Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-95

Union Pacific
Benton, IL
December 4, 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-2006-95

1.Name of Railroad Operating Train #1: Union Pacific RR Co. [UP]	1a. Alphabetic Code: UP	1b. Railroad Accident/Incident No.: 1206SL002
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.: 1206SL002
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident: Month 12 / Day 04 / Year 2006	6. Time of Accident/Incident: 02:24: ☑ 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
15	1	0	71	St Louis

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Benton	306.	N/A	IL	FRANKLIN

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
5 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	46		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: MHOY C02

28. Speed (recorded speed, if available) R - Recorded E - Estimated: 30 MPH — Code: R

29. Trailing Tons (gross tonnage, excluding power units): 6407

30. Method(s) of Operation (enter code(s) that apply)

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

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	2	N/A
(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	3	0	0	0	0
(2) Total Derailed	2	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	55	0	28	0	0
(2) Total Derailed	10	0	9	0	0

36. Equipment Damage — This Consist: 736286

37. Track, Signal, Way, & Structure Damage: 166025

38. Primary Cause Code: T201

39. Contributing Cause Code: N/A

Number of Crew Members

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

Length of Time on Duty

44. Engineer/Operator: Hrs 6 Mi 4

45. Conductor: Hrs 6 Mi 4

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	22

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: N/A

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

54. Train Number/Symbol: N/A

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

57. Method(s) of Operation (enter code(s) that apply)

a. ATCS	g. Automatic block	m.Special instructions
b. Auto train control	h. Current of traffic	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): N/A

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)	N/A	N/A	N/A
(2) Causing (if mechanical cause reported)	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(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

63. Equipment Damage This Consist: N/A

64. Track, Signal, Way, & Structure Damage: N/A

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
N/A	N/A	N/A	N/A

Length of Time on Duty

71. Engineer/Operator: Hrs N/A Mi N/A

72. Conductor: Hrs N/A Mi N/A

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

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): N/A

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: N/A

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

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

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: N/A

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
	N/A	N/A

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): N/A

103. Total Number of Highway-Rail Crossing Users (include driver): N/A

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.

109. SYNOPSIS OF THE ACCIDENT

Union Pacific Railroad Company (UP) northbound freight Train Symbol MH0YC02 derailed near Benton, Illinois at 2:24 a.m., c.s.t., on December 4, 2006. The result was the derailment of 2 trailing locomotives and 19 cars. Hazardous materials tank Car No. GATX 203578, loaded with Alkyl Phenols Liquid N.O.S., 8,UN 3145, PG III, was buried beneath an empty lumber center-beam flat car, but there was no release of hazardous materials. Two adjacent tank cars north of it contained lube oil and small amounts of oil were released to the ground in the area of the hazardous tank car. The lube oil had a slight odor. A precautionary one-half mile radius evacuation was ordered by the Christopher and West Frankfort, Illinois, Fire Departments which remained in effect until 4 p.m., December 4, 2006.

The derailment was caused by a broken rail. At the time of the accident, the weather was dark and clear with a temperature of 5 degrees Fahrenheit and a mild northeastern wind.

Monetary damages include $736,286 for equipment and a total of $166,025 for both track and signal.

110. NARRATIVE

The following was obtained from an investigation that was performed by the Federal Railroad Administration.

Circumstances Prior To Accident

The crew of Train Symbol MHOYC 02 included an engineer, conductor, and brakeman-in-training. They first went on duty at 8:20 p.m. CST, December 3, 2006, at the UP Yard Office in Dexter, Missouri. This is the away terminal for the entire crew, and all received more than the statutory off-duty period prior to reporting.

Their assigned train, freight Train Symbol MHOYC 02, consisted of 3 locomotives, 55 loads, 28 empties, weighing 6,407 tons, and having a length of 6,328 feet. The train was scheduled to travel from Houston, Texas to Chicago, Illinois, without adding or removing cars en route. It received a Class 1 Air Test (Initial Terminal) in Houston.

Train Symbol MHOYC 02 arrived Dexter at 8:45 p.m., and the de-boarding crew stated there were no problems with the train as they left the locomotive. After stocking the lead locomotive with ice and water, the engineer was seated at the controls and the conductor and brakeman-in-training were on the left side as they departed Dexter on Track No. 1 at 9:05 p.m., en route to Salem, Illinois.

The trip was uneventful until nearing the area of the accident, where the wayside detector at milepost (MP) 306.8 indicated they passed it at 41 mph. As the northbound train was approaching the accident area, the engineer was seated at the controls of the lead locomotive on the right side with the short hood forward, the brakeman-in-training was seated in the front left seat at the desk, and the conductor was seated in the rear seat on the left side. The northbound approach signal to the BNSF Railway Company (BNSF) crossing displayed a green indication, and the home signal at the interlocking was also displaying a green indication.

Starting at MP 305, there is a .04-percent descending grade northbound that changes to a .7- percent ascending grade at MP 305.5, to level grade at MP 305.8, then changes to a descending .4-percent grade at the derailment site, MP 306.6. This is a single main track consisting of 136-pound continuous-welded rail (CWR). There are no curves in this area. The point of derailment was located on the northwest corner of the crossing diamond where the UP crosses the BNSF.

The Accident

There is a 40 mph permanent speed restriction at the BNSF crossing at MP 306. Train Symbol MHOYC 02 had slowed to a recorded speed of 30 mph, preparing for a 25 mph restriction further north of the crossing. The crew stated that the crossing was very rough as they crossed it. They were in notch 3 when they heard a loud track noise and saw rocks and debris fly upward from the rail, toward the engineer's side of the lead locomotive. As they were discussing the crossing and preparing to notify the dispatcher, the train went into emergency. The result was the 2 trailing locomotives and 19 cars derailed. The two derailed locomotives and first five cars were upright and parallel to the track, and remained coupled. The train had separated with the locomotives and five cars stopping about 1,000 feet north of a piled-up derailment. The preponderance of the derailed cars were piled and cross-wise, extending from the crossing diamond northward for about 400 feet. The conductor and brakeman-in-training walked back to the pile of cars near the diamond, saw the tank cars dented, and smelled the odor. Fearing exposure to the hazardous materials, they returned to the locomotives. There was an access road near the locomotives, and the local fire department and deputy sheriff came to the train crew to get information on the derailment and materials involved. The crew was relieved from duty and taken for drug testing after furnishing emergency responders with the consist and hazardous materials handling instructions. A precautionary one-half mile radius evacuation was ordered by the Christopher and West Frankfort, Illinois, Fire Departments shortly after 2:24 a.m., and remained in effect until 4 p.m., December 4, 2006.

Analysis and Conclusion

Analysis

The 136-pound crossing diamond was installed March 1, 2006. It was manufactured by Nortrak and is a 76-degree 31-minute 13-second crossing. The broken rail occurred on rail that was part of the purchased diamond assembly. It started at a bolt hole and extended through the base of the rail on the northwest corner of the diamond. The track involved at the diamond is 136-pound. The 136-pound CWR then extends 80 feet north and 80 feet south, where it becomes 119-pound CWR, as described in the profile. The last rail detector test prior to the derailment was on November 11, 2006. The EC4 (UP geometry car) test was accomplished last on September 12, 2006. The last track inspection prior to the derailment was December 1, 2006.

The UP's Broken Rail Analysis report indicates a bolt hole break was the cause of the derailment. In communications with the supplier he also determined that inspection and correct tightening of the diamond rail assembly will prevent recurrence.

Review of the train consist determined compliance with current UP System Special Instructions -Train Make-Up requirements.

A printout of the locomotive event recorder download of lead Locomotive No. UP 9511 was obtained and reviewed.

The only dangerous tank car involved was Car No. GATX 203578. It contained 25,510 gallons of ALKYL PHENOLS LIQUID N.O.S., 8, UN 3145, PG III. However, there was no release of product. It was shipped from SI Group, Freeport, Texas to Hexion Specialty Chemicals, Pleasant Prairie, Wisconsin. The contents were later transferred into tank Car No. GATX 203580, and forwarded to destination.

Tank Car No. GATX 2794, loaded with lube oil, did not leak any product and was located on the south end of the dangerous tank car.

Tank Car No. UTLX 641573, containing lube oil, after the derailment was located immediately north of the dangerous car and was leaking, It lost approximately 1,000 gallons of product. Tank Car No. UTLX 643187, containing lube oil, was the second car north of it and was leaking also. It lost about 20,000 gallons of product. The lube oil had a slight odor, and the wind was blowing northeast from the derailed cars toward the occupied locomotive.
UP hazardous materials transfer crews from Fort Worth, Texas and Little Rock, Arkansas transferred the remaining product into tank cars.

Approximately 21,000 gallons of lube oil that contaminated the dirt was removed from the site by Hulcher Environmental Services personnel and disposed of at Allied Waste Landfill in DeSoto, Illinois.

Responding Illinois Fire Departments included West Frankfort, Christopher, Herrin, Marion, Sesser, Murphysboro, DuQuoin, and Williamson County. Also responding were the Franklin County EMA, Mercy Regional Health System Ambulance, and Illinois Environmental Protection Agency.

There were a total of 22 people that reported to the hospital because of fear of exposure to the product. They were all emergency responders and all were examined and released.

The 22 injuries were correctly reported by the UP on Form FRA F6180.55a.

Upon the crew being relieved from duty, they were taken for drug testing.

Conclusion

The UP's Broken Rail Analysis report indicates a bolt hole break was the cause of the derailment. In communications with the supplier he also determined that inspection and correct tightening of the diamond rail assembly will prevent recurrence.

Probable Cause and Contributing Factors

The FRA determined the probable cause to be T201 - "Bolt Hole Break."