

**NATIONAL TRANSPORTATION SAFETY BOARD**  
Vehicle Recorder Division  
Washington, D.C. 20594

November 25, 2019

## **Locomotive Event Recorder**

### **Specialist's Factual Report By Charles Cates**

#### **1. EVENT SUMMARY**

Location: Estill, South Carolina  
Date: November 30, 2018  
Company: CSX Railroad  
Train ID/Locomotive: CSXT8065/Lead Locomotive  
NTSB Number: RRD19FR002  
Summary: Refer to the Accident Summary report, within this docket.

#### **2. LOCOMOTIVE EVENT RECORDER GROUP**

A locomotive event recorder group was not convened.

#### **3. DETAILS OF RECORDER INVESTIGATION**

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following locomotive event recorder:

Device:	<b>Quantum Q1069</b>
Serial Number:	<b>94090322</b>
Locomotive ID:	<b>CSXT8065/Lead Locomotive</b>

##### **3.1. Locomotive Event Recorder Condition**

The recorder was in good condition and the data were extracted normally using the Quantum Desktop Playback Software and NTSB equipment.

Figure 1. Photo of Quantum Q1069 recorder from CSXT8065 Lead Locomotive



### 3.2. Locomotive Event Recorder Recording Description

Using the wheel size of 37.5 inches as provided by investigators, CSXT8065 event recorder data were extracted using the Quantum Desktop Playback (QDP) Software. The QDP Software outputted the locomotive event recorder parameters including distance and speed. The exported data have a sampling rate of one Hertz; therefore, data has an accuracy of +/- 1 second. Only the data relevant to this event are provided in this report.

### 3.3. Parameters

Table A-1 lists the parameters verified and provided in this report for CSXT8065. Additionally, table A-2 contains the unit and discrete state abbreviations for the parameters.

#### 3.3.1. Distance Traveled

The default output for the locomotive event recorder's total distance traveled started at 0 and the values were significantly large near the event. The number of feet traveled increases from 0 to 5,280 ft (one mile) and resets to zero to begin counting the next mile. Each time the number of feet resets to zero the number of miles increases by one.

### 3.4. Event Recorder Timing

The recorded time from the CSXT8065 locomotive event recorder data file is independently time stamped and, consequently, the times may not reflect the actual time of the day. Therefore, all times in this report and attachment are referenced as Recorder Time.

### 3.5. Plots and Corresponding Tabular Data

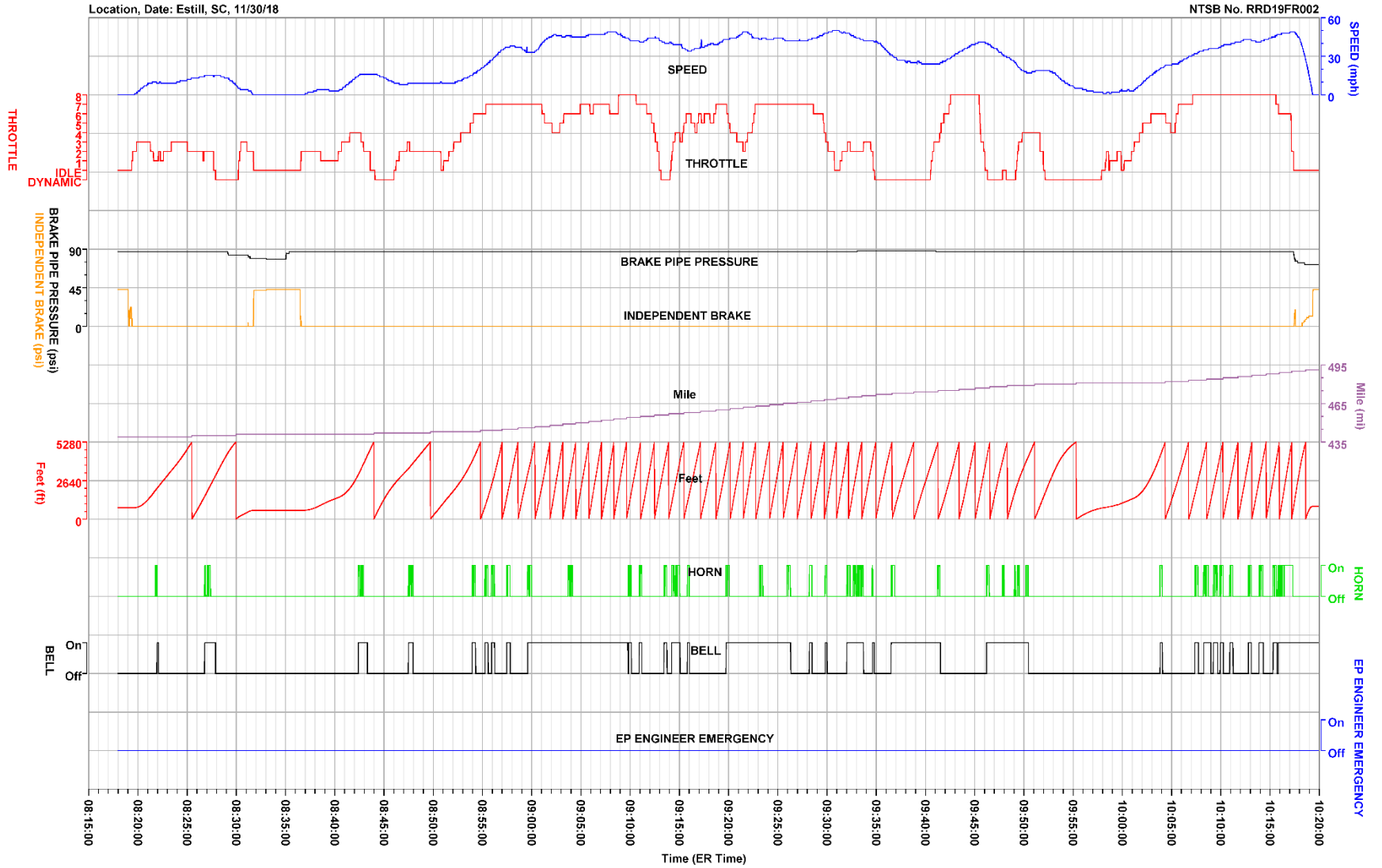
Figures 2 and 3 contain locomotive event recorder data from CSXT8065 recorded during the event on November 30, 2018. All the parameters listed in table A-1 were plotted.

In brief, the locomotive event recorder data from CSXT8065 indicated the following:

- At 08:36:36 the locomotive independent brake pressure reduced to 0 psi and the throttle advanced from idle, and by 08:37 the locomotive began moving. Brake pipe pressure was 87 psi.
- For the next one hour and fifteen minutes the locomotive's speed ranged between 3-49 mph and the throttle varied through its full range including dynamic brake, idle, and positions 1-8. Horn and bell were in use at points throughout, and the air brakes were not used.
- At 10:00:00 the speed was 3 mph and the throttle was at idle. Shortly after, the throttle was advanced and speed began to increase. The throttle reached position 8 at 10:07:10, and the locomotive continued to accelerate.
- At 10:15:00 the throttle was still at position 8 and speed was 44 mph and increasing.
- At 10:15:19 the horn began a series of long blasts that continued for the next two minutes. The horn was recorded as sounding continuously for 51 seconds from 10:16:29 until 10:17:20.
- At 10:15:37 and 10:15:53 the throttle reduced to position 7 and 6, respectively. At 10:17:12 the throttle reduced to position 2, approximately 9 seconds after reaching 49 mph.
- At 10:17:24 with the locomotive traveling 49 mph the throttle reduced to idle and brake pipe pressure began to reduce. Speed began to decrease at 10:17:34.
- As the locomotive slowed the brake pipe pressure reduced from 87 to 72 psi. The independent brake pressure went to 19 psi and then back to 0 when the locomotive first began to decelerate, then began gradually increasing at 10:18:17 when the locomotive was traveling 38 mph, reaching 12 psi at 10:18:56 when the locomotive was traveling 17 mph. Independent brake pressure increased to 43 psi after the locomotive came to a stop.
- Speed reached 0 mph approximately 46 seconds after throttle reduction and brake application, at 10:18:20.

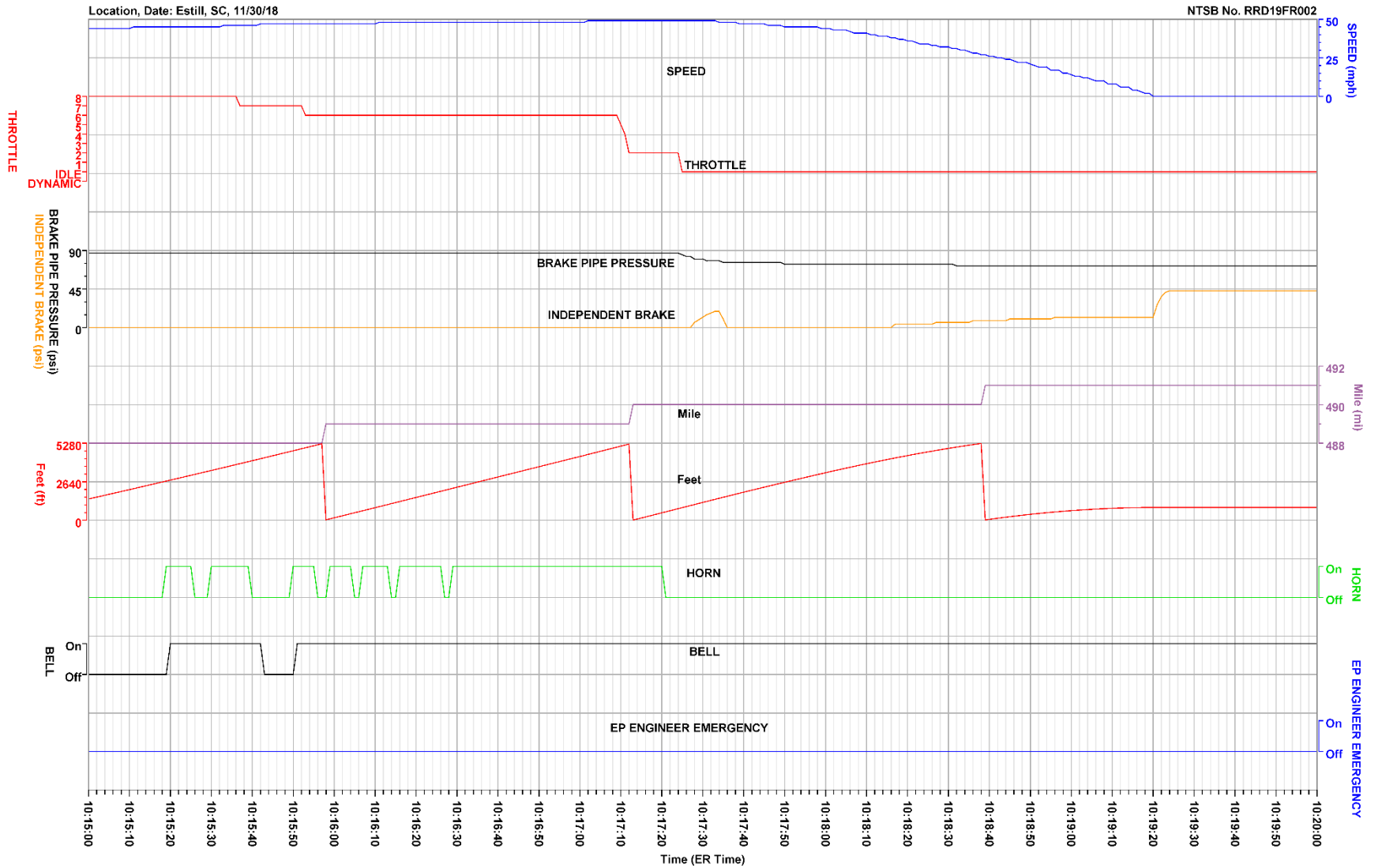
- No emergency signals including Engineer Induced Emergency or Train Emergency were recorded as active.

Figure 2: CSXT8065 locomotive event recorder parameters (2 hours 5 minutes).



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Figure 3: CSXT8065 locomotive event recorder parameters (5 minutes).



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## APPENDIX A

This appendix describes the locomotive event recorder parameters provided and verified in this report for CSXT8065. Table A-1 lists the plot labels, parameter descriptions, and units. Table A-2 contains the unit and discrete state abbreviations for the parameters.

**Table A-1. Verified and provided locomotive event recorder parameters for CSXT8065.**

<b>Plot Label</b>	<b>Parameter Description</b>	<b>Units</b>
1. Bell	Bell Active	
2. Brake Pipe Pressure	Brake Pipe Pressure	psi
3. EP Engineer Emergency	Engineer Induced Emergency Signal	
4. Feet	Feet Traveled	ft
5. Horn	Horn Active	
6. Independent Brake	Locomotive Independent Brake Pressure	psi
7. Mile	Miles Traveled	mi
8. Speed	Locomotive Speed	mph
9. Throttle	Throttle Position	

NOTE: Parameters with a blank unit description in table A-1 are discretes. A discrete is typically a 1-bit parameter that is either a 0 state or a 1 state where each state is uniquely defined for each parameter.

**Table A-2. Unit and discrete state abbreviations.**

<b>Unit and Discrete Abbreviation</b>	<b>Description</b>
ft	feet
psi	pounds per square inch
mi	mile
mph	miles per hour