Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-39

Union Pacific (UP)
Mojave, California
May 28, 2006

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

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2006-39

1.Name of Railroad Operating Train #1 Union Pacific RR Co. [UP]	1a. Alphabetic Code UP	1b. Railroad Accident/Incident No. 0506LA061
2.Name of Railroad Operating Train #2 Union Pacific RR Co. [UP]	2a. Alphabetic Code UP	2b. Railroad Accident/Incident 0506LA061
3.Name of Railroad Responsible for Track Maintenance: Union Pacific RR Co. [UP]	3a. Alphabetic Code UP	3b. Railroad Accident/Incident No. 0506LA061
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident Month 05 / Day 28 / Year 2006	6. Time of Accident/Incident 05:00: ☑ AM ☐ PM

7. 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) — **01**

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
17	0	0	0	Los Angeles

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Mojave	381.4	N/A	CA	KERN

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

21. Track Name/Number	22. FRA Track Class (1-9, X)	Code	23. Annual Track Density (gross tons in millions)	24. Time Table Direction 1. North 3. East	Code
Single Main		4	18.0		1

OPERATING TRAIN #1

25. 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: 1

26. Was Equipment Attended? 1. Yes 2. No — Code: 1

27. Train Number/Symbol: MWCR V-26

28. Speed (recorded speed, if available) — R - Recorded; E - Estimated: 40 MPH — Code: R

29. Trailing Tons (gross tonnage, excluding power units): 5092

30. 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 | N/A | N/A | N/A

30a. 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**

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	92	no
(2) Causing (if mechanical cause reported)	0	0	N/A

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

Alcohol	Drugs
0	0

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

34. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	5	0	0	0	0	(1) Total in Equipment Consist	17	0	93	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	2	0	7	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
142456	392604	M405	N/A

Number of Crew Members / Length of Time on Duty

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen	44. Engineer/Operator	45. Conductor
N/A	0	1	0	Hrs 7 Mi 10	Hrs 7 Mi 10

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	0

49. EOT Device? 1. Yes 2. No — 1

50. Was EOT Device Properly Armed? 1. Yes 2. No — 1

51. Caboose Occupied by Crew? 1. Yes 2. No — N/A

OPERATING TRAIN #2

52. 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: 1

53. Was Equipment Attended? 1. Yes 2. No — Code: 2

54. Train Number/Symbol: RMJLV C26

55. Speed (recorded speed, if available) — R - Recorded; E - Estimated: 0 MPH — Code: R

57. 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

57a. Remotely Controlled Locomotive?
0 = Not a remotely controlled; 1 = Remote control portable

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56. 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
5262			e | n | N/A | N/A | N/A	0

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	59. 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)	UP 2392	2	no		N/A	N/A
(2) Causing (if mechanical cause reported)	0	0	N/A	60. Was this consist transporting passengers? (Y/N)	N/A	

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

63. Equipment Damage This Consist	64. Track, Signal, Way, & Structure Damage	65. Primary Cause Code	66. Contributing Cause Code
0	0	N/A	N/A

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

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	0	0	0
Nonfatal	0	0	0

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

Highway User Involved

79. Type	Code
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)	N/A

80. Vehicle Speed (est. MPH at impact)	81. Direction geographical) 1.North 2.South 3.East 4.West	Code
0		N/A

82. Position	Code
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	N/A

86a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials?	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

Rail Equipment Involved

83. Equipment	Code
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)	N/A

84. Position of Car Unit in Train
0

85. Circumstance	Code
1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	N/A

86b. Was there a hazardous materials release by	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

86c. State here the name and quantity of the hazardous materials released, if any.
N/A

87. Type of 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
Code(s)	N/A	N/A		N/A		N/A	N/A			N/A		N/A

88. Signaled Crossing Warning (See instructions for codes)	Code
	N/A

89. Whistle Ban	Code
1. Yes 2. No 3. Unknown	N/A

90. Location of Warning	Code
1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach	N/A

91. Crossing Warning Interconnected with Highway Signals	Code
1. Yes 2. No 3. Unknown	N/A

92. Crossing Illuminated by Street Lights or Special Lights	Code
1. Yes 2. No 3. Unknown	N/A

93. Driver's Age	94. Driver's Gender 1. Male 2. Female	Code
0		N/A

95. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train	Code
1. Yes 2. No 3. Unknown	N/A

96. Driver	Code
1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative)	N/A

97. Driver Passed Standing Highway Vehicle	Code
1. Yes 2. No 3. Unknown	N/A

98. View of Track Obscured by (primary obstruction)	Code
1. Permanent Structure 2. Standing Railroad Equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicle 7. Other (specify in narrative) 8. Not obstructed	N/A

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	0	0

99. Driver Was	Code
1. Killed 2.Injured 3. Uninjured	N/A

102. Highway Vehicle Property Damage (est. dollar damage)
0

100. Was Driver in the Vehicle?	Code
1. Yes 2. No	N/A

103. Total Number of Highway-Rail Crossing Users (include driver)
0

104. Locomotive Auxiliary Lights?	Code
1. Yes 2. No	N/A

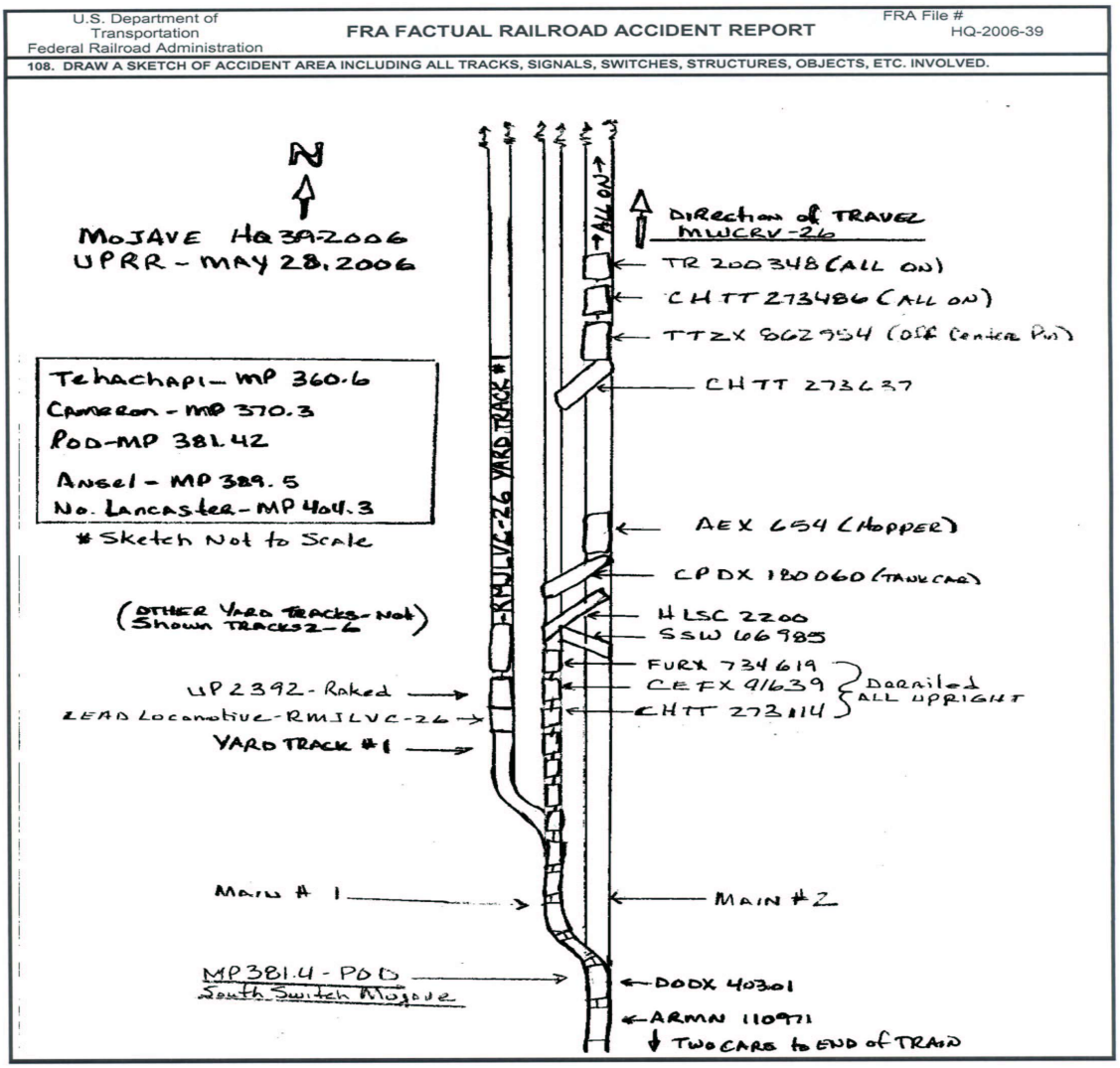
105. Locomotive Auxiliary Lights Operational?	Code
1. Yes 2. No	N/A

106. Locomotive Headlight Illuminated?	Code
1. Yes 2. No	N/A

107. Locomotive Audible Warning Sounded?	Code
1. Yes 2. No	N/A

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

scan_10_0
6.jpg



109. SYNOPSIS OF THE ACCIDENT

At 5:00 a.m., May 28, 2006, northbound (timetable) UP train symboled MWCRV-26 (Train No. 1) traveling at a recorded speed of 40 mph, derailed 9 cars at a switch located at the south end (geographic) of Mojave in Mojave, California, mile post 381.4. The train was operating on the UP's Los Angeles Division, Mojave Subdivision under centralized traffic control by the UP dispatcher in Omaha, NE. The locomotives and head end of the train traversed a switch from single main track to double main track, Main Track 2 when the derailment occurred while the train was moving. Freight car CHTT 273637 derailed along with eight other cars on the switch to main track 2. As a result, the locomotives and the head portion went on Main Track 2 while all cars following CHTT 273637 went to Main Track 1 until the train stopped, blocking both Main Tracks 1 and 2.

One of the derailed cars raked the second locomotive of an unoccupied UP train RMJLVC-26 (Train No. 2), which was sitting in yard track 1, adjacent to Main Track 1. There were no injuries to the crew of Train No. 1 and no hazardous materials were involved.

The weather was clear, visibility was dark and the temperature was 51 degrees Fahrenheit.

Damage was estimated at: equipment, $173,424; track and signal, $392,604.

The probable cause is Unusual Operational Situations, interaction of lateral/vertical forces (includes harmonic rock off).

110. NARRATIVE

Circumstances Prior to the Accident

Train No. 1 (MWCRV-26)

The crew of Train No. 1 included a locomotive engineer and a conductor. They first went on duty at 9:50 p.m., May 27, 2006, in Colton, California. This is not the home terminal for the crew members and both received more than the statutory off duty period prior to reporting for duty. Their assigned freight train consisted of five locomotives, 17 loads and 93 empties. It was 7,364 feet long and weighed 5,092 tons. The train was scheduled to travel from Colton to Bakersfield, California.

As the train approached the accident area, the engineer was seated at the controls on the right side of the lead locomotive. The conductor was seated on the left side. The train was traveling northbound at a recorded speed of 40 mph. The engineer was operating the locomotive throttle in run 8 and observed no irregularities to the roadbed as they moved over the south end of Mojave. When the train experienced an undesired emergency application of the brakes, he thought that the train had pulled apart and he released the independent brake valve in the "bail" position to keep the slack stretched. He stated he did not notice any slack action at the time of the emergency brake application. The conductor also stated that he did not take exception to the way the train handled at the time of the emergency brake application.

Approaching the accident site from the northbound control signal at South Mojave, the single main track splits into Main Tracks 1 and 2, and Yard Tracks 1 through 6 split off Main Track 1. From the south (geographic) to the north the track is tangent with a 0 .64% ascending grade, to a point about 100 feet prior to the point of derailment at MP 381.4 and becomes a grade of 1.08% ascending grade beyond.

Train No. 2 (RMJLVC-26)

Train No. 2 consisted of three locomotives, 40 loads and 3 empties. It was 2,067 feet long and weighed 5,262 tons. It was sitting unoccupied and unattended in Yard Track 1 to the west of Main Track 1. The crew of Train No. 2, an engineer and a conductor, went on duty at Bakersfield Yard, Bakersfield, California, and had not yet left Bakersfield via van to Mojave.

The Accident

After the train was stopped, the conductor left the head-end to inspect the train and found that they had derailed. They then notified the dispatcher that their train had derailed at South Mojave.

The derailment occurred while Train No. 1 was traversing a switch from single main track to double main track, Main Track 2, resulting in 9 derailed cars over the switch approaching South Mojave. Freight car CHTT 273637 derailed along with eight other cars on the switch to Main Track 2. As a result, the locomotives and the head portion went on Main Track 2 while all cars following CHTT 273637 went to Main Track 1 until the train stopped, blocking both Main Tracks 1 and 2.

The first car to derail was CHTT 273637, line number 92. As the cars derailed, one of them raked the second locomotive of unattended Train No. 2, which was tied down in Yard Track 1. There were no injuries and no hazardous materials were involved.

The crew was subsequently tested for drugs and alcohol and the results were negative.

Analysis and Conclusions

Analysis

The derailment was investigated by UP managers from Mechanical and Maintenance of Way (MOW) Engineering. Although the first car involved was CHTT 273637, the investigation centered around the rear trucks and wheel set of the car behind it, AEX 654, line 93, an empty hopper car last containing lime. UP's inspection of AEX 654 cleared the car of mechanical defects. Its inspection report was reviewed by a FRA Motive Power & Equipment (MP&E) inspector who agreed there were no defects on the car that would have contributed to the derailment.

A FRA Operating Practices (OP) inspector reviewed a download of the lead locomotive's event recorder who determined that the engineer's handling of the train did not contribute to the cause of this derailment.

The MOW Engineering investigation found that there were UP non-compliant track conditions at the point of derailment as well as marginal FRA Class 4 track alignment. UP Director of Track Maintenance found that the point of derailment was in FRA Class 4 track because the speed boards had not been moved to comply with the timetable in effect. Although the cause was closed out under Unusual Operational Situations, code M405 (interaction of lateral/vertical forces [includes harmonic rock off]), there was a marginal measurement of alinement for FRA Class 4 Track. The maximum allowable alinement cannot exceed 1 ½ inches for FRA Class 4 track; alinement was measured at 1 1/8 inches. However, Train No. 1 was only operating at Class 3 track speed (40 mph) and the measurements were well within the allowances at that speed. Therefore, the marginal alinement and marginal cross level and warp measurements at the point of derailment could have been contributing factors but there is insufficient evidence to assign it as a contributing factor or to refute the UP's probable cause.

Conclusions

Post-accident analyses of all available records, reports and downloads excludes mechanical or train handling as possible causes. Variations in alinement and marginal cross level and warp measurements, although present were not excessive for FRA Class 4 track, were insufficient at the recorded speed to definitively assign one or more as contributing factors. FRA's conclusion is in agreement with UP's probable cause.

Damage was estimated at: track and signal, $392,604; equipment, Train No. 1, $142,456; equipment, Train No. 2, $30,968.

Probable Cause and Contributing Factors

The Federal Railroad Administration's investigation found the probable cause to be Unusual Operational Situations, interaction of lateral/vertical forces (includes harmonic rock off).