Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-42

Burlington Northern Santa Fe (BNSF)
Hannibal, Missouri
May 12, 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-2005-42

1.Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
BURLINGTON NORTHERN SANTA FE CORPORATION	BNSF	SF0505203
2.Name of Railroad Operating Train #2	2a. Alphabetic Code	2b. Railroad Accident/Incident
N/A	N/A	N/A
3.Name of Railroad Responsible for Track Maintenance:	3a. Alphabetic Code	3b. Railroad Accident/Incident No.
N/A	N/A	N/A

4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident			6. Time of Accident/Incident
	Month	Day	Year	
063902D	05	12	2005	01:15: ☐ AM ☑ PM

7. Type of Accident/Indicent (single entry in code box)						13. Other (describe in narrative)
1. Derailment	4. Side collision	7. Hwy-rail crossing	10. Explosion-detonation			
2. Head on collision	5. Raking collision	8. RR grade crossing	11. Fire/violent rupture			
3. Rear end collision	6. Broken Train collision	9. Obstruction	12. Other impacts			07

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

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Hannibal	119.83	N/A	MO	MARION

17. Temperature (F) (specify if minus)	18. Visibility (single entry) 1. Dawn 3.Dusk 2. Day 4.Dark	Code	19. Weather (single entry) 1. Clear 3. Rain 5.Sleet 2. Cloudy 4. Fog 6.Snow	Code	20. Type of Track 1. Main 3. Siding 2. Yard 4. Industry	Code
67 F		2		2		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
Single Main Track		2	47		4

OPERATING TRAIN #1

25. Type of Equipment Consist (single entry)				A. Spec. MoW Equip.	Code	26. Was Equipment Attended? 1. Yes 2. No	Code	27. Train Number/Symbol
1. Freight train	4. Work train	7. Yard/switching						
2. Passenger train	5. Single car	8. Light loco(s).						
3. Commuter train	6. Cut of cars	9. Maint./inspect.car			1		1	HNTW MEM11

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

29. Trailing Tons (gross tonnage, excluding power units): 8205

30. Method(s) of Operation (enter code(s) that apply)

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

30a. Remotely Controlled Locomotive? 1

0 = Not a remotely controlled
1 = Remote control portable
2 = Remote control tower
3 = Remote control transmitter - more than one remote control transmitter

2. South 4. West

0

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	1	N/A
(2) Causing (if mechanical cause reported)	0	0	N/A

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

Alcohol	Drugs
N/A	N/A

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

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

35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	53	0	63	0	0
(2) Total Derailed	0	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
200.00	0.0	M304	N/A

Number of Crew Members

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

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 8 Mi 15	Hrs 8 Mi 15

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

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

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

OPERATING TRAIN #2

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

55. Speed (recorded speed, if available) R - Recorded E - Estimated			Code
	0	MPH	N/A

57. Method(s) of Operation (enter code(s) that apply)

a. ATCS	g. Automatic block	m.Special instructions
b. Auto train control	h. Current of traffic	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)	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)	2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter
0			N/A N/A N/A N/A N/A	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	0	N/A
(2) Causing (if mechanical cause reported)	0	0	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	Loade a. Freight	Loade 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	64. Track, Signal, Way, & Structure Damage	65. Primary Cause Code	66. Contributing Cause Code
0	0	N/A	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	72. Conductor
Hrs 0 Mi 0	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 — Code: G
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)

80. Vehicle Speed (est. MPH at impact): 00

81. Direction geographical) — Code: 3
1.North 2.South 3.East 4.West

82. Position — Code: 2
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped

86a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: 2
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

83. 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)

84. Position of Car Unit in Train: 1

85. Circumstance — Code: 1
1. Rail Equipment Struck Highway User
2. Rail Equipment Struck by Highway User

86b. Was there a hazardous materials release by — Code: 4
1. Highway User 2. Rail Equipment 3. Both 4. Neither

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)	01	02	03	06	N/A	N/A	N/A

88. Signaled Crossing Warning Code (See instructions for codes)

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

90. Location of Warning — Code: 1
1. Both Sides
2. Side of Vehicle Approach
3. Opposite Side of Vehicle Approach

91. Crossing Warning Interconnected with Highway Signals — Code: 2
1. Yes 2. No 3. Unknown

92. Crossing Illuminated by Street Lights or Special Lights — Code: 1
1. Yes 2. No 3. Unknown

93. Driver's Age: 51

94. Driver's Gender — Code: 2
1. Male 2. Female

95. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — Code: 2
1. Yes 2. No 3. Unknown

96. Driver — Code: 4
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)

97. Driver Passed Standing Highway Vehicle — Code: 2
1. Yes 2. No 3. Unknown

98. View of Track Obscured by (primary obstruction) — Code: 8
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

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	00	6

99. Driver Was — Code: 3
1. Killed 2.Injured 3. Uninjured

100. Was Driver in the Vehicle? — Code: 1
1. Yes 2. No

102. Highway Vehicle Property Damage (est. dollar damage): 1500

103. Total Number of Highway-Rail Crossing Users (include driver): 48

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

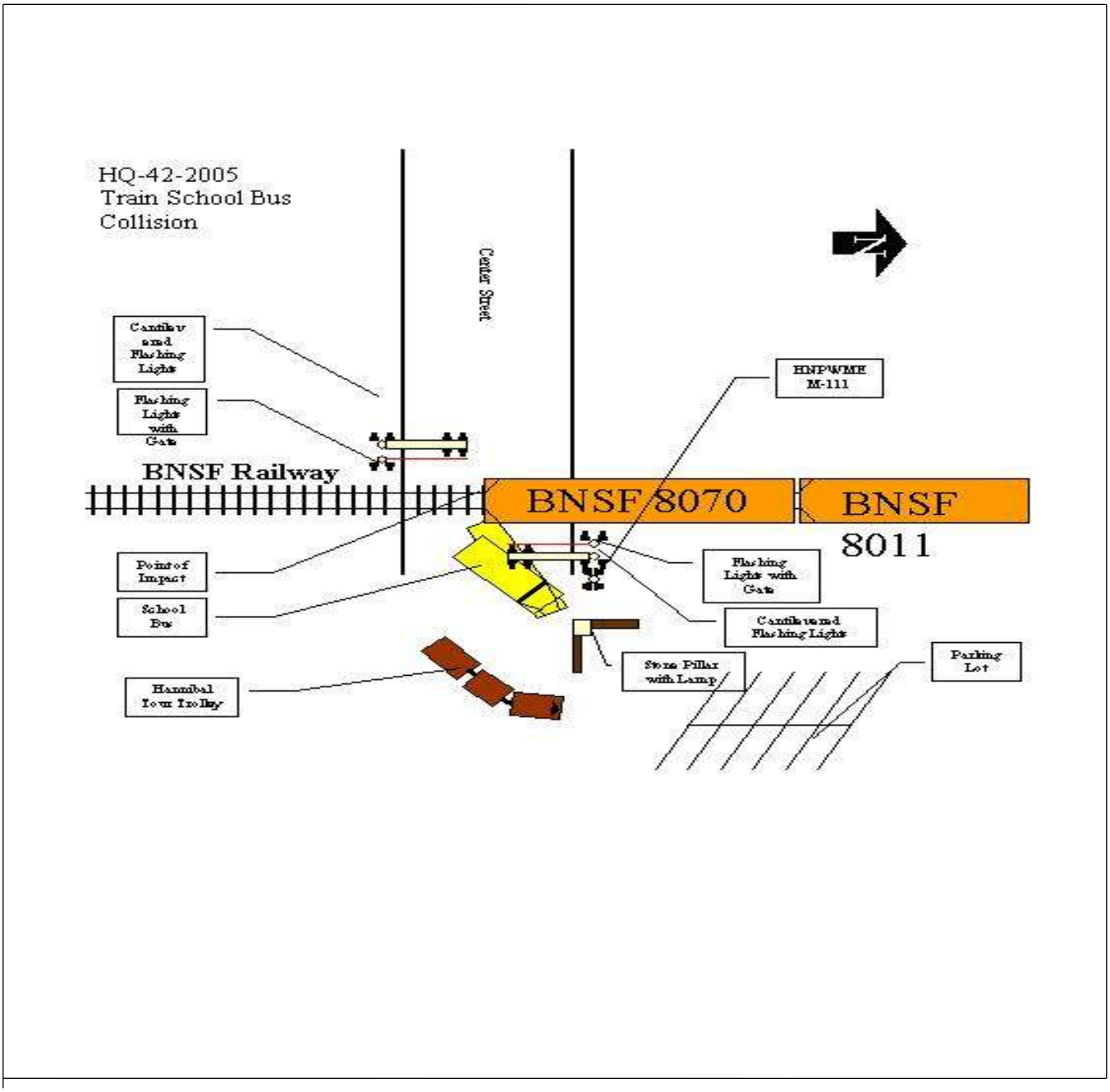
105. Locomotive Auxiliary Lights Operational? — Code: 1
1. Yes 2. No

106. Locomotive Headlight Illuminated? — Code: 1
1. Yes 2. No

107. Locomotive Audible Warning Sounded? — Code: 1
1. Yes 2. No

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

HQ-42-2005 Sketch.jpg



109. SYNOPSIS OF THE ACCIDENT

On May 12, 2005, at approximately 1:15 p.m. CDT, westbound BNSF freight Train Symbol HNTWMEM1-11A collided with a school bus at a highway-rail grade crossing. The accident occurred in Hannibal, Missouri, at BNSF Milepost (MP) 119.83, on the BNSF Hannibal Subdivision.

The school bus driver and 47 passengers survived the impact with minor injuries sustained by 6 of the students. The school bus was struck in the driver's side rear corner and sustained minor damage of approximately $1,500. There were no injuries to the train crew. The leading locomotive sustained minor damage of about $200, and there was no derailment.

At the time of the accident it was daylight, overcast, and the temperature was 67 °F.

The accident was caused by failure of the school bus driver to completely clear the crossing ahead of the train's arrival. According to the Missouri State Highway Patrol, the driver was in violation of the Missouri highway traffic laws for "driving through the crossing without sufficient space".

110. NARRATIVE

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

Circumstances Prior to the Accident

The crew of freight Train Symbol HNTWMEM1-11A included a locomotive engineer, conductor, and brakeman. They first went on duty at 5 a.m., CDT, May 12, 2005, at the BNSF depot at West Quincy, Missouri. This was the home terminal for all crew members, and all had received 14 hours and 30 minutes off duty time prior to reporting for duty. This is more than the required statutory off-duty period.

Their assigned freight train was scheduled to travel to Memphis, Tennessee, with cars to be added and removed at West Quincy. The train had received an initial terminal train air brake test and departed Northtown, Minnesota, at 12:09 p.m. CDT, on May 11, 2005. Northtown is located near Minneapolis, Minnesota.

The train was being operated by a crew working their regular local road switching job. Their assignment was to set out and pick up a block of cars at West Quincy, MP136, and proceed to the Ashburn Siding, MP 104.3. After switching was completed, their assigned freight train consisted of 2 locomotives, 53 loads, and 63 empty cars of several varieties. It was 7,142 feet long and weighed 8,205 tons.

As the westbound train approached the accident site, the locomotive engineer was seated at the controls on the right side of the leading locomotive. The conductor was seated on the left side of the lead locomotive, and the brakeman was seated in the center.

In this area of the railroad there are, in succession, a 2-degree curve to the right followed by a tangent of about 1,500 feet, a 2-degree 30-minute curve to the left followed by a tangent of about 1,000 feet, and a 1-degree 30-minute curve to the right followed by a tangent of about 350 feet leading up to the point of the accident. There is a descending grade of .48 percent between MP 120.5 and MP 119.83. In the area of highway-rail grade crossing DOT No. 063902D, Center Street, the road is tangent and the grade is practically level.

The railroad timetable direction of the train was west. The geographic direction was south. Timetable directions are used throughout this report when referencing the train, however, geographic direction is applied to the school bus, which was eastbound.

The Accident

Train Symbol HNTWMEM1-11A
The train was being operated at 25 mph approaching the accident area. The train crew's view of the crossing was unobstructed. Nearing the accident site, the conductor jumped from his seat and yelled for the engineer to make an emergency application of the train brakes because they were going to hit a bus. The engineer simultaneously initiated an emergency train air brake application. The train had slowed to 21 mph when the collision occurred. Both speeds were recorded by the event recorder of the controlling locomotive. The maximum authorized speed for this train was 25 mph, as designated in the current BNSF Timetable No. 5.

Highway Vehicle
The school bus, which originated at Wentzville, Missouri, with 47 passengers, was traveling eastbound on Center Street, arriving at the Mississippi riverfront tourist parking lot at Hannibal, Missouri. A rubber-tired tour trolley operated around it and stopped short of providing the bus enough room to clear the tracks. The bus driver then attempted to enter the parking lot by driving left of the trolley and between the crossing warning devices and a stone pillar located in the northeast

quadrant of the highway-rail grade crossing. The bus driver was unable to turn sharply enough to operate between the two and stopped, fouling the BNSF tracks.

When the approaching train caused the crossing lights, gates, and bell to activate, the school bus driver was unable to clear the tracks. The train impacted the driver's side rear corner of the bus, shoving it clear of the tracks. The train continued approximately 640 feet and stopped about 4 car lengths beyond the next highway-rail grade crossing at Broadway Street.

After the train stopped, the locomotive engineer stayed on the locomotive to establish communications with the train dispatcher. The conductor walked back to Center Street and cut the train to allow emergency personnel across the highway-rail grade crossing.

A Missouri Highway Patrolman arrived on the scene at 1:26 p.m. Emergency responders arrived at approximately the same time. After they coordinated the emergency response, the school bus passengers were examined for injuries. The highway patrolman then interviewed the train crew. There were no injuries to railroad personnel.

A BNSF roadforeman of engines was dispatched to the scene from West Quincy at 1:24 p.m. and arrived at approximately 2 p.m. He ascertained the condition of the train and track structure. There was no hazardous materials involvement and only minor damage to the lead locomotive. The local BNSF trainmaster responded to the site from Ft. Madison, Iowa and arrived at 3 p.m. He interviewed the crew, discussed the situation with the highway patrolman, and compiled the railroad accident report. The train crew was then released at 4:50 p.m., due to emotional trauma.

All the children were taken to Hannibal Regional Hospital for evaluation with six of the children treated for minor injuries. One child was held overnight for observation after having fainted due to an apparent anxiety attack.

Analysis

The school bus driver was a 51-year-old female, fully trained and qualified, with a total of 4 months experience driving a bus. The other school bus occupants consisted of 14 adults and 33 children.

The highway-rail grade crossing is equipped with warning lights, gates, and a bell. There are no advanced warning signs, and no pavement markings at this crossing.

The railroad has a whistle post in place about 1,600 feet east of the crossing. All three train crew members said the locomotive engineer began sounding the whistle when the train neared this post. This was later validated by analysis of the event recorder data.

The active warning device control bungalow was locked upon arrival of the BNSF signal maintainer and the keys were given to the local police. At approximately 4 p.m. the BNSF manager of signals arrived. He and other BNSF signal personnel tested the crossing and found it to be functioning as intended. A Missouri Department Of Transportation signal and train control inspector was present at the time of testing and confirmed the crossing was working as intended.

The lead locomotive was equipped with headlights, auxiliary lights, and the audible warning device as required by Federal regulations. These devices were tested in the presence of the trainmaster and functioned as intended. The devices were in full compliance with Federal requirements.

The locomotive was equipped with a speed indicator and an event recorder. The relevant event recorder data was downloaded by the roadforeman of engines at the accident site and analyzed. The analysis disclosed that the locomotive engineer was in compliance with all applicable railroad operating and train handling requirements. FRA reviewed the results of this analysis and concurred with these conclusions.

Conclusions

The railroad was in full compliance with their own and all applicable Federal standards. The school bus driver admitted to mis-judging the left turn and placing the bus in a position that was difficult to maneuver. The school bus driver had only been operating a bus for 4 months. Based on the facts of this investigation, the driver improperly stopped on the highway/rail grade crossing. A contributing factor was the driver's inattention, by driving through the crossing without sufficient space to clear the crossing.

Probable Cause & Contributing Factors

The FRA determined that the primary cause to be M304 - Highway user cited for violations of highway grade crossing traffic laws.