Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2012-41

CSX Transportation (CSX)
St. Charles, VA
December 9, 2012

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2012-41

1.Name of Railroad Operating Train #1: CSX Transportation [CSX]	1a. Alphabetic Code: CSX	1b. Railroad Accident/Incident No.: 000110904
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: Norfolk Southern Corp. [NS]	4a. Alphabetic Code: NS	4b. Railroad Accident/Incident No.: 102473
5. U.S. DOT_AAR Grade Crossing Identification Number:	6. Date of Accident/Incident: Month 12 Day 09 Year 2012	7. Time of Accident/Incident: 11:37:00 ☐ 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
0	N/A	N/A	0	Pocahontas

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
St. Charles	TB23.2	VA	51	LEE

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
55 F	4	4	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
Kemmer Gem Lead	1	25	4

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	C82109

29. Speed *(recorded speed, if available)* R - Recorded E - Estimated — Code	31. Method(s) of Operation *(enter code(s) that apply)*	31a. Remotely Controlled Locomotive?
9 MPH — R	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)*	0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter
30. Trailing Tons *(gross tonnage, excluding power units)*: 5000	Code(s): 1 N/A N/A N/A N/A	0

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	CSXT378109	25	yes
(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
0	0

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	3	0	0	0	0
(2) Total Derailed	0	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	53	0	0	0	0
(2) Total Derailed	0	0	0	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
$59,955.00	$55,520.00	T210	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 8 Mi 15	Hrs 2 Mi 37

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	1
Nonfatal	1	0	0

50. EOT Device? 1. Yes 2. No — 2

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

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

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)* R - Recorded E - Estimated — Code	58. Method(s) of Operation *(enter code(s) that apply)*	58a. Remotely Controlled Locomotive?
0 MPH — N/A	a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track	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)*	0	0	N/A
(2) Causing *(if mechanical cause reported)*	0	0	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	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

63. Cars	Loaded a. Freight	Loaded 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

64. Equipment Damage This Consist $0.00

65. Track, Signal, Way, & Structure Damage $0.00

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
0	0	0	0

Length of Time on Duty

72. Engineer/Operator Hrs 0 Mi 0

73. Conductor Hrs 0 Mi 0

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	0	0	0
Nonfatal	0	0	0

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? Code 1. Yes 2. No N/A

82. Train Number/Symbol N/A

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

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)*	0	0	N/A
(2) Causing *(if mechanical cause reported)*	0	0	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	0	0	0	0	0
(2) Total Derailed	0	0	0	0	0

90. Cars	Loaded a. Freight	Loaded 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

91. Equipment Damage This Consist $0.00

92. Track, Signal, Way, & Structure Damage $0.00

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
0	0	0	0

Length of Time on Duty

99. Engineer/Operator Hrs 0 Mi 0

100. Conductor Hrs 0 Mi 0

Casualties to:	101. Railroad Employees	102. Train	103. Other
Fatal	0	0	0
Nonfatal	0	0	0

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
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)* N/A

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

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

Rail Equipment Involved

111. Equipment Code
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)* N/A

112. Position of Car Unit in 0

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 Ban	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
0	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	0	0

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)*
0

131. Total Number of Highway-Rail Crossing Users *(include driver)*
0

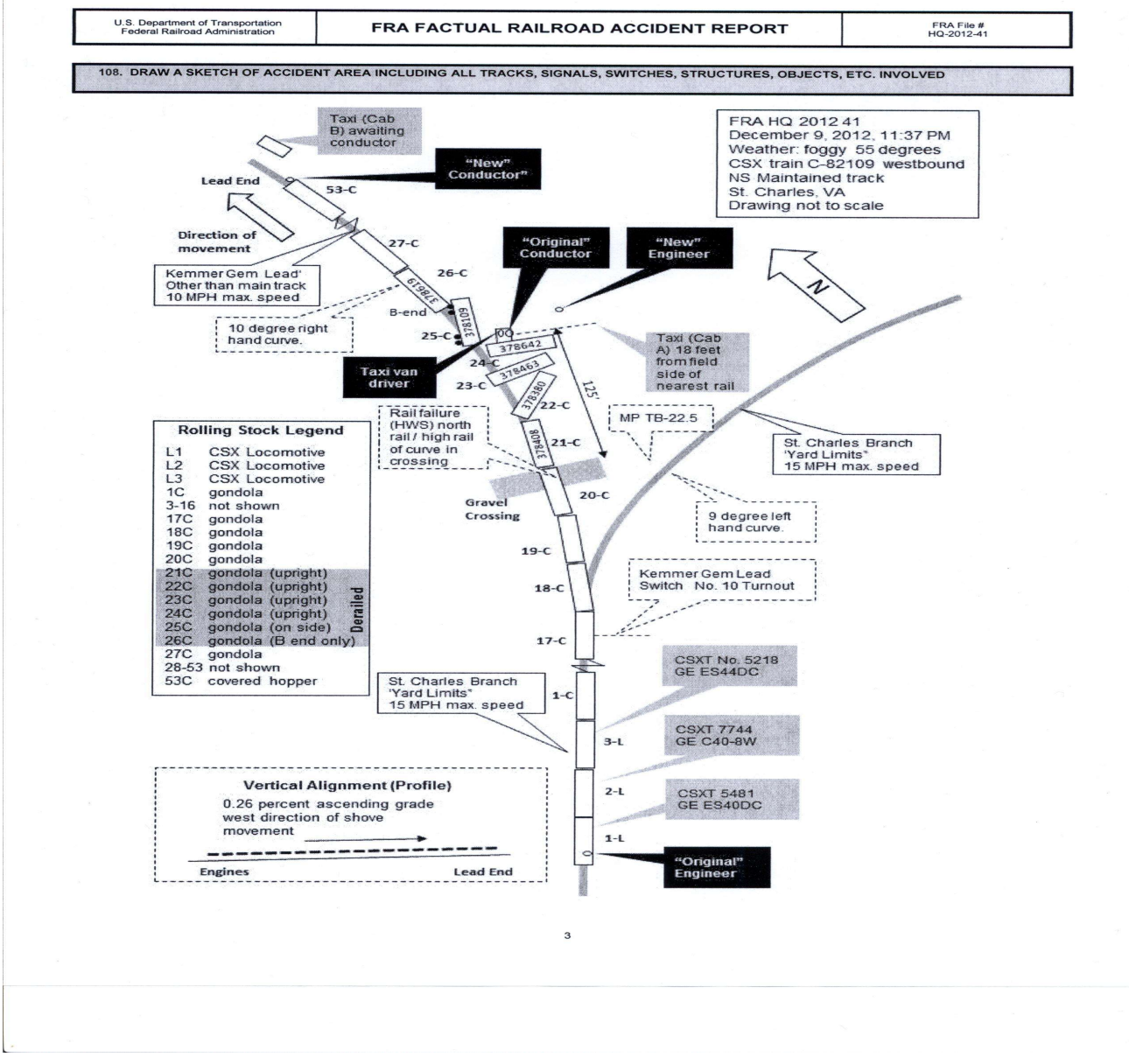
132. Locomotive Auxiliary Lights?	Code
1. Yes 2. No	N/A

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

At 11:37 p.m. on December 09, 2012, CSX Transportation (CSX) train symbol No. C-82109 operating west on Norfolk Southern (NS) track derailed. The derailment occurred at Milepost TB-23.2 on the NS Clinch Valley Extension District in St. Charles, VA. Six loaded coal gondolas derailed; one of the derailed rail cars came to rest on a crew transport van positioned adjacent to the track. The crew transport van was partially crushed, resulting in the death of the van driver and serious injury to a CSX conductor. Damages are reported to be $55,595.00 mechanical and $55,520.00 track and structure.

At the time of the accident it was dark and foggy. The temperature was 55 degrees F.

The accident was caused by a rail failure. Approximately 13 feet of the head of the rail was separated from the web. A head and web separation was identified on the north rail at the point of derailment.

138. NARRATIVE

Circumstances Prior to the Accident

The crew of the CSX C-82109 included a locomotive engineer and a conductor. They first went on duty at 3:30 p.m. December 09, 2012, in Loyall, Kentucky. This was the home terminal for the train crew members, and both received more than statutory off-duty period prior to reporting for duty.

A relief train crew for the CSX C-82109 was also involved in the train movements leading up to the accident. The two member relief crew for the CSX C-82109 included a locomotive engineer and a conductor. They first went on duty at 9:00 p.m. December 09, 2012, in Loyall, KY. This was the home terminal for the train crew members, and both received more than statutory off-duty period prior to reporting for duty.

The original crew was assigned to CSX C-82109. The train consisted of three locomotives and 109 empty coal cars. They boarded the train near Pennington Gap, VA, milepost TB 19.5, NS Pocket Block. After boarding the train at “Pocket” they preceded west 2.7 miles to the St. Charles wye. The crew then cut 53 cars and turned the train on the wye at St. Charles; they traveled west to the Lone Mountain coal load out to load the cars. After loading the cut of 53 cars, the train traveled east beyond the switch accessing the Kemmer Gem lead.

The transport van that was waiting for the operating train crew (Cab A) was positioned on the north side of the track, approximately 18 feet from the field side of the north rail. The transport van hauling the relieving crew (Cab B) arrived at a location near the Kemmer Gem lead switch. The relieving engineer exited Cab B and placed his grip in Cab A. Prior to the arrival of the C-82109, the relief conductor traveled to the west end of the Kemmer Gem lead; here he lit a fusee to mark the location where the rail cars would be spotted. The relief conductor returned to the Kemmer Gem lead switch, he briefed with the assigned conductor and it was decided that the relief conductor would protect the shove move into the track. Following the job briefing, the assigned conductor walked to Cab A.

Cab A was positioned north of the track, approximately 18 feet from the field side of the nearest rail and 125

feet west of a gravel crossing. Cab B was driven to the west end of the Kemmer Gem lead to await the relief conductor. The cab driver and the assigned conductor were sitting in Cab A which was positioned facing west with the driver's side nearest the track. The relief engineer was standing outside of Cab A, close enough to converse with the driver and conductor.

As the west bound train approached the accident area the relief conductor was on the north side of the rear car and the assigned engineer was seated at the controls of the lead locomotive.

The Accident

The train was being operated at 8 mph approaching the accident area. This speed was recorded by the event recorder on the lead locomotive. The maximum authorized speed for all trains on the Kemmer Gem lead is 10 mph, as designated in the current NS System Timetable No.1.

The CSX C-82109 consisted of three locomotives and 53 loaded coal cars. At the time of the derailment, the train was being shoved in a west direction from the St. Charles Branch main track into the Kemmer Gem lead. The operating engineer described his actions as the shove move was initiated. The engineer stated he placed the throttle in No. 5 notch to get the 53 loaded cars moving. When the cars started to move, he moved to throttle position No. 6, as the speed increased he moved the throttle to position No. 7. At this time the engines "lunged badly" according to the engineer. He moved the throttle down to position No. 5 and looked back at the train; he stated everything looked "okay". The engineer radioed the relief conductor on the rear of the 53 car cut and asked if the lunge was felt, the conductor verified that he had felt the lunge. The train continued west for 20 to 25 car lengths, the engineer returned the throttle to position No. 7. At this time, the engines lunged again and moments later the train experienced an undesired emergency brake application.

Twenty-six cars had traversed over a private highway-rail grade crossing; as car No. 378109 traveled over the wheels encountered a discontinuity in the rail. As a result of the rail discontinuity, Car No. 378109 and five additional rail cars derailed. Car No. 378109 impacted an embankment on the north side of the track, as the movement continued west, Car No. 378462 departed the track to the north side and impacted Cab A.

According to NS dispatcher digital recording, the relief conductor lined the route and was in place on the rear of the cars at 11:34 and 08 seconds. At 11:34 and 27 seconds, the train started moving west into the Kemmer Gem lead. The conductor continued to give a car count as the move was made. At 11:37 and 39 seconds, the conductor asked "what was that all about", the engineer stated that he did not know "they just lunged bad". At 11:38 and 08 seconds the relief conductor attempted to reach the conductor positioned in Cab A. The relief conductor then departed the rear of the train and traveled via Cab B back to the location that Cab A was parked. At 11:39 the relief conductor radioed the engineer, and told him to "hit 911", he proceeded to tell him about the derailment. At this time the engineer notified the NS train dispatcher of the accident and need for emergency medical assistance, the dispatcher notified emergency medical service.

Cab A was positioned north of the track, approximately 18 feet from the field side of the nearest rail and 125 feet west of the gravel crossing. The driver of Cab A and the assigned conductor where sitting in the cab. Cab A was positioned facing west with the driver's side nearest the track. The relief engineer was standing outside of the cab, close enough to converse with the driver and conductor. The relief engineer stated that he saw sparks and heard unusual noises. At this time, he ran away from the tracks in a north direction to the nearest house to phone for help. The occupants of the house dialed 911 and the engineer told the dispatcher that there was an emergency and gave them his location. After making the emergency call he returned to the scene, he noted that the cab driver's upper body was in the passenger floor of the van and he was lying flat. The conductor had attempted to exit the van through the passenger side window but had become trapped with his upper body out and his lower body inside the van. At this time the relief engineer waited with the two men until emergency services arrived.

Emergency personnel and Virginia State Police responded to the scene. The cab driver and assigned CSX conductor were removed from the impacted cab. The conductor was air lifted to Holston Valley Hospital in Kingsport, TN, he suffered serious injuries and has been released from the hospital. The driver of the cab was transported to Lee Regional Medical Center in Jonesville, TN, where he was declared dead the morning of Monday December 10, 2012.

Analysis and Conclusions

Analysis- Toxicology Testing: The two on-duty train crews submitted to Post Accident Toxicological Testing under the requirements of 49 CFR Part 219, Subpart C. Test results were negative for the two engineers and two conductors.

Conclusion: Intoxication of the on-duty train crew members was not a factor.

Analysis- Fatigue: FRA obtained fatigue information for the ten day period preceding the derailment. The information included a ten day work/rest history for the four on-duty train crew members.

Conclusion: FRA concluded that fatigue of the four trainmen was not a probable contributing factor in this incident.

Analysis- Locomotive Engineer Operating Performance: The lead locomotive (CSXT 5481) was equipped with an event recorder as required. The relevant event recorder data was downloaded and reviewed by CSX officials and FRA Inspectors.

Conclusion: The locomotive engineer was in compliance with all applicable railroad operating rules and train handling requirements.

Analysis- Mechanical: On December 10, 2012 and December 11, 2012, FRA Investigators formed a group of qualified inspectors to evaluate the derailment of CSX train C-82109. The mechanical condition of the equipment involved and document review of this derailment yielded the following information:

CSX train C-82109 consisted of three locomotive units at the head end and 107 coal cars. The train was empty, weighed 3,677 tons and was 5,900 feet in length when it arrived in St. Charles, VA. An air brake inspection had been last conducted on December 8, 2012, at Russell, KY. Immediately prior to the derailment, a cut of 53 cars were loaded with coal at the mine. The cut of 53 cars, now loaded, and the three locomotives were being moved on Kemmer Gem siding when cars 21 thru 26 derailed. The direction of movement was west in a shove move that had the locomotives on the east end of the consist.

The lead locomotive unit, CSXT 5481, of the derailing train is a General Electric, model ES40DC built in 2007 and has a CCBII airbrake system. This locomotive is a six axle, two truck unit. It is designated as a 4,000 horsepower diesel-electric locomotive. The last periodic inspection was recorded on form FRA 6180-49A as having been performed at Cumberland, Maryland on July 14, 2012.

The second locomotive unit, CSXT 7744, of the derailing train is a General Electric, model CW 40-8W built in 1991 and has a 26L airbrake system. This locomotive is a six axle, two truck unit. It is designated as a 4000 horsepower diesel-electric locomotive. The last periodic inspection was recorded on form FRA 6180-49A as having been performed at Corbin, Kentucky on October 31, 2012.

The third locomotive unit, CSXT 5218, of the derailing train is a General Electric, model ES40DC built in 2005 and has CCBII airbrake. This locomotive is a six axle, two truck unit. It is designated as a 4000 horsepower diesel-electric locomotive. The last periodic inspection was recorded on form FRA 6180-49A as having been performed at Cumberland, Maryland on October 26, 2012.

The coal cars behind locomotives of train C-82109 are open top gondola coal cars manufactured between the mid 1970's and mid 1980's. The design of the cars are AAR –J311- rated as 286,000 pound gross rail load with an AAR Plate "B" clearance diagram.

The December 10, 2012 inspection of train C-82109 found that the first 27 cars in relation to the direction of movement, cars 53 thru 27, passed over the point of derailment and remained on the rail. Car number 26 was derailed, the left side No. 1 wheel was only wheel found derailed. Car number 25 was derailed and on its' side. Car number 24 was derailed and on top of a motor vehicle. Cars 23 thru 21 were derailed and remained upright. Cars 20 thru 1 and the locomotives remained on the rail.

On December 11, 2012, the six cars from train C-82109 that derailed were examined where they came to rest. No exceptions were taken with the conditions of the brake rigging, side bearings, trucks or wheels. The only remarkable condition noted was a mark on the right side No. 3 wheel flange of car number 25 that would be consistent with an impact with a broken rail. This wheel was on the third axle derailed on the north side rail. The 27 cars that remained on the rail and passed over the point of derailment were inspected. Five defective conditions were noted, however are not considered to be a contributing factor of the derailment.

The three locomotives and cars position 1 thru 20 were not mechanically inspected at the site of the derailment. A records review found one defective condition to the lead locomotive. This defective condition is not considered to be a factor in the derailment.

Conclusion: No components of the cars or locomotives inspected in the wreckage were found to have contributed to the cause of the derailment.

Analysis-Track: On December 10, 2012, and December 11, 2012, FRA Investigators formed a group of qualified inspectors to evaluate the derailment of CSX train C-82109. An inspection of the track and structures revealed the following information:

The NS Kemmer Gem lead is 2,850 feet in length and is primarily used for rail car storage and switching. The track is constructed jointed rail of various sizes, seated on double shoulder rail plates, and attached using steel cut spikes. The Kemmer Gem lead is FRA Class 1 track with a timetable speed of 10 mph. Based on the speed and designation of the lead, track inspections are required to be performed monthly with at least 20 calendar days interval between inspections. A review of NS track inspection records from June 2012 through November 2012 was conducted. This review indicated the required inspections were conducted and the location and nature of deviation from the requirements of FRA Track Safety Standards were specified. In addition to the required track inspection, NS conducted a rail inspection on the Kemmer Gem lead. Due to the track speed and usage, a rail inspection is not required by FRA Track Safety Standards. This internal inspection of rail was conducted in an effort to enhance track safety. During the rail inspection conducted on April 24, 2012, one defective rail was identified in the Kemmer Gem lead. The defective rail, a 25 percent transverse fissure defect, was identified at mile 23.60. No defective rail was identified at the point of derailment, in the subject rail location. The internal rail inspection was conducted utilizing a walking stick; this type of internal rail test allows the test operator to view the data as the walking stick is passed over the rail. This method of rail inspection does not allow for data to be recorded for subsequent review.

At the point of derailment the vertical alinement is a 10 degree left hand curve, as viewed for the direction of travel. The lead has a 0.20 percent descending grade from the tracks end east toward the main track switch. The track is constructed jointed rail of various sizes, seated on double shoulder rail plates, and attached using steel cut spikes. In the subject curve the rail is box anchored and the spike pattern utilized is one rail spike and one anchor spike on the field side, and two rail spikes and one anchor spike on the gage side, on each rail in the curve. The crossing where the subject rail was embedded is constructed of gravel; the gravel is level with the top running surface of the rail. Rails which are embedded at grade crossing are very difficult to inspect for the normal signs of rail failures. The subject rail section is Tennessee 100 25 RE, manufactured in February, 1931. The subject rail exhibited severe corrosion in the head-web fillet area of the rail section. Rail corrosion is common in rail buried in road crossings and is essentially a rusting away of the metal. The corrosion weakens the rail and contributes to a complete rail failure. After the rail was removed from the gravel crossing, a previous separation was noted in the gage side head-web fillet area of the rail. The rail was discolored in this area which indicates that a void had been present prior to the rail failure.

Conclusion: Rail discontinuity caused by the rail head separation at the point of derailment was determined to be the primary cause.

Overall Conclusions: During the investigation there were no human factor, mechanical, nor signal issues that were identified as contributing factors to this accident. The train crew operated the locomotive and handled this train in compliance with all applicable federal regulations and their operating rules. There were no exceptions noted to the locomotives or rail cars that could have contributed to the accident. There were no railroad signals involved on the subject portion of track.

Probable Cause: FRA's investigation determined the probable cause of the accident was T210 - Broken Rail

- Head and web separation (outside joint bar limits)