



***Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch***

***Accident Investigation Report
HQ-2016-1158***

***Union Pacific Railroad Company (UP)
Dexter, MO
September 2, 2016***

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, 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.

SYNOPSIS

Synopsis

On September 2, 2016, at 1:25 p.m., CST, southbound Union Pacific Railroad (UP) Train ZG4MQ 02, struck a westbound sport utility vehicle (SUV) on UP's North Little Rock Service Unit, Jonesboro Subdivision near Dexter, Missouri. The collision occurred at County Road 732 (CO 732), UP Milepost 43.63. The CO 732 highway-rail grade crossing is located approximately two miles south of Dexter, Missouri in Stoddard County, Missouri. The U.S. DOT National Highway-Rail Crossing Inventory number is 787996H.

The CO 732 HGC consists of a two-lane road with a gravel surface east of the crossing, and pavement west of the crossing. At the time of the incident, passive crossbuck warning signs and yield signs were posted at the crossing for each direction of travel. Advance-warning signs were also present and in place approaching the crossing from both directions. Other than the Emergency Notification Systems signs on each post, no other signage was present at this crossing.

There were four fatalities and one injury that resulted from the accident. The surviving occupant sustained serious injuries and was transported via helicopter to Saint Francis Medical Center in Cape Girardeau, Missouri. There were no injuries to the train crew. The leading locomotive sustained minor damage, and there was no derailment.

The weather at the time of the accident was cloudy with moderate winds, and the temperature was 87° Fahrenheit.

According to the Missouri State Highway Patrol's (MSHP) report, the accident was caused by failure of the SUV driver to yield to the train. The Federal Railroad Administration's (FRA) investigation concluded the probable cause was Cause Code M302: highway user inattentiveness. Additionally, FRA determined drugs were a probable contributing factor in this accident based on the same MSHP report findings. FRA was unable to positively conclude if the locomotive horn not meeting the minimum decibel rating contributed to the cause or severity of this accident.

TRAIN SUMMARY

1. Name of Railroad Operating Train #1 Union Pacific Railroad Company	1a. Alphabetic Code UP	1b. Railroad Accident/Incident No. 0916LK001
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GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance Union Pacific Railroad Company		1a. Alphabetic Code UP	1b. Railroad Accident/Incident No. 0916LK001	
2. U.S. DOT Grade Crossing Identification Number 787996H		3. Date of Accident/Incident 9/2/2016	4. Time of Accident/Incident 1:25 PM	
5. Type of Accident/Incident Hwy-Rail Crossing				
6. Cars Carrying HAZMAT 1	7. HAZMAT Cars Damaged/Derailed 0	8. Cars Releasing HAZMAT 0	9. People Evacuated 0	10. Subdivision Jonesboro
11. Nearest City/Town Dexter		12. Milepost (to nearest tenth) 43.63	13. State Abbr. MO	14. County STODDARD
15. Temperature (F) 87 °F	16. Visibility Day	17. Weather Cloudy	18. Type of Track Main	
19. Track Name/Number Main		20. FRA Track Class Freight Trains-60, Passenger Trains-80		21. Annual Track Density (gross tons in millions) 55.35
				22. Time Table Direction South

OPERATING TRAIN #1

1. Type of Equipment Consist: Freight Train					2. Was Equipment Attended? Yes			3. Train Number/Symbol ZG4MQ 02				
4. Speed (recorded speed, if available) R - Recorded 54 MPH E - Estimated		Code R	5. Trailing Tons (gross excluding power units) 4759		6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter					Code 0		
6. Type of Territory Signalization: <u>Signaled</u> Method of Operation/Authority for Movement: <u>Signal Indication</u> Supplemental/Adjunct Codes: <u>Q</u>												
7. Principal Car/Unit		a. Initial and Number		b. Position in Train	c. Loaded (yes/no)		8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box			Alcohol	Drugs	
(1) First Involved (derailed, struck, etc.)		UP 2618		1						0	0	
(2) Causing (if mechanical, cause reported)							9. Was this consist transporting passengers?			No		
10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train		Rear End		11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded		Empty		e. Caboose	
		b. Manual	c. Remote	d. Manual	e. Remote		a. Freight	b. Pass.	c. Freight	d. Pass.		
(1) Total in Train	4	0	0	0	0	(1) Total in Equipment Consist	67	0	0	0	0	
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	0	0	0	
12. Equipment Damage This Consist 304			13. Track, Signal, Way & Structure Damage 0									
14. Primary Cause Code M302 - Highway user inattentiveness												
15. Contributing Cause Code												
Number of Crew Members						Length of Time on Duty						
16. Engineers/Operators		17. Firemen		18. Conductors		19. Brakemen		20. Engineer/Operator		21. Conductor		
1		0		1		0		Hrs: 0 Mins: 40		Hrs: 0 Mins: 40		
Casualties to:		22. Railroad Employees		23. Train Passengers		24. Others		25. EOT Device?		26. Was EOT Device Properly Armed?		
Fatal		0		0		4		Yes		Yes		
Nonfatal		0		0		1		27. Caboose Occupied by Crew?				N/A
28. Latitude 36.759839400				29. Longitude -89.964080900								

CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved	
1. Type Other Motor Vehicle		5. Equipment Train (Units Pulling)	
2. Vehicle Speed (<i>est. mph at impact</i>) 12	3. Direction (<i>geographical</i>) West	6. Position of Car Unit in Train 1	
4. Position of Involved Highway User Moved over Crossing		7. Circumstance Rail Equipment Struck Highway User	
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? Rail Equipment		8b. Was there a hazardous materials release by Neither	
8c. State here the name and quantity of the hazardous material released, if any. N/A			
9. Type of Crossing 1. Gates 4. Wig wags 7. Crossbucks 10. Flagged by crew 2. Cantilever FLS 5. Hwy. traffic signals 8. Stop signs 11. Other (<i>spec. in narr.</i>) 3. Standard FLS 6. Audible 9. Watchman 12. None 7, 11		10. Signaled Crossing Warning	11. Roadway Conditions Dry
12. Location of Warning Both Sides		13. Crossing Warning Interconnected with Highway Signals N/A	14. Crossing Illuminated by Street Lights or Special Lights No
15. Highway User's Age 19	16. Highway User's Gender Female	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train No	18. Highway User Did not stop
19. Driver Passed Standing Highway Vehicle No		20. View of Track Obscured by (<i>primary obstruction</i>) Not Obstructed	
Casualties to:	Killed	Injured	21. Driver was Killed 22. Was Driver in the Vehicle? Yes
23. Highway-Rail Crossing Users	4	1	24. Highway Vehicle Property Damage (<i>est. dollar damage</i>) 5000 25. Total Number of Vehicle Occupants (<i>including driver</i>) 5
26. Locomotive Auxiliary Lights? Yes		27. Locomotive Auxiliary Lights Operational? Yes	
28. Locomotive Headlight Illuminated? Yes		29. Locomotive Audible Warning Sounded? Yes	

10. Signaled Crossing Warning

Explanation Code

- | | |
|--|--|
| 1 - Provided minimum 20-second warning | A - Insulated rail vehicle |
| 2 - Alleged warning time greater than 60 seconds | B - Storm/lightning damage |
| 3 - Alleged warning time less than 20 seconds | C - Vandalism |
| 4 - Alleged no warning | D - No power/batteries dead |
| 5 - Confirmed warning time greater than 60 seconds | E - Devices down for repair |
| 6 - Confirmed warning time less than 20 seconds | F - Devices out of service |
| 7 - Confirmed no warning | G - Warning time greater than 60 seconds attributed to accident-involved train stopping short of the crossing, but within track circuit limits, while warning devices remain continuously active with no other in-motion train present |
| N/A - N/A | H - Warning time greater than 60 seconds attributed to track circuit failure (e.g., insulated rail joint or rail bonding failure, track or ballast fouled) |
| | J - Warning time greater than 60 seconds attributed to other train/equipment within track circuit limits |
| | K - Warning time less than 20 seconds attributed to signals timing out before train's arrival at the crossing/island circuit |
| | L - Warning time less than 20 seconds attributed to train operating counter to track circuit design direction |
| | M - Warning time less than 20 seconds attributed to train speed in excess of track circuit's design speed |
| | N - Warning time less than 20 seconds attributed to signal system's failure to detect train approach |
| | O - Warning time less than 20 seconds attributed to violation of special train operating instructions |
| | P - No warning attributed to signal systems failure to detect the train |
| | R - Other cause(s). Explain in Narrative Description |

SKETCHES

HQ-2016-1158 Sketch

*** Not to scale**

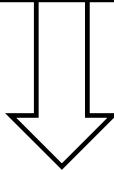
UP Jonesboro Subdivision

Report No. FE-2016-UP Dexter

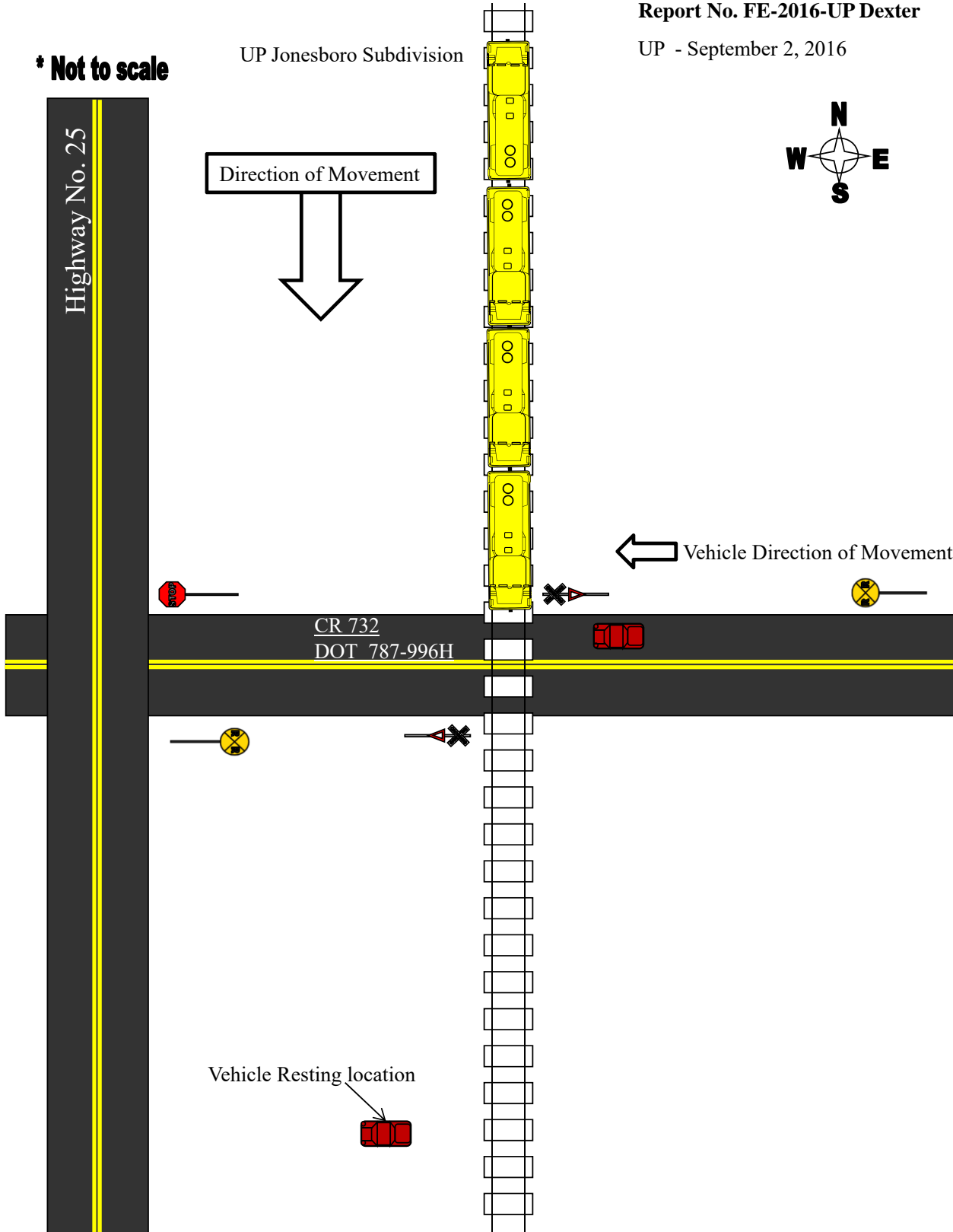
UP - September 2, 2016



Direction of Movement



Vehicle Direction of Movement



Vehicle Resting location



NARRATIVE

Circumstances Prior to the Accident

Union Pacific Railroad (UP) Train ZG4MQ 02 (striking train) was an intermodal train consisting of four head-end locomotives (UP 2618, UP 4337, UP 9001, and UP 4955), and 67 cars. Only the three lead locomotives were on-line and producing power; the fourth was shut down for fuel conservation. The striking train was 5,890 feet long and weighed 4,759 tons. The striking train originated at UP's Global 4 Yard in Joliet, Illinois, where the Class 1 brake test was performed and the required record completed. The striking train consisted of a Locomotive Engineer and Conductor. The crew went on duty at 12:45 p.m., CST, on September 2, 2016, at UP's yard office in Dexter, Missouri. This is an away-from-home terminal for both crew members, whose home terminal is North Little Rock, Arkansas. Both the Locomotive Engineer and Conductor received more than the statutory off-duty period prior to reporting for duty.

The striking train was operated to Dexter, Missouri with the original consist unchanged, arriving at 1:06 p.m., CST. A crew change was performed and the striking train departed Dexter, Missouri at 1:17 p.m., CST, and entered the Jonesboro Subdivision at Dexter Junction, Milepost (MP) 40.3, at 1:23 p.m., CST, en route to Pine Bluff, Arkansas. Through this area, UP operates north and south on a single main track over the Jonesboro Subdivision, which extends from Dexter, Missouri to Pine Bluff, Arkansas. The method of operation is by a traffic control system, remotely controlled from the Harriman Dispatch Center located in Omaha, Nebraska.

Approaching the accident site, there is a 0.58-degree curve in the track from MP 43 to MP 43.3. The track then remains tangent level track to the point of the accident. CO 732 is a gravel two-lane county road, and the grade is practically level for westbound traffic with a slight incline to meet the grade of the railroad. The maximum authorized speed for this train was 60 mph, as designated in the current UP North Little Rock Area Timetable No. 5.

After departing Dexter, Missouri, and prior to the accident, the crew reported no delays and no problems with the striking train. As they approached the accident area, the Locomotive Engineer was seated at the controls on the right side of the leading locomotive with the short-end forward. The Conductor was seated on the left side of the leading locomotive.

A 2013 Chevrolet Equinox (struck vehicle), with a driver and four passengers, was being operated west on CO 732, which intersects UP's Jonesboro Subdivision at the highway-rail grade crossing (HGC) DOT No. 787996H located at UP MP 43.63.

The geographic and railroad timetable direction of the striking train was south. Timetable directions are used throughout this report.

The Accident*Striking Train*

The striking train was being operated at a recorded speed of 54 mph approaching the accident area, and had an unobstructed view of the crossing. As the striking train approached, both the Engineer and Conductor observed the struck vehicle traveling westbound on CO 732 towards the crossing. The Engineer said he did not have any problem seeing the struck vehicle, and it appeared the driver was

going to stop for the crossing prior to entering the path of the striking train.

The Conductor said it did not look like anyone in the struck vehicle saw the striking train. He said it did not appear the driver was stopping or slowing for the crossing, but perhaps was slowing for a stop sign at a highway intersection just beyond the crossing. As the struck vehicle proceeded over the crossing in front of the striking train, the Conductor initiated an emergency train air brake application. There were no witnesses in the accident area except the Engineer and Conductor on the striking train.

Struck Vehicle

The struck vehicle was traveling east to west on CO 732. As the struck vehicle approached the HGC, the driver failed to yield the right-of-way and proceeded west in front of the striking train. The Engineer observed that no one in the struck vehicle was looking in the direction of the striking train. However, the front seat passenger did look up as the driver pulled onto the crossing in front of lead Locomotive No. UP 2618. At approximately 1:25 p.m., CST, the striking train impacted the passenger side of the struck vehicle about midpoint, knocking it off the crossing. The struck vehicle came to rest on the west side of the railroad track, 160.5 feet south of the crossing. Lead Locomotive No. UP 2618 of the striking train came to stop 2,613 feet south of the crossing.

After the accident, the Engineer contacted the train dispatcher on UP's radio to report the accident.

When the train came to a stop, the Conductor left the locomotive cab and began walking back to the struck vehicle to provide assistance. When the Conductor arrived, first responders were already on-scene. The Engineer remained in the locomotive cab to monitor railroad radio communications.

An ambulance from Stoddard County Emergency Medical Services arrived on-scene at 1:32 p.m., CST.

The Dexter Police Department arrived at 1:33 p.m., CST, followed by the Dexter Fire Department at 1:38 p.m., CST. A trooper from the Missouri State Highway Patrol (MSHP) arrived at 1:49 p.m., CST.

Five occupants were found in the struck vehicle, consisting of three adults and two infants. The driver, one other adult, and one infant were pronounced dead at the scene by the Stoddard County Coroner.

One infant was transported to Twin Rivers Medical Center in Kennett, Missouri, and pronounced dead on arrival. The one remaining adult was transported by air ambulance to the Saint Francis Medical Center in Cape Girardeau, Missouri, and admitted for treatment of injuries.

UP dispatched a manager of train operations, manager of operating practices, manager of track maintenance, senior claims representative, and a carman from the mechanical department. They ascertained the condition of the crew, train, and track. Lead Locomotive No. UP 2618 had damage to the right front bottom step, snow plow, pin lifter, and grab iron. There was no damage to the remainder of the train or to the track. The Manager of Operating Practices discussed the accident with a MSHP trooper and provided him with information regarding the striking train and its operation at the time of the accident. The Conductor and Engineer also discussed the accident with the trooper before being released from duty due to emotional trauma. They were then transported to their home terminal of North Little Rock, Arkansas. The striking train was released to proceed at approximately 5:00 p.m., CST, with a relief crew.

The relief crew moved the train approximately 14 miles to Malden, Missouri, where lead Locomotive UP 2618 was set out. The rest of the striking train continued on to Pine Bluff, Arkansas as scheduled.

Data retrieved from the struck vehicle and reviewed by MSHP indicated the struck vehicle's speed five seconds before deployment of its air bags was 21 mph, and 1.5 seconds before deployment was 12 mph.

Analysis and Conclusions

Analysis - Toxicological Testing: The driver of the struck vehicle was a 19-year old female. The other two adult female passengers were 19 and 20 years of age. One of the infant passengers was one-year of age; the other was nine months. MSHP indicated drugs were found in the struck vehicle and on the struck vehicle's driver. Toxicology testing performed on behalf of the Stoddard County Coroner's Office confirmed the presence of both a barbiturate (butalbital) and marijuana in the blood of the deceased driver. However, specific levels were not cited in the Coroner's report. There were no toxicological tests performed on the train crew. The Federal Railroad Administration (FRA) does not require such testing for this type of accident.

Conclusion: MSHP determined, and FRA agreed, that drugs were probable in contributing to the cause of this derailment.

Analysis - Highway-Rail Grade Crossing: An inspection of HGC DOT No. 787996H revealed that it was equipped with crossbuck, yield, and ENS signs for both directions of traffic. Advance-warning signs were also present and in place on both sides of the crossing. The advance-warning sign for westbound vehicle traffic is located 308 feet east of the crossing. Due to the road being gravel, there were no pavement markings. Located 34 feet beyond the crossing is a highway stop sign protecting an intersection with Missouri State Highway 25, which is located 62 feet west of the crossing. Railroad safety inspectors from the Missouri Department of Transportation provided photographs taken following the incident from the perspective of a driver operating a westbound vehicle on CO 732. The photographs show that at 1,030 feet before the crossing, the road appears to be level, and the driver of the struck vehicle would have had an unobstructed view of the HGC, the advance-warning sign, and crossbuck. They also show that at 1,030 feet before the crossing, looking northwest in the direction of the railroad tracks, is a soybean field, trees, and brush, which would have obstructed the driver's view of a southbound train. At 535 feet in approach to the HGC, the driver of the westbound struck vehicle would still have had an unobstructed view of the crossing, the advance-warning sign, and crossbuck. At 535 feet before the crossing, the road remains level as it cuts through topography with trees and brush on both sides of the road. Looking northwest towards the railroad tracks at this location, the view of an approaching train would be blocked by the trees and brush. Approximately 390 feet in approach to the crossing, the obscured view caused by the trees and brush ceases. At this point, a southbound train would have been visible, with a partially obstructed view for the driver over a soybean field due to sporadic tall weed growth amongst the beans. Approximately 150 feet in advance of the HGC, as the struck vehicle approached and entered the crossing, the struck vehicle's driver had an unobstructed view of the railroad tracks and the approaching striking train.

Conclusion: FRA determined that the Highway-Rail Grade Crossing did not contribute to the cause or severity of this accident.

Analysis - Locomotive Safety Devices: Lead Locomotive No. UP 2618 was equipped with a headlight, auxiliary lights, and the audible warning device required by federal regulations. Information provided by the locomotive event recorder indicates the headlight and auxiliary lights were illuminated prior to, and at the time of, the incident. The event recorder also indicated the locomotive horn was being sounded prior to, and at the time of, the incident, and the crew took no exception to the horn's performance. Following numerous requests to the railroad, UP failed to provide the results of the locomotive inspection on site as required by General Code of Operating Rules (GCOR) Rule 1.2.4, leaving only data from the event

recorder to substantiate the safety devices were functioning as intended at the time of the incident. UP did provide documentation that an inspection was completed on Lead Locomotive No. UP 2618 on November 2, 2016, and the headlight, auxiliary lights, and horn were operational at that time. Additional information received from UP indicated the locomotive horn was tested by an outside vendor, and the test results indicated the horn did not produce the minimum sound level rating of 96 decibels required by federal regulations. Requests to the railroad for the written results of the test were unsuccessful; however, UP's Track Image Recorder Event Center in Omaha, Nebraska did provide information that the test produced a 90.4 decibel rating.

Conclusion: FRA determined that Lead Locomotive No. UP 2618's horn did not produce the minimum sound level rating, however was unable to determine if the locomotive horn contributed to the cause or severity of this accident.

Analysis - Locomotive Engineer Operating Performance: The locomotive was equipped with a speed indicator and an event recorder, as required. The relevant event recorder data was downloaded by the manager of operating practices and analyzed at the accident site. Review of the download showed the Engineer of the striking train did comply with all applicable rules and regulations.

Conclusion: FRA determined Locomotive Engineer Operating Performance did not contribute to the cause or severity of this accident.

Overall Conclusions

The actions of the Conductor and Engineer complied with all applicable railroad operating and train handling requirements. The train crew had no information that could be used to determine why the struck vehicle failed to stop at the crossing. MSHP's investigation cited the struck vehicle driver's failure to yield, drugs, and distracted/inattentive driving as probable contributing circumstances to the incident.

Probable Cause and Contributing Factors

According to the MSHP report, the accident was caused by failure of the struck vehicle's driver to yield to the striking train. FRA's investigation concluded the probable cause was Cause Code M302: highway user inattentiveness. Additionally, FRA determined drugs were a probable contributing factor in this accident based on the same MSHP report findings. FRA was unable to positively conclude if Lead Locomotive No. UP 2618's horn not meeting the minimum decibel rating contributed to the cause or severity of this accident.