
# *Federal Railroad Administration*
# *Office of Safety*
# *Headquarters Assigned*
# *Accident Investigation Report*
# *HQ-2006-65*

## *Union Pacific*
## *St. Mary's, KS*
## *July 17, 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-2006-65

| | | |
|---|---|---|
| 1.Name of Railroad Operating Train #1: Union Pacific RR Co. [UP ] | 1a. Alphabetic Code: UP | 1b. Railroad Accident/Incident No.: 0706DV017 |
| 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.: 0706DV017 |
| 4. U.S. DOT_AAR Grade Crossing Identification Number: | 5. Date of Accident/Incident: Month 07 / Day 17 / Year 2006 | 6. Time of Accident/Incident: 02:15: ☐ 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 | Denver |

| 13. Nearest City/Town | 14. Milepost (to nearest tenth) | 15. State Abbr | 15. State Code | 16. County |
|---|---|---|---|---|
| St Marys | 92.5 | N/A | KS | POTTAWATOMIE |

| 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 |
|---|---|---|---|---|---|---|
| 100 F | | 2 | | 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 | 30. | | 4 |

## 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: CWEC SH12

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

29. Trailing Tons (gross tonnage, excluding power units): 14854

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) | | | | |
|---|---|---|---|---|
| j | 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; 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 | 28 | yes |
| (2) Causing (if mechanical cause reported) | N/A | N/A | 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 | 2 | 0 | 0 | 0 | 1 |
| (2) Total Derailed | 0 | 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 | 105 | 0 | 0 | 0 | 0 |
| (2) Total Derailed | 29 | 0 | 0 | 0 | 0 |

36. Equipment Damage — This Consist: 1464440; & Structure Damage: 99095

37. Track, Signal, Way,

38. Primary Cause Code: T109

39. Contributing Cause Code: 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: Hrs 4 Mi 15

45. Conductor: Hrs 4 Mi 15

| 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 — N/A

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): 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: 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): 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) | 0 | N/A | N/A |
| (2) Causing (if mechanical cause reported) | 0 | 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 | 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 |
|---|---|---|---|
| N/A | N/A | N/A | N/A |

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): 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 | 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

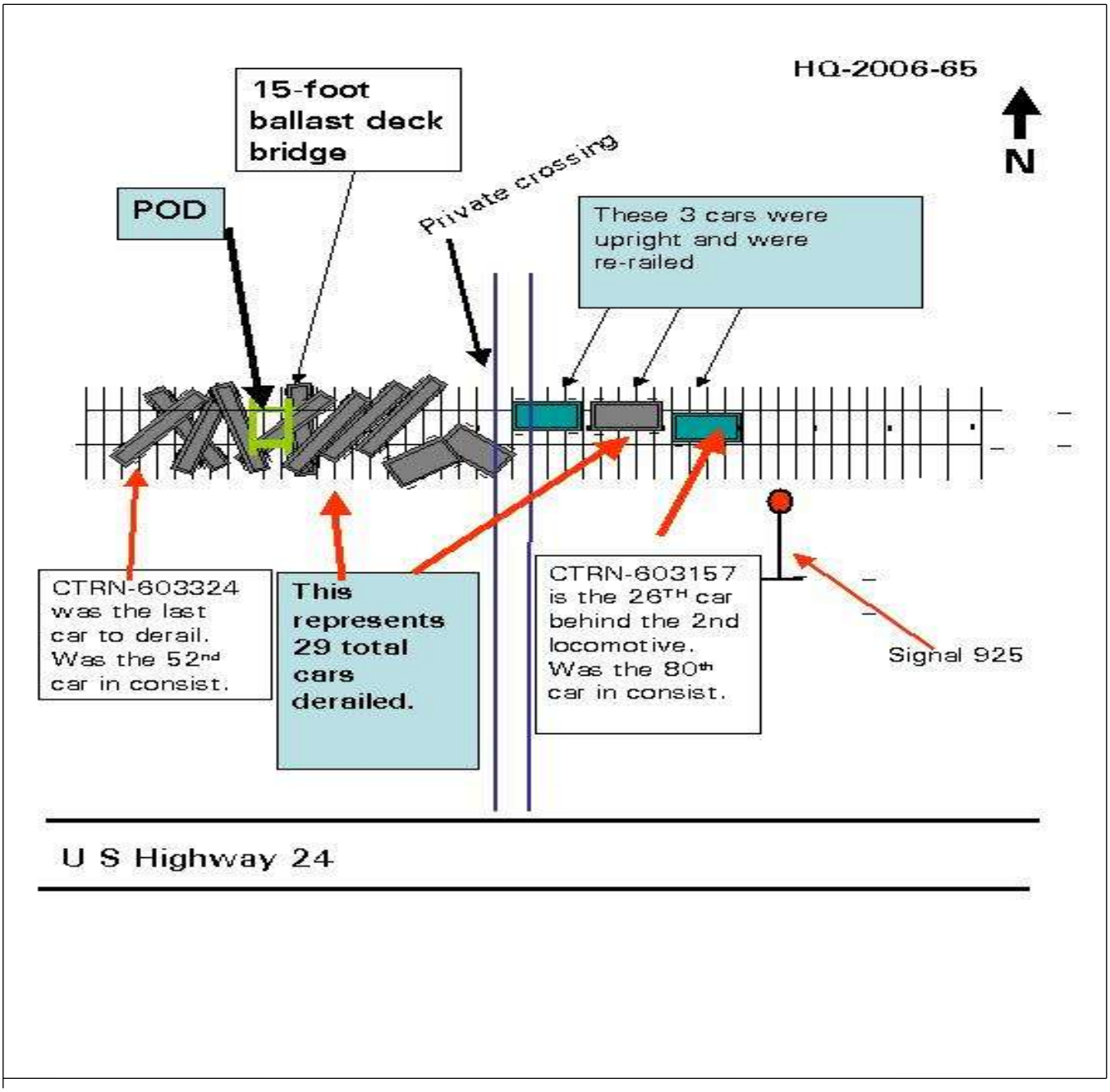
105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No — Code: N/A

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.

HQ-2006-65 sketch.jpg



109. SYNOPSIS OF THE ACCIDENT

At 11:05 a.m. CDT, July 17, 2006, eastbound Union Pacific (UP) loaded coal Train Symbol CWECSH-12 operating at a recorded speed of 40 mph, derailed 29 cars near St. Marys, Kansas. The derailed cars were the 26th thru 54th from the head-end locomotive consist. The estimated damages were $1,464,440 to equipment and $99,095 to track. There was no hazmat release and no injuries. The weather was clear and hot, with a temperature of 100 F.

Thermal misalignment of the track caused the derailment. This location was lined earlier in the day by UP track maintenance forces but the appropriate speed restriction/track compaction measures were not effective at preventing the derailment.

110. NARRATIVE

Circumstances prior to the Accident

At the time of the accident, the crew operating Train Symbol CWECSH-12 consisted of a locomotive engineer and a conductor. They went on duty at Salina, Kansas, at 10 a.m. (c.d.t.), on July 17, 2006, after having received the required statutory off-duty rest period.

The train consisted of 2 locomotives on the head-end, 105 loaded coal cars, and 1 distributive power unit (DPU) on the rear of the train. The initial air brake test had been completed in Grand Junction, Colorado, by the UP mechanical department on July 12, 2006. No exceptions were taken to the air brake test.

The engineer was operating the train eastbound, with the short hood forward, while seated on the right (south) side of the lead locomotive. The conductor was seated on the left (north) side. Train Symbol CWECSH-12 was following another train, and the engineer stated he was watching for signals and the train ahead.

Approaching the accident site from the west on tangent track, there is a 0.10-percent descending grade.

The railroad timetable direction of the train is east. The geographic direction is also east.

The Accident

The train was being operated at 40 mph due to a Level 2 heat restriction placed on the tracks by the local UP manager of track maintenance (MTM). The conductor observed a thermal misalignment of the track approximately 1,000 feet ahead of the train. He notified the engineer, who then applied a minimum air reduction with the automatic brake valve. After the 2 head-end locomotives and 25 cars traveled over the misalignment, the train experienced an undesired emergency application of the train's air brake system. The speed of 40 mph was recorded by the event recorder on the lead locomotive. Maximum authorized speed is 60 mph as listed in the UP Salina Area Timetable No. 2.

When the train came to a stop, the conductor dismounted the locomotive and walked toward the end of the train. He informed the engineer that Car No. CTRN 603157, the 26th car from the head-end and the next 28 cars, were derailed. The engineer stayed on the locomotive to monitor the radio and to notify the UP dispatcher of the derailment.

Analysis and Conclusions

Analysis:

A UP track foreman had preformed spot maintenance in the area of the thermal misalignment on July 13, 2006. He had raised and leveled the track, and filled the track and shoulders of track with ballast. On July 16, the UP track inspector noticed that the track was out of alignment by 7/8 of an inch, while patrolling track. It met FRA standards for the class of track, and he made the decision not to place a speed restriction at that time. Monday, July 17, the track inspector and manager of track maintenance (MTM) decided to have this alignment condition corrected by either lining the track or de-stressing the rail by cutting and welding and adjusting the rail neutral temperature. The welder could not be at the location then, so it was decided that the surfacing gang foreman would make the adjustment by aligning the track. The foreman proceeded to the area of MP 92.5 and realigned the track by 3/4 of an inch. The surfacing gang foreman did not follow ordinary maintenance procedures (Rule 7.7.13) in the UP Engineering Track Field Maintenance Manual by placing a lower speed restriction. The rule states that track speed would be lowered to 30 mph if the temperature is 80/85 F or above until 9:01 p.m. The UP CWR Plan, Rule 5.4 states the same.

The temperature had been in the high 90's from July 13 through July 20. On July 17, the actual high temperature according to AccuWeather was 103 F. The railroad reports indicated the temperature at the time of the accident as 100 F. The MTM had previously placed a Level 2 heat order on the track, per Item 2C in the UP System Special Instructions (Freight trains averaging 90 tons or more per car or platform 40 mph).

Post-accident toxicology testing was performed on the train crew members involved. The test results were negative.

The main track was damaged from MP 92.6 to MP 92.45. Also, a 15-foot ballast deck bridge was destroyed and has since been replaced with three 42 inch culverts. Track damages were $99,095 and equipment damages were $1,464,440, bringing the total damages to $1,563,535.

Analysis of the event recorder on the lead locomotive revealed no exceptions with train handling for the previous 5.75 miles prior to the time of derailment. There was an onboard camera on the front of the lead locomotive which shows the thermal misalignment at the west end of the short ballast deck bridge.

The UP geometry car (EC 4) tested this piece of track on January 5, 2006, with no exceptions in the immediate vicinity of the accident. The rail had been internally tested on June 19, 2006, by a UP detector car (DC-404). No exceptions were found in the rail in the immediate vicinity of the thermal misalignment.

The UP track inspector had shown an FRA defect at the location of the thermal misalignment (deviation from zero crosslevel) on his inspection report of July 13, 2006. He also indicated that the defect had been repaired before traffic was allowed to proceed over it. He made another inspection on July 16, 2006. No FRA exceptions were noted at that time. The track inspector said that he had made a string-line measurement at this location Sunday, July 16, and found it to be 7/8 of an inch out of alignment. He waited until Monday, July 17, to instruct the surfacing gang foreman to adjust the alignment.

After the alignment was completed and prior to the accident, two loaded trains passed over this location at 40 mph, without incident. This was not in accordance with the UP CWR Plan, Rule 5.4 or the UP Engineering Field Maintenance Manual, Rule 7.7.13. To comply, a 30-mph speed restriction should have been in place at the time of the derailment.

Conclusions:

The UP was in full compliance with their operational rules and FRA applicable requirements regarding operations. They were not in compliance with their CWR Plan as required by Title 49 of the Code of Federal Regulations (CFR) Section 213.119, nor were they in compliance with their own Engineering track maintenance handbook. One recommendation for civil penalty for failure to comply with 49 CFR 213.119.02 was issued.

After the derailment the UP modified their Rule 7.7.13, Ordinary Maintenance, Section B, for temperatures 80/85 F and above. When a Level 1 heat restriction has been placed or is forecast, the maximum speed is now 10 mph for jointed rail and 15 mph for CWR until 9:01 p.m., on the day the work is performed and at least three trains have operated over the track.

Probable cause

The Federal Railroad Administration found the probable cause to be T-109 Track alignment irregular (buckled/sunkink)