Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2015-1007

Canadian Pacific Railway Company (CP)
Sherrill, IA
February 4, 2015

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2015-1007

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Canadian Pacific Railway Company	CP	1000170207

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Canadian Pacific Railway Company	CP	1000170207
2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident	4. Time of Accident/Incident
	2/4/2015	11:20 AM

5. Type of Accident/Incident
Derailment

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated	10. Subdivision
80	14	7	0	Marquette

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Sherrill		IA	DUBUQUE

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
16 °F	Day	Clear	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Single Main Track	Freight Trains-40, Passenger Trains-60	19	South

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OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	632-015

4. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	5. Trailing Tons (gross exluding power units)	6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter	Code
24 MPH	R	10323		0

6. Type of Territory

Signalization:

Not Signaled

Method of Operation/Authority for Movement:

Direct Train Control

Supplemental/Adjunct Codes:

F, P

7. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.	Alcohol	Drugs
(1) First Involved *(derailed, struck, etc.)*	NS9052	1	yes		0	0
(2) Causing *(if mechanical, cause reported)*	N/A			9. Was this consist transporting passengers?		No

10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	3	0	0	0	0	(1) Total in Equipment Consist	81	0	0	0	0
(2) Total Derailed	2	0	0	0	0	(2) Total Derailed	15	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
954289	10911

14. Primary Cause Code

T220 - Broken Rail - Transverse/compound fissure

15. Contributing Cause Code

Number of Crew Members				Length of Time on Duty	
16. Engineers/Operators	17. Firemen	18. Conductors	19. Brakemen	20. Engineer/Operator	21. Conductor
1	0	1	0	Hrs: 5 Mins: 35	Hrs: 5 Mins: 35

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others	25. EOT Device?	26. Was EOT Device Properly Armed?
				Yes	Yes
Fatal	0	0	0	27. Caboose Occupied by Crew?	
Nonfatal	0	0	0		N/A

28. Latitude	29. Longitude
42.661870000	-90.848790000

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CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved
1. Type		5. Equipment
2. Vehicle Speed *(est. mph at impact)*	3. Direction *(geographical)*	6. Position of Car Unit in Train
4. Position of Involved Highway User		7. Circumstance
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials?		8b. Was there a hazardous materials release by
8c. State here the name and quantity of the hazardous material released, if any.		

9. Type of Crossing Warning	10. Signaled Crossing Warning	11. Roadway Conditions
1. Gates 4. Wig wags 7. Crossbucks 10. Flagged by crew 2. Cantilever FLS 5. Hwy. traffic signals 8. Stop signs 11. Other *(spec. in narr.)* 3. Standard FLS 6. Audible 9. Watchman 12. None		

12. Location of Warning	13. Crossing Warning Interconnected with Highway Signals	14. Crossing Illuminated by Street Lights or Special Lights

15. Highway User's Age	16. Highway User's Gender	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train	18. Highway User

19. Driver Passed Standing Highway Vehicle	20. View of Track Obscured by *(primary obstruction)*

Casualties to:	Killed	Injured	21. Driver was	22. Was Driver in the Vehicle?
23. Highway-Rail Crossing Users			24. Highway Vehicle Property Damage *(est. dollar damage)*	25. Total Number of Vehicle Occupants *(including driver)*

26. Locomotive Auxiliary Lights?	27. Locomotive Auxiliary Lights Operational?

28. Locomotive Headlight Illuminated?	29. Locomotive Audible Warning Sounded?

10. Signaled Crossing Warning

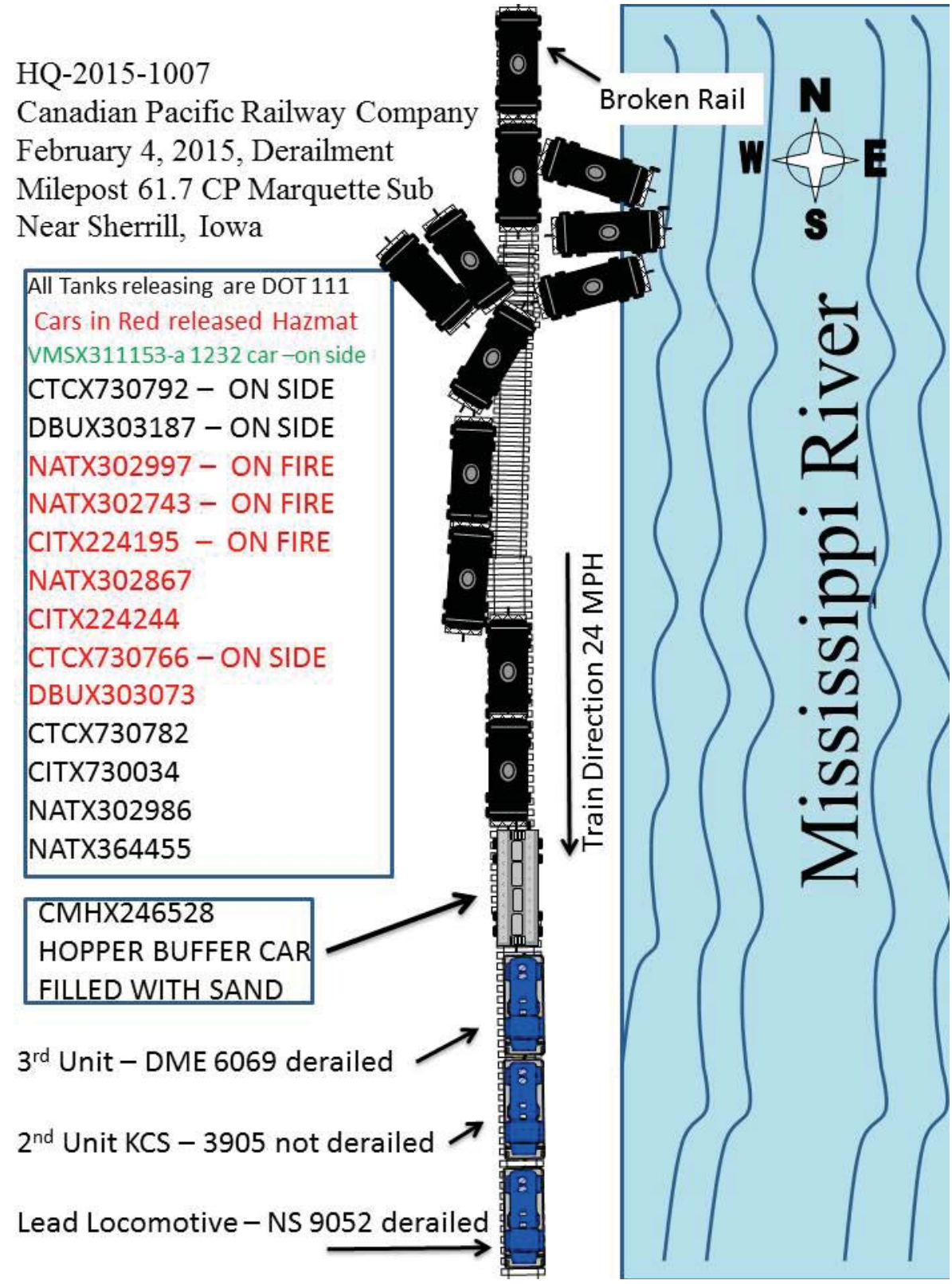
1 - Provided minimum 20-second warning
2 - Alleged warning time greater than 60 seconds
3 - Alleged warning time less than 20 seconds
4 - Alleged no warning
5 - Confirmed warning time greater than 60 seconds
6 - Confirmed warning time less than 20 seconds
7 - Confirmed no warning
N/A - N/A

Explanation Code

A - Insulated rail vehicle
B - Storm/lightning damage
C - Vandalism
D - No power/batteries dead
E - Devices down for repair
F - Devices out of service
G - Warning time greater than 60 seconds attributed to accident-involved train stopping short of the crossing, but within track circuit limits, while warning devices remain continuously active with no other in-motion train present
H - Warning time greater than 60 seconds attributed to track circuit failure (e.g., insulated rail joint or rail bonding failure, track or ballast fouled)
J - Warning time greater than 60 seconds attributed to other train/equipment within track circuit limits
K - Warning time less than 20 seconds attributed to signals timing out before train's arrival at the crossing/ island circuit
L - Warning time less than 20 seconds attributed to train operating counter to track circuit design direction
M - Warning time less than 20 seconds attributed to train speed in excess of track circuit's design speed
N - Warning time less than 20 seconds attributed to signal system's failure to detect train approach
O - Warning time less than 20 seconds attributed to violation of special train operating instructions
P - No warning attributed to signal systems failure to detect the train
R - Other cause(s). Explain in Narrative Description

SKETCHES

sketch



SYNOPSIS

Synopsis

Canadian Pacific Railway Company (CP) freight Train Symbol 632-015, traveling southbound at 24 mph on a single main track, in non-signaled track warrant control (TWC) territory, experienced a major derailment on February 04, 2015, at 11:30 a.m. The accident occurred near Sherrill, Iowa, at Milepost 61.7, on the CP Marquette Subdivision. It resulted in 2 locomotives and 15 cars derailed, release of hazardous materials from 7 derailed cars, and a fire. There were no injuries to the train crew and no evacuation.

At the time of the accident it was daylight and clear after a major snow storm and 16° F.

The FRA's investigation determined the probable cause was a Transverse/Compound Fissure broken rail (T220).

NARRATIVE

Circumstances Prior to the Accident

The crew of the southbound Canadian Pacific (CP) Ethanol unit Freight Train Symbol CP 632-015 included a locomotive engineer and a conductor. They first went on duty at 5:45 a.m., CST, February 04, 2015, at Marquette, Iowa. This was the home terminal for both crew members and both received more than the statutory off-duty period prior to reporting for duty.

Their train consisted of 3 lead locomotives, 1 sand loaded hopper buffer car, and 80 loaded tank cars. It was 5,025 feet long and weighted 10,323 tons. It was scheduled to travel to Dubuque, Iowa, to interchange with Canadian National Railway. The crew received Track Warrant 4021 to depart Marquette at 9:27 a.m.

The crew received no defects noted from roll by inspections at Marquette, Clayton, and Guttenberg, Iowa.

As the train approached the accident area, the Locomotive Engineer was seated at the controls on the west side of the leading locomotive. The Conductor was seated on the east side of the leading locomotive.

The single main track involved consists of 115-pound continuous-welded rail installed 3 years ago. From a ½ mile in approaching the derailment site, the track geometry traveling from north to south is as follows:
• a 0-degree, 43-minute left-hand curve of approximately 500 feet;
• a 1-degree, 44-minute right-hand curve of approximately 520 feet;
• followed by a tangent of approximately 800 feet;
• 0-degree, 29-minute right-hand curve of approximately 520 feet;
• a tangent of approximately 500 feet;
• 3-degree, 49-minute left-hand curve of approximately 300 feet;
• a 6-degree, 22-minute right-hand curve of approximately 500 feet; and
• a 2-degree, 53-minute left-hand curve.

There was a timber ballast deck bridge within the 6-degree, 22-minute curve; the south end of the bridge is at Milepost (MP) 61.80. This bridge consisted of seven 16-foot spans for a total length of 112 feet. On this portion of track, there is a descending grade of 0.03-percent which is very near river grade. The single main track in this area parallels the west side of the Mississippi River.

The train crew did not observe or feel anything unusual prior to the point of derailment. The speed at the time of the derailment was 24 mph as indicated by the event recorder of the second locomotive. Maximum authorized speed for this track is 35 mph. The Engineer had reduced speed to comply with a 25 mph speed restriction in effect between MP 61.5 and 61.3, because of a heavy frost.

The Accident

The Engineer stated that upon arriving at the south end of the bridge at MP 61.80, he noticed that he could see an area of snow cleared away from the tie plates and approximately seven spikes sticking up approximately 4 inches. Shortly afterward, he felt a sudden drop that was more pronounced on the conductor's side, and then heard the grinding vibration of the derailed equipment. He immediately made a minimum set in an effort to slow the train. About 15 to 20 seconds after initial ground contact, an undesired emergency application of the train air brakes occurred. The train came to a stop in about 9 to 10 car lengths. Both crewmembers reported that once the train stopped they looked back on the engineer's side as a fire erupted on one of first two ethanol cars. They cut the two lead locomotives from the derailed train consist, and moved south about 500 feet to get away from the fire. With the lead locomotive on the ground, they rolled the east rail over for 500 feet.

The third locomotive, buffer car, and 14 tank cars of ethanol were derailed. Three of the derailed tank cars ended up entering the Mississippi River and three cars caught on fire. As a result of the derailment, an estimated 53,180 gallons of ethanol was released from seven cars. However, the investigation could not officially determine how much ethanol stayed on land and how much actually spilled into the river. There were no injuries or evacuations associated with this derailment.

Analysis and Conclusions

Analysis - Post-Accident Toxicology: The two crewmembers involved were administered a Federal Railroad Administration Post-Accident Forensic Toxicology test.

Conclusion: Toxicology Result Reports indicate the two employees tested had negative test results. Drugs or alcohol were not a factor in this derailment.

Analysis – Fatigue: The crew work/rest cycles for the 10 days leading up to the derailment were obtained and reviewed.

Conclusion: Based upon the information provided, the Federal Railroad Administration (FRA) concluded fatigue was not probable and was not a contributing factor in this accident.

Analysis – Work History: Hours of service records were inspected for compliance with Federal regulations.

Conclusion: The crew/railroad was in compliance with the Federal Hours of Service Laws and Hours of Service was not a contributing factor in this derailment.

Analysis – Operational Testing: The CP furnished training records and efficiency testing information for inspection.

Conclusion: Both employees received adequate training to perform their jobs.
Analysis – Employee History: The CP provided the disciplinary histories of the train crew for inspection.

Conclusion: There were no disciplinary events in either record that appeared to be a contributing factor to this derailment.

Analysis - Event Recorder: The CP downloaded and provided the second lead locomotive event recorder data to the FRA for inspection. The data was inspected by an FRA mechanical inspector and two operating practices inspectors.

Conclusion: There is no evidence to believe that air brake or train handling were a factor in this derailment.

Probable Cause and Contributing Factors

The FRA's investigation determined the probable cause was a Transverse/Compound Fissure broken rail (T220).