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# Clarendon, Texas

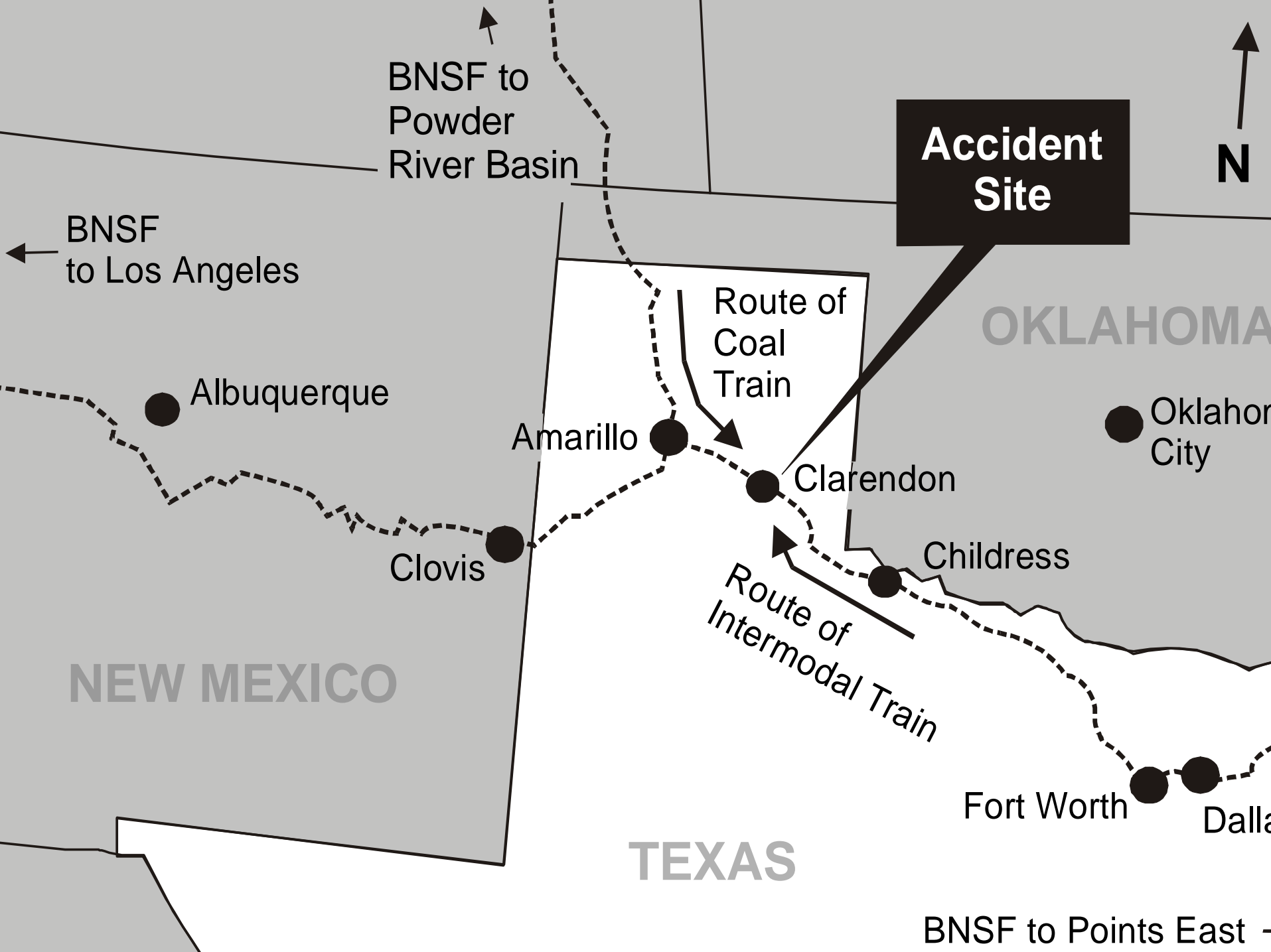
May 28, 2002

Collision of Two Burlington Northern  
Santa Fe Freight Trains



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# Coal Train

- 116 cars.
- Length 6,380 feet.
- Weight 15,843 tons.
- Three 4,000 horsepower locomotives, two on the head-end and one on the rear.



# Intermodal Train

- 169 containers and 11 trailers.
- Length 7,033 feet.
- Weight 5,545 tons.
- Powered by two locomotives.



# The Collision

- The coal train was moving at 49 mph when it was placed into emergency braking.
- The intermodal train was moving at 42 mph when it was placed into emergency braking.
- The collision occurred about 16 seconds later.



# As a Result of the Collision:

- 2 locomotives and 23 cars of the coal train derailed.
- 2 locomotives and the first 12 platforms of the intermodal train derailed.
- 18 loaded containers were destroyed.
- \$8 million in damages.







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J.B. HUNT

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# Injuries to Personnel

- Coal train engineer and conductor critically injured.
- Intermodal train engineer fatally injured.
- Intermodal train conductor minor injuries.



# Accident Discussion

- Trains were operated with track warrants.
- A track warrant may require a train to await the arrival of an opposing train before proceeding beyond a specified point.
- The train's last track warrant contained such an “after-arrival” requirement.



- Coal train did not stop at Ashtola Siding.
- Coal train traveled about 7.7 miles past Ashtola Siding.



# Accident Investigation

- All track warrants were correct and complete.
- Radio communications were clear and succinct.
- All crewmembers were experienced and qualified on the territory.



- Coal train engineer made a cell phone call about the same time that the final track warrant was complete.
- Coal train passed beyond Ashtola Siding while the engineer was using his cell phone.





# Safety Issues:

The Safety Issues discussed in this report are:

- The manner in which track warrants that contain an “after-arrival” are given to trains.
- The use of cell phones by operating employees.
- The lack of positive train control.



# Investigation Team

- Ron Hynes                      Investigator-In-Charge
- Pat Sullivan                   Signals
- Eric Sager                     Human Factors
- Ruben Payan                  Event Recorders
- Robert Moore                 Report Editor



# Additional Staff Support

- Gina John                      Graphic Support
- Abdullah Kakar                Audio Support



# Parties to the Investigation

- Federal Railroad Administration
- Burlington Northern Santa Fe Railway
- The Texas Railroad Commission
- The Brotherhood of Locomotive Engineers
- The United Transportation Union



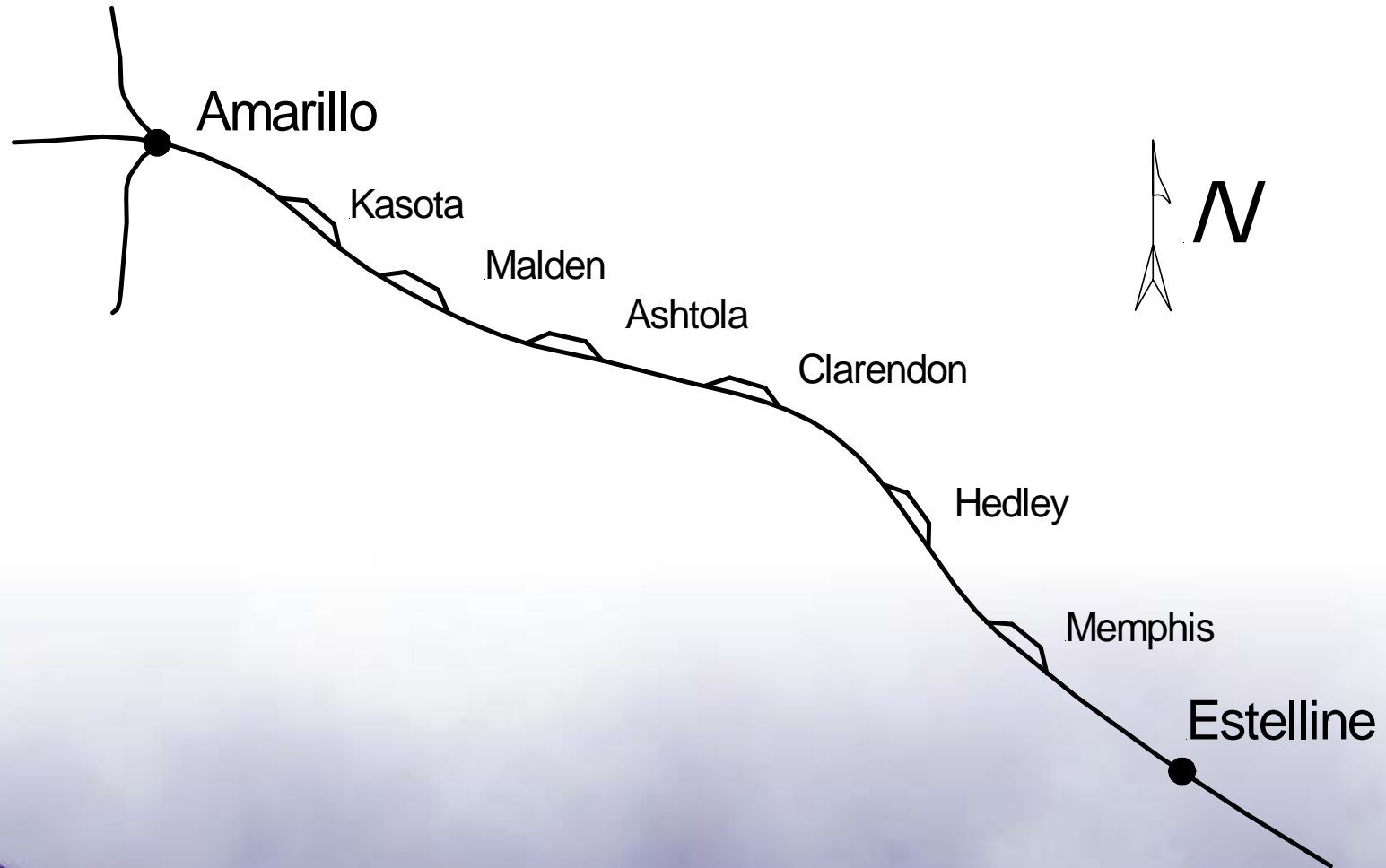


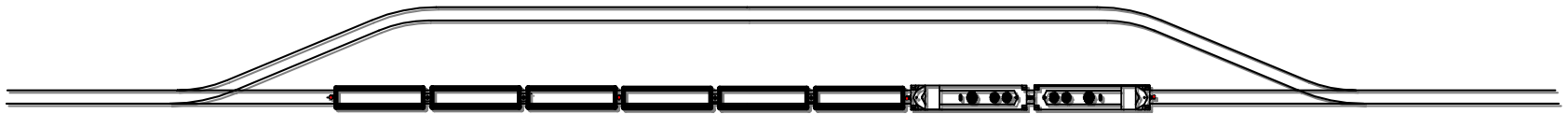
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# Track Warrants



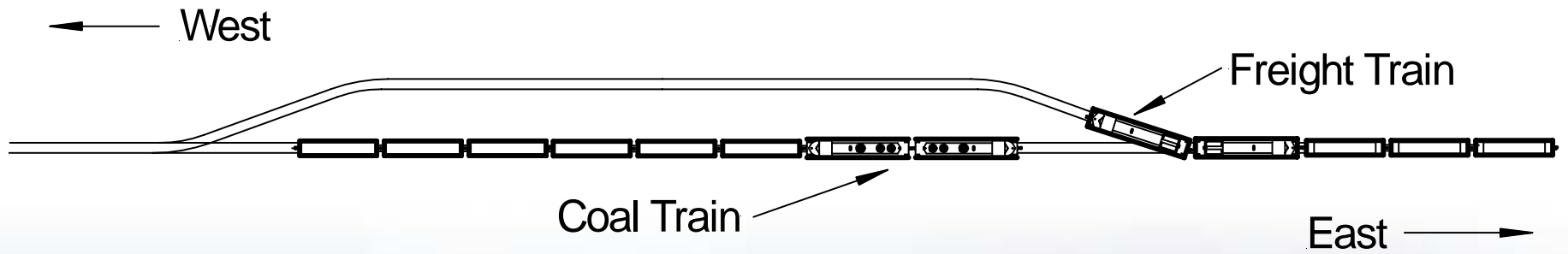
# Operating With Track Warrants





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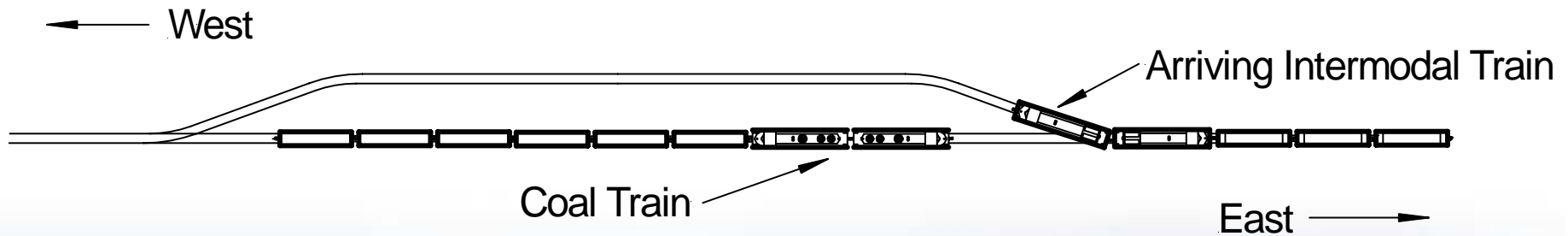


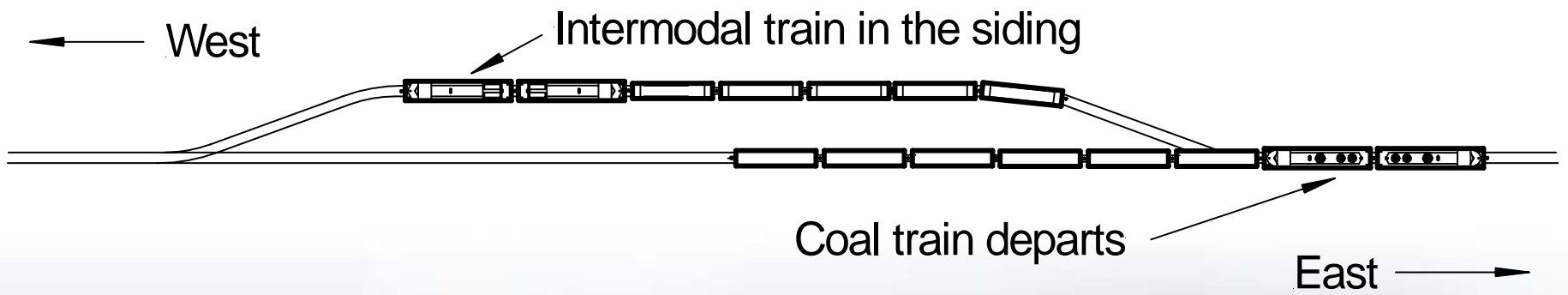
# “After-Arrival” Authority

- “After-arrival” track warrant allows a train to proceed from one location to another.
- Not in effect until after the arrival of a specified train.



# What Should Have Happened







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# **Train Dispatcher Audio Tape**



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**DISPATCHER**: Eighty-eight seventy-six east by two ninety-four now correct, over?

**BNSF 8876**: That is correct, over.

**DISPATCHER**: And a warrant, over.

**BNSF 8876**: Ready over. Patterson.



**DISPATCHER:** Number two-two, twenty-two,  
BNSF eight-eight-seven-six, eighty-eight seventy-six,  
east e-a-s-t  
milepost two-nine-four, two ninety-four.  
X two, t-w-o, proceed from east e-a-s-t siding switch  
Ashtola  
east e-a-s-t siding switch Hedley, main track.  
X box seven, s-e-v-e-n not in effect until after arrival  
BNSF forty-three eighty-five, four-three-eight-five  
west w-e-s-t  
at east e-a-s-t siding switch Ashtola, over.

16 second wait





**BNSF 8876**: Track warrant number twenty-two, two-two, to the Burlington Northern Santa Fe BNSF eight-eight-seven-six, eight-eight-seven-six east e-a-s-t, milepost MP 294, two-nine-four.

X box two t-w-o proceed from east e-a-s-t siding switch Ashtola

to east e-a-s-t siding switch Hedley, on main track.

X box seven, s-e-v-e-n not in effect until after arrival of Burlington Northern Santa Fe BNSF forty-three eighty-five, four-three-eight-five west w-e-s-t at east e-a-s-t siding switch Ashtola, over.



**DISPATCHER**: Two-two, eight forty-three, zero-eight-four-three, KCV, over.

**BNSF 8876**: OK at eight forty-three, zero-eight-four-three, Dispatcher KCV, over.

**DISPATCHER**: Correct thanks, Dispatcher out.

**END OF TRANSCRIPT**



# “After-Arrival” Track Warrants

- Many railroads do not use “after-arrival” authority.
- The General Code of Operating Rules permits the use of track warrants that contain an “after arrival” requirement.



**In non-signaled territory, there is no indication to the train dispatcher that a train has passed beyond the specified waiting point.**



**There is also no indication to other trains that a train has passed beyond the specified waiting point.**



# Consequence of Ignoring “After-arrival” Requirements

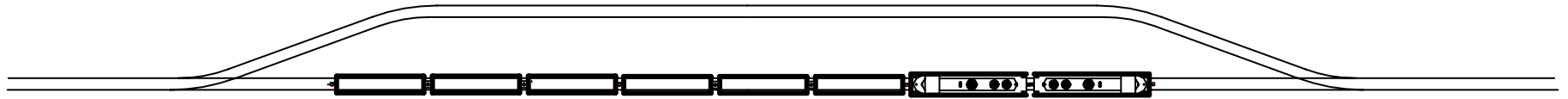


# Limiting the Use of “After-Arrivals”

Prohibit the use of “after-arrival” track warrants unless the train to receive the track warrant is already stopped at the location at which it will meet the opposing train.



# Post Accident BNSF Rule



Stopped before receiving "After-Arrival"





# Conclusion

The issuance, to moving trains, of track warrants containing an “after arrival” provision creates an unacceptable and unnecessary risk of a head-on train collision.



# Cell Phone Use

- All crewmembers had cell phones.
- Cell phone use has been shown to interfere with the perception process during the performance of operational tasks.
- The use of a cell phone by either crewmember may disrupt the normal interaction between the two.



# Coal Train Engineer

- 23-minute personal call.
- 17-minute break between calls.
- 10-minute personal call.



# Engineer's Cell Phone Use

- 8:43 - Train dispatcher radioed track Warrant 22 to the conductor.
- 8:43:55 - Communication with dispatcher ends.
- 8:44 - Phone records indicate that the engineer placed a call.
- 8:47 - Coal train passed the location where it should have stopped.
- 8:53 - Cell phone call ends.



# Radio Communications vs. Cell Phone Use



# Final Minutes of Train Operation

- Coal train continued past its designated waiting point with modest control inputs.
- The phone call ended a few minutes before the collision.
- No radio communication.



# Regulation of Cell Phone Use

- Federal regulations do not prohibit an engineer from using a cell phone while at the controls of a moving locomotive.
- At the time of the accident, the BNSF had no system-wide instructions that specifically restricted cell phone use.



# BNSF Restricted Cell Phones

- As a result of an unrelated collision, BNSF issued instructions that prohibit an engineer from using a cell phone while operating a locomotive.





# Conclusion

The engineer's cell phone use likely distracted him to the extent that he did not take proper note of the "after-arrival" stipulation of Track Warrant 22 and thus was unaware of his need to prepare to bring his train to a stop.





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# Positive Train Control

- Technology exists to automatically enforce the operation of trains and thus prevent train collisions.
- Positive train control has been on the Safety Board's list of "Most Wanted" transportation safety improvements since 1990.



# Positive Train Control

- 16 Major Accident Investigations
- 38 PTC Related Recommendations
- 30 Collision Accident Investigations since January 1999.



# Train Collisions

40 – 60 Accidents each year could be prevented by Positive Train Control.



# BNSF's Efforts in Positive Train Control

- BNSF is developing a system of train separation that would prevent trains from operating beyond the limits of track warrant authority.
- BNSF's train collision avoidance system is being designed to enforce the track warrant limits or signal indications and the operating rules that are in place.



# Human Factor Causes

- Fatigue
- Sleep Apnea
- Medication
- Reduced Visibility
- Distractions



# Conclusion

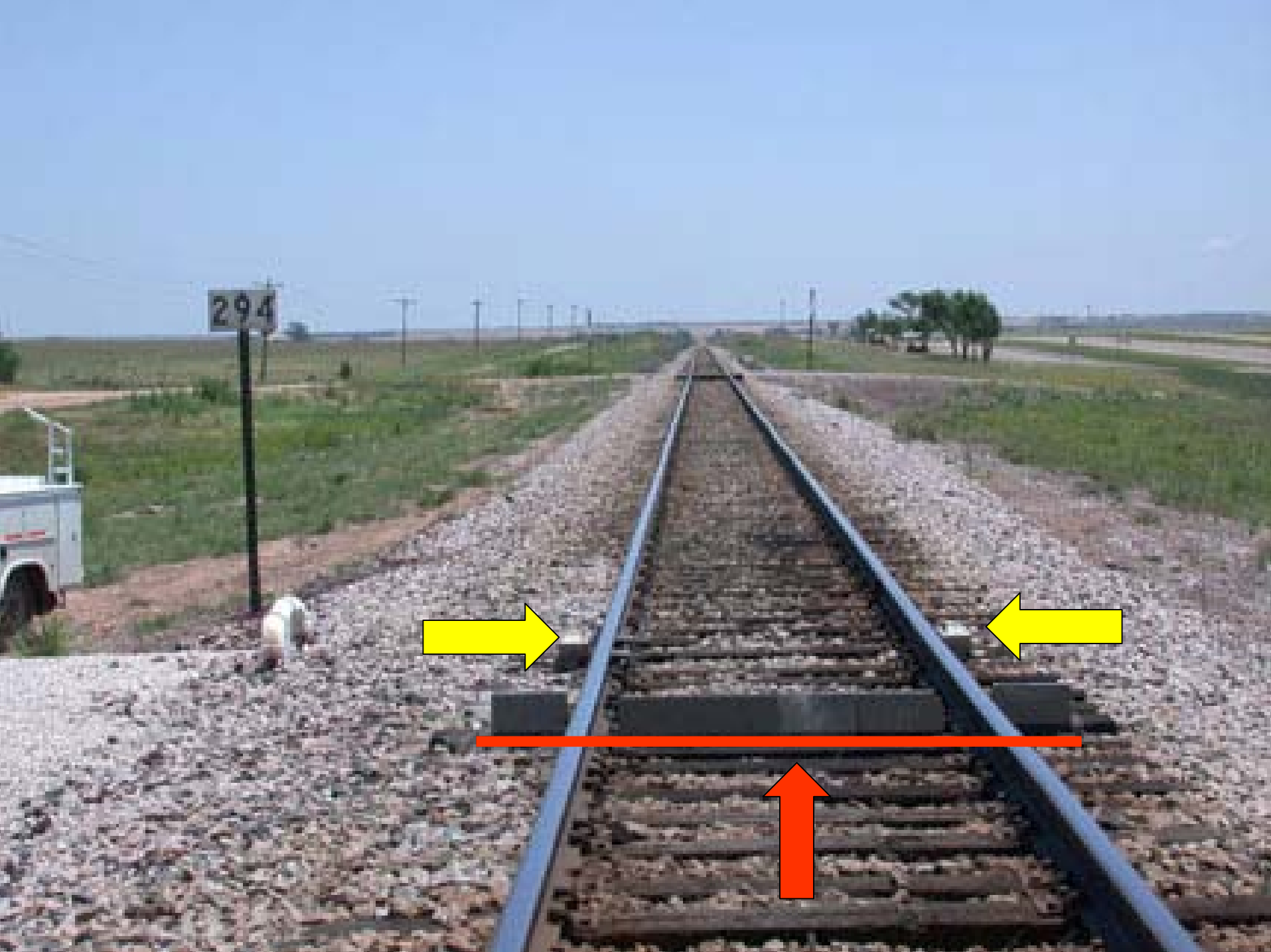
Had a positive train control system with collision avoidance capabilities been in place and operational on the Red River Valley Subdivision the collision probably would not have occurred.



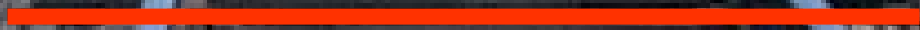




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