Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-96

Canadian National (CN)
Cherokee, Iowa
October 27, 2005

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-2005-96

1.Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Canadian National	CN	394775
2.Name of Railroad Operating Train #2	2a. Alphabetic Code	2b. Railroad Accident/Incident
N/A	N/A	N/A
3.Name of Railroad Responsible for Track Maintenance:	3a. Alphabetic Code	3b. Railroad Accident/Incident No.
N/A	N/A	N/A
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident: Month 10 / Day 27 / Year 2005	6. Time of Accident/Incident: 12:50:00 ☑ 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	0	0	0	Chicago

13. Nearest City/Town	14. Milepost *(to nearest tenth)*	15. State Abbr / Code	16. County
Cherokee	454.5	N/A / IA	CHEROKEE

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
27 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 Track	3	4.7	3

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	26. Was Equipment Attended? 1. Yes 2. No — Code	27. Train Number/Symbol
1	1	C7789126

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

29. Trailing Tons *(gross tonnage, excluding power units)*: 18486

30. Method(s) of Operation *(enter code(s) that apply)*: a. ATCS; b. Auto train control; c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; g. Automatic block; h. Current of traffic; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; m.Special instructions; n. Other than main track; o. Positive train control; p. Other *(Specify in narrative)*

Code(s): j | N/A | N/A | N/A | N/A

30a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter; 2 = South, 4 = West — 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	6	yes
(2) Causing *(if mechanical cause reported)*	0	0	N/A

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/A

34. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	2	0	0	0	1
(2) Total Derailed	0	0	0	0	0

35. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	132	0	0	0	0
(2) Total Derailed	21	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
1000000	3000	T299	N/A

Number of Crew Members				Length of Time on Duty	
40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen	44. Engineer/Operator	45. Conductor
2	0	1	0	Hrs 3 Mi 30	Hrs 3 Mi 30

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

49. EOT Device? 1. Yes 2. No — 1

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

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

OPERATING TRAIN #2

52. Type of Equipment Consist *(single entry)* 1. Freight train 2. Passenger train 3. Commuter train 4. Work train 5. Single car 6. Cut of cars 7. Yard/switching 8. Light loco(s). 9. Maint./inspect.car — A. Spec. MoW Equip. Code	53. Was Equipment Attended? 1. Yes 2. No — Code	54. Train Number/Symbol
N/A	N/A	N/A

55. Speed *(recorded speed, if available)* — Code: R - Recorded; E - Estimated 0 MPH — 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

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2005-96

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	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

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

88. Signaled Crossing Warning Code *(See instructions for codes)*: N/A

89. Whistle Ban 1. Yes 2. No 3. Unknown: 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

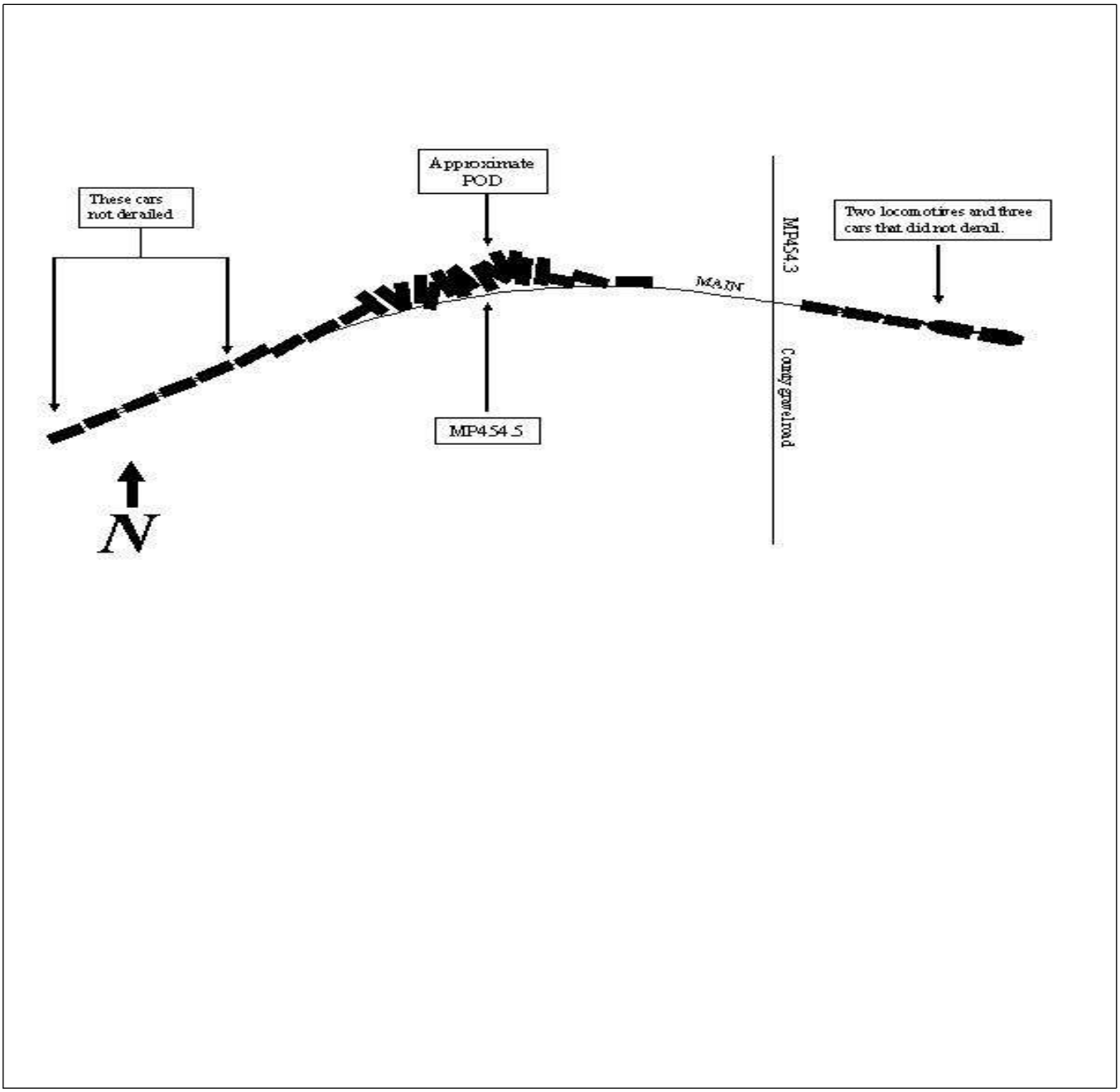
105. Locomotive Auxiliary Lights Operational? 1. Yes 2. No. Code: N/A

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.

HQ-96-2005 sketch.jpg



109. SYNOPSIS OF THE ACCIDENT

AA Chicago Central and Pacific (CC) coal train derailed on October 27, 2005, at 12:50 a.m. The accident occurred near Cherokee, Iowa, at milepost (MP) 454.5, on the CC Cherokee Subdivision.
There were no injuries or hazardous material spills as result of the derailment. Monetary damages reported for the derailment totaled $1,003,000.
At the time of the accident, it was dark with clear skies and a temperature of 27 °F.
The cause of the derailment is being ruled as a broken rail, although the exact type of break was not determined.
An eastbound train was operating on single main track at a recorded speed of 28 mph when the accident occurred. While traversing a right-hand curve, the train experienced an undesired emergency application of the air brake system, where upon it was discovered the 4th through 24th head cars had derailed.

110. NARRATIVE

Circumstances Prior to the Accident
The train crew of Train Symbol C77891-26 consisted of an engineer, student engineer, and conductor. They first went on duty at 9:20 p.m., CST, October 26, 2005, at Sioux City, Iowa. This was their home terminal, and all three had received more than the statutory off duty period prior to reporting for duty.
Their assigned train consisted of 2 locomotives on the head end, 132 loaded coal cars, and a remote unit on the rear end. The train was 7,229 feet long and weighed 18,486 tons. This crew was scheduled to take the train to Fort Dodge, Iowa and be relieved.
There was no work performed en route after departing and the trip was uneventful for the 61 miles leading up to the derailment.
As the eastbound train approached the accident area, the student engineer was seated at the controls on the south side of the lead locomotive. The locomotive engineer and conductor were seated on the north side of the same locomotive.
The track structure through the accident site is in a 2-degree 35-minute curve on a 1percent descending grade. It is constructed of 90-pound continuous welded rail on wood crossties.
The railroad timetable direction and geographical direction of the train are both east.

The Accident
The train was being operated at 28 mph approaching the derailment area. According to the train crew they did not observe or feel anything unusual prior to this area. The speed at the time of the derailment was 28 mph. Both speeds were recorded by the event recorder of the controlling locomotive. Maximum authorized speed for this curve was 30 mph as designated in current CN/IC Chicago Division Timetable.

Analysis and Conclusions
Analysis
Although the final cost of this derailment totaled just over $1,000,000, making it a major accident, the three crew members of Train Symbol C77891-26 were not FRA mandatory post-accident toxicologically tested. A Chicago Central Road Foreman of Engines was 33 miles away in Storm Lake, Iowa, when the accident

occurred waiting for this crew to ride with them to Ft. Dodge, Iowa. He was on the scene within 45 minutes of the wreck and downloaded the event recorders. The event recorders for both lead locomotives revealed nothing inconsistent with normal train handling at or prior to the time of the derailment.
The Road Foreman relayed this information to the CC Assistant Superintendent who was coming from Waterloo, Iowa, some 200 miles away. The Assistant Superintendent, in good faith, determined testing would not be necessary because by not being there he did not realize most of the rail cars were completely destroyed, thus driving the total cost to just over $1 million.

The last ultra sonic rail detection test through this area was on September 22, 2005, and the last geometry car survey, with the railroad's car, was in April 2005, with no defects noted in the immediate area.

Conclusion
The railroad was in compliance with their own and, all applicable FRA standards. There were no witnesses to the accident, other than the train crew, who only felt a small surge at the time they experienced the undesired emergency application of the air brakes.
Nothing was found at the derailment that could positively be attributed as the cause. The data reviewed from the event recorder ruled out train handling as a cause. There were also no track components, i.e. turnouts, bridges, grade crossings, or culverts at the point of derailment (POD) that could have contributed to the cause. The grade and curvature of the track were not a factor in this derailment for the speed involved.
There were no markings found on any wheels of the equipment that made it over the POD. Likewise there were no marks on the track structure prior to the derailment area, meaning that this derailment happened catastrophically and suddenly. In these cases the likely cause generally points to track or mechanical.

Probable Cause & Contributing Factors
All the truck components and wheels from the derailed cars were recovered with nothing suspicious found, thus ruling out mechanical.
On Monday, October 24, 2005, three days prior to the derailment, local maintenance forces found a fully broke rail on the high side of the curve at this same location. This rail break originated from a detail fracture of approximately 10% in the gage corner and had rapid growth of the defect prior to breaking. The rail was changed that same day and the ends welded. Both welds were found in the derailment and had not failed.

Several broken pieces of rail pulled from the derailment had small fissures on the gage corner. These pieces were all from the rail on the high side of the curve and happened as a result of the derailment and not as the cause. The fissures were all smaller than 5% and were all originating in head checking from the gage corner. Head checking was very evident in the remainder of the curve that was not damaged in the derailment. With this knowledge, the probable cause for this derailment is most likely a broken rail. Since the actual piece that caused the derailment was never found, it is impossible to determine what type defect caused it, but in all likelihood, it was a detail fracture originating in the gage corner from the head checking.