PRELIMINARY REPORT

HAZARDOUS MATERIALS

Accident Performance of DOT-117R Tank Cars

Custer, Washington
December 22, 2020
HMD21LR001

The information in this report is preliminary and will be either supplemented or corrected during the investigation.

On Tuesday, December 22, 2020, about 11:45 a.m. local time, northbound BNSF Railway Company (BNSF) petroleum crude oil unit train U TNDFEPO-36T derailed 10 loaded tank cars at MP 111.75 on the BNSF Bellingham Subdivision, in Whatcom County, in the town of Custer, Washington (Figure 1). The train consisted of 2 head-end locomotives, one head-end buffer car, 106 loaded tank cars, one rear-end buffer car, and 2 distributed power locomotives. Three tank cars released an estimated total of about 29,000 gallons of crude oil, which ignited and burned uncontrolled for 2 hours. An evacuation was ordered for a 1/2-mile radius around the accident site, affecting 120 persons for 4 hours. No injuries were reported. Weather at the time of the accident was partly cloudy and 34 degrees Fahrenheit, with a 5-mph wind.

Figure 1. Postaccident photograph of derailed tank cars blanketed with firefighting foam. (Photograph provided by Washington Utilities and Transportation Commission.)

Train U TNDFEPO-36T was classified by the U.S. Department of Transportation as a high-hazard flammable train.[1] BNSF was subject to the additional safety requirements of Title 49 *Code of Federal Regulations* (*CFR*) 174.310 for routing, maximum speed limit, and enhanced braking. The train was 6,668 feet in length and contained 15,279 trailing tons. The maximum authorized track speed at the derailment location was 10 mph. Preliminary information from the lead locomotive's event recorder indicated the head-end train speed at the time of the derailment was about 7 mph.

On December 17, 2020, Phillips 66 Company originated the shipment from the Savage Services Corporation rail terminal in Trenton, North Dakota. The shipment was destined to the Phillips 66 Ferndale Refinery in Ferndale, Washington. The hazardous material released in this accident consisted of UN1267 petroleum crude oil, a Class 3 flammable liquid in Packing Group I. Each derailed tank car was carrying about 30,000 gallons of crude oil.

The derailed tank cars were in positions 59 through 68 of the train. The three tank cars that released hazardous material were originally specification DOT-111A100W1 that were built to the Association of American Railroads CPC-1232 industry standard for tank cars ordered after October 1, 2011, for use in crude oil and ethanol service. The breached tank cars were converted to specification DOT-117R100W in 2019 and included the addition of ceramic fiber thermal

[1] A *high-hazard flammable train* is defined in Title 49 *Code of Federal Regulations* (*CFR*) 171.8 as a single train transporting 20 or more loaded tank cars of a Class 3 flammable liquid in a continuous block or a single train carrying 35 or more loaded tank cars of a Class 3 flammable liquid throughout the train consist.

protection systems, tank jackets, full head shields, and bottom outlet valve operating handles with a disengaging mechanism designed to prevent unintended opening in accidents.

Preliminary findings from the examination revealed hazardous material releases occurred from two mechanically breached tank cars, PPRX 172933 and PPRX 172745, and from a pressure relief device or top fittings of a third tank car, PPRX172323, that sustained fire exposure.

The National Transportation Safety Board (NTSB) initiated a limited investigation into the accident performance of the DOT-117R tank cars and will work with the Federal Railroad Administration (FRA) and the Washington Utilities and Transportation Commission to collect information relative to the tank car damages. On-scene tank car inspections were completed on January 7, 2021. The NTSB will evaluate factors that resulted in the release of hazardous materials and will publish findings upon completion of the investigation. The Federal Bureau of Investigation and the FRA are investigating causal factors relating to the derailment.