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

April 25, 2019

Locomotive Event Recorder

Specialist's Factual Report
By Charles Cates

1. EVENT SUMMARY

Location:	Bowie, MD
Date:	April 24, 2018
Company:	Amtrak (ATK)
Train ID/Locomotive:	ATK Train 86/Locomotive ATK 625
NTSB Number:	RRD18FR006
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 an event recorder file from the crash hardened memory (CHM) of the Train 86 locomotive, ATK 625.

3.1. Locomotive Event Recorder Recording Description

Train 86's locomotive event recorder data were extracted using the Wabtec Railway Electronics Event Recorder Data Analysis (WRE DAS) Software. The WRE DAS Software outputted the locomotive event recorder parameters including distance and speed. The exported data have a sampling rate of one second; therefore, the data have a time accuracy of +/- 1 second. Only the data relevant to this event are provided in this report.

3.2. Parameters

Table A-1 lists the parameters verified and provided in this report for ATK 625. Additionally, table A-2 contains the unit and discrete state abbreviations for the parameters.

3.2.1. Distance Traveled

The default output for the distance traveled is the distance decreasing in time. Therefore, the distance traveled began with a very large value and continually decreased to 0 feet.

3.3. Time Correlation

The times exported were provided as event local time, eastern daylight time (EDT). No other time offset was applied to the event recorder data. Therefore, for the rest of the report all times are referenced as EDT.

3.4. Plots and Corresponding Tabular Data

Figures 1 and 2 contain locomotive event recorder data from ATK 625 recorded during the event on April 24, 2018. All the parameters listed in table A-1 were plotted.

Figure 1 shows a time period of 20 minutes leading up to and including the time of the accident and Figure 2 shows a time period of two minutes leading up to and including the accident.

The reviewed data began with the train stopped about 17 miles from the end of the recording at 8:40:00 EDT. Brake cylinder pressure dropped to 0 psi and the throttle increased off idle at 8:40:30 EDT. The train traveled about 8.5 miles at speeds up to 118 mph before coming to a stop at 8:50:27.

The train remained stopped for 1 minute 50 seconds before accelerating again to a speed of 41 mph, with a cab signal present of AL45. At 8:53:30 the cab signal changed to C125 and the train accelerated to speeds between 104-107 mph.

At 8:57:10 speed began to decrease to between 97-99 mph. At 8:57:40 the horn and bell were recorded as being active and the locomotive was about 1.5 miles from the end of the recording. The horn was active for five 1-5 second blasts between 8:57:40 and 8:58:10.

At 8:58:12 EIE became active and EAB BP pressure dropped to 0 psi, while the EAB BC pressure rose to 75 psi, consistent with the locomotive entering emergency. The speed at this time was 98 mph. The speed began to decrease at 8:58:14 and the locomotive steadily decelerated until it stopped at 8:58:54. From the time the EIE activated until the locomotive stopped it traveled 3,273 feet (0.62 miles).

All of the corresponding tabular data used to create figures 1 and 2 are provided in electronic separated value (.csv) format as attachment 1 to this factual report.

Figure 1: ATK 625 event recorder data showing 20 minutes up to and including the accident.

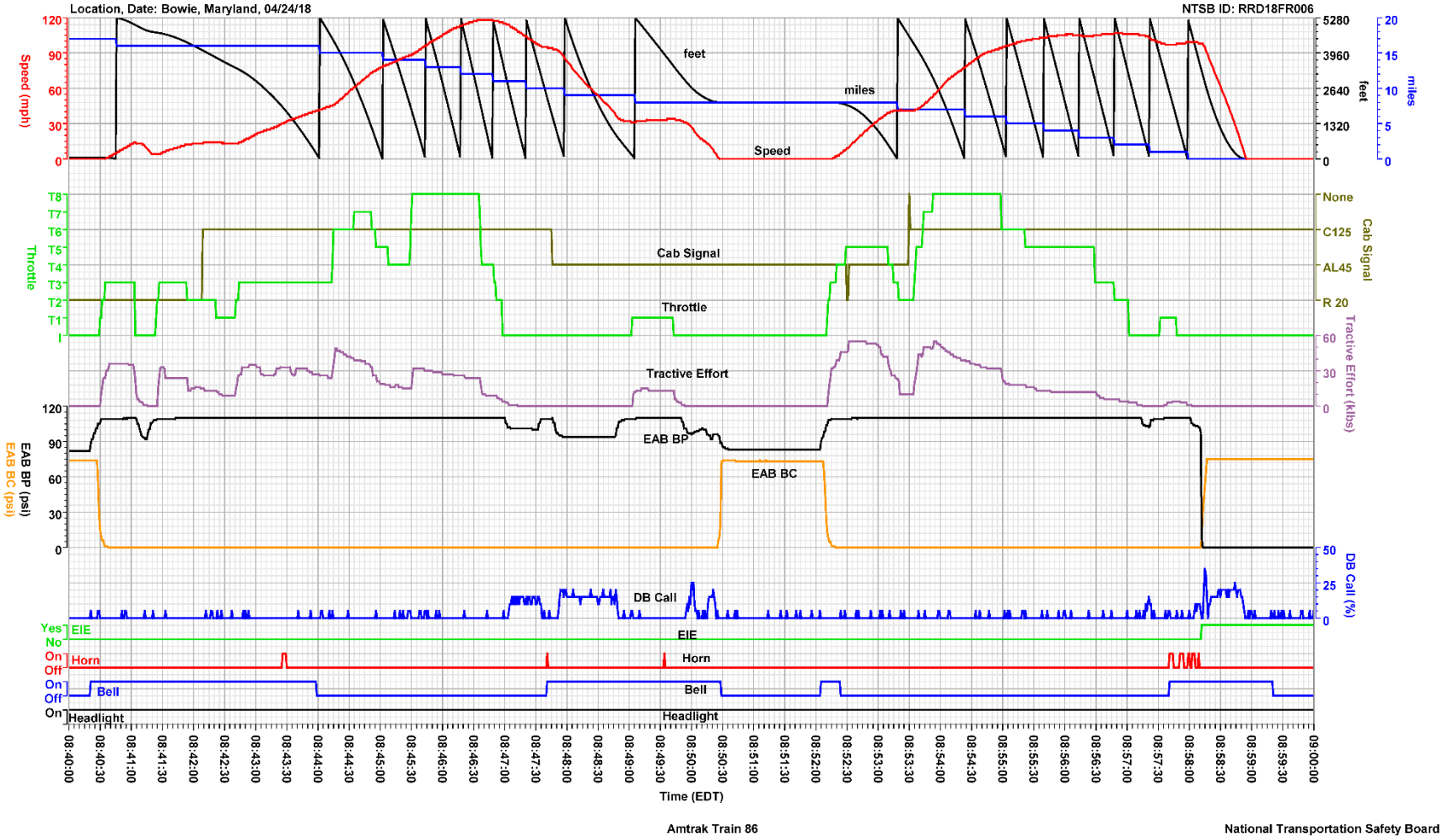
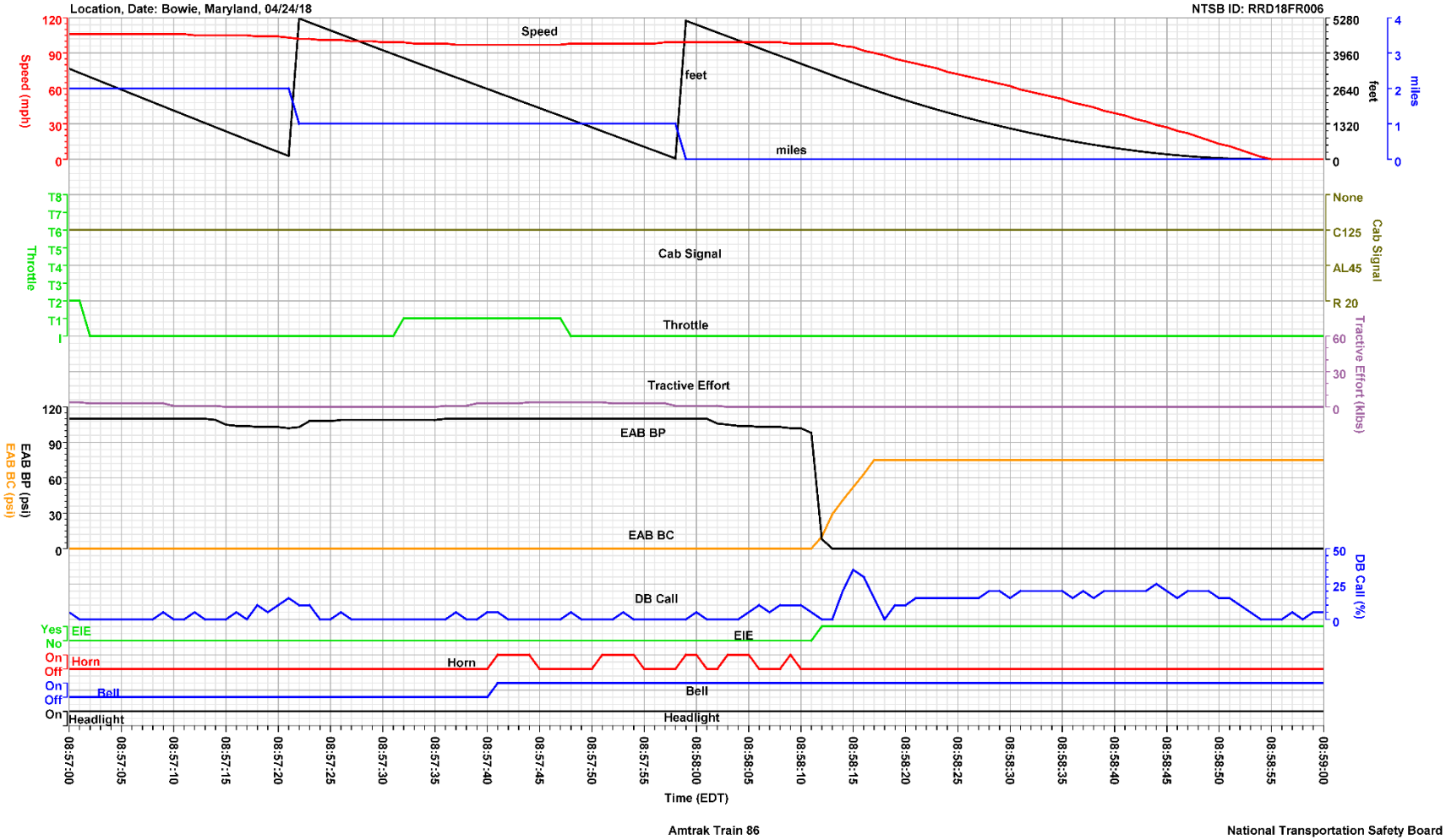


Figure 2: ATK 625 event recorder data showing two minutes up to and including the accident.



APPENDIX A

This appendix describes the locomotive event recorder parameters provided and verified in this report for ATK 625. 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 ATK 625.

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.

Plot Label	Parameter Description	Unit
Bell	Bell Active	
Cab Signal	Cab Signal Displayed	
DB Call	Dynamic Brake Commanded	%
EAB BC	Electronic Air Brake - Brake Cylinder Pressure	psi
EAB BP	Electronic Air Brake - Brake Pipe Pressure	psi
EIE	Engineer Induced Emergency	
feet	Feet traveled (0 to 5,280)	feet
Headlight	Headlight On	
Horn	Horn Active	
miles	Miles traveled	miles
Speed	Locomotive Speed	mph
Throttle	Throttle Position	
Tractive Effort	Tractive Effort	klbs

Table A-2. Unit and discrete state abbreviations.

Unit and Discrete Abbreviation	Description
psi	pounds per square inch
C125	Clear 125 Signal
AL45	Approach Limited 45 Signal
R20	Restricted 20 Signal
mph	miles per hour
klbs	thousand pounds
I	Idle
Tn	Throttle Setting n (T1-T8)