BROTHERHOOD OF LOCOMOTIVE ENGINEERS AND TRAINMEN

A DIVISION OF THE RAIL CONFERENCE
INTERNATIONAL BROTHERHOOD OF TEAMSTERS

SAFETY TASK FORCE

CLEVELAND, OHIO

BEFORE THE NATIONAL TRANSPORTATION SAFETY BOARD

NTSB Accident Number: DCA14MR004

Class: Major
December 30, 2013

Proposed findings, probable cause, and safety recommendations, in connection with the derailment of BNSF Railway grain train, G-RYLRGT9-26A, and subsequent collision, derailment, and fire of BNSF unit petroleum crude oil train, U-FYNHAY4-05T, on December 30, 2013 in Casselton, North Dakota

---

Stephen J. Bruno, BLET-Safety Task Force, National Chairman
Daniel B. Kenner, BLET-Safety Task Force, Party Spokesman

SUBMISSION

Accident Synopsis

On Monday, December 30, 2013, at 2:11 p.m. Central Standard Time (CST),[1] a westbound BNSF Railway[2] unit grain train,[3] G-RYLRGT9-26A, while operating on Main Track No.1, derailed thirteen (13) cars at milepost 28.5 near Casselton, North Dakota. The forty-fifth (45th) car of the grain train, (BNSF 486653) derailed onto Main Track No.2, blocking the track.

An eastbound BNSF Railway unit petroleum crude oil key train,[4] U-FYNHAY4-05T, while operating on Main Track No.2, collided with the derailed grain car that was blocking that track. The two (2) lead locomotives and the first twenty-one (21) cars of the crude oil train derailed during the collision, releasing nearly 500,000 gallons of crude oil and fueling a fire. An estimated 1,400 people were evacuated from the town of Casselton.

BNSF has estimated damages at $13.5 million; this does not include environmental remediation.

Train Information

The grain train consisted of two (2) head end locomotives, 112 covered hopper cars loaded with grain and one rear DPU.[5] The train weighed 14,776 tons and was approximately 6,840 ft. long.

The crude oil train consisted of two (2) head-end locomotives (BNSF 4934, BNSF 5958), 104 loaded tank cars, two (2) buffer cars[6] filled with sand (located at car positions No.1 and No.106) and one rear DPU. The train weighed 13,335 tons and was approximately 6,536 ft. long.

---

[1] All times in report will be Central Standard Time.

[2] Formerly known as Burlington Northern and Santa Fe Railway.

[3] Unit train is a train in which all cars carry the same commodity and are shipped from the same origin to the same destination, without being separated or stored en route.

[4] Definition of "key train" is provided by Association of American Railroads (AAR) publication OT-55-N, *Recommended Railroad Operating Practices for Transportation of Hazardous Materials*. "Key trains" have speed restrictions and other operating criteria. According to the BNSF Hazardous Materials Instructions for Rail, a key train includes a train with "A. One (1) or more car loads of Spent Nuclear Fuel (SNF) or High Level Radioactive Waste (HLRW) moving under the following Hazardous Material Response Codes (STCCs) - 4929142, 4929143, 4929144, or 4929147, or B. One (1) or more tank car loads of Poison or Toxic Inhalation Hazard (PIH or TIH) (Hazard Zone A, B, C, or D), anhydrous ammonia (UN1005), or ammonia solutions (UN3318), or C. Twenty (20) or more car loads (including intermodal portable tank loads) of any hazardous material."

[5] DPU refers to distributive locomotive power, generally located at the rear end of a train.

The Accident

On December 30, 2013 at 2:11p.m., the westbound grain train was traveling at twenty-eight (28) miles per hour ("MPH") on Main Track No.1, when it experienced an undesired emergency application ("UDE") of the train's air brake system. The crew of the westbound train consisted of a Locomotive Engineer, a Conductor, a student Locomotive Engineer and a BNSF Road Foreman of Engines, who was performing a qualifying check ride with the student Locomotive Engineer.

Post-accident mechanical investigation revealed the forty-fourth (44^{th}) through fifty-sixth (56^{th}) cars in the train derailed. The probable cause of the derailment was due to damage consistent with a broken axle on the forty-fifth (45^{th}) car of the train (BNSF 486653).

The eastbound oil train was proceeding at forty-three (43) MPH, using radio channel No. 39, to clear their track warrant from the Jamestown Subdivision. The crew said snow was being kicked up by the passing grain train reducing their visibility. As visibility improved, the Locomotive Engineer said he saw what appeared to be a grain car across the track. He placed the oil train into an emergency braking application and yelled at the Conductor to get down, estimating four (4) to five (5) seconds lapsed before impact (a distance of about 15 to 25 cars). The crew braced for impact then heard and felt the collision with the grain car.

The oil train's lead locomotive (BNSF 4934) came to rest upright on the south side of Main Track No. 2. The Conductor informed the engineer that the train and the locomotives 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 locomotive through the front door of the cab but it was jammed shut due to damage from striking the derailed grain car. They exited on the Engineer's side out the back door of the locomotive, climbed over to the Conductor's side and dismounted away from the tilt of the locomotive. They ran east on Main Track No. 2 away from the train, and called 911 while running.

---

[6] A buffer car is a railcar authorized by the Department of Transportation's Pipeline and Hazardous Materials Administration to be used as a separation vehicle for train crew safety from hazardous material rail car's in a train.

Interviews

In an interview with a BNSF signal maintainer, NTSB investigators were told that, as the maintainer worked on his laptop computer while sitting in his work vehicle, he looked up as the locomotives of the westbound grain train passed. It was then he saw the switch heater covers being "rolled up" (being torn up from the switch) by the grain train. He then attempted to make radio contact with the crew in order to inform them that they were dragging something in the middle of their train.

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

The Road Foreman of Engines noticed the oil train coming in their direction on the adjacent track and made an attempt via radio to contact the oil train and inform them of the UDE. The grain train was operating on AAR[7] channel No. 70. The Conductor of the grain train then announced "emergency" three (3) times on his radio, informing the BNSF dispatcher that their train experienced a UDE.

During interviews with investigators, the oil train crew said they were coming off the Jamestown subdivision at MP 31.11, which is controlled by track warrant onto the K.O. Subdivision, which is Centralized Traffic Control territory. The crew was operating on AAR channel No. 39 to clear their track warrant from the Jamestown Subdivision and never heard the grain train's emergency call, broadcast on AAR channel No. 70.

BNSF Railway, United States Hazardous Material Instructions ("USHMI")

[7] Association of American Railroads.

BNSF uses the USHMI[8] as a mandated guide for its transportation employees to reference when transporting hazardous materials in their trains. The guidelines set forth, specifically page 41, Item No.1 (Attachment C of this report), speaks directly to the transport of unit trains and the buffer car requirements. It states in part "Exception: In a loaded or empty bulk commodity unit train placarded cars may be placed between the buffer cars, but not nearer than the second car from an engine." On several occasions, BLET asked the Federal Railroad Administration ("FRA") to revise this rule, including in forums such as the Hazardous Materials Working Group of FRA's Railroad Safety Advisory Committee ("RSAC"). Situating locomotives further away in proximity from a potential fuel reduces the likelihood of a locomotive-initiated fire following a derailment, and also gives crews and first responders greater distance in space and time away from any dangerous fires and explosions that may result.

High Hazard Flammable Train

PHMSA's August 1, 2014 Notice of Proposed Rulemaking (NPRM) titled, *Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains*, states that the volume of crude oil carried by rail increased 423 percent between 2011 and 2012. According to a July 2014 AAR report titled, *Moving Crude Oil by Rail*, the number of "originated carloads of crude oil on U.S. Class I railroads (including the U.S. Class I subsidiaries of Canadian railroads) rose from 9,500 in 2008 to 233,698 in 2012 to 407,761 in 2013."

PROBABLE CAUSE

The Brotherhood of Locomotive Engineers and Trainmen ("BLET") finds that the probable cause of this accident was a broken axle on a grain car, resulting in the derailment of the grain train and subsequent collision, derailment and fire, of the unit oil train. It is the derailment and collision of the unit oil train and the potential future danger to employees and public from crude oil train accidents upon which our recommendations are based.

[8] See Attachments A, B, and C at the end of this report

PROPOSED RECOMMENDATIONS

Narrative

Since 1922 regulations have been in effect generally requiring that placarded cars carrying flammable commodities be separated from locomotive consists by at least five (5) cars.[9] However, the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration ("PHMSA") regulations currently permit railroads to use but a single buffer car as part of a train's makeup when that train is a unit train. *See* 49 C.F.R. § 174.85(d)(2). This practice unnecessarily increases the risks to train crew's safety by placing an ignition source (a locomotive) in close proximity to an accelerant fuel source, in this case Bakken crude oil.

As a result of PHMSA's regulatory loophole, the crew of train U-FYNHAY4-05T was presented with a significant risk due to the close proximity of their position on the lead locomotive and the placement of the first hazardous material car as the second car of their train. Because of this, the train crew was afforded a mere 200 feet of separation from the first petroleum crude oil loaded car (each locomotive is approximately seventy-three (73) feet in length, and the loaded buffer car of sand was approximately fifty-four (54) feet in length). During the interviews with the oil train crew members, they stated that as they tried to exit the front door of the locomotive, they found their egress impaired due to damage incurred from striking the derailed grain car. This caused them to seek an alternative way out and escape through the rear door, traversing the approximate seventy-three (73) feet of the locomotive towards the fire. Had the train crew been afforded five buffer cars (i.e., all loaded sand cars at 54 feet), their distance from the fire would have been increased an additional 216 feet. This distance could have further reduced the potential for severe injury or death, and is a subject BLET believes that train placement separation of hazardous materials on unit trains must be revisited and current regulations revised.

[9] *See* Safe Placement of Train Cars: A Report, Federal Railroad Administration Report to the Senate Committee on Commerce, Science and Transportation and the House Committee on Transportation and Infrastructure (June 2005), at 15.

The National Transportation Safety Board conducted tests of the oil derived from the Bakken oil fields where the oil in this train originated, their findings were as follows:

> "Based upon the results obtained from sampling and testing of the 135 samples from August 2013 to May 2014, the majority of crude oil analyzed from the Bakken region displayed characteristics consistent with those of a Class 3 flammable liquid, PG I or II, with a predominance to PG I, the most dangerous class of Class 3 flammable liquids. Based on our findings, we conclude that while this product does not demonstrate the characteristics for a flammable gas, corrosive liquid or toxic material, it is more volatile than most other types of crude, which correlates to increased ignitability and flammability."

Notwithstanding NTSB's potential findings in the accident, the practice of using a single buffer car in lieu of the generally required five (5) buffer cars, which provide for a greater measure of safety to the crew members, speaks directly to economics, not to the safety of the train crew employees. Therefore, the BLET makes the following recommendations.

Specific Recommendations

To BNSF Railway:

1. Immediately implement policy and procedures mandating five (5) buffer cars on all hazardous material unit trains.

2. Immediately remove all language in the BNSF Railway's United States Hazardous Material Instructions that allows for a single buffer car in unit trains. .

3. Establish an operating procedure that that provides that whenever trains carrying crude oil will meet another train on an adjacent track travelling in the opposite direction both trains shall be notified to operate not exceeding 10 MPH until their train is clear of the rear end of the train on the adjacent track.

4. Ensure that trains which traverse multiple Subdivisions that operate on different radio frequencies have the ability for crew members to contact both Subdivision Train Dis-

patchers on either channel.[10]

5. Support enhanced training to all BNSF Railway transportation employees regarding hazardous material awareness training. Such training is available through outreach programs such as the Teamsters Rail Conference Rail Workers Hazardous Material Training Program.

To the Association of American Railroads ("AAR"):

1. Immediately implement policy and procedures mandating five (5) buffer cars on all hazardous material unit trains.

2. Mandate all railroads to remove any language that supports the use of allowing a single buffer car in unit trains.

3. Designate a single railroad radio frequency for use on each railroad's subdivision in order to allow operating employees of trains operating in the same territory to hear the of each other's communications and to communicate directly with emergency responders.

4. Support enhanced training to all transportation employees regarding hazardous material awareness training. Such programs are available through outreach programs such as the Teamsters Rail Conference Rail Workers Hazardous Material Training Program.

To the Pipeline and Hazardous Materials Safety Administration ("PHMSA"):

1. Immediately publish regulations mandating a minimum of five (5) buffer cars on all haz-

[10] This is already in place on the BNSF Railway Montana Division, Forsyth Subdivision between the Forsyth and Hettinger Subdivisions at Terry MT, as well as between BNSF Railway and Montana Rail Link ("MRL") at Jones Jct., MT.

ardous material unit trains irrespective of train length.

To the Federal Railroad Administration ("FRA"):

1. Immediately publish regulations requiring railroads to designate a single emergency response railroad radio frequency to allow operating employees and emergency responders to communicate directly with one another.

2. Reconvene the Rail Safety Advisory Hazardous Materials Working Group ("RSAC") to formulate regulatory language that establishes a minimum safe distance between a locomotive consist and hazardous materials cars, but not less than (5) buffer cars, irrespective of train length.

CERTIFICATE OF SERVICE

I certify that on July 24, 2015 I have electronically served upon Mr. Richard Hipskind (hipskir@ntsb.gov), Investigator in Charge, National Transportation Safety Board, a complete and accurate copy of these proposed findings regarding the December 30, 2013 collision, derailment and subsequent fire of BNSF Railway trains G-RYLRGT9-26A and U-FYNHAY4-05T in Casselton, North Dakota, (NTSB Docket No. DCA 14 MR 004). An electronic copy of same was also forwarded to the individuals listed below in this certificate of service, as required by 49 CFR § 845.27 (Proposed Findings).

National Transportation Safety Board
c/o Mr. Richard Hipskind
Investigator in Charge, DCA14MR004
490 L' Enfant Plaza, SW
Washington, DC 20594
[redacted]

Mr. Kevin Wilde
General Director System Safety, BNSF
2600 Lou Menk Dr, OOB-1
Fort Worth, TX 76131
[redacted]

Mr. B. J. Shillingstad
SMART/UTU Transportation Safety Team
[redacted]

Kip Wills
Director, Field Operation-Central Region
Pipeline and Hazardous Materials Administration (PHMSA)
2300 East Devon Avenue, Suite 478
Des Plaines, IL 60018
Office: 847-294-8581
[redacted]

John Embree
TrinityRail
16822 NE 117th Street
Kearney, MO 64060
[redacted]

Steven Dedmon
Director – Technology & Research & Development
Standard Steel
500 North Walnut Street
Burnham, PA 17009
[redacted]

Matthew Brewer
Federal Railroad Administration
Deputy Regional Administrator
500 E Broadway, Suite 240
Vancouver, WA 98660
[redacted]

Sincerely yours,

[redacted]

Stephen J. Bruno
Brotherhood of Locomotive Engineers & Trainmen
National Secretary Treasurer
National Chairman, Safety Task Force
Standard Building, Mezzanine floor
1370 Ontario Street
Cleveland, OH 44113-1702

ATTACHMENT A

BNSF Railway Safety Vision

We believe every accident or injury is preventable. Our vision is that BNSF Railway will operate free of accidents and injuries. BNSF Railway will achieve this vision through:

A culture that makes safety our highest priority and provides continuous self-examination as to the effectiveness of our safety process and performance...

A work environment, including the resources and tools, that is safe and accident-free where all known hazards will be eliminated or safe-guarded...

Work practices and training for all employees that make safety essential to the tasks we perform...

An empowered work force, including all employees, that takes responsibility for personal safety, the safety of fellow employees, and the communities in which we serve.

This version contains the following revised or added pages:

August 1, 2012: 21, 22.

September 1, 2013: 43, 44.

February 1, 2014: Title page, 2, 41, 42.

BNSF RAILWAY

United States Hazardous Material Instructions for Rail

IN EFFECT AT 0001
Central, Mountain, and
Pacific Continental Time

Wednesday, July 29, 2009
(Including revisions through
February 1, 2014)

ATTACHMENT B

VI. TRAIN PLACEMENT

1. General Requirement

Place placarded hazardous material shipments in a train so as to comply with the instructions on the Position-in-Train Chart (Figure 11).

Note: Correct hazardous material train placement errors at the first location that allows switching, once the error is identified.

A Train is one or more engines coupled, with or without rail cars, displaying a marker, requiring an appropriate air brake test, and authorized to operate on a main track.

2. When to Use the Position-in-Train Chart

Use the chart to make sure placement position in train is correct:

A. Before a train departs the initial terminal.

B. Before a train departs an intermediate station where pickups and setouts were made en route.

C. When delivering cars to or picking cars up at interchange tracks that are owned and operated by another railroad.

3. How to Use the Position-in-Train Chart

A. Select the applicable column of the Position-in-Train Chart. To do so:

1. Identify the placards and/or markings applied to the car, either from the shipping papers or from observation.

   Note: When placards are displayed but are not required by regulation (permissive placarding), the rail car must be switched as required for the placard displayed.

2. Determine whether the car is loaded or residue/empty.

   Note: The notation "RESIDUE: LAST CONTAINED" on the shipping papers indicates a residue/empty shipment.

3. Identify the car type involved by observation (e.g. tank car, hopper car, gondola, etc.).

B. Find the applicable section on the chart, based on the placard or marking applied, the load or residue/empty status, and the car type.

C. Follow the instructions associated with the placard or marking, as the check marks in the columns indicate.

4. General Information

A. For train placement purposes, each platform or well of an intermodal rail car counts as one car.

B. A buffer car is a:

1. Non-placarded rail car.
2. Rail car with a placard or marking shown in Group E.
3. Residue/empty tank car, as long as it complies with Instruction # 2 on the Position-in-Train Chart.
4. Placarded rail car, other than a tank car, as long as it complies with Instruction # 6 on the Position-in-Train Chart.

C. The word "TOXIC" can appear in place of the word "POISON" on placards.

D. A business car train is not a passenger train.

ATTACHMENT C

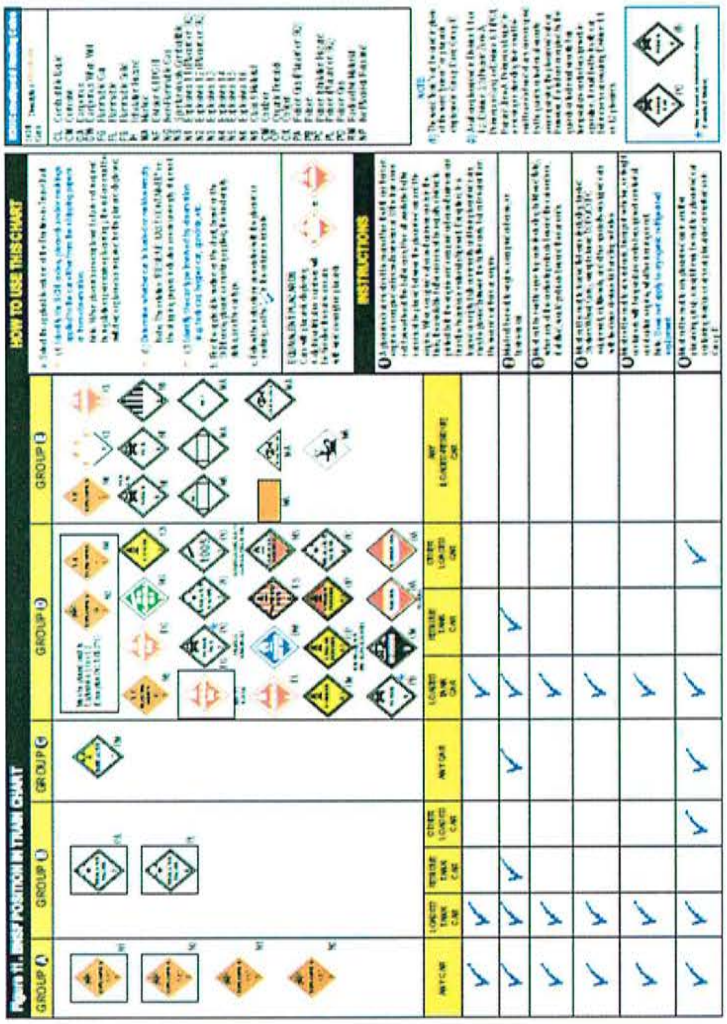

Figure 11. Position-in-Train Chart