National Transportation Safety Board

Office of Railroad, Pipeline & Hazardous Materials Investigations
Washington, D.C. 20594

RAILROAD ACCIDENT INVESTIGATION
IIC FACTUAL REPORT

Highway-Rail Collision
Amtrak P09806 Silver Meteor
25TH St. West Palm Beach Fl.

July 6, 2016

DCA16FR009

A. ACCIDENT

Type:	Highway Grade Crossing Highway-Rail Collision
Date and Time:	July 6, 2016 9:59 am
Location:	25TH St. Highway-Rail Grade Crossing, M.P. SX968.32, DOT 628116P West Palm Beach, FL.
Carrier:	South Florida Regional Transportation Authority
Train:	Northbound Amtrak #P09806 / Silver Meteor
Vehicle:	Westbound White 4 door, 2004 Mercury Sable
Fatalities:	0
Injuries:	1 injury

B. PARTIES TO THE INVESTIGATION:

- Federal Railroad Administration
- South Florida Regional Transportation Authority/Tri-Rail
- National Railroad Passenger Corporation/Amtrak
- Brotherhood of Railroad Signalmen
- VTMI/ Maintenance Contractor for Tri-Rail
- Transdev/ Transportation Operations Company for Tri-Rail
- West Palm Beach PD

Figure-1 depicts vehicle that Amtrak P09806 Silver Meteor struck in Northeast quadrant of 25th Street Highway Grade Crossing, West Palm Beach Florida, July 6, 2016, 9:59 am.

ACCIDENT SUMMARY

For a summary of the accident, refer to the Accident Summary report, within this docket.

D. DETAILS OF THE INVESTIGATION

1. Description and Method of Operation of the South Florida Regional Transportation Authority (SFRTA)

Trains on #1 and #2 track through this area have authority to move under Traffic Control System[1] from the South Florida Regional Rail Transit Authority, (SFRTA) Dispatcher located in Pompano, FL with a timetable speed of 55 mph for all trains, Passenger, Tri Rail, and Freight. Dispatcher services are provided by Amtrak for SFRTA.

This area is utilized by SFRTA, Amtrak, and CSX.

- SFRTA operates 50 weekday revenue trains and 30 weekend revenue trains.
- Amtrak operates four revenue trains per day.
- CSX operates approximately 4 freight trains and runs roughly 1 local through this area a day.

2. Circumstances Prior to the Accident

2.1 Amtrak P09806

Amtrak (ATK) Train P09806 originated at Amtrak's Miami passenger station located in Miami, FL (Hialeah Yard). The train's final destination was Penn Station, New York City, NY. The train crew received the train's equipment at Miami and performed all required pre-departure equipment tests prior to departure. Train P09806 consisted of 2 locomotives and 11 passenger cars. The locomotive crew consisted of a locomotive engineer, an assistant locomotive engineer, a conductor, and one assistant conductor. The train departed Miami Station on schedule, at 8:10 a.m. (EDT). Train P09806's last scheduled station stop was West Palm Beach, FL. The train proceeded at the required track speed departing from West Palm Beach, through to the accident

1 A block signal system under which train movements are authorized by block signals whose indications supersede the superiority of trains for both opposing and following movements on the same track.

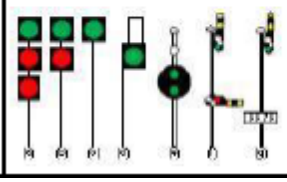
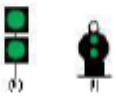
location. The Train P09806 had passed five previous open passenger stations before stopping at West Palm Beach station at about 9:45a.m., on schedule.

2.2 Operating Rules

Operating Rules governing employees at the time of the accident were the SFRTA Operating Rules, effective March 29, 2015. Also in effect was SFRTA Timetable No. 2, effective June 1, 2016. At the time of the accident the train crew operating the Amtrak train P09806 involved in the accident, was governed by wayside signal indications, railroad operating and Amtrak safety rules.

2.3 Signal Indications received by – Train No. P09806

Train P09806, with lead locomotive ATK 146, received a "Clear" at CP Coral prior to the accident. This signal indication was a normal indication at this location, and allowed the engineer to operate at maximum authorized speed. Table below represents operating rule 1281 with rule, signal aspects, name, and indication that governed P09806 at CP Coral the day of the accident.

RULE	HIGH SIGNAL ASPECTS	DWARF SIGNAL ASPECTS	NAME	INDICATION
1281			CLEAR	Proceed.

T-1 Depicts operating rule 1281 signal aspects, name and indication.

2.4 Locomotive Crew

The train crew went on-duty at Miami, FL. This was their first train assignment of the day for all train crew members (conductors and engineers). All crewmembers had received the required off-

duty rest period prior to reporting for duty the day of the accident. Federal regulations 49 Code of Federal Regulations (CFR) Part 240 and 242 require that both locomotive engineers and conductors be trained and certified under a federally approved program. Employees must pass required testing to confirm that they are qualified to perform their assigned duties. Records provided to NTSB, as part of this investigation, indicate that Amtrak had approved training program in place and that the train crews involved in this accident had received the required training by the railroad. All train crew members involved in the accident held current certifications for their assigned positions. Crew members were qualified for their position. Certification and hire dates are below for the Engineer and Assistant Engineer.

Amtrak Train No. P09806
Engineer:
Hire date: 7/23/97
Engineer initial certification (Amtrak): 12/23/97
Current Certification: 2/19/2016
Engineer went on duty in Miami, FL. at 7:10 a.m., on July 6, 2016.

Asst. Engineer:
Hire date: 5/7/91
Engineer initial certification (Amtrak): 11/29/91
Current Certification: 3/23/16
Asst. Engineer went on duty in Miami, FL. at 7:10 a.m., on July 6, 2016.

2.5 Train Consist

Amtrak Train P09806 consisted of 2 locomotives and 11 passenger cars. On the head of the train was ATK locomotive 146. The lead locomotive was equipped with a control compartment on the lead (north) end of the locomotive. The lead locomotive was followed by locomotive ATK No. 151. All 11 trailing cars were in revenue service. The train equipment is listed below respectively.

ATK 146 Locomotive (North End) (Head End)
ATK 151 Locomotive

ATK 61044 Car – Baggage car
ATK 62040 Car – Sleeping car
ATK 62017 Car – Sleeping car
ATK 62036 Car – Sleeping car
ATK 8505 Car – Diner car
ATK 28023 Car – Lounge car
ATK 25081 Car – Coach car
ATK 25014 Car – Coach car
ATK 25023 Car – Coach car
ATK 25057 Car – Coach car
ATK 25096 Car – Coach car (South End) (Rear Car)

2.6 VTMI Signal Inspector

Mr. Perez was hired as a signal inspector March 2015 by VTMI. He was previously employed by CSX from August 1996 to March 2015 in various signal craft positions. On January 21, 2014, his Job title changed from Signal Maintainer to Contract M/W Foremen. While employed as a Contract M/W Foreman he fulfilled the duties of a Signal Inspector. Training records revealed that Signal Inspector Perez had been trained and tested on SFRTA operating rules on Feb 3, 2016. Additionally, he received VTMI Signal & Communication Jumper policy annual training on June 20, 2016 just weeks prior to the accident at 25th Street. VTMI jumper policy explicitly prohibits any action "that alters the normal operation of the equipment" (2015, p.1) without Positive Protection. Positive protection is defined as "as a method to prevent trains from accessing a section of track or providing a message for the train to provide its own protection (2015, p.1)." In addition, inspection of relays is governed by VTMI Test #6 RELAYS. Section 1.0 governing Procedure-General states: "When making test of relays, approved instruments must be used and it must be known that no unsafe conditions are set up by the application of the test instrument." (section1.0 p.1) Mr. Perez was fully rested the day of the accident with 16 hours' prior rest and reporting for duty at 7 am, 7/6/2016. VTMI vehicle 1224 is assigned to Signal Inspector Perez. The Global Positioning System (GPS) history of that vehicle reflected that vehicle 1224 arrived at the 25th

Street crossing at 08:27:45 on July 6, 2016. On the day of the accident, Mr. Perez called the SFRTA dispatcher at 09:23:30 to inform him that he would be performing relay tests on the crossing signal at 25th Street. However, positive protection for the public or trains was not discussed or provided. Relay testing of Mechanical-Electro relays must be tested periodically as provided in CFR 49 Subtitle B Chapter ll part 234 to ensure that electro-mechanical relays meet certain electrical standards. Evidence retrieved at the 25th Street crossing reflects that the Signal Inspector had begun testing relays and had completed the first relay.

The below excerpt from the relay record depicts the top left relay in row one had been tested July 6, 2016.

VTMI Inspection Report - Relay Tests & Inspections

Division: FDOT
Subdivision: MIAMI
Milepost (with Prefix): SX 968.2F
Location / Highway Name: 25 ST
County:
Employee's Name: A. Perez
Asset ID: 628116 P
Test Date: 7/6/2016
State: FL
Force Number: SINI

Conditions Master Key
C = Test completed, condition left in compliance.
R = Replacements made (identified in associated comments), test completed, and condition left in compliance.
V = Visual inspection completed, condition left in compliance.
NT = The equipment was not tested in this inspection.
N = No inspection required. The given relay does not require inspection at this time.

Relay Tests (FRA 234.263, 236.106)

Shelf Name	Relay Name	Serial Number	Condition Left	
Row 1	XPPR	54587K029	C	
Relay Type (Drawing and/or Catalog Number)		Resistance (Ohms)	Contacts	Date Tested
91 36001-957		500	6FB HD	7/6/16
Neutral Dropaway	Neutral Pickup		Neutral Working	
.0147	.0147		.0147	

Figure-2 depicts relay record of the XPPR relay that was tested prior to the accident.

2.8 Federal Oversight

Federal oversight of the SFRTA and Amtrak is provided by the Federal Railroad Administration (FRA), which is part of the US Department of Transportation (DOT). The Code of Federal

Regulations (CFR) Title 49, Subtitle B, Chapter ll, Parts 240 and 242, covers the qualification and certification of engineers and conductors. CFR 49, Subtitle B, Chapter ll, Part 243, cover training, qualification, and oversight for other safety-related railroad employees. However, this will not go into effect until January 1, 2018. FRA employs multiple field inspectors which conduct field inspections on SFRTA and Amtrak property on a scheduled as well as random basis. FRA operational field inspectors monitor the railroad's compliance with DOT regulations per 49 CFR Parts 200 through 299. FRA also conducts periodic records reviews on SFRTA and Amtrak for various federal record keeping requirements.

3. The Accident

Train P09806 was operating on No. 2 main track northbound. The track speed limit on No. 2 track at this location is 55 miles per hour. As Amtrak P09806 approached the 25th Street highway-rail crossing, the locomotive engineer noticed several highway vehicles passing over the crossing. He knew the Highway Grade Crossing Warning System should have been activated. The locomotive engineer immediately applied the brakes on the train. As the train brakes were applied and the train began to slow, the locomotive engineer observed a vehicle that was in the right lane of two westbound traffic lanes occupying the 25th Street crossing, pull forward and partially foul No. 2 track. He immediately placed the train into a full emergency air brake application and sounded the horn on the lead locomotive upon approaching the crossing. The lights and bells of the Highway Grade Crossing Warning System activated with the gates still in the upright position with one-second warning time prior to the collision. The lead locomotive of train P09806 struck the highway vehicle on the driver's side at about 9:59 a.m., at a speed of approximately 50 miles per hour. The train then pushed the vehicle north on No. 2 track approximately 100 feet and clear of No. 2 track before the train came to a stop at approximately 710 feet beyond the crossing. The locomotive engineer gave immediate notification of the accident to the SFRTA (ATK) train

dispatcher[2]. The dispatcher acknowledged the report and made emergency notification to trains in the immediate area. Additionally, the engineer notified the dispatcher that the Highway Grade Crossing Warning System did not activate. The dispatcher asks the engineer to confirm that the crossing warning system did not activate. The engineer replied; "It did not activate." The dispatcher ask the engineer of P09806 if there was a VTMI maintenance truck at the crossing. The conductor replied to the affirmative, "Yes, it's back there." Additionally, the conductor stated the driver was ejected from the vehicle, but was alive. First responders and law enforcement were dispatched to the accident scene. West Palm Beach P.D. arrived at 10:02 am and First Responder personnel arrived at 10:08 am. The driver sustained severe injuries and was transported to Saint Mary's Medical Center, West Palm Beach FL. The driver to date is still under doctor's care and is unable to give a statement.

4. 25th St. Highway Grade Crossing and Warning System

25th St, DOT 628116P, M.P. SX 968.32 Highway Grade Crossing is located in West Palm Beach, FL. is on the northern end of the 72-mile South Florida Regional Transit Authority rail corridor. It is positioned between Control Point Coral milepost (SX 968.7) and Control Point Gator MP (SX 966.7). Three tracks traverse the grade crossing in a North/South direction. The tracks are designated from East to West as main track #2, #1, and Industry Track (U & Me). 25th Street is a four lane undivided road at the highway rail-grade crossing. 25th St. travels in an east-west direction with a speed limit of 30 mph. 25th Street is marked with RR warning stop lines and advance warning signs. The construction of the road is standard asphalt.

2 Amtrak provides dispatching services for SFRTA out of Pompano FL. SFRTA dispatching facility.

Figure-3 depicts view traveling west on 25th street, same as driver was traveling.

The Highway Grade Crossing Warning System is equipped with four quadrant gates, lights, bells and two cantilever structures for over lane lighting. There are four quadrant gates at the location because this portion of track is an approved quite zone[3]. All flashing light units at this highway rail-grade crossing are twelve-inch lights equipped with Light Emitting Diodes (LEDS). Exit gates are located at the southeast and northwest quadrants. The signal bungalow is located at the southeast quadrant. It is an 8X8 steel house. A Safetran Grade Crossing Predictor GCP-3000 D2 unit is utilized as the primary warning control for both main tracks. This unit was in the primary mode upon entering the crossing. The standby unit was fully functional. There was no internal recorder module in the unit, but an external North American Signal (NAS) recorder was on-site. Upon inspection, it was observed that the NAS external recorder was in the off position, in maintenance mode, and the CPU circuit board was missing. All other functions of the Highway Grade Crossing Warning System are accomplished utilizing electro-mechanical relays in conjunction with the GCP.

3 *Quiet zone* means a segment of a rail line, within which is situated one or a number of consecutive public highway-rail crossings at which locomotive horns are not routinely sounded.

5. Event and On-Board Image Recorders

5.1 Details of the Recorder Investigation

The lead locomotive of Amtrak P09806 was locomotive Amtrak 146 (ATK146). The locomotive had a Wabtec forward facing track image recorder and a Wabtec event recorder installed and operating.

5.2 On-Board Image Recorder Description

The Wabtec Video Trax On-Board Image recorder is a forward facing video camera that records to external storage. It records video at a resolution of 704x480 pixels at 15 frames per second (fps) with external audio.

5.3 Recorder Timing

The times used in this report are expressed as local time of the accident (EDT) based on the image recorder. The image recorder recorded the time of the collision at 0459 in an unknown time zone. Based on information from the Investigator-in-Charge, the collision occurred at 0959 EDT; accordingly, 5 hours were added to image recorder time to adjust to EDT.

5.4 ATK146 On-Board Event Recorder

In order to align the event recorder with the image recorder the start time of the horn blast prior to the collision, recorded on the image recorder's audio track at 0959:33 EDT, was aligned with the same event on the event recorder, recorded at 0958:24 EDT. Accordingly, 0001:09 was added to the event recorder time to convert to EDT and align with image recorder time.

5.5. Description of Data

Data from the event and image recorders of ATK146 provided investigators with the following chronological order of events. The video began at 0955:09 EDT when ATK146 was stationary on main track two, facing a grade crossing, and its bell was active. Bright daylight conditions prevailed, with shadows cast towards the left, relative to the direction of the train. Visibility was unrestricted, no precipitation, and there was no cloud cover in the immediate area. At 0959:36 EDT, ATK146 approached the 25th Street grade crossing with its horn active at 50 mph. The grade crossing signal bungalow was to the right of the track, and a white truck was parked adjacent to the bungalow (parallel to the tracks, on the grade crossing side). None of the quad-crossing gates were down. At 0959:37 EDT, ATK146's Pneumatic Control Switch (PCS) transitioned from closed to open, as the train continued towards the grade crossing, as shown in figure 8. A dark vehicle stopped prior to the tracks, while a white sedan continued across the grade crossing. At 0959:38 EDT, ATK146 struck the white sedan while the train slowed through 48 mph. At 0959:44 EDT, after ATK146 had struck the vehicle and passed the grade crossing, the horn, which had blown continuously from 0959:33 EDT, stopped as the train decelerated rapidly. At 0959:57 EDT, ATK146 came to a stop and engine sound decreased thereafter. The recorded ended at 1001:00 EDT as a vehicle with one or more flashing lights was observed on the roadway to the right of the train, heading in the direction of the grade crossing collision.

The below figure F-4 depicts ATK 146 in close proximity to the grade crossing with all four crossing gates in the up position while the private vehicle in the outer right hand lane is about to cross the Rail-Highway Grade Crossing.

Figure-4 Depicts crossing gates in the up position as ATK 146 approached the crossing.

6. Dispatcher Audio Files

Dispatcher audio files in connection with this accident were obtained from SFRTA dispatcher in Pompano FL. The audio file at 09:23:10 am 07/06/2016 reflects that Signal Inspector Alberto Perez called the dispatcher and informed him that he would be performing relay tests at 25th St. Highway Grade Crossing. At 09:59:10 a.m., 07/06/2016 Amtrak train P09806 engineer reported to the

dispatcher that they had struck an automobile. Additionally, the engineer of Amtrak P09806 reported that the crossing gates at 25th St. did not activate.

7. Highway Grade Crossing Signal Event Recorder

The Highway Grade crossing bungalow located at 25th St. has a North American Signal event recorder. The recorder monitors some of the electro-mechanical relays, the grade crossing warning device operation, and island relay input voltage. This process of recorded events includes crossing activation, light activation, light flash rate, gate movement, train occupancy of the crossing and crossing warning time. However, the NAS recorder does not monitor the control relay output of the Grade Crossing Predictor (GCP). The event recorder was found in the off position and in maintenance mode at the time of the post-accident inspection. Additionally, the CPU card was missing. A second CPU card was obtained and programmed. The data on the event recorder was still in the system and was retrieved. The time on the retrieved data was off by 3 hours and 26 minutes. The inaccurate recorder time was compared and corrected using data from Amtrak P09806, dispatcher event console, and signal data downloaded from CP Coral. The data from the NAS event recorder documented the accident time as 06:33:07 07/06/2016. The corrected time was 09:59:07 07/06/2016. The NAS recorder displayed that the crossing warning time for the accident was one second.

Table 2 depicts the crossing warning time of one second at the time of the accident.

```
07/06/16 06:33:26 LOG   GATE 1 MOVEMENT TIME DOWN (sec) 015
07/06/16 06:33:26 LOG   AGDPR RELAY POSITION UP
07/06/16 06:33:20 LOG   GATE 2 MOVEMENT TIME DOWN (sec) 009
07/06/16 06:33:20 LOG   BGDPR RELAY POSITION UP
07/06/16 06:33:11 LOG   XPPR RELAY DELAY (sec) 005
07/06/16 06:33:11 LOG   XPPR RELAY POSITION DOWN
07/06/16 06:33:07 ALARM  CROSSING WARNING TIME (sec) 001
07/06/16 06:33:07 LOG   ISL2 RELAY POSITION DOWN
07/06/16 06:33:06 LOG   XR1 RELAY POSITION DOWN
07/06/16 06:33:06 LOG   GPPR RELAY POSITION DOWN
07/06/16 06:32:38 LOG   ALL GATES MOVEMENT TIME UP (sec) 010
07/06/16 06:32:38 LOG   GPPR RELAY POSITION UP
07/06/16 06:32:32 LOG   BGDPR RELAY POSITION DOWN
07/06/16 06:32:29 LOG   XPPR RELAY POSITION UP
07/06/16 06:32:28 LOG   XR1 RELAY POSITION UP
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8. Post-Accident Signal System Examination and Testing.

8.1 Highway Grade Crossing Warning System

Upon arrival, a stop and flag protection order was placed on both main lines and the crossing signal bungalow was sealed. Post-Inspection began with obtaining the information contained within the GCP-3000 display panel. The warning time of the last ten trains that included the accident train were recorded and photographed. The warning time of the GCP that was recorded in the display module for the accident train was 39 seconds {P-5 pg-17}. The NAS recorder indicated actual warning time of the control relay to be only one second {table 2 pg-16}.

Figure-5 depicts warning time of the Grade Crossing Predictor to be 39 seconds

Post-accident testing continued with shunt tests on both main tracks and recording the results of each test. The termination shunts were removed to ensure proper operation and approach distance. Battery and ground tests were performed on the highway rail-grade crossing. Trains were observed in both directions on both tracks at track speed to verify warning times. All applicable tests were performed referenced by Code of Federal Regulation Title 49 Part 234 Subpart D Maintenance, Inspection, and Testing. There were no exceptions noted during the Post-Accident Inspection of the Grade Crossing Warning Device or signal appurtenances associated with the Highway Grade Crossing Warning System. Additionally, the NAS event recorder was tested at the manufacturer's test facility in Gainesville FL. on August 23, 2016 by NTSB, FRA and National American Signal technicians with no exception taken.

8.2 Wayside Signals

Inspection was performed of the absolute and intermediate signals in the accident area. Those locations equipped with data loggers were downloaded. Signal aspects were verified and ground tests were performed. Post-Accident signal lamp voltage measurements were recorded. There were no defects noted during the examination of the signal system or the associated signal appurtenances. This area does not have Positive Train Control (PTC) installed. However, it is scheduled to be implemented by December 2018.

8.3 Post-Accident Train Simulation

On July 9, 2016 an Amtrak train was dispatched to simulate the accident and to measure sight distances warning time. Two simulations were performed. The first simulation measured sight distance from the locomotive to the crossing, warning system detection, and island relay detection. The second simulation was performed at accident speed to obtain warning time, gate descent, light verification, and bell activation. No exceptions were taken with either simulation train.

8.4 Post-Accident Toxicology Results.

Signal Inspector was drug tested as a result of his involvement with the accident due to reasonable cause. The results were negative for Amphetamines, Cocaine, Marijuana, Phencyclidine, and Opiates. No other persons were tested in regards to this accident.

9. SFRTA Highway Grade Crossing Warning System Trouble/Remedy Tickets

Highway Grade Crossing Warning System trouble/remedy tickets logged by the SFRTA PSCC (Public Safety Coordination Center) for the 25th St Highway Grade crossing Warning System were requested and were reviewed for the 12-month period preceding the accident. There were no exceptions taken with the trouble/remedy tickets.

10. SFRTA Railroad Maintenance Records

Railroad maintenance, inspections and tests records were provided for monthly, quarterly, annual, 4 years, and 10-year inspections for the 25th St. crossing were reviewed with no exceptions taken.

11. Damages

There were $16,305.00 damages to the Amtrak locomotive. No other damage was done to the SFRTA signal system or track because of this Highway-Rail collision.

12. Interviews

Interviews were given by an eye witness, Amtrak Crew members, VTMI managers and employees. All interviews have been entered into the docket and once released may be viewed. An eyewitness stated, "When I noticed that the guard, the man working on the train guards was standing in the booth there at the doorway, and he was waving cars on". A subpoena to testify was issued to the Signal Inspector involved in the accident. On Wednesday August 10, 2016. The Signal Inspector declined to comment on the accident. He stated, "On the advice of counsel, I refuse to answer any question and exercise my rights under the 5th Amendment, to the United States Constitution."

END OF FACTUAL REPORT

TO BE FILLED OUT BY PARTY REPRESENTATIVE

REGARDING:

NTSB accident DCA 16 FR 009, On July 6, 2016, at 09:59am EDT, Amtrak train #98 (Silver meteor) struck a private vehicle at 25th Street near MP SX 968.32 in West Palm Beach FL.

I have reviewed the NTSB IIC Factual Report concerning the above referenced accident and (check one):

- ❑ I have no comments or corrections
- ❑ I have comments or corrections which are attached
- ❑ I have sent comments or corrections separately.

(Please return by January 9, 2017)

Signature

Organization Date