RAILROAD SIGNAL &
TRAIN CONTROL FACTUAL REPORT

Train Derailment & Collision in
Casselton, ND on
December 30, 2013

DCA-14-MR-004

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

Accident

LOCATION:	Casselton, ND
TRAIN 1:	Eastbound U-FYNHAY4-05
TRAIN 2:	Westbound G-RYLRGT9-26A
OPERATOR:	BNSF Railroad
DATE:	December 30, 2013
TIME:	2:10 p.m.
NTSB #:	**DCA-14-MR-004**

Signal & Train Control Group

Michael Hiller
NTSB Accident Investigator
[redacted]
Washington, DC 20594
[redacted]

Doug M. Proffitt
Director Signal, South Operations
BNSF Railroad
[redacted]
Kansas City, KS 66106
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Synopsis

On Monday December 30, 2013, at 2:11 p.m. central standard time, westbound BNSF grain train G-RYLRGT9-26A consisting of two head end locomotives, one rear DPU[1] and 112 cars derailed 13 loaded cars (the 43rd through 55th) at MP 28.5 of the KO Subdivision, Twin Cities Division in Casselton, North Dakota while traveling on Main Track #1. The derailment occurred in the middle of the train resulting in one of the grain cars, BNSF 486653, blocking Main Track #2. Eastbound BNSF petroleum oil train U-FYNHAY4-05T consisting of two head end locomotives, one rear DPU and 114 cars, collided with BNSF 486653 of the grain train, derailing the leading locomotives and 21 cars to the south on Main #2. After the collision more than 400,000 gallons of petroleum crude oil was released fueling a fire.

A voluntary evacuation of approximately 1400[2] civilians from the town of Casselton was ordered by local emergency officials. No civilian injuries were reported. The train crew from U-FYNHAY4-05T, consisting of an engineer and a conductor, escaped from the rear door of the lead locomotives uninjured. The crew from train G-RYLRGT9-26A was not injured.

BNSF has estimated damages at $8.0M, this does not include environmental remediation. The weather at the time of the accident was cloudy and -1 degrees Fahrenheit, winds N at 7MPH.

The parties to the investigation include the Federal Railroad Administration (FRA), the US Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA), the BNSF Railroad, the Brotherhood of Local Engineers and Trainmen (BLET), Standard Steel, LLC and Sheet Metal, Air, Rail and Transportation (SMART) [3].

Details of the Investigation

Description of Railroad Signal System

The BNSF Railroad, KO Subdivision consists of main tracks, sidings, yards etc. It runs in a geographic east-west direction between Minot, ND (MP 203.2X[4]) and East Dilworth, MN (MP 250.3). In the vicinity of the accident, the track structure consists of two main track territory. The maximum authorized speed on the two main tracks in the vicinity of the accident is 70 mph with a permanent head-end speed restriction of 40 MPH between MP 27.0 and MP 28.0.

Train movements on the KO Subdivision are governed by the General Code of Operating Rules[5] and the signal indications of a traffic control signal system. The traffic control signal system utilizes four aspect wayside signals. The signal system is arranged for running in both directions on each. Typically BNSF designates the northern track as Main Track #1. The southern track is designated as Main Track #2.

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[1] Distributive locomotive power unit.
[2] Estimated at the time of this report.
[3] Formally the United Transportation Union (UTU)
[4] Refers to duplicate mile posts in this location.
[5] Operating Rules Effective April 7, 2010, as amended September 1, 2013.

The BNSF Railroad Network Operations Center (NOC) is located in Fort Worth, TX and coordinates train movements. The Dispatchers utilize a Train Management and Dispatch System (TMDS) software package to coordinate train movements.

Given the primacy of the BNSF Dispatching Center in terms of operational monitoring on the KO Line, the clock time from the NOC was regarded as the standard time. Clock times relevant to this incident are derived from the BNSF Railroad NOC clock[6] and are referenced in this report unless otherwise noted.

Dispatcher Data Logs

Data logs from the TMDS system indicate the eastbound route on Main Track #2 through CP 30 was requested at 1:52:35 pm for eastbound train U-FYNHAY4-05. The route indicated lined at 1:52:57 p.m. At 2:09:45 p.m., CP30 eastbound signal indicated stop which means, the signal was displaying a red aspect.

The westbound route on Main Track #1 at CP Casselton was requested at 1:56:16 p.m., for westbound train G-RYLRGT9-26A. The route indicated lined at 1:57:51 p.m.

Signal Equipment Data Logs

Data logs from the signal equipment was downloaded and reviewed. The logs indicate the following:

1. At 2:02:30 p.m., the westbound train passes the track side warning device (dragging equipment and hot journal detector) at MP 25.3 on Main #1
2. At 2:03:48 p.m., the westbound train passes intermediate signal 25.8, displaying a green aspect, and occupies the track west of the signal on Main Track #1.
3. At 2:08:02 p.m., the eastbound train passes CP KO Junction at MP 31.11, displaying a flashing yellow over red aspect, occupying the OS section (east of the controlled signal) of CP KO Junction on Main Track #2.
4. At 2:08:56 p.m., the westbound train passes the controlled signal displaying a yellow over yellow aspect at CP Casselton, occupying the OS section (west of the controlled signal) of CP Casselton on Main track #1.
5. At 2:09:42 p.m., the eastbound train passes the controlled signal displaying a flashing yellow over red aspect at CP 30, MP 30.02, occupying the OS section of CP 30 (east of the controlled signal) on Main Track #2.
6. At 2:09:26 p.m., the westbound train shunts the track west of CP Casselton at MP 28.45 on Main Track #1.
7. At 2:09:50 p.m., the eastbound train shunts the track east of CP 30 at MP 30.02 on Main Track #2.

[6] BNSF Railroad Dispatching Center equipment is synchronized to UTC time.

Signal Maintenance Records

BNSF Railroad signal maintenance reports were collected during the on-scene phase on the investigation. Investigators completed their review of the records which included test and inspection records for all systems between approximately MP 31.2 and MP 25.3. Investigators completed a review of the records indicate all signal tests and inspections were conducted in accordance with FRA requirements.

Signal System Tests

The switch machine at CP Casselton was damaged as a result of the derailment thus, it was removed from service for the reverse position, and temporary wiring put in place. The track wires at Casselton were also damaged and had to be replaced. The switch was tested in the normal position, the track circuits were shunted and verified, and east and westbound routes were lined over the control point to verify proper aspects.