Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2008-35

Long Island Railroad (LIR)
Jamaica, NY
March 27, 2008

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-2008-35

1.Name of Railroad Operating Train #1: Long Island Rail Road [LI]	1a. Alphabetic Code: LI	1b. Railroad Accident/Incident No.: EQ20080302
2.Name of Railroad Operating Train #2: Long Island Rail Road [LI]	2a. Alphabetic Code: LI	2b. Railroad Accident/Incident No.: EQ20080302
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: Long Island Rail Road [LI]	4a. Alphabetic Code: LI	4b. Railroad Accident/Incident No.: EQ20080302
5. U.S. DOT_AAR Grade Crossing Identification Number	6. Date of Accident/Incident: Month 03 | Day 27 | Year 2008	7. Time of Accident/Incident: 09:59:00 ☑ 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	20	System

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
Jamaica	9	N/A	NY	QUEENS

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
45 F	2	2	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
Jamaica Interlocking	1	N/A	3

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
2	1	714

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?
3 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)*: N/A	Code(s): f | 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)*	LI7628	5	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): Y

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	1	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	0	6	0	0	0
(2) Total Derailed	0	1	0	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
$400,000.00	$100,000.00	S099	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 5 Mi 58	Hrs 5 Mi 58

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	1	1	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
2	1	1618

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 R	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

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2008-35

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): f | N/A | N/A | N/A | N/A

2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: 0

59. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	LI7773	12	yes
(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): Y

62. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	1	0	0	0	0	(1) Total in Equipment Consist	0	11	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	0	0	0

64. Equipment Damage This Consist: $56,000.00

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

66. Primary Cause Code: S099

67. Contributing Cause Code: N/A

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
1	0	1	0

Length of Time on Duty

72. Engineer/Operator: Hrs 3 Mi 26

73. Conductor: Hrs 3 Mi 26

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? 1. Yes 2. No | Code: N/A

82. Train Number/Symbol: N/A

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

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

85. Method(s) of Operation *(enter code(s) that apply)*

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

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

85a. Remotely Controlled Locomotive?
0 = Not a remotely controlled
1 = Remote control portable
2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter: N/A

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

87. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
N/A	N/A

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

89. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	90. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	N/A	N/A	N/A	N/A	N/A	(1) Total in Equipment Consist	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A	(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

91. Equipment Damage This Consist: N/A

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

93. Primary Cause Code: N/A

94. Contributing Cause Code: N/A

Number of Crew Members

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

Length of Time on Duty

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

100. Conductor: Hrs N/A Mi N/A

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

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

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

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

Highway User Involved

107. 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

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

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

Rail Equipment Involved

111. 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

112. Position of Car Unit in: N/A

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FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2008-35

110. Position 1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	Code N/A	113. Circumstance 1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	Code N/A
114a. 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	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither	Code N/A
114c. State here the name and quantity of the hazardous materials released, if any. N/A			

115. Type 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	116. Signaled Crossing *(See instructions for codes)*	Code	117. Whistle Ban 1. Yes 2. No 3. Unknown	Code
Code(s) N/A N/A N/A N/A N/A N/A N/A	N/A	N/A		N/A

118. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach	Code N/A	119. Crossing Warning with Highway Signals 1. Yes 2. No 3. Unknown	Code N/A	120. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown	Code N/A

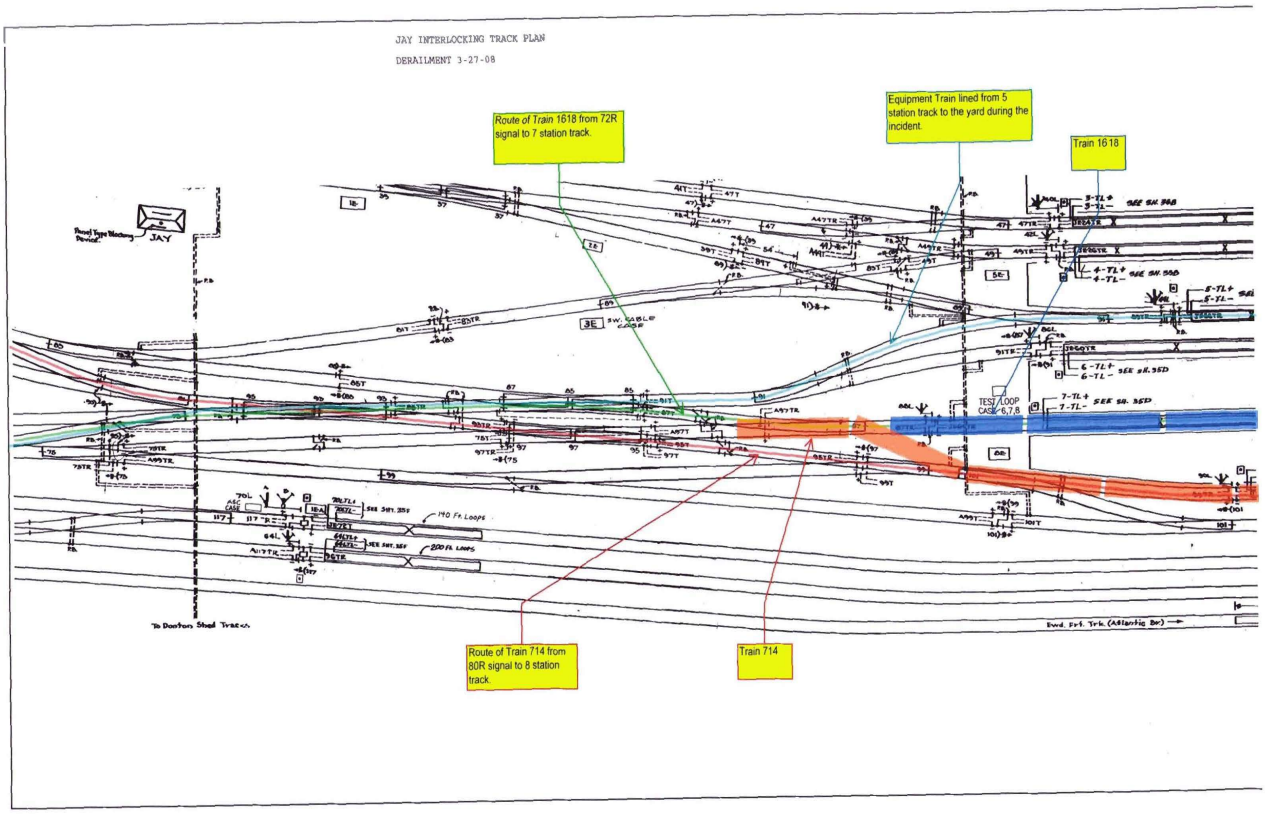
121. Age N/A	122. Driver's Gender 1. Male 2. Female	Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code N/A	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other *(specify in narrative)*	Code N/A

125. Driver Passed Highway Vehicle 1. Yes 2. No 3. Unknown	Code N/A	126. 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

Casualties to:	Killed	Injured	127. Driver 1. Killed 2.Injured 3. Uninjured	Code N/A	128. Was Driver in the Vehicle? 1. Yes 2. No	Code N/A
129. Highway-Rail Crossing Users	N/A	N/A	130. Highway Vehicle Property Damage *(est. dollar damage)*	N/A	131. Total Number of Highway-Rail Crossing Users *(include driver)*	N/A

132. Locomotive Auxiliary Lights? 1. Yes 2. No	Code N/A	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No	Code N/A
134. Locomotive Headlight Illuminated? 1. Yes 2. No	Code N/A	135. Locomotive Audible Warning Sounded? 1. Yes 2. No	Code N/A

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



137. SYNOPSIS OF THE ACCIDENT

On March 27, 2008 a derailment and subsequent sideswipe occurred on the Long Island Rail Road (LIRR). The accident occurred at 9:59 am at Jamaica Station. Jamaica Station is located within the confines of Jay Interlocking at milepost 9 on the Main Line of the Long Island Rail Road. Jay Interlocking is located in Jamaica, N.Y. Jamaica is a section of Queens, NY, one of the five boroughs of New York City.

The derailed and striking LIRR Commuter Train # 714 was eastbound. The train is a six car multiple unit train traversing onto Station Track Number 8 in Jamaica Station. The derailed car was car # 7628 located as the fifth car in the consist of LITT Commuter Train # 714. When car # 7628 derailed it struck the last car of LIRR Commuter Train # 1618.

LIRR Commuter Train # 1618 was an eastbound commuter train located at the platform on station track # 7 in Jamaica Station. LIRR Commuter Train # 1618 consisted of 12 multiple unit cars with car # 12 being struck by LIRR Commuter Train # 714. The car struck by LIRR Commuter Train # 714 was LIRR Passenger Car # 7773. LIRR Commuter Train # 1618 was not moving at the time of the collision.

The weather was cloudy and cold with an ambient temperature of 45 degrees F.

The accident was caused by the failure of a signal track repeating circuit. The repeating circuit inappropriately cleared, indicating by wayside train signal that there was no train on the track ahead. This allowed the switches within the route to be realigned and thrown under the wheels of LIRR Commuter Train # 714. The first four cars and the first truck of the fifth car were properly lined for station track # 8, however the switches were thrown under the fifth car. The second truck set then derailed and LIRR Passenger Car # 7628 struck the last car of LIRR Commuter Train # 1618 which was located on Station Track # 7. The remainder of LIRR Passenger Car # 7628 derailed as a result.

The damage to the track structure was $ 100,000 and the total damage to the equipment was $ 400,000.

The probable cause is an electrical failure allowing the track switches to re-align under the train.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

LIRR COMMUTER TRAIN # 714

The three member crew of LIRR Commuter Train # 714 reported for work at Jamaica, NY at 4:00 am EST on March 27, 2008 after receiving the required statutory off duty rest period. The three member crew consisted of an engineer, conductor, and brakeman. The job number for LIRR Commuter Train # 714 is assignment # 173.

The crew performed a brake test and an Automatic Speed Control (ASC) test on the 6 car Multiple Unit (MU) train prior to departing Flatbush Avenue located in Brooklyn, NY. The seal for the ASC was discovered by the crew to be broken so it was replaced by a transportation manager prior to departure. The train departed Flatbush Avenue at 9:35 a.m. en route east toward Jamaica Station. The train made stops at Nostrand Avenue and East New York prior to Jamaica Station. The crew took no exceptions to the train performance during the trip to Jamaica.

Upon arrival at Jay Interlocking LIRR Commuter Train # 714 was routed from Atlantic Track # 2 to Station Track # 8. The signal for this route is 80R utilizing switches 79 normal (N), 81 reverse (R), 93R, 95R, 97R, 99N, and 101N. The move for LIRR Commuter Train # 714 was made after the arrival of LIRR Commuter Train # 1618.

The consist of LIRR Commuter Train # 714 was (east to west) Passenger Car # 7824 (lead), # 7823, # 7346, # 7345, # 7628, and # 7627

The engineer was located in the cab. The conductor and brakeman were located in the 4th car at the time of

the accident. The crew members were preparing for the arrival of the LIRR Commuter Train at Jamaica Station.

LIRR COMMUTER TRAIN # 1618:

The three member crew of LIRR Commuter Train # 1618 reported for work on March 27, 2008 at 5:09 am EST at Port Jefferson, NY after receiving the required statutory off duty rest period. The three member crew consisted of an engineer, a conductor, and a brakeman. The job number for train #1618 is assignment # 38.

The crew performed a brake test on the 12 car multiple unit (MU) train prior to departing New York Penn Station at 9:36 am. The train headed east to Jamaica making station stops at Forrest Hills and Kew Gardens prior to arriving at Jamaica. The crew took no exceptions to the train performance during the trip to Jamaica.

Upon arrival at Jay Interlocking, LIRR Commuter Train # 1618 was routed from Mainline Track # 4 to Jamaica Station Track # 7. The signal for this route is 72R utilizing switches 69N, 73R, 95N, 93N, 85N, and 87R.

LIRR Commuter Train # 1618 arrived at Jamaica and was at the platform on Station Track # 7 when Train # 714 arrived. Track # 7 holds 10 cars. The rear two cars of LIRR Commuter Train # 1618 protruded into Jay Interlocking past 88L signal. This is normal procedure for this train.

The engineer was of Train LIRR # 1618 was located in the cab. The brakeman was located in the 8th car. The conductor was located in the 6th car. The crew had opened the train doors and was awaiting the arrival of connecting Train # 714.

The consist of LIRR Commuter Train # 1618 was (east to west) Passenger Car # 7816 (lead), # 7815, # 7786, # 7785, # 7756, # 7755, # 7832, # 7831, # 7214, # 7213, # 7774, and car # 7773.

BLOCK OPERATORS:

The block operators for Jay Tower reported for work at 7:00 am on March 27, 2008 after receiving 16 hours rest, the required statutory off duty rest period. On the day of the accident the operator instructed the lever-man to route LIRR Commuter Train # 1618 onto Track # 7 via the “big loop” so that the train would clear switches for the next train move to Track # 8. LIRR Commuter Train # 1618 was routed to Track # 7 and then the operator instructed the lever-man to route LIRR Commuter Train # 714 to Track # 8. This route was established for LIRR Commuter Train # 714. The operator also told the lever-man that the next move would be a westbound move from Station Track # 5 to the Hump Track. The lever-man had to wait for LIRR Commuter Train # 714 to clear the interlocking onto Station Track # 8 before throwing the necessary switches to make the next move. The route from # 5 Station Track to the Hump Track required the lever-man to normal three switches used in the routing of LIRR Commuter Train # 714 (-Switches = 93N, 95N, and 97N). The lever-man was watching the apron light for these switches. The apron light is located below the switch lever on the interlocking machine. When the light illuminates, it indicates that the track is clear of trains and the switch can be thrown to a different position.

Traveling east from the interlocking signal, the grade of the railroad is practically level. There are no obstructions impeding the view of the engineer.

THE ACCIDENT

LIRR Commuter Train # 714 was traveling at approximately 13 mph as it approached the derailment site and slowed to 3.6 mph just prior to impact. The train was making a station stop at Jamaica Rail Station and had slowed prior to when the derailment and subsequent collision. This information was obtained by interviews with the crew and substantiated by the lack of damage to the trains following the derailment. The event recorder data analysis confirmed the speed at 3.6 mph at impact.

LIRR Commuter Train # 714 had reached the platform when the crew members felt a slight bump and heard a loud noise. The crew members were in the fourth car just ahead of the derailed car. The conductor looked out the window and saw that the fifth car had derailed. He pulled the dump cord on the train putting the train air brakes into emergency. The crew took no exceptions to the train, the tracks, or the physical characteristics right up until the time of the derailment. The ride was normal.

The second truck of the fifth car (7628) of train LIRR Commuter Train # 714 derailed north off Track # 8 and swung into the twelfth car (7773) of LIRR Commuter Train # 1618. The entire car then derailed but remained upright.

The crew of LIRR Commuter Train # 714 walked the approximately 80 passengers located in the first five cars off the train onto the platform at Jamaica Station. The sixth car of the traint remained upright and on the tracks but separated from the train when the derailment occurred. There were approximately 20 passengers on the car. These passengers could not walk through the separated train. They were evacuated from the 6th car approximately 30 minutes following the derailment by Long Island Rail Road management. There was 1 passenger and 1 employee injured as a result of the derailment. There were no fatalities. The crew of LIRR Commuter Train # 714 was taken for drug and alcohol testing. The results of the tests were negative.

The New York City Fire Department as well as the Metropolitan Transportation Authority (MTA) Police Department responded to the scene. The MTA Police assisted in removing passengers from the 6th car.

ANALYSIS AND CONCLUSION

ANALYSIS:

The Long Island Rail Road Signal Department conducted an investigation into the derailment. The investigation determined that LIRR Commuter Train # 714 was still in route when switches # 93, # 95, and # 97 were thrown normal under the train. These three switches were trailed through by LIRR Commuter Train # 714 and there were wheel markings over the frog area of # 97 switch indicating that passenger car # 7628 of LIRR Commuter Train # 714 derailed over the movable point frog of # 97 switch. All three switches would have been thrown normal for the next move requested by the train director, Five Station Track to the Hump Yard.

Additionally, analysis of the switch levers on the interlocking machine proved that the switches were thrown during the time that LIRR Commuter Train # 714 was traversing the switches. Switch levers for # 93, # 95, and # 97 Switches should have been completely to the right. This is the fully locked reverse position. However, # 93 lever was discovered to be to the left of center position. This is the indicating position for the switch thrown in the normal position. The lever for switch # 95 was discovered to be fully left. This is the fully locked normal position. The lever for switch # 97 was right of center. This is the indicating position for the switch thrown in the reverse position. Obtaining the route requested for LIRR Commuter Train # 714 required these levers to be in the fully locked reverse position. The train director could not have displayed the home signal without these three levers being in the complete reverse position. Also, once LIRR Commuter Train # 714 entered the interlocking, route locking circuits prevent the train director from changing the route or throwing the levers until the train has passed the switches and exited the track circuit.

Once they determined that the cause of the derailment was the switches being thrown under the train, the signal department began the investigation into why the switches were able to be thrown. The signal department performed preliminary tests at the time of the derailment on the track circuitry to affirm they were working properly. The derailed LIRR Commuter Train # 714 cleared switches # 93, # 95, and # 97, so shunt tests were performed on the # 93T and # 97T track circuits to ensure the circuits opened, thus recognizing the train on the tracks. Shunt tests are performed by placing a wire with a resistance of .06 ohms across the rails of the track. This simulates a train on the track. Both circuits shunted properly, indicating if there was a problem with the track circuits, it was no longer present. Track repeaters, grounds, and cable insulation resistance were also tested at this time. All testing results were within FRA requirements. No further testing could be performed until the trains were removed from the site.

On March 28, 2008 the Long Island Rail Road performed a re-enactment of the incident utilizing two equipment trains. The route and train positions were set up four different times without any failure of the signal system. The signal department performed extensive signal testing over the weekend. There were no exceptions taken to the integrity of the signal system. All testing was complete at this time.

With the integrity of the signal system intact the signal department began to look at circumstances that could have caused an isolated incident. A new Central Instrument Location (CIL) was being tested by a signal construction gang which will control a new Jay Interlocking. New Jay will be a microprocessor interlocking

and beginning in January 2008 the new system had been undergoing breakdown and indication testing. Four of six microprocessors were programmed and were working. They were isolated from the old Jay Tower with the exception of several indication circuits. These new microprocessors record indications internally in the form of data logs. On March 31, 2008 the LIRR with the FRA were able to obtain computer downloads of the data logs from the four processors. The data log recorded what the construction gang had been testing the past two days (March 27 and 28).

Signal policy dictates that when work is being performed on a new installation the battery and common buss are opened at the end of the day to prevent an undesirable feed from a buss back to the existing, working equipment. However, this policy actually contributed to the cause of the derailment. When the data log was analyzed it was determined that four indication wires were left closed at the end of the previous day. Additionally, the common energy buss was left open as per signal standards. This combination caused a back-feed of energy from the New Jay to the existing Jay Interlocking. Battery traveled through one of the indication wires, through the opened common buss, and back through the other indication wires. This back feed of energy caused the # 93TM and # 97TM relays to energize, thereby releasing the route locking circuits under LIRR Commuter Train # 714. When the lever-man for Jay Tower observed the apron light illuminate, he immediately threw the three switches needed for the next move. LIRR Commuter Train # 714 was not clear of the switches, and derailed over the # 97 switch.

The Signal Department and FRA recreated the events based on the information obtained by the data log. Seven volts of energy were recorded on the track repeaters, more than enough to energize the relays.

CONCLUSIONS:

The derailment was caused by the back feed of energy from the New Jay to the existing Jay Interlocking. This undesired energy caused the track repeaters to energize under the wheels of LIRR Commuter Train # 714, thereby releasing the route lock circuit, allowing the switches to be thrown under the train. LIRR Commuter Train # 714 derailed over the facing point of Switch # 97. Although the signal department followed normal signal procedures, the opening of the common buss in the New Jay Interlocking contributed to the cause of the derailment.

The cause was proved by the testing and recreating of the circumstances indicated by the data log.

When the derailment occurred the Long Island Signal Department halted all testing on the New Jay pending resolution of the derailment. They hired a consultant to assist in formulating procedures which would allow for the continuation of testing in the safest manner possible. Together they comprised a list of recommendations to implement and allow for safe testing. On July 7, 2008 the Long Island Rail Road continued testing New Jay with these recommendations in force.

The probable cause is an electrical failure allowing the track switches to re-align under the train.