RAILROAD SIGNAL & TRAIN CONTROL GROUP
FACTUAL REPORT OF INVESTIGATION

Derailment of Eastbound Amtrak #4 (Southwest Chief)
Near MP 372.9 in the vicinity of Cimarron Kansas

March 14, 2016

DCA16MR004

Contents

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF RAILROAD, PIPELINE &
HAZARDOUS MATERIALS INVESTIGATIONS
WASHINGTON, D.C. 20594

A. ACCIDENT

Type:	Derailment
Date and Time:	March 14, 2016 at 12:02 a.m. CDT
Location:	MP 372.9 Cimarron Kansas
Carrier:	Burlington Northern Santa Fe Railroad
Train:	Eastbound Amtrak #4 Southwest Chief
Fatalities:	0
Injuries:	Approximately 33 injuries
NTSB #	**DCA16MR004**

B. SIGNAL & TRAIN CONTROL GROUP

R. Page
Railroad Accident Investigator
NTSB Office of Railroad, Pipeline, and Haz-Mat Investigations

Luong Van Le
Signal &Train Control Inspector
US Department of Transportation
Federal Railroad Administration

Larry Brackett
Manager of Signals
Burlington Northern Santa Fe Railroad

C. ACCIDENT SUMMARY

On March 14, 2016, at 12:02am CDT, Amtrak train #4 (Southwest Chief) derailed near MP372.9 in the vicinity of Cimarron, KS. This LA to Chicago train consisted of two locomotives and 10 cars. Four cars were derailed on their sides, one car derailed and was leaning, two cars derailed upright, and one car derailed a single truck. There were approximately 130 passengers and 14 crew members on board. Initial reports indicated that between 10 and 33 passengers were transported and/or treated for injuries at two area medical centers. The American Red Cross responded to assist with passengers.

This event occurred on the Burlington Northern Santa Fe (BNSF), La Junta Division. The maximum allowable speed on this section of rail is 60 mph for passenger trains and 40 mph for freight trains. Estimated damages are $1,463,000.00.

Parties to the investigation were Amtrak, BNSF, FRA, BMWED, SMART, BLET, and the Gray County Sheriff's Office.

D. DETAILS OF THE INVESTIGATION

1. Description and Method of Operation of the BNSF La Junta Subdivision

The La Junta Subdivision of the BNSF Kansas Division Timetable extends from MP 124.7 near Emporia, Kansas to MP 533.6 near Las Animas, Colorado in a timetable east-west direction. The maximum authorized speed on the subdivision is 79 mph for passenger trains and 55 mph for freight trains with permanent speed restrictions between posted timetable mileposts. In the vicinity of the accident area, the BNSF operates trains over a single main track with passing sidings utilizing Track Warrant Control (TWC)[1] with Automatic Block Signal System (ABS)[2] and Automatic Train Stop System (ATS)[3]. Additionally, train movements on the La Junta Subdivision are governed by operating rules, timetable instructions, and signal indications of the automatic block signal system.

1. The BNSF defines TWC as a method to authorize train movements or protect men or machines on a main track within specified limits in a territory designated by the timetable.
2. The FRA defines ABS as a block signal system wherein the use of each block is governed by an automatic block signal, cab signal, or both.
3. The FRA defines ATS as a system so arranged that its operation will automatically result in the application of the brakes until the train has been brought to a stop.

2. Description of the Railroad Signal System

2.1 BNSF La Junta Subdivision

The Railroad Signal System on the La Junta Subdivision consists of areas with signal indications of a Traffic Control System (TCS), and additional areas of Track Warrant Control (TWC) supplemented by signal indications of an Automatic Block Signal (ABS) system arranged for movements in either direction. The entire subdivision is equipped with an Automatic Train Stop (ATS) for passenger trains. The La Junta Subdivision dispatcher, at the BNSF Network Operations Center (NOC), is located in Fort Worth, Texas.

In the vicinity of the accident area, the BNSF operates trains over a single main track with passing sidings utilizing ABS and ATS systems. The wayside signal equipment consists of both searchlight and color light type signals, hand-operated switches equipped with US&S switch circuit controllers, and electronically coded track circuits (Electro-Code 5). The system is designed with approach lighting to activate signals within the block.

The ABS System in the block of the accident uses coded track circuits in conjunction with train presence to activate signals within the block. Eastbound train movements into the block are governed by the Absolute signal located at the East Siding Switch Charleston (MP 382.8) using wayside searchlight signals with a single head capable of displaying green, yellow, flashing yellow, and red aspects. Eastbound Intermediate Signals MP 380.1, MP 377.3, and MP 374.1 are equipped with wayside color light signals with a single, three position head capable of displaying a green, yellow, red, and flashing red aspects. Each intermediate is also equipped with automatic train stop inductors designed to apply the brakes of the train automatically in the event a train crew fails to acknowledge a restricting signal.

2.1A Planned PTC Installations

Portions of the La Junta Subdivision will be equipped with positive train control (PTC). In the area of the accident there are no current plans for PTC installation. However, BNSF has requested to operate under a limited passenger train operation for this particular section of track. FRA will conduct an investigation into the BNSF request and then make a decision in this matter.

3. Post-accident Signal Data Logs

Field signal equipment maintains logs of signal data individually. Therefore each location is not synchronized with other locations. Table 1 summarizes ABS signal events recorded for Amtrak Train #4 as it proceeded east bound from East End of Charleston MP 382.8 to the point of derailment MP 372.9. It must be noted that the times reflected in this table chart are CST prior to Daylight Savings Time becoming effective at 2:00 am on March 13, 2016.

Signal Location	ABS Eastbound Signal Aspect	Time of East Track Occupancy	ABS Eastbound Signal Aspect After Occupancy
MP 382.8 – ESS CHARLESTON	Green	22:55:26 CST	Red
MP 380.1 - INTERMEDIATE	Green	22:57:50 CST	Red
MP 377.3 - INTERMEDIATE	Green	22:56:53 CST	Red
MP 374.1 - INTERMEDIATE	Green	23:05:42 CST	Red

Table 1. *BNSF post-accident ABS signal data log*

4. Defect Detectors

In addition to wayside signal data, downloads were obtained from defect detectors encountered by the Amtrak Train #4. Table 2 summarizes the data from the hot bearing and dragging equipment detectors.

Location	Train	Train Speed IN / OUT	Defects
MP 418.1 - Deerfield	Amtrak #4 Southwest Chief	78/78 MPH	No Defects
MP 397.7 - Garden City	Amtrak #4 Southwest Chief	61/60 MPH	No Defects
MP 380.2 - Ingalls	Amtrak #4 Southwest Chief	61/61 MPH	No Defects

Table 2. *Data from defect detectors for Amtrak train #4*

5. Highway Grade Crossing Warning System

Main Street crosses the BNSF main track at MP 377.3. The highway-rail grade crossing was equipped with a Safetran grade crossing predictor. The data log from the highway grade crossing warning system was downloaded. Table 3 summarizes the data from the Highway Grade Crossing Warning Device

Location	Train	Warning time	Train Speed
MP 377.3 - Main Street DOT# 012910F	Amtrak #4 Southwest Chief	33 seconds	60

Table 3 *Data from Main Street Highway Grade Crossing Warning Device*

6. Post-Accident Signal System Examination and Testing

The post-accident inspection found all signal equipment secured with no indications of tampering or vandalism.

Absolute and intermediate signals were examined and all locations equipped with data loggers were downloaded. Signal aspects were verified and ground tests were performed. Post-Accident signal lamp voltage measurements were recorded.

There were no defects noted during the examination of the signal system or the associated signal appurtenances.

7. BNSF Signal System Trouble/Remedy Tickets

Signal system trouble/remedy tickets logged by the Network Operations Center for East End Charleston MP 382.8 to and including West End Cimarron were reviewed for the 12-month period preceding the accident. No exceptions taken.

8. BNSF Railroad Maintenance Records

Railroad Maintenance, inspections and tests records were provided for monthly, quarterly, semi-annual, annual, 2 year, 4 year, and 10 year inspections for the East End Charleston to and including the West End of Cimarron ABS signal block. No exceptions taken.

9. Damages

There was no damage to the BNSF signal system as a result of this derailment.

E. ATTACHMENTS

1. Signal locations event recorded data

2. Inspection records

3. Prints

4. Signal system trouble reports

END OF SIGNAL GROUP FACTUAL REPORT

TO BE FILLED OUT BY PARTY REPRESENTATIVE

REGARDING:

NTSB accident DCA 16 MR 004, On March 14, 2016, at 12:02am CDT, Amtrak train #4 (Southwest Chief) derailed near MP372.9 in the vicinity of Cimarron, KS.

I have reviewed the NTSB Signal & Train Control Factual Report concerning the above referenced accident and (check one):

- ❑ I have no comments or corrections
- ❑ I have comments or corrections which are attached
- ❑ I have sent comments or corrections separately.

(Please return by August 5, 2016)

_____

Signature

_____

Organization Date