NATIONAL TRANSPORTATION SAFETY BOARD

Office of Railroad, Pipeline and Hazardous Materials Investigations

WASHINGTON, D. C. 20594

Operations Factual Report

Train Derailment Hazmat Release

ACCIDENT

Description: Derailment/ Mudslide

Location: Draffin, KY

Accident Date: February 13, 2020

NTSB accident number: RRD20FR002

PARTY MEMBERS

Tomas Torres NTSB-Operations Group Chairman	Zach Zagata NTSB- Operations Investigator
Barry Stamper FRA Operating Practices	Steve Ammons CSX, Director of Train Handling & Practices
Jeffery Mitchell SMART- Investigator	Randy Fannon BLET Safety Task Force- Investigator

A summary of the accident will be placed in the Docket.

Events Prior to the accident

The crew of train K42911 consisted of a locomotive engineer and a conductor. They went on duty at 12:50 a.m. EST on February 13, 2020, at Kingsport, Tennessee. This was the home terminal for the crew members, and both received more than the statutory off-duty period prior to reporting for duty.

Their assigned freight train consisted of three locomotives followed by one buffer, 96 tank cars loaded with ethanol and one buffer car at the rear of the train.[1] The train weighed 13, 172 tons and was 6,045 feet long. The train was classified as a KEY train. [2]

Upon reporting for duty, the train crew was transported from Kingsport, Tennessee to Shelbiana, Kentucky to take charge of their assigned train K42911. The train crew arrived at Shelbina, Kentucky at about 2:30 a.m. est. The engineer said that he was notified by the yardmaster that their train was being delayed. Their trains delay was due to another train being stopped for fallen trees on the main track. The engineer and conductor reviewed their bulletins pertaining to their train while they waited for their train.[3] . Specific to the crew's bulletins and the Kingsport Sub, the bulletins showed 2 slide warnings, not Flood Warnings. One of those warnings (between milepost CMG 120.8 – CMG 120.9) was new, as stated by the Engineer. There were two additional bulletins that showed slide detector fences out of service and caution crews to approach at Restricted Speed, looking out for any obstruction.[4]

Once train K42911 arrived, the engineer inspected the locomotives for fuel and water levels and placed the third locomotive online.[5] After the engineer completed the inspection of the locomotives, he contacted the CSX dispatcher and requested for permission to proceed. After they

[1] Buffer car – a rail car used to meet the hazardous material separation requirements in either switching or train operations.
[2] Refer to Appendix A for definition of a Key Train at the end of the report.
[3] Bulletin- A computer-generated form issued by the train dispatcher containing current operating instructions that apply to the train addressed as well as information relating to the most recently issued system and division bulletins.
[4] Restricted Speed - A speed that permits stopping within one-half the range of vision. It also permits stopping short of a train, a car, on-track equipment, an obstruction, a Stop signal, a derail, or an improperly lined switch. It permits looking out for broken rail. It is not to exceed 15 MPH until the entire movement clears turnouts, crossovers, and power-operated switches; otherwise it does not exceed 20 MPH.
[5] Online-s in reference to selecting a switch in the locomotive to run mode so that it responds to the lead locomotive's throttle changes and application and release of the brakes.

departed and the train attained the required speed, the engineer engaged Trip Optimizer.[6] The engineer said prior to the accident that about two to three miles from the accident they complied with the two slide advisories that were in the their bulletins . one between North End and South End of Marrowbone, and another one between milepost 120.8 and milepost120.9 The engineer disengaged Trip Optimizer to comply with the slide advisories and manually operated the train at 5 mph. When the headend of the train cleared the limits of the slide advisories, the engineer re-engaged Trip Optimizer. The train continued traveling towards Kingsport, Tennessee until it came upon the mudslide. The engineer said he was operating under clear signal indications (proceed).[7]

The engineer said once he saw the mudslide, he initiated an emergency train brake application.[8] The engineer explained "the fog was so thick and the rain that by the time I, time I see the slide, yeah, it was -- we're there". The engineer said that the mudslide was approximately the same height as the nose of the locomotive. After impacting the mudslide, he tried to go to the floor because he thought the mudslide would come in through the windshield. He felt the locomotive move to the left, he thought that the locomotive was going to tip over, however, it remained upright. The nose of the locomotive came to rest in the Big Sandy River, water started to come into the locomotive cab. According to the Trip Optimizer log the train was being operated at 24 mph at the time of the accident and the trip ended at 6:46 a.m. EST.

The engineer dialed up the CSX train dispatcher and reported the accident.

[6] Trip Optimizer- is an intelligent, fuel-saving cruise control for a locomotive that optimizes fuel consumption based on a specific train's make up and the route traveled. The system calculates automatically controls throttle and dynamic brake according to the plan to provide smooth operation while keeping the train on schedule and minimizing fuel use.

[7] Signal indication- the information conveyed by the aspect of a signal aspect relative to speed and conditions on the track ahead.

[8] Emergency Brake Application- The type of brake application made when a train must be stopped in the minimum distance possible for the equipment. An emergency brake application is a rapid uncontrolled reduction of brake pipe pressure, which produces 15% to 20% percent more braking effort than a full service application.

DISPATCHER: CSX FT Jacksonville emergency radio call.

CALLER: K429. We hit a (indiscernible) started in Big Sandy River. We've got a big fire.

DISPATCHER: All right, K429. Can you give me a mile post on it?

CALLER: Yeah, (indiscernible) it's 120 -- 123, 124, somewhere in there. We got cars on fire They were -- they loaded (ph.) in the river. But we got -- we're going to need, we're going to need help.

DISPATCHER: Okay. I understand, K429. Go back to the road channel. Let me get some people called. I'll be right back to you. Over.

After the engineer reported the accident to the CSX train dispatcher, he turned on his cell phone and called 911 to report the accident and request assistance from the dispatcher. The following was entered on the 911 CAD report " CSX crew member advised they are trapped on the engine in the river, water too swift to swim and the riverbank is on fire behind them, fire spreading down the river".[9]

Due to smoke and heat coming into the cab of the locomotive, the engineer and conductor exited through the front door onto the front walkway of the locomotive. Once on the walkway, he and conductor were trapped between the fire on both sides and the Big Sandy River's rushing water. The engineer said that he did not know how to swim and took his backpack with him as a floatation device. The engineer said "the fire department was everywhere. They just couldn't get to us. They're trying to figure out where to launch a boat or something". After 30 to 40 minutes on the platform, he and the conductor made the decision to enter the water. They were able to navigate their way through the water to safety.

[9] CAD-Computer Aided Dispatching

Figure 1Photo Courtesy of Darffin, KY Police Department

508 Text: Photo is an aerial view of the train derailment. To the right of the train is a hill and shows where a mudslide occurred. To the left of the train is the river. The lead locomotive and 2 trailing locomotives are derailed to the left of the railroad tracks. The nose of the lead locomotive is in the water with fire on both sides of the locomotive. Also seen on the photo are two derailed tank cars, one is near the rear of the lead locomotive and on fire.

The engineer said that prior to the accident he did not notice anything unusual about the train. He described the track leading up to the accident site as being river grade with curves. He said during the interview that he was extremely vigilant about looking out for slides.

NTSB investigators asked the engineer if any windows had been broken or blown out in the impact. He said they all remained intact, both doors in the cab remained straight and unblocked, making egress easy. He also said that no one hit their head and lost consciousness during the impact. While standing in the front walkway of the locomotive, the engineer said the heat was intense and was causing rocks to explode, one of which struck the conductor in the shoulder.

During the interview the engineer was asked by NTSB investigators if the train would have been safer if additional buffer cars had been placed on the headend. He said that he is unsure if he would have been safer with additional cover cars on the head end.

The engineer explained that the rains had been exceptionally heavy lately and that there had been a lot of flooding, potentially record levels. It had rained for the entirety of their tour of duty leading up to the accident. He states he had not seen any track inspectors that night.

A CSX trainmaster was dispatched to the scene. According to the responding trainmaster, he was notified of the accident at about 6:50 a.m. He was not on duty at the time he was notified, and where the accident occurred was not his area of supervision. He drove from his home; it took him approximately 30 minutes to arrive on scene. When he arrived, he saw that some of the equipment was on fire and he could hear a loud whoosh as the flames shot out. He saw that the cab of the lead locomotive was at the edge of the riverbank. The trainmaster said the engineer and conductor were standing on the front platform of the locomotive, he called out to them and told them to swim to safety. They finally stepped down into the water and walked in chest high water to safety. The engineer told the trainmaster that it was foggy and did not see the debris on the track until their train was upon it. The trainmaster said on average 2-to-9 trains operate daily on that segment of the railroad.

Interview Transcripts of the Engineer and Train Master will be placed in the Docket. The Conductor was not available for an interview.

Method of Operation

CSX authorizes train movements with a Traffic Control System (TCS). Train movements are coordinated by the FG train dispatcher located at the Dispatch Center in Jacksonville, Florida. Train movements on the Kingsport Subdivision are governed by signal indications of the traffic

control system and dispatcher permission. The maximum authorized speed on this segment of track was 25 mph.

Operating Documents

- Employee Operating Manual, effective July 1, 2019
- Kingsport Subdivision Timetable No.2, effective October 1, 2018
- Big Sandy Subdivision Timetable No.2, effective April, 2019
- Dispatcher Bulletin 24151, effective February 13, 2020

Trip Optimizer Information

Wabtec confirmed that there was a successful Trip Optimizer trip initialization and trip end/summary on CSXT 168 on the morning of 2/13/2020.

The Trip Optimizer data log showed that from the beginning of the trip to the time of the accident the train traveled 10.09 total miles and 6.5 miles of those miles were in auto control.

Based on that data log:

- At 06:04: The locomotive operator accepted the trip data. This would have been where the crew boarded the train and the train departed from (Shelbiana, KY) milepost CMG 114.
- At 06:46 the trip ended near the CMG 123.8

The data shows that the train speed just prior to the derailment was at or near 24 mph. The train throttle was in position 5.

5 of those miles were operated in auto control (similar to cruise control). WABTEC provided information of the Trip Optimizer; it will be placed into the public docket.

Train Crew Work History

Engineer 10-day work History

Date/Time On Duty	Date/Time Off Duty	Total Time On Duty
02/03/20-8:30 a.m.	02/03/20-8:25 p.m.	11 hours, 55 minutes
02/04/20-5:55 p.m.	02/05/20- 6:34 a.m.	12 hours, 39 minutes
02/07/20-8:50 p.m.	02/08/20-10:38 a.m.	13 hours, 48 minutes
02/10/20-1:30 a.m.	02/11/20-11:15 a.m.	9 hours, 45 minutes
02/13/20-12:50 a.m.		Day of accident

Conductor 10-day Work History

Date/Time On Duty	Date/Time Off Duty	Total Time On Duty
02/03/20-7:30 a.m.	02/03/20-5:35 p.m.	10 hours, 5 minutes
02/04/20-2:30 p.m.	02/04/20-11:30 p.m.	9 hour, 0 minutes
02/06/20-9:30 a.m.	02/06/20-8:20 p.m.	10 hours, 50 minutes
02/07/20-9:15 p.m.	02/08/20-3:25 a.m.	6 hours, 10 minutes
02/08/20-10:30 p.m.	02/09/20-7:00 a.m.	8 hours, 30 minutes
02/10/20-6:00 a.m.	02/10/20-11:55 a.m.	5 hours, 55 minutes
02/11/20-10:00 p.m.	02/12/20-4:45 a.m.	6 hours, 45 minutes
02/13/20-12:50 a.m.		Day of accident

Train Crew Training History

Employee: Conductor

Hire Date: 03/23/1998

TRAIN SERVICE ENGINEER Start Date: 01/20/2006

Last Physical characteristics Exam:1/27/2020

Last Operational test: 01/17/2020

Last Rules Testing/Training: 1/27/2020

Employee: Engineer

Hire Date: 07/11/1994

TRAIN SERVICE ENGINEER Start Date: 04/08/1997

Last Physical characteristics Exam:1/21/2020

Last Operational test: 01/09/2020

Last Rules Testing/Training: 1/21/2020

Appendix A

6402 Key Train Definition

A "Key Train" is any train as described in either a, b, or c below:

a. one (1) or more loads of spent nuclear fuel (SNF) or high level radioactive waste (HLRW) moving under the following Hazardous Materials Response Codes - 4929142, 4929143, 4929144, or 4929147

or

b. one (1) or more loaded tank cars containing materials that require the phrase "POISON/TOXIC- INHALATION HAZARD" on the shipping papers (Hazard Zone A, B, C, or D), anhydrous ammonia (UN1005), or ammonia solutions (UN3318)

or

c. twenty (20) or more loaded hazardous materials shipments or intermodal portable tank loads having any combination of hazardous materials.
Exception: Do not count box cars, trailers, or containers carrying mixed loads of hazardous materials when determining key train status.

I have read and approve the Report

Tomas R Torres – NTSB Operations

	Date	12/16/2020
Zack Zagata- NTSB Operations		12/16/2020
Barry Stamper- FRA Operating Practices		05/15/2020
	Date	
Steve Ammons- CSX CSX		No Reply
	Date	
Randy Fannon- BLET Safety Task Force		05/17/2020
	Date	
Jeffery K. Mitchell SMART-		No Reply
	Date	