OPERATIONS
GROUP FACTUAL

National Transportation Safety Board

Office of Railroad, Pipeline and Hazardous Materials Investigations

Washington, D.C. 20594

Derailment of BNSF Grain Train G-RYLRGT9-26A

And Subsequent of Collision BNSF Oil Train U-FYNHAY4-05T

Casselton, North Dakota

December 30, 2013

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

Accident

NTSB Accident Number:	DCA-14-MR-004
Date of Accident:	December 30, 2013
Time of Accident:	2:11p.m. (CDT[1])
Type of Trains:	BNSF Freight Trains, G-RYLRGT9-26A & U-FYNHAY4-05T
Railroad Owner:	BNSF Railroad
Train Operator:	BNSF Railroad
Fatalities:	0
Injuries:	2
Location of Accident:	Casselton, ND

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[1] Central daylight time

Accident Summary

On Monday, December 30, 2013, at 2:11 p.m. central standard time, a westbound BNSF Railway Company (BNSF) grain unit train derailed 13 cars at milepost 28.5 near Casselton, North Dakota. The grain train, operating on main track 1, consisted of 2 head-end locomotives, 1 rear distributive power unit (DPU) locomotive, and 112 cars. The 45th car from the head end of the grain train derailed onto main track 2, blocking the track.

An eastbound BNSF petroleum crude oil unit train, operating on main track 2, U-FYNHAY-05T, collided with the derailed grain train car that was blocking the track. The crude oil train consisted of 2 head-end locomotives, 1 rear DPU locomotive, and 106 cars. The 2 head-end locomotives and the first 21 cars of the crude oil train derailed during the collision, releasing nearly one-half million gallons of crude oil and fueling a fire. An estimated 1560 people were evacuated from the town of Casselton. No injuries to the train crews or the public were reported at the time of the accident.

The eastbound train crew from U-FYNHAY4-05T, consisting of an engineer and a conductor, escaped from the rear door of the lead locomotives uninjured. Subsequent to the on-scene investigation, the eastbound train crew reported non-life threating injuries to the railroad.

BNSF has estimated damages at $7.2 million, this does not include environmental remediation. The weather at the time of the accident was cloudy and -1 degrees Fahrenheit, winds north at 7 mph.

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), the International Association of Sheet Metal, Air, Rail and Transportation Workers (SMART)[2] , Trinity Rail Car and Standard Steel L.L.C.

[2] Formally the United Transportation Union (UTU)

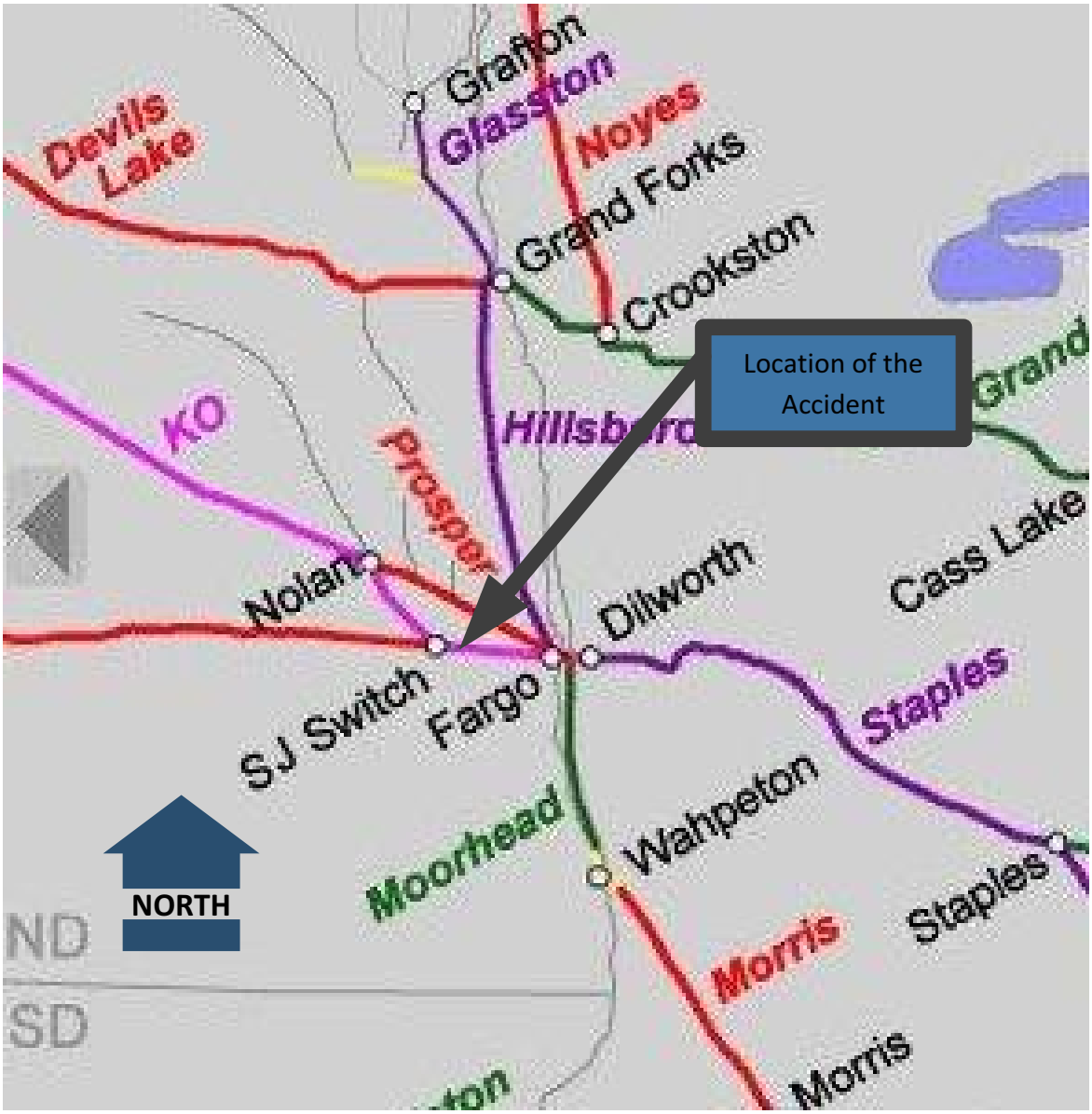

Figure 1-Illustration Showing Location of the Accident

Narrative

On December 30, 2013 at 2:11pm (CST), westbound grain train G-RYLRGT9-26A, moving at 28 miles per hour on main track 1, experienced an undesired emergency application (UDE) of the train's air brake system. The crew of the westbound train consisted of an engineer, a conductor, a student engineer and a road foreman of engines who was performing a qualifying check ride with the student engineer.

The westbound crew reported for duty at 12:15 p.m. at Dilworth Yard, Dilworth, MN. After collecting necessary paperwork, the crew was transported to the train at 27th street, Fargo,

ND for crew change. Just prior to reaching the lead locomotives, the engineer and student engineer stopped at the DPU to perform a daily inspection of the unit and check fuel levels prior to departure. The crew then continued to the train at 27th street where they briefed with the inbound crew and assumed control of the train. They were notified by the inbound train crew, who they were relieving, that the lead two locomotives were already inspected and the train had experienced no problems up to this point. They contacted the dispatcher for permission to depart and proceeded westward at 1:15 p.m. to their final destination of Mandan, ND.

The crew of the eastbound train was called for an on duty time of 6:10 a.m., in Mandan, ND. The crew arrived at Mandan Yard at 6:10 a.m., and received instructions that they were going to take the oil train from Mandan, ND to Dilworth, MN. They reviewed their paperwork, job briefed, safety briefed, verified the air slip and that the air test (Class I brake test) had been completed by the mechanical department, verified the locomotive daily inspection cards were completed and was ready to depart at approximately 7:00 a.m. The train originated (was loaded) at Fryburg Terminal, ND, with a final destination of Hayti, MO.

Interviews

In interviews with the westbound train crew, they reported that after approximately 25 miles they passed the controlled signal displaying a yellow over yellow aspect at CP Casselton on main track 1, an Approach Medium signal, which required them to proceed prepared to pass the next signal at 40 mph. (GCOR 9.1 and BNSF Railway Signal Aspects and Indications Rule 9.1.6) They were slowing to come to a stop at CP30, the next grade crossing, to let the Road Foreman of Engines off of the train. As they were slowing, the westbound crew was contacted by a signal maintainer (via radio), who was positioned on an adjacent street at about 2:00 p.m. He was preparing to obtain track authority to conduct maintenance to the north of main track 1 near MP 28.5 and informed the crew that their train was tearing up switch heater covers.

In an interview, the signal maintainer told NTSB investigators that as he looked on his portable computer while sitting in his work vehicle, he looked up as the head end of the westbound grain train passed. It was then he saw the switch heater covers being “rolled up” (tearing up from the switch) by the westbound train.

He then attempted to make radio contact with the crew, so he called out to inform them that they were dragging something in the middle of their train. He then explained, that he left the area and began heading east. He then stated he heard the derailment and immediately dialed 911 on his cell phone and reported the emergency. After calling 911, he contacted the BNSF dispatcher and notified them of the derailment. He stated this was about 2:15 p.m.

The train crew from the westbound train told investigators they heard the transmission from the signal maintainer but, did not understand exactly what was being reported. The Road Forman of Engines was in the process of following up with the signal maintainer when, the westbound train went into an undesired emergency brake application (UDE) immediately after his transmission.

The Road Foreman of Engines on the westbound train noticed there was an eastbound train coming in their direction on the adjacent track and made an attempt via radio to contact the eastbound oil train (UFYNHAY4-05T), and inform them of the UDE. The conductor of the westbound train then announced emergency, three times on his radio informing the BNSF dispatcher that their train experienced a UDE. All crew members of the westbound train reported in the interviews that the train, prior to that, had been running normal, with no indication of anything remarkable.

All four members of the train crew aboard the westbound train also reported in interviews, that almost immediately after the head end of the eastbound train passed them they heard the eastbound train go into emergency and call out on the radio that they were "on fire, we are a key train and we're getting out of here".

All four occupants of the westbound train then exited the locomotive unharmed and walked west along main track 1 to the nearest grade crossing, CP30, and got in the highway vehicle waiting to pick up the Road Foreman of Engines.

During interviews with investigators, the eastbound train crew said they were coming off the Jamestown subdivision at MP 31.11, controlled by track warrant onto the K.O. subdivision, which is Centralized Traffic Control territory. according to signal data in NTSB Railroad Signal & Train Control Factual Report, at 2:09:50 pm the eastbound shunted the track east of the controlled signal displaying a flashing yellow over red aspect at CP 30, MP 30.02 on main track 2.

The crew was proceeding on an Approach Medium Signal (GCOR 9.1 and BNSF Railway Signal Aspects and Indications Rule 9.1.6) moving at 43 mph., using radio channel 39 to clear their track warrant. The crew said snow was being kicked up by the passing train reducing their visibility. Since they had passed the crossing they were not concerned with the limited visibility because the next crossing wasn't until Casselton.

As visibility improved, the engineer said he saw what appeared to be a grain car across the track. He placed the train into emergency and yelled at the conductor to get down estimating 4 to 5 seconds before impact. (a distance of about 15 to 25 cars). They braced for impact then heard and felt the impact with the grain car.

The lead locomotive came to rest on the south side of main track 2, the conductor said he informed the engineer that the train and the locomotive were on fire. The engineer told the conductor to "grab your cell phone and run". The engineer then announced over the radio "we are on fire, we are a key train and on fire and we are leaving" The crew attempted to exit the front door but it was jammed shut. They left out the back door, climbed over to the conductor's side and got off away from the tilt of the locomotive. They ran east on main 2, away from the train and called 911 while running.

As the eastbound train crew ran, the engineer noticed switch covers missing and track was disturbed within 1 to 10 feet of the switch. They were picked up by a civilian and rode to Casselton High School, as requested by the BNSF dispatcher. The crew met the local sheriff at about 2:30 p.m. and informed him that they were operating a hazardous material train and to get people away.

Post-Accident Actions

At the crossing the westbound train crew was approached by the Assistant Fire Chief of the Casselton Fire Department and was asked to assist the emergency responders by pulling a cut of tank cars west away from the burning, derailed cars.

Upon receiving the request, the road foreman of engines consulted with the crew to see if they felt it was safe to move the cars, which they did. The engineer and student engineer went to the DPU on the eastbound train and the conductor and road foreman of engines went to the east to the nearest grade crossing and made a cut of an estimated 50 tank cars, and the engineer and student engineer pulled the cars about a quarter mile west, away from the burning cars.

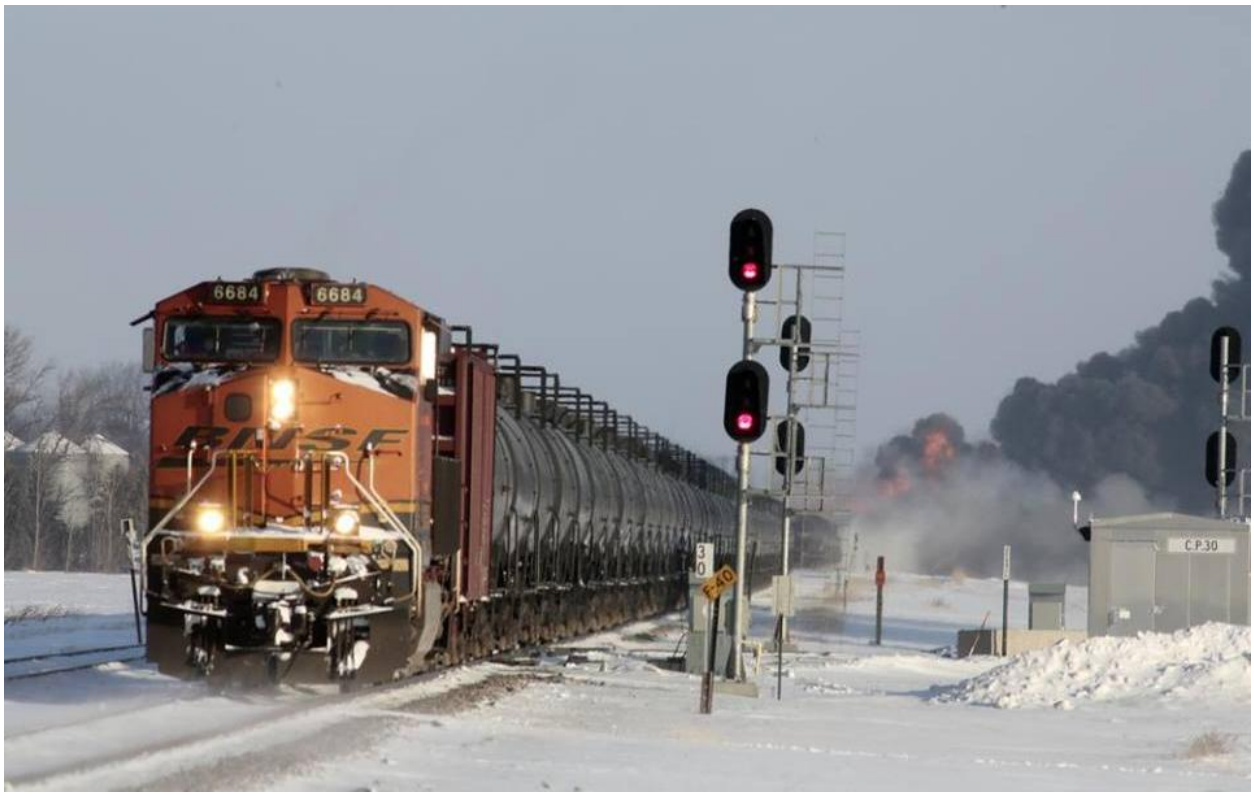

Figure 2-Photograph of the Eastbound Train's DPU, BNSF 6684

About 30-45 minutes after the move was completed, the Assistant Fire Chief of the Casselton Fire Department met the westbound crew at the rear locomotive of the eastbound train and asked if additional tank cars from the eastbound train could be moved. The crew made contact with a BNSF trainmaster and communicated the request. The trainmaster told the crew if the move could be completed safely, then they could proceed.

The student engineer left the locomotive with the Assistant Fire Chief of the Casselton Fire Department, heading east to couple the train together and make an additional cut of tank cars. The student engineer borrowed the Assistant Chief's fire protective clothing and walked within 10 cars of the fire and uncoupled the cars to the east. The engineer then pulled approximately 20 additional tank cars a quarter mile west away from the fire.

The on scene commander issued a voluntary evacuation as a precaution for the town of Casselton ND due to a thick smoke plume and varied wind directions carrying smoke near the town. An estimated 1560 Casselton residents voluntarily evacuated. The on scene commander lifted the recommended voluntary evacuation at 3:00 p.m. on December 31, 2013 and the residents returned to their homes.

All five operating crew members (two from the oil train and three from the grain train) were taken in for FRA Post Accident Toxicology testing in accordance with Title 49 *Code of Federal Regulations* Part 219, Subpart C. Test results were negative.

Method of Operations

On the KO Subdivision, where the derailment occurred, trains are governed and authorized by signal indications. The territory was Centralized Traffic Controlled (CTC) with the train dispatcher stationed at Network Operations Center (NOC), Ft. Worth, Texas.

On the Jamestown Subdivision, the subdivision the eastbound train was travelling through prior to CP30, trains are governed by track warrant control (TWC). Track authority is granted by the dispatcher at the NOC by mandatory directive. Which means authorities are dictated by the dispatcher and copied by the train crew on standard forms.

At the accident site there are two main tracks, each signaled for train movement in both directions and part of a CTC system. The tracks are primarily parallel and oriented in an east and west direction. The northern most track is designated main track 1 and the southernmost track is designated as main track 2. This configuration is often referred to as multiple main.

According to BNSF, on the KO subdivision when a train is passing a signal displaying other than clear in advance of a control point a crew member must transmit the following by radio[3]:

- Train Identification (Initials Engine Number and Direction);
- Signal Name in advance of control point;
- Location on (Track) and;
- (Speed) MPH.

BNSF operating rules that are applicable when a train goes into emergency or, has an undesirable emergency (UDE) brake are described in General Code of Operating Rules (GCOR), Sixth Edition and BNSF Railway Air Brake and train Handling Rules, No. 5. The requirements are specific to the actions required by train crew members such that:

- When an UDE brake application occurs, move the automatic brake valve handle to EMERGENCY and wait until the train stops;
- After stopping, if operating conditions permit, place the automatic brake valve handle in RELEASE to release the brakes and help locate the air hose separation or other problem.

[3] BNSF General Notice #77

All emergency brake applications that occur while moving, whether undesired or intentionally induced by a crew member, are considered an en route delay and must be reported to the train dispatcher. In addition, all undesired emergencies brake applications that occur during normal service braking (commonly referred to as "kickers" or "dynamiters") should also be reported to mechanical desk as an air brake defect.

Damage Estimates

The BNSF estimated accident costs are as follows:

- Car damages: $2,405,769
- Locomotives: $4,225,259 (Both locomotives of the oil train were completely destroyed)
- Track: $488,941
- Signal: $22,000
- Other: (Adjacent buildings, other private property, etc.) $60,000
- Total damages: $7,201,969

Operating Documents

Timetables and Rule Books in effect at the time of the incident:

- General Code of Operating Rules 6th Edition, dated April 7, 2010 as amended by BNSF September 1, 2013
- Air Brake and Train Handling Rules No. 5, dated April 7, 2010 as amended by BNSF November 1, 2013
- System Special Instructions No. 4, dated August 14, 2013 as amended by BNSF October 1, 2013
- U.S. Hazardous Material Instructions for Rail, dated July 29, 2009 as amended by BNSF September 1, 2013
- TY&E Safety Rules, dated October 30, 2005 as amended by BNSF June 1, 2013
- Twin Cities Division No. 5 Timetable, dated August 22, 2012
- Division General Order #100, dated December 18, 2013
- Division General Notice #71, dated December 18, 2013
- System General Order #37, dated December 23, 2013
- System General Notice #67, dated December 27, 2013

Crew Information

U FYNHAY4 05	Position	Hire Date	Engine Service
Bryan P Thompson	Engineer	March 2005	December , 2011
Peter Riepl	Conductor	October 2011	

G RYLRGT9 26	Position	Hire Date	Engine Service
Thomas Cooks	Engineer	May 2011	November, 2013
Bruce Anderson	Conductor	May 1977	
Geoff Andersen	Student Engineer	October 2012	