

1 National Transportation Safety Board

2 Office of Railroad, Pipeline and Hazardous Materials Investigations

3 Washington, D.C. 20594

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6 Derailment of BNSF unit crude oil train U TIOEXP0 44T

7 Heimdal, ND

8 May 6, 2015

9 Mechanical Group Factual

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24 **Accident**

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26 NTSB Accident Number: DCA15FR009
27 Date of Accident: May 6, 2015
28 Time of Accident: 7:29 a.m. (CDT)
29 Type of Trains: Freight
30 Railroad Owner: BNSF
31 Train Operator: BNSF
32 Fatalities: 0
33 Injuries: 0
34 Location of Accident: Heimdahl, ND

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36 **Mechanical Group Members**

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38 National Transportation Safety Board-Group Chairman
39 Joey Rhine
40 490 L'Enfant Plaza East, SW
41 Washington, D.C. 20594

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46 Federal Railroad Administration
47 Brian Ramey
48 Bismarck, ND

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52 Federal Railroad Administration
53 Milo Voigt
54 Glendive, MT

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58 Burlington Northern Railroad
59 Larry Stover
60 Minneapolis, MN

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64 Hess / RME
65 Tom Johnson
66 St. Louis Park, MN

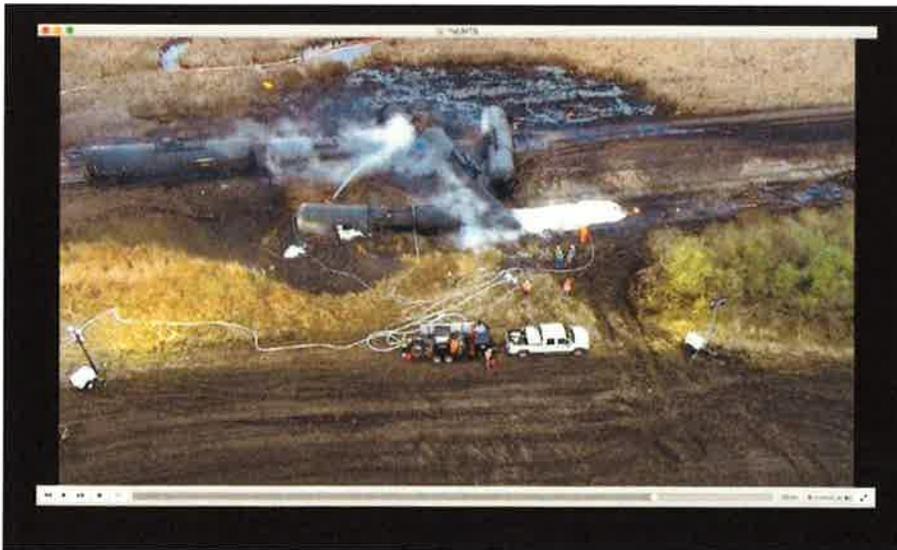
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70 Synopsis

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72 On Wednesday, May 6, 2015, at approximately 7:21 a.m. central daylight time, a BNSF crude
73 oil unit train traveling at approximately 45 miles per hour derailed at milepost 153.9, resulting in
74 a subsequent pile-up at 7:29 a.m. at milepost 149. The train consisted of 109 cars (107 loaded
75 tank cars and 2 buffer cars on the head end), and three locomotives at the front of the train. Six
76 tank cars derailed. As a result, four of the derailed tank cars were breached and caught on fire.
77 The derailment is about a mile east of Heimdal, ND near the 45th Avenue crossing in Wells
78 County, ND. The fire resulting from the derailment required the evacuation of all residents from
79 the town of Heimdal and surrounding rural residents (approximately 30 individuals) due to heavy
80 smoke creating respiratory health concerns. Evacuated residents were directed to the Fessenden
81 City Hall for shelter, but most opted to stay with friends or relatives located away from the
82 impacted area. The smoke plume extended to the north requiring notification of the Manitoba
83 Emergency Measures Organization. Tank cars that were not damaged or derailed were
84 uncoupled at each end from the damaged railcars (including three locomotives) and were moved
85 about one quarter mile from the scene. Damages were estimated to be \$4 million. Weather at the
86 time of the accident was 57 degrees and overcast skies.

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88

89 [Figure 1 Photo from drone of accident site after the fire was extinguished.](#)

90 **Train Consist**

91 The eastbound BNSF crude oil unit train U TIOCXP0 44T consisted of 3 locomotive, 2 buffer
92 cars, and 107 tank cars. The train was 6,640 feet in length and weighed 14,995 tons. The
93 locomotive consist had a total of 13,000 horsepower and a horse power / ton ratio of .8.

94 **Railroad Equipment Involved in the Collision**

95 The locomotives on the eastbound U TIOCXP0 44T were all positioned in the lead position and
96 were not derailed. The locomotive consist consisted of the following:

- 97 1. BNSF 9100 East SD70ACE Built 2012
- 98 2. BNSF 6717 West ES44C4 Built 2011
- 99 3. BNSF 9058 East SD70ACE Built 2012

100 The freight cars consisted of 2 loaded buffer cars and 107 loaded tank cars. The 2 buffer cars
101 were hoppers and in position 1 & 2. The tank cars were in position 3-109. All the loaded tank
102 cars were DOT 111 CPC 1232 cars. The 6 derailed cars consisted of the following:

- 103 Car position 81 TRFX 1224 All 4 wheels derailed
- 104 Car position 82 TRFX 1176 All 4 wheels derailed
- 105 Car position 83 TRFX 1374 All 4 wheels derailed
- 106 Car position 84 TRFX 1056 All 4 wheels derailed
- 107 Car position 85 TRFX 1170 All 4 wheels derailed
- 108 Car position 86 TRFX 1044 The leading (east) 2 axles derailed

109 Equipment damage was estimated by BNSF to be approximately \$433,000.

110 **Accident Sequence**

111 Preliminary review of event recorder data and physical data from the accident scene indicate the
112 eastbound train was approaching the POD at milepost 153.9 traveling at approximately 45 mph.

113

114



115

116 [Figure 2 POD at milepost 153.9](#)

117 The throttle was in notch 2 with no brake pipe reduction and minimal tractive effort. There were
118 marks on the rail every 114 inches leading up to the POD.



119

120 [Figure 3 Rail marks every 114 inches.](#)

121 At milepost 150.7, 2 pieces of broken wheel were found. The 6 derailed cars came to rest at
122 milepost 149.1.



123

124 [Figure 4 Piece 1 at milepost 150.7](#)

[Figure 5 Piece 2 at milepost 150.7](#)

125 **Pre-Departure Inspections**

126 On May 4, 2015, at 10:46 pm CDT, a Class I Air Brake Test and Pre-departure inspection was
127 conducted on the U TIOCP0 44T at the Tioga, ND, Hess loading facility by BNSF Qualified
128 Mechanical Inspectors. The BNSF Qualified Mechanical Inspectors set out 1 car for a bad wheel
129 and made 7 repairs in train before departure.

130 **Equipment Post Accident Inspections**

131 Un-derailed equipment

132 On May 9, 2015, the mechanical group conducted an FRA Class I Air Brake Test and Pre-
133 departure inspection on the remaining 103 cars from the U TIOCP0 44T that did not derail.
134 The train was reassembled in its original configuration from the time of the incident. The
135 following is a summary of the defects observed:

- 136 • 42 cars had head shields that were not properly secured.
- 137 • 10 cars had safety appliance defects.
- 138 • 2 cars had bottom outlet valve flange bolts that were loose.
- 139 • 1 car had a bottom outlet cap that was loose.

- 140 • 1 car had a broken/inoperable draft gear.
141 • 1 car had a broken knuckle pin.
142 • 1 car had an AAR thin flange.

143 On May 10, 2015, the End of Train device BNQ 47479 was inspected and tested by the
144 Mechanical group with no exceptions noted.

145 Derailed equipment

146 On May 8, 2015, the mechanical group conducted inspections on the running gear of the 6
147 derailed cars. The running gear parts were staged adjacent to the incident site by railroad
148 contractors for review.



149

150 Figure 6 Running gear parts

151 The running gear parts were inspected for defects and regulatory compliance with no defects
152 noted. However, the “B” end truck of car TRFX 1224 had received the most damage from the
153 derailment. The left #2 wheel was broken and tagged with NTSB tag #1 as evidence.



154

155 [Figure 7 Left #2 wheel.](#)

156 Wheel set #1 and the slack adjuster from the TRFX 1224 was also tagged with NTSB tag #2 and
157 is being held by the BNSF Railroad.

158 No exceptions were observed with the condition of the brake rigging or brake pads, all appeared
159 to have indications of normal contact patterns consistent with properly braking equipment. The
160 truck assemblies and wheels were examined and no abnormal conditions were observed.

161 **Documentation Received**

- 162 • Train list
- 163 • Weight list
- 164 • Any diagrams and photos of the accident scene
- 165 • Aerial photos of the accident scene
- 166 • Event recorder data
- 167 • Forward facing camera download
- 168 • Car repair history for the 6 derailed cars
- 169 • Blue cards for the locomotives

- 170 • Locomotive daily inspection records
- 171 • Air brake test record
- 172 • Hot box data
- 173 • WILD data
- 174 • TPD data
- 175 • Umler data
- 176 • Dragging equipment data
- 177 • Waybills
- 178 • Rear end device calibration data
- 179 • Train repair/inspection records
- 180 • BNSF procedures for KIP impact wheels
- 181 • Training records for the carmen & supervisor who performed train inspection
- 182 • Mechanical damage estimates
- 183 • Train route and inspection criteria
- 184 • Wheel change out history
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195 **Group Member to the Investigation - Acknowledgment Signatures**

196 The undersigned designated *Group Member to the Investigation* representatives attest that the
197 information contained in this report is a factually accurate representation of the information
198 collected during the on scene phase of this investigation, to the extent of their best knowledge
199 and contribution in this investigation.

200



Date 2-9-16

201

202 Joey Rhine, NTSB

203

204

Date _____

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Date _____

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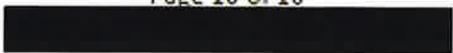
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212 _____ Date _____

213 Larry Stover, BNSF

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215 _____ Date 2-12-2016

216 Tom Johnson, Hess

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