

# National Transportation Safety Board

Office of Railroad, Pipeline and Hazardous Materials

Washington, DC 20594



RRD23FR013, ELLISTON, VA

## **HUMAN PERFORMANCE**

Group Chair's Factual Report

November 21, 2023

## **A. NORFOLK SOUTHERN (NS) TRAIN DERAILMENT**

Location: Elliston, Virginia  
Date: July 6, 2023  
Time: 7:44 p.m. local time  
Train: 814V404

## **B. HUMAN PERFORMANCE**

Group Chair	Dr. Anne Garcia NTSB System Safety Group Chair
Party Coordinator	Robert Lewis NS Division Superintendent
Party Coordinator	Ron Sabol SMART TD Safety Task Force
Party Coordinator	Scott Buntin BLET Safety Task Force
Party Coordinator	Dennis Wilson TCU BRC/TCU-MECH
Party Coordinator	John Ranschaert Federal Railroad Administration Operations Inspector

## **C. SUMMARY**

On July 6, 2023, at about 7:42 pm local time, a NS freight train derailed 19 loaded coal cars. All cars remained upright, there was no release, no evacuation, and no injuries. The incident train (814V04) was a loaded unit coal train, consisting of 3 locomotives and 105 cars. The train originated in Bluefield, WV and was destined for

Norfolk, VA. The incident occurred on the White Thorne Subdivision near Elliston, VA. The White Thorne Subdivision was recently acquired by Virginia Passenger Rail Authority and is operated and maintained by NS.

Investigators identified a burnt off journal on car 71 of the consist. At about 5:29 pm, a hot bearing detector at milepost 276.3 flagged the car, and the crew was in the process of moving the train to a siding to set the car out when the derailment occurred. Due to operational concerns, the train crew bypassed two setout locations and were moving the train to another location when the derailment occurred at milepost 263.6. The POD was about three miles west of the destination set-out point. The train was traveling at approximately 25 mph at the time of the derailment.

## **D. DETAILS OF THE INVESTIGATION**

### **1.0 Environmental**

The derailment occurred at 7:42 p.m., about sunset. The weather was clear and 74 degrees.

### **2.0 Toxicology Testing**

The train crew (Engineer and Conductor) were not post-accident tested, nor was NS required to test according to 49 Code of Federal Regulations.

### **3.0 Timeline**

The following timeline was developed based on information from the locomotive event recorder, interviews with NS employees, the Operations Factual Report and the Signal and Wayside Detector Factual Report.

5:28 p.m.                      Train crew notified on critical alarm from the Hot Box Detector

- 5:32 p.m. Train stops and crew notifies the Dispatcher of the critical alarm  
Dispatcher advised train crew to visually inspect the bearing  
and contact the ATC desk
- 5:35 p.m. Train crew contacted the ATC desk who told them exact location  
of bearing to inspect and requested a callback after inspection
- 6:20 p.m. Dispatcher notifies the Road Manager
- 6:30 p.m. Conductor reports to Dispatcher that the Tempilstik melted and  
there was grease coming out the back, but said it was not  
extensive.
- 6:57 p.m. ATC desk contacts train crew and learns results of inspection;  
advised crew the bearing might have substantial internal damage  
and to contact Dispatch on how to proceed
- 6:59 p.m. Dispatcher contacts train crew after talking with Mechanical and  
Train Manager; instructed crew to move train to siding at track  
speed and set off car with hot wheel bearing
- 7:00 p.m. Mechanical contacted by Road Manager (approximate time)
- 7:16 p.m. Train begins moving to the set out location
- 7:44 p.m. Train derails, traveling at 34 mph

#### **4.0 Interviews**

The investigative team interviewed three NS employees (Senior General Supervisor Mechanical Department, Road Manager, the Train Dispatcher the Chief Dispatcher, and the ATC Manager) on Sunday, July 9, 2023, and Monday, July 10, 2023 at the Hampton Inn in Roanoke, Virginia. The Train Dispatcher and ATC Manager participated virtually from NS Headquarters in Atlanta, GA. FRA interviewed the train crew (Engineer and Conductor) on Friday, July 7<sup>th</sup>, 2023.

The FRA conducted additional fatigue analysis interviews with the Engineer, Conductor, and the Senior General Supervisor Mechanical Department. These Fatigue Analysis Reports will be included in the docket once received from the FRA.

#### **4.1 Senior General Supervisor, Mechanical Department (Mechanical)**

He has 29 years with NS, first 13 years as a caman in Roanoke, VA, promoted to mechanical management in 2007. He has been the Senior General Supervisor over the Roanoke and Lynchburg territories for approximately 6 years. He has general supervisors that report directly to him; two general supervisors in Roanoke and one general supervisor in Lynchburg. 36 people, in total, work for him.

About 7 p.m. Mechanical was contacted by the Road Manager on a company cell phone, that Train 814 hit an alarm on a hot box detector (the Conductor told the Dispatcher, who told the Road Manager, who told him). He did not speak directly with the train crew or the dispatcher, or the ATC desk, only the Road Manager. The Conductor had reported the temp stick melted at the wheel. Mechanical stated the Conductor "did not see any defects visibly with the bearing." He specifically asked about heat discoloration with the bearing, any defects, splits in the bearing, and was told the Conductor "did not see any obvious defects with that". He stated, "Typically, the years that I've seen multiple hot boxes like this, you have a - you have the defects visible before you actually lose the bearing. You're going to see the bearing on fire, you're going to see it actually start to disintegrate and lose the bearings. Those things, those are the things that trigger us to start thinking well, we probably need to change it right here. But when we don't have those things, typically, we're going to take it and set it out in the next siding."

When asked, Mechanical stated that when a bearing heats up to the point to cause a critical alarm from a wayside detector, that it is failing. They know something is going wrong with that bearing. There is a progression. He stated that he and the Road Manager decided to have the train crew take the train to the next available siding and set that car out. The decision, at this point, was whether to have the train continue and set the car out, or to have it stay, stopped on the tracks, and have someone go to the train and change it there. The decision was "definitely to set the

car out.” Regarding what influenced the decision to continue moving the train down the track to set it out, he stated, “That decision is made off of those visual things” which the Conductor reported.

The decision to set the car out was made by the Chief Dispatcher and the Road Manager and the Wayside Detector desk, before Mechanical got into it. When Mechanical got involved it was a matter of deciding how and where it was going to be set out. In his opinion, if you know you have a defect, it should be automatic that track speed is not what to run to a set-out. He assumed it would be run at a restricted speed. He did not have any input on what speed the train was to run to the siding.

Mechanical was not sure if NS has a speed restriction if there’s a hot box alarm. He stated that typically, if mechanical is on site, they’ll give speed restrictions depending on what they observe. “In this particular situation, it was the assumption that it would just be taken at restricted speed...it would be 10 mile an hour or something...to that effect.” He further stated that no grease was reported as observed on the wheel, and that is one of the things they look at for a defective bearing.

When asked why a train would continue at track speed with a bearing warning from the detector, he replied, “It would not. There would be no reason to continue at track speed because the entire process is setting the car out. So we’re taking a known defective car to a siding to set it out, so track speed should not be an issue.” It would be the natural assumption that we’re easing it down to the set out, not travel at track speed.

He did not recall any conversation about track speed. If he had been asked if the speed should be restricted, he would have said yes, no matter what, because track speed is just obviously not what they would do. He is not typically notified of the speed that a train is proceeding, once he’s been notified. The final authority to

impose restrictions on a car, such as with a bearing issue, in this case, would be made between the wayside desk and the Dispatchers. Mechanical has the authority to make that decision also.

Mechanical stated he was out on a derailment the previous night, had been up since 4:30 Wednesday morning and up straight through.

Their other general foreman who was on duty had also been up on a derailment the night before and had been up the same amount of time. Their third general foreman was on an off day.

**His regular work schedule:**

Sunday: Off

Monday: Off

Typical work days:

Tuesday - Saturday:

4:30 am Gets up

6:00 am Worked at the yard for 12 hours (tries to get off between 4 and 5)

6:00 pm Off work

**His work hours on the day before the derailment:**

Wednesday, July 5:

4:30 am Got up

6:00 am - 12am At work, worked through the night

Thursday, July 6:

12 am - 7:42 p.m. Continued working up to the train derailment at 7:42, and beyond.

He is on call 24 hours a day, 7 days a week. Two of the three of them are on duty at all times.

## **4.2 NS Road Manager**

The Road Manager has 5 ½ years, hired as a management trainee, currently serves on the Radford District, manages 240 employees and two assistants. He works 24/5 with two rest days.

He was notified at 6:20 pm by the Dispatcher. He asked if Mechanical had been contacted and did not receive an answer. He left to find the train. He called Mechanical and notified him of the hot bearing alert. They discussed the situation and decided to set the car out. Mechanical wanted more information and the Conductor determined that the bearing was intact. He did not receive instructions from the Chief Dispatcher. No speed restrictions were placed on the defective car. He stated that Operations Bulletin 21, release July 7, 2023, specifies how to handle the situation; use 10 mph restricted speed.

## **4.3 NS Dispatcher**

The Dispatcher worked as a Conductor out of Conway PA, Dispatcher for 7 years, with 2 years on New River Desk, Blue Ridge Division. The Road Manager told him no speed restrictions on the train moving to the set-out, so he relayed that to the crew. His understanding was that the Road Manager was talking with Mechanical. He does not interact with the wayside desk, the train crew does. He was not aware of the Dispatch Chief or Assistant Chief talking to Mechanical.

He works the second shift; comes in at 2 p.m., leaves at 10:15 p.m., working Wed - Sunday. He eats dinner at his desk.



#### **4.4 NS Chief Dispatcher**

She works 6am to 6pm, on 4 days, off 4 days. The shift change-over starts between 5 and 6 am. She does not get a meal break but can walk away or take a meal or break. The Assistant Chief looks after things when she takes a break. The dispatchers work 8-hour shifts; 6-2, 2-10, 10-6.

On day of this derailment, she had another train with a hot bearing that was stopped at the same time as this train. She was concentrating on the other train and protecting the Amtrak passengers that were en route. She took a break to get up and walked away to use the restroom. When she came back, she had a notification from the dispatcher that the train was in emergency. Then she was notified that the crew was inspecting the train. There was no discussion with the Road Manager, or anyone, if the train should proceed to set-out at reduced speed or at track speed.

She stated, "We have a plan if it melts the Tempilstik...if we see any leaking of grease or anything, we set the car out. It can't go ... more than 10 miles per hour and we have to inspect every 3 miles to the location to set that car out." She stated there should have been a speed restriction on the train. That information was to be communicated through the Dispatcher or if Mechanical's on the scene then they would give a restriction. At the time, she did not know that no speed restriction was given to this train.

#### **4.5 ATC Manager**

The ATC Manager was first interviewed by NTSB investigators on April 13, 2023, as part of the NS East Palestine investigation. He began working for NS as a manager trainee in 2004 as a mechanical supervisor in the locomotive traction motor shop in Altoona, PA. He received two promotions prior to his most recent promotion, in 2011, to what is now called the ATC Manager.

The ATC desk works under NS Operating Rules Manual, sections 145 - 153 (Hot Box). The ATC analyst on duty received a Hot Box Detector alert of 253°, the maximum reading. The ATC analyst advised the train crew to consult with the Dispatch office, who would get Mechanical enroute. He received a phone call from the ATC analyst that the crew had a critical alarm and that the train had derailed<sup>1</sup>.

The ATC desk has two 12-hour shifts, 6:30 - 6:30. The basic schedule is on a two-week rotation. Week one is 2 days on, 2 days off, 3 days on. Week two is 2 days off, 3 days on, 2 days off. During his April 13, 2023, interview, the ATC Manager stated that there was one ATC analyst staffed for the desk for every shift and that he had requested additional staffing several times over several years without success.

During this interview, the ATC Manager stated he has received additional staffing for four ATC analysts, and the new hiring will be completed this week. The new staffing levels will provide two ATC analysts for each shift, which totals eight analysts plus one analyst for vacation relief.

#### **4.6 NS Engineer (Interview Conducted by the FRA)**

The Engineer was called by crew-caller at 8:15 a.m. for on-duty time of 10:15 a.m. The trip was uneventful until reaching the Yellow Sulphur detector - V276.3, where he got a Critical Alarm. He contacted New River Dispatcher on Radio Channel One (AAR 072-072) and also contacted Wayside Dispatcher - confirmed axle count given by detector to be axle 299. Wayside provided car number and position in train as well as what side of train (CR 507499 - Car position 71 - Waybill line 74 - Northside axle on car.

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<sup>1</sup> See the Timeline in Section D.3.0 for more detailed information and specific timestamps.

The Conductor reported that the TempilStik barely melted - used the new 169-degree TempilStik. He waited about 30 minutes to get guidance back from the Dispatchers as what to do. The Dispatcher gave instructions to set off at North Fork or Fagg. Crew countered with concerns about being able to shove back with HP/Tonnage ratio. The Dispatcher also said to take car to siding (house track) at Riverside.

Hours of Service left to work were never discussed with the crew. At this time they had about three hours left to work. After it was determined their train had derailed, they had about 1.5 hours left to work

#### **4.7 NS Conductor (Interview Conducted by the FRA)**

The Conductor was called at 08:15 for a 10:15 on duty time. He arrived for duty at 10:15 to get train at Bluefield Yard, Radford Subdivision, Blue Ridge Division. He reported that the weather was partly sunny, 80+ degrees and clear visibility.

He called the Dispatcher when the hot box detector sounded an alarm. He got suited up and walked the southside of the train first due to vegetation concerns. He reached the 20 axles prior to the identified axle and began checking. He continued to the identified axle with no defects found, continued on southside, 20 more axles, then crossed over equipment and began checking axles headed back to the engines. He reached the identified car/axle and tested it with TempleStik on the axle cap and bearing cage. The TempleStik melted slightly. He inspected end cap - all bolts were in place, no discoloration of wheel and bearing cage. Grease was only slightly coming out the back of the bearing, no significant grease evident.

He walked back to the locomotive, drank some water and called the Dispatcher to inform him he was back on locomotive. He briefly discussed options with the Dispatcher and told him that he didn't think it was too bad considering they had some brakes on for over a mile. He called the Wayside desk who asked for the findings. He reported that some grease was coming out but it wasn't extensive.

Initially, the Wayside Desk wanted to shove the train back to North Fork but due to tonnage and horsepower they would be unable to shove back same as it would be for Fagg (they had three locomotives, however only two were working).

He reported that after a long pause, the dispatcher came back on said to take the train to Riverside siding for the set out. This was approximately 12-13 miles from the stopped location. They were told they could leave from where they were at to Riverside "Signal indication at Track Speed". When questioned by the interviewer as to who gave that instruction, he responded that "they" had put their heads together and made that decision; he didn't know who all the players were who made that decision.

When asked about the locomotives and the make-up, and which were running, and which one was shut down, he responded that of the three engines, only two were working third was shut down and wouldn't stay running.

## **5.0 Employee Training and Disciplinary Records**

NS employee records for the incident train's conductor and train engineer were reviewed and the following information was obtained regarding their employment history, certification, training and disciplinary records.

### **5.1. Train Conductor**

The Conductor was 61 at the time of the accident. He hired on with NS on October 21, 2004, and marked up as a Conductor on March 4, 2005. He was certified as an Engineer on May 23, 2011. His most recent recertification was February 1, 2023, as both a Conductor and Engineer.

He passed all of NS's Conductor's and Engineer's Knowledge Assessments (Operating Rules, HazMat Rules, Air Brake Rules, and Territorial Knowledge Tests) which were conducted in 2011, 2012, 2013, 2014, 2015, 2016, 2018, 2020, and most recently on November 16, 2022. The frequency of the Knowledge Assessments changed from once a year to once every two years beginning in 2016.

The Conductor passed his most recent required performance evaluation as an Engineer on October 3, 2022.

The Conductor passed all of NS's required vision acuity and hearing acuity evaluations, which were conducted in 2010, 2013, 2016, 2019, and 2022 (every three years).

NS reviews Conductor and Engineer State and National driving records for DUIs or substance abuse at every recertification. There were no infractions in the Conductor's records which covered 2010 to August 4, 2022.

The Conductor's discipline record at NS had one Rules violation over the last 15 years, which was on July 25, 2015. He received 10 days deferred suspension for a violation of OR4, when he failed to follow instructions from Bluefield yardmaster and yarded his train in an improper track without authority while working as a conductor on 11xv424 in Bluefield Yard.

He has no injuries on his employee record.

## **5.2. Train Engineer**

The Engineer was 39 at the time of the accident. He hired on with NS on September 18, 2006 and was marked up as a Conductor on February 14, 2007. He

was certified as an Engineer on November 19, 2013. His most recent recertification was September 1, 2020 as both a Conductor and Engineer.

He passed all of NS's Conductor's and Engineer's Knowledge Assessments which were conducted in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2020, and most recently on March 9, 2023.

The Engineer passed his most recent required performance evaluation as an Engineer on March 9, 2023.

The Engineer passed all of NS's required vision acuity (with corrective lenses) and hearing acuity evaluations, which were conducted in 2012, 2013, 2017, 2020, and 2023.

NS's review of the Engineer's showed no DUI or substance abuse infractions in his records which covered 2012 to April 12, 2023.

The Engineer's discipline record at NS shows one minor operating rule violation in 2014 for failure to properly test the effectiveness of handbrakes. His record also shows one minor safety rule violation in 2016 for improperly dismounting equipment and failure to use a brake stick. He did not lose any work time for either of these minor violations.

There were no injuries on the Engineer's employee record.

Additional information about the train crew is provided in the Operations Factual Report.

## 6.0 Incident Train Car Inspections

An FRA inspection of a loaded coal car was observed at the NS South Yard in Roanoke, VA, where the incident train (minus the incident car) was located. Protocols for examining a hot wheel bearing inspection were discussed (see Figure 3).

NS Train Crews are issued Tempilstiks, with a wax-based, push-up replaceable inner “crayon” that melts at 169°. (Mid-February 2023 NS lowered the standard of the Tempilstik melting point from 200° to 169°.) These are used to gauge the wheel bearing temperature when an alert or alarm is set off by the HBD (see Figure 4).



**Figure 1:** Exemplar Tempilstik issued to Train Crews. This will melt at hot wheel bearing temperatures of 169° or above. The inner wax-based, push-up crayon that will melt is removed and set below the pen in this photograph.

## 7.0 Inward and Outward Facing Video Review

The NS Inward and Outward Facing Video Recordings from the incident train review was conducted remotely. Only ten minutes of the outward facing video was available, stopping at the point where the train came to rest for the Conductor to get out and examine the wheel bearing. The following information was obtained:

- Prior to the Detector alert the display showed the train traveling at 26.3 mph.
- After the train stopped to inspect the bearing, the display showed the train reaching a speed of 35 mph.

The inward facing video recording stopped four minutes after the train came to a rest, following the derailment. This is in accordance with the DVR programming on the incident train, which is an older train. Mr. Hawkins explained that the locomotive DVR would need to be reprogrammed to allow additional recording time. The DVRs have about three weeks of train movement time available for recording retention. Newer recorders do not stop recording after the train is stationary and NS is in year two of a ten year replacement cycle for locomotive inward facing video recording systems. The newer systems are also tied in with PTC power, so they will have power as long as the PTC has power.

The following observations were made of the video:

- No handheld devices, such as cell phones, were observed with either crew member.
- The crew appeared alert and attentive to their duties
- Engineer made a normal controlled stop
- After the stop, the Conductor is seen using the radio
- Prior to derailment, once again the crew is attentive to their duties and conversing normally, no sound

## **8.0 Audio Recording, Train 814**

The following excerpts of the conversation between the ATC analyst and the Conductor were taken from the audio recording of Train 814 communications radio:

Conductor:



"The bearing was a little warm. It was warm enough to try to melt that new stick that we have, but just barely."

"We've been riding the brakes down the mountain a mile or so at least, I don't know if that'll have any difference."

"Wasn't a lot of grease or anything on it, just warm."

The ATC analyst questioned the Conductor about what was observed:

"No real visible defects that you can see? You didn't see it as leaking grease, or discoloration, or anything like that?"

"There was no discoloration or anything, but there was a little bit of grease at least on the backside. It wasn't profuse. The stick did melt a little bit when we put it on the outer can, but it wasn't crazy."

"Yeah, I just hate to see what that thing looks like internally if it is giving up a little grease or melting that temple stick there... It could be marled up on the inside because it was pushing over 200 degrees when it hit the detector. That's pretty high for what we see."

"Ok, well, we'll do whatever you tell us to do."

## **8.0 Post Accident Actions by NS**

NS's post accident actions include:

1. On critical HBD alarm the train is required to be stopped.

2. Upon crew inspection, if there is any deformation of the bearing or visible damage, a QMI must inspect in place.

3. If none is noted, the dispatcher can authorize a movement at speed not exceeding 10 mph to the next set out point.

4. If this is done, train must be stopped every three miles and bearing must be inspected.

Submitted by:  
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