



***Federal Railroad Administration  
Office of Railroad Safety  
Accident and Analysis Branch***

***Accident Investigation Report  
HQ-2015-1008***

***Union Pacific Railroad Company (UP)  
McGrew, NE  
February 11, 2015***

***Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, 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.***

TRAIN SUMMARY


|  |                           |   |
|--|---------------------------|---|
| 1. Name of Railroad Operating Train #1<br>Union Pacific Railroad Company | 1a. Alphabetic Code<br>UP | 1b. Railroad Accident/Incident No.<br>0215NP021 |
|--|---------------------------|---|

GENERAL INFORMATION

|   |   |   |
|---|---|---|
| 1. Name of Railroad or Other Entity Responsible for Track Maintenance<br>Union Pacific Railroad Company | 1a. Alphabetic Code<br>UP                                     | 1b. Railroad Accident/Incident No.<br>0215NP021               |
| 2. U.S. DOT Grade Crossing Identification Number  | 3. Date of Accident/Incident<br>2/11/2015                     | 4. Time of Accident/Incident<br>11:40 AM                      |
| 5. Type of Accident/Incident<br>Derailment  |   |   |
| 6. Cars Carrying<br>HAZMAT 0  | 7. HAZMAT Cars<br>Damaged/Derailed 0                          | 8. Cars Releasing<br>HAZMAT 0                                 |
| 9. People<br>Evacuated 0  | 10. Subdivision<br>South Morrill                              |   |
| 11. Nearest City/Town<br>McGrew   | 12. Milepost (to nearest tenth)<br>128.3                      | 13. State Abbr.<br>NE   |
| 14. County<br>SCOTTS BLUFF  |   |   |
| 15. Temperature (F)<br>55 °F  | 16. Visibility<br>Day   | 17. Weather<br>Clear  |
| 18. Type of Track<br>Main   |   |   |
| 19. Track Name/Number<br>Main Track No. 2   | 20. FRA Track Class<br>Freight Trains-60, Passenger Trains-80 | 21. Annual Track Density<br>(gross tons in millions)<br>185.4 |
| 22. Time Table Direction<br>East  |   |   |

OPERATING TRAIN #1

|  |  |                        |  |                                     |   |                    |  |  |            |                                    |            |                        |            |  |
|--|--|------------------------|--|-------------------------------------|---|--------------------|--|--|------------|------------------------------------|------------|------------------------|------------|--|
| 1. Type of Equipment Consist:<br>Freight Train   |  |                        |  |                                     | 2. Was Equipment Attended?<br>Yes   |                    | 3. Train Number/Symbol<br>CATNW10                        |  |            |                                    |            |                        |            |  |
| 4. Speed (recorded speed, if available)<br><br>R - Recorded<br>E - Estimated   |  | Code<br><br>R          | 5. Trailing Tons (gross excludng power units)<br><br>19448 |                                     | 6a. Remotely Controlled Locomotive?<br>0 = Not a remotely controlled operation<br>1 = Remote control portable transmitter<br>2 = Remote control tower operation<br>3 = Remote control portable transmitter - more than one remote control transmitter |                    |  |  |            | Code<br><br>0                      |            |                        |            |  |
| 6. Type of Territory<br><br>Signalization:<br>Signaled<br><br>Method of Operation/Authority for Movement:<br>Signal Indication<br><br>Supplemental/Adjunct Codes:<br>Q, A  |  |                        |  |                                     |   |                    |  |  |            |                                    |            |                        |            |  |
| 7. Principal Car/Unit  |  | a. Initial and Number  |  | b. Position in Train                |   | c. Loaded (yes/no) |  | 8. If railroad employee(s) tested for drug/ alcohol use, enter the number that were positive in the appropriate box. |            | Alcohol                            |            | Drugs                  |            |  |
| (1) First Involved<br>(derailed, struck, etc.)   |  | ETRX 851223            |  | 75                                  |   | yes                |  |  |            | 0                                  |            | 0                      |            |  |
| (2) Causing (if mechanical, cause reported)  |  | N/A                    |  | 0                                   |   | no                 |  | 9. Was this consist transporting passengers?   |            |                                    |            | No                     |            |  |
| 10. Locomotive Units<br>(Exclude EMU, DMU, and Cab Car Locomotives.)   |  | a. Head End            | Mid Train  |                                     | Rear End  |                    | 11. Cars<br>(Include EMU, DMU, and Cab Car Locomotives.) |  | Loaded     |                                    | Empty      |                        |            |  |
|  |  |                        | b. Manual  | c. Remote                           | d. Manual   | e. Remote          |  |  | a. Freight | b. Pass.                           | c. Freight | d. Pass.               | e. Caboose |  |
| (1) Total in Train   |  | 2                      | 0  | 0                                   | 0   | 1                  | (1) Total in Equipment Consist                           |  | 136        | 0                                  | 0          | 0                      | 0          |  |
| (2) Total Derailed   |  | 0                      | 0  | 0                                   | 0   | 0                  | (2) Total Derailed                                       |  | 33         | 0                                  | 0          | 0                      | 0          |  |
| 12. Equipment Damage This Consist<br><br>1385088   |  |                        | 13. Track, Signal, Way & Structure Damage<br><br>336587    |                                     |   |                    |  |  |            |                                    |            |                        |            |  |
| 14. Primary Cause Code<br><br>M507 - Investigation complete, cause could not be determined (When using this code, the narrative must include the reason(s) why the cause of the accident/incident could not be determined) |  |                        |  |                                     |   |                    |  |  |            |                                    |            |                        |            |  |
| 15. Contributing Cause Code  |  |                        |  |                                     |   |                    |  |  |            |                                    |            |                        |            |  |
| Number of Crew Members   |  |                        |  |                                     |   |                    |  |  |            |                                    |            | Length of Time on Duty |            |  |
| 16. Engineers/Operators  |  | 17. Firemen            |  | 18. Conductors                      |   | 19. Brakemen       |  | 20. Engineer/Operator  |            | 21. Conductor                      |            |                        |            |  |
| 1  |  | 0                      |  | 1                                   |   | 0                  |  | Hrs: 1 Mins: 40  |            | Hrs: 1 Mins: 40                    |            |                        |            |  |
| Casualties to:   |  | 22. Railroad Employees |  | 23. Train Passengers                |   | 24. Others         |  | 25. EOT Device?  |            | 26. Was EOT Device Properly Armed? |            |                        |            |  |
| Fatal  |  | 0                      |  | 0                                   |   | 0                  |  | Yes  |            | Yes                                |            |                        |            |  |
| Nonfatal   |  | 0                      |  | 0                                   |   | 0                  |  | 27. Caboose Occupied by Crew?  |            |                                    |            | N/A                    |            |  |
| 28. Latitude<br><br>41.734457569   |  |                        |  | 29. Longitude<br><br>-103.381261825 |   |                    |  |  |            |                                    |            |                        |            |  |

|  |                           |  |  |   |                                |
|--|---------------------------|--|--|---|--------------------------------|
|  U.S. Department of Transportation<br>Federal Railroad Administration   |                           | <b>FRA FACTUAL RAILROAD ACCIDENT REPORT</b>  |  | FRA File #HQ-2015-1008  |                                |
| <b>CROSSING INFORMATION</b>  |                           |  |  |   |                                |
| <b>Highway User Involved</b>   |                           |  | <b>Rail Equipment Involved</b>                 |   |                                |
| 1. Type  |                           |  | 5. Equipment                                   |   |                                |
| 2. Vehicle Speed ( <i>est. mph at impact</i> )   |                           | 3. Direction ( <i>geographical</i> )   |  | 6. Position of Car Unit in Train                                  |                                |
| 4. Position of Involved Highway User   |                           |  | 7. Circumstance                                |   |                                |
| 8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials?  |                           |  | 8b. Was there a hazardous materials release by |   |                                |
| 8c. State here the name and quantity of the hazardous material released, if any.   |                           |  |  |   |                                |
| 9. Type of Crossing Warning<br><div>1. Gates            4. Wig wags            7. Crossbucks    10. Flagged by crew<br/>2. Cantilever FLS   5. Hwy. traffic signals   8. Stop signs    11. Other (<i>spec. in narr.</i>)<br/>3. Standard FLS   6. Audible            9. Watchman    12. None</div> |                           |  | 10. Signaled Crossing Warning                  |   | 11. Roadway Conditions         |
| 12. Location of Warning  |                           | 13. Crossing Warning Interconnected with Highway Signals                                   |  | 14. Crossing Illuminated by Street Lights or Special Lights       |                                |
| 15. Highway User's Age   | 16. Highway User's Gender | 17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train |  | 18. Highway User  |                                |
| 19. Driver Passed Standing Highway Vehicle   |                           | 20. View of Track Obscured by ( <i>primary obstruction</i> )                               |  |   |                                |
| Casualties to:   | Killed                    | Injured  | 21. Driver was                                 |   | 22. Was Driver in the Vehicle? |
| 23. Highway-Rail Crossing Users  |                           | 24. Highway Vehicle Property Damage ( <i>est. dollar damage</i> )                          |  | 25. Total Number of Vehicle Occupants ( <i>including driver</i> ) |                                |
| 26. Locomotive Auxiliary Lights?   |                           |  | 27. Locomotive Auxiliary Lights Operational?   |   |                                |
| 28. Locomotive Headlight Illuminated?  |                           |  | 29. Locomotive Audible Warning Sounded?        |   |                                |

10. Signaled Crossing Warning

- 1 - Provided minimum 20-second warning
- 2 - Alleged warning time greater than 60 seconds
- 3 - Alleged warning time less than 20 seconds
- 4 - Alleged no warning
- 5 - Confirmed warning time greater than 60 seconds
- 6 - Confirmed warning time less than 20 seconds
- 7 - Confirmed no warning
- N/A - N/A

Explanation Code

- A - Insulated rail vehicle
- B - Storm/lightning damage
- C - Vandalism
- D - No power/batteries dead
- E - Devices down for repair
- F - Devices out of service
- G - Warning time greater than 60 seconds attributed to accident-involved train stopping short of the crossing, but within track circuit limits, while warning devices remain continuously active with no other in-motion train present
- H - Warning time greater than 60 seconds attributed to track circuit failure (e.g., insulated rail joint or rail bonding failure, track or ballast fouled)
- J - Warning time greater than 60 seconds attributed to other train/equipment within track circuit limits
- K - Warning time less than 20 seconds attributed to signals timing out before train's arrival at the crossing/island circuit
- L - Warning time less than 20 seconds attributed to train operating counter to track circuit design direction
- M - Warning time less than 20 seconds attributed to train speed in excess of track circuit's design speed
- N - Warning time less than 20 seconds attributed to signal system's failure to detect train approach
- O - Warning time less than 20 seconds attributed to violation of special train operating instructions
- P - No warning attributed to signal systems failure to detect the train
- R - Other cause(s). Explain in Narrative Description

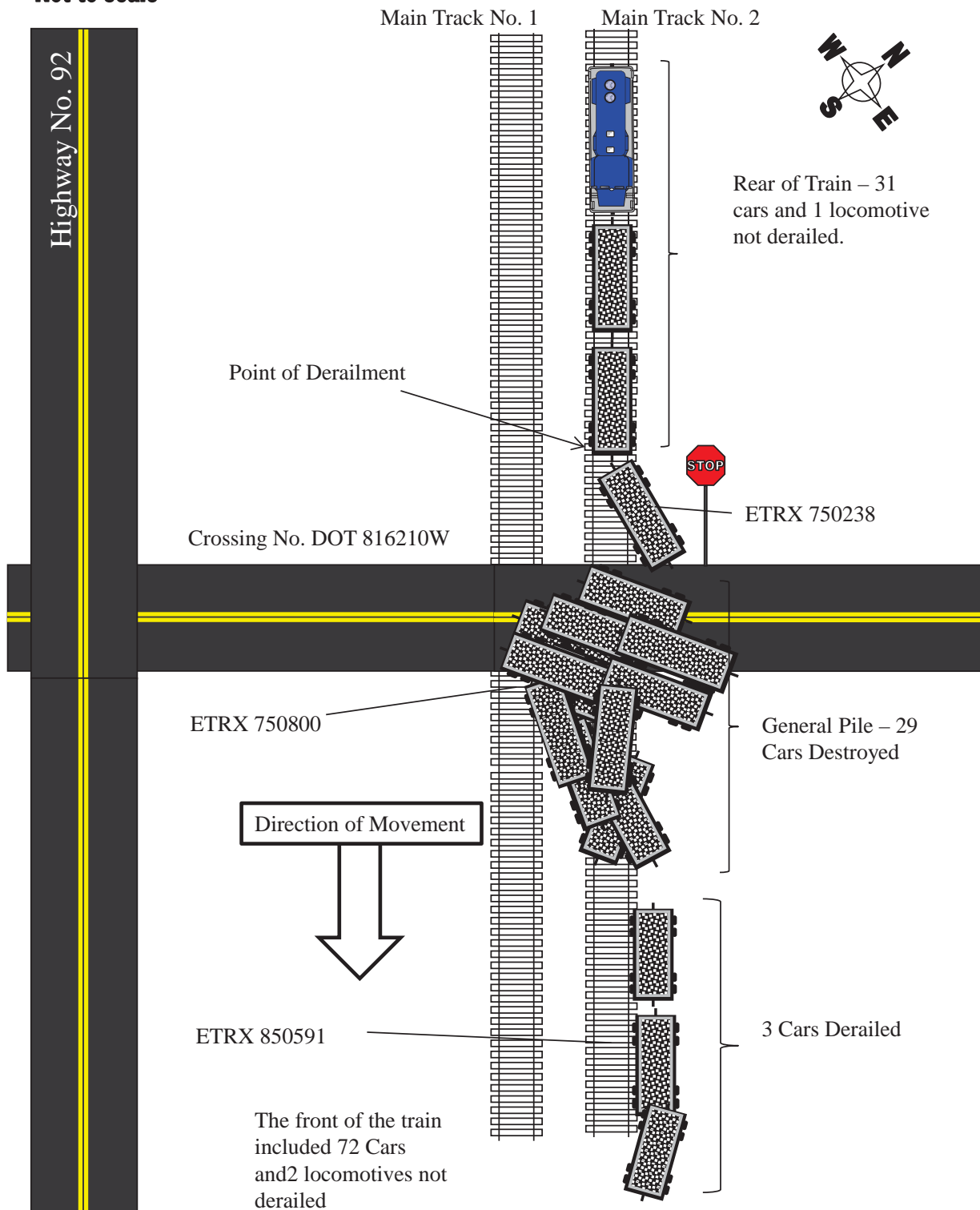
SKETCHES

HQ-2015-1008 Sketch

Report No. HQ-2015-1008, Derailment

UP - February 11, 2015

\* Not to scale





# FRA FACTUAL RAILROAD ACCIDENT REPORT

## SYNOPSIS

On February 11, 2015, at 11:40 a.m., MST, 33 cars of an eastbound Union Pacific Railroad (UP) loaded coal train operating on Main Track Number 2 derailed. Train CATNW10, with 136 cars and 2 locomotives on the front and one distributed power unit (DP) on the rear, was operating in cab signal territory near the maximum authorized speed of 50 mph as verified by the event recorder. The derailment occurred on the South Morrill subdivision at Milepost 128.3, approximately 3 miles from the town of McGrew, Nebraska. Main Track Number 1 was also damaged and a private highway-rail grade crossing was damaged and temporarily closed.

The weather was sunny with clear skies and 55 degrees Fahrenheit.

The total Federal Railroad Administration (FRA) reportable damage is \$1,721,675.

There were no injuries or hazardous material spills.

This is not a crude oil or Amtrak route.

It is unknown if this was a positive train control-preventable derailment.

Investigators from UP found a broken wheel during the accident investigation and determined the probable cause to be E62C-Broken Plate (wheels). Laboratory analysis concluded the wheel broke as a result of the derailment and did not cause the derailment. However, UP officials informed FRA inspectors they would not change the cause based on the laboratory report.

Due to the results of the laboratory metallurgical analysis and on-site investigation, FRA finds the probable cause of the accident to be Cause Code M507- Cause could not be determined



## NARRATIVE

### Circumstances Prior to the Accident

The crew of Union Pacific (UP) Train CATNW10 consisted of an engineer and conductor. They went on duty at 10:00 a.m. MST on February 11, 2015, at South Morrill, Nebraska. This was their away-from-home terminal, and both received more than the statutory off-duty rest period prior to reporting for duty.

The crew's assigned coal train consisted of three locomotives with two on the front of the train and one on the rear. It had 136 loaded hopper cars. The train was 7,568 feet long and weighed 19,448 tons. Train CATNW10 received a Class I air brake test on February 9 in North Platte, Nebraska, prior to being loaded. The train was scheduled to return to North Platte, where the crew would be relieved and the train would receive a Class I air brake test. There were no changes to the train consist during this trip.

As eastbound UP Train CATNW10 approached the accident area, the Locomotive Engineer was seated at the controls on the south side of the leading locomotive and the Conductor was seated on the north side of the same locomotive.

In this area of the railroad the track is tangent. It has a slight .25-percent descending grade to the east. The track is constructed of 141-pound continuous-welded rail (CWR) on concrete ties and fastened with Safelock One clips. There is a private crossing at Milepost (MP) 128.24. On the south side of the railroad, Nebraska Highway 92 runs parallel and is approximately 150 feet from the tracks.

The railroad timetable direction of the train was east. The geographic direction was southeast. Timetable directions are used throughout this report.

### The Accident

UP Train CATNW10 was being operated on Main Track Number 2 near the maximum authorized speed of 50 mph approaching the derailment. According to the crew it was an uneventful trip. They reported some soft spots in the roadbed, the track was straight and there were no speed restrictions. The speed at the time of derailment was 49 mph as recorded on the event recorder. The maximum authorized speed for this territory is 60 mph as noted in the current UP North Platte Timetable Number 4. The maximum authorized speed for this train is 50 mph as noted in the UP System Special Instructions effective April 20, 2012.

The train crew was traversing two crossings in close proximity to each other. The lead locomotive traversed the first crossing and the Engineer was preparing to blow the horn for the next crossing when the train experienced a train line initiated emergency brake application. The Engineer looked back and observed coal dust in the air and the Conductor radioed to the Dispatcher and stated they had come to an emergency stop. The Dispatcher stated the dispatch system showed the train occupying Main Track Number 1 as well. The Conductor inspected the train and confirmed the derailment and noted the train was in three parts. The crew stayed with the train until UP management arrived.

### Analysis and Conclusion

**Analysis - Toxicological Testing:** The two crew members of Train CATNW10 were tested under FRA mandatory post-accident toxicological test requirements because this accident exceeded the 1 million dollar major accident threshold.

**Conclusion:** The test results obtained from FRA Alcohol and Drug Control Program Manager were negative.

**Analysis - Fatigue:** FRA obtained fatigue-related information for the 10-day period preceding this accident, including the 10-day work history (on-duty/off-duty cycles) for all of the employees involved.

**Conclusion:** Upon analysis of that information, FRA concluded fatigue was not probable for any of the employees.

**Analysis - Locomotive Engineer Operating Performance:** The lead locomotive was equipped with a speed indicator and event recorder as required. The data was downloaded by the UP Manager Train Operations (MTO) at the accident site, and analyzed by UP officials at the North Platte Service Unit office in North Platte.

**Conclusion:** The Locomotive Engineer was in compliance with all applicable railroad operating and train handling requirements.

**Analysis - Lab Analysis of Broken Wheel:** Remnants of a broken wheel were discovered on the south side of the general pile of cars and the remainder of the wheel set (axle, bearings and mate wheel) was uncovered from the debris. This broken wheel and its parts were delivered to Engineering Systems Incorporated (ESI) located in Omaha, Nebraska.

FRA analyzed the broken wheel serial number and car owner maintenance records for the train. Additionally, in-train forces and derailment dynamics were analyzed.

**Conclusion:** The ESI lab found no indication of abnormal wear and concluded the break was a sudden overload fracture. The lab concludes the wheel broke during the derailment and was not a cause of the derailment.

The broken wheel was applied to Car Number ETRX 750800 on September 20, 2012. The car was located 12 cars behind the first derailed car. The car's position in the train and general pile, as well as the laboratory determination, make it unlikely that the suspected broken wheel caused the derailment.

**Analysis - Track; Rail; and Geometry Car Inspections:** The track was last inspected by the UP Track Inspector on February 10, 2015, with additional inspections on February 8 and 9.

The last three rail detector tests on Main Track Number 2 were on February 2, 2015; January 14, 2015; and December 1, 2014. The UP EC5 Track Geometry car's last two inspections on Main Track Number 2 were on November 8, 2014, and April 16, 2014.

During the derailment investigation a walking inspection of the tracks was made to look for wheel flange markings on the top of the rail or on the ties.

**Conclusion:** Prior to the accident the track inspection exceeded the required frequency for Class 4 track, which is twice weekly with at least 1 calendar day between inspections. There were no defective track conditions reported for the derailment location.

The internal rail defect inspection was in compliance with the Track Safety Standards (TSS) which requires an inspection interval of 40 million gross tons (MGT) between inspections. The UP South Morrill Subdivision has an annual track density on Main Track Number 2 of 185.4 MGT.

There were no defective rail conditions reported at the derailment location.

The EC5 Track Geometry inspections were in compliance with the TSS for inspection of track constructed with concrete cross-ties which requires two annual inspections on track with over 40 MGT. This section of track has a track density of 185.4 MGT. There were no defective conditions in the derailment area on either test.

After the accident, a walking inspection discovered marks on top of the north rail and then on the ties consistent with wheel flange markings. The markings were in the direction of travel some 100 feet prior to the crossing and this was deemed the point of derailment (POD).

**Analysis - Rail Cars on Train CATNW10:** A walking inspection of the rail cars that made it over the POD was made on February 11. Particular attention was paid to wheel conditions and signs of broken rail such as blunt marks on the wheel treads.

**Conclusion:** The cars were inspected by UP mechanical personnel from South Morrill, with no specific wheel marks found. However several of the cars nearest the POD had ballast marks on the flange, tread and plate area. They were not indicative of being derailed but rather having possibly traveled through ballast in soft road conditions.

Analysis - Weather: Daily weather temperatures and rainfall were reviewed from February 1, until the date of the derailment to determine if the roadbed may have recently been settled or soft.

Conclusion: From February 6, through February 10, the daily high temperature was above 60 degrees F which is above the normal high of 43 degrees F. The area had received 39.9 inches of snow which is 14.9 inches above the average of 24.0 inches to date. Considering the high sand content of the soil in the area, it is possible the roadbed was settled or soft in the days prior to and including the day of the accident.

#### Overall Conclusions

UP was in compliance with its own and all applicable FRA standards. The data reviewed from the event recorder ruled out train handling as a cause. There were marks on the rail prior to the POD but it was impossible to determine if these indicated a cause to the derailment or were a result of the derailment.

The track inspections were conducted within the required FRA required frequency and no FRA track defects were noted.

The UP investigation focused on pieces of broken wheel found south of the general pile of cars. The lab report for this wheel determined the wheel broke as a result of the derailment and did not cause the accident.

Above normal precipitation and temperatures contributed to the soft road bed reported by the crew and mechanical employees and may have contributed to the ballast marks on the wheels, but it is not clear what impact these conditions had on the derailment.

#### Probable Cause and Contributing Factors

Due to the results of the laboratory metallurgical analysis and on-site investigation, FRA finds the probable cause of the accident to be Cause Code M507- Cause could not be determined.