



***Federal Railroad Administration  
Office of Safety  
Headquarters Assigned  
Accident Investigation Report  
HQ-2008-37***

***Union Pacific (UP)  
Northfield, MN  
March 31, 2008***

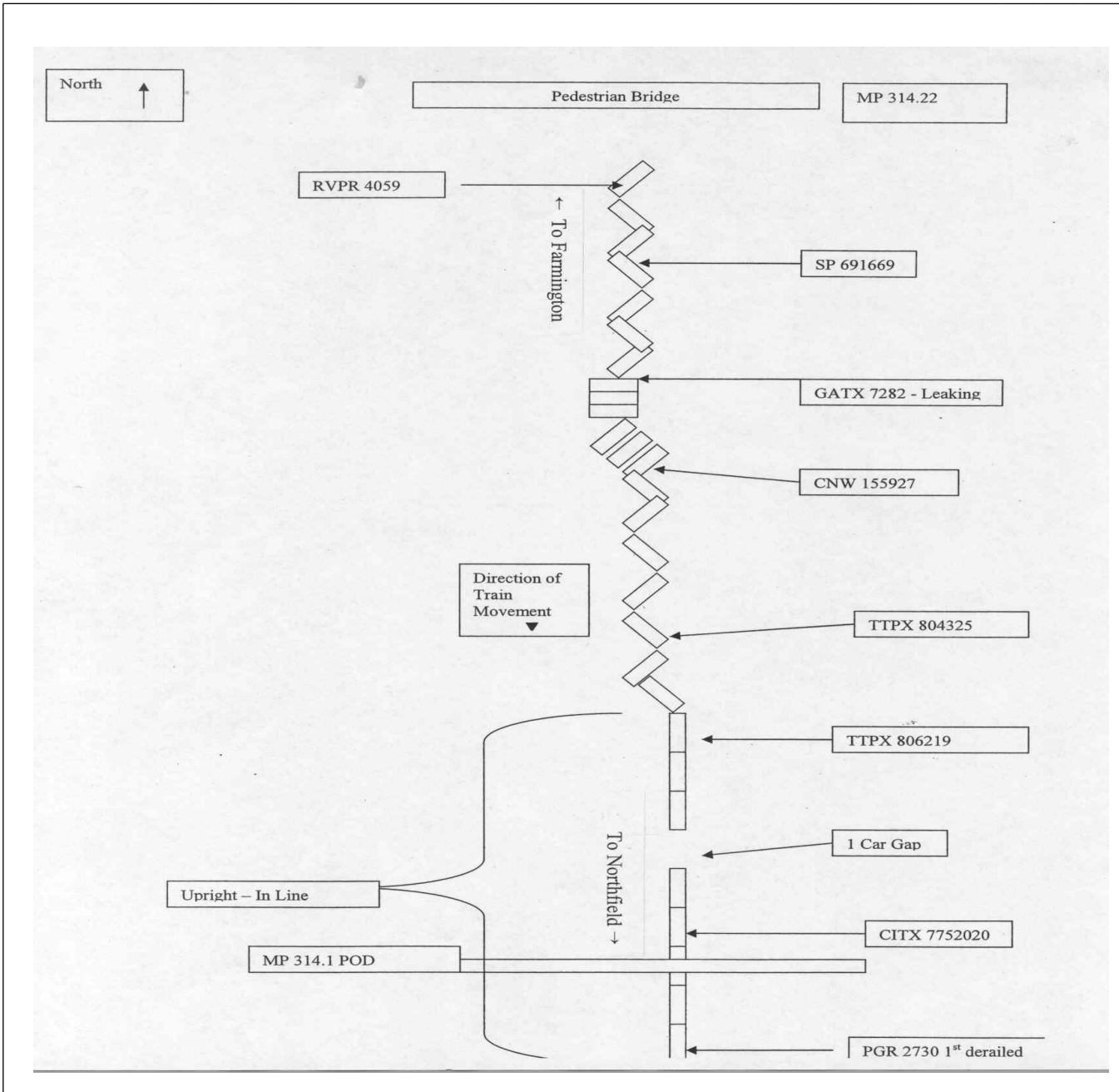
***Note that 49 U.S.C. §20903 provides that no part of an accident or incident report made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.***

1. Name of Railroad Operating Train #1 Union Pacific RR Co. [UP ]			1a. Alphabetic Code UP			1b. Railroad Accident/Incident No. 0308TC019							
2. Name of Railroad Operating Train #2 N/A			2a. Alphabetic Code N/A			2b. Railroad Accident/Incident No. N/A							
3. Name of Railroad Operating Train #3 N/A			3a. Alphabetic Code N/A			3b. Railroad Accident/Incident No. N/A							
4. Name of Railroad Responsible for Track Maintenance: Union Pacific RR Co. [UP ]			4a. Alphabetic Code UP			4b. Railroad Accident/Incident No. 0308TC019							
5. U.S. DOT_AAR Grade Crossing Identification Number			6. Date of Accident/Incident Month 03 Day 31 Year 2008			7. Time of Accident/Incident 01:51:00 <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM							
8. Type of Accident/Incident (single entry in code box)			1. Derailment 2. Head on collision 3. Rear end collision			4. Side collision 5. Raking collision 6. Broken Train collision							
			7. Hwy-rail crossing 8. RR grade crossing 9. Obstruction			10. Explosion-detonation 11. Fire/violent rupture 12. Other impacts							
			13. Other (describe in narrative)			Code 01							
9. Cars Carrying HAZMAT 11		10. HAZMAT Cars Damaged/Derailed 2		11. Cars Releasing HAZMAT 1		12. People Evacuated 0		13. Division TWIN CITIES					
14. Nearest City/Town NORTHFIELD			15. Milepost (to nearest tenth) 314.1		16. State Abbr Code N/A MN		17. County RICE						
18. Temperature (F) (specify if minus) 37 F		19. Visibility (single entry) 1. Dawn 3. Dusk 2. Day 4. Dark		Code 4		20. Weather (single entry) 1. Clear 3. Rain 5. Sleet 2. Cloudy 4. Fog 6. Snow		Code 2					
21. Type of Track 1. Main 3. Siding 2. Yard 4. Industry			Code 1										
22. Track Name/Number SINGLE MAIN TRACK			23. FRA Track Code Class (1-9, X) 4		24. Annual Track Density (gross tons in millions) 19.17		25. Time Table Direction 1. North 3. East 2. South 4. West						
			Code 2										
OPERATING TRAIN #1													
26. Type of Equipment Consist (single entry)			1. Freight train 4. Work train 7. Yard/switching 2. Passenger train 5. Single car 8. Light loco(s). 3. Commuter train 6. Cut of cars 9. Maint./inspect.car			A. Spec. MoW Equip. Code 1		27. Was Equipment Attended? Code 1. Yes 2. No 1					
								28. Train Number/Symbol MSSNP 30					
29. Speed (recorded speed, if available) R - Recorded E - Estimated 25 MPH R			Code R			31. Method(s) of Operation (enter code(s) that apply)							
30. Trailing Tons (gross tonnage, excluding power units) 12283			Code 12283			31a. Remotely Controlled Locomotive? 0 = Not a remotely controlled 1 = Remote control portable 2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter							
						Code(s) e N/A N/A N/A N/A							
32. Principal Car/Unit			a. Initial and Number PGR 2730		b. Position in Train 10		c. Loaded (yes/no) no						
(1) First involved (derailed, struck, etc)							33. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box. Alcohol 00 Drugs 00						
(2) Causing (if mechanical cause reported)			0		0		N/A						
								34. Was this consist transporting passengers? (Y/N) N					
35. Locomotive Units		a. Head End		Mid Train		Rear End		36. Cars					
				b. Manual c. Remote		d. Manual c. Remote		a. Freight b. Pass. c. Freight d. Pass. e. Caboose					
(1) Total in Train		4		0 0		0 0		(1) Total in Equipment Consist		88 0 19 0 0			
(2) Total Derailed		0		0 0		0 0		(2) Total Derailed		20 0 8 0 0			
37. Equipment Damage This Consist \$624,551.00			38. Track, Signal, Way, & Structure Damage \$213,670.00			39. Primary Cause Code H504			40. Contributing Cause Code H503				
Number of Crew Members						Length of Time on Duty							
41. Engineer/Operators 1		42. Firemen 0		43. Conductors 1		44. Brakemen 0		45. Engineer/Operator Hrs 5 Mi 7			46. Conductor Hrs 5 Mi 7		
Casualties to:		47. Railroad Employees 0		48. Train Passengers 0		49. Other 0		50. EOT Device? 1. Yes 2. No 1			51. Was EOT Device Properly Armed? 1. Yes 2. No 1		
Fatal								52. Caboose Occupied by Crew? 1. Yes 2. No			2		
Nonfatal													
OPERATING TRAIN #2													
53. Type of Equipment Consist (single entry)			1. Freight train 4. Work train 7. Yard/switching 2. Passenger train 5. Single car 8. Light loco(s). 3. Commuter train 6. Cut of cars 9. Maint./inspect.car			A. Spec. MoW Equip. Code N/A		54. Was Equipment Attended? Code 1. Yes 2. No N/A		55. Train Number/Symbol N/A			
56. Speed (recorded speed, if available) R - Recorded E - Estimated N/A MPH N/A			Code N/A			58. Method(s) of Operation (enter code(s) that apply)			58a. Remotely Controlled Locomotive? 0 = Not a remotely controlled 1 = Remote control portable				
			a. ATCS g. Automatic block m. Special instructions b. Auto train control h. Current of traffic n. Other than main track										

57. Trailing Tons (gross tonnage, excluding power units)		N/A		c. Auto train stop d. Cab e. Traffic f. Interlocking		i. Time table/train orders j. Track warrant control k. Direct traffic control l. Yard limits		o. Positive train control p. Other (Specify in narrative) Code(s)		2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter		N/A				
59. Principal Car/Unit		a. Initial and Number		b. Position in Train		c. Loaded(yes/no)		60. 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)		N/A		N/A		N/A							N/A		N/A	
(2) Causing (if mechanical cause reported)		N/A		N/A		N/A		61. Was this consist transporting passengers? (Y/N)					N/A			
62. Locomotive Units		a. Head End		Mid Train		Rear End		63. Cars		Loaded		Empty		e. Caboose		
(1) Total in Train		N/A		N/A		N/A		(1) Total in Equipment Consist		N/A		N/A		N/A		
(2) Total Derailed		N/A		N/A		N/A		(2) Total Derailed		N/A		N/A		N/A		
64. Equipment Damage This Consist		N/A		65. Track, Signal, Way, & Structure Damage		N/A		66. Primary Cause Code		N/A		67. Contributing Cause Code		N/A		
Number of Crew Members				Length of Time on Duty												
68. Engineer/Operators		69. Firemen		70. Conductors		71. Brakemen		72. Engineer/Operator		73. Conductor						
N/A		N/A		N/A		N/A		Hrs N/A Mi N/A		Hrs N/A Mi N/A						
Casualties to:		74. Railroad Employees		75. Train Passengers		76. Other		77. EOT Device?		78. Was EOT Device Properly Armed?						
Fatal		N/A		N/A		N/A		1. Yes 2. No   N/A		1. Yes 2. No   N/A						
Nonfatal		N/A		N/A		N/A		79. Caboose Occupied by Crew?		1. Yes 2. No						
OPERATING TRAIN #3																
80. Type of Equipment Consist (single entry)		1. Freight train		4. Work train		7. Yard/switching		A. Spec. MoW Equip. Code		81. Was Equipment Attended?		Code		82. Train Number/Symbol		
		2. Passenger train		5. Single car		8. Light loco(s).		N/A		1. Yes 2. No		N/A		N/A		
		3. Commuter train		6. Cut of cars		9. Maint./inspect.car										
83. Speed (recorded speed, if available)		Code		85. Method(s) of Operation (enter code(s) that apply)				85a. Remotely Controlled Locomotive?								
R - Recorded		N/A		a. ATCS		g. Automatic block		m. Special instructions		0 = Not a remotely controlled						
E - Estimated		MPH		b. Auto train control		h. Current of traffic		n. Other than main track		1 = Remote control portable						
N/A		N/A		c. Auto train stop		i. Time table/train orders		o. Positive train control		2 = Remote control tower						
84. Trailing Tons (gross tonnage, excluding power units)		N/A		d. Cab		j. Track warrant control		p. Other (Specify in narrative)		3 = Remote control transmitter - more than one remote control transmitter						
				e. Traffic		k. Direct traffic control		Code(s)		N/A						
				f. Interlocking		l. Yard limits		N/A		N/A						
86. Principal Car/Unit		a. Initial and Number		b. Position in Train		c. Loaded(yes/no)		87. 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)		N/A		N/A		N/A							N/A		N/A	
(2) Causing (if mechanical cause reported)		N/A		N/A		N/A		88. Was this consist transporting passengers? (Y/N)					N/A			
89. Locomotive Units		a. Head End		Mid Train		Rear End		90. Cars		Loaded		Empty		e. Caboose		
(1) Total in Train		N/A		N/A		N/A		(1) Total in Equipment Consist		N/A		N/A		N/A		
(2) Total Derailed		N/A		N/A		N/A		(2) Total Derailed		N/A		N/A		N/A		
91. Equipment Damage This Consist		N/A		92. Track, Signal, Way, & Structure Damage		N/A		93. Primary Cause Code		N/A		94. Contributing Cause Code		N/A		
Number of Crew Members				Length of Time on Duty												
95. Engineer/Operators		96. Firemen		97. Conductors		98. Brakemen		99. Engineer/Operator		100. Conductor						
N/A		N/A		N/A		N/A		Hrs N/A Mi N/A		Hrs N/A Mi N/A						
Casualties to:		101. Railroad Employees		102. Train		103. Other		104. EOT		105. Was EOT Device Properly						
Fatal		N/A		N/A		N/A		1. Yes 2. No   N/A		1. Yes 2. No   N/A						
Nonfatal		N/A		N/A		N/A		106. Caboose Occupied by Crew?		1. Yes 2. No						
Highway User Involved								Rail Equipment Involved								
107. C. Truck-Trailer. F. Bus J. Other Motor Vehicle Code		A. Auto D. Pick-Up Truck G. School Bus K. Pedestrian		B. Truck E. Van H. Motorcycle M. Other (spec. in narrative)		N/A		111. Equipment		3. Train (standing)		6. Light Loco(s) (moving)		Code		
								1. Train(units pulling)		4. Car(s)(moving)		7. Light(s) (standing)		N/A		
								2. Train(units pushing)		5. Car(s)(standing)		8. Other (specify in narrative)				
108. Vehicle Speed (est. MPH at impact)		N/A		109. geographical Code		N/A		112. Position of Car Unit in		N/A						
				1. North 2. South 3. East 4. West		N/A										

110. Position 1. Stalled on Crossing 2. Stopped on Crossing 3. Moving Over Crossing 4. Trapped				Code N/A	113. Circumstance 1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User				Code N/A		
114a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? 1. Highway User 2. Rail Equipment 3. Both 4. Neither				Code N/A	114b. Was there a hazardous materials release 1. Highway User 2. Rail Equipment 3. Both 4. Neither				Code N/A		
114c. State here the name and quantity of the hazardous materials released, if any. N/A											
115. Type Crossing 1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig Wags 5. Hwy. traffic signals 6. Audible Warning 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other (spec. in narr.) 12. None				Code N/A	116. Signaled Crossing (See instructions for codes)				Code N/A	117. Whistle Ban 1. Yes 2. No 3. Unknown	
Code(s)				N/A	N/A	N/A	N/A	N/A	N/A	N/A	
118. Location of Warning 1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach				Code N/A	119. Crossing Warning with Highway Signals 1. Yes 2. No 3. Unknown				Code N/A	120. Crossing Illuminated by Street Lights or Special Lights 1. Yes 2. No 3. Unknown	
121. Age N/A		122. Driver's Gender 1. Male 2. Female		Code N/A	123. Driver Drove Behind or in Front of and Struck or was Struck by Second Train 1. Yes 2. No 3. Unknown				Code N/A	124. Driver 1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop	
125. Driver Passed Highway Vehicle 1. Yes 2. No 3. Unknown				Code N/A	126. View of Track Obscured by (primary obstruction) 1. Permanent Structure 2. Standing Railroad Equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicle 7. Other (specify in narrative) 8. Not obstructed				Code N/A		
Casualties to:			Killed	Injured	127. Driver 1. Killed 2. Injured 3. Uninjured				Code N/A	128. Was Driver in the Vehicle? 1. Yes 2. No	
129. Highway-Rail Crossing Users			N/A	N/A	130. Highway Vehicle Property Damage (est. dollar damage)				N/A	131. Total Number of Highway-Rail Crossing Users (include driver)	
132. Locomotive Auxiliary Lights? 1. Yes 2. No				Code N/A	133. Locomotive Auxiliary Lights Operational? 1. Yes 2. No				Code N/A		
134. Locomotive Headlight Illuminated? 1. Yes 2. No				Code N/A	135. Locomotive Audible Warning Sounded? 1. Yes 2. No				Code N/A		

136. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC., INVOLVED.



## 137. SYNOPSIS OF THE ACCIDENT

On March 31, 2008 at 1:51 a.m. CDT a southbound Union Pacific Railroad (UP) mixed freight train, MSSNP-30 derailed 28 cars. The accident occurred in Northfield, Minnesota at UP Milepost (MP) 314.1 on the Twin Cities Service Unit, Albert Lea Subdivision on single main track.

The conductor and locomotive engineer of UP Train MSSNP-30 sustained no injuries. PGR 2730, the sixth car from the head end of the train, was the first car to derail. This caused the seventh through the 33rd cars to derail in a general pile up. A total of 28 cars derailed, two of which were placarded loads of Sulfuric Acid (UN 1830). Tank car GATX 7282, a load of 98 percent Sulfuric Acid, was breached and leaking. The leak was contained to 655 gallons. There was no fire or evacuation, but as a precaution the Northfield Fire Department closed the northern lane of State Highway Route 3 which is adjacent to the derailment site.

The total estimated damages were \$ 838,221. Estimated equipment damage was \$ 624,551 and estimated track damage was \$ 213,670.

At the time of the incident it was dark and cloudy. The wind was north northeast at five mph and the temperature was 37 °F.

The probable cause of the derailment was excessive buffing or slack action due to the train makeup for the given consist of UP Train MSSNP-30, which included primarily cushioning device railcars. Train handling during dynamic braking was contributory but not considered the primary cause of the derailment

## 138. NARRATIVE

## CIRCUMSTANCES PRIOR TO THE ACCIDENT

The crew of UP Train MSSNP-30 consisted of a locomotive engineer and conductor. They went on duty at 9:30 p.m. on March 30, 2008 at UP St. Paul Yard in South St. Paul, Minnesota. St. Paul is the home terminal for both crew members. Before they went on duty both crew members received more than the required statutory off-duty rest period. The engineer had 26 hours 30 minutes off duty and the conductor had 26 hours 33 minutes off duty.

UP Train MSSNP-30 was scheduled to operate from South St. Paul to Mason City, Iowa with 107 cars of mixed freight (88 loads and 19 empties) with four locomotives on the head end. UP Train MSSNP-30 was 6,894 feet long, with 12,283 trailing tons. Before departing St. Paul Yard the engineer inspected the locomotives. The last daily inspection on the lead locomotive, UP 8316, was performed on March 30, 2008 at 5:00 a.m. and the last periodic inspection of locomotive UP 8316 was performed on March 23, 2008.

A Class 1 Terminal Air Brake Test was completed by a qualified mechanical employee at the UP South St. Paul Rail Yard on March 30, 2008 at 11:30 p.m. The End-of-Train Device (EOTD) # UPRQ 061357 WK was tested at the South St. Paul Locomotive Facility. It functioned as intended. The engineer acknowledged that the air brake slip was current and UP Train MSSNP-30 departed South St. Paul Yard at 12:30 a.m. on March 31, 2008.

The method of operation was Centralized Traffic Control (CTC). The maximum authorized speed was 40 mph. There were no speed restrictions in effect on the Albert Lea Subdivision in the area of the derailment. UP Twin Cities Area Timetable No. 3 effective 0001 Monday, December 17, 2007 was in effect. The timetable and geographic direction of the train was south. Timetable directions are used throughout this report.

UP Train MSSNP-30 movement from South St. Paul Yard to the east end of Northfield was uneventful. The engineer recalls cutting out the dynamic brakes on the fourth locomotive because the UP has a policy of a

maximum of 28 axles with dynamic brakes in operation. The engineer took no exception to the train makeup based upon his inspection of the train list. At about milepost 347, UP Train MSSNP-30 passed a wayside detector and no defects were noted. The axle count, as computed by the detector, matched the train list. UP Train MSSNP-30 operated through the siding at Farmington, Minnesota to meet a northbound train. The conductor of the northbound train inspected UP Train MSSNP-30 from the ground on the east side and reported no exceptions.

## THE ACCIDENT

As UP Train MSSNP-30 approached the Point of Derailment (POD), the engineer was operating the train at a recorded speed of 25 mph in dynamic breaking notch 8 when the computer screen in front of him indicated he should go to emergency air recovery. Prior to that, the crew did not feel or hear anything unusual. The train stopped suddenly and the air brakes did not recover. The locomotive engineer went back to check the trailing locomotives. While back there, a Northfield police officer shouted to him from the adjacent road. The officer told him he had a report of a derailed train. At that time the conductor shined a light toward the rear of the train and observed the derailed cars. The conductor then walked back toward the derailed cars and met the emergency responders. He checked the train list with the responders and concluded it was likely that at least one hazardous materials car was derailed.

## ANALYSIS AND CONCLUSIONS

### ANALYSIS - TOXICOLOGICAL TESTING:

This accident met the criteria prescribed in Title 49 CFR, Part 219, Subpart C, Post Accident Toxicological Testing. A UP official transported the train crew to Woodwinds Hospital in Woodbury, Minnesota for mandatory FRA toxicological screening. The results of the tests were negative for both employees. FRA did take two exceptions to the documentation of the post-accident testing procedures. The specimens were collected after the four hour goal and the time of blood collection was missing on one of the Form #74.

### CONCLUSION:

Impairment of the crew was not a causal factor.

### ANALYSIS - LOCOMOTIVE ENGINEER OPERATING PERFORMANCE:

The locomotive engineer of UP Train MSSNP-30 was a certified locomotive engineer. He was in possession of a valid certification card at the time of the accident. He had been working as a locomotive engineer for the past 12 years and had operated on numerous occasions over the territory where the accident occurred. The locomotive engineer said he was alert and not distracted from his duties.

The UP mechanical department downloaded the event recorder data from lead locomotive UP 8316. Analysis of the data by FRA disclosed that locomotive UP 8316 was operating at 28 mph and slowed to 25 mph just before the train experienced an undesired emergency application of the train air brake system. No exception was taken to the engineer's train handling procedures.

A post accident simulation by Rail Sciences, Inc. concluded that due to the train make-up UP Train MSSNP-30 should have had no more than 28 equivalent dynamic brake axles applied. The engineer had 29 axles applied in dynamic position # 8 which may have generated enough retarding force to contribute to the buff forces that led to the derailment. The engineer's actions were not considered the causal event but allegedly contributed to the derailment scenario.

### CONCLUSION:

The engineer's performance during dynamic braking procedures was a contributing factor in the accident.

### ANALYSIS - LOCOMOTIVE SAFETY DEVICES:

The four locomotives of UP Train MSSNP-30 were all equipped with a headlight, auxiliary lights, and an audible warning device as required by Federal regulation. The event recorder data indicated these devices were functioning as intended prior to the accident. Locomotive UP 8316 was equipped with an operating

speed indicator and event recorder. FRA's inspection of Locomotive UP 8316 revealed that the automatic brake valve was in full service with the independent brake valve applied. There was one exceptions noted to the second locomotive UP 3902 except that the left side flywheel guard was insecure. This exception did not contribute to the cause of the derailment.

**CONCLUSION:**

The locomotive safety devices were in compliance with Federal Regulations.

**ANALYSIS - TRACK STRUCTURE:**

The track structure at the POD included 136 lb continuous welded rail (CWR) laid in 2001. The track was in the middle of a long earthen cut on tangent track with a 0.5 percent descending grade. The UP's last required FRA track inspection was performed by a qualified track inspector on Saturday, March 29, 2008 and no defects were noted. There were no CWR joints in the derailment area. The last mechanized geometry inspection was performed on August 26, 2007 and there were no defects noted in the vicinity of the derailment. The last ultrasonic rail test was conducted on November 28, 2007. No defective rails were found in the vicinity of the derailment. No suspect evidence of rail or track failure was found during FRA's investigation. Some of the rail near the POD was not recovered and some that was recovered was severely damaged due to the derailment and cleanup process.

**CONCLUSION:**

The track was in compliance with Federal Regulations.

**ANALYSIS: - FATIGUE**

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

**CONCLUSION:**

Upon analysis of that information FRA concluded that one or more of the employees may have been working at a diminished level of safety (effectiveness) due to mental and/or physical attributes associated with fatigue, which may have contributed to the cause of the accident.

**PROBABLE CAUSE & CONTRIBUTING FACTORS**

FRA determined that the probable cause of the derailment was excessive buffing or slack action due to train makeup of UP Train MSSNP-30 which included primarily cushioning device railcars. Train handling during dynamic braking was contributory but not considered the primary cause of the derailment.

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