Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-75

Union Pacific
Redlands, CA
August 27, 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-2006-75

1.Name of Railroad Operating Train #1: Union Pacific RR Co. [UP]	1a. Alphabetic Code: UP	1b. Railroad Accident/Incident No.: 0806LA036
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident: N/A
3.Name of Railroad Responsible for Track Maintenance: Union Pacific RR Co. [UP]	3a. Alphabetic Code: UP	3b. Railroad Accident/Incident No.: 0806LA036
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident: Month 08 / Day 26 / Year 2006	6. Time of Accident/Incident: 09:30: ☐ 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
0	0	0	0	Los Angeles

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Redlands	549.6	N/A	CA	SAN BERNARDINO

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
80 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
Number 1 Main		3	41		4

OPERATING TRAIN #1

25. Type of Equipment Consist (single entry)	A. Spec. MoW Equip.	Code	26. Was Equipment Attended? 1. Yes 2. No	Code	27. 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		8		1	ETUW CB-26

28. Speed (recorded speed, if available) R - Recorded / E - Estimated: 80 MPH; Code: R

29. Trailing Tons (gross tonnage, excluding power units): 0

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/A N/A N/A N/A

30a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 2. South 4. West; 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	3	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
(1) Total in Train	9	0	0	0	0
(2) Total Derailed	7	0	0	0	0

35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
4534857	205640	H099	N/A

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	0	1	0

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 8 Mi 0	Hrs 8 Mi 0

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: 2

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

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

OPERATING TRAIN #2

52. Type of Equipment Consist (single entry)	A. Spec. MoW Equip.	Code	53. Was Equipment Attended? 1. Yes 2. No	Code	54. 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		N/A		N/A	N/A

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

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): 0

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): N/A | N/A | N/A | N/A | N/A

2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: N/A

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

59. 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

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
(1) Total in Train	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

63. Equipment Damage This Consist: 0

64. Track, Signal, Way, & Structure Damage: 0

65. Primary Cause Code: N/A

66. Contributing Cause Code: N/A

Number of Crew Members

67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen
0	0	0	0

Length of Time on Duty

71. Engineer/Operator: Hrs 0 Mi 0

72. Conductor: 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? 1. Yes 2. No: N/A

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

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

Highway User Involved

79. Type: 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

80. Vehicle Speed (est. MPH at impact): 0

81. Direction geographical) 1.North 2.South 3.East 4.West
Code: N/A

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

86a. 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

Rail Equipment Involved

83. 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

84. Position of Car Unit in Train: 0

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

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

88. Signaled Crossing Warning (See instructions for codes) Code:

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

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

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

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

93. Driver's Age: 0

94. Driver's Gender 1. Male 2. Female
Code: N/A

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

96. Driver 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)
Code: N/A

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

98. View of Track Obscured by (primary obstruction) 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
Code: N/A

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

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

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

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

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

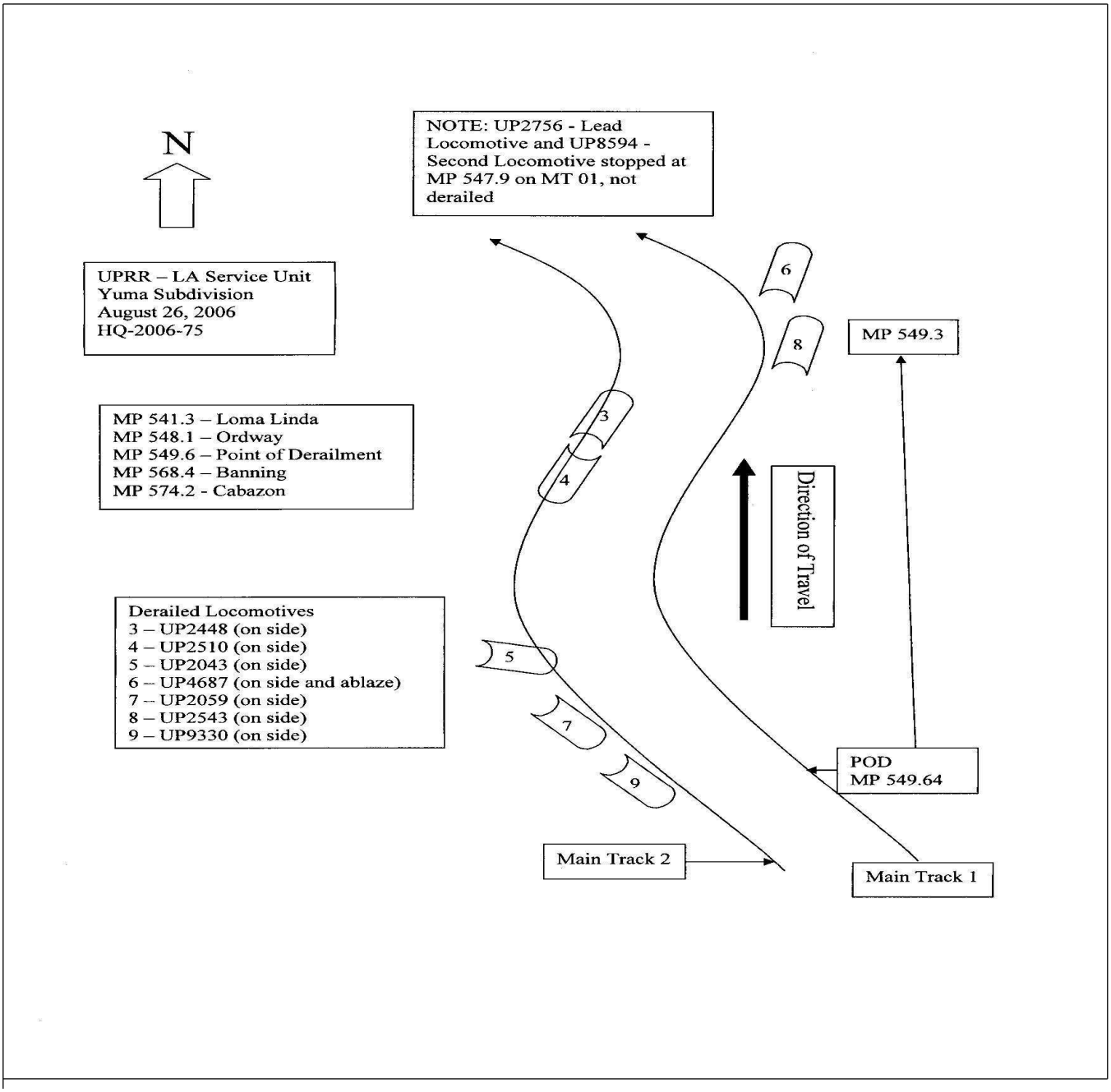
104. Locomotive Auxiliary Lights? 1. Yes 2. No
Code: N/A

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

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

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

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



109. SYNOPSIS OF THE ACCIDENT

On August 26, 2006, at 9:30 p.m. PDT, the crew of Union Pacific (UP) train ETUWCB-26, a nine locomotive consist, of which seven were dead in consist (DIC), was traveling westbound between Beaumont and Redlands, California, on UP's Yuma Subdivision. The engineer experienced difficulty in controlling the speed of the train on a descending grade of 1.97% near milepost 559.0 and placed the train in full dynamic braking in an attempt to control the movement. When that failed, and as the train gathered speed to 39 mph near milepost 559.11, the engineer induced an emergency brake application using the automatic brake valve. However, he neglected to manually apply the independent brake. The train, now a run-away, traveled approximately 9.5 miles and reached a recorded speed of 80 mph before derailing the seven rear locomotives in a right-hand and left-hand curve on main track 1 between mileposts 549.6 and 549.3. The two unattended lead locomotives, UP 2756 and UP 8594, continued westward another 1.8 miles before coming to a stop without incident at milepost 547.8.

Both crew members sustained injuries and were taken to area hospitals where they were treated and released. They have since not returned to duty. FRA Post Accident Testing was conducted and results were negative.

The weather was clear, visibility was dark, and the temperature was 80 degrees Fahrenheit.

Damage to equipment was reported at $4,534,857 and $205,640 for track and signal.

The probable cause of the accident was Use of Brakes, Other, H099. The engineer was in full dynamic braking and placed the train into emergency at 39 mph but failed to manually apply the independent brake to stop.

110. NARRATIVE

Circumstances Prior to the Accident

The crew of the ETUWCB-26 included a locomotive engineer and a conductor. They first went on duty at 1:30 p.m. PDT, on August 26, 2006, in Yuma, Arizona. This is not their home terminal. They both received more than the statutory off duty period prior to reporting for duty. Their assigned train consisted of nine locomotives, of which seven were dead in consist (DIC). It was 619 feet long and weighed 1,472 tons. The train was scheduled to travel from Yuma, Arizona to Colton, California, over the Union Pacific Yuma Subdivision. In this part of the railroad, movement is controlled by a dispatcher located in Omaha, Nebraska.

Upon leaving Palm Springs (CA), at milepost 581.7, the engineer experienced some wheel slip and stopped the train at Cabazon (CA), at milepost 574.2, where he made an inspection. He conferred via radio with the dispatcher resulting in helper locomotives being added to the rear of the train to assist them up the grade. The train proceeded without incident to Beaumont (CA), milepost 561.8, where the helpers were cut off at the crest of the grade.

As the train proceeded down the grade and approached milepost 559.0, the engineer experienced difficulty in controlling the speed of the train. The engineer placed the lead locomotive in full dynamic braking in an attempt to control his speed. When full dynamic braking failed to slow the train and the speed reached 39 mph near milepost 559.11, the engineer then induced an emergency application of the train air brakes using the automatic brake valve. After placing the automatic brake valve in the emergency position, the engineer and conductor exited out the rear door of the lead locomotive and managed to reach the seventh locomotive to ride it out. On their way to the rear of the consist and in an attempt to separate and slow the locomotives individually, they stated that they pulled knuckle pins and set handbrakes. At that point, the train had traveled approximately 9.5 miles and reached a top speed of 80 mph before derailing the rear seven units in an S-curve between mileposts 549.6 and 549.3. The two lead locomotives, now unoccupied, continued westward on main track 1 another 1.8 miles before coming to a stop without incident at milepost 547.8.

Approaching the accident site in a westward direction at the crest of the grade at milepost 562.0 in Beaumont (CA), there are twelve curves beginning at milepost 554.81 to the point of derailment (POD) at milepost 549.6 on main track 1. The descending gradient between milepost 554.81 and the POD averages 1.57%.

The Accident

Train ETUWCB-26 traveling uncontrolled in a westward direction at a recorded speed of 80 mph derailed seven dead-in-consist (DIC) locomotives on main track 1 on a right-hand curve and a left-hand curve between mileposts 549.6 and 549.3. The derailment blocked main tracks 1 and 2. Both crew members were riding in the seventh locomotive and were injured when it derailed on the south side of the right hand curve. At the point of derailment, the engineer was on the engineer's side holding on to the seat; the conductor braced himself between the door and the first seat on the left side of the locomotive. As the locomotives derailed, locomotives nine, seven, and five ended up on their sides on the south side of main track 2; locomotives three and four ended up on their sides on main track 2; and locomotives six and eight ended up on their sides down an embankment on the north side of main track 1 and in addition, locomotive six caught on fire. Several thousand gallons of diesel fuel spilled onto the right of way and into a natural drainage area.

Emergency personnel from the Moreno Valley (CA) and Yucaipa (CA) Fire Departments, United States Fish and Game, and Union Pacific managers arrived a short time later. After the crew members were initially examined by emergency personnel, the conductor was transported to Loma Linda (CA) University Medical Center and the engineer was transported to Riverside Regional Hospital, Moreno Valley, by AMR Ambulance Company.

Post-Accident Investigation

On August 27, 2006, at 1:45 a.m. PDT, a California Public Utilities Commission (CPUC) Operating Practices Inspector and FRA Chief Inspector interviewed the

conductor at Loma Linda University Medical Center. A UP manager of train operations (MTO) was also present.

In the interview the conductor stated that the trip was uneventful until the engineer reported some wheel slip to the dispatcher and had helper power attached to the rear of the train to assist them up the grade. The helper power was cut away at the crest of the grade.

After the locomotives derailed, the conductor and the engineer were assisted by a passing motorist who heard the noise caused by the derailment. Their injuries consisting of cuts, contusions, and other relatively minor injuries, were initially treated by firemen at the scene and transported separately to area hospitals.

After interviewing the conductor at the Loma Linda hospital, the FRA and CPUC inspectors drove to the hospital in Moreno Valley to interview the engineer.

During the engineer's interview, he stated that the trip was uneventful until he realized the dynamic brakes were not adequately controlling the descent from Beaumont (CA) and made an emergency brake application. He remembered calling the dispatcher to inform him that he was on a run-away train and that they were going 80 mph down the hill. He said he and the conductor started moving to the back of the consist because he felt their chances of survival would be better at the rear of the train. After the derailment, he remembered helping the conductor out of the locomotive with the assistance of a passing motorist.

A post-accident UP mechanical review of the event recorder downloads indicated the engineer was operating with dynamic brakes and when that failed to slow the movement, he induced an emergency application of the brakes, which also failed to slow the movement. By failing to then apply the independent air brakes, the consist continued out of control until reaching the point of derailment.

The event recorder tape for the lead locomotive (UP 2756) indicates that when the engineer made an emergency brake application, the dynamic brakes functioned as intended. The dynamic braking held steady and the dynamic brake interlocker (DBI) prevented brake cylinder application. Analysis of the second locomotive (UP 8594) revealed that the dynamic braking dropped out and did not function properly. This caused a rapid increase of speed on the descending grade. UP subsequently conducted inspections and tests of both units at its West Colton (CA) locomotive facility, which confirmed the analysis of both event recorders.

When operating in dynamic brake mode, the DBI is activated, preventing the application of automatic air brakes on the engine consist. This is what the DBI is designed to do. Therefore, on a light engine consist while in the dynamic brake mode and an emergency brake application is made, the air brakes will not apply throughout the consist.

A post-accident review of the engineer's training revealed that the engineer was tested on January 5, 2006, on GCOR Exam/Air Brake Test, Heavy Grade Training on May 29, 2001, and other training. A UP post- accident disciplinary investigation assigned responsibility for the derailment to the engineer for over speeding and improper brake application. UP's investigation exonerated the conductor.

Subsequent to the accident, the engineer was dismissed from his duties with the railroad. The conductor was placed on extended medical leave for counseling treatment and has not returned to duty since.

Analysis and Conclusions

Analysis

The derailment was investigated by UP managers from Mechanical and Maintenance of Way (MOW) Engineering. The UP mechanical event recorder downloads were reviewed by a FRA and CPUC MP&E Inspectors and a FRA OP Inspector. They concurred with the UP's analysis that train handling was the primary cause of the derailment. The analysis determined the engineer failed to control train speed and did not comply with the rules governing use of air and dynamic brakes.

The two lead locomotives were also inspected and found to be generally in compliance. A few minor defects were noted but did not contribute to the cause of the accident.

The UP MOW Engineering and FRA Track inspectors investigated the track conditions in the area approaching the derailment site and at the POD. They concluded that track was in compliance for the authorized speed for Class 3 track and did not contribute to the derailment.

Conclusions

The engineer failed to comply with UP Special Instructions Item 2 (12), engines running light, "When operative dynamic brake is not sufficient to control speed on descending grade over 1 percent-25mph". When he allowed the train of light engines to exceed 25 mph in dynamic braking alone, additional emergency braking measures were required.

The engineer also failed to comply with provisions of GCOR Rule 33.8: "When stopping from an emergency application: Actuate and hold the handle in the actuate position. Then move the independent handle to a position in the application zone that will develop the desired brake cylinder pressure without sliding wheels or developing excessive buff or draft force. Extra care must be used to prevent sliding wheels if in dynamic brake mode at the time of emergency application".

As a follow up to the derailment and the engineer's failure to properly apply the independent brake, FRA and CPUC inspectors will conduct joint audits on dynamic brake interlock training and periodic tests and inspections in accordance with Part 217.

The engineer was in full dynamic braking and placed the train into emergency at 39 mph but failed to manually apply the independent brake to stop.

Probable Cause and Contributing Factors

Upon investigation by the Federal Railroad Administration the probable cause of the accidentwas found to be use of brakes, Other, H099.