Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-52

Union Pacific
Helper, UT
September 25, 2007

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-52

1.Name of Railroad Operating Train #1: Union Pacific RR Co. [UP]	1a. Alphabetic Code: UP	1b. Railroad Accident/Incident No.: 09070V028
2.Name of Railroad Operating Train #2: Utah Rwy Co. [UTAH]	2a. Alphabetic Code: UTAH	2b. Railroad Accident/Incident No.: A42007
3.Name of Railroad Operating Train #3: N/A	3a. Alphabetic Code: N/A	3b. Railroad Accident/Incident No.: N/A
4.Name of Railroad Responsible for Track Maintenance: Union Pacific RR Co. [UP]	4a. Alphabetic Code: UP	4b. Railroad Accident/Incident No.: 09070V028
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 09 | Day 25 | Year 2007	7. Time of Accident/Incident: 08:55: ☑ AM ☐ PM

8. Type of Accident/Indicent *(single entry in code box)*: 1. Derailment; 2. Head on collision; 3. Rear end collision; 4. Side collision; 5. Raking collision; 6. Broken Train collision; 7. Hwy-rail crossing; 8. RR grade crossing; 9. Obstruction; 10. Explosion-detonation; 11. Fire/violent rupture; 12. Other impacts; 13. Other *(describe in narrative)* — Code: 01

9. Cars Carrying HAZMAT	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
0	N/A	N/A	0	Denver

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
Helper	634.0	N/A	UT	CARBON

18. Temperature (F) *(specify if minus)*	19. Visibility *(single entry)* 1. Dawn 2. Day 3.Dusk 4.Dark — Code	20. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow — Code	21. Type of Track 1. Main 2. Yard 3. Siding 4. Industry — Code
52 F	2	1	1

22. Track Name/Number	23. FRA Track Class (1-9, X) — Code	24. Annual Track Density *(gross tons in millions)*	25. Time Table Direction 1. North 2. South 3. East 4. West — Code
Main Track 1 and 2	3	20	4

OPERATING TRAIN #1

26. Type of Equipment Consist *(single entry)* 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/switching 8. Light loco(s). 9. Maint./inspect.car A. Spec. MoW Equip. — Code	27. Was Equipment Attended? 1. Yes 2. No — Code	28. Train Number/Symbol
1	1	CSVPH 24

29. Speed *(recorded speed, if available)* — Code: R - Recorded; E - Estimated 12 MPH | E

30. Trailing Tons *(gross tonnage, excluding power units)*: 15087

31. Method(s) of Operation *(enter code(s) that apply)*: a. ATCS; b. Auto train control; c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; g. Automatic block; h. Current of traffic; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; m.Special instructions; n. Other than main track; o. Positive train control; p. Other *(Specify in narrative)*

Code(s): e | N/A | N/A | N/A | N/A

31a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter: 0

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	NRLX700450	74	yes
(2) Causing *(if mechanical cause reported)*	0	0	N/A

33. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
N/A	N/A

34. Was this consist transporting passengers? (Y/N): N

35. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	3	3	0	0	1
(2) Total Derailed	0	0	0	0	0

36. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	107	0	0	0	0
(2) Total Derailed	7	0	0	0	0

37. Equipment Damage — This Consist: $266,385.00

38. Track, Signal, Way, & Structure Damage: $60,087.00

39. Primary Cause Code: T222

40. Contributing Cause Code: N/A

Number of Crew Members

41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen
2	0	2	0

Length of Time on Duty

45. Engineer/Operator	46. Conductor
Hrs 2 Mi 15	Hrs 2 Mi 15

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	0	0	0

50. EOT Device? 1. Yes 2. No: 2

51. Was EOT Device Properly Armed? 1. Yes 2. No: N/A

52. Caboose Occupied by Crew? 1. Yes 2. No: N/A

OPERATING TRAIN #2

53. Type of Equipment Consist *(single entry)* 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/switching 8. Light loco(s). 9. Maint./inspect.car A. Spec. MoW Equip. — Code	54. Was Equipment Attended? 1. Yes 2. No — Code	55. Train Number/Symbol
1	1	CUSIP-25

56. Speed *(recorded speed, if available)* — Code: R - Recorded; E - Estimated 24 MPH | R

58. Method(s) of Operation *(enter code(s) that apply)*: a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track

58a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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57. Trailing Tons *(gross tonnage, excluding power units)*	c. Auto train stop d. Cab e. Traffic f. Interlocking	i. Time table/train orders j.Track warrant control k. Direct traffic control l.Yard limits	o. Positive train control p. Other *(Specify in narrative)* Code(s)	2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter
2173			e N/A N/A N/A N/A	0

59. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*	60. 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)*	IPPX 1066	30	no		N/A	N/A
(2) Causing *(if mechanical cause reported)*	0	0	N/A	61. Was this consist transporting passengers? (Y/N)		N

62. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	4	0	0	0	0	(1) Total in Equipment Consist	0	0	91	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	16	0	0

64. Equipment Damage This Consist	65. Track, Signal, Way, & Structure Damage	66. Primary Cause Code	67. Contributing Cause Code
$866,792.00	$0.00	T222	N/A

Number of Crew Members				Length of Time on Duty	
68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen	72. Engineer/Operator	73. Conductor
1	0	1	0	Hrs 2 Mi 30	Hrs 2 Mi 30

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	0	0	0
Nonfatal	0	0	0

77. EOT Device? 1. Yes 2. No	78. Was EOT Device Properly Armed? 1. Yes 2. No	79. Caboose Occupied by Crew? 1. Yes 2. No
1	1	N/A

OPERATING TRAIN #3

80. Type of Equipment Consist *(single entry)*	81. Was Equipment Attended?	Code	82. Train Number/Symbol
1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/switching 8. Light loco(s). 9. Maint./inspect.car A. Spec. MoW Equip. Code N/A	1. Yes 2. No	N/A	N/A

83. Speed *(recorded speed, if available)* Code R - Recorded E - Estimated N/A MPH N/A	85. Method(s) of Operation *(enter code(s) that apply)* a. ATCS b. Auto train control c. Auto train stop d. Cab e. Traffic f. Interlocking g. Automatic block h. Current of traffic i. Time table/train orders j.Track warrant control k. Direct traffic control l.Yard limits m.Special instructions n. Other than main track o. Positive train control p. Other *(Specify in narrative)* Code(s) N/A N/A N/A N/A N/A	85a. Remotely Controlled Locomotive? 0 = Not a remotely controlled 1 = Remote control portable 2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter N/A
84. Trailing Tons *(gross tonnage, excluding power units)* N/A		

86. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*	87. 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)*	N/A	N/A	N/A		N/A	N/A
(2) Causing *(if mechanical cause reported)*	N/A	N/A	N/A	88. Was this consist transporting passengers? (Y/N)		N/A

89. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	90. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	N/A	N/A	N/A	N/A	N/A	(1) Total in Equipment Consist	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A	(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

91. Equipment Damage This Consist	92. Track, Signal, Way, & Structure Damage	93. Primary Cause Code	94. Contributing Cause Code
N/A	N/A	N/A	N/A

Number of Crew Members				Length of Time on Duty	
95. Engineer/ Operators	96. Firemen	97. Conductors	98. Brakemen	99. Engineer/Operator	100. Conductor
N/A	N/A	N/A	N/A	Hrs N/A Mi N/A	Hrs N/A Mi N/A

Casualties to:	101. Railroad Employees	102. Train	103. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

104. EOT 1. Yes 2. No	105. Was EOT Device Properly 1. Yes 2. No	106. Caboose Occupied by Crew? 1. Yes 2. No
N/A	N/A	N/A

Highway User Involved

107. A. Auto B. Truck C. Truck-Trailer. D. Pick-Up Truck E. Van F. Bus G. School Bus H. Motorcycle J. Other Motor Vehicle K. Pedestrian M. Other *(spec. in narrative)*	Code
	N/A

108. Vehicle Speed *(est. MPH at impact)*	109. *geographical)* 1.North 2.South 3.East 4.West	Code
N/A		N/A

Rail Equipment Involved

111. Equipment 1.Train *(units pulling)* 2.Train *(units pushing)* 3.Train *(standing)* 4.Car(s) *(moving)* 5.Car(s) *(standing)* 6.Light Loco(s) *(moving)* 7.Light(s) *(standing)* 8.Other *(specify in narrative)*	Code
	N/A

112. Position of Car Unit in
N/A

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110. Position 1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	Code N/A	113. Circumstance 1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	Code N/A
114a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither	Code N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither	Code N/A
114c. State here the name and quantity of the hazardous materials released, if any. N/A			

115. Type Crossing Warning 1.Gates 2.Cantilever FLS 3.Standard FLS 4.Wig Wags 5.Hwy. traffic signals 6.Audible 7.Crossbucks 8.Stop signs 9.Watchman 10.Flagged by crew 11.Other *(spec. in narr.)* 12.None								116. Signaled Crossing *(See instructions for codes)*	Code N/A	117. Whistle 1. Yes 2. No 3. Unknown	Code N/A
Code(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A				

118. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach	Code N/A	119. Crossing Warning with Highway Signals 1. Yes 2. No 3. Unknown	Code N/A	120. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown	Code N/A

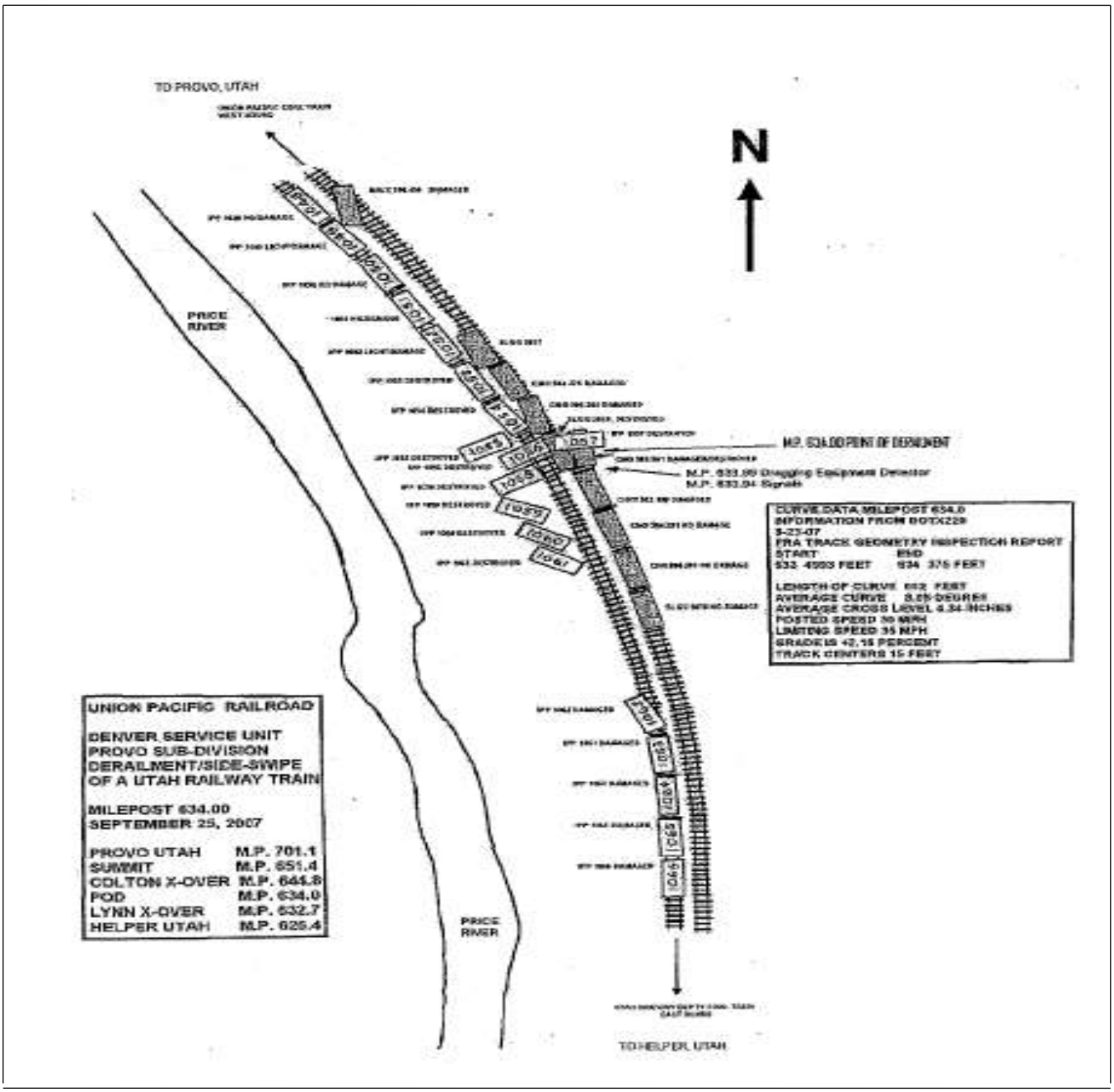
121. Age N/A	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	124. Driver 1. Drove around or thru the Gate 4. Stopped on Crossing 2. Stopped and then Proceeded 5. Other *(specify in narrative)* 3. Did not Stop	Code N/A

125. Driver Passed Highway Vehicle 1. Yes 2. No 3. Unknown	Code N/A	126. View of Track Obscured by *(primary obstruction)* 1. Permanent Structure 3. Passing Train 5. Vegetation 7. Other *(specify in narrative)* 2. Standing Railroad Equipment 4. Topography 6. Highway Vehicle 8. Not obstructed	Code N/A

Casualties to:	Killed	Injured	127. Driver 1. Killed 2.Injured 3. Uninjured	Code N/A	128. Was Driver in the Vehicle? 1. Yes 2. No	Code N/A
129. Highway-Rail Crossing Users	N/A	N/A	130. Highway Vehicle Property Damage *(est. dollar damage)*	N/A	131. Total Number of Highway-Rail Crossing Users *(include driver)*	N/A

132. Locomotive Auxiliary Lights? 1. Yes 2. No	Code N/A	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No	Code N/A
134. Locomotive Headlight Illuminated? 1. Yes 2. No	Code N/A	135. Locomotive Audible Warning Sounded? 1. Yes 2. No	Code N/A

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



137. SYNOPSIS OF THE ACCIDENT

On September 25, 2007, at 8:55 a.m. MDT, a westbound Union Pacific (UP) Railroad Unit Coal Train No. CSVPAH-24, consisting of seven locomotives and 107 loaded coal hopper cars and traveling at an estimated speed of 12 mph, derailed seven cars on Main Track No. 1 about eight miles west of Helper, Utah. The derailed cars then sideswiped a passing eastbound Utah Railway (UTAH) empty Unit Coal Train No. CIPUSJ -25, consisting of four locomotives and 91 empty coal cars, operating on Main Track No. 2 at a recorded speed of 24 mph, resulting in 16 derailed cars.

The derailment occurred at milepost 634.0 on the UP's Denver Service Unit, Provo Subdivision. Movements in this part of the railroad are under Centralized Traffic Control (CTC) by a dispatcher located in Omaha, Nebraska. This subdivision is found in the Salt Lake City Area Timetable # 2, effective October 29, 2000. The maximum authorized speed for passenger and freight trains on this segment of track is 30 mph, FRA Class 3 track.

There were no injuries resulting from the accident and no hazardous materials were involved.

The weather was clear and the temperature at the time of the accident was 52 degrees F.

UP estimates that the equipment damage is $266,385, tracks and signal damage are $60,087. Utah Railway estimates the total equipment damage is $866,792.

Post-accident drug testing was conducted and all six employees tested with negative test results.

The probable cause of the accident was an broken rail.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE INCIDENT

UP UNIT COAL TRAIN # CSVPAH-24 West (Train #1)

The crew of UP Unit Coal Train # CSVPAH-24 West (Train #1), two locomotive engineers and two conductors, reported for duty at 6:45 a.m. MDT at Helper, UT. For the engineer and conductor in the lead locomotive, this is the away from home terminal; for the crew of the mid-train helper locomotives, this was the home terminal. All crew members received more than the required statutorily off duty rest period. The train was scheduled to travel from Helper to Provo, UT; it consisted of seven locomotives, three on the head end, three mid-train locomotives and one rear-end locomotive, and 107 loaded coal hopper cars; trailing weight was 15,087 tons and was 6,088 feet long. A locomotive engineer and conductor were in the head-end locomotive and the other locomotive engineer and conductor were in the mid-helper locomotive. Both engineers were seated at the controls on the north side of their respective locomotives and the conductors were seated on the south side. After receiving an initial job briefing and following a train inspection and air brake test, the crew departed at 8:30 a.m. MDT for their trip en route to Provo, UT. The crew described the trip as normal and uneventful approaching the accident site.

UTAH EMPTY COAL TRAIN # CIPUSJ-25 (Train #2):

The crew of Utah Railway empty Unit Coal Train # CIPUSJ-25 (Train #2), a locomotive engineer and conductor, reported for duty at 6:30 a.m. MDT at Provo, UT. This is their home terminal and they received more than the required statutorily off duty rest period. Their train was scheduled to travel from Provo en route to Helper, UT; it consisted of four locomotives and 91 empty coal cars, was 4,914 feet long with 2,193 trailing tons. After receiving a job briefing and following a train inspection and initial terminal air brake test, the crew departed at 7:15 a.m. MDT. The locomotive engineer was seated at the controls on the south side of the locomotive, while the conductor was seated on the north. The crew described the trip as normal and uneventful approaching the accident site.

This segment of track where the derailment occurred is located in the Price Canyon area, about 8 miles west of Helper, Utah. From MP 633.0 to 635.0 there are 10 back-to-back curves from 1 to 8.5 degrees of curvature. The rail where the derailment occurred is a left-hand curve with a curvature of 8 degrees and 20 minutes, and the grade is 2.16 percent ascending from east to west, according to the Union Pacific's curve chart. This segment of track has two main lines with 15' track centers.

THE ACCIDENT

UP TRAIN CSVPAH-24 (Train #1):

At 8:55 a.m. MDT, the westbound UP Train CSVPAH-24, operating on Main Track # 1 at an estimated speed of 12 mph, approached the derailment site approximately eight miles west of Helper, UT. The crew said the train was running normally. They stated they had noticed the passing eastbound UTAH Train CIPUSJ-25 when they heard the dragging equipment detector report over the radio and suddenly experienced an undesired emergency train air brake application. The locomotive engineer called the dispatcher and reported what had happened. The dispatcher then called the UTAH train #2 to inquire about their train and was told they had also made an emergency stop. Once stopped, the conductor in the mid-train locomotive walked back to check the train and discovered that his train cars had sideswiped the passing train and was blocking both main tracks.

UTAH TRAIN CIPUSJ (Train # 2):

At the same time, eastbound UTAH train #2, operating on Main Track # 2 at a recorded speed of 24 mph, was passing the westbound UP train # 1. As the locomotive engineer observed the train at a point just behind the rear mid-train locomotives at milepost 634.0, he noticed the cars were passing over a broken rail, which he described in statements as being a gap of approximately 18-24 inches. He immediately attempted to alert the UP train # 1 crew by radio but his transmission was blocked by the dragging equipment detector that had gone off at the same time. Just after the radio message was given, the engineer reported his train experienced an undesired emergency application of the train air brakes. The conductor walked back and discovered his cars had been sideswiped by the UP train. He called his engineer to stop eastbound and westbound trains and immediately began applying hand brakes.

Railroad officials and emergency management teams from both railroads were called to the scene to assess the damage. A total of seven cars derailed from UP train # 1 and were damaged or destroyed, while 16 cars from UTAH train # 2 derailed and were damaged or destroyed. There were no injuries to the crew members of either train.

Following the accident, post-accident toxicological tests were conducted on all six crew members with negative results.

POST ACCIDENT INVESTIGATION:

An FRA Operating Practices (OP) Inspector and a Utah Department of Transportation (UDOT) Track Inspector responded to the scene to conduct the investigation. The crew members were interviewed that morning by UP and UTAH Officials. During the interviews, all crew members stated that the trip was uneventful until both trains made emergency brake applications.

A review of the event recorder downloads for UP Train # 1 and UTAH Train # 2 indicated that the trains were being operated within the posted track speed and the engineers' train handling did not contribute to the accident. The investigation revealed the first car to derail on UP Train # 1 was NRLX 700450 which was the 74th coal hopper car in the consist and six cars behind it also derailed. One or more of these cars sideswiped or struck UTAH Train # 2's empty coal hopper car IPPX 1066, the 30th car in the consist, and derailed it and fifteen other cars behind it.

Post-accident investigation of the signal system revealed that the signal system functioned as intended.

Following the derailment, UP engineering forces discovered a 100 percent broken rail at the point of derailment. The defect is known as an ordinary broken rail defect. Rail end batter and wheel marks on the broken rail indicated that several wheels passed over the break before the derailment occurred. The UDOT

Track Inspector examined the broken rail and noted 1.0 inch of rail head wear, leaving only 0.75 inch of rail head on which to operate.

A UP Track Inspector conducted a visual inspection of the track through the area of derailment on September 20, 2007, five days before the accident. No defects were reported or noted during that inspection in the area. A review of the UP Track Inspection reports, Rail Detector Analysis and Geometry Analysis Report revealed that the UP followed its own Engineering Track Maintenance Field Manual Instructions.

The double main track for several miles surrounding the derailment site consisted of 136 lb. continuous welded rail (CWR), which was manufactured by CF&I Steel Company in 1977 and was installed in 1977 by the Denver and Rio Grand Western Railroad (D&RGW) when it owned this segment of track. The rail in the area of the derailment was inspected ultrasonically for internal rail flaws on July 12, 2007, approximately ten weeks prior to the date of the derailment. Although not directly at the site of the derailment, the following defects were found and noted on Main Track # 1 and the conditions corrected on the same day:

M.P. 636.71 right rail detail fracture 30 percent
M.P. 632.22 right rail detail fracture 30 percent
M.P. 632.72 left rail detail fracture 10 percent
M.P. 628.38 left rail detail fracture 30 percent
M.P. 626.40 right rail detail fracture 25 percent

ANALYSIS AND CONCLUSIONS:

A review of locomotive event recorders for UP Train # 1 and UTAH Train # 2 indicated the trains were operating within the posted track speeds and the train handling instructions by the respective locomotive engineers and did not contribute to the accident.

A review of all available records, tests and inspections on the signal system indicated the system functioned as intended.

The broken rail was examined and rail head wear was measured at 1.0 inch, leaving only 0.75 inch for train to operate on. Although the FRA does not have rail standards that address rail head wear, the railroads should address this condition when discovered.

Damages are estimated at: UP, equipment, $266.385, track and signals, $60, 087; UTAH, equipment, $866,792.

PROBABLE CAUSE AND CONTYRIBUTING FACTORS

FRA has concluded that the probable cause of the accident was a broken rail.