Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-79

Northeastern Illinois Regional Commuter Rail (NIRC)
Chicago, Illinois
September 17, 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-2005-79

1.Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Northeast IL Regional Commuter Rail Corp. [NIRC]	NIRC	R0522
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.
Northeast IL Regional Commuter Rail Corp. [NIRC]	NIRC	R0522
4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident: Month 09 / Day 17 / Year 2005	6. Time of Accident/Incident: 08:35:00 ☑ 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) — **01**

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
0	0	0	0	ROCK ISLAND

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
CHICAGO	4.7	N/A	IL	COOK

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
80 F		2		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
NO 2 MAIN CROSSOVER		1	11.76		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: 3

26. Was Equipment Attended? 1. Yes 2. No — Code: 1

27. Train Number/Symbol: 504

28. Speed (recorded speed, if available) R - Recorded E - Estimated: 69 MPH — Code: R

29. Trailing Tons (gross tonnage, excluding power units): 275

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: 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	1	no
(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
00	00

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

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	0	0	0	0	1
(2) Total Derailed	0	0	0	0	1

35. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	0	3	0	2	0
(2) Total Derailed	0	3	0	2	0

36. Equipment Damage — This Consist: 5000000

37. Track, Signal, Way, & Structure Damage: 3000000

38. Primary Cause Code: H222

39. Contributing Cause Code: N/A

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	0	2	1

Length of Time on Duty

44. Engineer/Operator: Hrs 1 Mi 31

45. Conductor: Hrs 1 Mi 41

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	2	0
Nonfatal	N/A	150	0

49. EOT Device? 1. Yes 2. No: 2

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

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: 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) 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	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 (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: N/A

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
	N/A	N/A

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): N/A

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

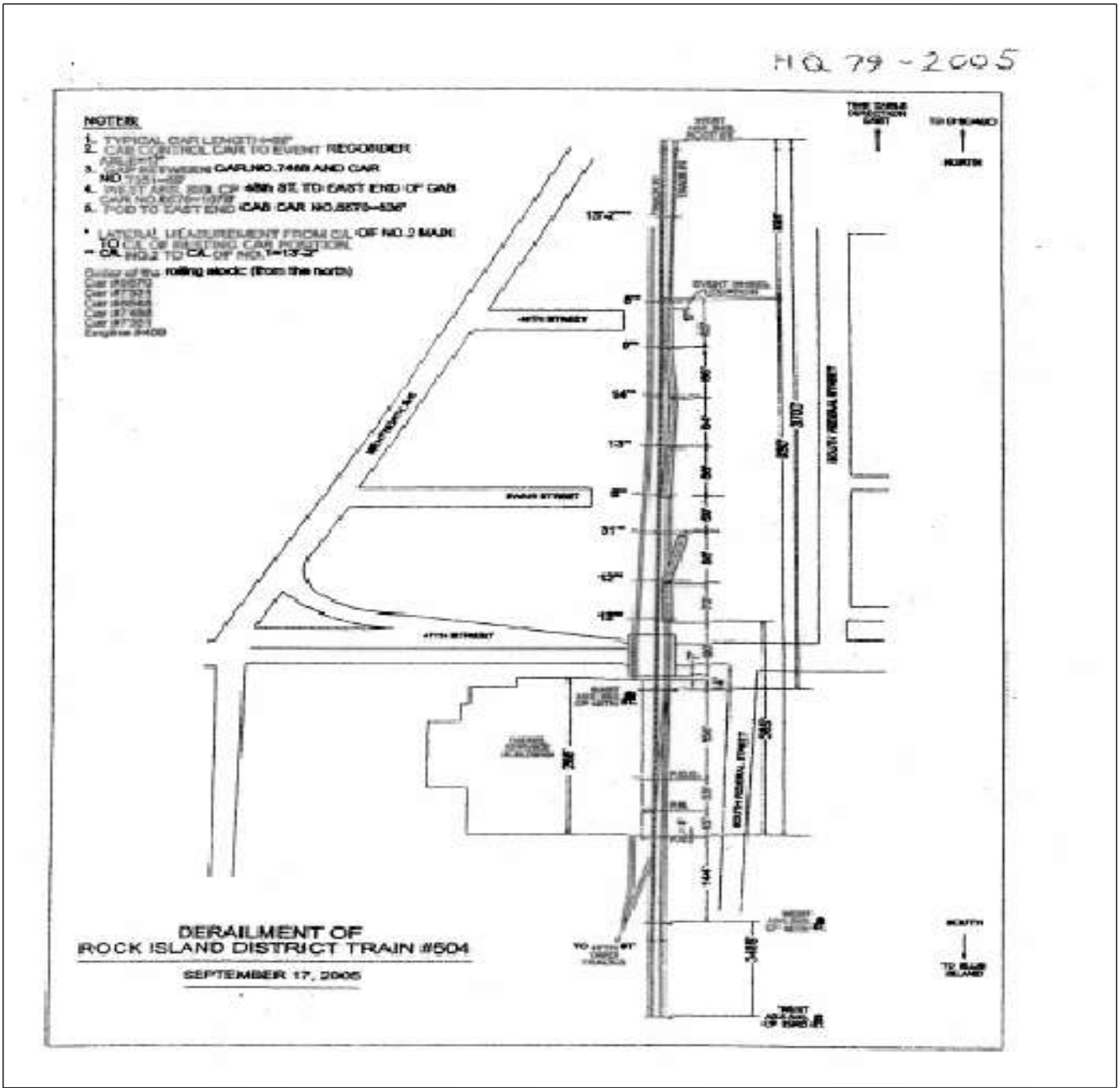
104. Locomotive Auxiliary Lights? 1. Yes 2. No — Code: N/A

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.
79.bmp



109. SYNOPSIS OF THE ACCIDENT

Synopsis

An eastbound Northeast Illinois Commuter Corporation (NIRC) a.k.a "Metra" commuter train, No. 504, carrying 185 passengers and a crew of four employees, derailed at a crossover switch on September 17, 2005, at 8:35 a.m. The accident occurred in Chicago, Illinois, at Control Point (CP) 48th Street, Milepost (MP) 4.7, on Metra's Rock Island District.

Two passengers were killed and 150 others were injured. Three crew members suffered reportable injuries as well as two employees of another train crew, while assisting with the post-accident evacuation of the train. No hazardous materials were involved, and there was no fire or fuel spill from the locomotive. Damages are $5 million to equipment and $3 million to track, signals, and bridge.

At the time of the accident it was daylight, clear and calm. The temperature was 80 F.

The accident was caused by the failure of the engineer to comply with the interlocking signals at CP 53rd Street and CP 48th Street.

110. NARRATIVE

The following information was obtained from an investigation that was conducted by the Federal Railroad Administration.

Location and Method of Operation

The derailment occurred on the Joliet Sub District, at MP 4.7. The timetable direction at this location is east and west (compass north and south) over two main tracks. The Method of Operation is Centralized Traffic Control (CTC), controlled from Metra's Dispatching Center located in Chicago.

Circumstances Prior to the Accident

The crew of Metra Train 504 included a locomotive engineer, conductor, assistant conductor, and collector. The train crew went on duty at 6:54 a.m., CDT, September 17, 2005, at Joliet, Illinois, after being off duty for over 17 hours. The engineer went on duty at 7:04 a.m. and was also fully rested. All four crew members were assigned to the extra board.

Metra Train 504

Metra Train No. 504 was an eastbound commuter train which originated in Joliet and was destined for La Salle Street Station in Chicago. The train consisted of one locomotive and five cars, including Cab Car 8570 (leading), Coach 7331, Cab Car 8548, Coach 7488, Coach 7351, and locomotive Metra 409. The train was being operated from the leading cab car in push-pull mode and the locomotive was trailing.

The crew conducted a job briefing and Type I air brake test prior to departure. No exceptions were taken to the air test by the crew. The engineer stated that he also tested the alerter and "deadman" pedal in the cab car, and that both were cut in and functioning normally.

During their pre-departure job briefing, the crew discussed their Track Warrant, No. 109171, which included a Form B Track Bulletin. The Form B stated that No. 2 Main Track was under the control of a Maintenance of Way foreman between MP 6.2 and MP 6.68 on the Joliet Sub District (the mileposts are in descending order for eastward trains) from 8 a.m. until 5 p.m. This meant that Train No. 504 would have to contact the foreman for permission to enter these limits.

Because it was a Saturday, when fewer passengers were expected than during the week, the conductor informed his crew that they would use only the three middle cars of the train for passengers. Train 504 departed Joliet on time at 7:24 a.m., and was scheduled to make all stops until arriving at Chicago La Salle Street Station at 8:45 a.m. The train operated without incident via the Joliet Sub District and the Beverly Sub District to Gresham Junction (MP 9.9), where it re entered the Joliet Sub District.

Because No. 1 Main Track, normally used for eastbound trains, was out of service for maintenance between milepost 6.2 and 6.68, the train dispatcher routed Train 504 onto No. 2 Main Track from Gresham Junction to CP 48th Street. In an interview, the train dispatcher stated that he routed Train 504 back to No.1 Main Track at CP 48th Street, because he did not want to delay an opposing train which was preparing to depart Chicago on No. 2 Main Track. The dispatcher did not advise the crew by radio of the change in routing, however, there was no requirement to notify the crew because the method of operation is CTC, where the authority for movement of trains is governed by signal indication.

As they neared the limits of the Form B shown on the track warrant, the engineer noted that there were no red/yellow flags (colored reflective panels), which are normally displayed to the right of the track one mile in advance of the working limits. This is to remind approaching trains that they are approaching the limits of a Form B and must be prepared to stop unless they receive permission to pass the flags from the employee in charge.

The engineer made two or three attempts to contact the foreman by radio to request permission to pass through the limits. The foreman did not respond so the engineer brought his train to a stop just short of the red flag that marked the boundary of the foreman's working limits. Just as the train stopped, the foreman responded to the engineer and gave him permission to pass through the limits. In an interview, the foreman said that he was in the process of displaying the red/yellow flags as Train 504 passed him.

After passing through the limits of the Form B, Train 504 continued toward its destination, complying with a permanent speed restriction of 40 mph between MP 6.9 and MP 6.6, where it resumed the maximum authorized speed of 70 mph. Meanwhile, the engineer attempted to contact the conductor to advise him about the missing red/yellow flags. Using the public address system on the train, the engineer asked the conductor, who was in the third car to pick up the intercom, which cannot be heard by passengers.

However, as the two men began to speak over the intercom, another crew member advised them by radio that their conversation was "bleeding over" onto the PA system, where it could be overheard by the passengers. The conductor advised the engineer that he would walk up through the train to speak with the engineer in person.

Approaching the derailment area, the track grade is nearly level between MP 7.0 and MP 4.7. The track is tangent, from MP 7.0 to MP 6.7. At Englewood, MP 6.7, three tracks cross Metra's two main tracks at an angle. Geographically north of the crossing begins a 3-degree 40-minute left hand curve for the direction of travel of the train. Proceeding north from the curve, both main tracks are tangent up to the point of derailment.

When the train dispatcher lines the route for an eastward train to cross over from No. 2 Main Track to No. 1 Main Track at CP 48th Street, the signal at CP 53rd Street will display a yellow-over-yellow aspect on a two-headed signal mast located on a signal bridge above the track at that location. The signal at CP 48th Street, located 3,483 feet beyond, will display a red-over-green aspect on a two-headed signal mast also located on a signal bridge at that location.

As the eastbound train approached the derailment site, the engineer was seated at the controls on the east side of the control cab car. The conductor, who was walking toward the head end of the train to speak with the engineer, had just entered the second car from the head end of the train. The assistant conductor was in the unoccupied rear car of the train, where he had gone to check his supply of tickets. The collector was in the fourth car from the head end, which was occupied by 67 passengers. As the train approached CP 48th Street at nearly 70 mph, the engineer suddenly noticed that the crossover switch immediately in front of his train was lined to cross over to No. 1 Main Track. The maximum authorized speed through the crossover is 10 mph.

The Accident

Before the engineer had time to react, Train 504 entered the facing-point crossover switch at CP 48th Street at a recorded speed of 69.3 mph, derailing the entire train. The derailed cars continued moving forward, through the crossover onto No. 1 Main Track and through the 47th Street bridge. At this point, some of the derailed cars struck the south end of the east side of the 70-foot long, through plate girder bridge which extends about three feet above the ballast on each side of the track.

The first car, Cab Car 8570, which was unoccupied except for the engineer, remained coupled to the car behind it, and continued through the bridge until it came to rest approximately 820 feet from the point of derailment. The engineer suffered a minor cut on his arm.

The second car, Coach 7331, which was the first car occupied by passengers, remained coupled to the cars ahead and behind it and made minor contact with the bridge on the right side of the car, just below the side sill. The conductor, who was walking through this car on his way to talk with the engineer, suffered non-life-threatening injuries.

The third car, Cab Car 8548, which was the second occupied car, remained coupled to the cars ahead and behind it and also contacted the bridge girder. The right front corner of the car rode over the girder, damaging the underside of the car and the frame of the lead truck. The collector, who was riding in this car, suffered non-life-threatening injuries.

The fourth car, Coach 7488, which was the third occupied car, remained coupled to the car ahead of it, and also impacted the bridge girder at the right front corner, causing significant damage to the car and the bridge. At some point, the trailing truck sheared from the car body of Coach 7488 and went under the fifth car, Coach 7351, in front of its leading truck. The car wall was deformed and windows were destroyed. The passenger compartment was penetrated by fractured metal and railing from the bridge, which resulted in one fatality. One of the fatally injured passengers was known to be seated in this area. The second victim died at the hospital and it is not known where she was sitting. Most of the serious injuries occurred to passengers who were riding in this car.

The fifth car, Coach 7351, was unoccupied except for the assistant conductor who suffered non-life-threatening injuries. It impacted and over-rode the bridge girder and the rear truck of Coach 7488, and the right front corner scraped along the side of the adjacent bridge girder. The rear truck remained on the ground, where it impacted and dragged the detached trailing truck of Coach 7488. The vertical motion, which resulted as the car over-rode the bridge girder, caused Coach 7351 to uncouple from Coach 7488, however Coach 7351 remained coupled to the trailing locomotive. Coach 7351 and the locomotive then continued through the bridge and came to rest on the north side of the bridge, separated by about 30 feet from the rest of the train. All five cars and the locomotive remained upright and in line.

After they came to a stop, the engineer immediately attempted to use the train radio to declare an emergency but found the train radio to be inoperative. The engineer then used his personal hand-held radio to declare an emergency, and called the train dispatcher to notify him of the derailment. The dispatcher, having already noticed several alarms sounding on his panel, then called the Metra police to investigate. The Chicago Fire Department was notified at 8:38 a.m. The first units arrived on the scene at 8:41 a.m., and immediately began treating and removing victims from the train. The fire department used 30 ambulances and several busses to transport 150 injured passengers and four crew members to 14 area hospitals. Three of the four crew members suffered reportable injuries. All four crew members and the train dispatcher submitted to Post-Accident testing under Federal authority. Two employees from another train, who suffered minor, but reportable injuries while assisting with the evacuation, were treated the following day.

Post-Accident Investigation

The accident was investigated by the FRA, National Transportation Safety Board (NTSB), the Illinois Commerce Commission (ICC) and Metra. It was learned that there were two Metra employees in the immediate vicinity, who were preparing to film a Metra training video in the Metra maintenance facility adjacent to the scene. Although they did not see the derailment, they were alerted by the sound and ran to the scene, where they videoed the damaged equipment and the assistance rendered by the Chicago Fire Department. They were among the first persons to speak with the crew after the accident.

FRA and NTSB Track inspectors determined by consensus that the point of derailment was 52.74 feet north (railroad east) of the end of the switch point on the curved closure rail on No. 2 Main Track. They also noted extensive damage to track and bridge structure caused by the derailment, however they concluded that neither the track nor the bridge was a primary or contributing cause of the derailment.

FRA Motive Power and Equipment (MP&E) inspectors observed the download of event recorders on the locomotive and the control cab car. They also inspected the equipment and attempted to test the brakes. They tested the brakes on the locomotive the following day and found the brakes to be working correctly. However, due to equipment damage, the inspectors were unable to test the brakes on the passenger cars. The MP&E inspectors concluded that neither the locomotive nor the rolling equipment was a primary or contributing cause of the derailment.

FRA Signal and Train Control (S&TC) inspectors met with Metra's Director of Engineering less than three hours after the accident and assisted with inspecting the

signal appliances in the field. Post accident inspection found all signal units and cases at CP 48th Street locked and secured with no indications of tampering or vandalism to any of the equipment.

Shortly thereafter, authorization was granted to download the event recorder (diagnostics logs) from the Harmon Vital Logic Controller (HVLC) at CP 48th Street. Downloads of the event recorders were then performed at the CP 53rd Street and CP Root Street. FRA S&TC inspectors also arranged for downloads of the train dispatcher's console, and the route that was lined for Train 504.

The NTSB, Metra, ICC and FRA conducted joint signal event recorder download analysis of the signal system from CP 53rd Street, CP 48th Street and CP Root Street. Track circuit indications circuits, switch and signal request, control and indication circuits were reviewed. By reviewing the HVLC event recording downloads, the sequence of events for the operation of the 4R-signal, located on Eastward Track No. 2 at 48th Street, was consistent with the operational plans and signal design. Due to the derailed cars an operational test of the signal system was not performed at that time.

On September 18, representatives from Metra, NTSB, ICC and FRA began inspecting and testing the signal system. A simulation at CP 53rd Street and CP 48th Street was conducted. The signal aspect displayed was in accordance with the signal system design and each track circuit functioned as intended in all cases.

On September 19, maintenance, test and inspection records were collected for CP 48th Street, CP 53rd Street and CP Root Street. Signal testing was also conducted at CP 48th Street. Again, the signal system functioned as designed.

On September 20, representatives from Metra, NTSB, ICC and FRA interviewed two signal test men and one signal maintainer that were in the vicinity of the derailment and responded to the incident. The interviews revealed that at no time did they perform any task that would have been a contributing factor to the incident. Signal testing was conducted at CP 53rd Street. The signal system functioned as designed.

On September 21, additional signal tests were conducted at CP 53rd Street. Again, the signal system functioned as designed.

On September 22, insulation resistence tests were made on all signal cables at CP 48th Street and CP 53rd Street. No exceptions were taken and the signal system functioned as designed.

Further examination of the signal maintenance records did not identify any condition that would prevent the signal system from functioning as designed. After conducting extensive testing the FRA and other agencies concluded that the signal system was functioning as designed and was not the primary or contributing cause of the derailment. The formal results of the signal tests and simulations are contained in an attachment from FRA Signal Inspector Viser.

FRA Operating Practices Inspectors and NTSB investigators interviewed the entire crew of Train 504. The conductor has worked for Metra since August 1999, and was promoted to conductor in February 2003. This was the first trip that the conductor and engineer had worked together in passenger service, however they had worked together on a Metra work train the previous day.

The engineer was a relatively new Metra employee, having been hired in April 2005, after he resigned from CSX railroad to accept the position with Metra. Prior to being hired by Metra, the engineer was employed by CSX since 1998, where he became a certified locomotive engineer in 2000. Because he was already a certified locomotive engineer, Metra placed him in an abbreviated training program. After undergoing numerous training trips to familiarize him with the territory and passing the required written tests, he was qualified on August 29, 2005, to operate trains over the territory where the accident occurred.

The FRA also examined the engineer's medical records of both his present and former railroad employers, and noted no conditions which would prevent him from safely performing his duties as a locomotive engineer.

Post-Accident drug and alcohol test results were negative for all employees tested. The FRA took no exceptions to the actions of the conductor, assistant conductor, collector and train dispatcher and concluded that they were not the primary or contributing causes of the derailment.

The engineer maintained that he had clear signals leading up to the derailment site, despite the findings of an extensive post-accident investigation and the unanimous conclusion by the investigators that the signal system was functioning as intended at the time of the derailment.

He also stated that he had an unobstructed view of the signals and had no warning that he was going to cross over at CP 48th Street until he saw that the crossover switch was reversed.

However, in an interview with a Metra officer who was working near the scene, and was one of the first persons to speak with the engineer after the incident, the engineer allegedly told the officer, "I didn't see it . . . I didn't see it!" The officer stated that, in his opinion, the engineer meant that he missed the signal.

Metra System Timetable No. 1, effective 3:01 a.m., Sunday April 3, 2005, states that CP 53rd Street and CP 48th Street are both on the Joliet Sub District. In the System Special Instructions section of that timetable, Rule 9.1.7 states that a yellow-over-yellow aspect is an "Approach Diverging" signal, which indicates that a train must, "Proceed prepared to advance on diverging route at the next signal at prescribed speed through turnout."

Rule 9.1.10 states that a red-over-green aspect is a "Diverging Clear" signal, which indicates that a train must, "Proceed on diverging route at prescribed speed through the turnout."

In the same timetable, the Joliet Sub District Special Instructions states that, "Speed through turnout of . . . All Switches Not Otherwise Specified . . . 10 (mph)." This would include the crossover switches at CP 48th Street.

Probable Cause

The FRA determined the probable cause of the accident to be the engineer failure to comply with the interlocking signals at CP 53rd Street and CP 48th Street.