NATIONAL TRANSPORTATION SAFETY BOARD

Office of Railroad, Pipeline and Hazardous Materials Investigations

WASHINGTON, D. C. 20594

Operations / Human Performance Group Factual Report

Tomas Torres-Operations, Dr. Michael Hoepf-Human Performance

A. ACCIDENT

Description: Train Head-On Collision

Location: Cayce , South Carolina

Accident Date: February 4, 2018

Report date: February 21, 2018

NTSB accident number: RRD18MR003

Keys #: 96691

B. PARTY MEMBERS

Tomas Torres NTSB-Operations Group Chairman	Michael R. Hoepf, Ph.D. NTSB-Human Performance Group Chairman
Gregory Drakulic FRA Railroad Safety Specialist-Chief Inspector	Steve Ammons CSXT-Director Train Handling Rules & Practices
Matt Campbell SMART-Georgia State Legislative Director	Bryan Aldridge BLET-Primary Investigator, Safety Task Force
Marcus Landy	Jonathan Hines

South Carolina Operating Practice Inspector Office Regulatory Staff	Senior Director, Compliance & Certifications Safety Compliance and Training

C. ACCIDENT SUMMARY

For a summary of the accident, refer to the *Accident Summary Report* in the docket for this investigation.

D. **DETAILS OF THE INVESTIGATION**

Events Prior to the Accident

The crew of train CSXT 777-03 included a locomotive engineer, and a conductor. They first went on duty at 3:30 p.m. EST, February 3, 2018, at the CSXT Cayce Yard in South Carolina.[1] This was the home terminal for all crew members and each received more than the statutory off-duty period prior to reporting for duty. The engineer received 16 hours, 8 minutes rest, the conductor received 16 hours and 7 minutes rest.

Hours of Service and Rest Cycle - Title 49 CFR Part 228 – **Hours of Service of Railroad Employees,** requires that railroad operating employees not work over 12 hours in a given shift and must have a minimum of 10 hours off duty between shifts.[2]

Their assigned freight train consisted of two locomotives and 38 loaded auto racks.[3] It was 3,718 feet long and weighed 2,891 tons. The train was scheduled to travel from the CSXT Cayce Yard to the auto facility with cars to be switched into the auto facility located at railroad milepost 367.0.

The crew stopped the train at the auto facility to add and remove cars from the tracks. They removed 34 cars empty cars from the auto facility tracks and placed them into the Silica Storage Track.

[1] Yard - A system of tracks other than main tracks and sidings. A yard is used for making up trains, for storing cars, and for other purposes.
[2] For Additional information on Hours of Service of Railroad employees refer to title 49 CFR Part 228.
[3] Auto Racks are in reference to railroad cars used to transport automobiles.

The crew of train of Amtrak PO9103 included a locomotive engineer, a conductor, an assistant conductor, and five service employees. They first went on duty at 10:43 p.m. EST, February 3, 2018 at Hamlet, North Carolina. The home terminal for the engineer was Savannah Georgia, the home terminal for the conductor and assistant conductor was Jacksonville, Florida. Each received more than the statutory off-duty period prior to reporting for duty. The engineer received 13 hours, 19 minutes rest. The conductor received 13 hours and 19 minutes rest. The assistant conductor received 14 hours and 45 minutes rest.

The engineer was not regularly assigned to Amtrak PO9103, he was working off the engineers' extra board. The conductor was the regular assigned conductor to the train, and the assistant conductor was still training.

Their assigned train consisted of 1 locomotive, and 7 coach cars. The train was scheduled to travel from Hamlet, North Carolina to Jacksonville, Florida.

Upon going on duty, the train crew had a job briefing. They reviewed the train orders and bulletins pertaining to their train movement. An Amtrak Road Foreman of Engines job briefed the train crew of the signal suspension that was in effect between mileposts S362.5 and S385.1 near Cayce, South Carolina.[4]

The Amtrak Road Foreman explained to the train crew the signal suspension, and the required actions of the train crew.

CSXT Columbia Subdivision Bulletin 105, was issued to both train crews explaining the process to operate their trains through the signal suspension. (See Appendix A)

[4] Signal Suspension is in reference to wayside signals temporarily not in effect, the train dispatcher cannot authorize train movements through signal indications.

According to title 49 CFR Part 236.0, trains operating in territory that is not equipped with a signal system must not exceed 59 mph for passenger equipment and 49 mph for all other trains. With the signals suspended this restriction applied. [5]

The Amtrak Road Foreman explained that the crew would be required to get EC-1 (TWC-D) Authority to enter the limits of the signal suspension and that the SPAF (switch position awareness form) would have to be filled out if any main track switches were to be operated. [6],[7]

Amtrak PO9103 stopped to pick up and drop off passengers at Columbia, South Carolina.

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

Amtrak PO9103 traveled southbound between milepost S-360.0 to the point of collision at Silica Storage Track milepost 367. Amtrak PO9103 train traversed a grade ranging from 0% to 1.01%. The main track curvature leading up to the point of collision from milepost S-366.0 was mostly tangent track with five curves ranging from 2.15-degree to .27-degree curves.

[5] 49 CFR 236 Applicability, minimum requirements and penalties**:** …(2) On and after January 17, 2012, where a passenger train is permitted to operate at a speed of 60 or more miles per hour, or a freight train is permitted to operate at a speed of 50 or more miles per hour, a block signal system complying with the provisions of this part shall be installed, unless an FRA approved PTC system meeting the requirements of this part for the subject speed and other operating conditions is installed.

[6]Track Warrant Control Non-Signaled (TWC-D) When the authority for movement on a controlled track is designated in special instructions, dispatcher message, or Form EC-1 as TWC-D, trains will be governed by verbal authority from the train dispatcher.

[7] Form EC-1 - A form used to record specific instructions or dispatcher messages from the train dispatcher regarding movements on controlled tracks.

Instructions for the Signal Suspension

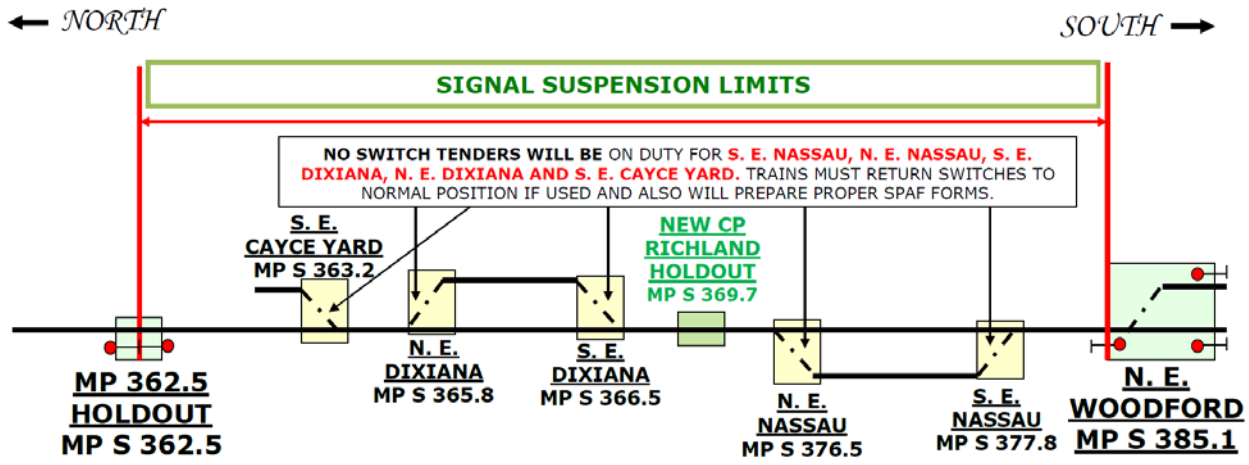

Figure 1. Diagram of the Signal Suspension Limits

The Southbound absolute signal at MP 362.5 Holdout MP S362.5 governs movement into the signal suspension only. According to CSXT Bulletin 105 southbound trains must have both a signal to proceed and EC-1 authority from the FF train dispatcher at Jacksonville before passing the southward absolute signal at MP 362.5 Holdout MP S362.5.

All switches within the limits of the signal suspension will be operated in accordance with operating rules 401 and 505.12 under the directions of the FF train dispatcher at Jacksonville.[8][9]

[8] CSXT Operating rule 401 is in reference to CSXT operating rules 401 through 401.16 pertaining to switch and derail operation.

[9] Refer to the Appendix B at the end of the report for additional information on the CSX operating rule 505.12 pertaining to the SPAF (Switch Position Awareness Form).

The Accident – Amtrak PO9103

Amtrak PO9103 trip between Hamlet, North Carolina and Columbia, South Carolina was uneventful.

At Columbia, South Carolina the conductor of Amtrak PO9103 contacted the CSXT train dispatcher to obtain an EC-1 (Track Warrant Control-D) to enter the limits of the signal suspension located between mile post 362.5 and mile post 385.1. At about 2:01 a.m. On February 4, 2018 the train dispatcher issued and EC-1(Track Warrant Control-D) to Amtrak PO9103 at 2:01 a.m. proceed through the limits.

Amtrak PO9103 received authority to enter the signal suspension from the CSXT train dispatcher. Prior to departing Columbia, South Carolina the Amtrak PO9103 conductor told the assistant conductor that he would be riding on the headend (lead locomotive) with the engineer to talk him through the suspension, as he did not feel comfortable with the engineer being by himself.

Amtrak PO9103 departed Columbia, South Carolina at about 2:01 a.m., and stopped at a red signal at milepost 362.5 to get authority to pass a stop indication in order enter the limits of the signal suspension. Amtrak PO9103 waited for about 10 to 15 minutes before the train dispatcher answered the radio. The train dispatcher answered the radio and authorized the Amtrak PO9103 past the stop indication, the train continued southbound.

As the southbound train approached the accident area, the locomotive engineer and conductor were on the lead locomotive, the assistant conductor was seated in the café car. The train was traveling about 57 mph when it entered Silica Storage Track.

The assistant conductor said that once they had copied the EC-1 and received authority to pass the signal at 362.5 they began operating south again. He was preparing to contact the Engineer

and Conductor and remind them of the Gaston defect detector and said the next thing he remembers is that he was sitting at the rear seat of the café car and that the train began to lurch and that he was being thrown around. He said that when they struck, “the café car started closing in on itself, got knocked onto the floor”. The assistant conductor called out “91 AC to headend” and said he did not get a response.

The assistant conductor called out “emergency” over the radio and was able to establish communication with the CSXT Train Dispatcher. The assistant conductor explained to the train dispatcher what had just occurred and that the rear of the train was at mile post 367 and that there was a CSXT locomotive on the adjacent track. The train dispatcher responded by saying ““Alright, standby, over.”

The assistant conductor walked towards the head-end of the train and saw that the locomotive was lying flat on its side and that diesel fuel was leaking from the locomotive. He returned to the passenger cars and started the evacuation of the passengers. EMS instructed, the assistant conductor and the attendants to evacuate the non-injured to one side of the train and the injured to the other side.

The assistant conductor, along with the local police swept the cars to ensure that all passengers had been evacuated.

The assistant conductor and an attendant walked towards the headend of the train again and saw that the engineer and conductor were lying on the ground.

The Accident – CSXT Train F777-03

The train crew went on duty at 3:00 p.m. on February 3, 2018 at CSXT Cayce Yard. At about 3:30 p.m., the Trainmaster on duty had a job briefing via telephone with the train crew on the signal suspension that was in effect between mile post S362.5 and mile post S385.1. The Trainmaster also explained to the train crew that they would be operating under EC-1 (TWC-D) and that the Switch Position Awareness Form (SPAF) would be required. The Trainmaster expressed that if they had any questions to make sure to give him a call.

Due to the signal suspension the CSXT train crew was not able to go to the auto facility until about 6 p.m. In the meantime, the crew was instructed by the Yardmaster to relief the CSXT 794 train that had expired under the hours of service. After the train crew brought the train into the CSXT Cayce Yard they were instructed to take 2 locomotives and 38 loaded auto racks and travel to Silica Storage Track to pull and spot the auto facility.

The train crew of F777-03 received an EC-1 (track warrant) at 8:10 p.m. on February 3, 2018, to proceed south from MP 362.5 Holdout Main Track to the SAS Richland Holdout Main Track. The EC-1 authority also included permission to use 3 switches located at S 366.9, S367.9, S367.0.

The F777-03 departed CSXT Cayce Yard at 8:23 p.m. and traveled southbound, and at 8:31 p.m. the conductor reported to the CSXT train dispatcher that their train movement was south of SAS North End of Dixiana. At 8:32 p.m. the train dispatcher instructed the train crew “And also

your EC-1 #93537 the F777-03 which is now the SAS north end Dixie end SAS Richland holdout change that from south to both. Change direction only."[10]

When the train crew on F777-03 arrived at Silica Storage Track they pulled down the main track with 38 loads and two locomotives. The crew secured the train and cut the locomotives, and the conductor operated the south end of Silica Storage Track switch and traveled north bound via the Silica Storage Track. [11]

After the train crew reached the north end of Silica Storage Track the conductor operated the switch and lined it to main track. The crew entered the main track and traveled south bound to the main track switch that leads to the runaround track. The conductor operated the switch and lined it main track to the runaround track. The train crew entered the run around track and then into the tracks in A-Lot and switched out empty auto rack cars from multiple tracks. The train crew then switched out the empty auto rack cars from B-Lot from multiple tracks. After switching out the empty auto rack cars, the train crew traveled north past the Silica Storage Track switch with a hold of 30 empty auto rack cars. The conductor operated the switch and lined it main track to siding. The train crew then made a shoving movement into the Silica Storage Track and left the 30 empty auto racks in the siding. F777-03 returned to the runaround track and picked up the 4 empty auto racks that they had earlier left behind. They returned to the Silica Storage Track and coupled them to the other 30 cars. F777-03 left the Silica Storage Track with light engines and went to pick up the loaded auto rack cars from the main track, they traveled north passed the runaround track switch, lined the switch from main track to the runaround track, shoved loaded auto racks into B-

[10] Change directions was in reference that train CSX 777-03 was authorized to move in both directions, south and north.
[11] Switch - A device consisting of necessary rails and connections designed to change the direction of a movement from the track on which it is moving to another track.

Lot and spotted the cars into multiple tracks.[12] F777-03 pulled out of B -Lot and spotted the remainder of the loaded auto rack cars into the A Lot into multiple tracks.

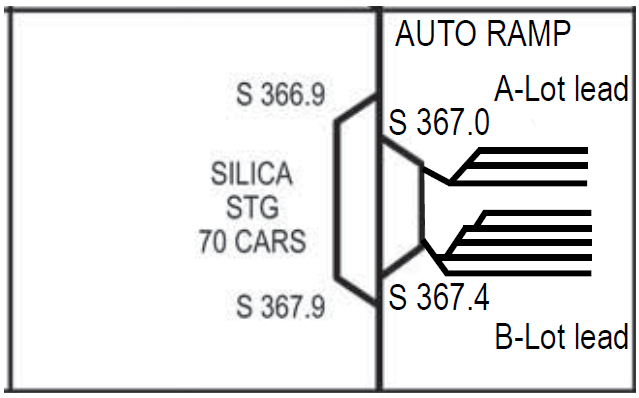

Figure 2. Diagram of the tracks at Silica Storage Track and A and B Lots tracks

F777-03 traveled northbound out of A-Lot with light engines past Silica Storage Track switch and operated the switch from main track to the siding. As the locomotives traveled southbound into the siding, the conductor instructed the engineer to stop the locomotives just past the derail. Engineer said that when he stopped the locomotives just past the derail, "I noticed he was already there, that is the reason I asked him did he get the switch." The engineer explained he saw the conductor line the Silica Storage Track derail for derailing position, walk east towards the main track switch that leads to the runaround track, and line it for normal movement (main track). The conductor then lined the derail on the runaround track for the derailing position. The conductor returned to Silica Storage Track, the crew proceeded south and coupled the locomotives against the standing auto racks that been placed earlier in the siding.

[12] Light Locomotive: A locomotive consist without cars attached to it.

After the train crew coupled the locomotives to the cars, the conductor proceeded to apply the hand brake on the lead locomotive, the engineer walked out the back door of the locomotive to the second locomotive to isolate (isolation switch) and apply the handbrake.[13]

When the engineer returned to the lead locomotive, the engineer asked the conductor if he lined the main track switch back to normal position, the conductor answered yes and instructed the engineer to press key #3 on the radio keypad to tone (call) the train dispatcher to establish communications. The CSXT train dispatcher answered the tone and the conductor communicated the release of the EC-1 track warrant and the restoration of main track switches. Both the engineer and conductor each filled out a SPAF (Switch Position Awareness Form) while the switches were operated in the vicinity of Silica Storage Track

Conductor: Alright I got a switch time for you on that 366.9, uhh 2012 uhh before that 2015 or 20 sorry 2015. 366, or 367.9 reversed 2048 restored 2049, 367.0 reversed 2132, restored 2210.

Dispatcher: I assumed the time recorded on 3 switches _____ switch position ____ initials over.

Conductor: Sorry about that EC-1 #93537 F77703, Engine CSXT 36, ____Northend of Dixieanna and SAS Richland holdout over.

[13] Isolation Switch - Switch normally located on the engine control panel and labeled Isolation Switch. The selective positioning of this switch may limit the diesel engine's ability to respond to throttle or dynamic brake commands resulting in elimination of tractive effort, braking effort or both.

Dispatcher: EC-1 #935737 F77703, with the CSXT 36, (name of conductor) being released on authority of all tracks it's going to be between SAS Signal Northend of Dixieanna and the SAS Signal Richland holdout. So that release time is now 0151. (dispatcher initials) over.

Conductor: Alright 0151 over.

After the conductor accepted the release time of 1:51 a.m., the train dispatcher asked, "and everything is in the clear is that right over?"[14] The conductor replied by saying "That's right and we locked up in Silica."[15]

After the conductor released the EC-1(TWC-D) authority, the engineer and conductor sat in the cab of the locomotive waiting for a ride home. The engineer estimated that they had been waiting around for about ten (10) – twenty (20) minutes when he asked the conductor if he realigned the Silica Storage Track main track switch. The conductor replied that he was sure he got it. The engineer then said, "well because when we pulled back, I could swear you were down at the derail already. I know you walk fast but don't know if you can walk that fast." The conductor then requested the engineer turn on the locomotive headlights to verify the position of the Silica Storage Track switch, but the light did not reach the area around the switch, which was dark. Moreover, there was no target on the switch for them to see which way it was lined.[16]

[14] Track is clear means: The portion of the track to be used for the intended movement is unoccupied by rolling equipment, on-track maintenance-of-way equipment, and conflicting on-track movements; Intervening switches and fixed derails are properly lined for the intended movement.
[15] Refer to Appendix C- title 49 CFR 218.105 at end of the report for additional operational requirements for hand-operated main track switches.
[16] A target is a visual indicator on a switch the makes it easier for crews to visually verify the position of the switch.

When they failed to visually verify the position of the switch with the locomotive headlight, the engineer decided to walk over to it to ensure it was correctly aligned. He said that he just "had a feeling," and wanted to go check it. However, as the engineer walked to the switch, he saw the Amtrak train coming, and in seeing that he did not have sufficient time to get to the switch before the arrival of the train, decided to simply "watch it by." Then, the engineer saw the approaching Amtrak train take the diverging route into Silica Storage Track and ran up the hill away from the impending collision. The engineer proceeded towards the highway to see if he could flag someone down and ask for assistance.

The conductor said "they [Amtrak] just hit the side and came flying fast down right at us." The conductor ran out the back door of the locomotive. When Amtrak struck train CSXT 777-03, the conductor was thrown and pinned between the CSXT and Amtrak locomotives, the conductor after a few moments managed to free himself. The conductor said that he was doused in diesel fuel and when the engineer arrived he said, "I can't believe you made it out."

Interviews of both train crews and the CSXT train dispatcher were recorded and transcribed. The interview transcripts will be placed in the docket.

Work Familiarity

The CSXT engineer and conductor had worked together in the past, though not on a regular basis. They reported a good working relationship with each other. The engineer indicated that it had been about a year and a half since he had last completed the job to be performed on the day of the accident. The conductor had completed the job multiple times in the past month, but the signals had always been operational. Thus, the shift would be the first time that he completed the job using EC-1 authority.

When using EC-1 authority, it is necessary to report the time that each main track switch is initially lined and restored to the main track on a SPAF. The conductor stated that the additional time required to complete this process was minimal, but noted that (page 27, lines 6-10) “I prefer signals a lot of times because you don't have to write down the EC-1s and, you know, the dispatcher doesn't catch you off guard and ask you where you're at and you're not really sure where you're at and have to, you know, ask your engineer and stuff.” The conductor also indicated that it was operating with EC-1 authority was slightly more challenging than operating with the normal signals. However, he also said (page 27, lines 11-13) “sometimes the EC-1 authority is good if you have a large amount of track that you're in, that you're the only one in there, then you don't need to worry about signals.”

The CSXT engineer indicated that using EC-1 authority required the use of a different set of operating rules. He said that using EC-1 instead of normal signaled operations was more challenging, and a “little more aggravating” because it required more communication with the dispatcher. The CSXT engineer stated that trains still operated at track speed when EC-1 authority was used. He said that he had no safety concerns about using EC-1 authority, rather it was more of a matter of inconvenience compared to normal signaled operations.

Work Factors

During his work shift, the conductor reported that he was alert, clearheaded, and focused on the task. However, he also reported that he had become overly warm after engaging in extensive physical effort working with a piece of rusted equipment, and as a result, he had taken off his jacket. Later, after removing his jacket, he became cold. He also recalled having chapped lips, a dry mouth, and being thirsty during his shift. The conductor indicated that he did not immediately stop his work to address these issues because he preferred to get into a rhythm and keep working, without taking frequent breaks.

While completing his work in the hours leading up to the accident, the conductor recalled that he did not feel like he was rushing himself, but said that "it wasn't a relaxed pace," and there was "a lot to do." He felt a sense of urgency because of the number of switching operations that he needed to perform, and he was not sure how long it was going to take him to complete the work. Moreover, he knew that his work needed to be completed before an Amtrak train arrived at 2:00 a.m. (Sunday, 2/4/2018), but his watch was broken. As a result, he had asked the engineer on duty with him to keep track of time for him. He recalled the engineer reporting to him when it was around 1:00 a.m. (Sunday, 2/4/2018). Around that time, he encountered an issue with one of the cars, and as a result he had to complete another switching movement. At that point, he recalled thinking, "there's more switching than I thought." However, he also recalled thinking that there was enough time to complete his work before the Amtrak train reached his location after hearing the dispatcher state that the train had reached Camden.

SPAF

Regarding the SPAF, the conductor reported that “the switch times and stuff was a mess.” He stated that this was because he forgot to report the time that he realigned each switch to the engineer. He reasoned that this was because it was not part of his usual work routine. He also stated that he was not sure which milepost number corresponded to each switch. However, the conductor believed he had realigned both switches, and stated, “I knew I had it locked up, and that’s all that really mattered in my mind, you know.” The conductor said that he told the engineer to (page 9, lines 13-15) “report the switch time as your time. You know, both those switches have been restored at your time.”

The engineer said that he completed most of the SPAF, but that the conductor “may have filled outs something. He said he had to put something there.” The engineer also said that he maintained possession of the SPAF, except when the conductor used it while contacting the dispatcher to give up control of track. The engineer said the completion of SPAFs was not a part of his usual work routine, and it had been about two and half (2.5) years since he last completed one.

CSXT Conductor's Reflection on the Events

The CSXT conductor told investigators that, prior to the accident, he believed that he had realigned the T21 Switch to the main track. However, after the conductor spent some time thinking about what had occurred, he acknowledged that he probably had failed to do so. In his post-accident conversation with investigators, the conductor indicated that a work pattern had become "second nature," or like a "habit" to him, and this might have interfered with his intentions. That is, he talked about how throughout the night he had been repeatedly getting up and down from the locomotive. He also described a work pattern that he was used to "in the yard" in which he and an engineer would throw a switch and shove back into it, and then lock it up. He suggested that, perhaps, on the night of the accident, he thought to himself that he was locking up for the night and failed to realize that he needed to remain at the switch (not ride the locomotive back), and shove the engineer back, and then realign the switch back to the main track.

The Accident – Train Dispatcher

The train dispatcher said he was aware of the signal suspension at least a week before the accident via bulletins and a packet placed on his desk.

The train dispatcher went on duty at 10:30 p.m. February 3, 2018, at which time the F777 crew (CSXT) was already working. He said he was keeping track of train crew to ensure the track could be cleared for Amtrak PO9103. He contacted the train crew of the F777 when Amtrak was around Cassatt and told them that he would let know when Amtrak got to Lugoff.

The train dispatcher recalled the train crew of the F777 called him to give him times of the 3 switches of when they restored to normal position (main track). He repeated the times back to the train crew and asked the train crew if the switches had been returned to normal position (main track), and if the SPAF (Switch Position Awareness Form) had been initialed.

The train dispatcher explained that when Amtrak PO9103 left Columbia station the train crew contacted him and requested EC-1 authority to proceed through the limits of the signal suspension.

Investigators asked the train dispatcher what kind of information is visually available to him at his work station during a signal suspension. The dispatcher said that when a signal suspension is in effect, he can see an “SS” on his screen. The train dispatcher was asked if he gets a track light (warning) during a signal suspension on the screen if a switch is misaligned or if there is defect on the track such as a broken rail. The train dispatcher said he that would not get a track light if the switch is misaligned nor with any other defects on the track.

The train dispatcher said that if he had received a track light, he would have asked the crew to double check the derail and that no train movements would have been authorized until the track light was cleared.

He said that in signaled territory, under normal operating conditions, crews are not required to give switch times when restoring main track switches. He said that he generally did not communicate with Amtrak employees, other than to issue speed restrictions. He said that, in general, efforts were made to allow passenger trains to proceed without stopping.

CSXT Procedural Instruction Manual[17]

Train Dispatcher Check List for Signal Suspension

When a signal system is suspended, and an alternate method of operation is in effect:

1. Obtain a job briefing to understand the limits, the alternated method of operation and any PTC requirements.
2. If necessary, instruct the first movement through the limits to stop at all power operated switches, secure the switches in hand position as outlined either by dispatcher message or special instructions.
3. Before issuing the authority:
    1. Ascertain the employee was job briefed and understands the method of operation. If the employee has not been job briefed or does not understand, stop the movement and perform the necessary job briefing.
    2. If there are drawbridges or railroad crossings at grade within the limits of the signal suspension remind the employee to stop at these locations or be governed by the dispatcher message or special instructions.
    3. When a switch tender is on duty confirm they:
        1. Understand the movement to be made
        2. Have properly lined the switch (es), and
        3. Instruct the train crew to confirm the switch tender switches (es) are properly lined for their movement.[18]

[17] CSXT Procedural Instruction Manual (PIM) - Written instructions issued to train dispatchers by Network Operations concerning the safety or movement of trains and employees.
[18] Switch tender means a qualified employee assigned to handle switches at a specific location

4. Issue the authority prior to lining into the suspension limits.

CSXT Train Dispatcher Operating Rule Requirement

608.8 When hand-operated switches are used in Track Warrant Control non-signal territory (TWC-D), the train dispatcher must use the train dispatcher radio to confirm:

1. Location of the switch(es) operated,
2. Switch(es) were restored and locked in normal position,
3. Time switch(es) were initially reversed,
4. Time switch(es) were restored and locked in normal position,
5. Name of the employee who operated the switch(es), and
6. The Switch Position Awareness Form (SPAF) was initialed by both the conductor and locomotive operator.

Trainmasters

Trainmaster 1

The trainmaster 1 was not on duty but was notified of the accident between 2:30 a.m. and 2:40 a.m. and was the first CSXT manager to arrive. When he arrived, he ascertained the condition of the train and track structure, he saw that the Amtrak locomotive was on its side. He continued to access the CSXT locomotive to see if anything was derailed and could not find the lead CSXT 130 locomotive. He walked to the other side and saw the bodies of the Amtrak engineer and conductor. He immediately walked back to the other side to looked for the CSXT engineer and conductor. The trainmaster located the CSXT train crew and asked them if they were okay. They engineer answered that he was fined, and the conductor shook his head but was unresponsive.

The trainmaster asked the engineer what happened, and he said, “I was walking towards the switch to see if it was lined and I saw the Amtrak come in, and I just ran up the hill”. The trainmaster asked the conductor again what happened, and he just shook his head. He never did say anything. The engineer told the trainmaster that he had asked the conductor two times if he had lined the switch back to main track movement. The trainmaster then walked the engineer and conductor over to trainmaster 2.

Trainmaster 2

A CSXT trainmaster 2 was dispatched to the scene, from Cayce, South Carolina, and arrived about 30 minutes after being notified of the accident. The trainmaster explained that when he arrived at the scene of the accident "there was so much police and there was much emergency people". As the trainmaster made his way closer to the collision he saw that the Amtrak locomotive was demolished. Another trainmaster (trainmaster 1) that had arrived earlier brought the CSXT engineer and conductor to him. He asked them if they needed medical assistance, the conductor said he was okay and did not need anything. The engineer pointed to the back of his head. The trainmaster said both the engineer and the conductor were pretty shook up. The conductor told the trainmaster that he was "pretty confident and pretty positive" that he got the switch back for main track. The trainmaster discussed the situation with the CSXT train crew.

The trainmaster explained that during the job briefing he had with CSXT train crew when they first went on duty, the conductor expressed that he was not familiar with milepost locations of the switches located near Silica Storage Track. The trainmaster was going to refer the conductor to the timetable, but there was another engineer present that offered to provide the information on the location of the switches to the conductor. [19]

[19] Timetable - A publication containing instructions and other essential information relating to the movement of trains or equipment.

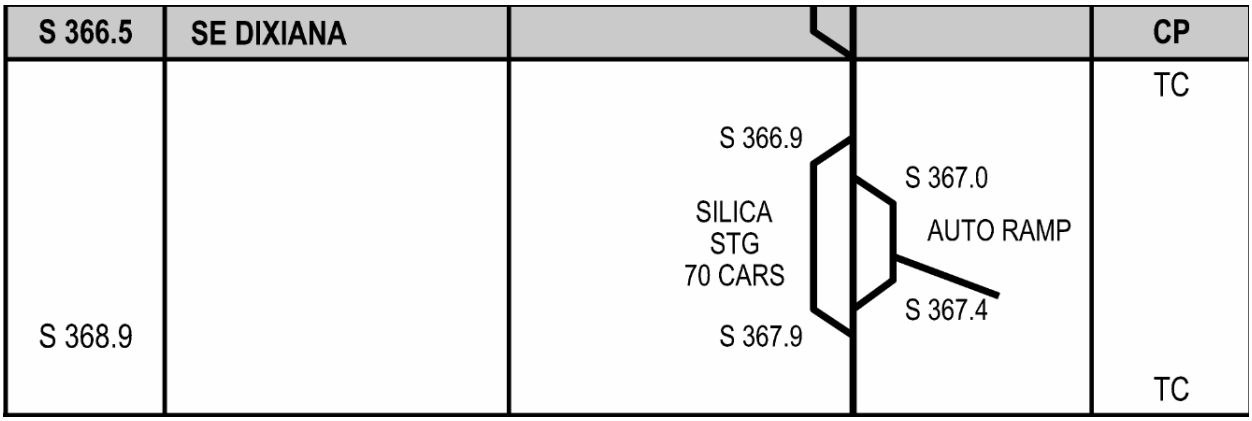

Figure 3. CSXT Columbia Timetable No.1 page 7 showing the milepost locations of the switches.

Operating Documents

The crews were governed by the following documents containing the operating rules and procedures:

- CSXT Employee Operating Manual, Effective April 1, 2017
- CSXT Columbia Subdivision No. 1, Effective April 1, 2017
- CSXT Columbia Subdivision Bulletin No.105

Method of Operation

The CSXT was in the process of installing positive train control (PTC) between MP 362.2 and MP 385.1.

Within the limits of the signal suspension train movements were govern by:

- Operating Rules 504.36 and 504.37.[20]
- Track Warrant Control Non-Signaled (TWC-D) When the authority for movement on a controlled track is designated in special instructions dispatcher message, or Form EC-1 as TWC-D, trains will be governed by verbal authority from the train dispatcher.
- Track Warrant Control (TWC) - A method of authorizing movements or protecting employees or on-track equipment in signaled or non-signaled territory on controlled track within specified limits. Movement within TWC territory is under the jurisdiction of the train dispatcher.
- Form EC-1 - A form used to record specific instructions or dispatcher messages from the train dispatcher regarding movements on controlled tracks.

[20] Refer to Appendix D for additional information on CSX Operating Rules 504.36 and 504.37.

- Special Instructions - Information contained in timetables, system bulletins, division bulletins, and CSXT procedural instruction manuals.

Amtrak Crew Information

Table. 1 Engineer Certification

Hire Date	05/13/2013
Certification Date	03/02/2017
Certification Expiration Date	03/01/2020
Last Efficiency Test	01/22/2018
Medical Examine	05/26/2017
Last Skills Performance	09/29/2017
Knowledge Test	05/17/2017
Hearing Exam	05/26/2017
Vision Exam	05/26/2017
Operating Rules	05/16/2017
EAP Review	02/13/2017

Table. 2 Conductor Certification

Hire Date	03/04/2008
Certification Date	07/19/2016
Certification Expiration Date	07/19/2019
Efficiency Test	10/04/2017
Hearing Exam	05/05/2016
Vision Exam	05/05/2016

Medical	05/05/2016
Operating Rules	07/18/2017
Knowledge Test	07/19/2017
EAP Review	02/13/2017

Table. 3 Assistant Conductor Certification

Hire Date	04/14/2017
Certification Date	Currently Training
Operating Rules	12/14/2017
Efficiency Test	09/27/2017

Amtrak Train Crew Work History

Table. 4 Engineer 10 Day Work History

Previous Time Off	On Duty- Date/Time	Off Duty- Date/Time	Total Time On Duty
Day Off	01/26/2017		
Day Off	01/27/2018		
52 hours, 5 minutes	01/28/2018-7:35 a.m.	01/28/2018-11:49 a.m.	4 hours, 14 minutes
5 hours, 10 minutes	01/28/2018-4:59 p.m.	01/28/2018-11:09 p.m.	6 hours, 10 minutes
Day Off	01/29/2018		
Day Off	01/30/2018		
Day Off	01/31/2018		
Day Off	02/01/2018		
Day Off	02/02/2018		

5 Days	02/03/2018-10:43 p.m.	02/04/2018	2:27 a.m. time of accident

Table. 5 Conductor 10 Day Work History

Previous Time Off	On Duty- Date/Time	Off Duty- Date/Time	Total Time On Duty
Day Off	01/25/2018		
26 hours, 44 minutes	01/26/2018-2:35 a.m.	01/26/2018-9:37 a.m.	7 hours, 2 minutes
12 hours, 26 minutes	01/26/2018-10:03 p.m.	01/27/2018-7:04 a.m.	9 hours, 1 minute
Day Off	01/28/2018		
Day Off	01/29/2018		
Day Off	01/30/2018		
81 hours, 14 minutes	01/31/2018-4:17 p.m.	02/01/2018-12:04 a.m.	7 hours, 47 minutes
26 hours, 31 minutes	02/02/2018-2:35 a.m.	02/03/2018-9:24 a.m.	6 hours, 49 minutes
13 hours, 19 minutes	02/03/2018-10:43 p.m.	02/04/2018-2 :27 a.m.	time of accident

Table. 6 Assistant Conductor 10 Day Work History

Previous Time Off	On Duty- Date/Time	Off Duty- Date/Time	Total Time On Duty
7 hours, 36 minutes	01/26/2018-6:47 p.m.	01/26/2018-11:23 p.m.	4 hours, 36 minutes
Day Off	01/27/2018		
35 hours, 7 minutes	01/28/2018-10:30 a.m.	01/28/2018-7:15 p.m.	8 hours, 45 minutes
Day Off	01/29/2018		
Day Off	01/30/2018		
Day Off	01/31/2018		
Day Off	02/01/2018		
Day Off	02/02/2018		
5 Days, 14 hours,48 minutes	02/02/2018-10:03 p.m.	02/03/2018-7:38 a.m.	9 hours, 35 minutes
14 hours, 45 minutes	02/03/2018-10:43 p.m.	02/04/2017-2:27 a.m.	Time of accident

CSXT Train Crew Information

Table. 7 Engineer Certification

Hire Date	11/2000
Certification Date	12/31/2016
Certification Expiration Date	12/31/2019
Skills Evaluation	01/04/2018
Medical Exam Date	03/17/2016
Knowledge Exam	03/09/2016
Territory Physical Characteristics	03/29/2017
Locomotive Engineer Re-Certification Exam	03/09/2016

Table. 8 Conductor Certification

Hire Date	2014
Certification Date	12/31/2016
Certification Expiration Date	12/31/2019
Medical Exam Date	05/12/2016
Knowledge Test	04/22/2016
Territory Physical Characteristics Exam	05/15/2017

CSXT Train Crew Work History

Table. 9 Engineer 10 Day Work History

Previous Time Off	On Duty- Date/Time	Off Duty- Date/Time	Total Time On Duty
Off Day	01/25/2018		
Off Day	01/26/2018		
Off Day	01/27/2018		
Off Day	01/28/2018		
4 Days	01/29/2018-3:30 p.m.	01/30/2018-12:11 a.m.	8 hours, 41 minutes
15 hours, 19 minutes	01/30/2018-3:30 p.m.	01/30/2018-11:23 p.m.	7 hours, 52 minutes
64 hours, 8 minutes	02/02/2018-3:30 p.m.	02/02/2018-11:22 p.m.	7 hours, 52 minutes
16 hours, 8 minutes	02/03/2018-3:30 p.m.	02/03/2018-2:27 a.m.	Time of accident

Table. 10 Conductor 10 Day Work History

Previous Time Off	On Duty- Date/Time	Off Duty- Date/Time	Total Time On Duty
Off	01/25/2018		
Off	01/26/2018		
84 hours, 40 minutes	01/27/2018-3:30 p.m.	01/27/2018-11:25 p.m.	7 hours, 55 minutes
16 hours, 5 minutes	01/28/2018-3;30 p.m.	01/28/2018-11:21 p.m.	7 hours, 51 minutes
16 hours, 9 minutes	01/29/2018-3:30 p.m.	01/30/2018-12:10 a.m.	8 hours, 40 minutes
15 hours, 20 minutes	01/30/2018-3:30 p.m.	01/30/2018-11:21 p.m.	7 hours, 51 minutes
Off	01/31/2018		
Off	02/01/2018		
64 hours, 9 minutes	02/02/208-3:30 p.m.	02/02/2018-11:21 p.m.	7 hours, 51 minutes
16 hours, 7 minutes	02/03/2018-3:30 p.m.	02/04/2018-2:27 a.m.	Time of accident

72-Hour History of CSXT Conductor

Thursday 2/1/2018

The CSXT conductor stated that he did not work on Thursday and had spent the day watching the stock market and day-trading. He stated that he probably went to sleep about 10:00 p.m.

Friday 2/2/2018

The CSXT conductor stated that he awoke on Friday morning around 9:00 a.m., indicating a window for sleep of eleven (11) hours. He stated that he was in Spartanburg visiting family during the day on Friday, and around 1:00 p.m. or 1:30 p.m. he initiated a drive to his brother's house, which took about an hour and 45 minutes.

The CSXT conductor reported that on Friday he worked a second shift yard job. He estimated that he worked from 3:30 p.m. to about 11:30 p.m. After work he reported driving to his brother's house, relaxing, and then going to bed. He said that he went to sleep around midnight.

Saturday 2/3/2018 – Sunday 2/4/2018

The CSXT conductor estimated that he awoke that morning at 8:00 a.m. on Saturday morning, and was "well rested," after obtaining about 8 hours of rest. During the day, he said that he had "just hung around" because he was anticipating getting called into work that day. That is, he learned that another employee had taken a personal leave day, and he was likely to get called to fill in for him, as he was the "first out" on the extra board.

The conductor stated that he departed his brother's house around 2:30 p.m. for work, and it was about a 20-minute drive to the terminal (the location where he reported for work). He indicated that it was cold, but clear out, and not raining. The conductor stated that he went on duty at 3:00

p.m., and he anticipated his shift lasting for twelve (12) hours, as there was a large amount of work that needed to be completed, including many switching operations.

T21 Switch Machine with Electric Lock

Description of Switch

There were three physical locks on the switch. Two of these locks were signal locks, generally used only by the signal department for maintenance purposes. One of the locks was a switch lock. The switch lock could be unlocked by a qualified employee (conductor or engineer) with a key, thereby allowing the employee access to the switch. There was also an electric lock, that had a timing feature. When an employee presses the foot lever, they start a timer, and a certain amount of time must pass before the switch can be unlocked. The locks are used to prevent tampering.

Visibility of Switch at The Time of The Accident

At the end of the shift, the CSXT engineer asked the conductor to verify that he had correctly relined the switch. The CSXT conductor told the engineer that he was sure that he had lined the T21 switch correctly. Nevertheless, as the two were sitting in the CSXT locomotive, they decided to turn on the engine headlight on so that they could verify that the switch was correctly aligned. However, even with the headlight on, the area around the switch was too dark for them to see it.

After the accident, several CSXT employees arrived at the scene and took photos. The following two photos show the lighting conditions at night in the area around the T21 switch. The first photo shows that the area was dark, and the switch was not visible. The second photo, in which a light source is directed at the switch, is presented for comparison.

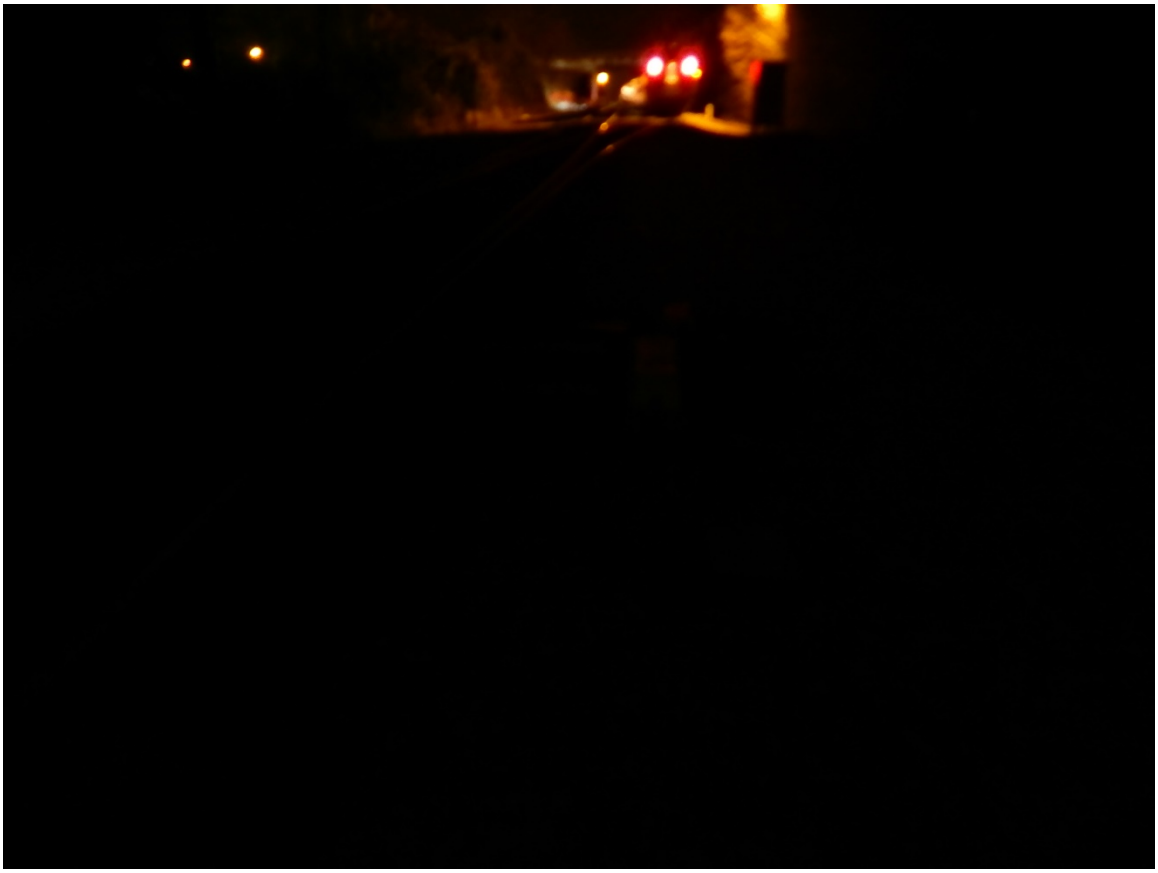

Figure 4. View of T21 switch at night.

The photograph is almost entirely black. Near the top of the photo, several light sources are present, which partially illuminate an area of the track. Photo taken by CSXT on 2/4/2018.

Figure 5. View of T21 switch at night with added light.

The railroad tracks to the left side of the photo are largely dark, except were illuminated by artificial light sources. The T21 switch is illuminated by a circular light near the top of the photo, several light sources are present, which partially illuminate an area of the track. Photo taken by CSXT on 2/4/2018.

Switch Alignment

Investigators found the handle for the T21 switch positioned opposite of the red square, indicating that the switch was lined for the siding. It was also determined that a physical lock was holding the switch in this position. The following photos illustrate these features.

Figure 6. T21 hand throw switch with electric timeout.

The switch has been lined for the siding, as indicated by the handle positioning away from the red square. Photo taken by NTSB on 2/4/2018.

Figure 7. Side view of the T21 switch lined and locked for the siding.

A metal lock is shown near the center of the photo. The lock is closed, barring access to change the position of the switch. Photo taken by NTSB on 2/4/2018.

Cell Phone Records

For information pertaining to the use of cell phones, refer to the *Cell Phone Report* in the docket for this investigation.

Medical

For medical information, refer to the *Medical Report* in the docket for this investigation.

Weather

For weather information, refer to the *Weather Report* in the docket for this investigation.

Amtrak Railroad Post Accident Actions

Amtrak Trains Operating During Planned Signal Suspensions

The following new system instruction applies to Amtrak trains operating on host railroads.

To ensure passenger train safety, in addition to complying with all host railroad operating rules and special instructions during planned signal suspensions, train crews of Amtrak trains operating in territory with a planned signal suspension where Positive Train Control (PTC), Cab Signals and wayside block signal systems are not in service must perform the following tasks:

1. Crews must conduct a pre-trip job briefing to identify and discuss any facing point switches within the limits of the signal suspension.
2. Conductor must remind the locomotive Engineer of the approach to the signal suspension area and all facing point switches within the limits. This reminder must be made no less than 2 miles prior and no more than 5 miles before entering the signal suspension area.
3. Train must not pass over facing point switches until the engineer or conductor visually determines that the switches are properly lined for the intended movement.
4. If facing point switches are improperly lined, crews must stop the train and inform the controlling Train Dispatcher immediately.

CSXT Railroad Post Accident Actions

On March 7, 2018 the CSXT Railroad issued a Sub System Bulletin on changes on Operating Rules 401.14,505.11 and 505.12. See Appendix E for additional information.

E. Appendices

Appendix A - CSXT Columbia Sub Division Bulletin 105

C S X T R A N S P O R T A T I O N
FLORENCE DIVISION

JANUARY 30, 2018

COLUMBIA SUB DIVISION BULLETIN 105

TO: T&E CREWS AND ALL CONCERNED
SUBJECT: TEMPORARY SUSPENSION OF SIGNAL
SYSTEM EFFECTIVE: 0800HRS, FEBRUARY 3, 2018

ITEM 1 - TC AND CP SIGNAL RULES ARE TEMPORARILY SUSPENDED FROM SERVICE ON ALL MAIN TRACKS AND SIDINGS AS FOLLOWS:

A. NORTHBOUND TRAINS

1. FROM BUT NOT INCLUDING THE NORTHWARD ABSOLUTE SIGNAL AT N. E. WOODFORD MP S 385.1 TO BUT NOT INCLUDING THE NORTHWARD ABSOLUTE SIGNAL AT MP 362.5 HOLDOUT MP S 362.5.

2. THE NORTHWARD ABSOLUTE SIGNAL AT N. E. WOODFORD MP S 385.1 GOVERNS MOVEMENT OVER THE POWER OPERATED SWITCH ONLY. NORTHBOUND TRAINS MUST HAVE BOTH A SIGNAL TO PROCEED AND EC-1 AUTHORITY FROM THE 'FF' TRAIN DISPATCHER AT JACKSONVILLE BEFORE PASSING THE NORTHWARD ABSOLUTE SIGNAL AT N. E. WOODFORD
MP S 385.1.

B. SOUTHBOUND TRAINS

1. FROM BUT NOT INCLUDING THE SOUTHWARD ABSOLUTE SIGNAL AT MP 362.5 HOLDOUT MP S 362.5 TO BUT NOT INCLUDING THE SOUTHWARD ABSOLUTE SIGNAL AT N. E. WOODFORD MP S 385.1.

2. THE SOUTHWARD ABSOLUTE SIGNAL AT MP 362.5 HOLDOUT MP S 362.5 GOVERNS MOVEMENT INTO THE SIGNAL SUSPENSION ONLY.
SOUTHBOUND TRAINS MUST HAVE BOTH A SIGNAL TO PROCEED

AND EC-1 AUTHORITY FROM THE 'FF' TRAIN DISPATCHER AT JACKSONVILLE BEFORE PASSING THE SOUTHWARD ABSOLUTE SIGNAL AT MP 362.5 HOLDOUT
MP S 362.5.

C. ALL TRAINS

1. ANY TRAIN ENTERING THIS SIGNAL SUSPENSION FROM ANY POINT MUST OBTAIN EC-1 AUTHORITY FROM THE TRAIN DISPATCHER.

ITEM 2 - METHOD OF OPERATION

A. BE GOVERNED BY OPERATING RULES 504.36 AND 504.37

1. PROVIDED EC-1 AUTHORITY IS GRANTED, IT WILL NOT BE NECESSARY FOR TRAINS TO STOP AT ABSOLUTE SIGNAL LOCATIONS AT:
S. E. NASSAU, N. E. NASSAU, RICHLAND HOLDOUT, S. E. DIXIANA, N. E. DIXIANA AND S. E. CAYCE YARD

B. AUTHORITY FOR MOVEMENT

BETWEEN LOCATION/MILEPOST	RULE IN EFFECT
N. E. WOODFORD MP S 385.1 AND MP 362.5 HOLDOUT MP S 362.5	505 (TWC-D)

ITEM 3 - SWITCHES

A. THE POWER OPERATED SWITCHES AT S. E. NASSAU MP S 377.8, N. E. NASSAU MP S 376.5, S. E. DIXIANA MP S 366.5, N E. DIXIANA MP S 365.8 AND S. E. CAYCE YARD MP S 363.2 ARE SECURED IN HAND POSITION AND LINED FOR MOVEMENT ON THE MAIN TRACK.
TRAINS ARE NOT REQUIRED TO STOP AND EXAMINE THESE SWITCHES BEFORE PASSING THESE LOCATIONS.

B. ALL SWITCHES WITHIN THE LIMITS OF THE SIGNAL SUSPENSION WILL BE OPERATED IN ACCORDANCE WITH OPERATING RULES 401 AND 505.12 UNDER THE DIRECTION OF THE 'FF' TRAIN DISPATCHER AT JACKSONVILLE.

ITEM 4 - SPEEDS

A. UNLESS OTHERWISE RESTRICTED, THE MAXIMUM AUTHORIZED SPEED IS 59 MPH FOR PASSENGER TRAINS AND 49 MPH FOR FREIGHT TRAINS BETWEEN N. E. WOODFORD MP S 385.1 AND MP 362.5 HOLDOUT MP S 362.5.

B. UNLESS FURTHER RESTRICTED, THE MAXIMUM AUTHORIZED SPEED FOR ALL TRAINS MAKING DIVERGING MOVES THROUGH CROSSOVERS OR TURNOUTS WITHIN THE LIMITS OF THE SIGNAL SUSPENSION IS 15 MPH.

ITEM 5 - OTHER ITEMS

A. UNLESS OTHERWISE RESTRICTED, ALL AUTOMATIC GRADE CROSSING WARNING DEVICES AND DEFECT DETECTORS WITHIN THE LIMITS OF THE SIGNAL SUSPENSION WILL BE OPERATIVE.

ISSUED BY DIVISION MANAGER HQ

Appendix B - CSXT Operating Rule 505.12

Complete the Switch Position Awareness Form (SPAF) in ink,

1. Report the following to the train dispatcher:
    1. Location of the switch operated,
    2. Switch(es) restored and locked in normal position,
    3. Time switch was initially reversed,
    4. Time switch was restored and locked in normal position, and
    5. Name of employee who operated the switch.

Retain the Switch Position Awareness Form (SPAF) until the next tour of duty.

Appendix C - Title 49 CFR 218.105

(c) *Additional job briefing requirements for hand-operated main track switches.* (1) Before a train or a train crew leaves the location where any hand-operated main track switch was operated, all crewmembers shall have verbal communication to confirm the position of the switch.

(d) *Releasing authority limits.* In non-signaled territory, before an employee releases the limits of a main track authority and a hand-operated switch is used to clear the main track, and, prior to departing the switch's location, the following conditions are required:

(1) The employee releasing the limits, after conducting a job briefing in accordance with this subpart, shall report to the train dispatcher that the hand-operated main track switch has been restored to its normal position and locked, unless the train dispatcher directs that the hand-operated main track switch be left lined and locked in the reverse position and the necessary protection is provided;

(2) If the report of the switch position is correct, the train dispatcher shall repeat the reported switch position information to the employee releasing the limits and ask whether that is correct; and

(3) The employee releasing the limits shall then confirm to the train dispatcher that this information is correct.

Appendix D - CSXT Operation Rules 504.36, 504.37

504.36 Special instructions, dispatcher message, or Form EC-1 may temporarily remove block signals and signal rules from service. When signal system is suspended, establish an alternate method of operation and notify all trains affected.

504.37 Unless otherwise specified, when signals are temporarily removed from service, trains must:

1. Approach all Absolute signals prepared to stop and not pass these signals without permission of the train dispatcher,
2. Stop at drawbridges and railroad crossings at grade and be governed by rules or special instructions in effect for that particular location,
3. Approach all public crossings at grade that are equipped with automatic grade crossing warning devices prepared to stop and provide protection,
4. Examine switch points of spring switches to confirm they are lined and switch is locked before making a facing point movement, and
5. Operate switches and derails in accordance with rules governing operating switches and derails by hand.

Appendix E - CSXT Sub System Bulletin 019

C S X T R A N S P O R T A T I O N
CSXTT SYSTEM
MARCH 7, 2018

HEADQUARTERS SUB SYSTEM BULLETIN 019

TO: T&E CREWS AND ALL CONCERNED

SUBJECT: OPERATING RULE 401.14, 505.11, & 505.12
EFFECTIVE: 2359HRS, MARCH 7, 2018

ITEM 1 - OPERATING RULE CHANGES

OPERATING RULES 401.14, 505.11, & 505.12 ARE CHANGED AS FOLLOWS:

401.14 THE EMPLOYEE WHO RESTORES A HAND-OPERATED MAIN TRACK SWITCH TO THE NORMAL POSITION FOR THE PURPOSE OF RELEASING AN AUTHORITY OR REPORTING BY A SPECIFIC LOCATION WHERE TWC-D RULES ARE IN EFFECT MUST:

1. REMAIN AT THE SWITCH UNTIL VERBALLY CONFIRMING WITH EACH CREWMEMBER THE SWITCH WAS RESTORED AND LOCKED IN NORMAL POSITION,
2. COMPLETE THE SWITCH POSITION AWARENESS FORM (SPAF) IN INK, AND
3. RETAIN THE SPAF UNTIL THE NEXT TOUR OF DUTY.

505.11 PRIOR TO RELEASING AN AUTHORITY OR REPORTING BY A SPECIFIC LOCATION, ALL CREW MEMBERS MUST AGREE IT IS SAFE TO DO SO. ALL CREWMEMBERS MUST BE PRESENT AND HEAR THE AUTHORITY BEING RELEASED. A TRAIN MUST NOT RELEASE OR REPORT BY A SPECIFIC LOCATION UNTIL AT LEAST ONE OF THE FOLLOWING CONDITIONS CONFIRMING THE TRAIN HAS CLEARED THE SPECIFIED LIMITS IS MET:

A. A CREWMEMBER OR OTHER EMPLOYEE OBSERVES THE REAR END MARKER OR CONFIRMS THE REAR CAR BY INITIAL AND NUMBER, OR
B. THE TRAIN PASSES A DEFECT DETECTOR THAT GIVES AN AXLE COUNT THAT AGREES WITH THE COUNT OF A PREVIOUS DEFECT DETECTOR OR AN ACTUAL COUNT

MADE BY A CREWMEMBER, OR

C. THE TRAIN IS EQUIPPED WITH PROPERLY FUNCTIONING TELEMETRY THAT INDICATES:
   1. THE ENTIRE TRAIN IS INTACT,
   2. AIR PRESSURE READING ON THE REAR OF THE TRAIN IS EXPECTED READING, AND
   3. DISTANCE TRAVELED BY THE LEADING END OF THE TRAIN IS EITHER THE TRAIN'S LENGTH AS DETERMINED BY THE ODOMETER ON THE HTD OR AT LEAST THREE MILES BEYOND THE CLEARING POINT.

505.12 WHEN HAND-OPERATED SWITCHES ARE USED, SUCH SWITCHES MUST BE RESTORED TO NORMAL POSITION BEFORE RELEASING AUTHORITY OR REPORTING BY A SPECIFIC LOCATION. IF ANY CREWMEMBER HAS DOUBT OR UNCERTAINTY ABOUT THE POSITION OF SUCH SWITCHES, THE AUTHORITY MUST NOT BE RELEASED. IF DOUBT OR UNCERTAINTY ARISES AFTER RELEASING OR REPORTING BY A SPECIFIC LOCATION, THE CREW MUST IMMEDIATELY CONTACT THE TRAIN DISPATCHER. REPORT THE FOLLOWING TO THE TRAIN DISPATCHER WHEN RELEASING AUTHORITY OR REPORTING BY A SPECIFIC LOCATION:

1. ALL CREWMEMBERS AGREE SWITCH(ES) RESTORED AND LOCKED NORMAL,
2. MILEPOST LOCATION OF SWITCH(ES) OPERATED,
3. CONFIRMATION SWITCH(ES) RESTORED AND LOCKED IN NORMAL POSITION,
4. TIME SWITCH WAS INITIALLY REVERSED,
5. TIME SWITCH WAS RESTORED AND LOCKED IN NORMAL POSITION, AND
6. NAME OF EMPLOYEE WHO RESTORED AND LOCKED SWITCH IN NORMAL POSITION.

ISSUED BY OPERATING RULES DEPARTMENT

F. End of Report

I have read and approve the Report

Tomas R Torres – Operations NTSB //s// 05/25/18

_____ Date _____

Michael R. Hoepf, Ph.D.
Human Performance Investigator //s// 05/25/18
NTSB

_____ Date _____

Gregory Drakulic
Railroad Safety Specialist-Chief Inspector //s// 05/18/18
FRA

_____ Date _____

Steve Ammons //s// 05/16/18
Director Train Handling Rules & Practices
CSXT

_____ Date _____

Matt Campbell
Georgia State Legislative Director
SMART //s// 05/25/18

_____ Date _____

Bryan Aldridge

Primary Investigator, Safety Task Force

BLET

//s// 05/25/18

_____ Date _____

Marcus Landy

South Carolina Operating Practice Inspector

Office Regulatory Staff

//s// xxxx

_____ Date _____

Jonathan Hines

Senior Director, Compliance & Certifications

Safety Compliance and Training

Amtrak

//s// xxxx

_____ Date _____