



Issued: July 26, 2023

Preliminary Report: RRD23FR013

This information is preliminary and subject to change.

Norfolk Southern Railway Derailment

Elliston, Virginia

July 6, 2023

On July 6, 2023, about 7:42 p.m. local time, eastbound Norfolk Southern Railway (NS) unit coal train 814V404 derailed 19 loaded gondola cars on a single main line track of the NS New River Division's Whitethorne District at milepost 263.7 near Elliston, Virginia.¹ The derailed equipment remained upright and did not separate from other railcars in the train. (See figure.) There were no injuries, fatalities, fires, or release of coal. NS estimated damages to equipment and track infrastructure to be \$288,360. Visibility conditions at the time of the derailment were daylight and clear, and the temperature was 82°F with no precipitation.

¹ (a) All times in this report are local time. (b) Train 814V404 was traveling from Bluefield, West Virginia, to Norfolk, Virginia; the section of track on which the derailment occurred is owned by the Virginia Passenger Rail Authority and operated and maintained by NS. (c) In a *unit coal train*, all railcars are carrying coal. (d) A *gondola car* is an open-top freight railcar frequently used to haul coal.



Figure. Derailed gondola cars (*left*) and a wheelset with a burned-off bearing (*right*).
(Sources: NS (*left*); Federal Railroad Administration (*right*).)

The crew of train 814V404 consisted of one engineer and one conductor. The train, which was composed of 3 head-end locomotives and 105 railcars, was 5,562 feet long and weighed 14,158 tons. It was traveling about 25 mph at the time of the derailment, less than the maximum authorized timetable speed of 40 mph.² Train movements in the area of the derailment are authorized by a centralized traffic control system and coordinated by the New River Division train dispatcher located in Atlanta, Georgia.³

The rail network in the area of the derailment is equipped with wayside hot bearing detectors (HBD) to assess the temperature of wheel bearings while trains are

² The authorized speed was set by NS Whitethorne District Timetable.

³ NS train dispatchers direct and coordinate railroad traffic, issue permits and authorities, monitor all rail movements, and maintain electronic records.

en route.⁴ HBDs detect overheated bearings, provide real-time audible alarm messages to train crews, and alert railroad technicians monitoring the advanced train control (ATC) system.⁵ A critical alarm is sent when the HBD has detected bearings above 170°F; if this alarm is received, the crew must immediately bring the train to a controlled stop for inspection.

About 5:29 p.m., an HBD at milepost 276.3 transmitted a critical alarm message for an axle on the 71st railcar of train 814V404. After the crew stopped the train, the conductor inspected the railcars and told the ATC desk that the axle's temperature indicator stick had melted slightly, indicating a measurement of 169°F or higher, and that some grease was coming from the back of one of the axle bearings.⁶ The ATC desk advised the crew to confer with the train dispatcher, who directed them to set out the railcar for inspection. The dispatcher gave the crew permission to move the train about 13 miles east to the Riverside siding to set out the railcar; as the crew was moving the train to this location, the derailment occurred.

On July 7, the day after the derailment, NS issued an operations bulletin providing clarification of the requirements for responding to hot bearing and dragging equipment alarms.⁷ The bulletin states that upon receiving a critical hot bearing alarm, the crew must immediately stop the train for inspection. If the overheated condition is confirmed, the crew must inform the ATC desk and seek guidance on moving to the next available set out location. Any authorized movement must not exceed 10 mph, and the defective railcar must be reinspected at least every 3 miles until set out. The bulletin further states that a visual inspection of the indicated bearing and its associated components must be performed. If this inspection reveals exceptions (for example, leaking grease or visible damage), the ATC desk must be notified, and NS mechanical department personnel must perform an inspection before the railcar is moved.

While on scene, National Transportation Safety Board (NTSB) investigators recovered burned-off bearing components, wheels, and axles from the 71st railcar.

⁴ HBDs use a sensor to detect passing trains and upward-pointing thermal cameras on each rail to measure the temperature of wheel bearings at either end of each axle.

⁵ NS's ATC system identifies HBD trends that may become critical. NS technicians monitor the system from the ATC desk in Atlanta.

⁶ A *temperature indicator stick* is made of material that melts instantly when the surface it is touching reaches a certain temperature—in this case, 169°F.

⁷ A *dragging equipment alarm* alerts when a wayside device detects an object dragging from beneath a train.

The NTSB reviewed information from data logs, the lead locomotive event recorder, and forward- and inward-facing image recorders; examined and tested railroad equipment; and completed interviews.

The NTSB's investigation is ongoing. Future investigative activity will focus on the 71st railcar's wheelset and reconditioned bearings, NS's use of HBDs, and NS operating rules for defective equipment detectors.

Parties to the investigation include the Federal Railroad Administration; the Virginia Passenger Rail Authority; NS; the International Association of Sheet Metal, Air, Rail and Transportation Workers–Transportation Division; the Brotherhood of Railroad Signalmen; and the Brotherhood of Locomotive Engineers and Trainmen.