

National Transportation Safety Board

Office of Railroad, Pipeline and Hazardous Materials

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OPERATIONS

Group Chair's Factual Report

July 23, 2024

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A INCIDENT

Location: Bordulac, ND
Railroad: CPKC Railway
Date: July 5, 2024
Time: 3:36 AM
Train: 242-03

B OPERATIONS GROUP

Group Chair	Ben Strot NTSB Rail Accident Investigator
Party Coordinator	Ryan Dunn FRA Ops Investigator
Party Coordinator	Jim Chase SMART-TD National Safety Team
Party Coordinator	DB Kenner BLET Safety Task Force
Party Coordinator	Tom Jared CPKC Railroad General Manager US West Operations

C SUMMARY

See IIC summary in accident docket.

D BEFORE THE ACCIDENT

CPKC Railroad train 242-03 was a mixed manifest train that originated in Lambton Park Yard, Alberta with a final destination of St. Paul, Minnesota. The train was operated across multiple crew districts with a total distance from origin to destination of 1,347 miles.¹ The crew on board the train at the time of the accident

¹ A crew district is the portion of a trip operated by a train crew between two set points designated as the home terminal and away from home terminal.

consisted of one conductor and one engineer located in the operating compartment of the lead locomotive. This crew went on duty in Minot, ND at 9:15pm on the 4th of July and their destination was Enderlin, ND.

Train 242-03 departed Minot at about 10:30pm. The crew had an enroute work event at Harvey, ND. The planned work event was a 28 car pick up out of low one track. The superintendent was at Harvey to assist the crew and give them new paperwork. He stated to them that they were picking up 28 cars that were pretested and ready. After departing Harvey, the crew passed the defect detector at MP 383.9 and found that they had one extra car in their train. The crew immediately contacted the dispatcher who informed them they had an extra car in the pickup but that it was not hazmat and "good to go" where it was.² The conductor updated his hazmat paperwork and the crew continued.

Prior to reaching the accident scene the crew made several train meets with no issues reported. The crew reported that the trip was going smoothly. After leaving the last siding at Carrington the crew proceeded towards Bordulac.

E ACCIDENT SEQUENCE

At railroad station Bordulac the train was operating on a slight descending grade (0.3 to 0.4%) transitioning to a slight ascending grade (0.1%) just prior to the derailment location. Event recorder data shows the throttle decreasing from throttle 2 to idle on both the head end and DP locomotives with train speed varying from 43 to 44mph.

As the crew passed over the derailment location, they did not report any abnormal movement of the locomotives. The crew reported that as they passed the west end of Dry Lake siding, they felt a run in from the rear of the train. They did not report the run in as being severe and the engineer stated that it was normal to get a run in there as the train transitions from the descending grade to slight ascending grade coming into and through Dry Lake siding. Almost immediately following the run in, the train experienced a train line application of the emergency brakes. The engineer brought the train to a stop with dynamic brakes and independent brakes reporting this to be the "smoothest stop" he'd ever had in emergency.³

After the emergency application of the brakes and before the train came to a stop the conductor reported to the engineer that he could see a fireball behind the train. The conductor called out emergency on the radio and the dispatcher was contacted. The crew reported to the dispatcher that they were in emergency and could see fire behind them. The conductor requested and was granted permission to

² Interview of Train 242 conductor, July 7, 2024; page 17 Lines 20-25 and page 18 Lines 1-3

³ Interview of Train 242 engineer, July 7, 2024; page 9 Line3

disconnect the locomotive from the train and pull it up to a crossing further away from the fire.

The crew reported seeing the first emergency vehicles arriving about 4:20am, 42 minutes after the train stopped. The engineer made multiple calls to the dispatcher to make sure that the fire crews knew what materials were being transported on the train.⁴ The emergency manager for the county drove out to the crew to check on them. In conversations with him the crew asked if he needed a copy of their consist paperwork. The emergency manager stated that he did not need a copy of the consist.⁵

The crew stayed on the train until the superintendent arrived about 6:30am. The superintendent had them reattach their locomotive to their cars on the east end of the derailment site. These cars were pulled up towards Dry Lake to clear the area. The crew was then transported to the command center where there was a briefing with the fire chief. The engineer was transported by a CPKC employee to the DP unit on the rear of the train. After a brief training discussion with the fire department, the conductor donned a self-contained breathing apparatus and went with a firefighter to close the angle cock on the first car not derailed on the west side of the derailment. The west cars were pulled away from the derailment site and the crew was transported to perform post-accident toxicological testing.

F TRAIN DOCUMENTS

Upon going on duty in Minot the train crew received the following paperwork for review and use throughout their trip. Copies of these documents are in the accident docket for review.

- Tabular general bulletin orders (TGBO)
- Train tonnage profile
- Marshalling messages
- Outbound wheel report
- Hazardous Materials List
- Compressed Waybills
- Emergency Response Instructions

After making the pickup at Harvey the superintendent provided the crew with new paperwork that included the cars picked up (minus the extra car). Once the crew realized that they had an extra car the conductor manually updated the paper list to show correct locations and line numbers of the hazmat in the train.

⁴ Interview of Train 242 engineer, July 7, 2024; page 10 Lines 20-25 and page 11 Lines 1-7

⁵ Interview of Train 242 conductor, July 7, 2024; page 15 Lines 18-22

The crew was only supplied with one set of paperwork at Harvey for the new train consist. The crew stated that this was sufficient but not ideal as they would not have a set of paperwork if they had to give a copy to first responders.⁶

G TERRITORY

The Carrington subdivision is a 139.3-mile subdivision that runs from Harvey, ND (MP 395.8) to Enderlin, ND (MP 253.6). The railroad is laid out in the timetable as running in a West to East direction. The Carrington subdivision consists of single main track the entire length of the subdivision with 7 sidings for meets and passes. At the time of the accident the train was running timetable east.

Timetable maximum authorized speed on the Carrington subdivision is 60 mph with various permanent speed restrictions across the subdivision. At the location of the derailment there were no permanent speed restrictions listed in the timetable.

Trains on the Carrington Subdivision are managed and controlled using a traffic control signal system dispatched by the Portal dispatcher in the Minneapolis Dispatching center. There are 6 Hot Bearing Detector/Dragging Equipment Detectors on the subdivision and 1 Wheel Impact Load Detector (WILD).

Positive Train Control (PTC) is operational on the subdivision and was in use by the crew of train 242-03. Crews do not receive mandatory directives or bulletins electronically through PTC.

Trip Optimizer (TO) is an energy management system designed and installed on locomotives by Wabtec. TO is used across the CPKC system including the Carrington Subdivision but the engineer stated in his interview that TO was not working at the time of the accident.⁷

H CREW

Crew was called out of their away from home terminal in Minot, ND at 9:15 PM on July 4, 2024. According to CPKC documents both crew members were qualified in their respective job positions and on the territory operated.

Engineer

- Home Terminal- Enderlin
- Hire Date- July 19, 2010

⁶ Interview of Train 242 conductor, July 7, 2024; page 8 Lines 17-20 and page 28 Lines 17-22

⁷ Interview of Train 242 engineer, July 7, 2024; page 17 Lines 23-25 and page 18 Lines 1-2

- Locomotive Seniority Date: April 5, 2012
- Recertification Date: February 15, 2024
- Last Rules Exam: January 15, 2024
- Last Knowledge Exam: January 17, 2024
- Last Hazmat Exam: January 16, 2024
- Subdivision knowledge exam: January 15, 2024

Conductor

- Home Terminal- Enderlin
- Hire (Seniority) Date- November 7, 2022
- Conductor Certification Date: June 26, 2023
- Last Rules Exam: November 16, 2023
- Last Hazmat Exam: January 4, 2023
- Subdivision knowledge exam: January 21, 2023

I TRAIN

Train 242-03 consisted of 126 loads, 25 empties, 8,850 feet, and 17,975 tons as it approached Bordulac, ND. It was powered by a single locomotive, CP 8882 on the head end of the train and a single distributed power locomotive, KCSM 4535 on the rear. The train picked up 29 cars on the head end at Harvey to make up the totals approaching the derailment site.

The train was designated a key train as defined in the United States Hazardous Material Instructions (USHMI). The train contained 84 cars carrying hazardous material, including 21 loads of Anhydrous Ammonia (poison inhalation), 9 tank cars of Methonal (flammable liquid), 53 Hazmat tank cars, and one Hazmat non-tank car.

The train was given an initial terminal safety and brake inspection by carmen at Lambton Yard, AB. The train picked up cars in Red Deer and Dunmor, AB as well as in Harvey, ND. The train set out cars in Red Deer, AB. The train was given a second air test by carmen in Moose Jaw, AB. All cars picked up enroute were inspected by operating employees.

Lines 48-76 (29 cars) were derailed at MP 343.4. The derailed cars included 12 loads of propylene plastic pellets and the 17 derailed tank cars included 11 containing anhydrous ammonia and six containing methanol.

J WEATHER WARNINGS

At the time of the accident there were no active weather warnings for the Bordulac area on the CPKC railroad. The area had received a significant amount of

rain prior to the accident. CPKC, and most other class 1 railroads, contracts out weather alerting and forecasting to Accuweather.

CPKC supplied the following information about weather alerts from Accuweather:

- When deciding to issue an alert, AccuWeather meteorologists factor in several variables including past, current, and forecasted weather conditions.
- CPKC has established alert criteria with AccuWeather on anticipated rainfall and temperature for when temperature and rainfall thresholds are forecasted or observed. AccuWeather will issue an alert to CPKC once predetermined hazard thresholds are reached. For example, CPKC will be notified for:
 - Tornadoes when they are expected to pass within three miles of track
 - Heavy Rain
 - Flash Floods
 - Wind speeds of 50 mph or higher
 - Snow of 2" in 12 hours or 4" in 24 hours
 - Blizzards
 - Flash Freezing and Ice Storms
 - High Temperatures of 95°F or higher
 - Low Temperatures below 0°F
 - Reported Earthquakes of 5.0 magnitude or greater within specified miles of the epicenter
 - Hurricanes or Tropical Storms in the Atlantic; Pacific Basins and the Gulf of Mexico
- In response to multiple queries related to its dynamic alerting product, AccuWeather recently sent the information below to its railroad customers which further elaborates on their alerting capabilities.

"There are several key pieces of information that go into determining when a SkyGuard Flash Flood Warning is needed. As a reminder our SkyGuard Warnings are NOT automatically generated by AI or computers, they are manually generated by AccuWeather meteorologists using several pieces of disparate information to make warning issuance decisions, which are provided on a milepost-by-milepost level of detail. There are several components of foundational data used in this process provided by government or other data sources. Dynamic Flash Flood Guidance is one such piece of foundational data used in evaluating the risk for a flash flood in a specific area. Dynamic Flash Flood Guidance looks at type of soil (sand, vs clay, vs urban area), soil saturation, and how much rain that it would take to result in flash flooding within various timescales such as 1 hour, 3 hour and 6 hour timeframe. The Dynamic Flash Flood Guidance is gridded data that updates hourly, has 4 km

resolution, and displays to meteorologists within AccuWeather's proprietary warning software called SmartWarn. SmartWarn unifies a wide variety of weather and environmental data layering the information on top of client assets for meteorologist evaluation.

In addition to Dynamic Flash Flood Guidance, AccuWeather meteorologists utilize other foundational data such as weather radar data, Multi-Radar/Multi-Sensor (MRMS) information, and observational sensor data to quantify rain rates and what amounts of rain may have fallen over a length of time. AccuWeather meteorologists consider snowpack that could potentially melt during a rain event that could add additional liquid water into runoff areas making flash flooding occur more quickly. We also monitor past snowmelt and how that affects soil saturation levels. Additionally, how much rain has fallen over a particular area over the last few days, month, or even season, goes into assessing the current situation and how the already saturated ground will not be able to hold nearly as much rain before flash flooding may begin. Watershed information is also considered to estimate where water, once it has fallen, may flow directionally, terrain and its impacts near track are reviewed, as well as Local Storm Reports, government information and social media to consider the potential impacts our clients might face and where flooding may occur from a rainfall event. AccuWeather's SkyGuard Warnings does provide those dynamic weather alerts to help enhance location-based weather forecasts and highlighting potential impacts to railroad personnel."

CPKC supplied the following information on how weather alerts are sent out to the field:

- CPKC has a Critical Natural Hazard Notification Process in place that outlines the steps that must be taken when a critical weather alert is received. The flow of information within the legacy CP and legacy KCS Operations Centres ("OC") is slightly different but for both OCs, Dispatchers receive critical warnings for further communication to train crews. In general, the process is:
- AccuWeather SkyGuard issues a warning to CPKC authorized employees. This is done using multiple mechanisms in order to address the different needs of CP employees e.g. those that may be working in the field. The available mechanisms are access to a Web based portal, email, an app on mobile devices with push notifications and text messages (if subscribed to).
 - If a warning is not critical e.g. warning and watches for or hurricanes; right-of-way fire, close monitoring of a water hazard, the notification is sent to the Engineering Services Reliability ("ESR") desk. The ESR desk notifies the relevant Roadmaster(s) and Risk Management.
 - If the warning is critical e.g. wind speed >50 mph, tornado, flash flood and earthquake events, a notification is sent to the relevant Operations Centre ("OC"). Within 2 minutes, the OC is expected to

acknowledge the warning through the AccuWeather portal or by a clicking on a button in an email. The warning may be initially provided to a Director but is ultimately provided to the Dispatcher(s) for communication to affected train crews.

- If the OC does not acknowledge the warning in <2 minutes, AccuWeather calls the CPKC Public Safety Communication Centre, who acknowledges the warning and notifies the OC via phone using an Emergency Line.
- For the notification of Critical Weather Warnings, which includes Flash Floods, Tornadoes, or Thunderstorms. the Dispatcher will:
 - Contact all trains in affected area and advise the train crews on the adverse weather condition(s). For certain conditions e.g. high winds or gusts, the Dispatcher will also notify any Engineering employees in the vicinity.
 - Determine from crew or employees in field the local conditions they are observing.
 - Trains will then be governed by the train dispatcher instructions in the handling of their trains in line with internal operating rules.
 - If a restriction or stopped train movement is given it will remain in effect until otherwise advised by the Dispatcher.

K LOCOMOTIVE OUTWARD FACING CAMERA

Both locomotives on train 242-03 were equipped with image recording systems. Video from these locomotives was obtained and preserved by the CPKC for future use. Outward facing camera from the accident train and previous trains 243-04 and 315-926 were reviewed on scene.

L LOCOMOTIVE EVENT RECORDER

While on scene investigators reviewed the event recorder information from the lead and DP locomotives. The downloads have been sent to the NTSB headquarters RE department for review and annotation. An event recorder specialist factual report will be in the docket.

M TOXICOLOGY TESTING

The conductor and engineer were drug and alcohol tested under FRA Post accident testing protocol at Sanford Health in Jamestown, ND. Testing was performed between 1220pm and 1255pm on July 5, 2024. A review of the results of the testing and medical review officer report show that both employees tested negative for controlled and unprescribed substances.

49 CFR 219.203 (d)(1) states that a railroad must make every reasonable effort to assure that specimens are provided as soon as possible after the accident or incident, preferably within four hours.

49 CFR 219.203 (d)(2) states that the requirements of paragraph (d) must not be construed to inhibit an employee who is required to be post-accident toxicological tested from performing, in the immediate aftermath of an accident or incident, any duties that may be necessary for the preservation of life and property.

N OPERATING DOCUMENTS

At the time of the accident crews operating on the Carrington subdivision were governed by the following rule books:

- US Eastern Region Timetable 1 Effective July 1, 2024
- General Code of Operating Rules (GCOR), Eighth Edition April 1, 2020
- Air Brake and Train Handling (ABTH), Effective Date June 15, 2024
- Special Instruction No. 4 Effective September 15, 2021
- Train & Engine Safety Rule Book April 2023
- United States Hazardous Material Instructions (USHMI) March 1, 2022
- Emergency Response Guide (ERG) 2024

O INTERVIEWS

On scene interviews were conducted at the Fairfield Inn located in Jamestown, ND. Interviews were conducted with the following individuals and transcripts of the interviews are contained in the accident docket:

- Train 242 Conductor
- Train 242 Engineer
- CPKC Superintendent

Submitted by:

Benjamin Strot
Operations Group Chair