
***Federal Railroad Administration***
***Office of Railroad Safety***
***Accident and Analysis Branch***

# *Accident Investigation Report*
# *HQ-2015-1075*

***BNSF Railroad Co. (BNSF)***
***Culbertson, MT***
***July 16, 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 #R8-2015-1075

## TRAIN SUMMARY

| 1. Name of Railroad Operating Train #1 | 1a. Alphabetic Code | 1b. Railroad Accident/Incident No. |
|---|---|---|
| BNSF Railway Company | BNSF | MT-0715-105 |

## GENERAL INFORMATION

| 1. Name of Railroad or Other Entity Responsible for Track Maintenance | 1a. Alphabetic Code | 1b. Railroad Accident/Incident No. |
|---|---|---|
| BNSF Railway Company | BNSF | MT-0715-105 |
| 2. U.S. DOT Grade Crossing Identification Number | 3. Date of Accident/Incident | 4. Time of Accident/Incident |
| | 7/16/2015 | 5:54 PM |

5. Type of Accident/Incident
Derailment

| 6. Cars Carrying HAZMAT | 7. HAZMAT Cars Damaged/Derailed | 8. Cars Releasing HAZMAT | 9. People Evacuated | 10. Subdivision |
|---|---|---|---|---|
| 106 | 22 | 5 | 50 | Glasgow |

| 11. Nearest City/Town | 12. Milepost *(to nearest tenth)* | 13. State Abbr. | 14. County |
|---|---|---|---|
| Culbertson | | MT | ROOSEVELT |

| 15. Temperature (F) | 16. Visibility | 17. Weather | 18. Type of Track |
|---|---|---|---|
| 84 °F | Dusk | 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-60, Passenger Trains-80 | 70.28 | West |

U.S. Department of Transportation
Federal Railroad Administration

# FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #R8-2015-1075

## OPERATING TRAIN #1

| 1. Type of Equipment Consist: | 2. Was Equipment Attended? | 3. Train Number/Symbol |
|---|---|---|
| Freight Train | Yes | U-TNDAWA0-10T |

| 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 |
|---|---|---|---|---|
| 44 MPH | R | 14963 | | 0 |

6. Type of Territory

Signalization:

Signaled

Method of Operation/Authority for Movement:

Signal Indication

Supplemental/Adjunct Codes:

Q

| 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.)* | STAX 10495 | 79 | yes | | 0 | 0 |
| (2) Causing *(if mechanical, cause reported)* | N/A | 0 | | 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 | 2 | 0 | 0 | 0 | 2 | (1) Total in Equipment Consist | 108 | 0 | 0 | 0 | 0 |
| (2) Total Derailed | 0 | 0 | 0 | 0 | 0 | (2) Total Derailed | 22 | 0 | 0 | 0 | 0 |

| 12. Equipment Damage This Consist | 13. Track, Signal, Way & Structure Damage |
|---|---|
| 1831011 | 260000 |

14. Primary Cause Code

T109 - Track alignment irregular (buckled/sunkink)

15. Contributing Cause Code

T206 - Defective spikes or missing spikes or other rail fasteners (use code T111 if results in wide gage)

| 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: 7 Mins: 49 | Hrs: 7 Mins: 49 |

| 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 |
|---|---|
| 48.143765000 | -104.380785000 |

U.S. Department of Transportation
Federal Railroad Administration

# FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #R8-2015-1075

## 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<br>2. Cantilever FLS 5. Hwy. traffic signals 8. Stop signs 11. Other *(spec. in narr.)*<br>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

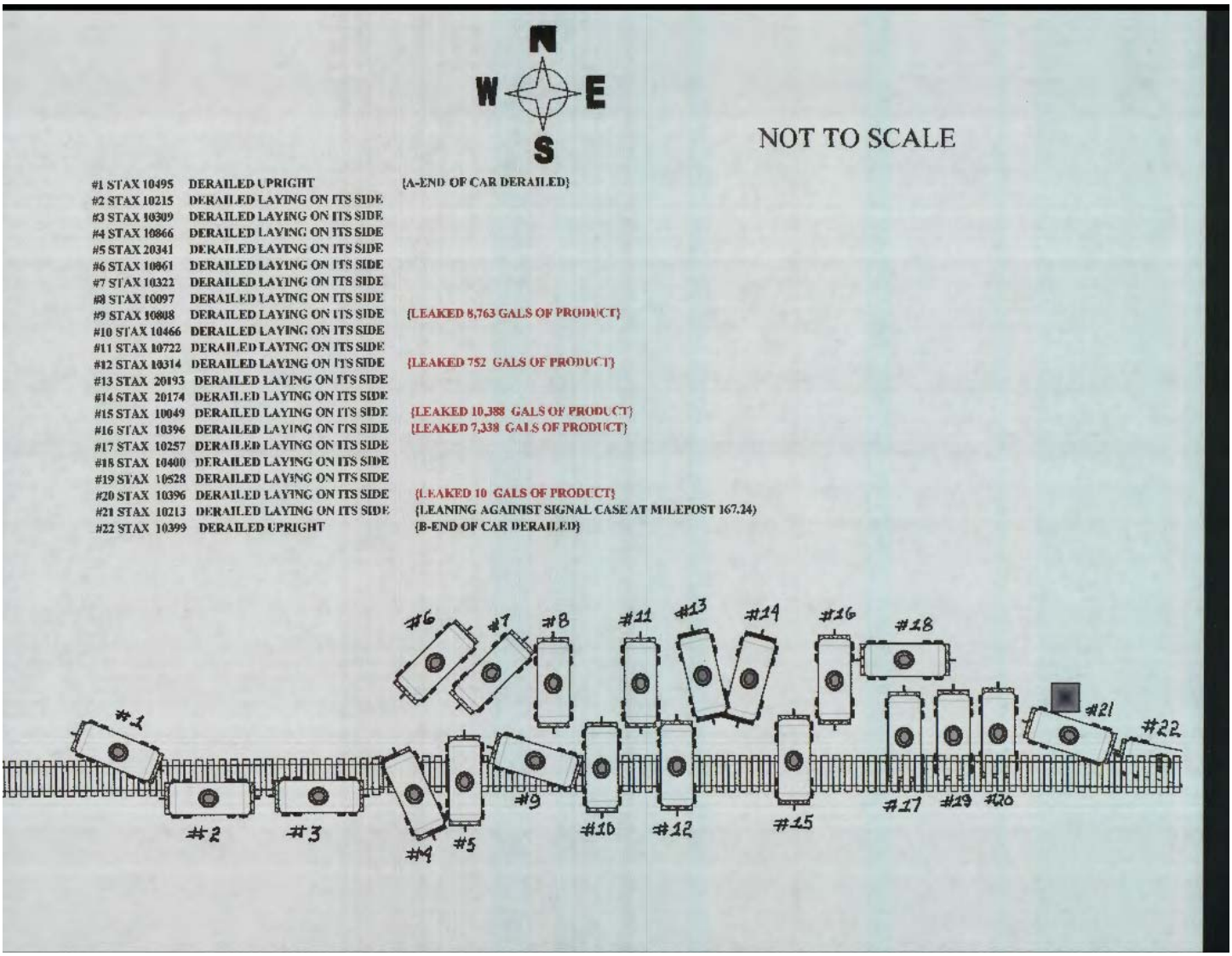
1 - Provided minimum 20-second warning
2 - Alleged warning time greater than 60 seconds
3 - Alleged warning time less than 20 seconds
4 - Alleged no warning
5 - Confirmed warning time greater than 60 seconds
6 - Confirmed warning time less than 20 seconds
7 - Confirmed no warning
N/A - N/A

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



U.S. Department of Transportation
Federal Railroad Administration

# FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #R8-2015-1075

## SYNOPSIS

On July 16, 2015 at approximately 5:54 p.m. (MDT) westward BNSF Loaded Unit Petroleum Crude Oil Train U-TNDAWA0-10T derailed 22 cars, line items 77 through 98 (consist positions 79 through 100), at milepost 167.2 on the Glasgow Subdivision of the BNSF's Montana Division. Twenty cars derailed on their sides with one leaning against the signal case at milepost 167.24 and two cars derailed in an upright position. The derailment site is located approximately 46 miles west of Williston, North Dakota and approximately 6 miles east of the town of Culbertson, Montana. Train U-TNDAWA0-10T consisted of two leading locomotives, 106 loaded crude oil tank cars, two buffer cars, and two Distributive Power (DP) locomotives located on the rear of the train. The train had 14,963 trailing tons and was 6,702 feet in total length. Five of the derailed tank cars were breached and leaked a total of 27,201 gallons of product. A BNSF HAZ-MAT team responded to the accident and contained the spilled product with earthen dams. No water ways were affected by the spilled crude oil. Due to the spilled crude oil an evacuation order was issued by the Culbertson Fire Department for an area within a two mile radius of the accident site. This led to the evacuation of approximately 50 people (approximately 6 homes and an oil field workers residence camp). The evacuation was lifted at approximately 8:00 a.m. on July 17, 2015.

There were no injuries and no fire. The BNSF's Glasgow Subdivision is an Amtrak route and Amtrak train's 007 and 008 of the seventeenth received delays. A bus bridge was established around the derailment site.

The railroad damages reported were; $1,831,011 for equipment damages and $260,000 for track, signal and structure damages which total $2,091,011.

At the time of the accident/incident it was daylight (dusk) and clear, with west southwest winds at 9.2 mph and a temperature of 84° F.

FRA's investigation determined that a possible contributing factor to this accident/incident was a failure, by BNSF, to properly maintain the rail fasteners (rail anchors) in the vicinity of the accident/incident. This failure allowed for excess longitudinal movement of the rail. (FRA cause code T206)

Furthermore, FRA's investigation determined that the probable cause of this accident/incident was due to a thermal misalignment of the rail. (FRA cause code T109)

## NARRATIVE

CIRCUMSTANCE PRIOR TO THE ACCIDENT/INCIDENT:

The crew of westbound BNSF Unit Crude Oil Train U-TNDAWA0-10T reported for duty at 10:05 a.m. on July 16, 2015 at the BNSF train depot in Glasgow, Montana. The two person crew consisted of an engineer and conductor. This was the home terminal for both employees and both employees had received the statutory off-duty period prior to reporting for duty. After collecting the necessary paperwork the crew departed Glasgow at 10:15 a.m. via crew van en-route to their train which was tied-down (parked) at Bainville (milepost 159.2). Westward bound Train U-TNDAWA0-10T had been tied-down at Bainville due to a previous derailment which had occurred at 8:17 p.m. on July 14 at Blair (milepost 179.1). The crew arrived at Bainville at 12:35 p.m. and released the hand-brakes on the leading locomotive and 10 rail cars. They then verified that there was a signed air brake slip on the leading locomotive containing the trains brake test information. The conductor noticed that the train had received a FRA Class I (initial terminal) brake test, at the originating terminal of Trenton, North Dakota. The engineer then performed two air-line brake tests on the rail cars and found the air brakes working as intended. The crew then waited for seven eastbound trains which included Amtrak train 008. The engineer stated that only three of the four locomotives were set in the run position to provide tractive effort and that the fourth locomotive in consist position 111 was to provide only dynamic braking effort. They departed Bainville siding at approximately 5:38 p.m. on a proceed (green) signal indication. As they departed the siding the conductor was seated in the conductor's seat on the south (left) side of the locomotive and the engineer was seated in the engineer's seat on the north (right) side of the leading locomotive. The crew reported having clear blocks (proceed indications) up to the time of the derailment.

In the area of the accident the BNSF's Glasgow subdivision is single main track territory. The method of operation in the area of the accident is by signal indications of a Traffic Control System (TCS) controlled by a BNSF train dispatcher located in Fort Worth, Texas. Per the BNSF's Montana Division's Timetable dated October 9, 2013 (including updates through July 14, 2015), the derailment area's maximum authorized timetable speed for freight trains is 70 mph. Train U-TNDAWA0-10T exceeded 100 tons per operative brake and therefore, per timetable instructions, was restricted to a maximum speed of 45 mph.

Approaching the accident site from east to west the track is tangent with no curvature involved. The geographic direction for train U-TNDAWA0-10T was west. The railroad timetable direction for train U-TNDAWA0-10T was west. Timetable directions are used throughout this report.

THE ACCIDENT/INCIDENT:

Per post-accident interview statements from the crew of train U-TNDAWA0-10T, after departing the Bainville siding (milepost 159.2) and upon entering the main track the engineer increased the train speed to 43-44 mph. Both crew members stated that the train was handling smoothly and that the trip was uneventful up to the time of the accident at milepost 167.2. The engineer stated that at the accident site he had looked at his locomotive display screen and noticed that the PCS valve had opened and that their train was in a non-engineer inducted emergency brake application while the train was traveling at a speed of 44 mph (as recorded by the event recorder). The engineer then immediately applied the independent brakes in order to control slack action and the train came to a smooth stop. Per the BNSF's Montana Division's Timetable, dated October 9, 2013 (including updates through July 14, 2015), the derailment area's maximum authorized timetable speed for freight trains is 70 mph. Train U-TNDAWA0-10T exceeded 100 tons per operative brake and therefore, per timetable instructions, was restricted to a maximum speed of 45 mph.

After their train had come to a stop, the conductor called out "emergency" three times on the radio while the engineer attempted to recover the train's air and reset the PCS valve. When the air brakes did not recover the engineer realized that they did not have continuity with the rear of their train. The engineer then cut out the brakes on the DP units in order to make sure that the DP units would not release the brakes unexpectedly. The engineer stated that he initially thought that an air-brake hose had disconnected and was causing the loss of continuity. He then proceeded to the second locomotive to ensure that the engineer's chair in that locomotive unit had not spun around and struck the automatic brake handle knocking it into the emergency position. He found the engineer's chair was secured and that everything in that unit was in the proper position. Upon returning to the lead locomotive he noticed a sheriff's car positioned on the road next to their train. The conductor, after talking to the engineer, went to talk to the person in the sheriff's car. The sheriff told the conductor that there had been a report of approximately 10 rail cars from their train derailed. Shortly after talking to the sheriff, the Bainville Fire Chief arrived on scene and the conductor took the train's consist list and rode in the fire chief's vehicle toward the rear of the train to get the line numbers of the cars which were derailed. The conductor verified that two cars had partially derailed and 20 rail cars had derailed in an accordion style. He further verified that the derailed cars were line items 77 through 98 (consist positions 79 through 100). The conductor also noticed that a power transmission line and a signal bungalow had been damaged by the derailed cars. He returned to the leading locomotive and the crew then relayed all pertinent information about the derailment to the BNSF dispatcher. The crew then secured the head-end of their train and then rode with the fire chief to the rear of the train and secured that portion of their train and shut down the two rear DP locomotives at approximately 7:00 p.m.

After tying down the rear of their train the crew was taken by the Culbertson Fire Chief to a waiting railroad crew van and transported back to the BNSF's Glasgow Train Depot. They arrived at the depot at 7:35 p.m. At approximately 8:30 p.m. a BNSF trainmaster arrived at the depot. The trainmaster then drove the crew to The Glendive Medical Facility in Glendive, Montana for post-accident toxicology testing. The crew was tested then driven back to Glasgow where they were released from duty at 3:50 a.m. on July 17.

Hazardous Materials-
Of the 22 derailed tank cars five were breached and leaked 27,201 gallons of product. Below is a list of the five Petroleum Crude Oil rail cars which leaked product and the amount of product released from each car.

| Consist Position | Car Number | Released Volume (GAL) |
|---|---|---|
| 87 | STAX 10808 | 8,763 |
| 90 | STAX 10314 | 752 |
| 93 | STAX 10049 | 10,338 |
| 94 | STAX 10396 | 7,338 |
| 98 | STAX 10412 | 10 |

There was no explosion or fire, nor were there any fatalities. There were no injuries and no waterway was effect as a result of direct or indirect exposure to the release of the petroleum crude oil. The BNSF HAZ-MAT team which responded to the accident managed to contain the spilled product with earthen dams.

Emergency Response-
The Culbertson Volunteer Fire Department responded to the accident on July 16 as well as the Roosevelt County Sheriff's department, the Montana Highway Patrol, and a BNSF HAZ-MAT team. A Roosevelt County Sheriff's deputy and a Montana Highway Patrol officer appeared on scene at approximately 6:03 p.m. with the Culbertson Fire Chief arriving shortly after. Upon assessing the situation and learning that the tank cars were loaded with petroleum crude oil, the fire chief ordered a volunteer evacuation of nearby homes and a nearby oil field residence man camp. Since U.S. Highway 2 runs parallel and within approximately 75 feet of the track in the vicinity of the derailment, the fire chief also ordered the closure of U.S. Highway 2 for two miles in each direction from the derailment site. A detour for U.S. 2 traffic was established by the Montana Department of Transportation. The fire chief also had the 911 dispatcher contact the local electrical power company and request that they shut down electrical power to the transmission line which was running directly above and perpendicular to the derailed cars. When the BNSF HAZ-MAT team arrived, they worked to contain the spilled product with earthen dams and then oversaw the safe and proper transloading of crude oil from the derailed cars into tanker trucks.

The on-scene commander (Culbertson Fire Chief) lifted the voluntary evacuation at approximately 8:00 a.m. on July 17 allowing the local residence to return to their homes and/or to their oil field housing facilities. However, U.S. Highway 2 was kept closed to thru traffic in the vicinity of the accident until all the derailed tank cars were unloaded of their product and pulled clear of the track. This occurred at approximately mid-morning on Sunday, July 18.

POST ACCIDENT INVESTIGATION:

On July 16, 2015, the Federal Railroad Administration (FRA) began an investigation of this accident. FRA's Region 8 management assigned a Chief Inspector as Investigator/Inspector-in-Charge (IIC) of this investigation. They also sent a Deputy Regional Administrator, an Operating Practices Inspector, a Hazardous Material Inspector, a Hazardous Materials Supervisory Specialist, two MP&E Inspectors, a Track Inspector, and a Track Integrity Specialist to assist the IIC. The FRA worked in conjunction with inspectors from the Pipeline and Hazardous Materials Safety Administration (PHMSA). The following analysis and conclusions, as well as any possible contributing factors and the probable cause in this report represent the findings of FRA's investigation.

ANALYSIS AND CONCLUSIONS:

Analysis-Emergency Response:
Local emergency responders from the Roosevelt County Sheriff's Department, Montana Highway Patrol and the Culbertson, Montana Volunteer Fire Department responded to the derailment. In addition a BNSF HAZMAT response team also responded to the accident.

Conclusion: FRA concluded that the emergency response was both immediate and thorough with all precautions taken to ensure the safety of the general and traveling public within the area of the accident.

Analysis-FRA Post Accident Toxicological
This accident/incident met the criteria for FRA Post Accident Toxicology Testing as required under Title 49 CFR Part 219, Subpart C.

Conclusion: The crew was tested under that authority and the results were negative for both crewmembers.

Analysis-Crew Fatigue:
FRA obtained and analyzed a ten day work/rest history for the crewmembers of BNSF Unit Crude Oil Train U-TNDAWA0-10T.

Conclusion: Upon analysis of the ten day work/rest history for the crewmembers, utilizing the FRA's Fatigue Avoidance Scheduling Tool (FAST) program, FRA determined that crewmember fatigue was not probable and was not a possible contributing factor in the accident.

Analysis- Locomotive Event Recorder:
FRA obtained and analyzed a copy of the Locomotive Event Recorders for leading locomotive BNSF 7722 and for distributive power locomotive BNSF 722.

Conclusion: Upon analysis of the event recorders, FRA determined that there were no exceptions to proper train handling on the part of the train crew and when the undesired emergency (UDE) application of the train's air brake line occurred, the engineer's quick and correct actions helped bring the non-derailed portion of the train to a smooth stop. This prevented further derailing of additional rail cars. The analysis also showed that the train was traveling at a speed of 44 mph when the UDE occurred.

Analysis- Locomotive Camera:
The locomotive camera from BNSF Train U-TNDAWA0-10T was not able to be downloaded and analyzed. However, FRA viewed the locomotive camera download of the previous two eastbound trains which traversed the derailment site ahead of westbound BNSF Train U-TNDAWA-10T.

Conclusion: FRA verified that there was nothing unusual with the condition of the track or any visible unusual conditions prior to the accident.

Analysis- FRA Hazardous Materials Inspection:
FRA's hazardous materials investigation team conducted a thorough investigation and inspection of the paperwork and handling of the cars from both the shipper and the BNSF Railway Company. They also inspected the damages to the derailed tank cars. They then went to Williston, North Dakota and inspected and tested the rear 10 cars from train U-TNDAWA0-10T along with investigators from DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA).

Conclusion: BNSF Railway Company's Unit Crude Oil Train U-TNDAWA0-10T was a designated "key train" with a total of 106 cars containing petroleum crude oil which is designated by the Department of Transportation (DOT) as hazardous for commercial transportation. Commercial transport of petroleum crude oil is subject to the regulatory requirements of the Hazardous Material Regulations (HMR) as specified in Title 49 of the Code of Federal Regulations (CFR)

FRA's investigation determined that the train consist list matched the physical placement of the cars in the train. All tank cars were of DOT 111A100W1 specification that met the CPC-1232 standard. FRA also determined that samples of the crude oil shipment had been collected and analyzed in accordance with ASTM D5842-Sampling and Handling of Fuels for Volatility Measurements. Furthermore, FRA's investigation determined that the crude oil met with the requirements of the new standards set by the North Dakota's Industrial Commission's Order No. 25417. Commission Order No. 25417 requires operators to condition Bakken crude oil to a vapor pressure of no more than 13.7 pounds per square inch (psi) and to separate light hydrocarbons from all Bakken crude to be transported and prohibits the blending of light hydrocarbons back into oil supplies prior to shipment.

Analysis- FRA Mechanical Investigation:
FRA assigned two motive power and equipment (MP&E) inspectors to the derailment investigation team. The two inspectors conducted a thorough and complete inspection of the 84 tank cars and four locomotives from train U-TNDAWA-10T which had not derailed, the two tank cars that had partially derailed, and the remaining 40 trucks and 80 wheelsets of remaining derailed equipment investigating for any possible mechanical contributing factors.

Conclusion: No casual exceptions were noted and FRA's mechanical investigation and inspection of the locomotives and equipment determined that a mechanical issue was not a possible contributing factor or probable causal factor of the oil train derailment.

Analysis- FRA Track Inspection:
FRA's investigation team conducted a thorough and complete investigation into possible contributing and/or probable causal factors resulting from track related issues. This included a walking inspection of approximately two miles of track structure in approach to the point-of-derailment (POD), at milepost 167.2.

Conclusion:
The track approaching and through the POD consisted of 136 lb. continuous welded rail (CWR) on treated wood ties secured with double shoulder tie plates and six inch cut spikes on tangent track (no curvature) in the derailment area. The rail was manufactured in October, 1996. The rail lays on 6-inch double-shoulder tie plates secured by four 6-inch long cut track spikes to fasten the rail to the plate (two rail-holding and two anchor spikes, one in each quadrant of the plate). The tie plates rest on treated 7-inch by 9-inch wooden ties that are 8 feet, 6 inches long with an average spacing of 19 to 21 inches between tie centers.

FRA's investigation and inspection of the track structure in approach to the POD determined that there was a failure of the applied rail anchors in providing effective longitudinal restraint of the rail. FRA noted evidence of rail running through anchors in excess of two inches at several locations on both rails in the area of the train derailment. FRA determined that the failure of the applied rail fasteners was a possible contributing factor to the accident. The probable cause of the derailment of train U-TNDAWA-10T was due to a thermal misalignment of the rail.

POSSIBLE CONTRIBUTING FACTORS:

FRA's investigation determined that a possible contributing factor to this crude oil train derailment was a failure by BNSF to properly maintain the rail fasteners (rail anchors) in the vicinity of the accident. This failure allowed for excess longitudinal movement of the rail (FRA cause code T206).

PROBABLE CAUSE:

FRA's investigation determined that the probable cause of this accident/incident was due to a thermal misalignment of the rail (FRA cause code T109).

#