
# *Federal Railroad Administration*
# *Office of Safety*
# *Headquarters Assigned*
# *Accident Investigation Report*
# *HQ-2006-23*

## *CSX Transportation (CSX)*
## *Chillicothe, Ohio*
## *April 22, 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-2006-23

| | | |
|---|---|---|
| 1.Name of Railroad Operating Train #1: CSX Transportation [CSX ] | 1a. Alphabetic Code: CSX | 1b. Railroad Accident/Incident No.: 0406HU302 |
| 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: CSX Transportation [CSX ] | 3a. Alphabetic Code: CSX | 3b. Railroad Accident/Incident No.: 0406HU302 |
| 4. U.S. DOT_AAR Grade Crossing Identification Number | 5. Date of Accident/Incident: Month 04 / Day 22 / Year 2006 | 6. Time of Accident/Incident: 03:00:00 ☑ 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) — Code: 01

| 8. Cars Carrying HAZMAT | 9. HAZMAT Cars Damaged/Derailed | 10. Cars Releasing HAZMAT | 11. People Evacuated | 12. Division |
|---|---|---|---|---|
| 0 | 1 | 1 | 150 | Huntington |

| 13. Nearest City/Town | 14. Milepost (to nearest tenth) | 15. State Abbr | 15. State Code | 16. County |
|---|---|---|---|---|
| Chillicothe | CJ53.3 | N/A | OH | ROSS |

| 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 |
|---|---|---|---|
| 58 F | 4 | 1 | 1 |

| 21. Track Name/Number | 22. FRA Track Class (1-9, X) — Code | 23. Annual Track Density (gross tons in millions) | 24. Time Table Direction 1. North 3. East — Code |
|---|---|---|---|
| Main | 4 | 63.3 | 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: Q634-21

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

29. Trailing Tons (gross tonnage, excluding power units): 7000

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): e | 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
2. South 4. West
Code: 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 | 67 | yes |
| (2) Causing (if mechanical cause reported) | GATX29724 | 67 | yes |

32. 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 |

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 | 0 |
| (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 | 58 | 0 | 30 | 0 | 0 |
| (2) Total Derailed | 1 | 0 | 0 | 0 | 0 |

| 36. Equipment Damage This Consist | 37. Track, Signal, Way, & Structure Damage | 38. Primary Cause Code | 39. Contributing Cause Code |
|---|---|---|---|
| 70000 | 2500 | H218 | E53C |

| Number of Crew Members | | | | Length of Time on Duty | |
|---|---|---|---|---|---|
| 40. Engineer/ Operators | 41. Firemen | 42. Conductors | 43. Brakemen | 44. Engineer/Operator | 45. Conductor |
| N/A | 0 | 1 | 0 | Hrs 11 Mi 20 | Hrs 11 Mi 20 |

| Casualties to: | 46. Railroad Employees | 47. Train Passengers | 48. Other |
|---|---|---|---|
| Fatal | 0 | 0 | 0 |
| Nonfatal | N/A | 0 | 4 |

49. EOT Device? 1. Yes 2. No — 1

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

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

## 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) — Code
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: 0

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 |
|---|---|---|
| | 0 | 0 |

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): 0

103. Total Number of Highway-Rail Crossing Users (include driver): 0

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

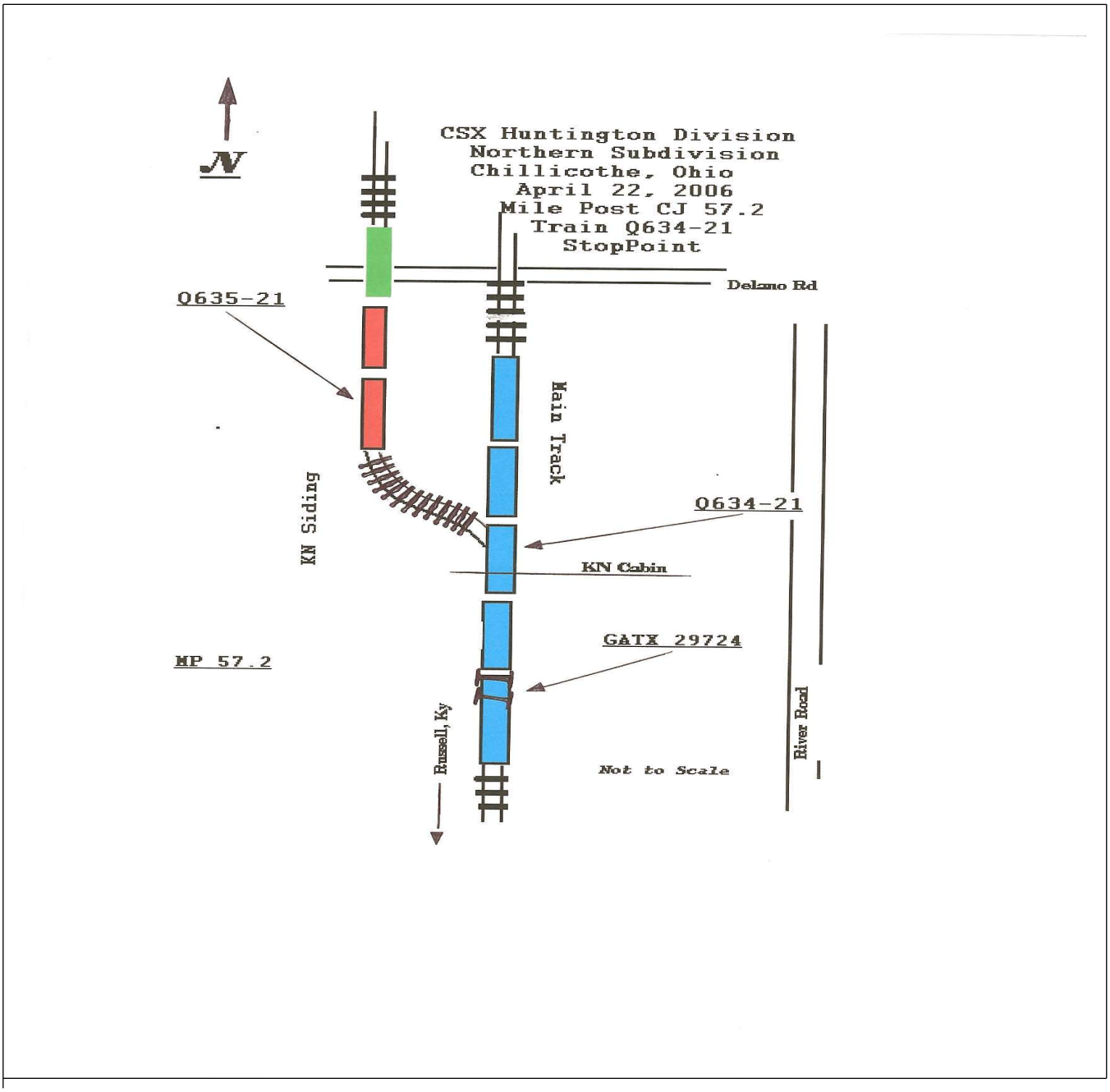
105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No — Code: N/A

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.

SKETCH
HQ-2006-
23.jpg



109. SYNOPSIS OF THE ACCIDENT

A westbound CSX freight train had a tank car loaded with Naphtha, a Hazardous Material, derailed account a burned off roller bearing journal. There was a Hazardous Materials release and fire with subsequent evacuation of about 150 residents, on April 22, 2006, at 3:00 a.m. The derailment occurred 2 miles west (north geographically) of Chillicothe, Ohio, at CSX Milepost CJ 53.3, on the CSX Huntington Division, Northern Subdivision, the train stopping with tank car burning at Mile Post CJ 57.2.

There were no injuries to the train crew or evacuated residents. There were four injuries to individuals other than the train crew. Three firefighters were treated for minor injuries sustained in fighting the fire and one individual walking near the derailment and fire scene was transported to a local hospital with breathing difficulty and chest pain. The derailed tank car and a tank car next to it in the train consist were destroyed account fire damage, approximately $70,000 depreciated values, and about $2,500 track damage.

At the time of the accident it was dark and clear, with a south-southwest wind at about 1.8 miles per hour. The temperature was about 57°F.

The accident was caused by the failure of the train crew to properly inspect their train after the second of two separate railroad wayside hot box detectors indicated an overheated roller bearing journal on the subsequently derailed tank car, a violation of the CSX Equipment Handling Rule No. 4100. Concurrently, the train crew moved the tank car in excess of 10 mph, a violation of the CSX Equipment Handling Rule No. 4105 which prohibits a speed in excess of 4 mph. when moving equipment that has a hot bearing.

A contributing cause was the burned off roller bearing journal.

110. NARRATIVE

Circumstances Prior to the Accident
The crew of CSX freight train Q634-21 included a locomotive engineer who had eight years service with the railroad, and a conductor with four years service. They first went on duty at 3:30 p.m., Eastern Standard Time, April 21, 2006, at the CSX, Big Four Yard, Russell, Kentucky. This was the home terminal for both crew members, and both had received more than the statutory off duty period prior to reporting for duty. The engineer was employed October 27, 1997, promoted to engineer on March 11, 2000, and was last certified as an engineer on December 31, 2005. He was qualified on CSX Operating Rules January 17, 2006, passed a CSX Safety Rules Examination on January 24, 2006, and was medically qualified. The conductor was employed May 19, 2002, was qualified on CSX Operating Rules on January 17, 2006, had passed a CSX Safety Rules Examination on February 18, 2006, and was medically qualified.

Their assigned freight train consist listed two locomotives, CSXT 8737 and FURX 3039, and 59 loaded and 33 empty cars, total 92 cars of several varieties. The consist listed 27 Hazardous Materials loaded cars, train length 5,397 feet in length with 8,020 tons trailing. The train was scheduled to travel to Walbridge, Ohio, with cars to be removed and added at three locations en route. The train and its end-of-train device received the required Federal freight car safety standard, safety appliance, and initial terminal air brake inspections and tests by CSX mechanical department employees at Russell. After minor repairs to one of the locomotives, the train departed at 6:20 p.m. The crew had noted that the head six cars of train were not in place according to their train consist and had reported this fact to the CSX Yardmaster. On departing the yard, the crew noted that when passing an automatic equipment identification (AEI) scanner at Mile Post CA 535-9, at about 6:52 p.m., the train was reported to be four axles (one car) short. The car scanner registered 91 total cars, (59 loaded and 32 empties) leaving Russell, KY. Reducing length and tonnage by that of the missing freight car, which was later identified as an empty hopper, the actual length would have been approximately 5,330 feet, with approximately 7,985 tons trailing. The train crew contacted the train dispatcher for information and direction on the missing car. The dispatcher never returned a call to the crew with further directions on the car. The railroad timetable direction of the train was west. Timetable directions are used in this report.

The crew stopped the train to remove cars at two locations while en route. They had been instructed to make set-offs only, and they removed two empty cars at MP CJ 3, at about 7:50 p.m. The train had been repeatedly delayed en-route by malfunctioning wayside signals. The malfunctions, which were intermittent, were traced to equipment failures which were eventually corrected but not before this train traversed the section of the railroad. The crew was given permission by the dispatcher to pass several stop signals and had to hand throw at least one power switch that was malfunctioning, a situation that apparently had occurred with some regularity on this section of railroad. The CSX signal maintainers with responsibility for this section of the railroad had worked their limit of hours of service and thought the problems were corrected and had gone home. The second set off was one loaded car at an industry at Mile Post CS 26 at about 12:30 a.m., now April 22. The train consist was now 58 loaded cars, and 30 empty cars, resulting in approximately 7,000 trailing tons. The number of the hazardous materials loaded cars remained the same at 27.

At about 1:15 a.m., at Mile Post CJ 31.6, a wayside equipment detector (Hot Box Detector) indicated an overheating journal on the south side of the train at axle number 278. Given two, six-axle locomotives at the head end and the first axle of the 67th car, physically this was the second axle of the 67th car, south (timetable) side of the train, the R-2 location; this was listed in the train consist as the 70th car, GATX 29724, tank car, loaded with Petroleum Products, N.O.S. (Naphtha), UN 1268, PG III, STCC 4914256, Placarded “Flammable” . The engineer stopped the train and notified the CSX train dispatcher at Jacksonville, Florida, by radio of the situation. The conductor stated that he used the train consist to find the car. He walked back and inspected the car, both sides, and 5 cars before and behind the indicated car, both sides, and detected no unusual heating of journals using his bare hand in close proximity to the roller bearings. He was not able to use his issued temperature indicating crayon stick (Tempilstik) because it was broken. This particular hot box detector had a history of malfunctioning. It was removed from service and repaired a week previously and then had been taken out of service for a short period of time earlier the previous day. It had been repaired and placed back in service prior to this train’s (Q634-21) movement past and the conductor was aware of these instances. The conductor stated that he tagged the indicated car with a red hot box tag and walked back to the locomotives. The train departed at about 2:10 a.m, after the conductor notified the CSX train dispatcher of his findings.

At about 2:45 a.m., at Mile Post CJ 51.3, another wayside equipment detector again indicated an overheating journal, again at the same location, on the south side

of the train at the 67th car in the train, (listed as 70th car on the train consist,) axle number 278, loaded tank car GATX 29724, Naphtha. The engineer was seated at the controls of the locomotive, on the right or north side of the cab of the leading locomotive. The conductor was seated on the left or south side of the cab of the leading locomotive. According to the lead locomotive event recorder log, the engineer was slowing the train from about 40 mph and was preparing to stop when the conductor reached the CSX dispatcher by radio. The dispatcher was told that the train had another hot box indication and that the train crew would have to set out the indicated car at station location KN Cabin, (Mile Post CJ 57.3) and that they would reach ther maximum hours of service in about 30 minutes. The train was now traveling at between 20 and 30 mph. No mention was made by the train crew that an inspection of the indicated car was required by CSX Equipment Handling Rules or that the required inspection had not been made. Moreover, the CSX Equipment Handling Rule No. 4105 requires that when moving equipment that has a hot bearing, train speed should not exceed 4 mph. The crew did not inform the dispatcher that their train speed was in excess of 4 mph.

When the Hot Box Detector at Mile Post CJ 51.3 had indicated an overheated journal on the naphtha loaded tank car, the engineer began reducing the train speed from about 40 mph, apparently preparing to stop. It was during this time period while the train crew was in contact with the dispatcher that the right number two roller bearing journal on the naphtha loaded tank car burned off at Mile Post CJ 52.2. The train crew was unaware of this critical mechanical component failure and the engineer was still gradually reducing his train speed.

The train speed was reduced to between 12 and 15 mph. The train dispatcher advised the train crew of Q634-21 that an eastbound freight train, Q635-21, was presently standing in KN Siding, a long siding at KN Cabin located at Mile Post CJ 57.3. Train Q635-21 was waiting for their train, westbound Q634-21, to clear before it, the eastbound, could leave the siding and enter the single track main and proceed eastward toward Russell, Kentucky. The dispatcher then asked the crew of westbound Q634-21 if they could pull their train in between stations KN Cabin (MP CJ 57.3) and ZK Cabin (MP CJ 60.1). The KN Siding, 2.8 miles long, is located on the south side between the control points KN Cabin and ZK Cabin. When the subject train Q634-21 reached this area it would be clear of single track territory. The train crew of Q634-21 responded that they could do this. They then advised the dispatcher that there was a stub siding at about Mile Post CJ 57.5 on the north side of the main track where they could set out the defective car. The dispatcher responded “Okay” and left this radio contact to call another train crew.

A short time later, the crew of westbound train Q634-21 again contacted the dispatcher. They suggested that since they had less than 30 minutes on duty time remaining, that when they passed KN Cabin, their train would be clear of the single track and they could then leave their train. The dispatcher then agreed. He directed them that on their arrival between the switches (control points) at KN Cabin and ZK Cabin they should secure their train and call him, leaving the information on the defective car with the train, and that the relieving crew could then set off the indicated car in west end of the KN siding at ZK Cabin. The train crew confirmed these instructions.

The normal timetable authorized speed for freight trains on this section of the railroad is 50 mph, but account this train’s tonnage was in excess of 7,000 tons, the maximum authorized speed for this train was 40 mph, as designated in the current CSX Timetable No. One, Huntington Division East, effective Saturday, January 1, 2005, Station Page Note 2, Northern Subdivision, Page 123.

In this area of the railroad westbound from Mile Post CJ 51, there are, in succession, a tangent of about 3480 feet, a right hand curve of 0 degrees, 30 minutes for 1560 feet, followed by a tangent of about 2640 feet, followed by a left hand curve of 0 degrees, 36 minutes for 520 feet, a left hand curve of 0 degrees, 30 minutes for 2640 feet, and a tangent of 520 feet, followed by a right hand curve of 1 degree, 30 minutes for 4224 feet. The grade ascends slightly at 0.12-percent to MP CJ 52 and then ascends at about 0.17-percent to MP CJ 52.2.

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

The Accident

After the two radio conversations with the dispatcher, the train crew continued moving the train toward the long passing siding, KN Siding, at Mile Post CJ 57.3, and the stub siding at Mile Post CJ 57.4 where it was planned that the indicated defective car be set off. During this period of time the tank car with the burned off journal reached Mile Post CJ 53.3. At this point, after traveling over two miles with a burned off journal, the trailing end of the tank car’s right truck side frame finally dropped to the field side of the south rail account the journal burn off. This pulled the left number two wheel off the north rail into the gage of the track. The right number two wheel stayed on the south rail, trapped between the tank sheet and the rail as the tank came down account the side frame dropping. This wheel immediately began to cut through the tank sheet. When this occurred, the speed of the car in the train would have been at about 28 mph and would continue to be reduced to about 15 mph over the course of about two miles. At some point after the derailment, the tank car loaded product, naphtha, began to leak from the breached tank and was ignited by sparks.

The engineer, still unaware of the bearing failure, the subsequent derailment and now the dragging and burning tank car, brought the train speed down to about 15 mph, increased the speed to over 20 mph for about one mile and then reduced the train speed to about 10 mph over the distance of about one-half mile and maintained that speed for the last one-half mile as the train approached the point where it would finally be stopped.

In this area of the railroad, westbound from Mile Post CJ 55, there are, in succession, a tangent to MP CJ 55.2, followed by a 1-degree curve to the left for about 3100 feet, followed by a tangent of 2100 feet, then a 1-degree curve to the right of about 1600 feet, then a tangent of about 1300 feet, followed by a 1-degree curve to the left, and tangent track for about 2600 feet to the east signal of the long siding at KN Cabin at MP CJ 57.3. There is a slight descending grade of about 0. 48-percent from Mile Post CJ 55 to about MP CJ 55.5 and then a slight ascending grade, 0.27-percent, at MP CJ 56, then a slight descending grade, 0.14-percent, from MP CJ 56.6 for the remaining distance to MP CJ 57.3. There are bridges over Hopetown Road at Mile Post CJ 55.3, and over U. S. Highway 23 at CJ 55.5.

The train crew of CSX eastbound train Q635-21, which was standing in the KN Siding at KN Cabin, were observing westbound train Q634-21 as it approached the east end of the siding. The crew of Q635-21 saw flames and sparks flying from a car back in train Q634-21 as it came through the left-hand curve prior to the tangent track approaching the siding. They notified the train crew of Q634-21 that there was a fire back in their train. The engineer of train Q634-21 brought his train to a controlled stop with a full service application of the train brakes. The derailed, burning tank car, GATX 29724, came to rest at Mile Post CJ 57.2, about 150 yards east of the east end of the siding switch at Control Point KN Cabin, Mile post CJ 57.3. It was the 67th car, axle number 278, GATX 29724, tank car, loaded with Petroleum Products, N.O.S. (Naphtha), UN 1268, PG III, STCC 4914256, Placarded
“ Flammable.” It had traveled almost 4 miles or 20,600 feet from the point of derailment until coming to rest, and a total of 5 miles or 26,400 feet, from the journal burn off. The locomotives came to a stop some distance west of the Delano Road county road grade crossing located at Mile Post CJ 57.4

The conductor of train Q634-21 notified the dispatcher by radio that there was an emergency and fire and began walking back toward the fire to try and determine which car was on fire. The engineer stayed on the locomotive to keep communications open with the train dispatcher. The conductor stated that the flames at this time were 40 or 50 feet in the air. He used his cell phone to call 911, Ross County, Ohio, local emergency response, and was told they had already been notified. The Ross County, Ohio, Sheriff’s Department registered an emergency call at 3:11 a.m. The conductor called 911 again about 10 minutes later to give the hazardous materials information on the 5 or 6 cars that he could get close enough to see might be involved. An Ohio State Highway Patrol trooper arrived at 3:16 a.m. at the Delano Road crossing and transported the conductor to an Emergency

Response Command Center which the Green Township, Ross County, Ohio, Volunteer Fire Department had set up about a quarter of a mile away from the burning tank car. The fire department had arrived there at 3:18 a.m.

The train crew was then requested to separate the train at the Delano Road crossing to allow nearby residents to be evacuated. The Green Township Volunteer Fire Chief determined that the proximity of the 68th car in the train, (listed 71st in the train consist) a loaded tank car, UTLX 200359, Xylene, UN 1307, STCC 4909348, Placarded “Flammable,” located next to the burning tank car of Naphtha, required that a larger radius of evacuation was necessary. Upwards of 150 persons evacuated in a one mile radius and account the proximity of the load of xylene to the burning Naphtha load and the drifting plume of smoke from the Naphtha fire, a local area hospital, Adena Regional Medical Center, was ordered to “shelter in place” and shut down all air handling equipment. This involvement of the hospital and its staff prompted initial reports of the number of persons evacuated to be estimated at 1000. The hospital brought in 46 emergency medical service technicians and transport vehicles to stand by should an evacuation of the hospital have become necessary but no evacuation of the hospital patients or staff was made.

One of the freight cars listed on the train consist, a loaded box car ABOX 51960, non-hazardous, was erroneously listed as the 69th car in the train consist, between the burning tank car and the tank car of xylene. It was subsequently determined to be missing from its designated position. It was not between the burning tank car of naphtha and the tank car of xylene, but was found to be located in the train as the 54th car some time later. This caused considerable delay and concern within the fire department until the car was determined to have been placed elsewhere in the train.

The conductor and fire department were then able to determine the three or four cars involved and the fire department requested that the train pull that section of the train standing west of the burning car out of the area. The train crew of Q634-21 recoupled their train and the conductor was able to get near enough to the burning tank car to uncouple between the 65th and 66th cars in the train. The 66th car was a loaded tank car, PLMX 26314, Hydraulic Oil, non-hazardous. This car was left standing coupled to the burning naphtha load tank car. The head 65 cars were then hauled westward into the clear. Several hours later, when the naphtha fire was sufficiently under control, the fire department used a large wrecker to pull the hydraulic oil loaded tank car about 200 yards west away from the fire.

The train crew of a third train, unit grain train 79720, which was waiting eastward of train Q634-21 at Vauces Siding, at about Mile Post CJ 45, was requested to secure their train, uncouple and use its locomotive consist to approach the Q634-21 at the east or rear end of that train. The locomotive consist coupled to the rear of train Q634-21 and the conductor from Q634-21 again was able to get close enough to the burning tank car to uncouple the car closest to it, UTLX 200359, the 68th car, the tank car loaded with the hazardous material xylene. This car and the remaining cars at the rear of the train were then hauled away eastward from the burning tank car into the clear.

Over 9,800 gallons of naphtha were eventually lost of the total 26,000 gallons loaded on the derailed, breached tank car. The evacuation was maintained until about 10:00 a.m., April 22, 2006, whereupon only a few residents of the nearest two or three homes were still effected.

The train crew of Q634-21 continued to work with emergency responders for about 2 ½ hours beyond the expiration of their hours of service limit. They were then relieved by the train crew of the eastbound train Q635-21 which was still standing in KN Siding. After several further delays of over two hours, the Q634-21 crew were transported by a CSX Trainmaster to a Columbus, Ohio, hospital for post-accident drug and alcohol testing. However, after several further hours, the hospital refused to perform the Federally mandated drug testing. The CSX trainmaster after numerous phone calls and more delays, finally located an outpatient clinic at Grove City, Ohio, that would administer a urine test to the train crew but not a blood test. The results of the urine test were later found to be negative. The blood test required under the mandatory Federal Post-Accident Testing regulations was not performed.

After being on duty for over 21 hours, the crew were then instructed to provide written statements to the railroad. They were then notified that they, along with the train dispatcher, were being removed from service pending an investigation into the circumstances of the accident. The train crew members were then transported back to their home terminal at Russell, Kentucky, arriving there over 27 hours from the time they had first reported for duty.

Analysis and Conclusions
Analysis

The CSX wayside equipment detectors (Hot Box Detectors) at Mile Post CJ 31.6 and 51.3 operated as intended and provided clear warning to the crew of train Q634-21 that a roller bearing journal on a Hazardous Materials loaded tank car was overheating. This was confirmed by event log tapes removed from the HBD's by the CSX signal supervisor.

The train crew of train Q634-21, apparently account concerns about the approaching limit of their hours of service, did not stop their train and inspect the indicated car after the second HBD warning. This was in violation of CSX Equipment Handling Rules. Furthermore, while having slowed the train speed from 40 mph, down to 20 mph and less, they still elected to move the car almost six miles distance at speeds in excess of 10 mph instead of the required 4 mph, again in violation of the CSX Equipment Handling Rules. This was in order to set the car off at a stub siding where and when the train would be clear of single main track. The CSX train dispatcher, with knowledge of the situation, did not countermand the train crew's decision to move the car with an overheated journal six miles without an inspection.

The burned off roller bearing was retrieved and along with its wheel set and opposite roller bearing and the other wheel set and bearings in the same truck, were sent to Brenco Inc., Petersburg, VA for analysis. The findings of that analysis established that inadequate clamp retaining force resulted in a loose bearing failure of the bearing assembly. This finding was supported, first, by the heavily worn face of the bearing outboard wear ring which was still present on the separated stub, indicating a loose bearing. Furthermore, the cap screw torques at the bearing end cap were negligible and could be turned by hand on the burned off journal stub, again indicating a loose bearing. High heat generated in a journal burn off usually traps the cap screws preventing movement and producing very high torque values. The cap screws themselves had a flattening or deformation of three or four threads further down the screw length suggesting the end cap had been loose and moving against these screws for some time. The mate roller bearing at the opposite end of the axle from the burned off journal also had insufficient torque on the cap screws at the bearing end cap, well below the A.A.R. standard 360-390 ft. lbs. production torque requirements. This lack of torque on the cap screws of the bearing end cap indicated inadequate retaining clamp on this roller bearing assembly also. The other two roller bearings on the second wheel set were examined and also presented inadequate torque values on their cap screws of the end caps. While these caps screws were not loosened to the extent noted on the first set of bearings, the clamp force of these bearing assemblies was compromised as well, but had not resulted in bearing failure.

Conclusions
The railroad, through the actions of its employees, was not in compliance with its own operating rules, safety rules, and several applicable Federal regulations.

Probable Cause & Contributing Factors

A contributing cause found by the Federal Railroad Administration was the failure of the roller bearing journal on the derailed tank car loaded with hazardous materials.

The FRA found the probable cause of the accident to be due to the train crew of CSX train Q634-21 failing to stop and inspect freight car equipment indicated as defective by a trackside equipment detector. The train crew then moved that equipment at speeds in excess of a four mph speed limit. These were direct violations of the CSX Equipment Handling Rules.