Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2019-1358

CSX Transportation (CSX) Side-Collision
Carey, Ohio
August 12, 2019

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

On August 12, 2019, at approximately 5:08 a.m., EDT, CSX Transportation (CSX) Train H70211 (Train 1) struck CSX Train W31411 (Train 2) at Milepost (MP) CD 76.4, approximately 3.5 miles north of Carey, Ohio. The side collision resulted in the derailment of 1 locomotive and 4 cars of Train 1 and 19 cars on Train 2.

The collision resulted in the lead locomotive (CSXT 736) and lead four cars of Train 1 derailing. The locomotive and lead two cars overturned on their right sides; the third car derailed upright while leaning at a 45-degree angle; and the fourth car derailed the leading set of trucks. Nineteen cars derailed on the struck Train 2 in an accordion-formation, beginning with the eighth car back from the head end. The sixth and seventh cars in the train were struck and damaged; however, they did not derail.

The Engineers of Train 1 and Train 2 were taken by ambulance to Wyandot Memorial Hospital.

Total damage estimates were reported as $3,721,988. Train 1 damages were $2,269,503; Train 2 damages were $1,293,895; and track and signal damages were $158,590.

The Federal Railroad Administration (FRA) investigation determined the probable cause of the accident was cause code H221 – Automatic block or interlocking signal displaying a stop indication -- failure to comply.

Additionally, FRA's investigation determined H605 – Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal, and H101 – Impairment of efficiency or judgment because of drugs or alcohol, were contributing factors.

U.S. Department of Transportation Federal Railroad Administration	**FRA FACTUAL RAILROAD ACCIDENT REPORT**	FRA File #HQ-2019-1358

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
CSX Transportation	CSX	000184670
2. Name of Railroad Operating Train #2	**2a. Alphabetic Code**	**2b. Railroad Accident/Incident No.**
CSX Transportation	CSX	000184670

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
CSX Transportation	CSX	000184670
2. U.S. DOT Grade Crossing Identification Number	**3. Date of Accident/Incident**	**4. Time of Accident/Incident**
	8/12/2019	5:08 AM

5. Type of Accident/Incident
Side Collision

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated	10. Subdivision
0	0	0	0	CSX TRANSPORTATION - COI

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Carey	CD76.4	OH	WYANDOT

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
65 °F	Dark	Cloudy	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Main 1 / Main 2	Freight Trains-60, Passenger Trains-80	30	West

23. PTC Preventable	24. Primary Cause Code	25. Contributing Cause Code(s)
No	[H221] Automatic block or interlockin	H101, H605

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2019-1358

OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	H70211

4. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	5. Trailing Tons (gross excluding power units)	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
9.3 MPH	R	15936		0

6. Type of Territory

Signalization: Signaled

Method of Operation/Authority for Movement: Signal Indication

Supplemental/Adjunct Codes: Q

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.)*	CSXT 736	1	no		1	1
(2) Causing *(if mechanical, cause reported)*	0	0	no	9. Was this consist transporting passengers?		No

10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	1	0	1	0	0	(1) Total in Equipment Consist	109	0	37	0	0
(2) Total Derailed	1	0	0	0	0	(2) Total Derailed	4	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
2269503	158590

Number of Crew Members				Length of Time on Duty	
14. Engineers/Operators	15. Firemen	16. Conductors	17. Brakemen	18. Engineer/Operator	19. Conductor
1	0	1	0	Hrs: 8 Mins: 8	Hrs: 8 Mins: 8

Casualties to:	20. Railroad Employees	21. Train Passengers	22. Others	23. EOT Device?	24. Was EOT Device Properly Armed?
				Yes	Yes
Fatal	0	0	0	25. Caboose Occupied by Crew?	N/A
Nonfatal	1	0	0		

26. Latitude	27. Longitude
40.987839000	-83.394344000

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2019-1358

OPERATING TRAIN #2

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	W31411

4. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	5. Trailing Tons (gross excluding power units)	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
23.0 MPH	E	15708		0

6. Type of Territory

Signalization: Signaled

Method of Operation/Authority for Movement: Signal Indication

Supplemental/Adjunct Codes: Q

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.)*	WWUX 18499	6	yes		0	0
(2) Causing *(if mechanical, cause reported)*	N/A	0	no	9. Was this consist transporting passengers?		No

10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	0	(1) Total in Equipment Consist	110	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	19	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
1293895	0

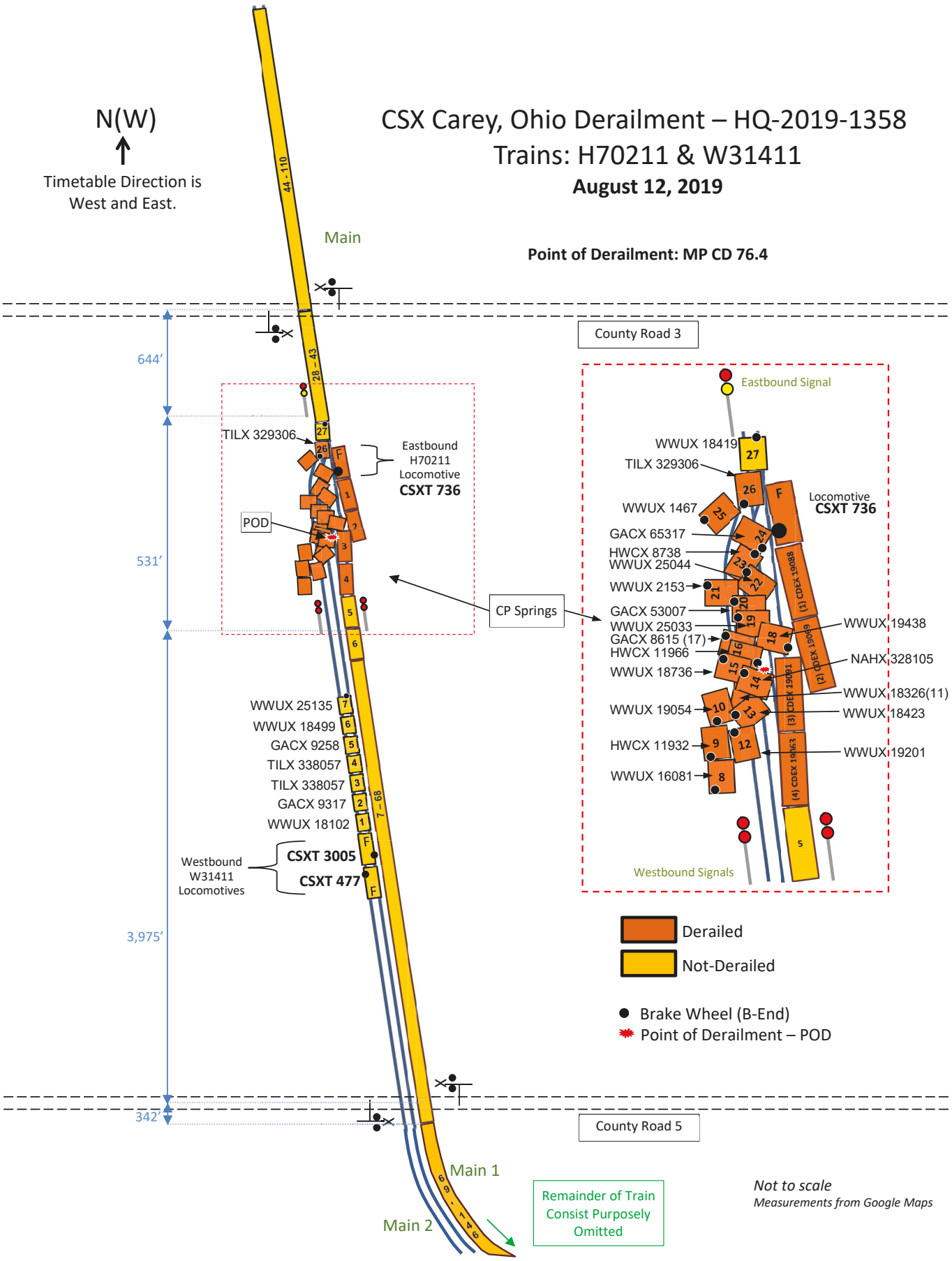
Number of Crew Members				Length of Time on Duty	
14. Engineers/Operators	15. Firemen	16. Conductors	17. Brakemen	18. Engineer/Operator	19. Conductor
1	0	1	0	Hrs: 3 Mins: 28	Hrs: 3 Mins: 28

Casualties to:	20. Railroad Employees	21. Train Passengers	22. Others	23. EOT Device?	24. Was EOT Device Properly Armed?
				Yes	Yes
Fatal	0	0	0	25. Caboose Occupied by Crew?	N/A
Nonfatal	1	0	0		

26. Latitude	27. Longitude
40.987839000	-83.394344000

SKETCHES

Sketch - Sketch



NARRATIVE

Circumstances Prior to the Accident

CSX Transportation Train H70211 (Striking Train)

CSX Transportation (CSX) Train H70211 (Train 1) originated at the CSX Parsons Yard, located in Columbus, Ohio, with a scheduled destination of Willard, Ohio. The scheduled routing for Train 1 was the CSX Columbus Subdivision, traveling timetable west to Fostoria, Ohio, then timetable eastward on the Willard Subdivision to Willard Yard. The originating train consisted of 176 mixed freight cars (109 loads, 67 empties), with 16,816 trailing tons and 10,955 feet in length. The train was powered by one head-end locomotive, CSXT 736, and one distributed power unit (DPU), CSXT 3107, positioned between the 93rd and 94th cars in the train. Prior to departure from Parsons Yard, the train received a Class I brake test. Additionally, lead locomotive CSXT 736 passed a Cab Signal and Train Control Departure Test as well as a Positive Train Control (PTC) Departure Test on August 9, 2019, well within the required 96-hour window allotted for departure. The train crew was instructed on the day of the accident to set out the rear 30 cars in the Carey Center Siding, located from Milepost (MP) CD 71.1 – CD 73.5. Upon completion of the set-out, the train had 146 mixed freight cars (109 loads, 37 empties), with 15,936 trailing tons and 9,497 feet in length. Per CSX Equipment Handling Rule 4400, the train speed was restricted to 60 mph due to a consist of mixed freight.

The crew of Train 1 consisted of an engineer and conductor. The crew was on duty August 11, 2019, at 9 p.m., EDT, reporting to their home terminal at the CSX Parsons Yard (MP - CD 1) located in Columbus. Both employees received more than the statutory rest period prior to reporting for duty.

As Train 1 approached the accident area, the Engineer was seated at the controls on the right side of the locomotive. The Conductor was located near the rear of the train, at the west end of the Carey Center Siding (CD 71.1 – 73.5). At the time of the accident, the Conductor had completed the set-off of the rear 30 cars, and was being transported via contract taxi to the head end of Train 1.

CSX Transportation Train W31411 (Train 2)

CSX Train W31411 (Train 2) originated in Chicago, Illinois, with a scheduled route eastbound (timetable) on the CSX Garrett Subdivision to Fostoria, then turning timetable east (compass south) onto the Columbus Subdivision. A crew change point exists in Garrett, Indiana, where a new crew would take the train into Columbus, and again, change crews to continue south. Train 2 consisted of 110 loaded freight cars containing fracking sand, with 15,708 trailing tons and 4,768 feet in length. The train was powered by two head-end locomotives, CSXT 477 and CSXT 3005, facing back to back. The lead locomotive, CSXT 477, was equipped with PTC; however, the system was cut-out due to an en-route failure upon departure. Per CSX Equipment Handling Rule 4400, the train speed was restricted to 50 mph due to train classification, as Train 2 was a loaded unit train.

The crew of Train 2 consisted of an engineer and a conductor. The crew was on duty August 12, 2019, at 1:40 a.m., EDT, reporting to their home terminal at the CSX Garrett Yard (MP BI 128), located in Garrett. Both employees received more than the statutory rest prior to reporting for duty. As Train 2 approached the accident area, the Engineer was seated at the controls, on the right side of the lead locomotive, and the Conductor was seated on the left side of the locomotive.

The accident occurred on the CSX Columbus Subdivision, near Carey. Approaching the accident area from the east, two main tracks, track 1 and track 2, and a center siding from MP CD 71.1 to CD 73.5 (10,587 feet in length) are present. From Control Point (CP) Carey (MP CD 73.5) the double main tracks continue west through CP Onion (MP CD 74.5) before reaching CP Springs (MP CD 76.5) and converging to a single main. An ascending grade between 0.04 and 0.11 percent is present throughout the area, and the track is tangent until a 0-degree, 55-minute right-hand curve at MP CD 75.15. A road crossing (DOT 228768E) is located 0.89 miles east of CP Springs, and another road crossing (228769L) is located 0.07 miles west of CP Springs. The method of operation on the Columbus Subdivision is a centralized traffic control (CTC) system, governed by signal indication, with a PTC overlay. The maximum authorized speed while operating on main track 1, main track 2 and the single main for this track segment is 50 mph (CSX Columbus Subdivision Timetable No. 1). Per CSX Headquarters System Bulletin No. 033, Train 1 was limited to restricted speed because it was operating in PTC “restricted” mode. The Train 2 crew was operating on a medium approach signal at CP Springs, restricting their train speed to not exceed 30 mph.

At 10:18 p.m., EDT, on August 11, 2019, Train 1 departed timetable west from CSX Parsons Yard. Train 1 encountered several operational delays, including a 53-minute delay at CP CD 18.4 for track maintenance. At 2:21 a.m., EDT, on August 12, 2019, Train 2 departed east from Garrett. At approximately 4 a.m., EDT, Train 1 arrived at CP Onion (MP CD 74.5) on track 1 and the crew began their work to set off the rear 30 cars of the train on the west end of center siding. The Engineer placed the train’s PTC system in restricted mode so the train would be able to make a reverse movement into the siding for a switching operation. The crew of Train 1 finished the set off, and next assisted an eastbound train working on the east end of center siding. The crew of Train 1 completed their work and conducted a job briefing at about 4:48 a.m., EDT, in which they agreed the Conductor would be transported via contract taxi to meet the Engineer at a road crossing near CP Springs. At 4:53 a.m., EDT, Train 2 passed CP Loudon (MP CD 83.6) heading east. Train 2 received a medium approach at an intermediate signal at MP CD 77, and began to slow in preparation of crossing over from the single main track to track 2 at CP Springs.

The Accident

At approximately 4:50 a.m., EDT, the Engineer of Train 1 increased speed to 13 mph, and placed the train in idle at about 4:53 a.m., EDT. Train 1 slowed to a near stop while in idle, with dynamic breaks applied before the Engineer began to increase speed once again. At about 5:01 a.m., EDT, Train 1 increased speed to 10 mph. The Engineer of Train 1 again placed the train in idle at about 5:03 a.m.,

EDT, and the train began to slow and was operating at less than 1 mph. At about 5:07 a.m., EDT, Train 1 was approaching the stop signal at CP Springs on track 1 as Train 2 was traversing the crossover onto track 2 traveling about 26 mph. The Engineer of Train 1 increased speed to 9.3 mph just before passing the stop signal at CP Springs. The Engineer of Train 1 sounded the horn and bell as Train 1 struck the sixth car of Train 2 at about 5:08 a.m., EDT. The Engineer of Train 1 did not apply any brakes prior to the collision.

The collision resulted in the lead locomotive (CSXT 736) and lead four cars of Train 1 to derail. The locomotive and lead two cars overturned on their right sides; the third car derailed upright while leaning at a 45-degree angle; and the fourth car derailed the leading set of trucks. Nineteen cars derailed on the struck Train 2 in an accordion-formation, beginning with the eighth car back from the head end. The sixth and seventh cars in the train were struck and damaged; however, they did not derail.

The Conductor of Train 2 made the required emergency announcement over the radio. Train 2 switched the radio to the dispatcher channel and notified the train dispatcher they had been struck by an oncoming train at CP Springs. The Conductor of Train 1 was in the contract taxi headed to CP Springs, attempting to raise the Engineer of Train 1 on the radio with no response. The Conductor of Train 2 dismounted his locomotive and began to walk back towards the point of impact (POI). The Conductor of Train 2 heard the Engineer of Train 1 yelling for help as he approached. The Engineer of Train 1 crawled out of the locomotive window, and the Conductor of Train 2 assisted him away from the wreckage. The Conductor of Train 1 arrived in the contract taxi as the other two employees were walking away from the wreckage.

Emergency services arrived, including the Wyandot County EMS and the Wyandot County Sheriff's Department. The Engineers of Train 1 and Train 2 were taken by ambulance to Wyandot Memorial Hospital. Other responding agencies included the Wyandot County Engineer's Office, American Electric Power, Sunpro Environmental Solutions, Hulcher Services Inc., R.J. Corman Railroad Group, CSX Special Agents, and the National Transportation Safety Board.

Total damage estimates were reported as $3,721,988. Train 1 damages were $2,269,503; Train 2 damages were $1,293,895; and track and signal damages were $158,590.

Post-accident/Incident Investigation

On August 12, 2019, the Federal Railroad Administration (FRA), as well as the National Transportation Safety Board (NTSB), began an investigation of this accident/incident. FRA investigators inspected the accident site, locomotive event recorder download, signal system, track conditions, locomotive tests and inspections, fatigue analysis of the striking train's crew, toxicology analysis, operational testing performed by the carrier prior to the accident, and rules compliance in accordance with Federal regulation as well as carrier operating rules. After the on-site inspection and investigation, FRA conducted interviews with the train crew of the striking train, struck train, and dispatcher on duty. FRA's investigators also requested and received all records, forms, and other documentation necessary to conduct their final analysis and

draw conclusions concerning the pertinent facts of the accident/incident. The following analysis and conclusions, as well as any possible contributing factors and the probable cause in this report, represent the findings of FRA's investigation.

Analysis and Conclusions

Analysis – Evaluation and Testing of Equipment: FRA Motive and Power Equipment Investigators requested and reviewed all pertinent test and inspection records and found no air brake or mechanical issues that contributed to this accident. Non-complying conditions that were not contributing factors to the accident included lead locomotive CSXT 477 (Train 2) Air Flow Meter Calibration (AFM) was expired past the 92-day max interval (Title 49 Code of Federal Regulations (CFR) 229.29(b)). The FRA F 6180-49A (Blue Cab Card) displays the last AFM calibration on March 18, 2019, 55 days past due. Form FRA F 6180.96 report number 89, dated September 23, 2019, reflects a violation for a FRA non-compliant FRA F 6180-49A (Blue Cab Card). Title 49 CFR §229.29(b) requires the Air Flow Meter indicator shall be calibrated in accordance with §232.205(c)(1)(iii) at intervals not to exceed 92 days, and records shall be maintained as prescribed in §229.29(g)(1).

Conclusion: FRA determined the mechanical condition of the equipment did not contribute to the cause or severity of the accident.

Analysis – Toxicology: This accident met the criteria for Title 49 Code of Federal Regulations (CFR) Part 219, Subpart C, *Post-Accident Toxicological Testing*. All employees on Train 1 and Train 2 were tested.

FRA post-accident testing determined that the Engineer of Train 1 was significantly impaired by alcohol, and had a blood alcohol concentration of 0.115 in his blood (and 0.113 in his urine) from specimens collected over six hours after the accident. Assuming no ingestion of alcohol in this intervening period, it is estimated the Engineer of Train 1 had a blood alcohol concentration of between 0.17 and 0.23 at the time of the accident. In addition, the Engineer also tested positive for marijuana metabolite (THC-COOH) from previous use of the drug at a concentration of 6.3 ng/mL in his blood and 32.6 ng/mL in his urine.

The Conductor of Train 1 and both the Engineer and Conductor of Train 2 were each negative for both drugs and alcohol based on FRA post-accident testing.

Conclusion: FRA determined the intoxication of the Engineer of Train 1 contributed to the cause and severity of the accident. (Cause code H101)

Analysis - Fatigue: FRA uses an overall effectiveness rate of 72 or less for 80 percent or more of the time as the baseline for fatigue analysis. This is the level at which the risk of a human factors-related accident is calculated to be equal to chance. Below this baseline, fatigue was not considered as probable for an employee. Software sleep settings vary according to information obtained from each employee. If an employee does not provide sleep information, FRA uses the default software settings.

FRA obtained fatigue-related information, including work history, for all train operating employees involved in this accident. Based on the Fatigue Audit InterDyne (FAID) analysis, fatigue was not probable for any of the crew members involved in the accident.

Conclusion: FRA determined fatigue did not contribute to the cause or severity of this accident.

Analysis – Operating Practices (Train 1): FRA Operating Practices Investigators reviewed the download of the lead locomotive on the striking train, revealing the engineer fluctuated between throttling above 10 mph and dynamic braking to nearly stopping several times during the westward pull towards the stop signal. The engineer throttled up to notch 8, reaching a speed of 13 mph by 4:53 a.m., EDT, and set the throttle at idle. By 4:57 a.m., EDT, the train nearly reached a stop, operating under 1 mph with dynamic breaks applied before the engineer reacted and began to throttle up to notch 8 once again. Within 4 minutes, the train speed increased to 10 mph (5:01 a.m., EDT). The train throttle was notched down to idle again and by 5:03 a.m., EDT, the train was operating under 1 mph for a second time during the westward pull. From this point, the engineer began notching up to throttle position 6 while approaching and passing the stop indication at CP Springs. Additionally, the engineer sounded the whistle immediately before impact while never activating the emergency brake. The engineer's handling of the train up to the signal was abnormal and erratic, indicating signs of impairment. Expectations of normal operation of the train for this movement would be carried out in a slow constant pull towards the signal with a descending speed when approaching the stop indication. FRA examined the carrier PTC requirements established in CSX Headquarters System Bulletin 033, stating that after using "restricted mode" to set off or pick up cars, PTC is to be reactivated by verifying and updating the consist information in PTC system "prior to departing location." Further language clarified the intent of the bulletin within the CSX PTC Quick Reference Guide, stating, "Immediately after completing all switching moves and updating all required consist changes, the locomotive operator must turn off restricted mode prior to making initial movement to depart location." This intent was reinforced by a post-accident rule change with CSX Headquarters System Bulletin 048, adding in a selection reading, "Immediately after completing all switching moves and updating all required consist changes, the locomotive operator must turn off restricted mode prior to making initial movement to depart location." The engineer had not yet updated the consist as their job briefing concluded the engineer would pull the train to "Springs Road" where the conductor would be waiting to board the train and relay the new consist information necessary to reactivate PTC. During the movement to the road crossing, PTC was not active and still in restricted mode, requiring the train to be operated at restricted speed. FRA determined the engineer failed to operate at a range that permitted stopping within one-half the range of vision while operating at restricted speed and in PTC restricted mode (CSX Headquarters System Bulletin 033, item no. 14. and Operating Rule 300.3). The engineer failed to stop short of the stop signal indication at CP Springs as required by CSX Operating Rule 504.20. CSX carrier records were obtained for both train crews and inspected for compliance with all applicable hours of service laws. All crew members were compliant with hours of service laws pertaining to limitations of time on-duty outlined by United States Code 21103. Training and certification records for all striking train crew members were obtained and reviewed by FRA. Both the engineer and conductor on the striking train were certified in accordance with Title 49 CFR Parts 240 and

242. Lead locomotive video footage of the striking train and struck train were reviewed by FRA and CSX officials.

A review of all training, qualification, and testing records of the crew of Train 2 were reviewed with no defects identified.

Conclusion: FRA determined the failure of Train 1 to comply with the stop indication at CP Springs was the probable cause of the accident. Additionally, the failure of Train 1 to comply with restricted speed contributed to the accident. (Cause codes H221 and H605)

Analysis – Railroad Testing: FRA reviewed the historical operational testing conducted within a 10-mile radius of the accident (CD 66.4 – 86.4) for the six months leading up to the month of the accident (February – July 2019), and for the days in August prior to the accident. The CSX Transportation Department conducted 404 tests in the proximity of the accident area over the previous six months, identifying 14 occasions of non-compliance. Of the performed tests, 125 tests were relevant to the causes of the accident (drug and alcohol, traveling at a speed permitting stopping at half the range of vision, and stop-signal related). The striking train's engineer had been tested 10 times across the system over the previous six months, demonstrating compliance with rules relevant to the accident including drug and alcohol observational testing and stop-related operational testing. FRA determined that frequent and adequate operational testing was performed in the proximity of the accident location by multiple supervisors over the six-month period reviewed.

Conclusion: FRA determined that operational testing did not contribute to the cause or severity of the accident.

Analysis – PTC System: The I-ETMS PTC system for Train 1 was operating in Restricted Mode at the time the train passed the stop signal at CP Springs. Restricted Mode is an onboard PTC function which only utilizes the locomotive segment to enforce restricted speed. While operating in Restricted Mode, PTC will provide overspeed warning to the engineer at 19 mph and enforce a train stop penalty at 21 mph. It does not provide stop signal protection. Since Restricted Mode is a locomotive-based PTC function, the locomotive segment was the primary focus of inspection. Logs were downloaded and inspected from the locomotive segment, including verifying the proper software revision levels, confirming that the locomotive passed the required departure test, and confirming that the locomotive was operating with the correct SubDiv (track database) file. Logs were downloaded and inspected from the wayside PTC segment, including verifying the Wayside Interface Unit (WIU) inputs were correct and in accordance with the circuit plans, and confirming the proper software revision levels. Logs were also downloaded and inspected from the communication's PTC segment, including verifying proper addressing for the locomotive and WIUs, and confirming that no loss of communication occurred prior to entering Restricted Mode. Logs were also downloaded and inspected from the back-office PTC segment, including verification that information from the dispatcher's system was properly received by the back-office system. No exceptions were taken from the review of any PTC segment. The PTC system was

not tampered with in any way. All segments were operating with the correct software revision levels. While PTC enforcement was not overridden, the locomotive was operating in Restricted Mode in accordance with CSX operating rules. Train 1 was operating with PTC in the Active State until performing switching operations prior to the accident. At the time of the accident, the CSX PTC bulletin did not require the engineer to transition PTC to the Active State before departing the switching location. The engineer continued to operate in Restricted Mode until the time of the accident. Restricted Mode is not a PTC failure and there was no indication of any PTC errors or malfunctions leading up to the accident. The PTC system functioned as designed. While operating in Restricted Mode, there is no positive stop enforcement at a stop signal.

FRA concluded that although PTC was not a contributing factor in the accident, PTC operating in the Active State under normal working conditions would have prevented Train 1 from passing the stop signal at CP Springs.

Conclusion: FRA determined PTC did not contribute to the cause or severity of the accident.

Analysis – Signal System: FRA inspected the signal system at the site of the accident and reviewed all relevant CSX signal inspection records. Equipment logs indicate that Signal No. 2 displayed favorable signal for Train 2, which entered CP Springs at 5:07:45 a.m., EDT. The logs indicate that Train 1 entered the Westbound approach circuit to CP Springs at 4:01:37 a.m., EDT. Train 1 occupied the approach circuit to CP Springs the entire time they were switching cars at CP Onion. Train 1 departed CP Onion ahead of the signals, therefore CP Springs No. 4 Signal is the next signal to which it would arrive. The logs indicate that CP Springs Signal No. 4 was not displaying a favorable aspect at the time of the accident. The circuitry at CP Springs is not capable of indicating the exact time that Train 1 passed Signal No. 4 due to the presence of Train 2 inside CP Springs. No signal-related defects were noted as a result of the FRA investigation.

Conclusion: FRA determined that the signal system did not contribute to the cause or severity of the accident.

Analysis – Track: Following the derailment, FRA reviewed CSX track and rail inspection records. No defects were noted near the POD. FRA requested track notes from CSX but none were taken following the derailment because of the destroyed track. Main track No. 1 and Main track No. 2 were respectively constructed with 136-pound and 122-pound welded rail. The single main track from CP Springs westward has a south rail constructed of 136-pound welded rail and the north rail constructed of 122-pound welded rail. The rail fastenings to wood crossties consist of cut spikes with double-shouldered tie plates and granite ballast. Lag fasteners and elastic clips were used through the turnout. Review of CSX track inspection and internal rail test records indicated no prior conditions. No rail defects were discovered at the time of derailment. Conditions of track, determined point of derailment, and review of relative track documents do not indicate a deficiency in track structure.

Conclusion: FRA determined track conditions did not contribute to the cause or severity of the accident.

Overall Conclusions

FRA has determined that the engineer of CSX Train 1 did not comply with CSX Operating Rules, failing to stop short of a signal displaying a stop indication. The engineer failed to operate at a speed that permitted stopping within one-half the range of vision of a stop signal while in PTC-restricted mode. FRA determined the engineer of Train 1 was impaired by alcohol at the time of the accident.

This accident was not PTC preventable. While PTC enforcement was not overridden, the locomotive was operating in Restricted Mode in accordance with CSX operating rules. While operating in Restricted Mode, there is no positive stop enforcement at a stop signal.
All applicable carrier rules and Federal regulations were reviewed throughout the course of this investigation. FRA has determined that CSX failed to comply with CSX Operating Rule 504.20, stating, "A train approaching a fixed signal requiring a stop must stop before any part of the movement passes the signal." Additionally, CSX employees failed to comply with restricted speed while operating in PTC restricted mode. This practice is non-compliant with CSX Headquarters System Bulletin 033, item no. 14 (restricted mode) as well as Operating Rule 300.3 (restricted speed). The FRA investigation revealed the CSX Engineering Department failed to comply with Title 49 CFR 213.241(b)(1) by not completing the inspection record the day of the inspection, which occurred on June 19, 2019.

Probable Cause

The FRA investigation determined the probable cause of the accident was cause code H221 – Automatic block or interlocking signal displaying a stop indication -- failure to comply.

Additionally, FRA's investigation determined H605 – Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal, and H101 – Impairment of efficiency or judgment because of drugs or alcohol, were contributing factors.