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

February 15, 2017

Locomotive Event Recorder Data - Ancillary Data

Specialist's Factual Report
By Cassandra Johnson

1. EVENT SUMMARY

Location:	Panhandle, Texas
Date:	June 28, 2016
Operator:	BNSF Railway
Train:	Eastbound Train S-LACLPC1-26K
Locomotive ID:	5162 (lead locomotive)
NTSB Number:	DCA16FR008
Summary:	Refer to the Accident Summary report, within this docket.

2. DETAILS OF LOCOMOTIVE EVENT RECORDER ANCILLARY DATA

In support of the investigation, the National Transportation Safety Board (NTSB) Vehicle Recorder Division received the locomotive event recorder data file from BNSF 5162, the lead locomotive on the eastbound train. This data had been remotely transmitted by the on-board Wi-Tronix system after BNSF 5162 arrived into Amarillo, TX (about 2 hours before the collision). The locomotive event recorder data from BNSF 5162 was obtained to review the activity of the Trip Optimizer State parameter and the Alerter Alarm parameter.

2.1. BNSF 5162 Locomotive Event Recorder Recording Description

Using the wheel size of 42 inches,[1] the locomotive event recorder data for BNSF 5162 were extracted using the Wabtec Railway Electronics Event Recorder Data Analysis software. This software computed the locomotive event recorder parameters including distance and speed. The exported data have a sampling rate of one sample per second; therefore, the data set has an accuracy of +/- 1 second. Only pertinent data from BNSF 5162 are provided in this report.

2.2. Parameters

Table A-1 lists the parameters verified and provided in this report for BNSF 5162. Specifically, table A-1 lists the plot labels, parameter descriptions, and units. Additionally, table A-2 contains the unit and discrete state abbreviations for the parameters.

2.3. Event Recorder Timing

The recorded time from BNSF 5162's locomotive event recorder data is independently time stamped and, consequently, the times may not reflect the actual time of day. However, the Wi-

[1] The wheel size was obtained from BNSF 5162's January 19, 2016 Wheel Inspection Report.

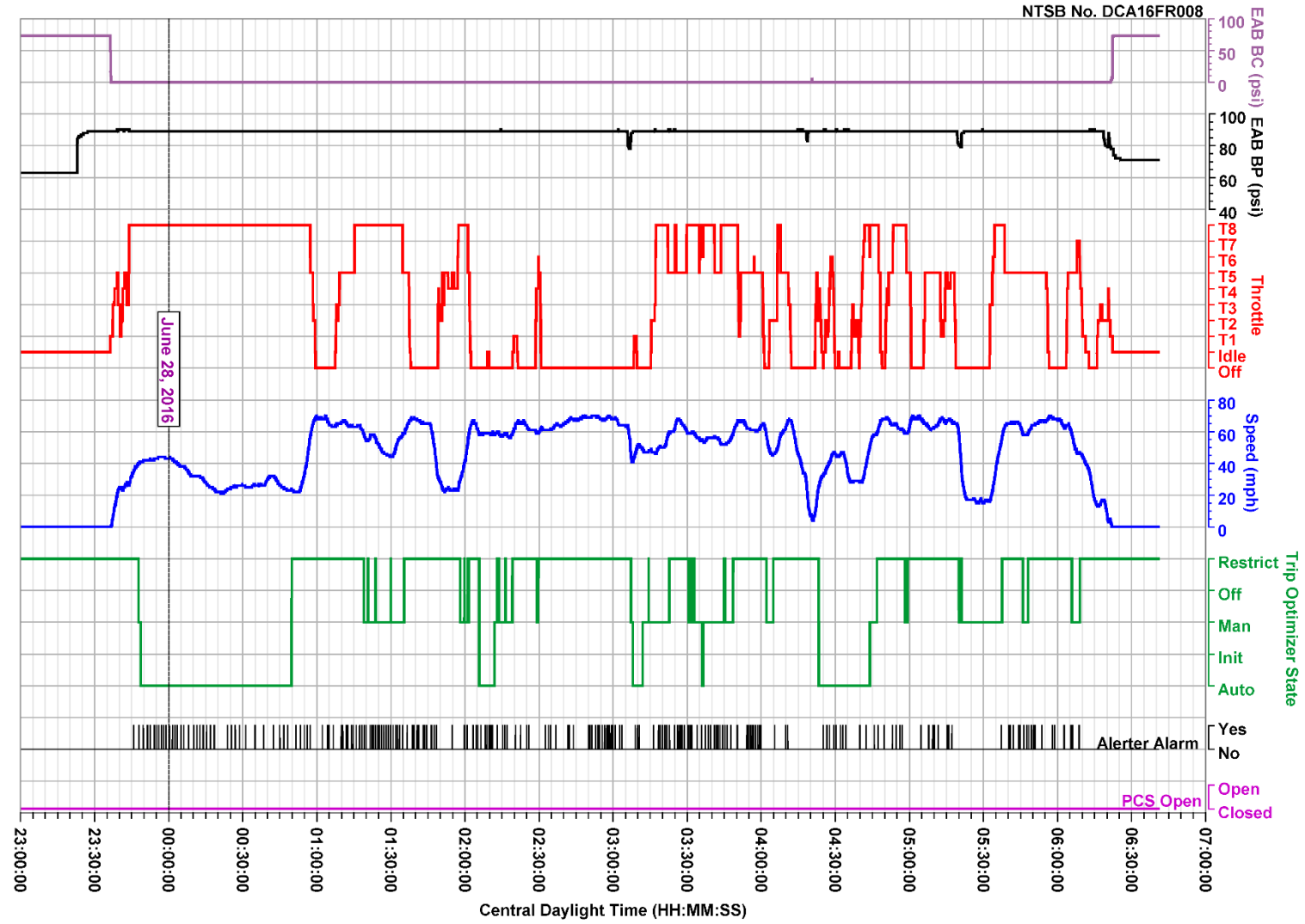
Tronix equipment onboard BNSF 5162 included an internal Global Positioning System (GPS) which provided GPS time with a +/- 1 second accuracy adjusted to central daylight time (CDT). The Wi-Tronix software adjusted the event recorder's time by subtracting 37 minutes and 45 seconds to change the recorder time to local time. Therefore, for the rest of the report, all times are referenced as CDT.

2.4. Plot and Corresponding Tabular Data

Figure 1 contains locomotive event recorder data from BNSF 5162 recorded from June 27, 2016 at 23:00:00 CDT (11:00 pm) to June 28, 2016 at 06:40:54 CDT (6:40:54 am). All the parameters listed in table A-1 were plotted. In brief, the locomotive event recorder data from BNSF 5162 indicated that both the Trip Optimizer State and the Alerter Alarm parameters were active.

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

Figure 1. BNSF 5162's locomotive event recorder data (June 27, 2016 at 23:00:00 CDT to June 28, 2016 at 06:40:54 CDT)



Revised: 15 February 2017 BNSF 5162 Event Recorder Data (6/27/16 23:00:00 CDT to 6/28/16 06:40:54 CDT) National Transportation Safety Board

APPENDIX A

This appendix describes the locomotive event recorder parameters provided and verified in this report for BNSF 5162. 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.

Plot Label	Parameter Description	Unit
1. Alerter Alarm	Alerter Alarm	
2. EAB BC	Electronic Air Brake – Brake Cylinder Pressure	psi
3. EAB BP	Electronic Air Brake – Brake Pipe Pressure	psi
4. PCS Open	Pneumatic Control Switch	
5. Speed	Speed	mph
6. Throttle	Throttle Position	
7. Trip Optimizer State	Trip Optimizer State	

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.

Units and Discrete Abbreviation	Description
Init	Initialized
Man	Manual
mph	miles per hour
psi	pounds per square inch
T1	Throttle Position 1
T2	Throttle Position 2
T3	Throttle Position 3
T4	Throttle Position 4
T5	Throttle Position 5
T6	Throttle Position 6
T7	Throttle Position 7
T8	Throttle Position 8