Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2008-89

Southern CA Regional Rail Auth./Burlington Northern Santa Fe
(SCAX/BNSF)
Woolridge, MO
November 20, 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-2008-89

1.Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Southern California Regional Rail Authority [SCAX]	SCAX	112008
2.Name of Railroad Operating Train #2	2a. Alphabetic Code	2b. Railroad Accident/Incident No.
BNSF Rwy Co. [BNSF]	BNSF	CA1108117
3.Name of Railroad Operating Train #3	3a. Alphabetic Code	3b. Railroad Accident/Incident No.
N/A	N/A	N/A
4.Name of Railroad Responsible for Track Maintenance:	4a. Alphabetic Code	4b. Railroad Accident/Incident No.
Southern California Regional Rail Authority [SCAX]	SCAX	112008
5. U.S. DOT_AAR Grade Crossing Identification Number	6. Date of Accident/Incident: Month 11 Day 20 Year 2008	7. Time of Accident/Incident: 11:25: ☑ 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: 05

9. Cars Carrying HAZMAT	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
4	0	0	0	System

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
Rialto	52.4	N/A	CA	SAN BERNARDINO

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
80 F	2	1	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
Main	4	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
	3	1	ML306

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?
1 MPH	E	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): e | m | N/A | N/A | N/A

31a. Remotely Controlled Locomotive?: 0

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	SCAX 877	1	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
N/A	N/A

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	1	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	3	0	0	0
(2) Total Derailed	0	0	0	0	0

37. Equipment Damage This Consist	38. Track, Signal, Way, & Structure Damage	39. Primary Cause Code	40. Contributing Cause Code
$61,650.00	$0.00	H220	N/A

Number of Crew Members				Length of Time on Duty	
41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen	45. Engineer/Operator	46. Conductor
2	0	1	0	Hrs 2 Mi 55	Hrs 2 Mi 55

Casualties to:	47. Railroad Employees	48. Train Passengers	49. Other
Fatal	0	0	0
Nonfatal	0	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
	1	1	LCAL11120T

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?
27 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

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57. Trailing Tons *(gross tonnage, excluding power units)*: 12198

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): e | i | j | 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)*	BN621413	99	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): N

62. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	4	0	0	0	2
(2) Total Derailed	0	0	0	0	0

63. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	96	0	6	0	0
(2) Total Derailed	0	0	0	0	0

64. Equipment Damage This Consist: $23,700.00

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

66. Primary Cause Code: H220

67. Contributing Cause Code: N/A

Number of Crew Members

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

Length of Time on Duty

72. Engineer/Operator: Hrs 5 Mi 25

73. Conductor: Hrs 5 Mi 25

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: 1

78. Was EOT Device Properly Armed? 1. Yes 2. No: 1

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: 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
(1) Total in Train	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

90. Cars	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(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

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. Code: N/A
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)*

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

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

Rail Equipment Involved

111. Equipment Code: N/A
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)*

112. Position of Car Unit in: N/A

110. Position	Code
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	N/A

113. Circumstance	Code
1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	N/A

114a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials?	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

114b. Was there a hazardous materials release	Code
1. Highway User 2. Rail Equipment 3. Both 4. Neither	N/A

114c. State here the name and quantity of the hazardous materials released, if any.
N/A

115. Type Crossing Warning	1.Gates	4.Wig Wags	7.Crossbucks	10.Flagged by crew
	2.Cantilever FLS	5.Hwy. traffic signals	8.Stop signs	11.Other *(spec. in narr.)*
	3.Standard FLS	6.Audible	9.Watchman	12.None

Code(s)							
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

116. Signaled Crossing *(See instructions for codes)*	Code
	N/A

117. Whistle Ban	Code
1. Yes 2. No 3. Unknown	N/A

118. Location of Warning	Code
1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach	N/A

119. Crossing Warning with Highway Signals	Code
1. Yes 2. No 3. Unknown	N/A

120. Crossing Illuminated by Street Lights or Special Lights	Code
1. Yes 2. No 3. Unknown	N/A

121. Age	122. Driver's Gender	Code
N/A	1. Male 2. Female	N/A

123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train	Code
1. Yes 2. No 3. Unknown	N/A

124. Driver	Code
1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other *(specify in narrative)*	N/A

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

126. View of Track Obscured by *(primary obstruction)*	Code
1. Permanent Structure 2. Standing Railroad Equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicle 7. Other *(specify in narrative)* 8. Not obstructed	N/A

Casualties to:	Killed	Injured
129. Highway-Rail Crossing Users	N/A	N/A

127. Driver	Code
1. Killed 2.Injured 3. Uninjured	N/A

128. Was Driver in the Vehicle?	Code
1. Yes 2. No	N/A

130. Highway Vehicle Property Damage *(est. dollar damage)*
N/A

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

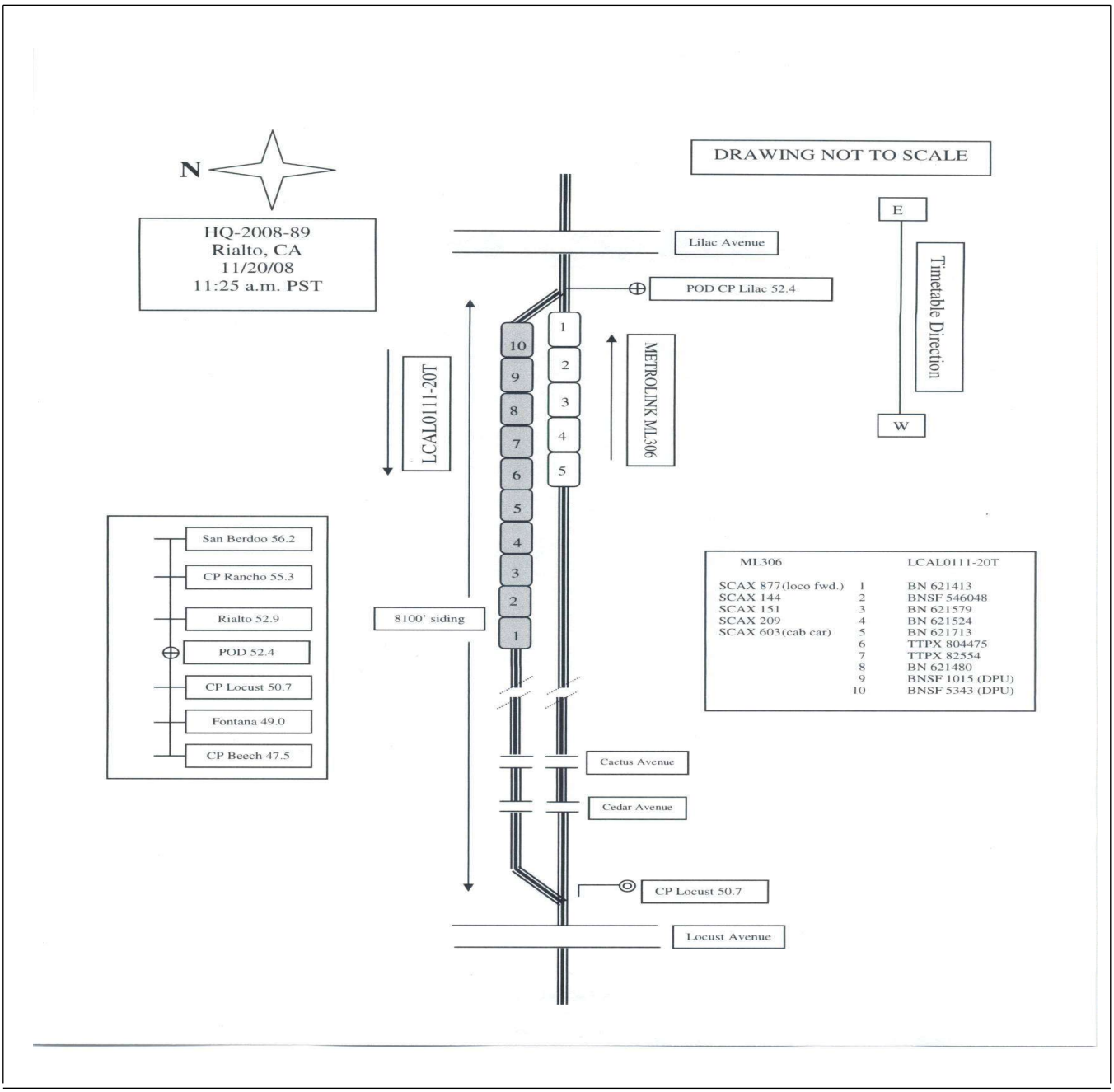
132. Locomotive Auxiliary Lights?	Code
1. Yes 2. No	N/A

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

134. Locomotive Headlight Illuminated?	Code
1. Yes 2. No	N/A

135. Locomotive Audible Warning Sounded?	Code
1. Yes 2. No	N/A

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



137. SYNOPSIS OF THE ACCIDENT

At approximately 11:25 a.m. PST, November 20, 2008, an eastbound passenger train owned by the Southern California Regional Rail Authority (SCAX), operating as Metrolink (ML) 306 in a locomotive forward configuration, sideswiped a westbound BNSF Railway freight train LCAL01-11-20T, at CP Lilac, milepost 52.4, on SCAX/Metrolink's San Gabriel Subdivision near Rialto, California. The raking collision damaged the lead locomotive of ML 306 and the last eight cars and two trailing locomotives of the BNSF train. No crew members of either train were injured and no equipment derailed. Of the 15 passengers aboard the ML 306 passenger train, one sustained minor injuries and was taken to a local hospital for treatment.

Movements on this part of the railroad are controlled by a Metrolink dispatcher located in Pomona, California.

Damage to the Metrolink locomotive was estimated at $61,650; damages to the BNSF locomotives and cars were estimated at $23,700. There was no damage to track, signals or structures.

Weather at the time of the accident was daylight and clear with a temperature of 80 degrees Fahrenheit.

The probable cause of the accident was the failure of the Metrolink crew to comply with a fixed signal displaying a stop indication.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

Railroad timetable and geographic direction of travel for train movements described in this report are the same and can be used interchangeably. All references to time are expressed in Pacific Standard Time (PST) and all references to events occurring on the date of the accident are November 20, 2008.

METROLINK TRAIN ML-306

The crew of Metrolink Train ML-306 Passenger Train consisted of a locomotive engineer, an assistant engineer and a conductor. The locomotive engineer and conductor went on duty at the Central Maintenance Facility (CMF), Los Angeles, CA, their home terminal, at 8:30 a.m., after receiving more than the required statutorily off duty rest period. The assistant engineer went on duty at 6:04 a.m. at San Bernardino, CA, his home terminal, also after receiving more than the required statutorily off duty rest period. The crew was assigned a four-car train consisting of a locomotive (SCAX 877) three Bombardier bi-level passenger cars (SCAX 144, SCAX 151 and SCAX 209), and a Bombardier cab car (SCAX 603). The crew departed the CMF at 10:10 a.m. operating Train ML-306 East. The crew is employed by Connex Railroad, a division of Veolia Transportation, under contract to the Southern California Regional Rail Authority (SCRRA), which operates commuter service throughout southern California under the Metrolink name.

Eastward Metrolink Train ML-306 was operating on track owned and maintained by SCRRA and is located on the Metrolink San Gabriel Subdivision. On this part of the railroad movements are controlled by a Metrolink dispatcher located in Pomona, California. The maximum authorized track speed is 79 mph for passenger trains and 55 mph for freight trains. The track is also jointly used by Burlington Northern Santa Fe (BNSF) Railway freight trains which are also controlled by the Metrolink dispatcher.

The plan called for Train ML-306 to hold the main line and stop at Control Point (CP) Lilac, milepost 52.4, to await the passage of BNSF Freight Train LCAL0111-20T, known as the Kaiser Hauler, which was to enter the siding at CP Lilac. Train ML-306 received an advance approach indication (flashing yellow aspect) at CP

Beech, milepost 47.5, and an approach indication (solid yellow aspect) at CP Locust, milepost 50.7.

Approaching the accident site the locomotive engineer was seated on the right side of the locomotive cab and the assistant engineer was seated in the conductor's seat on the left side of the locomotive cab. The conductor was in one of the bi-level cars performing his duties. They described the trip from Los Angeles as uneventful with normal station stops and reported no mechanical difficulties with the equipment. Approximately 15 passengers were on-board and seated throughout the train. The assistant locomotive engineer stated he waved at the crew of BNSF Freight Train LCAL0111-20T stopped on the siding track as they passed.

The crew of ML-306 Passenger Train received a stop (red aspect) signal indication at CP Lilac, milepost 52.4, but continued past the red signal.

BNSF FREIGHT TRAIN LCAL0111-20T

The crew of BNSF Freight Train LCAL0111-20T consisted of a locomotive engineer, conductor and brakeman. The crew reported for duty at 6:00 a.m. in Barstow (CA), their home terminal, after receiving more than the required statutorily off duty rest period. The assigned train consisted of six locomotives, four at the head end and two in the trailing end as a Distributive Power Unit (DPU), with 96 loads and six empty rail cars. The train consist also contained four tank cars with hazardous materials of which three were loads and one was an empty residue tank car. The train weighed 12,198 tons and was 6,926 feet in length. It was scheduled to operate between Barstow and the Kaiser Yard in Fontana. The crew had instructions to set-out the entire train consist.

The crew departed Barstow at 7:29 a.m. and proceeded along the BNSF Cajon Subdivision to San Bernardino where it entered the Metrolink San Gabriel Subdivision en route to Kaiser Yard located in Fontana. They described the trip as uneventful as they approached the accident site. They were instructed to enter the 8,100 feet Rialto siding track at CP Lilac to allow Train ML-306 to pass. Approaching the accident site, the locomotive engineer was seated at the controls on the right side of the locomotive cab while the conductor was seated in his seat on the left side and the brakeman was seated on the brakeman's seat on the left side of the locomotive cab.

THE ACCIDENT

METROLINK COMMUTER TRAIN ML-306

At approximately 11:25 a.m. PST, Metrolink Train ML-306 went past the stop (red aspect) signal at CP Lilac. The lead locomotive raked the last eight cars and two DPU locomotives of BNSF Freight Train LCAL0111-20T as the latter was pulling into the Rialto Siding at CP Lilac. After ML-306 Passenger Train stopped the conductor called on his radio to check on his crew and the condition of the passengers, he then exited the rail car to investigate. He heard the crew of the ML-306 train call out "Emergency, Emergency, Emergency" on the radio followed by BNSF's emergency call over the radio.

Within minutes, local law enforcement, fire department and emergency response personnel arrived on the scene. There were no injuries to the three-man crew. Of the 15 passengers aboard, one passenger reported minor injuries and was taken to a local hospital for treatment.

BNSF FREIGHT TRAIN LCAL0111-20T

BNSF Freight Train LCAL0111-20T crew stated the train entered the siding normally. The conductor stated he observed the eastbound Metrolink train approaching at what he described as a high rate of speed. A minute later, their train went into an undesired emergency and they came to a stop approximately 500 feet from the westbound control signal at CP Locust, milepost 50.7. They called "Emergency, Emergency, Emergency" over the radio while the brakeman exited the locomotive to inspect the train. He discovered the trailing eight cars and two DPU locomotives were separated from the train after being struck by the Metrolink train on the Main Track however none of the cars derailed.

There were no injuries to the crew and no hazardous materials were involved.

POST-ACCIDENT INVESTIGATION

Investigators from the National Transportation Safety Board (NTSB), Federal Railroad Administration (FRA) and California Public Utilities Commission (CPUC), and company officials from SCRRA/Metrolink, Connex Railroad and BNSF quickly responded to the scene. Interviews with train ML-306 crew members were conducted at the Metrolink Operation Center in Pomona, CA, within a few hours after the collision by the responding investigators, absent BNSF official Representatives.

SIGNAL SYSTEM INVESTIGATION

DESCRIPTION OF RAILROAD SIGNAL SYSTEM

The Metrolink San Gabriel Subdivision runs in a timetable east/west direction. The track structure in the vicinity of the accident consists of rail siding and main track territory. The maximum timetable speed on the San Gabriel Subdivision is 79 mph for passenger trains and 55 mph for freight trains; the maximum speed through the turnout is 40 mph. The track is tangent and visibility is not obscured in either direction.

Train movements on the San Gabriel Subdivision are governed by Operating Rules, General Orders, Timetable Instructions and the signal indications of a Centralized Traffic Control (CTC) system using four aspect signaling. CP Lilac is equipped with a General Electric Transportation Services (GETS) Electro Logic Control (ELC) processor and intermediate signals are equipped with GETS Electro-code 4 (EC-4) processors. The Automatic Train Control System (ATCS) protocol are via lease line and microwave base station to control point communications path from the Metrolink Operations Center (MOC) to field control point locations.

The grade crossing warning systems between CP Lilac and CP Locust use CPUC standard # 9 and # 9A warning devices in conjunction with GETS HXP-3R2 constant warning processors.

The Metrolink CTC system between CP Lilac and CP Locust uses GRS LED (Light Emitting Diode) Color-light signals and GRS LED Sentinel signals. The CTC system also uses US&S M-23A low voltage power switch machines and the signal track circuits are controlled by Electro Code 4 electronic coded track circuits (Control Point to Control Point) and DC track circuits within Control Point on Station (OS) sections. Signals are arranged for movement in either direction.

RAILROAD SIGNAL EVENT RECORDERS

Information from the signal data logs were downloaded at CP Locust and CP Lilac. The logs indicate the signals functioned as intended. No signals were cleared after the BNSF train had occupied the detector track at CP Lilac. The eastbound signal at CP Lilac was not cleared again until signal tests were performed on November 20 for Main Track and November 21 for routes onto the siding track.

The investigating team visited the Dispatch Center and post-accident data was obtained from the Digicon logs. The logs indicate the Metrolink dispatcher requested the switch at CP Lilac to the reverse position and lined the signal for a westbound train movement from the Main Track to diverge into the siding at CP Lilac. Field data recorders were downloaded and the information was in accordance with the logs from the dispatch centers.

Train detection data for the Metrolink Train ML-306 movement was also obtained from the Harmon Crossing Processor, HXP-3R2 units at Locust, Cedar, and Cactus highway rail grade crossings. The data indicates the warning devices at Locust and Cedar Avenues functioned as intended and activated 31 seconds prior to the arrival of Metrolink Train ML-306; the warning devices at Cactus Avenue were already activated due to BNSF occupying the crossing.

POST-ACCIDENT INSPECTION/TESTING OF SIGNAL SYSTEM

On November 20 and 21, representatives from the CPUC, Metrolink, FRA, and Mass Electric Construction Company began inspecting and testing the signal system. The post-accident inspection revealed that all signal units and the signal cases at the intermediate signals and at control points CP Lilac and CP Locust were locked and sealed with no indications of tampering or vandalism to any of the signal equipment.
The following tests were performed at CP Lilac: switch lock rod and point detector tests; switch overload;

route locking; time locking; signal indication locking; switch indication locking; switch contact breaks; loss of shunt timers; track circuit verification; meggering switch and signal cables; ground tests; operating characteristics of relays and recorded signal lamp voltages.

The signal team also simulated the train movements of Metrolink Train ML-306 and the BNSF trains by using rolling shunts. During the simulation signal personnel were stationed at CP Lilac intermediate signal 531 and eastbound signal at CP Locust. Signal aspects were observed and the signal system functioned as designed and intended.

Metrolink maintenance test and inspection records were collected. Examination of the signal data log and inspection of the maintenance records did not identify any condition that would have prevented the signal system from operating as designed.

Signal trouble reports for CP Lilac on the San Gabriel Subdivision were reviewed and no exceptions were noted.

MECHANICAL INSPECTION

Event recorders from the lead locomotive SCAX 877 and the cab car SCAX 603 were downloaded and analyzed. The locomotive sustained damage in the collision. Minimal repairs were performed to make the locomotive road worthy for use in the testing. With data from the event recorders, tests were performed on November 23 on the same equipment involved in the November 20 incident. The tests were intended to replicate the movement of Train ML-306 prior to the accident as described by the operating crew and observations from the data contained on Train ML-306 event recorders. The distance from initial action to the point where the train stopped was measured.

A Class 1 pre-departure air brake test was performed on the train in the same manner as the train was made ready on the day of the accident. Brake pipe pressure was 110 psi en route to the testing site. A running air brake test was conducted. The locomotive was set up as it was on the day of the incident.

In order to coincide with events indicated on the lead locomotive event recorder, the tests involved leaving Fontana station and accelerating to the approximate 76 mph speed, the throttle moved from run 8 position to idle, a 40-second pause, followed by six brake pipe applications of 6-psi reductions spaced three seconds apart and then emergency braking. Three running tests were executed and the results are described as follows:

- Test 1, the blended braking (dynamic brake) was applied and the train was placed in emergency 11 seconds later. Total stopping distance was approximately 2,301 feet.

- For Test 2, the blended braking (dynamic brake) was cut-out. The automatic braking valve was applied when the train reached 75 mph and the emergency brake application was made 17 seconds later. Total stopping distance was 2,757 feet.

- For Test 3, the automatic brake valve and blended braking (dynamic brake) was used but not the emergency brake application. This is the normal way of braking. The brakes were first applied when the train reached 74 mph but was applied more aggressively than the previous tests with less time between applications and with greater braking forces requested. Total stopping distance was 2,488 feet.

For all three tests, the train would have stopped short of the red (stop) signal indication at CP Lilac on the day of the accident. NTSB, FRA, and CPUC concluded the air brake system and dynamic brake system functioned as intended and there were no mechanical deficiencies that would have contributed to the accident.

TRAIN HANDLING

The crew of Metrolink Train ML-306 was interviewed a few hours following the collision. The locomotive engineer and assistant locomotive engineer described their trip from Union Station as uneventful and the train as performing properly. Both said they observed the BNSF train moving on the siding. The locomotive engineer stated he was aware of the signal aspects and their requirements as they approached the accident

site. He stated that as they approached the red signal at CP Lilac, he could see that the BNSF train had not cleared into the siding and was still on the Main Track beyond the signal. He said he applied the brakes but the train did not decelerate and "squat down" immediately as he expected and when it appeared the train was not slowing sufficiently, he placed the train into emergency brake application. The assistant locomotive engineer said he felt the same delay and asked if the engineer at the controls should place the train into emergency and was told the train was already in emergency braking. When it appeared the train would not stop and would impact the BNSF train, both employees stepped to the rear of the cab and stood behind a bulkhead. Here they debated about jumping from the locomotive and, deciding against it, instead braced for a collision.

LOCOMOTIVE EVENT RECORDER DATA

A review of the event recorder data from Train ML 306 lead locomotive (SCAX 877) indicates the train passed the yellow signal at the east end of CP Locust at 74 mph, approximately 9,500 feet prior to impact. The data then indicates the speed increased to 76 mph, at which point the engineer moved the throttle from the run 8 to the idle position and 40 seconds later, began a series of six 6-psi sets on the automatic air brake system before placing the train into emergency. With the throttle in the idle position and air brakes set incrementally, the dynamic brake actuates and applies in conjunction with the train air brake system, thus "blending" the brakes, which aids in slowing the train and minimizes wheel slip. In effect, the train traveled nearly 7,000 feet and over a minute after passing the yellow signal before braking was attempted and the emergency brakes applied when the train failed to slow sufficiently. The train then traveled approximately 2,600 feet before coming to a stop when it collided with the rear end of the BNSF Kaiser Local Train. The speed at impact was estimated to be 1 mph.

Event recorders on the BNSF train indicate it was traveling into the siding at 27 mph when the train line separated following impact at the rear of Train ML-306.

CREW TESTING AND TRAINING

A review of operational tests and inspections on the crew of Train ML-306 indicate a sufficient number and variety of tests were performed over the previous 12 months. While the deficiencies noted were minor in nature, there were no instances observed or recorded involving passing a red (stop) signal indication.

The interviews also determined that the crew members' personal cell phones were turned off and stowed and were not used in the course of the trip. The NTSB obtained their cell phone records and the crew statements were verified.

The three Train ML-306 crew members were administered FRA post-accident testing following the collision. The results were negative for each employee. BNSF Train crew members were not post-accident tested.

ANALYSIS AND CONCLUISIONS

A review of all records of tests and inspections of the signal and highway-rail grade crossing systems and track excludes them as contributing to the accident.

A similar review of records of tests and inspections on Train ML-306 equipment indicate the train was operating normally and did not contribute to the collision. This is reinforced by the post-accident testing performed with the exact equipment involved in the collision and using data from the event recorders to recreate the sequence of events. Using various combinations of train air and dynamic braking at the point where the event recorder indicates braking began to occur, the train would have stopped had proper braking been applied.

Metrolink Timetable # 5, effective September 1, 2007, was in effect on the day of the accident. Rule 9.1.9 - Approach Signal Aspects and Indications, states, "proceed prepared to stop at the next signal. Trains exceeding 40 mph must begin reduction to 40 mph as soon as the head end of the train passes the signal." In this accident, Train ML-306 passed the approach (yellow aspect) signal at CP Locust at 72 mph and did not begin braking until the train had traveled approximately 7,000 feet.

Subsequent to the accident, Metrolink took steps to clarify its rules concerning signal aspects and indications

governing the movement of trains and engines and published Metrolink Timetable # 6 and Joint Special Instructions, effective July 1, 2009. Metrolink Rule 9.1.7, Advance Approach, now reads, “Proceed prepared to stop at second signal. Also be prepared to pass the next signal not exceeding 40 mph...” Rule 9.1.9, Approach, now reads, “Proceed prepared to stop at the next signal. Trains exceeding 40 mph must immediately reduce to that speed.”

Following the multiple-fatality accident in September, 2008, in which a westbound Metrolink passenger train collided head-on with an eastbound UP freight train near Chatsworth, CA, Metrolink/Connex published Notice # 23.08 on October 3, assigning conductors and engineers to ride in the cabs of locomotives and cab cars under an initiative known as “head end jobs”. While assigned to these duties, the second person in the cab must call all signals, comply with all indications and remind the engineer in control of the locomotive of upcoming restrictions. Based on interviews with the ML-306 train crew, it appears these functions were performed. However, with the intent of the Connex Notice to have been ostensibly to prevent or mitigate the likelihood of what occurred in this accident, i.e., failing to stop at a red signal, it is unknown what might have contributed to the lapse of situational awareness that allowed the train to go that deep into that signal territory before braking action was initiated.

Metrolink decertified the locomotive engineer following the accident.

PROBABLE CAUSE AND CONTRIBUTING FACTORS

FRA has concluded the probable cause of the accident was the failure of the Metrolink crew to comply with a fixed signal displaying a stop indication. There were no contributing factors noted.