Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2018-1277

CN Rear-End Collision
Weirgor, Wisconsin
June 16, 2018

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 June 16, 2018, at 9:08 a.m., CDT, a southbound Canadian National Railway (CN) freight train Q-11651-10 (Train 1) traveling at 26 mph on a single main track struck southbound CN intermodal freight train Q-11851-10 (Train 2) traveling at 3 mph from behind. The collision caused the derailment of two locomotives and three cars from Train 1 and one car from Train 2. The accident occurred at Milepost (MP) 373.3 on the CN Superior Subdivision near Weirgor, Wisconsin, which is 33 miles south of Hayward, Wisconsin, in Sawyer County.

Both locomotives of Train 1 derailed on their sides and caught fire. The derailed cars from both Train 1 and Train 2 remained upright, but also caught on fire. The conductors of Train 1 and Train 2 were injured in the accident.

There were no hazardous material releases, and no evacuation. Damages were estimated at $1,048,094 to equipment and $153,775 to track, signal and structures.

The weather at the time of the accident was daylight, raining, and 71º F.
The FRA investigation concluded the probable cause of the accident was H220 -- Fixed signal (other than automatic block or interlocking signal), failure to comply.

Additionally, FRA has identified H999 – other train operation/human factors, and H599 – other causes related to train handling as contributing factors to the accident.

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2018-1277

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Canadian National - North America	CN	000962758
2. Name of Railroad Operating Train #2	2a. Alphabetic Code	2b. Railroad Accident/Incident No.
Canadian National - North America	CN	000962758

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Canadian National - North America	CN	000962758
2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident	4. Time of Accident/Incident
	6/16/2018	9:08 AM

5. Type of Accident/Incident
Rear End Collision

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated	10. Subdivision
6	0	0	0	Superior

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Weirgor	373.3	WI	SAWYER

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
71 °F	Day	Rain	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Superior Subdivision Main Track	Freight Trains-60, Passenger Trains-80	11	South

23. PTC Preventable
Yes

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FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2018-1277

OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	Q-11651-10

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
26.0 MPH	R	7667		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.)*	CN 2197	1	no		0	0
(2) Causing *(if mechanical, cause reported)*	CN 2197	1	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	140	0	0	0	0
(2) Total Derailed	2	0	0	0	0	(2) Total Derailed	3	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
995895	0

14. Primary Cause Code
H220 - Fixed signal (other than automatic block or interlocking signal), failure to comply.

15. Contributing Cause Code
H607 - Failure to comply with restricted speed or its equivalent not in connection with a block or interlocking signal.

Number of Crew Members

16. Engineers/Operators	17. Firemen	18. Conductors	19. Brakemen
1	0	1	0

Length of Time on Duty

20. Engineer/Operator	21. Conductor
Hrs: 6 Mins: 8	Hrs: 6 Mins: 8

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others
Fatal	0	0	0
Nonfatal	1	0	0

25. EOT Device?	26. Was EOT Device Properly Armed?
Yes	Yes

27. Caboose Occupied by Crew? N/A

28. Latitude	29. Longitude
45.716488000	-91.294842000

U.S. Department of Transportation
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FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2018-1277

OPERATING TRAIN #2

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	Q-11851-10

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
3.0 MPH	R	7610		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.)*	DTTX 62449	134	yes		0	0
(2) Causing *(if mechanical, cause reported)*	DTTX 62449	134	yes	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	134	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	1	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
52199	153775

14. Primary Cause Code
H220 - Fixed signal (other than automatic block or interlocking signal), failure to comply.

15. Contributing Cause Code
H607 - Failure to comply with restricted speed or its equivalent not in connection with a block or interlocking signal.

Number of Crew Members

16. Engineers/Operators	17. Firemen	18. Conductors	19. Brakemen
1	0	1	0

Length of Time on Duty

20. Engineer/Operator	21. Conductor
Hrs: 7 Mins: 38	Hrs: 7 Mins: 38

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others
Fatal	0	0	0
Nonfatal	1	0	0

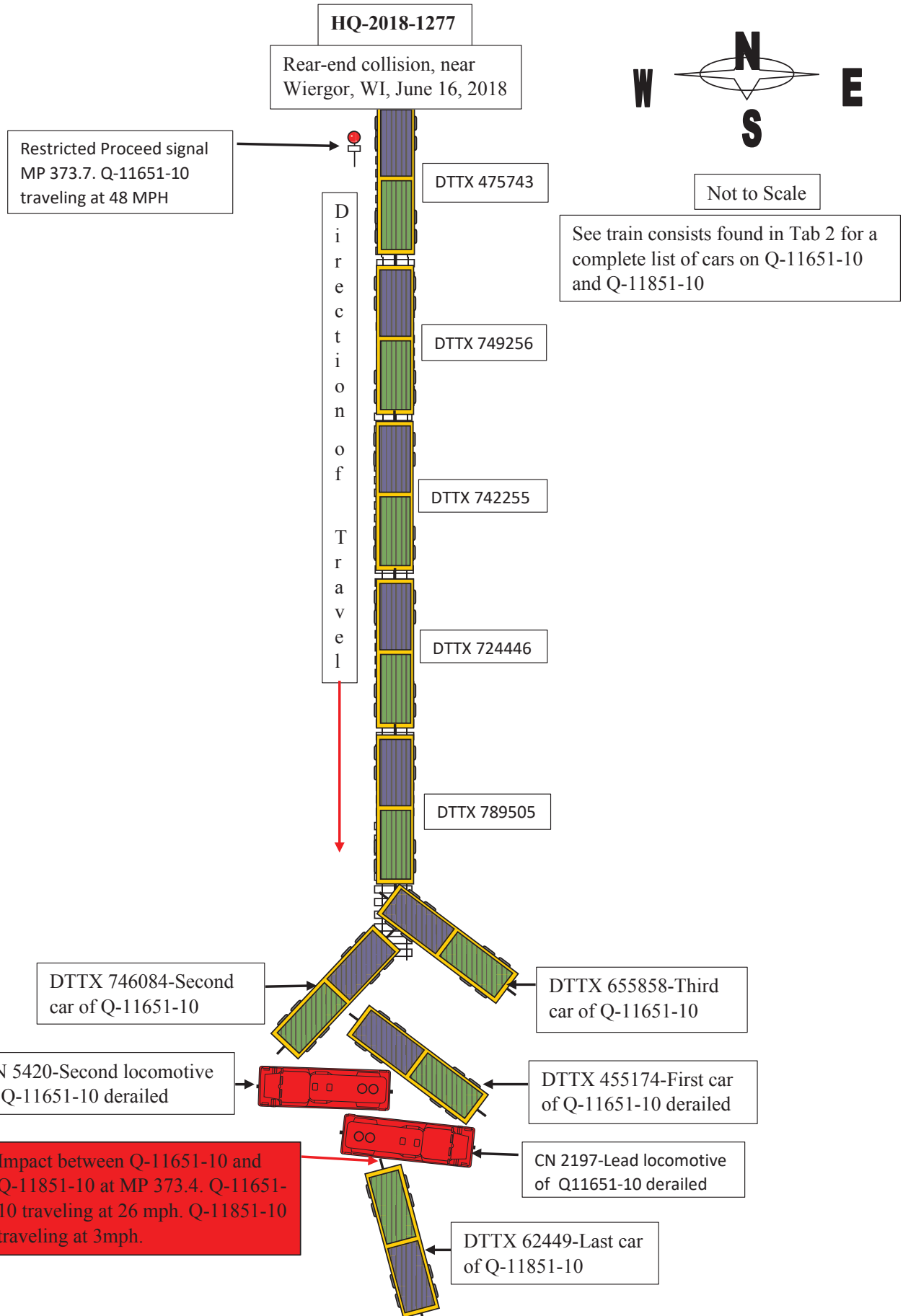
25. EOT Device?	26. Was EOT Device Properly Armed?
Yes	Yes

27. Caboose Occupied by Crew? N/A

28. Latitude	29. Longitude
45.716488000	-91.294842000

SKETCHES

Sketch - Accident Sketch



NARRATIVE

Circumstances Prior to the Accident

Freight Train Q-11651-10

On June 16, 2018 at 3:00 a.m., CDT, a crew consisting of a locomotive engineer and conductor reported for duty at their home terminal, Pokegama Yard, Superior, Wisconsin, milepost (MP) 461. The crew was assigned to Canadian National Railway (CN) freight train Q-11651-10 (Train 1). Both crew members received more than the statutory off duty time prior to reporting for duty. This was the first time this crew had worked together. Upon reporting for duty, the conductor and engineer reviewed their bulletins, consist, updated notices and held a job briefing to discuss information that may have affected the movement of their train.

On June 16, 2018, train 1 departed Pokegama Yard, headed southbound. Train 1 was a through train consisting of 2 head-end locomotives and 140 loaded intermodal cars. It was 8,639 feet and had 7,667 trailing tons. Train 1 received a Class 1 brake test at Symington Yard, Winnipeg, Manitoba, Canada on June 15, 2018, at 7:52 a.m. CDT.

Freight Train Q-11851-10

On June 16, 2018 at 1:30 a.m., CDT, a crew consisting of a locomotive engineer and conductor reported for duty at their home terminal, Pokegama Yard. The crew was assigned to Canadian National Railway (CN) freight train Q-11851-10 (Train 2). Both crew members received more than the statutory off duty period prior to reporting for duty.

On June 16, 2018, train 2 departed Pokegama Yard, headed southbound. Train 2 was a through train consisting of 2 head-end locomotives and 134 loaded intermodal cars. It was 8,756 feet and had 7,610 trailing tons. Train 2 received a Class 1 brake test at Symington Yard, Winnipeg, Manitoba, Canada, on June 15, 2018, at 6:51 a.m. CDT.

The accident occurred on the CN Midwest Division, Superior Subdivision near Weirgor, Wisconsin. The Superior Subdivision is dispatched using a Centralized Traffic Control (CTC) system, and is a single main track with sporadic passing sidings. Timetable direction on the Superior Subdivision is south, and the maximum authorized speed is 60 mph for freight trains. Beginning at MP 375.0, and headed south, the track is tangent until MP 374.1 when the track enters a right-hand curve before becoming tangent again at MP 373.8, and continues through the accident site. There is a descending grade of 0.5 percent between MP375.0 and MP 372.5, then the track is level until MP 372.2 where it descends at a 0.3-percent grade through MP 372.

Train 2 departed Pokegama Yard at 2:28 a.m. CDT, and traveled south on signal indication, with the

engineer seated on the right (west) side of the lead locomotive (IC 2715), and the conductor was on the left (east) side. When train 2 reached Chittamo Siding, MP 412.6, they were held to meet some northbound traffic.

Train 1 departed Pokegama Yard at 4:46 a.m. CDT, and traveled south on signal indication, following Train 2. The engineer seated on the right (west) side of the lead locomotive (CN 2197), and the conductor was on the left (east) side. Train 2 was still at Chittamo siding, MP 412.6, when train 1 arrived so train 1 slowed to allow Train 2 to get farther ahead of them. Train 1 was following Train 2, operating on a clear signal indication, until they received an advance approach signal indication at MP 377.15.

Train 2 was stopped ahead at the absolute signal at MP 371.4, clear of Applebee Road. Train 1 continued to follow Train 2, and received an approach signal indication at MP 376.05, and a restricted proceed indication at MP 373.7. Train 1 was traveling a recorded speed of 48 mph as they passed the restricted proceed signal.

The weather at the time of the accident was daylight, raining, and 71º F.

The Accident

As Train 1 passed the restricted proceed signal at MP 373.7, the rear end of the stopped Train 2 was visible. The engineer of Train 1 initiated an emergency brake application at 9:08:06 a.m., CDT, while traveling 48 mph, and 2,330 feet from the rear of Train 2. The conductor of Train 1 broadcast "Emergency, Emergency, Emergency" and the engineer called out to Train 2 to tell them to brace for impact.

Train 2 had just received a clear signal, and began to move south. At 9:08:45 a.m., CDT, Train 1, traveling 26 mph, struck the rear end of Train 2, traveling 3 mph.

At impact, the lead locomotive on Train 1 rode up on top of the last car of Train 2 and fell over on its side. The second locomotive followed the lead locomotive on top of the rear car in Train 2, and fell the opposite direction on its side. The three lead cars on Train 1 derailed upright, as did the last car on Train 2. The last car on Train 2 was a five-well intermodal car, and only the one rear well derailed. Both locomotives on Train 1 ruptured their fuel tanks and caught fire, which spread to the first two cars of Train 1 and the last car of train 2. The Train 1 crew crawled out of the lead locomotive through the door on the front of the engine. Both crew members recalled crawling through thick smoke and flames as they exited. Both crew members exited the engine and stayed on the same side of the track as they made their way toward the head end of Train 2, and the highway-grade crossing at Applebee Road.

At approximately 9:09 a.m., CDT, the crew from Train 2 received a call from the Train 1 engineer, using a hand-held radio, requesting a 911 call be forwarded to the dispatcher. At 9:10 a.m., CDT, the dispatcher responded to the call from train 2. At 09:16 a.m., CDT, the dispatcher contacted the Sawyer County Sheriff's Department and reported that there was a fire involved collision with injuries.

At approximately 10:00 a.m., CDT, the Sawyer County Sheriff's Department established an Incident Command Post near the scene of the accident to direct the EMS, Sawyer County HAZMAT team, Sawyer County Fire Department, and Wisconsin Department of Natural Resources, to mitigate the fuel spill and control the fire.

The Train 1 conductor was met by an ambulance at Applebee Road and transported to Lakeview Medical Center in Rice Lake, Wisconsin, around 10:00 a.m. CDT. The fire was eventually brought under control after 7:00 p.m., CDT, and the main track was placed back in service the next day, June 17, at approximately 1:00 p.m. CDT. The CN reported the damage cost to equipment at $1,048,094 and damage to track at $153,775.

Post-Accident Investigation

FRA arrived on the scene of the accident between 11:00 a.m. and 3:00 p.m., CDT, on June 16, 2018. FRA investigators conducted an on-scene investigation, performing inspections, obtaining documents and photographing the accident scene.

FRA's interviews of the train crew and their account of the accident was substantiated by analyzing event recorder data and signal downloads. The investigators also reviewed track inspection and equipment maintenance inspection records.

FRA reviewed and inspected crew discipline records, training records, hours of service records, as well as testing and certification.

The following analysis and conclusions represent the findings of the FRA investigation.

Analysis and Conclusions

Analysis – Motive Power & Equipment: A review of records of tests and inspections of the equipment involved shows no defects or other conditions were present at the time of the accident. Both trains had valid Class 1 air brake tests and Class 1A air brake tests prior to departing Pokegama Yard.

Conclusion: FRA determined that Motive Power & Equipment did not contribute to the cause or severity of the accident.

Analysis – Operating Practices: A review of qualifications, discipline records, training, periodic performance tests, fatigue and the actions of the crew members revealed the engineer of Train 1 had eight months experience, and the conductor had seven months experience in their assigned positions. These crew members did not know each other prior to coming on duty the day of the accident.

Further review of discipline records for the engineer of Train 1 revealed he received discipline by the CN

for a signal violation on April 6, 2018, while operating the Q-11651-01. The discipline assessed prevented him from returning to duty as an engineer until May 7, 2018.

A review of the locomotive event recorder download corroborated the locomotive engineer's statement that he struggled to control the speed of the train once he realized he was going too fast.

Conclusion: FRA determined that the qualifications, experience level, and training of the operating crew and their actions contributed to the cause of the accident. (H999 – Other train operation/human factors)

Analysis—Locomotive Engineer Operating Performance: FRA conducted a review and analysis of both train's event recorder downloads, but focused mostly on Train 1. The analysis revealed the event recorder data received from Train 1's lead locomotive, CN 2197, was recorded from 5:16 a.m., CDT, to 10:17 a.m., CDT, and matched with the data received from the trailing locomotive, CN 5420, which was recorded from 5:18 a.m., CDT, to 9:18 a.m., CDT.

The event recorder data of Train 1 shows the train was stopped between 5:54 a.m., CDT, and 6:49 a.m., CDT. Train movement between 8:11:38 a.m., CDT, until 9:08:48 a.m., CDT, was as described in the table below.

Time	**Throttle**	**Speed**	
8:11:38 a.m.	T8	18 mph	
8:25:40 a.m.	T7	40 mph	
9:03:56 a.m.	T8	47 mph	MP 377.15 – Advanced App
9:05:24 a.m.	T7	46 mph	MP 376.05 - Approach
9:05:33	T6	46 mph	
9:06:05	T5	47 mph	
9:06:16	T4	47 mph	
9:06:29	T3	47 mph	
9:06:59	T2	47 mph	
9:07:03	T1	47 mph	
9:07:25	Idle	48 mph	
9:08:02	DB	43 mph	MP 373.7 – Restricted Proceed
9:08:06	DB	48 mph	Emergency brake applied
9:08:16	DB	45 mph	15-pound independent brake
9:08:17	DB	47 mph	39-pound independent brake
9:08:18	DB	47 mph	58-pound independent brake
9:08:19	DB	46 mph	66-pound independent brake
9:08:20	DB	46 mph	69-pound independent brake

9:08:21	DB	45 mph	70-pound independent brake
9:08:39	DB	32 mph	Horn actuated
9:08:44	DB	27 mph	Horn stops
9:08:45	DB	26 mph	Collision
9:08:48	DB	0 mph	MP 373.3

Analysis of the event recorder shows the engineer of Train 1 failed to adequately control his train while passing the advance approach, approach, and restricted proceed signals.
The engineer was slow to react to the approach signal and when he finally applied the dynamic brakes, the train was on a 0.50 percent descending grade. Train 1 continued to gain speed until the emergency braking system was applied. At no time did the engineer attempt to use the train's air brakes to control his speed, which lead to the loss of control of the train. The engineer did apply the locomotives independent brakes about 10 seconds after initiating an emergency brake application of the train's automatic brakes.

Conclusion: FRA determined the Train 1 engineer's failure to comply with the restricted proceed signal indication was the probable cause of the accident. (H220 – Fixed signal (other than automatic block or interlocking signal), failure to comply)

Additionally, FRA determined the Train 1 engineer's handling of the train brakes contributed to the cause and severity of the accident. (H599 – Other causes related to train handling)

Analysis—Toxicology Testing: This accident meet the criteria for Title 49 Code of Federal Regulations (CFR) part 219, subpart C, *Post Accident Toxicological Testing*. All crewmembers from Train 1 and Train 2 were tested with negative results.

Conclusion: FRA determined that drugs and alcohol did not contribute to the cause or severity of the accident.

Analysis – Signal & Train Control: FRA reviewed signal test and inspection records, as well as reviewed the performance of the applicable signal and wayside detectors, and verified that all functioned as intended.

FRA inspection of CN records revealed there were defects in their record keeping, however, this would not have prevented the accident.

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

Analysis – Track and Structures: FRA reviewed the 2018 CN walking, hi-rail, and ultrasonic track inspection records and concluded inspections were being conducted as required. FRA did not conduct an inspection at the accident scene due to the severity of damage to the track and fire which resulted

from the collision.

The FRA review of CN track inspection records did not reveal any exceptions to the track or structures.

Conclusion: FRA determined that Track and Structures did not contribute to the cause or severity of the accident.

Analysis –Fatigue Analysis: FRA performed a fatigue analysis using the Fatigue Avoidance Scheduling Tool (FAST). FRA uses an overall effectiveness rate of 77.5 percent as the baseline for fatigue analysis. At or above this baseline, the FRA does not consider fatigue as probable for any employee. Inputs into the FAST software vary based on information obtained from each employee.

FRA obtained fatigue-related information, including a 10-day work history, for all crewmembers of Train 1 and Train 2. Results indicate fatigue was probable for both engineer and conductor on Train 1 and Train 2.

FRA was unable to conclude if fatigue contributed to the reaction, and train handling, by the crew of Train 1.

Conclusion: FRA determined fatigue may have contributed to the cause of the accident. (H999 – Other train operation/human factors)

Overall Conclusions

A thorough review and analysis of the accident data revealed that inspections were conducted and the locomotives and train braking systems were in good working order, as were the signal system and track.

The post-accident toxicology test determined the crew was not impaired from drugs or alcohol. The fatigue analysis revealed the crew members were likely fatigued, which could have played a role in their failure to recognize and react to the signal indications in a timely manner.

Both crew members of Train 1 were relatively inexperienced in their positions, and had never worked together. The engineer had eight months of experience in his position, having served a one month decertification in April 2018 for a signal violation. The conductor had seven months of experience in his position when the accident occurred.

The engineer stated this was his first trip operating a GE C40-8 type locomotive, and the brakes did not respond like he thought they would. The conductor stated he instructed the engineer twice to slow down, but the engineer failed to control his train's speed. The engineer's failure to use the train's air brakes contributed to the severity of the accident.

Train 1 was aware that Train 2 was ahead of them, but Train 1 failed to respond to the signal indications

of advance approach, approach, and restricted proceed in a timely and adequate manner. Both crew members of Train 1 mentioned their surprise as they passed the restricted proceed signal and at the same time saw Train 2 in front of them.

Probable Cause and Contributing Factors

The FRA investigation concluded the probable cause of the accident was H220 -- Fixed signal (other than automatic block or interlocking signal), failure to comply.

Additionally, FRA has identified H999 – other train operation/human factors, and H599 – other causes related to train handling as contributing factors to the accident.