Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2009-64

Amtrak (ATK)
Fairbury, NE
December 9, 2009

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-2009-64

1.Name of Railroad Operating Train #1: Amtrak [ATK]	1a. Alphabetic Code: ATK	1b. Railroad Accident/Incident No.: 114102
2.Name of Railroad Operating Train #2: N/A	2a. Alphabetic Code: N/A	2b. Railroad Accident/Incident No.: N/A
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: Norfolk Southern Corp. [NS]	4a. Alphabetic Code: NS	4b. Railroad Accident/Incident No.: 114102
5. U.S. DOT_AAR Grade Crossing Identification Number: 735236Y	6. Date of Accident/Incident: Month 12 Day 09 Year 2009	7. Time of Accident/Incident: 05:18: ☐ 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: 07

9. Cars Carrying HAZMAT	10. HAZMAT Cars Damaged/Derailed	11. Cars Releasing HAZMAT	12. People Evacuated	13. Division
0	N/A	N/A	0	PIEDMONT

14. Nearest City/Town	15. Milepost *(to nearest tenth)*	16. State Abbr	16. State Code	17. County
DURHAM	H57.57	N/A	NC	DURHAM

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
68 F	3	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	9.1	4

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	PO79-79

29. Speed *(recorded speed, if available)* — Code: R
R - Recorded
E - Estimated 74 MPH

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

31. 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

31a. 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
Code: 0

32. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded *(yes/no)*
(1) First involved *(derailed, struck, etc)*	ATK77	1	N/A
(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	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	7	0	0	0
(2) Total Derailed	0	0	0	0	0

37. Equipment Damage — This Consist: $8,203.00

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

39. Primary Cause Code: M303

40. Contributing Cause Code: M302

Number of Crew Members

41. Engineer/ Operators	42. Firemen	43. Conductors	44. Brakemen
1	0	2	0

Length of Time on Duty

45. Engineer/Operator: Hrs 1 Mi 6

46. Conductor: Hrs 1 Mi 6

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

50. EOT Device? 1. Yes 2. No — 2

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

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

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
N/A	N/A	N/A

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

58. 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

58a. Remotely Controlled Locomotive?
0 = Not a remotely controlled
1 = Remote control portable

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) 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

59. 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

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/A

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	N/A	N/A	N/A	N/A	N/A
(2) Total Derailed	N/A	N/A	N/A	N/A	N/A

63. 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

64. Equipment Damage This Consist N/A

65. Track, Signal, Way, & Structure Damage N/A

66. Primary Cause Code N/A

67. Contributing Cause Code N/A

Number of Crew Members

68. Engineer/ Operators	69. Firemen	70. Conductors	71. Brakemen
N/A	N/A	N/A	N/A

Length of Time on Duty

72. Engineer/Operator Hrs N/A Mi N/A

73. Conductor Hrs N/A Mi N/A

Casualties to:	74. Railroad Employees	75. Train Passengers	76. Other
Fatal	N/A	N/A	N/A
Nonfatal	N/A	N/A	N/A

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
(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 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)* 1

109. *geographical)* Code 1
1.North 2.South 3.East 4.West

Rail Equipment Involved

111. Equipment Code 1
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 1

DEPARTMENT OF TRANSPORTATION
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110. Position	Code	113. Circumstance	Code
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	3	1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	1
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	4	114b. Was there a hazardous materials release 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 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)	01	02	03	06	07	N/A	N/A

116. Signaled Crossing *(See instructions for codes)*	Code	117. Whistle Ban 1. Yes 2. No 3. Unknown	Code
	01		2

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

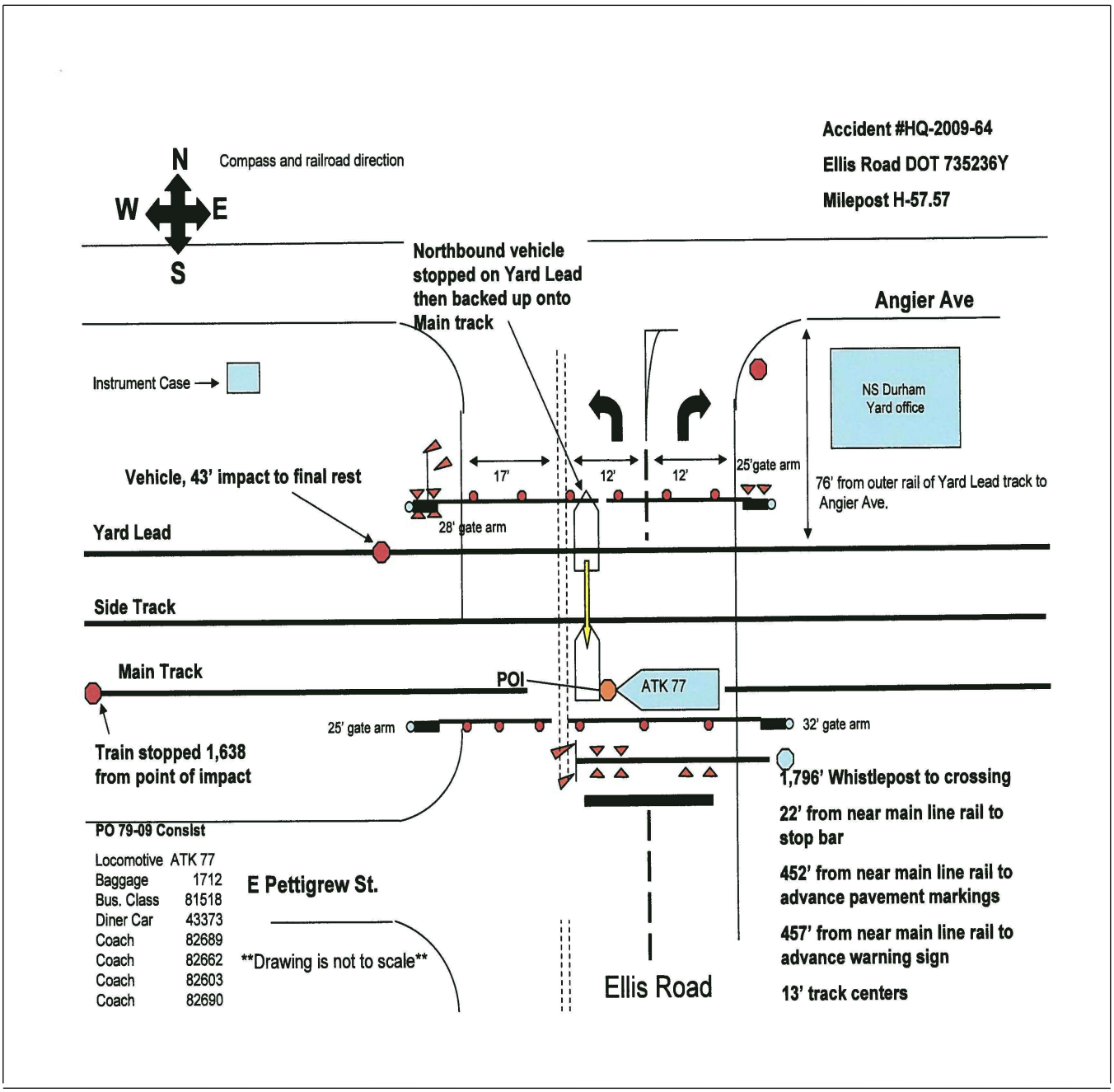
121. Age	122. Driver's Gender 1. Male 2. Female	Code	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown	Code	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other *(specify in narrative)*	Code
35		2		2		2

125. Driver Passed Highway Vehicle 1. Yes 2. No 3. Unknown	Code	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
	2		8

Casualties to:	Killed	Injured	127. Driver 1. Killed 2.Injured 3. Uninjured	Code	128. Was Driver in the Vehicle? 1. Yes 2. No	Code
				2		1
129. Highway-Rail Crossing Users	2	1	130. Highway Vehicle Property Damage *(est. dollar damage)*	12000	131. Total Number of Highway-Rail Crossing Users *(include driver)*	3

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

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



137. SYNOPSIS OF THE ACCIDENT

On December 9, 2009, at 5:18 p.m. EST westbound Amtrak Train PO79-09 struck a northbound automobile at Ellis Road highway-rail grade crossing. The accident occurred in Durham, North Carolina (NC) at Norfolk Southern Corporation (NS) milepost (MP) H57.57 on the Piedmont Division, Danville District. The method of operation in the accident area is by a Traffic Control System (TCS).

The automobile driver was injured and two passengers were killed. The automobile was completely destroyed. There were no personal injuries to any of the train passengers. There was a reportable occupational injury to the Amtrak Locomotive Engineer that was stress related. Amtrak reported an estimated damage to the lead locomotive of $ 8,203.59. NS reported no signal equipment or track structure damage. There was no derailment as a result of the highway-rail grade crossing collision.

The weather was dusk and clear. The temperature was 68° F.

The probable cause of the accident was the driver misjudged traffic conditions. Contributing to the cause may have been the highway user's inattentiveness to the grade crossing warning devices and the southbound entrance gate coming down on the vehicle not allowing a clear exit.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

On December 9, 2009, Amtrak Passenger Train PO79-09 originated at Sunnyside Yard, New York where a Class 1 Brake Test was performed at 3:20 a.m. The train consisted of one locomotive, (locomotive ATK 77) with one baggage car, one dining car, and five passenger coach cars for a total of seven cars. Amtrak Train P079-09 departed New York City, New York at Penn Station en route to Charlotte, North Carolina. A new Amtrak crew boarded ATK Train PO79-09 at Raleigh, NC which is a crew change point and station stop. The train crew consisted of a locomotive engineer, a conductor, and an assistant conductor. They went on duty at 4:12 p.m. at Raleigh. All three crew members received more than the required statutory off-duty rest period. The train departed Raleigh at 4:50 p.m. bound for Charlotte, NC on the Norfolk Southern (NS) Piedmont Division.

ATK Passenger Train PO79-09 was operating at 74 miles per hour as it approached Ellis Road highway-rail grade crossing on the Main Track. The Engineer was seated at the controls on the north side of the locomotive. The Conductor was in the baggage car walking toward the locomotive. The Assistant Conductor was in the body of the train performing his normal duties.

Traversing the track between MP H 58 and MP H 57.8 there is a 1.5 degree left-hand curve. From MP H 57.8 to the point of accident and beyond the track is tangent. From MP H 58.0 there is a slight descending and then ascending grade to the point of the accident and beyond. Northward highway traffic approaching the Ellis Road highway-rail grade crossing, the grade is descending to the NS main line track and then ascending beyond. Ellis road crosses the NS tracks at an 84 degree angle.

The motor vehicle, a 2001 Ford Explorer, was being operated northward in the left turning lane on Ellis Road by a female driver. There were two male passengers in the back seat of the vehicle. Vehicular traffic on Ellis Road was stopped due to the grade crossing warning devices being activated by approaching an ATK Train PO79-09. Just prior to the accident witnesses reportedly saw the vehicle stopped clear of the main track between the horizontal four quad gates. The southbound entrance gate which extends four feet into the

northbound left turning lane was resting on the vehicle hood. The vehicle then backed up onto the main track and stopped.

The NS timetable direction of the train was west which corresponds with the geographic direction. Timetable direction will be used in this report.

THE ACCIDENT:

At 5:18 p.m. ATK Passenger Train PO79-09 was traveling westbound on the NS main track approaching Ellis Road. The train was operating at 74 mph as recorded by the event recorder on the lead locomotive (ATK 77). The maximum authorized speed for this line segment is 79 mph as designated in the current NS Piedmont Division Timetable No. 1. The active grade crossing warning devices at Ellis Road were activated. The engineer observed a small SUV on Ellis Road which appeared to be on the NS Yard Lead track on the north side of the crossing. The vehicle backed up onto and fouling the siding track, paused and then backed up onto the main track in the path of the train and stopped. The Engineer stated that he placed the train into emergency about 50 to 60 feet prior to impact. The train struck the vehicle on the passenger side. The impact forced the vehicle 43 feet northwest and it came to rest on the NS Yard Lead track. According to the conductor of ATK Train PO 79-09, the lead locomotive stopped 1,638 feet west of the impact point.

After the accident, the locomotive engineer contacted the NS Greenville, South Carolina Dispatcher. The Conductor walked back to the accident scene to render assistance. After the train was released from the accident area, the engineer and conductor operated the train to the Durham, NC Amtrak station approximately three miles west. A relief crew was taxied from Raleigh, NC to Durham where they resumed operation of the train to its final destination. The engineer and conductor were relieved of their duties and dead-headed via the same transportation as the relief crew to the Amtrak station in Raleigh.

At 5:18 p.m. Durham County 911 services were notified. They dispatched Police, Fire and Emergency Medical Services (EMS) which arrived at the accident scene at 5:23 p.m. The two male occupants of the vehicle, ages six and nine, were pronounced deceased at the scene. The female occupant, (driver) was transported to Duke Medical Center with non-life threatening injuries. Durham Police determined that the two male occupants were not utilizing shoulder or lap restraints and were ejected from the vehicle. Due to the force of the impact debris from the vehicle struck a second vehicle causing minor damage, however there were no injuries reported to the occupants of that vehicle.

The engineer and conductor assessed the condition of the train. There were no hazardous materials involved and only minor damage to the locomotive. Amtrak was delayed two hours and five minutes. An NS Track Inspector was dispatched to the scene. He determined that there was no damage to the track structure. An NS Signal Supervisor and Signal Maintainer were also dispatched to the scene and conducted an investigation of the highway-rail grade crossing warning devices.

ANALYSIS AND CONCLUSIONS:

ANALYSIS-TOXICOLOGICAL TESTING:

No toxicological tests were performed on the driver of the vehicle or the train crew members. The FRA does not require such testing for this type of accident.

ACTIVE WARNING DEVICE TESTS ANALYSIS:

For a main track movement the active warning devices are controlled by a Safetran Grade Crossing Predicator (GCP 3000D2). The operating units download data indicates that there was 34 seconds of warning time for the train movement. Ellis Road has an asphalt railroad surface and there are three lanes of traffic; one 17 foot wide southbound lane and two 12 foot wide northbound lanes. Ellis Road tees into Angier Avenue 76 feet north of the NS Yard Lead track. All highway traffic must turn left or right after complying with a stop sign. There are active warning devices located on both sides of the grade crossing. The crossing is equipped with two entrance gates and two exit gates. For northbound traffic the grade crossing is equipped with a ground mast mounted entrance gate arm and a bridge cantilever equipped with four sets of flashing light units and a bell. Two of the flashing light pairs face south directed at northbound highway vehicular traffic. One pair faces east for intersecting street auto traffic (Pettigrew Street), and one pair faces north for

southbound highway traffic users. On the north side of the crossing for northbound traffic, the grade crossing is equipped with a ground mast mounted 25 foot exit gate arm with one set of flashing light units. These flashing lights are facing north for southbound highway traffic. For northbound traffic there is a stop bar placed 22 feet from the nearest rail. Also for northbound traffic the passive pavement markings and a passive railroad sign are 452 feet and 477 feet respectively from the nearest rail. For southbound traffic the north side of the grade crossing is equipped with a ground mast mounted 28 foot entrance gate arm, three sets of flashing lights, and a bell. On the south side of the grade crossing there is a ground mast mounted exit gate that covers the southbound lane when activated. There are three NS tracks that intersect Ellis Road from south to north. They are identified as Main track, Side track, and Yard Lead. ATK Passenger Train PO79-09 operated on the Main Track. The railroad whistle post for westbound train and engine movement is 1,796 feet east of the crossing. The engineer began sounding the whistle when the train neared this whistle post. This is validated by analysis of the event recorder data and witnesses statements. The locomotive engineer's view of the grade crossing is unobstructed. For northbound highway movements the view of westbound train movements is unobstructed.

Witnesses at the accident scene stated that the vehicle was stopped on the track with the gates down and the lights flashing.

The active warning devices were tested the evening of the accident by an NS Signal Supervisor and Signal Maintainer. The warning devices functioned as intended. The Safetran SEAR II event recorder was downloaded at this time. No exceptions were taken to the events recorded at the crossing. The tests were performed again on December 10, 2009, at 10:00 a.m. These tests were performed in the presence of an FRA Signal and Train Control Inspector. The tests revealed that the breakaway on entrance gates was four seconds and the exit gate was ten seconds. The sequence for the entrance gates are as follows: the crossings is activated, the lights and bells began to operate, four seconds later the entrance gates start down, eight seconds later the entrance gates are horizontal. The sequence for the exit gates are as follows: the crossing is activated, the lights and bells began to operate, ten seconds later the exit gates start down, 16 seconds later the exit gates are horizontal.

An FRA inspection of the grade crossing warning devices revealed that the flashing light lenses were not in good condition, (dirty) and the circuit plans were not correct. Neither of these conditions were factors in this accident. Inspection records indicate that this highway-rail grade crossing had been inspected on November 24, 2009. A review of inspection records for this highway-rail grade crossing indicates that it is inspected on a regular basis in compliance with Federal Regulations.

CONCLUSION:

The highway-rail grade crossing devices functioned as intended. There were no defects found that contributed to the cause of the accident.

ANALYSIS-LOCOMOTIVE SAFETY DEVICES:

The locomotive was equipped with a headlight, auxiliary lights, and audible warning devices required by Federal regulations. These devices were tested by the engineer and conductor at the accident site and found to be working properly. The locomotive was equipped with an event recorder as required. The relevant event recorder was downloaded by an Amtrak Road Foreman in Charlotte, NC.

CONCLUSION:

Analysis of the event recorder data disclosed that the locomotive engineer was in compliance with all applicable railroad operating rules and train handling requirements.

ANALYSIS - FATIGUE:

FRA obtained fatigue information from Amtrak Officials including a 10-day work history for the 3 Amtrak employees involved in a grade crossing collision in Durham, North Carolina. They were the Engineer, Conductor and Assistant Conductor of Amtrak Passenger Train PO-79. A program default setting of excellent was used. FRA uses an overall effectiveness rate of 77.5 percent as a baseline for fatigue analysis, which is equivalent to blood alcohol content (BAC) of 0.05. At or above this baseline FRA does not consider fatigue as

probable.

CONCLUSIONS:

1. Locomotive Engineer of Amtrak PO79-09
Sleep setting Excellent
Overall effectiveness = 99.77 %
Lapse Index = 0.2
Reaction Time = 100 %
Chronic Sleep Debt = 3.81
Hours of Continuous Wakefulness = 11.30
Time of Day (military) 17.17
BAC Equivalent = < 0.05

CONCLUSION: Fatigue was not evident for this employee.

2. Conductor assigned to Amtrak PO79-09
Sleep setting Excellent
Overall effectiveness = 99.39 %
Lapse Index = 0.3
Reaction Time = 101 %
Chronic Sleep Debt = 3.39
Hours of Continuous Wakefulness = 11.30
Time of Day (military) 17.17
BAC Equivalent = < 0.05

CONCLUSION: Fatigue was not evident for this employee.

3. Assistant Conductor assigned to Amtrak PO79-09
Sleep setting Excellent
Overall effectiveness = 99.02 %
Lapse Index = 0.3
Reaction Time = 101 %
Chronic Sleep Debt = 3.96
Hours of Continuous Wakefulness = 11.32
Time of Day (military) 17.17
BAC Equivalent = < 0.05

CONCLUSION: - Fatigue was not evident for this employee.

ANALYSIS – FORENSIC TRAIN CREW INVESTIGATION:

There was a reportable stress related occupational injury to the locomotive engineer as a result of the accident.

PROBABLE CAUSE AND CONTRIBUTING FACTORS:

The probable cause of the accident was the driver misjudged traffic conditions. Contributing causes may have been the highway user inattentiveness to the grade crossing warning devices and the southbound entrance gate coming down on the vehicle not allowing a clear exit.