Direction West

OPERATING TRAIN #1

1. Type of Equipment Consist: Freight Train				2. Was Equipment Attended? No		3. Train Number/Symbol LDG89-15					
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 2301		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>Not Signaled</u> Method of Operation/Authority for Movement: <u>Other Than Main Track</u> Supplemental/Adjunct Codes: <u>L, Z</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 (derailed, struck, etc.)		FCTX787	19	no							
(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.)	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	15	0	12	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	6	0	0
12. Equipment Damage This Consist 143072			13. Track, Signal, Way & Structure Damage 0								
14. Primary Cause Code H702 - Switch improperly lined											
15. Contributing Cause Code H406 - Train orders, track warrants, direct traffic control, track bulletins, written, error in preparation, transmission or delivery											
Number of Crew Members						Length of Time on Duty					
16. Engineers/Operators		17. Firemen		18. Conductors		19. Brakemen		20. Engineer/Operator		21. Conductor	
0		0		0		0		Hrs: 0 Mins: 0		Hrs: 0 Mins: 0	
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 39.000000000				29. Longitude -99.000000000							

OPERATING TRAIN #2

1. Type of Equipment Consist: Cut of Cars				2. Was Equipment Attended? No		3. Train Number/Symbol								
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code E	5. Trailing Tons (gross excluding power units)		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>Not Signaled</u> Method of Operation/Authority for Movement: <u>Other Than Main Track</u> Supplemental/Adjunct Codes: <u>L, Z</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>		ATW496696	1	no										
(2) Causing <i>(if mechanical, cause reported)</i>		0	0		9. Was this consist transporting passengers?		N/A							
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		0	0	0	0	0	(1) Total in Equipment Consist		3	0	7	0	0	
(2) Total Derailed		0	0	0	0	0	(2) Total Derailed		0	0	6	0	0	
12. Equipment Damage This Consist 359796			13. Track, Signal, Way & Structure Damage 0											
14. Primary Cause Code H702 - Switch improperly lined														
15. Contributing Cause Code H406 - Train orders, track warrants, direct traffic control, track bulletins, written, error in preparation, transmission or delivery														
Number of Crew Members						Length of Time on Duty								
16. Engineers/Operators		17. Firemen		18. Conductors		19. Brakemen		20. Engineer/Operator				21. Conductor		
0		0		0		0		Hrs: 0 Mins: 0		Hrs: 0 Mins: 0				
Casualties to:		22. Railroad Employees		23. Train Passengers		24. Others		25. EOT Device?				26. Was EOT Device Properly Armed?		
Fatal		0		0		0		No				N/A		
Nonfatal		0		0		0		27. Caboose Occupied by Crew?				N/A		
28. Latitude 39.000000000				29. Longitude -99.000000000										

OPERATING TRAIN #3

1. Type of Equipment Consist: Freight Train		2. Was Equipment Attended? Yes		3. Train Number/Symbol MSIDV-15	
4. Speed (recorded speed, if available) R - Recorded E - Estimated		Code E	5. Trailing Tons (gross excluding power units) 6597		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
40 MPH					Code 0
6. Type of Territory Signalization: <u>Not Signaled</u> Method of Operation/Authority for Movement: <u>Other Than Main Track</u> Supplemental/Adjunct Codes: <u>L, Z</u>					
7. Principal Car/Unit (1) First Involved (derailed, struck, etc.)		a. Initial and Number UP7276	b. Position in Train 1	8. If railroad employee(s) tested for drug/ alcohol use, enter the number that were positive in the appropriate box.	
(2) Causing (if mechanical, cause reported)		0	0	Alcohol 0	
				Drugs 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
		b. Manual	c. Remote	d. Manual	e. Remote
(1) Total in Train		3	0	0	0
(2) Total Derailed		3	0	0	0
				11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	
				(1) Total in Equipment Consist	
				(2) Total Derailed	
				a. Freight	b. Pass.
				c. Freight	d. Pass.
				e. Caboose	
				51	0
				28	0
				0	0
				9	0
				1	0
				0	0
12. Equipment Damage This Consist 4284950		13. Track, Signal, Way & Structure Damage 111620			
14. Primary Cause Code H702 - Switch improperly lined					
15. Contributing Cause Code H406 - Train orders, track warrants, direct traffic control, track bulletins, written, error in preparation, transmission or delivery					
Number of Crew Members			Length of Time on Duty		
16. Engineers/Operators 1	17. Firemen 0	18. Conductors 1	19. Brakemen 1	20. Engineer/Operator Hrs: 9 Mins: 7	
Casualties to:		22. Railroad Employees	23. Train Passengers	21. Conductor Hrs: 9 Mins: 7	
Fatal	0	0	0	25. EOT Device? Yes	
Nonfatal	3	0	0	26. Was EOT Device Properly Armed? Yes	
				27. Caboose Occupied by Crew? No	
28. Latitude 39.000000000		29. Longitude -99.000000000			

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 July 16, 2013, at 1:17 a.m. Central Daylight Time (CDT), a westbound Union Pacific (UP) mixed-freight train operating under train symbol MSIDV-15 (Train 2) and traveling at an estimated speed of 40 miles per hour (mph) (with three locomotives, 51 loads, 28 empties, 6,597 tons and 4,809 feet) struck Car No. ATW 496696 and nine other secured cars (Train 3). The collision occurred at approximately mile post (MP) 288.9 in the house track (Track No. 740) on the Sharon Springs Subdivision in Hays, Kansas. As a result of the collision, the three locomotives of the striking train and 22 rail cars were damaged. Train 2 received a total of \$4,284,950 in damages. While to standing equipment and track received \$502,868 and \$111,620 in damages respectively.. Total FRA reportable damages was from this accident \$4,899,438.

As a result of the collision, the conductor and conductor trainee on Train 2 received medical treatment for bruises and possible contusions. The engineer on Train 2 received medical treatment for broken ribs.

At the time of the accident, it was night and the weather was clear. The temperature was 70 °F.

The Federal Railroad Administration's (FRA) investigation determined the probable cause of this accident was the failure of the brakeman on the LDG89-15 (Train 1) to properly restore the main track hand-operated switch at MP288.67 for main track to main track movement. The brakeman lined the pass track switch for movement into the house track instead of lining the main track switch for main to main movement. Contributing to the accident was the failure of the brakeman to go to the opposite side of the main track after lining the main track switch and not returning to the switch stand until movement was complete. The overall probability of the brakeman inadvertently throwing the wrong switch would have been reduced if the brakeman had gone to the opposite side of the main track switch because he would have had to cross three tracks to get to the house/pass track switch versus one track to get to the main track switch. Based upon the fatigue analysis in this report, there is potential for fatigue being considered as a contributing factor in this accident .

H-702 Switch improperly lined

H-406 Train orders, track warrants, direct traffic control, track bulletins, written, error in preparation, transmission or delivery

NARRATIVE

Circumstances Prior to the Accident

Train Symbol UP Train LDG 89-15 (Train 1)

The local crew on July 16, 2013 of Train 1 consisted of one locomotive engineer, one conductor, and one brakeman. The crew went on duty at 1 p.m. CDT on July 16, 2013 in Salina, KS, which is the home terminal for all three employees. The crew's assignment was to set out and pick up cars for Union Pacific customers from Salina, KS to Hays, KS. Prior to being called to work, the engineer was off duty for 72 hours, received about nine hours of sleep the night before, and took about a one hour nap at 11:30 a.m. The conductor was off duty for 80 hours and received about 9 1/2 hours of sleep the night before. The brakeman was off duty for 25 hours and received about nine hours of sleep the night before. All three employees received more than the required statutory off-duty rest. According to the interview, the crew aboard Train 1 pulled up to the east switch at Hays with two locomotives and 27 cars. After having a job briefing, the brakeman climbed off the power and lined the switch and derail into the pass track. The brakeman remained at the switch on the south side of the train and the engineer pulled the 27 cars down to the Vine Street crossing. The conductor got off at the crossing and told the engineer to pull forward to clear the derail. The brakeman stopped the movement when they cleared the derail at the east end. Based on the position of the switches and the interviews, it was determined that after stopping Train 1, the brakeman inadvertently lined the pass track switch for movement into the house track instead of lining the main track switch for main to main movement. The switch between the pass track (Track No. 141) and the house track (Track No. 740) was found lined and locked for movement into the house track, which was opposite of the position of the crew's movement when they pulled into the pass track. The main track was left improperly lined for movement into the house track versus normal position for main to main movement and the lock was found in the hasp and unlocked. The brakeman informed the conductor via the radio, that the main track switch and the pass track derail were restored. The conductor separated the train between the 15th and 16th cars, which left 12 secured cars east of Vine Street in the pass track. The engineer pulled the remainder of the train across the Vine Street crossing and secured the remaining 15 cars and two locomotives in the pass track. The conductor talked to the engineer and released the track warrant to the dispatcher. According to the interview with the dispatcher, the conductor on Train 1 called the dispatcher via telephone to release the track warrant. The dispatcher stated that he had a briefing with the conductor which included the status of all main track switches operated. He confirmed that a briefing had been conducted between the engineer and the conductor before allowing the conductor to report clear of Track Warrant No. 5465. The conductor said the train was clear of the main track and all utilized switches had been returned to normal at 12:45 a.m. Once Train 1 released Track Warrant No. 5465, the dispatcher issued Train 2 a new track warrant from MP 269 to Collyer, which is west of Hays Siding at 12:49 a.m. After securing the train in the pass track, the crew on Train 1 tied up at 1:08 a.m. and 1:15 a.m., for a total of 12 hours and 8 minutes on duty and 12 hours and 15 minutes on duty.

On the UP Sharon Springs Subdivision from MP 263.2 to MP 290.8, the method of operation is Track Warrant Control (TWC). The maximum authorized speed on the UP Sharon Springs Subdivision from MP 237.8 to MP 305.4 is 49 mph as designated by General Order No. 7 (dated August 22, 2012). The crews were governed by the General Code of Operating Rules (sixth edition) effective April 7, 2010 with updates added July 2, 2013. At the time of the accident, the current timetable was UPRR Timetable No. 4 effective October 25, 2010.

In the area where the collision occurred, it is approximately 885 feet from the main track switch to where the rolling equipment was located at the point of impact in the house track. The main track switch is approximately 200 feet from the pass/house track switch.

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

Train Symbol MSIDV-15 (Train 2)

The crew of Train 2 consisted of an engineer, a conductor and a student conductor. The crew went on duty at 4:10 p.m. CDT on July 16, 2013 in Salina, KS, which is the home terminal for all three employees. The crew's assignment was to take Train 2 from Salina, KS to Denver, CO. Prior to being called to work, the engineer was off-duty for 24 hours and received about 8 1/2 hours of sleep the night before. The conductor was off-duty for 18 hours, 10 minutes and received about 10 hours of sleep the night before. The conductor-in-training was off-duty for 56 hours, 12 minutes and received about 10 1/2 hours of sleep the night before. All three crew members received more than the statutory off-duty period prior to reporting for duty.

Their assigned train consisted of three locomotives (UP7276, UP 6536, and UP6707), 28 empties, and 51 loads. The train was 4,809 feet long with 6,597 trailing tons.

According to the interviews, the crew had 2 hours and 40 minutes of initial terminal delay in Salina due to maintenance-of-way personnel on the track. They departed Salina at 6:50 p.m. and followed the crew on Train 1 the entire way to Hays, KS. All three crew members were located in the lead locomotive. The engineer was seated at the controls of the locomotive on the north side of the leading locomotive, the conductor-in-training was seated on the south side of the leading locomotive and the conductor was seated in the middle of the locomotive. The last radio communication the crew remembered was the crew of Train 1 talking to each other at Russell (MP 263) when they (Train 2) were at Dole (MP 250). Their trip was uneventful until the collision.

ATW 496696(Train 3)

Cut of cars that included three loads and seven empties. Six empty cars derailed at impact.

The Accident

Striking Train Symbol UP Train MSIDV-15 (Train 2)

At 1:17 a.m., Train 2, traveling at an estimated speed of 40 mph, struck the east car in the house track at MP 288.9, in Hays, KS. According to interviews, while proceeding into Hays, the crew indicated that they called out the distant signal for Hays Siding, located at MP 289, which was clear. They saw a red target ahead, but thought it was on another track. During the reenactment, it was determined that the first point of visibility for the switch targets is at MP 288.36 with an estimated sight distance of 1,813 feet from the main track switch. By the time they realized it was the main track switch that had a red target, they were on top of the switch and the engineer initiated an emergency brake application. After initiating the emergency brake application, Train 2 traveled approximately 795 feet into the house track before impacting Car No. ATW 496696 at an estimated speed of 40 mph. Prior to the impact, the engineer was sitting with his back to the engineer's seat and his feet were under the control stand. The conductor-in-training stood up with his back to the conductor's seat with his feet down and his arms out. The conductor was in the middle seat. The crew recalled that at 16 line of impact the train jerked. The car hit went 15 to 20 feet in the air and felt three jolts. When movement stopped, the crew realized they were upside down and saw debris and fire outside. The conductor-in-training was the first to exit the locomotive through a 2 foot by 2 foot opening. At 1:20 a.m., the other two crew members exited the locomotive through the conductor's windshield. An emergency call to the dispatcher was made at 1:22 a.m. advising 16 dispatcher of the collision. Shortly after exiting the locomotive, they heard sirens and saw the responders. An emergency responder told them to walk to a command post, where they were later transported by a railroad representative to the clinic in Hays for post-accident toxicological tests. No communication was noted between Train 1 and Train 2 prior to the incident on the audio playback.

As a result of the collision, the conductor and conductor-in-training on Train 2 received medical treatment for bruises and possible contusions. The engineer on Train 2 received medical treatment for broken ribs.

Train Symbol LDG 89-15 (Train 1)

According to interviews, upon tie up, the crew went to Burger King and arrived at the hotel around 1:40 a.m. Between 2:00 and 2:15 a.m., the conductor received a call from the corridor manager to call the Salina Manager of Operating Practices (MOP). The conductor waited until 11:30 a.m. for someone to show up. The crew was not subject to post-accident toxicological testing due to their hours of service having expired and the fact that the collision occurred after they had gone off-duty.

Analysis and Conclusions

Analysis - FRA Post-Accident Toxicological Testing: Post-accident forensic toxicology reports indicate that all crew members of Train 2 had negative test results.

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Conclusion: Intoxication was not a factor in the accident/incident.

Analysis - Fatigue: FRA obtained fatigue-related information for the 10-day period preceding this accident, including the 10-day work history (on-duty/off-duty cycles) for five of the six employees involved. This included the engineer, the conductor, and the brakeman assigned to Train 1 as well as the engineer and the conductor assigned to Train 2. An analysis of the conductor-in-training on Train 2 was not completed. Three of the employees reported typical call times of 2 hours and one of those also reported a commute of 2 ½ hours. The software settings were adjusted to accommodate the extended call time and unusual commute time.

In addition, the crew of Train 1 was officially off duty at the time of the collision. Therefore, the analysis for that crew was based on the portion of the incident they were directly involved in; The lining of the switches. The time reflected in the graphs was established on the release of Track Warrant No. 5465 at 12:45 a.m., on July 16th. However, the analysis for the engineer and the conductor of Train 2 was based on the time of the collision at 1:17 a.m. An analysis was not completed for the conductor-in-training on Train 2.

Conclusion: FRA concluded fatigue was not probable for three of the employees: the engineer and the conductor assigned to Train 1 and the engineer assigned to Train 2. It also concluded that fatigue was probable for the conductor assigned to Train 2, but the fatigue would not be considered a contributing factor to the accident/incident. As for the brakeman on Train 1, it was concluded that fatigue was probable and it may have contributed to the cause of the accident/incident.

Analysis - Locomotive Engineer Operating Performance: The lead locomotive of Train 2 was equipped with a speed indicator and event recorder as required by law. The event recorder data was reviewed by FRA and the National Transportation Safety Board (NTSB).

Conclusion: The locomotive engineer was in compliance with all applicable railroad operating and train handling requirements.

Analysis - Operations Testing: The 2013 test results for the crew on Train 1 were provided to FRA. According to the operational testing records, the brakeman had been observed 75 times. The brakeman had complied with the rules appropriately 74 times and had to be "coached" by a supervisor once. On two occasions in the past seven years, the brakeman on Train 1 was found responsible for incidents involving a switch improperly lined.

Conclusion: The UP had properly monitored their employees in the field and inadequate operating testing was not an issue in this accident/incident.

Analysis - Interviews: The three crew members on Train 1 and the three crew members on Train 2 were interviewed after the accident by FRA and the NTSB Accident Team.

Conclusion: When asked in the NTSB interviews what type of switch he lined, the brakeman replied, "a high stand," but made arm movements for throwing a low stand. The main track switch is a high stand switch and the house/pass track switch is a low stand (the same type of switch that the brakeman simulated operating with his arms). When asked what style of target the main track switch was equipped with the brakeman replied, "just a red target without green." The main track switch (high stand switch) is equipped with a target that displays red and green and the house/pass track switch (low stand switch) has a target that matches what the brakeman described as a red target without green. On two occasions, the brakeman referenced the low stand switch when providing answers in the interview process, thus giving the indication that he inadvertently operated the house/pass track switch (low stand switch), instead of the main track switch (high stand switch). When asked if he went to the opposite side of the main track after lining the switch, he replied that he remained on the south side of the train. The switch between the pass track and the house track was left lined and locked for movement into the house track, opposite of the position of the crew's movement when they pulled in. The main track switch was left improperly lined for the pass and house tracks versus normal position for main track to main track movement and the lock was found in the hasp, unlocked. The brakeman inadvertently lined the pass track switch for movement into the house track instead of lining the main track switch for main track to main track movement. The brakeman was not in compliance with the applicable parts of Title 49 Code of Federal Regulations (CFR) and UP General Code of Operating Rules (GCOR). A number of inconsistencies were found between the brakeman's interview and the interview of the other two crew members.

Analysis - Inspection of Train Braking Systems: On July 17, 2013, FRA inspected the remaining cars (69 cars) from Train 2 that were not damaged in the collision. The 69 cars were taken from the derailment site and were placed at a siding approximately 15 miles east in Gorman, Kansas. The UP provided a crew with two locomotives for the inspection and a full Class I initial terminal air brake test was performed on the 69 cars. The air brake system on Train 2 worked properly.

Conclusion: The air brake system on Train 2 was not a factor in the collision.

Overall Conclusion: The railroad was in compliance with UP and FRA standards. The locomotive air brake system on Train 2 worked properly and was not a factor in the collision. Based on the results of the interview process and the position of the switches, it was determined that the brakeman failed to properly line the main track switch located at MP 288.67 and therefore was not in compliance with applicable requirements stated in 49 CFR Section 218.105 and UP GCOR Rule 8.3.

Probable Cause and Contributing Factors

FRA's investigation determined the probable cause of this accident was the failure of the brakeman on the LDG89-15 to properly restore the main track hand-operated switch at MP 288.67 for main track to main track movement. The brakeman lined the pass track switch for movement into the house track instead of lining the main track switch for main track to main track movement. Contributing to the accident was the failure of the brakeman to go to the opposite side of the main track after lining the main track switch and not returning to the switch stand until movement was complete. The overall probability of the brakeman inadvertently throwing the wrong switch would have been reduced if the brakeman had gone to the opposite side of the main track switch because he would have had to cross three tracks to get to the house/pass track switch instead of one track to get to the main track switch. Based upon the fatigue analysis in this report, there is potential for fatigue being considered as a contributing factor in this accident. H-702 Switch improperly lined
H-406 Train orders, track warrants, direct traffic control, track bulletins, written, error in preparation, transmission or delivery