Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2007-64

CSX Transportation
Grand Ridge, FL
October 20, 2007

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2007-64

1.Name of Railroad Operating Train #1: CSX Transportation [CSX]	1a. Alphabetic Code: CSX	1b. Railroad Accident/Incident No.: 000038157
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident No.: N/A
3.Name of Railroad Operating Train #3: N/A	3a. Alphabetic Code: N/A	3b. Railroad Accident/Incident No.: N/A
4.Name of Railroad Responsible for Track Maintenance: CSX Transportation [CSX]	4a. Alphabetic Code: CSX	4b. Railroad Accident/Incident No.: 000038157
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 10 | Day 20 | Year 2007	7. Time of Accident/Incident: 09:57: ☑ AM ☐ PM

8. 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)* — Code: 01

9. Cars Carrying HAZMAT	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
57	8	0	50	Jacksonville

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
Grand Ridge	K800.2	N/A	FL	JACKSON

18. Temperature (F) *(specify if minus)*	19. Visibility *(single entry)* 1. Dawn 2. Day 3.Dusk 4.Dark — Code	20. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow — Code	21. Type of Track 1. Main 2. Yard 3. Siding 4. Industry — Code
82 F	2	1	1

22. Track Name/Number	23. FRA Track Class (1-9, X) — Code	24. Annual Track Density *(gross tons in millions)*	25. Time Table Direction 1. North 2. South 3. East 4. West — Code
single main	4	24	2

OPERATING TRAIN #1

26. 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	27. Was Equipment Attended? 1. Yes 2. No — Code	28. Train Number/Symbol
	1	1	Q60919

29. Speed *(recorded speed, if available)* — Code: R
R - Recorded
E - Estimated 47 MPH

30. Trailing Tons *(gross tonnage, excluding power units)*: 5921

31. 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): k | N/A | N/A | N/A | N/A

31a. 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

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	CSXT7735	1	N/A
(2) Causing *(if mechanical cause reported)*	0	0	N/A

33. 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

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

35. 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	5	0	0	0	0
(2) Total Derailed	5	0	0	0	0

36. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	27	0	78	0	0
(2) Total Derailed	9	0	18	0	0

37. Equipment Damage — This Consist: $1,319,500.00

38. Track, Signal, Way, & Structure Damage: $80,000.00

39. Primary Cause Code: T220

40. Contributing Cause Code: N/A

Number of Crew Members

41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen
1	0	1	0

Length of Time on Duty

45. Engineer/Operator	46. Conductor
Hrs 2 Mi 27	Hrs 2 Mi 27

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	0	0	0

50. EOT Device? 1. Yes 2. No — 1

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

52. Caboose Occupied by Crew? 1. Yes 2. No — 2

OPERATING TRAIN #2

53. 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	54. Was Equipment Attended? 1. Yes 2. No — Code	55. Train Number/Symbol
	N/A	N/A	N/A

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

58. 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

58a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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57. 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

59. 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

60. 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

61. Was this consist transporting passengers? (Y/N) N/A

62. 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

63. Cars	Loaded a. Freight	Loaded 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

64. Equipment Damage This Consist N/A

65. Track, Signal, Way, & Structure Damage N/A

66. Primary Cause Code N/A

67. Contributing Cause Code N/A

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

72. Engineer/Operator Hrs N/A Mi N/A

73. Conductor Hrs N/A Mi N/A

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

77. EOT Device? 1. Yes 2. No N/A

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

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

OPERATING TRAIN #3

80. 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

81. Was Equipment Attended? 1. Yes 2. No Code N/A

82. Train Number/Symbol N/A

83. Speed *(recorded speed, if available)* Code
R - Recorded
E - Estimated N/A MPH N/A

84. Trailing Tons *(gross tonnage, excluding power units)* N/A

85. 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) N/A N/A N/A N/A N/A

85a. 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 N/A

86. 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

87. 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

88. Was this consist transporting passengers? (Y/N) N/A

89. 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

90. Cars	Loaded a. Freight	Loaded 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

91. Equipment Damage This Consist N/A

92. Track, Signal, Way, & Structure Damage N/A

93. Primary Cause Code N/A

94. Contributing Cause Code N/A

Number of Crew Members

95. Engineer/ Operators	96. Firemen	97. Conductors	98. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

99. Engineer/Operator Hrs N/A Mi N/A

100. Conductor Hrs N/A Mi N/A

Casualties to:	101. Railroad Employees	102. Train	103. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

104. EOT 1. Yes 2. No N/A

105. Was EOT Device Properly 1. Yes 2. No N/A

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

Highway User Involved

107. Code N/A
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)*

108. Vehicle Speed *(est. MPH at impact)* N/A

109. *geographical)* Code N/A
1.North 2.South 3.East 4.West

Rail Equipment Involved

111. Equipment Code N/A
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)*

112. Position of Car Unit in N/A

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

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

114a. 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

114b. Was there a hazardous materials release	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

114c. State here the name and quantity of the hazardous materials released, if any.
N/A

115. Type Crossing Warning	1.Gates	4.Wig Wags	7.Crossbucks	10.Flagged by crew
	2.Cantilever FLS	5.Hwy. traffic signals	8.Stop signs	11.Other *(spec. in narr.)*
	3.Standard FLS	6.Audible	9.Watchman	12.None

Code(s)							
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

116. Signaled Crossing *(See instructions for codes)*	Code
	N/A

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

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

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

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

121. Age	122. Driver's Gender	Code
N/A	1. Male 2. Female	N/A

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

124. 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

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

126. 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

Casualties to:	Killed	Injured
129. Highway-Rail Crossing Users	N/A	N/A

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

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

130. Highway Vehicle Property Damage *(est. dollar damage)*	
	N/A

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

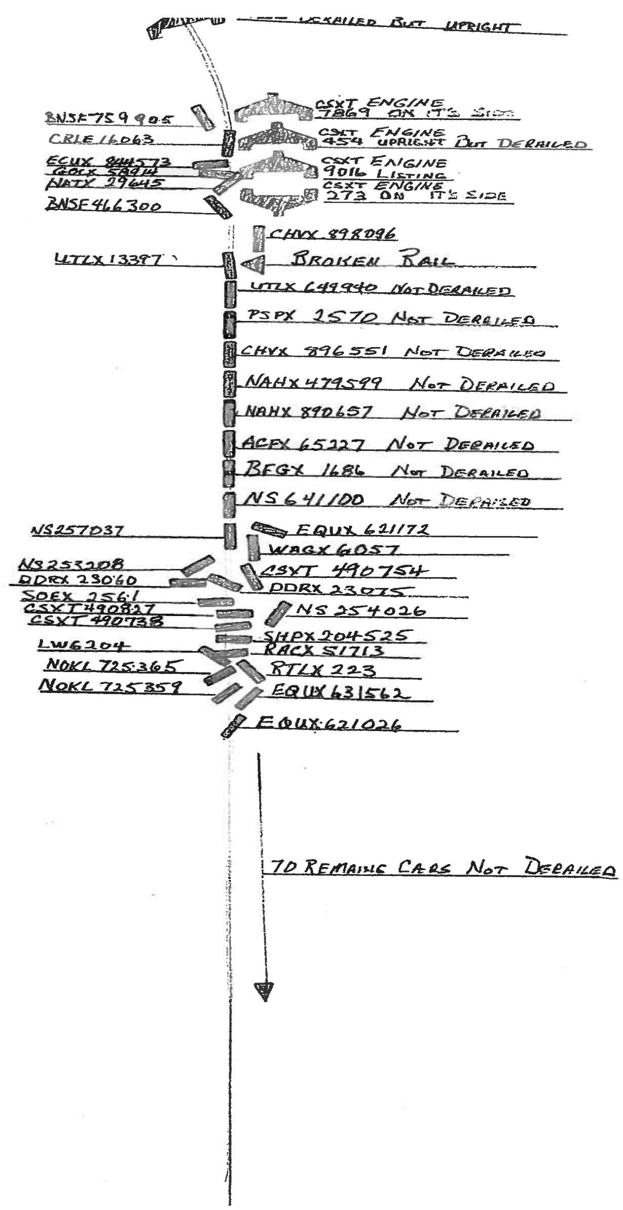
132. Locomotive Auxiliary Lights?	Code
1. Yes 2. No	N/A

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

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

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

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



137. SYNOPSIS OF THE ACCIDENT

On October 20, 2007, at 9:57 a.m. EST a southbound CSX Transportation (CSX) freight Train Q609-19 derailed at milepost (MP) K800.2 on the P&A Subdivision, Jacksonville Division near Grand Ridge, Florida (FL).

CSX Train Q609-19 consisted of five locomotives and 105 freight rail cars. All five locomotives and an additional 27 cars derailed. The lead locomotive remained upright, the second locomotive was on its side, and the third through the fifth locomotives were leaning. The fuel tank of the second locomotive ruptured causing diesel fuel to spill onto the ballast.

The first eight rail cars behind the locomotives derailed, however the 9th through the 16th rail cars remained on the track. The 17th through the 35th rail cars derailed and the 36th through the 105th rail cars remained on the track. Eight of the 27 derailed rail cars contained hazardous material, but none were compromised and did not leak or discharge any material. Emergency responders issued a half mile precautionary evacuation, however it was removed shortly after officials determined the site was safe.

There were no injuries to CSX employees as a result of the accident. The equipment damages totaled $1,319,500, and track damages of $80,000.

At the time of the derailment, it was daylight, clear, and 82 °F.

The probable cause of the derailment was a broken rail described as an internal 70 percent transverse compound fissure that had propagated into a 100 percent rail failure.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

CSX Train Q609-19 originated in Waycross, Georgia (GA) where a pre-departure car inspection and Class I air brake test were performed. The train departed Waycross on October 19, 2007 with five locomotives, 27 loaded rail cars and 78 empties rail cars for a total of 5,921 trailing tons and was 6,579 feet in length. From Waycross, the train was routed through Baldwin, FL and arrived in Chattahoochee, FL at 4:00 a.m. on October 20, 2007. No work was performed en route. Chattahoochee is the junction of the CSX Tallahassee and P&A Subdivisions and a CSX crew change point.

The crew of CSX Train Q609-19 included an engineer and a conductor. They went on duty at 7:30 a.m. on October 20, 2007, in Chattahoochee, which is the away from home terminal. Both crew members received a required statutory off-duty rest period more than 12 hours prior to reporting for duty. After the initial job briefing, the new crew boarded the train and departed Chattahoochee southbound at 9:25 a.m.

CSX Train Q609-19 was traveling southward on the Jacksonville subdivision. The engineer was operating the locomotive in throttle position 8, traveling on a clear block signal indication at 47 miles per hour (mph) approaching the accident area at MP 800.2. The engineer was seated in the cab of the locomotive at the controls on the west side of the lead locomotive, CSXT 7735, and the conductor was seated on the east side of the same locomotive at the conductor's table.

Beginning at MP K802.0 in the direction of travel, the main track grade descends at .52 percent for about ½ - mile. The grade then ascends at an average of .37 percent to the derailment site, a distance of about 1.3 miles. Trains traveling in a southward direction traverse tangent track for three miles prior to the derailment site. Sixty-six feet south of the point of derailment (POD), MP 800.2, there is a 2-degree, 4-minute left hand curve. The size of the rail at this location is 115 lbs. continuous welded rail (CWR) fastened to wooden crossties by spikes. Freight trains operate under Direct Train Control (DTC) with a maximum speed of 49 mph as designated in the current CSX Jacksonville Division Timetable No. 5 dated October 1, 2007.

The railroad timetable direction of Train Q609-19 was south. Timetable direction is used for this report.

THE ACCIDENT

At 9:56 a.m., Train Q609-19 passed the Grand Ridge Defect Detector (DD), a hot box indicator and dragging equipment detector, at MP 801.5. At this time, the conductor began writing down the information from the detector. The engineer stated that he noticed about three car lengths ahead of the locomotive a small section of the west rail missing. He could not remember if he initiated an emergency application of the train air brake system or throttled down before the locomotive took a downward plunge and began to sway back and forth. The conductor was thrown to the floor. Tie plates and track spikes were flying by the cab of the locomotive as it moved down the track. The lead locomotive traveled 785 feet before coming to a stop at approximately 9:58 a.m.

After the train stopped, the conductor contacted the CSX dispatcher via the locomotive radio and informed him of the derailment. He dismounted the train to perform an inspection and discovered the lead locomotive derailed on the track bed between the rails. He walked north and found the four trailing locomotives had also derailed. Locomotives CSXT 7869 and CSXT 273 were on their side, CSXT 454 remained upright, and CSXT 9016 was leaning to the west. Fuel was leaking from CSXT 7869. He found the first eight freight cars were also derailed. The engineer dismounted the lead locomotive and noticed Locomotive CSXT 454 was still running and shut it down.

The conductor continued inspecting the train and counted 19 additional derailed cars. Eight of the derailed cars contained hazardous material including a residue car containing Xylenes, four residue cars containing Ammonium Nitrate, and another residue car containing Methyl Ethyl Ketone. Also derailed was a loaded car of Sluorosilicic Acid and two loaded cars containing Phosphoric Acid. None of the cars were breached and no hazardous commodities were discharged or spilled.

The Jackson County Fire Department and Emergency Responders arrived at the derailment site around 10:30 a.m. and issued a precautionary ½ - mile emergency evacuation order. When officials determined that no hazardous commodities were leaking, local residents were allowed to return to their homes. A retaining ditch and dam were constructed to capture the flow of diesel fuel leaking from the locomotives. Later, a pumping truck was brought in to recover the diesel fuel. It was estimated that a total of 3,500 gallons of diesel fuel leaked from the derailed locomotives.

ANALYSIS AND CONCLUSION:

ANALYSIS:

The engineer said that he saw a section of the rail missing from the track as they approached the derailment site. The lead locomotive, CSXT 7735, was equipped with a video camera. Federal Railroad Administration (FRA) inspectors reviewed the locomotive video and could also see the missing rail section, confirming the engineer's statement. The locomotive event recorder data was downloaded and reviewed. FRA took no exception to the train handling or the crew members performance.

After the wheels of lead Locomotive CSXT 7735 impacted the broken rail, the west CWR rail turned over, allowing the wheels on the west side of the locomotive to mount and travel along the web section of the rail. The wheels on the east side of the lead locomotive subsequently fell inward toward the gage of the track and traveled on the crossties before coming to a stop. The four trailing locomotives followed the lead locomotive and immediately derailed.

A 28-inch segment of rail was found at the Point of Derailment (POD) during the accident investigation conducted by the FRA. The piece of rail had a 70 percent internal transverse fissure defect, which was clearly visible and located near the head of the rail. This internal defect ran through the entire length of the 28 -inch rail segment and propagated into a 100 percent rail failure.

The south end of the 28-inch piece of rail also had significant wheel batter marks on the head portion of the rail indicating previous train wheels had impacted the rail before it completely broke out. The rail end batter was observed on both receiving and leaving ends of the rail break, which further indicated the rail was broken out by a previous train. The north end of the rail was not as severely battered as the south end, indicating the

south end of the rail broke first under train movement. It could not be determined which train caused the 28-inch rail to completely fail prior to CSX Train Q609-19's arrival.

The rail was 115 lbs. continious welded rail (CWR) rolled in May of 1966 by Illinois Steel Company. The last rail inspection was performed by Sperry Rail Services on August 23, 2007. Sperry Rail Services report number 235A indicates no rail defects at the derailment location. The nearest 115 lbs. transverse rail defect noted during the August 23rd inspection was identified at MP K802.3951. CSX contracts Sperry Rail Services to test this track line segment for internal rail defects on a 93 day cycle.

The last scheduled track inspection conducted by a CSX track inspector was on October 19th and no exceptions at the derailment location were noted by CSX records during that inspection date. This line segment is non-signaled and neither the train dispatcher nor a train crew operating over this track would be given any prior warning of this broken rail condition.

ANALYSIS:

FRA obtained fatigue related information, for the 10-day period preceding this incident 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.

CONCLUSION:

The engineer’s statement, the locomotive video, and the discovery of the defective 28-inch rail containing the transverse fissure clearly point to the broken rail as the probable cause of the derailment. The missing rail segment allowed the wheels of the lead locomotive to derail starting a chain reaction that eventually derailed the four trailing locomotives and 27 freight rail cars.

PROBABLE CAUSE:

The probable cause of the derailment was a broken rail described as an internal 70 percent transverse compound fissure that had propagated into a 100 percent rail failure.