Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2013-4

CSX Transportation (CSX)
Bloomington, MD
February 18, 2013

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-2013-4

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
CSX Transportation	CSX	000113064

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
CSX Transportation	CSX	000113064

2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident	4. Time of Accident/Incident
	2/18/2013	1:41 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
0	0	0	0	Baltimore/Mountain

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Bloomington	211.2	MD	GARRETT

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
2 °F	Dark	Clear	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Main/#2	Freight Trains-40, Passenger Trains-60	15.7	East

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OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	N735

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
49 MPH	R	10720		0

6. Type of Territory

Signalization:

N/A

Method of Operation/Authority for Movement:

N/A

Supplemental/Adjunct Codes:

D, N/A

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.)*	VAPX093636	1	yes		0	0
(2) Causing *(if mechanical, cause reported)*	0	0	no	9. Was this consist transporting passengers?		N/A

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	77	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	73	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
2451110	256200

14. Primary Cause Code

E09C - Other brake defects, cars (Provide detailed description in narrative)

15. Contributing Cause Code

E09C - Other brake defects, cars (Provide detailed description in narrative)

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: 6 Mins: 30	Hrs: 6 Mins: 30

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		No

28. Latitude	29. Longitude
39.499317000	-79.107112000

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CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved
1. Type N/A		5. Equipment N/A
2. Vehicle Speed *(est. mph at impact)* 0	3. Direction *(geographical)* N/A	6. Position of Car Unit in Train 0
4. Position of Involved Highway User N/A		7. Circumstance N/A
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? N/A		8b. Was there a hazardous materials release by N/A

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 N/A		N/A

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

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
0	N/A	N/A	N/A

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

Casualties to:	Killed	Injured	21. Driver was	22. Was Driver in the Vehicle?
			N/A	N/A
23. Highway-Rail Crossing Users	0	0	24. Highway Vehicle Property Damage *(est. dollar damage)* 0	25. Total Number of Vehicle Occupants *(including driver)* 0

26. Locomotive Auxiliary Lights?	27. Locomotive Auxiliary Lights Operational?
N/A	N/A
28. Locomotive Headlight Illuminated?	29. Locomotive Audible Warning Sounded?
N/A	N/A

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

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SYNOPSIS

On Monday, February 18, 2013, at 1:41 a.m., EST, an eastbound CSX loaded unit coal train, N735-16, operating from Grafton, West Virginia, to Cumberland, Maryland, derailed 73 cars of the train while operating on double track in traffic control system territory on CSX's Huntington East Division, Mountain Subdivision, near Bloomington, Maryland. Train N735-16 lost effective braking while descending a section of track known as "17-Mile Grade" from Altamont to Bloomington, Maryland. Train N735-16 derailed 73 of its 77 cars when the train failed to negotiate curves at excessive speed. The train consisted of three, six-axle locomotives and 77 loaded coal hopper cars. There were no injuries, no release of hazardous material and no evacuation. At the time of the accident, it was dark and clear. The temperature was 2 degrees Fahrenheit. The total estimated damage is reported as $2,707,310.

A contributing factor was a faulty end-of-train emergency brake valve but the probable cause of the accident was E09C - brake pipe restriction.

NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

On February 15, 2013, CSX Transportation (CSX) Train N735-16 originated at Keyser, West Virginia (WV), using train symbol E716-14, where the train received a class 1 air brake test. The train departed Keyser at 15:45 for Grafton, WV as the N735-16 and arrived at Grafton, WV at 23:35 on February 15, 2013. At Grafton, WV, this train changed its train symbol to Train N735-16 and later departed for the CONSOL Bailey coal mine in Enon, Pennsylvania.

The train consisted of 3 locomotives, 77 loads, and 0 empties. The train had 10,720 trailing tons, and was 4,000 feet in length. The cars were loaded, weighed, and returned to Grafton, WV on February 17, 2013, at 12:21. The train received a mechanical inspection at Grafton, WV by the carrier car inspector on February 16, 2013, and was placed on yard air as a unit train. The coal cars were destined for delivery to the Mount Storm Power Station, near Mount Storm, WV.

The crew of CSX Train N735-16, which included a locomotive engineer and a conductor, went on duty at 7:10 p.m. EST, February 17, 2013, at Grafton, WV. This was their away-from-home terminal. Both employees received more than the statutory off-duty period prior to reporting for duty. They performed a job briefing and gathered the required paperwork. They boarded their locomotives, CSX 5151(GE CW 44AH), 985 (GE ES 44AC-H), and 8061 (EMD SD 40-2) from the "ready track." The locomotives were serviced at Grafton and received a daily inspection on February 17, 2013, at 7:10 p.m., EST, in Grafton. The Conductor climbed on board the engine and the crew proceeded east on 17 Track and cleared the long-side of the lead switch. The Conductor removed the yard air, coupled the engines to the train, laced the air hoses, cut in the air, and knocked off the brakes. The crew performed a Class 3 air brake test and advised the Yardmaster that they were ready to proceed. They were advised by the Yardmaster that the train had authority to depart.

The train departed Grafton, at 8:58 p.m. and proceeded east on Main Track Number 2 to Newburg (Milepost (MP) BA 267.4), and waited for helpers. With the helpers connected to the rear of N735-16 they departed Newburg heading east on Main Track Number 2. At approximately 10:40 p.m. the train started up Newburg Grade at an average speed of 13 miles per hour (mph) and topped over the grade at approximately 10 mph. The Engineer made a minimum brake pipe reduction. The train proceeded up to Cranberry at an average speed of 10 to 11 mph and stopped at Rinard (MP BA 241.7) to let off the helpers. The helper brakeman cut the helpers away and put the air back into the end-of-train device (EOTD). Train N735-16 continued east and, at Beckmansfield (MP BA 220.8), the Engineer used 2 more pounds of air and was in full dynamic brake as the train proceeded through Swanton (MP BA 219.6) at approximately 12 mph. The train proceeded east on Main Track Number 2 and topped over the hill at Altamont (MP BA 223.4) at 10 mph. As they continued descending the grade, the Engineer made independent brake pipe reductions as he transitioned from throttle to dynamic braking. The train was not responding as expected and the brake pipe was eventually reduced to full service and dynamic brake fully applied. As the train reached 14 mph, the Engineer immediately initiated an emergency application of the air brakes and operated the two-way EOT switch. The train came to a complete stop at MP BA 212.7 and an emergency call was made to the BF Train Dispatcher at 1:41 am on February 18, 2013.

The area where the train came to a complete stop is on a steep eastward descending section of track known as "17-Mile Grade." The grade is 17 miles in length and extends between the summit at Altamont, Maryland, and Piedmont, West Virginia. CSX instructions related to air brake and train handling rules on steep grade require that 50 percent of train hand brakes must be applied before the recharging procedure is initiated.

There is a series of curves and an average 2.4 percent descending grade to the site of the accident. The maximum speed for loaded unit coal trains descending the 17-mile grade between Altamont and Piedmont is 15 mph, as designated by current CSX Baltimore Division Timetable Number 8, Effective Monday, August 15, 2011. As the train approached the accident area, the Engineer was sitting on the east side of the lead locomotive and the conductor was sitting on the west side.

THE ACCIDENT

The Engineer attempted to set the hand brake on the engine and the Conductor had started to leave the cab to set hand brakes on the cars in the train. Before they had a chance to set any brakes, an unintentional release of the train brakes occurred and the train started to move. With both independent and automatic air brakes still applied, the train unexpectedly began moving. The train moved uncontrollably for approximately one minute at 6 mph and gradually picked up speed. The Conductor informed the dispatcher that the train was travelling at 35 mph. The maximum speed for loaded coal trains descending "17-Mile Grade" is 15 mph. Exceeding the maximum authorized speed, the uncontrollable train continued descending down the 2.4 percent grade reaching a speed of 49 mph. When the train failed to negotiate the curves, all 77 cars of the train separated from the three locomotives at BA 211.2 in two separate segments. The rear portion of the train derailed first, cars 77 through 34. Cars 33 through 30 remained upright and on the track. Cars 29 through 1 derailed about a ½-mile east. The three locomotives did not derail and continued east. The 3 locomotives' speed increased to 51 mph and, as the engines passed the defect detector at Warnick's Curve (MP BA 210.0), the detector announced only 18 axles. The crew was able to slow the three locomotives down and they came to a complete stop at MP BA 208.7. The crew notified the train dispatcher when they had come to a stop. The crew was met by a CSX Manager and taken to an area hospital for observation and drug tests. The crew received no injuries but was distressed by the experience. Immediately following the derailment, CSX and FRA Safety Inspectors began an investigation to determine the cause of the derailment. All 73 of the 77 derailed cars were cut up as scrap and Main Track Number 1 was back in service on February 23, 2013. Main Track Number 2 was restored to service when the derailed cars were removed and repairs to the track were completed.

ANALYSIS AND CONCLUSION

Analysis - Derailment History

Conclusion: On January 30, 2000, CSX Train V986-26 derailed on the 17-Mile Grade near the site of this recent derailment. As a result of the 2000 derailment, the National Transportation Safety Board (NTSB) made several safety recommendations to CSX. All NTSB recommendations were implemented by CSX, and were not a factor in this derailment.

Analysis - Signal

On February 21, 2013, an FRA Signal and Train Inspector, accompanied by a CSX Signal Supervisor, conducted an inspection of the signal system in the area of the derailment. The inspection included a review of signal test records, event logs, and test and inspection of signal equipment.

Conclusion:

The signal system was in compliance with Title 49, Code of Federal Regulations (CFR) Part 236 and was operating as intended. The signal system was not a factor in the derailment of CSX Train N735-16.

Analysis - Track

Conclusion:

On February 18, 2013, an FRA Track Inspector conducted an inspection of the track in the derailment area. The inspector found the track was in compliance with the requirements of 49 CFR Part 213 and not a causal factor in the derailment of CSX Train N735-16.

Analysis - Post Accident Toxicological Test Results

Conclusion:

Post-Accident Toxicological testing was performed on the Engineer and Conductor of CSX Train N735-16 and the results were negative. Intoxication was not a factor in the cause of this accident.

Analysis - Fatigue

FRA obtained fatigue-related information for the 10-day period preceding this accident/incident, including the 10-day work history (on-duty/off-duty cycles) for all the

FRA obtained fatigue-related information for the 10-day period preceding this accident/incident, including the 10-day work history (on-duty/off-duty cycles) for all the employees involved.

Conclusion: Fatigue was not a factor in the cause of this accident.

Analysis - Train Handling

CSX and FRA Inspectors reviewed train event logs, interviewed train crews, and inspected equipment involved in this accident. The investigation found that the crew of Train N735-16 operated the train in compliance with CSX's Train Handling and Equipment Handling Rules and CSX Operating Rules.

Conclusion:

Train handling was not a factor in the cause of this accident.

Analysis - Train Mechanical

An FRA Motive Power and Equipment Inspector was one of the first inspectors on the scene. He began an inspection of the cars and locomotives at the derailment site. His investigation included a review of equipment maintenance, test records, event recorder data, and EOTD maintenance test records, associated with the mechanical operation and derailment of CSX Train N735-16. No exceptions were taken to the railroad maintenance and testing of Train N735-16's locomotives and cars, or the EOTD. The event recorder data and inspection of cars and locomotives indicated that Train N735-16 experienced a brake pipe restriction and faulty operation of the EOTD.

Conclusion:

Train N735-16 had an air brake pipe restriction that caused the train's air brakes to fail to go into full emergency from the head-end of the train when the Engineer applied the brakes to the train. A contributing factor was the EOTD, which had a faulty emergency brake valve, leading the rear portion of the train to leak air off slowly from 44 pounds to zero. This started the brakes to release with the air still in the train line, releasing brakes on the rear potion of the train. Due to the excessive "bluing" of the wheels on the front 31 cars, these brakes were applied when the train derailed. The rear portion (46 cars) had less "bluing" of the wheels which indicate brakes started to release on the rear portion of the train causing the train to move.

The coal hopper-style cars were all equipped with Wabtec-ABDX type air brake control valves which can trigger the brakes to start releasing with minimal induced air pressure.

Overall Conclusion

A brake pipe restriction caused the unintended release of the brakes after the train had come to a complete stop on a 2.4 percent grade.

Probable Cause:

E09C - Brake pipe restriction.