Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2006-17

Union Pacific (UP)
Longview, Texas
March 20, 2006

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.

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2006-17

1.Name of Railroad Operating Train #1: Union Pacific RR Co. [UP]	1a. Alphabetic Code: UP	1b. Railroad Accident/Incident No.: 0306LK040
2.Name of Railroad Operating Train #2: Union Pacific RR Co. [UP]	2a. Alphabetic Code: UP	2b. Railroad Accident/Incident: 0306LK040
3.Name of Railroad Responsible for Track Maintenance: Union Pacific RR Co. [UP]	3a. Alphabetic Code: UP	3b. Railroad Accident/Incident No.: N/A
4. U.S. DOT_AAR Grade Crossing Identification Number: 0306LK0	5. Date of Accident/Incident: Month 03 / Day 20 / Year 2006	6. Time of Accident/Incident: 10:39: ☐ AM ☑ PM

7. Type of Accident/Indicent (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): 04

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
22	5	1	0	North Little Rock

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
Long View	88.5	N/A	TX	GREGG

17. Temperature (F) (specify if minus)	18. Visibility (single entry) 1. Dawn 2. Day 3.Dusk 4.Dark	Code	19. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow	Code	20. Type of Track 1. Main 2. Yard 3. Siding 4. Industry	Code
45 F		4		1		2

21. Track Name/Number	22. FRA Track Class (1-9, X)	Code	23. Annual Track Density (gross tons in millions)	24. Time Table Direction 1. North 3. East	Code
Yard		1	0		N/A

OPERATING TRAIN #1

25. Type of Equipment Consist (single entry)	A. Spec. MoW Equip.	Code	26. Was Equipment Attended? 1. Yes 2. No	Code	27. Train Number/Symbol
1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s).; 9. Maint./inspect.car		7		1	YLT25 R-20

28. Speed (recorded speed, if available) R - Recorded E - Estimated: 10 MPH; Code: R

29. Trailing Tons (gross tonnage, excluding power units): 2221

30. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; g. Automatic block; h. Current of traffic; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; m.Special instructions; n. Other than main track; o. Positive train control; p. Other (Specify in narrative) Code(s): n N/A N/A N/A N/A

30a. 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: 3

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	1	no
(2) Causing (if mechanical cause reported)	0	0	N/A

32. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
0	0

33. Was this consist transporting passengers? (Y/N): N

34. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	3	0	0	0	0
(2) Total Derailed	1	0	0	0	0

35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	14	0	21	0	0
(2) Total Derailed	0	0	0	0	0

36. Equipment Damage This Consist	37. Track, Signal, Way, & Structure Damage	38. Primary Cause Code	39. Contributing Cause Code
40000	0	H306	H991

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	0	1	0

Length of Time on Duty

44. Engineer/Operator	45. Conductor
Hrs 6 Mi 44	Hrs 6 Mi 44

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	0

49. EOT Device? 1. Yes 2. No: 2

50. Was EOT Device Properly Armed? 1. Yes 2. No: N/A

51. Caboose Occupied by Crew? 1. Yes 2. No: N/A

OPERATING TRAIN #2

52. Type of Equipment Consist (single entry)	A. Spec. MoW Equip.	Code	53. Was Equipment Attended? 1. Yes 2. No	Code	54. Train Number/Symbol
1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s).; 9. Maint./inspect.car		7		1	YLT67-20

55. Speed (recorded speed, if available) R - Recorded E - Estimated: 5 MPH; Code: R

57. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track

57a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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56. Trailing Tons (gross tonnage, excluding power units)	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
4271			n N/A N/A N/A N/A	0

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	59. 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)	UTLX6 40065	24	yes		0	0
(2) Causing (if mechanical cause reported)	0	0	N/A	60. Was this consist transporting passengers? (Y/N)		N

61. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	0	(1) Total in Equipment Consist	9	0	4	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	5	0	0	0	0

63. Equipment Damage This Consist	64. Track, Signal, Way, & Structure Damage	65. Primary Cause Code	66. Contributing Cause Code
145271	68790	H306	H991

Number of Crew Members				Length of Time on Duty	
67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen	71. Engineer/Operator	72. Conductor
1	0	1	1	Hrs 8 Mi 4	Hrs 8 Mi 4

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	0	0	0
Nonfatal	0	0	0

76. EOT Device? (1. Yes 2. No)	77. Was EOT Device Properly Armed? (1. Yes 2. No)	78. Caboose Occupied by Crew? (1. Yes 2. No)
1	2	N/A

Highway User Involved

79. Type	Code
A. Auto B. Truck C. Truck-Trailer. D. Pick-Up Truck E. Van F. Bus G. School Bus H. Motorcycle J. Other Motor Vehicle K. Pedestrian M. Other (spec. in narrative)	N/A

80. Vehicle Speed (est. MPH at impact)	81. Direction geographical) 1.North 2.South 3.East 4.West	Code
N/A		N/A

82. Position	Code
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped	N/A

86a. 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

Rail Equipment Involved

83. Equipment	Code
1.Train(units pulling) 2.Train(units pushing) 3.Train (standing) 4.Car(s) (moving) 5.Car(s) (standing) 6.Light Loco(s) (moving) 7.Light(s) (standing) 8.Other (specify in narrative)	N/A

84. Position of Car Unit in Train
0

85. Circumstance	Code
1. Rail Equipment Struck Highway User 2. Rail Equipment Struck by Highway User	N/A

86b. Was there a hazardous materials release by (1. Highway User 2. Rail Equipment 3. Both 4. Neither)	Code
	N/A

86c. State here the name and quantity of the hazardous materials released, if any.
N/A

87. Type of Crossing Warning	1.Gates	2.Cantilever FLS	3.Standard FLS	4.Wig Wags	5.Hwy. traffic signals	6.Audible	7.Crossbucks	8.Stop signs	9.Watchman	10.Flagged by crew	11.Other (spec. in narr.)	12.None
Code(s)	N/A	N/A		N/A	N/A		N/A	N/A		N/A	N/A	

88. Signaled Crossing Warning (See instructions for codes)	Code
	N/A

89. Whistle Ban (1. Yes 2. No 3. Unknown)	Code
	N/A

90. Location of Warning (1. Both Sides 2. Side of Vehicle Approach 3. Opposite Side of Vehicle Approach)	Code
	N/A

91. Crossing Warning Interconnected with Highway Signals (1. Yes 2. No 3. Unknown)	Code
	N/A

92. Crossing Illuminated by Street Lights or Special Lights (1. Yes 2. No 3. Unknown)	Code
	N/A

93. Driver's Age	94. Driver's Gender (1. Male 2. Female)	Code
0		N/A

95. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train (1. Yes 2. No 3. Unknown)	Code
	N/A

96. Driver (1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative))	Code
	N/A

97. Driver Passed Standing Highway Vehicle (1. Yes 2. No 3. Unknown)	Code
	N/A

98. 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

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	0	0

99. Driver Was (1. Killed 2.Injured 3. Uninjured)	Code
	N/A

102. Highway Vehicle Property Damage (est. dollar damage)
0

100. Was Driver in the Vehicle? (1. Yes 2. No)	Code
	N/A

103. Total Number of Highway-Rail Crossing Users (include driver)
0

104. Locomotive Auxiliary Lights? (1. Yes 2. No)	Code
	N/A

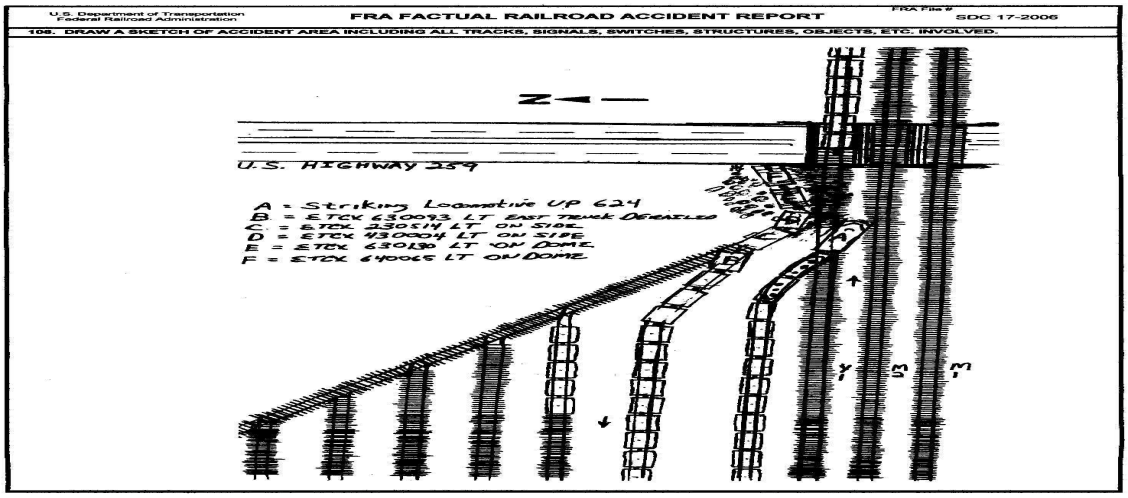
105. Locomotive Auxiliary Lights Operational? (1. Yes 2. No)	Code
	N/A

106. Locomotive Headlight Illuminated? (1. Yes 2. No)	Code
	N/A

107. Locomotive Audible Warning Sounded? (1. Yes 2. No)	Code
	N/A

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

HQ-17-2006.jpg



109. SYNOPSIS OF THE ACCIDENT

At 10:39 p.m. (CST) on Monday, March 20, 2006, a side collision occurred between Union Pacific Remote Control Yard Switching Job YLT 25R-20 and Union Pacific Manual Yard Switching Job YLT 67-20.

This accident happened on other than main track in the Longview Texas Yard at mile 88.5 on the Little Rock Subdivision of the North Little Rock Service Unit. The method of operation at the point of the collision was "Other than main track." Longview Texas Yard lies within the city of Longview, Texas.

Striking train YLT 25R -20 was pulling in a eastward geographic direction, on other than main track, and at a recorded speed of 10 mph when the accident occurred. This train consisted of 3 locomotives, 14 loads, and 21 empties. It was 2294 feet long with 2221 trailing tons. The striking train was being operated under remote control and exceeded the limits of an active and established remote control zone on a switching lead. The crew was not protecting the leading end of their movement when the accident occurred.

Struck train YLT 67-20 was shoving in a westward geographic direction, down the switching lead, and into an adjacent yard track at a recorded speed of 5 mph when struck. This train consisted of 2 locomotives, 32 loads, and 4 empties. It was 2197 feet long with 4271 trailing tons.

The accident happened in darkness. The weather was reported as 45 degrees and clear.

No one was injured.

The lead locomotive on the striking derailed remaining upright.

Five loaded tank cars derailed on the struck train, four of which overturned.

About one quart of combustible liquid, N.O.S., (2-Ethyl Hexanol), NA1993, leaked from the top hatch of one of the overturned tanks. There was no evacuation. U.S. Highway 259 was closed at the sight for approximately 3 hours during initial assessment.

Total FRA reportable damages were $254,061.

The accident was due to human error.

The primary cause of the accident was the failure of the remote control crew on the striking train to protect the leading end of their movement as required by carrier operating rules.

A contributing cause was the intentional disabling of the Pull-back Stop Protection system on the remote control locomotive. This system is designed to prevent the locomotive from operating beyond the remote control zone. Disabling and then operating the locomotive with the disabled Pull-back Stop Protection system allowed the locomotive to go beyond the limits of the active zone where it struck another train.

110. NARRATIVE

Circumstances Prior to the Accident:

YLT-25R-20:

The crew of the striking train YLT 25R-20 consisted of two certified Remote Control Operators working as a Yard Foreman (conductor) and a Yard Helper (brakeman). The foreman was working his regularly assigned job. The helper was called off the Longview extra-board. Both crew members came on duty at 3:55 p.m. (CST) March 20, 2006 at Longview, Texas. This is the home terminal for both crew members. Both crew members received more than the statutory off duty period prior to reporting for duty. The job foreman had a 21 hour and 53 minute off duty period prior to coming on duty. The job helper had a 57 hour and 20 minute off duty period before coming on duty.

When the crew went to eat they contacted the yardmaster and deactivated both Remote Control Zone One and Remote Control Zone Two. Upon returning from lunch the crew reactivated Remote Control Zone One only.

The crew then used the Remote Control Locomotive consist to remove a caboose from the east end of yard track number two and put it to track number 10. The locomotive consist was then moved back to number two track and the air was cut in the remaining 35 cars. These moves were made in compliance with the rule requiring protection of the leading end of movement.

Just prior to the accident the foreman was controlling the final pull back move using the remote control device from his position beside the track near the point where the air had been cut in the cars.

Just prior to the accident the helper had dismounted the moving locomotive after disabling the pull back stop protection feature. He dismounted at a distance estimated to be about 2250 feet from the point of collision.

The controlling locomotive was the east unit in the locomotive consist. The front of the lead locomotive was facing east.

The helper said that one bulb of the two bulb headlight was not working in the forward direction. The single working light would still meet the requirements of 49 CFR 229.125 (b), regarding the required headlights for locomotives used in yard service.

The consist at the time of the collision included 3 locomotives, 14 loads, and 21 empty
cars of mixed type and various commodities. It was 2294 feet long with 2221 trailing tons.

There were no placarded cars in this consist.

The final pull back move began 2649 feet from the point of collision.

Number two track switch is about 2348 feet from the point of collision.

YLT-67-20:

Just prior to the accident the crew of struck train YLT 67-20 consisted of one engineer and one conductor. The engineer and conductor were working their regularly

assigned job. A conductor trainee had been released from duty prior to the accident to avoid payment of overtime and was not witness to the accident. All crew members came on duty at 2:35 p.m. (CST) March 20, 2006 at Longview, Texas. This is the home terminal for all crew members.

All crew members received more than the statutory off duty period prior to reporting for duty. The engineer had a 12 hour and 20 minute off duty period prior to coming on duty. The conductor had a 80 hour off duty period before coming on duty.

The struck train had just returned from an outlying industry with 59 cars. Both the conductor and engineer said they had successfully completed a transfer air test prior to departing the industry. The train was equipped with a highly visible marker. This job did not require a two way end of train device and the locomotive was not equipped with a two way end of train device receiver. The conductor said that the rear end device was left on the rear car as it was shoved into the first track.

Following the instructions from the yardmaster, the crew had entered the far east end of the yard from main track through a hand throw crossover, put 24 cars into "Sit Yard" number two track, and had begun shoving the balance of 35 cars into "Sit Yard" number one track when the accident occurred.

At the time of the accident this train consisted of 2 locomotives, 32 loads, and 4 empties. It was 2197 feet long with 4271 trailing tons. There were 22 placarded tank cars in the consist. The controlling locomotive was the east unit in the consist with the front end facing east.

Just prior to the accident the engineer was at the control stand of the lead locomotive. The conductor was riding the end of the leading car into "Sit Yard" number two track.

Yard Topography:

The east end of Longview yard consists of a switching ladder track accessing 20 westward entry tracks used for classification, repair, and storage. These tracks are to the south of the ladder track. The section of this track between Track Two switch and Track One switch is approximately 2285 feet long and without intervening switches.

The "Sit Yard" entry switch where the accident occurred is about 75 feet east of the Number One Track switch and about 200 feet into Remote Control Zone 2. This switch is westward entry with the "Sit Yard" tracks to the north side of the yard ladder.

As the ladder extends eastward from Track One it changes designation to the "Water Track" at the "Sit Yard" switch. It extends beyond the "Sit Yard" entry switch for approximately 3000 feet with the entire length being within Remote Control Zone 2.

There is a 100 foot long railroad bridge spanning U.S. Highway 259 with the west end of the bridge located about 100 feet east of the "Sit Yard" entry switch.

Yard layout is on westward descending grade with the grade cresting near the east end of the yard between Number One and Number Two track switches. The track profile shows the grade as being .56 westward descending west of the grade crest and .18 eastward descending east of the grade crest.

There are two Remote Control Zones established at the east end of Longview Yard.

Both remote control zones are equipped with Pull-back and Stop Protection (PSP). These remote control zones are used in conjunction with operating rules for the purpose of allowing the "pull back" of a string of cars without requiring an employee to be positioned or within sight of the PSP equipped Remote Control Locomotive leading the movement. The remote control zone is "activated" and "deactivated" by verbally reporting and concurrence with the yardmaster. The yardmaster records the zone and time of activation and deactivation on a hand written record. Operating rules require that all movements must check with the yardmaster to determine whether the zone is active or inactive before entering a Remote Control Zone. The Remote Control Zones are delineated by Remote Control Zone signs.

Entry into Remote Control Zone One is located near Number Two Track switch on the east switching ladder and runs for about 2250 feet east (the pull back direction) terminating about 130 feet west of the Number One Track switch.

The entry into Remote Control Zone Two begins about 15 feet west of Number One Track switch and extends about 3025 feet east (the pull back direction) to the end of the "Water Track."

There is about 115 feet of track that separates the departure end of Zone One and entry end of Zone Two.

The point of collision was about 192 feet beyond the departure end of zone one. This point is about 77 feet into Zone Two.

The "Sit Yard" switch, "Sit Yard" derail, Track One switch, and Track Two switch are radio controlled. At the time of the accident, the yard track switches were controlled on a different radio channel than the Sit Yard entry switch.

Pullback Stop Protection (PSP):

Pull-back Stop Protection is a feature on Union Pacific Remote Controlled Locomotives that automatically restricts the speed of the locomotive within a Remote Control Zone and then stops a Remote Control Locomotive as it approaches the departure end of a zone.

The PSP system consists of both locomotive mounted equipment and transducers called "pucks" placed along the center line of the track.

These pucks are used to initialize the system as a Locomotive enters a Remote Control Zone and limits the speed in decreasing increments as the locomotive approaches the departure end of the Zone (furthest limit in the pull back direction). The "Stop Pucks" placed near the departure end of the zone will automatically stop the locomotive from operating beyond the zone in the pull back direction. There is no speed limiting or stop protection in the shoving direction. The speed and stop protection is only provided in the "pull-back" direction of movement. Pucks can also be used to activate the horn and bell.

The PSP can be manually disabled by simultaneously pushing two buttons on the Remote Control Box (Receiver/Decoder) mounted inside the cab of the Locomotive. Both buttons must be pushed simultaneously for five seconds for deactivation. The L.E.D. display on the control box will then indicate that the system has been disabled. The system will remain disabled until automatically initialized as the locomotive re-enters either end of any Remote Control Zone.

At the time of the accident, only Zone One had been activated with the yardmaster. The PSP had been manually disabled by the crew of the striking locomotive and the locomotive was then operated beyond the limits of zone one without providing point protection.

Method of Operation:

The method of operation for both trains was "Other than Main Track." Union Pacific GCOR rule 6.28 "Movement on Other Than Main Track" requires movement "prepared to stop within ½ the range of vision."

Union Pacific Timetable Special Instructions restricts movement on all tracks other than main tracks or sidings to 10 mph.

Weather:

It was dark and the weather was reported as 45 degrees and clear.

The Accident:

YLT 25R-20:

Striking train YLT 25R-20 was working on a different radio channel than struck train YLT67-20.

Train YLT 25R-20 was pulling geographic eastward at the time of the accident.

This job was using a remote control locomotive consist. The controlling Remote Control Locomotive was the east locomotive in the consist. The front end of the locomotive was facing east. It was being controlled by the Yard Foreman during the final pull back move.

The crew had coupled the locomotive to a string of 35 cars and cut the air into the brake pipe. The job foreman and helper were standing on opposite sides of and at the rear of the locomotive consist. While standing in this position the yardmaster called the crew to re-activate Remote Control Zone One. The helper said that it was noisy standing next to the locomotive and that he “heard something about the Remote Control Zone” and “thought in the back of my mind” that the crew had reactivated both Zone One and Zone Two. The crew did not hold a job briefing to ensure understanding and concurrence in regards to what zones had been activated.

The crew decided there were too many cars to come out of Track Two without being stopped by the stop pucks. The crew conversed and concurred that the helper should disable the PSP system to enable them to come out with all of the cars in a single cut.

The helper went to the lead locomotive to board and disable the PSP system as the job foreman began the pullback movement. The helper dismounted the lead locomotive after disabling the PSP system.

As YLT 25R-20 continued the now unprotected pullback movement, the conductor on YLT 67-20 came to the same radio channel as YLT 25R-20 and gave warning of a pending collision. The job foreman then moved the control switch on his remote control operators unit to emergency.

Initial contact with the struck train occurred at 10 mph.

The impact occurred before the emergency command was given.

The lead locomotive derailed to the south, remaining upright.

No other cars or locomotives derailed on the striking train.

Event Recorder Data from striking train YLT 25R-20 indicates the following:

The locomotive number for the event recorder is UP 624. The wheel size used in analysis was 39.88 inches.

The direction of travel was forward.

The Remote Control Receiver on the locomotive was receiving and responding to Remote Control Transmitter “A” during the entire pullback movement with one second delays between the command from the Remote Control Transmitter and response of the Locomotive Remote Control Receiver. Remote Control Transmitter “B” remained linked but inactive during final pullback move.

The final pullback move began 2596 feet from the point of collision.

The PSP system was manually disabled while the locomotive was moving, 2378 feet from the point of collision.

The remote control operator changed speed request from 10 mph to 4 mph 43 feet from the point of collision.

The remote control operator changed the speed request from 4 mph to coast 14 feet from the point of collision.

The remote control operator changed the speed request from coast to stop at about the same time as the collision.

The locomotive was moving at 10 mph when it struck the other train.

Event recorder time of collision is given as 22:38:53 on 03/20.

The locomotive recorded 53 feet of movement after initial contact with the struck train.

The remote control operator requested emergency three seconds after a train line emergency application of the brakes.

YLT67-20:

At the time of the accident, struck train YLT67-20 was working on a different radio channel than striking train YLT 25R-20.

YLT67-20 had just put a cut of cars to “Sit Yard” number two track and was in the process of shoving 36 cars into “Sit Yard” number one track.

The conductor was directing this shoving move with his radio. The conductor mounted the leading end of the movement and had begun the shoving move when he saw the striking locomotive approaching the end of Zone One. The conductor realized it was a remote control job and changed radio channels to the working channel for the striking train. He shouted warning over the radio but it was too late. He jumped from the car he was riding and ran clear of immediate area just as impact occurred.

The struck train was making a geographic westward shoving move at five mph when it was struck.

Given as a position from the leading end of movement on the struck train the involved cars on the struck train are as follows.
Car 10 Loaded Tank ETCX 630093, non-hazardous Industrial Chemicals.
Car 11 - Loaded Tank ETCX 230514, Octyl Aldehydes, Combustible Liquid, UN 1191, PG III.
Car 12 - Loaded Tank ETCX 430004, Combustible Liquid, 2-Ethyl Hexanol, NA 1993, PG III
Car 13 - Loaded Tank ETCX 630130, Combustible Liquid, 2-Ethyl Hexanol, NA 1993, PG III
Car 14 - Loaded Tank UTLX 640065, Other Regulated, Ethylene Glycol, NA 3082, PG III

Initial contact with the striking locomotive was at the 10th car from the leading end of movement. The striking locomotive raked along the side of this car causing the trailing trucks on the10th car to derail to the north. The following car in the direction of movement, car 11 from the west end, followed car 10 with the leading end derailing to the north before being raked along the side, lifted, and initiating a roll onto it’s side. The striking locomotive then struck the leading end of car 12, causing the trailing draw bar of the 11th car to separate, and knocking the 12th car onto its side. Because of the torque force on the couplers translated through the 12th car, in combination with the compressive longitudinal force translated from both the shoving train consist and the striking train; the immediate trailing cars, 13 and 14, also derailed to the north; rolling and sliding down an embankment with both cars coming to rest on their tops. During this event, cars 12 and 13 became uncoupled. The trailing end draw bar on car 14 broke leaving the 15th car sitting on the bridge.

Cars 13 and 14 remained coupled preventing car 14 from falling onto the roadway. Car 14 rolled off to the north side of the bridge, sliding down the bridge head wall,

and coming to rest on it's top with the trailing end of the car laying on and near the base of the bridge head wall.

None of the tank cars were breached. A small amount of product leaked through the top hatch bolts of loaded tank ETCX 430004, Combustible Liquid, 2-Ethyl Hexanol, NA 1993, PG III.
The total volume of the leak was estimated to be one quart.

U.S. Highway 259 was closed at the site for approximately three hours during initial assessment. There was no evacuation.

The downloaded event recorder from this consist was taken from the west unit of a two unit consist. The west unit was facing west. The movement was being controlled from the east unit.

Event Recorder Data from struck train YLT 67-20 indicates the following:

The locomotive number for the associated event recorder is NS 9902.

The wheel size used in analysis was 40.00 inches.

The speed at the time of the collision was 5 mph.

The movement from the last stop to impact was 420 feet.

The engine continued to move for a distance of 28 feet after impact.

Emergency application of the brakes registered at the locomotive 2 seconds after impact.

The recorder time at impact is 22:39:01 March 20.

Train line pressure was 88 lbs at impact.

Throttle position was "T3" at impact.

Traction Motor current was 616 amps just prior to the collision; spiking to 744 at the time of collision before going to 0 as the PCS switch opened at emergency.

Analysis and Conclusions:

Analysis:

The Remote Control Operators of the offending train held current certification as Remote Control Engineers.

The remote control crew had properly set up and tested the remote control system prior to beginning work. Event recorder data indicates that the system was operating as designed.

There were no regulatory non-complying conditions found for equipment or infrastructure.

The operating officer on scene made a good faith determination that the accident would not meet FRA thresholds for Post Accident Testing.

The carrier initiated drug and alcohol testing under "reasonable cause."

The crew members of both trains tested negative for Drugs and Alcohol.

Conclusions:

The cause of the accident was human factor and caused by the crew of the striking train.

Union Pacific rules relieve remote control movements from moving "prepared to stop within ½ the range of vision" only when specific conditions are met. Those conditions were not met and the crew of the striking train failed to comply with GCOR rule 6.28.

Primary and Contributing Causes:

The FRA determined that the primary cause of the accident was "Shoving movement, absence of man on or at leading end of movement." This crew failed to protect the leading end of movement while operating a remote control locomotive with an intentionally disabled Pull-back Stop Protection system.

A contributing cause of the accident was "Tampering with safety/protective device(s)." The crew of the striking train, after discussion and concurrence, intentionally disabled the Pull-back Stop Protection on the locomotive. This crew then operated the locomotive with a disabled Pull-back Stop Protection system in such a manner as to cause the locomotive to go beyond the limits of the active zone where it struck another train.