Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2014-15

Union Pacific Railroad Company (UP)
Winterhaven, CA
November 1, 2014

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 #R7-2014-1155

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Union Pacific Railroad Company	UP	1114ST002
2. Name of Railroad Operating Train #2	**2a. Alphabetic Code**	**2b. Railroad Accident/Incident No.**
Union Pacific Railroad Company	UP	1114ST002

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Union Pacific Railroad Company	UP	1114ST002
2. U.S. DOT Grade Crossing Identification Number	**3. Date of Accident/Incident**	**4. Time of Accident/Incident**
	11/1/2014	5:12 PM

5. Type of Accident/Incident
Rear End Collision

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated	10. Subdivision
0	0	0	0	Yuma

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Winterhaven		CA	IMPERIAL

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
72 ˚F	Day	Clear	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Main	Freight Trains-60, Passenger Trains-80	40.8	East

U.S. Department of Transportation
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FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #R7-2014-1155

OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	AMLNGR-31

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
22 MPH	R	3959		0

6. Type of Territory

Signalization:

Signaled

Method of Operation/Authority for Movement:

Supplemental/Adjunct Codes:

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.)*	UP 5136	1	no		0	0
(2) Causing *(if mechanical, cause reported)*	UP 5136	1	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	2	0	0	0	0	(1) Total in Equipment Consist	0	0	74	0	0
(2) Total Derailed	1	0	0	0	0	(2) Total Derailed	0	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
20000	33834

14. Primary Cause Code

H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

15. Contributing Cause Code

H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

Number of Crew Members

16. Engineers/Operators	17. Firemen	18. Conductors	19. Brakemen
1	0	1	0

Length of Time on Duty

20. Engineer/Operator	21. Conductor
Hrs: 11 Mins: 37	Hrs: 11 Mins: 37

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others
Fatal	0	0	0
Nonfatal	0	0	0

25. EOT Device?	26. Was EOT Device Properly Armed?	27. Caboose Occupied by Crew?
N/A	N/A	N/A

28. Latitude	29. Longitude
32.756180000	-114.686063000

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FRA FACTUAL RAILROAD ACCIDENT REPORT

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OPERATING TRAIN #2

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	ZLCAI-01

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
0 MPH	R	5855		0

6. Type of Territory

Signalization:

Signaled

Method of Operation/Authority for Movement:

Supplemental/Adjunct Codes:

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.)*	DTTX 620769	92	yes		0	0
(2) Causing *(if mechanical, cause reported)*	DTTX 620769	92	yes	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	4	0	0	0	0	(1) Total in Equipment Consist	92	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	1	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
152823	0

14. Primary Cause Code

H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

15. Contributing Cause Code

H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

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: 10 Mins: 42	Hrs: 10 Mins: 42

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others	25. EOT Device?	26. Was EOT Device Properly Armed?
Fatal	0	0	0	Yes	Yes
Nonfatal	0	0	0	27. Caboose Occupied by Crew?	N/A

28. Latitude	29. Longitude
32.756180000	-114.686063000

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

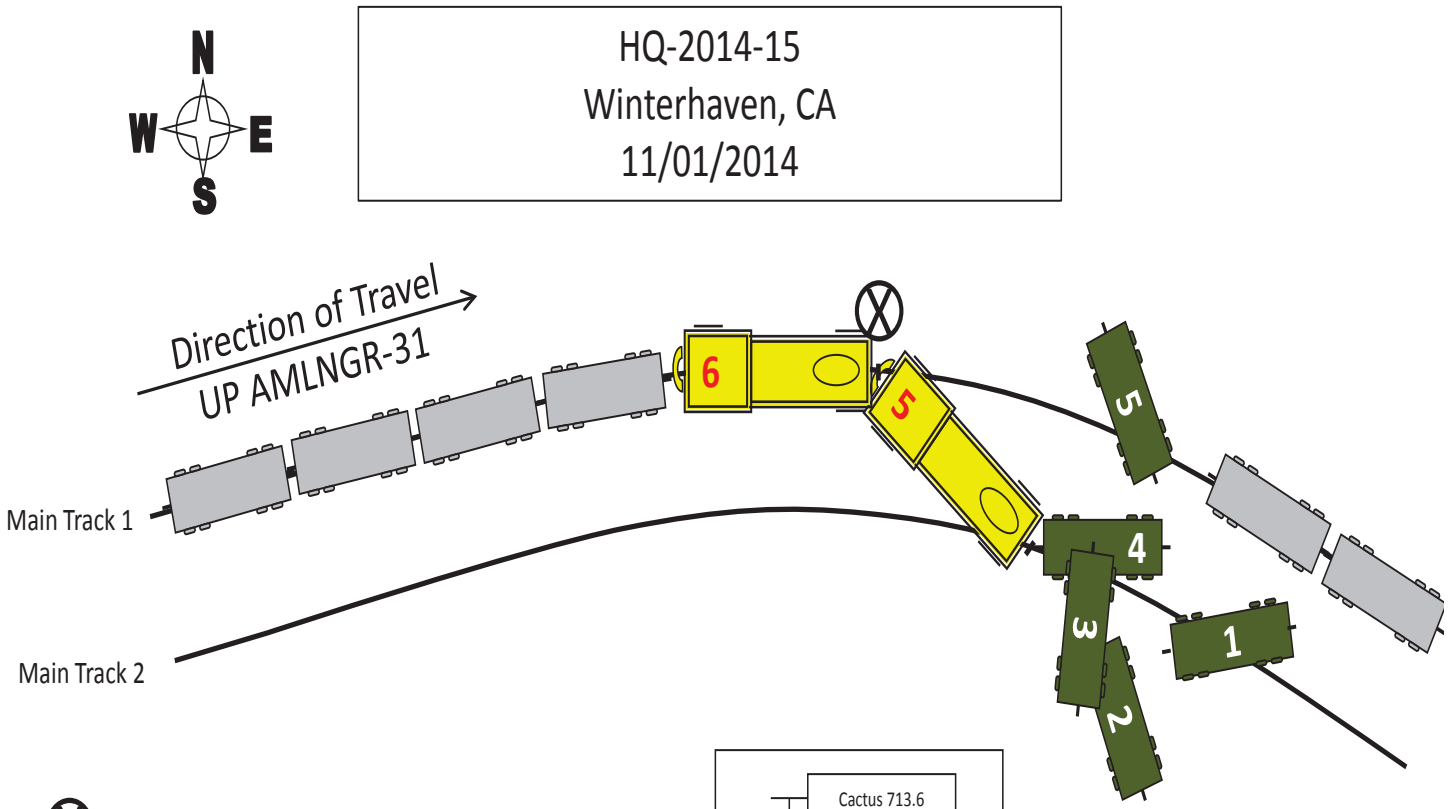
1 - Provided minimum 20-second warning
2 - Alleged warning time greater than 60 seconds
3 - Alleged warning time less than 20 seconds
4 - Alleged no warning
5 - Confirmed warning time greater than 60 seconds
6 - Confirmed warning time less than 20 seconds
7 - Confirmed no warning
N/A - N/A

Explanation Code

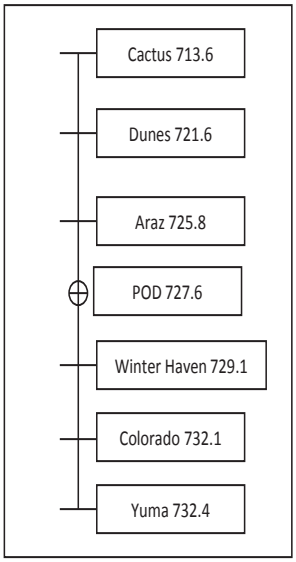
A - Insulated rail vehicle
B - Storm/lightning damage
C - Vandalism
D - No power/batteries dead
E - Devices down for repair
F - Devices out of service
G - Warning time greater than 60 seconds attributed to accident-involved train stopping short of the crossing, but within track circuit limits, while 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

WinterhavenHQ201415



Point of Derailment – MP 727.6



UP AMLNGR-31

5 - UP Locomotive 5136
6 - UP Locomotive 4927
74 Empties

UP ZLCAI-01

4 Locomotives
1- Well Car Derailed
2- Well Car Derailed
3- Well Car Derailed
4- Well Car Derailed
5- Well Car Derailed
Total 92 Loads

DRAWING NOT TO SCALE

SYNOPSIS

Synopsis

On Saturday, November 1, 2014, at 5:12 p.m. PST, an eastbound Union Pacific Railroad (UP) train AMLNGR-31(Train #1) collided with the rear end of a standing eastbound UP train ZLCAI-01 (Train #2) at milepost (MP) 727.6 on the Yuma Subdivision, Los Angeles Service Unit, near the town of Winterhaven, CA. Winterhaven is located approximately four miles north of Yuma, AZ. Train #1's speed at impact was recorded at 22 miles per hour (mph). The collision derailed the lead locomotive of train AMLNGR-31 and one intermodal car with multiple platforms on train ZLCAI-01. In this part of the railroad, movements are under a traffic control system (TCS) operated by a UP dispatcher in Omaha, NE. There were no injuries to the trains' crew members, no release of hazardous materials, and no evacuation was ordered. The accident occurred on main track 1, which blocked both main track #1 and main track #2. Damage to Train #1's locomotive was estimated at $20,000, damage to Train #2's intermodal car was $152,823, and track damage was reported as $33,834 with no damage to signals or structures.

Weather at the time of the accident was clear with a temperature of 72 degrees Fahrenheit.

The probable cause of the accident was the crew of Train #1's failure to comply with restricted speed in connection with a restrictive indication in a block or interlocking signal.

NARRATIVE

Circumstances Prior to the Accident

UP AMLNGR-31 (Train #1)

The crew of UP train AMLNGR-31, consisting of a locomotive engineer and a conductor, went on duty at 5:30 a.m. PST, on Saturday, November 1, 2014, at West Colton, CA. This was their home terminal, and both crew members had received more than their statutorily required off-duty time prior to reporting for duty. Their train consisted of two head-end locomotives and 74 empty auto racks and was intended to operate between Mira Loma, CA, and Yuma, AZ, where the crew expected they would terminate duty. After a job briefing and reviewing notices, they departed at 7:50 a.m. and described the trip as uneventful until the time of the accident. The engineer was seated at the controls on the right (south) side of the leading locomotive and the conductor on the left (north) side. The conductor stated that he was observing signals and communicating with the locomotive engineer.

Approaching the accident site, the train was proceeding towards Winterhaven on main track #1. According to the conductor, as the train neared Control Point (CP) Araz, MP 725.8, he called the UP dispatcher at 4:18 p.m. to advise his train was stopped and that a westbound and eastbound train had already rolled by, at which point the dispatcher indicated the crew would be relieved at Winterhaven. Train #1 then departed CP Araz at 5:05 p.m. on a diverging advance approach signal indication (red over flashing yellow aspect), and the crew was concerned about getting to Winterhaven without exceeding their hours of service limit. At CP Araz Junction, the train crew received an approach signal indication (yellow aspect), at which point the conductor advised the engineer to slow the train to below 30 mph because their next signal "could be red" (restricting indication) and they may have to stop. The engineer did not heed that advice. The conductor advised the engineer numerous times to slow down from its current 38-mph speed due to a standing UP train on main track #2 obscuring the conductor's forward vision, at which point he saw a red aspect (restricting indication) at intermediate signal 729.6. At 5:11:20 p.m., the conductor placed the train in emergency using the emergency control handle at his seat as he saw Train #2 ahead, and the crew braced for impact.

UP ZLCAI-01 (Train #2)

The crew of UP train ZLCAI-01, consisting of a locomotive engineer and a conductor, went on duty at the LA Transportation Center (LATC), in Los Angeles, CA, at 6:30 a.m. PST, on Saturday, November 1, 2014. This was their home terminal, and both crew members had received more than their statutorily required off-duty time prior to reporting for duty. Their train consisted of four head-end locomotives and 92 loaded intermodal platform cars and was intended to operate between LATC and Yuma, AZ, where the crew was to terminate duty. The crew described their trip as uneventful and the rear of their train was stopped at MP 727.6.

The Accident

At 5:11:43 p.m., Train #1 impacted the rear of Train #2 at a recorded speed of 22 mph. The impact derailed the head end locomotive of Train #1 and the rear multi-platform intermodal car of Train #2. The derailment blocked both main tracks #1 and #2. There were no injuries to the crew members of either train and no hazardous materials were released. Train #1's conductor contacted the UP dispatcher to report the collision and called for emergency services to respond.

Post-Accident Investigation

Officials from UP, as well as inspectors from the Federal Railroad Administration (FRA) and California Public Utilities Commission (CPUC) reported to the scene. FRA and CPUC inspectors began the investigation by obtaining documents, crew member statements and photographs of the accident site. Law enforcement, fire department and emergency personnel and ambulances from the local area responded to the derailment location.

FRA's investigation into the accident included interviews of the crew members operating UP Train #1. The results were substantiated by a review of event recorder data. The investigators also obtained and analyzed signal and train control records, track inspection records, and crew training, testing and certification records. Signal indications encountered were verified by examining the conductor's signal awareness form.

As the investigation progressed, the actions of the UP Train #1's crew were examined. FRA investigators interviewed the train crew and determined the engineer failed to control the train for both the approach and restricting signal indications. There was considerable communication in Train #1's locomotive cab between the conductor and the locomotive engineer to the signals they passed at CP Araz and CP Araz Junction and whether they would exceed the hours of service limit before reaching the Winterhaven relief point.

Analysis and Conclusions

Analysis – Operating Practices/Train Handling

The event recorder download of Train #1's locomotive units indicates the train was stopped at CP Araz at 5:02 p.m. At 5:07 p.m., the train was traveling at 38 mph in dynamic braking with 300 amps set and 87 pounds of air on the automatic brake pipe. At 5:09 p.m., dynamic braking was increased to 500 amps at 38 mph. At 5:10:28 p.m., the engineer increased to full dynamic braking and 13 seconds later provided a minimum set of 7 pounds on the automatic brake pipe, and then set an additional 10 pounds on the automatic brake pipe. At 5:11:20 p.m., the conductor placed the train into emergency using the emergency brake handle located at the conductor seat. Impact with Train #2 occurred at 5:11:43 p.m. at a recorded speed of 22 mph.

Conclusion

Train #1's crew was compliant with required training, testing and certification, and was within the hours of service duty day at the time of the accident. Event recorder data supports the conductor's statement that the engineer failed to properly respond to the signal indications as it approached the accident site. The engineer also failed to heed the counsel of his conductor who had advised the engineer to slow the train down after receiving the approach signal indication at CP Araz Junction, in anticipation that the next signal ahead could be a restricting indication and their vision was obscured by the standing UP train on the adjacent track.

Analysis – Track

An FRA track inspector conducted a post-accident site inspection and no defects were noted. He described the track as 141 lbs. rail with wooden ties and a full ballast section. The location of the incident was in a 1-degree, 30-minute, 50-second curve with 1.75 inches of elevation. Visibility along the track was clear with no obstructions.

An FRA DOTX ATIP geometry car surveyed the track in the area of the derailment twice in the first two weeks of October 2014. Cited defects and conditions were noted and remediated on site.

Conclusion

Following a review of all records, tests and inspections of the right of way in the area of the derailment, FRA determined that no track issues were a contributing factor to the accident.

Analysis - Signal & Train Control

An FRA signal and train control inspector conducted a post-accident site inspection and tests, and the FRA inspector noted the signal equipment functioned as intended with no defects.

Conclusion

Following a review of all records, tests and inspections of the signal system in the area of the derailment, FRA determined that no signal issues were a contributing factor to the accident.

the accident.

Analysis – Fatigue

Train #1 Engineer

FRA uses an overall effectiveness rate of 77.5 percent as the baseline for fatigue analysis, which is equivalent to the blood alcohol content (BAC) of less than 0.05. At or above this baseline, FRA does not consider fatigue as probable for this employee.

FRA obtained a 5-day work history for the UP Engineer from Train #1 (E1).

Sleep Settings = Excellent
Overall Effectiveness = 92.19
Lapse Setting = 1.5
Reaction Time = 108.5
Chronic Sleep Debt = 5.94
Hours of Continuous Wakefulness = 13.13
Time of Day (military) = 17:12
BAC Equivalent <0.05

Conclusions

FRA concluded fatigue was not a probable factor for the UP Engineer from Train #1.

FRA obtained a 6-day work history for the UP Conductor from Train #1 (C1):

Sleep Settings = Excellent
Overall Effectiveness = 85.41
Lapse Setting = 2.4
Reaction Time = 118.85
Chronic Sleep Debt = 5.55
Hours of Continuous Wakefulness = 13.13
Time of Day (military) = 17:12
BAC Equivalent <0.05

Conclusions

FRA concluded fatigue was not a probable factor for the UP conductor from Train #1.

Overall Conclusions

Following the accident, UP held a hearing for Train #1's crew members and found they were at fault for violating General Code of Operating Rules Rule 6.27, Restricted Speed, for failing to proceed at a speed that allows for stopping within one-half the range of vision to an obstruction or train on the track after receiving a restricted signal indication. Train #1's engineer's employment was terminated while the conductor was given Level 3 discipline.

On November 4, 2014, UP published a system-wide Incident Alert, which included an abbreviated account of and the rules violated in the accident.

Probable Cause and Contributing Factors

FRA has concluded that the probable cause of the accident was the failure of Train #1's crew to comply with restricted speed in connection with a restrictive indication in a block or interlocking signal.