

Federal Railroad Administration Office of Safety Headquarters Assigned Accident Investigation Report HQ-2005-90

> Union Pacific (UP) Texarkana, Arkansas October 15, 2005

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 # <u>HQ-2005-90</u>																			
FEDERAL RAILR	ROAD A	ADMINIS'I	RATI	ON				-						Dailanad Apaidant (Traidant N					
1.Name of Railroad Operating Train #1 Union Pacific RR Co. [UP]									1a. Alphabetic Code 1b UP					 Railroad Accident/Incident No. 1005LK032 					
2.Name of Railroad C	2a. Alp	ohabetic	Code	2b. R	Railroad Accident/Incident														
Union Pacific RR C	39 Alt	nhabetic	UP	36	1005LK032														
Union Pacific RR C	5a. / uj	phabette	UP	50.1	Kanroad 7	1005LK	1032	<i>J</i> .											
4. U.S. DOT_AAR G	5. Date	e of Acci	dent/Incident	6. T	ime of Ac	cident/In	ncident												
	N	Aonth 10	Day 15	Year 200	04:56: 🗸 AM 🗌 PM														
7. Type of Accident/I	7. Hw	7. Hwy-rail crossing 10. Explosion-detonation 13. Other																	
(single entry in coo	de box)	2. Head of	on colli	sion	5. Raking	g collision	1	8. RR	8. RR grade crossing 11. Fire/violent rupture (describe in narrative)										
3. Rear end collision 6. Broken Train collisio									ostruction	,		03							
HAZMAT 21	21 9. HAZMAT Cars Damaged/Derailed				10	Releasin T	1 Evacuated				1	012	12. Division North Little F			C			
13 Nearest City/Tow	'n					14. Mile	epost			15. State	~ .	16	. County						
15. Realest City/10w	Те	exarkana			(to nearest t			enth) 417.8		Abbr N/A	Cod	e 10 R		MILLER					
17. Temperature (F)		18. Visit	oility	(sing	(single entry) Code 19.			Veather	(single	entry)	C	ode	20. Tvi		ck		Code		
(specify if minus)	(specify if minus) 1. Dawn			3.D	3.Dusk 1			Clear 3. Rain 5.Sleet			1	1	1. Main 3. Siding			I	1		
21 Track Name/Number					Jark	22. FRA Track			de de	g 6.Snow	Snow 1 wal Track Density			2. Yard 4. Industry			Code		
Single Main					k	Class (1-9, X) (gross tons in					s in	30	1. North 3. East						
Single Main Track 2 millions) 39 4																			
25 Type of Equipme	ent 1	Freight tr	ain	4 Wc	ork train 7	Yard/swi	itching	A Sn	ec MoV	V Equip Code	26. V	Vas Equip	ment (ode	27 Train N	umber	/Symbol		
Consist (single er				ttended?	ided?														
29 9	3	. Commute	r train	6. Cu	t of cars 9.	Maint./in	ispect.ca	r	1 () (1. Yes	2. No 1 ZYCLD13						
28. Speed (recorded R - Recorded	speed, if	available)	Code	30.	Method(s) of ATCS	of Operati g	on (g. Autom	enter co atic bloc	ode(s) t :k	hat apply) m.Special instru	uctions		30a. Rem 0 = Not a	atery Co	ontrolled Lo Iv 4 0 Westl e	comot d	ive?		
E - Estimated 17 MPH R b. Auto train control h. Curren									ïc i	n. Other than m	k	1 = Remote control portable							
29. Trailing Tons (gross toppage d Cab i Track									orders	 Positive train p. Other (Grander) 	1	2 = Remote control tower 3 = Remote control							
excluding power units) e. Traffic k. Direc									ontrol	Code	e(s)	(rrative)	transmitter - more than one						
		3961		f.	Interlocking	g 1	.Yard lin	nits		1 N/A 1	N/A N/	A N/A	remote o	control t	ransmitter		0		
31. Principal Car/Unit	t	a. Initial	and Nu	mber	b. Positio	on in Trair	n c. I	Loaded(y	/es/no)	32. If railroad	employ	ee(s) teste	ed for drug	alcohol/	l use,				
 First involved (derailed, struck, etc.) 		1			N/A	N/A the appropria			that were ox.	positive ii	n	Alcoh	ol	Drugs					
(2) Causing (if med	chanica	1	0		0			N/A	N/A 33. Was this consis				ing passen	gers? (Y	/N)				
cause reported)) 	Re	ar End		25.0			Lo	aded		Empty		IN		
54. Locomotive Units		End b. N		nual	c. Remote	d. Manua	c. Remo	mote	35. Cars			a. Freight	b. Pass.	c. Freig	ght d. Pass	. e. (Caboose		
(1) Total in Train	ı	2 0		0	0		0	(1	l) Total i	in Equipment C	onsist	57	0	0	0		0		
(2) Total Deraile	d	0		0	0	0	0	(2	2) Total l	Derailed		0	0	0	0		0		
36. Equipment Dama	ıge		3	37. Tra	ck, Signal, V	Way,		38	8. Prima	ry Cause			39. Cont	ributing	Cause				
This Consist	С	Code H607 Code N/A																	
Number of Cre 40 Engineer/ 41 Eirgman 4					w Members 42. Conductors 43. Brakemen				Length					45. Conductor					
Operators 0 N/A 0			1			0			Hrs 6 Mi			101 001	Hi	rs 6	Mi	56			
Casualties to:	46. Rail	road Emplo	7. Trai	in Passenger	engers 48. Other			49. EOT Device?				50. Was EOT Device Properly Armed?							
Fatal		0			0		0		1. Ye	es 2. No	1. Yes 2. No 1								
No foto1								5	51. Caboose Occupied by Crew?				•						
N/A 0 0 1. Yes 2. No											N/A								
OPERATING TRAIN #2																			
52. Type of Equipme	nt = 1. trv = 2.	. Freight tra . Passenger	un train	4. Wo 5. Sin	rk traın 7. gle car 8.	Y ard/swi Light loc	tching o(s).	A. Spe	ec. MoW	/ Equip. Code	53. W	as Equip: ttended?	ment C	ode	54. Train N	umber	/Symbol		
Consist (siligle en	y) 2. 3.	. Commute	r train	6. Cut	of cars 9.	Maint./in	spect.ca	r		1		1. Yes	2. No 1		MPE	HG15	i		
55. Speed (recorded	speed, if	available)	Code	57.	Method(s)	of Operati	on (enter co	ode(s) t	hat apply)	57a. Remotely Controlled Locomotive?								
E - Estimated 0 MPH R a. ATCS g. Autor								atic bloc	k ¹ ic ¹	n. Other than m	k	0 = Not a remotely controlled 1 = Remote control portable							
L		-		0.	- rano train (Jonuor II	Juriell												

DEPARTMENT FEDERAL RAI	T OF TR. LROAD A	ANSPOF Adminis	TAT TRA	ION FION	FRA F.	ACTUA	LRAILR	ROAD AC	CII	DENT	REPO	ORT	F	RA File #	<u>HQ-200</u>	<u>5-90</u>	
56. Trailing Tons (gross tonnage, excluding power units) 2790					. Auto trai . Cab . Traffic . Interlockin	n stop i. j.' k.	rain orders of nt control I ic control	tin orders o. Positive train control control p. Other (Specify in narrative) control Code(s)					2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter				
58. Principal Car/Unit a. Initial and Nu					b. Posit	ion in Traii	ted(ves/no)	59									
(1) First involved			5264		(yes/110)	enter the number that were positive in Alcoho											
(derailed, struck, etc)			5304	64 55			no	the appropriate box. 0						0	0		
(2) Causing (if mechanical cause reported) 0				0			N/A 60. Was this consist transporting passengers? (Y/					gers? (Y/N	D)	N			
61. Locomotive Un	nits	a. Head End b. Mar			Mid Train nual c. Remote		ar End l c. Remote	62. Cars	62. Cars Lo a. Freight					Err c. Freight	npty d. Pass.	e. Caboose	
(1) Total in Train		2		0	0	0	0	(1) Total in	a Equipment Consist 9			9	0	9	0	0	
(2) Total Dera	(2) Total Derailed 0			0 0		0	0	(2) Total E	Derail	ed		1	0	9	0	0	
63. Equipment Dan This Consist	lage 292530 6			64. Tr	ack, Signal, Structure D	Way, amage	2053198	65. Primar Code	55. Primary Cause 66. Contributing Code H607 Code				ributing Ca	use	N/A		
		Num	er of G	Crew Me	embers	•		Length of Time on Duty									
67. Engineer/	68. Fi	remen		69. Co	onductors	70. Br	akemen	71. Engin	eer/C	perator			72. Con	ductor			
Operators 1	Operators 1 0				1		0		Hrs	7	Mi	26		Mi 26			
Casualties to:	73. Rai	lroad Emp	loyees	74. Tra	in Passenge	ers 75. Oth	her	76. EOT Device? 77.						77. Was EOT Device Properly Ar			
Fatal		0			0		1		ose O	ccupied b	v Crew	/?					
Nonfatal		1			0		0		1.	Yes		2. No		N/A			
		way U	ser Inv	olved			Rail Equipment Involved										
79. Type C. Truch	nicle	Code	Code 83. Equipment 3.Train (standing) 6.Light Loco(s) (moving)														
A. Auto D. Pick- B. Truck F. Van	norrativa)	1.Train(units pulling) 4.Car(s) (moving) 7.Light(s) (standing) 2.Train(units pulsing) 5.Car(s) (standing) 8.Other (moving) 8.Other (moving) 1.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2															
80. Vehicle Speed	geograph	ical)	Code	84. Position of Car Unit in Train													
(est. MPH at	outh 3.East	4.West	N/A	0													
82. Position							Code	de 85. Circumstance									
1.Stalled on Ci 4. Trapped	r Crossing	N/A 2. Rail Equipment Struck by Highway User															
86a. Was the high		Code	86b. Was t	here	a hazardo	ous mat	erials releas	e by			Code						
in the impact	t transporti	ng hazard	ous ma	terials?			1 N/A	1 High	way	User 2	Rail F	auinment	3 Both	4 Neithe	r	N/A	
1. Highway User 2. Rail Equipment 3. Both 4. Neither N/A 1. Highway User 2. Rail Equipment 3. Both 4. Neither R6c State here the name and quantity of the bazardous materials released if any 1. 1. 1.														IV/A			
obe. State here the		quantity 0	the m	izurdous	materials i	cicused, ir t	N/A										
87. Type of 1.C	Gates	4.W	ig Wa	gs	7.Cross	sbucks 10).Flagged by	crew	88. 5	Signaled (Crossin	g Warning	Code	89. Whis	tle Ban	Code	
Crossing 2.0 Warning 3.9	signs 11 hman 12	l.Other (spec 2 None	c. in narr.)	(See instru	ctions	for codes)		1. Ye 2. No								
Code(s) N	N/A	N/A	N/	A	N/A	N/A	N/A	N/A 3. Unkno							known	N/A	
90. Location of Wa	urning	ing Code 91. Cros						Interconnect gnals	ed	Code	92.0	Crossing Illu Lights or S	minated b	inated by Street cial Lights			
2. Side of Veh	1	. Yes					1. Yes										
3. Opposite Side of Vehicle Approach					N/A	2			N/A		2. No 3. Unkn	own	N/A				
93. Driver's 94. Driver's Gender Code 95. Driver Drove Ber							n Front of T	rain Code	. !	96. Drive			Code				
Age 1. Male 2. Female					and Struck or was Struck by Second T 1. Yes 2. No 3. Unknown				2. Stopped and then Proceeded 5. Other (specify in								
U N/A								N/A	N/A 3. Did not Stop narrative)								
97. Driver Passed Highway Vehic	Standing cle	Code	98.	View of	f Track Obs	scured by	(primary ob	struction)	Verr	tation	7	Other (a	necify in -	arrativa		Code	
Inguway venuce 1. Permanent Structure 3. Passing Train 5. Vegetation 7. Other (specify in narrative) 1. Yes 2. No 3. Unknown N/A 2. Standing Railroad Equipment 4. Topography 6. Highway Vehicle 8. Not obstructed														N/A			
101. Casulties to Highway-Rail Crossing Users Killed					Injured			Cod	e	100. Was E	Was Driver in the Vehicle?						
					-	1. Killed 102. High	Uninjured Property Da	Jninjured N/A 1. Yes Property Damage 103. Total Number of						Rail Cross	ing Users		
			0		0	(est.	dollar dama	ge)		0		(inclue	le driver)		0	-	
104. Locomotive A	uxiliary Li	ghts?	Jo			1	Code	105. Locor	notiv	e Auxilia	ry Ligł	nts Operatio	nal?			Code	
1. Tes 106. Locomotive H		Code	1. 107 Locos	r es	e Audible	e Warn	2. NO	d?			N/A Code						
1. Yes 2. No							N/A	1.	1. Yes 2. No						N/A		

108. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC., INVOLVED. 90.bmp

A = Provetored Loaded Propylene Track CAR - 19 th CAR for Room B = Empty Covered Hopper - 18+6 Car From Rear C = Empty Covered Hopper - 17th Car From Rear D = Empty Coursed Hopper - 16th CAR FROM Rea Es LEAD Lucomutive at Striking Train F= Destroyed Residence with Owe Fatality G= Destroyed Unscripted Residence H - Dertroyed Vehicles Hobo Park (Carried あるというないないないの思想 Parking Area TT I I I THE OWN THIS AND A DATE OF THE OWNER ATTER TO ANY A CHERY A CHERY AND A CHERY A Dudles G 115 105 н 18 ň 5 Jackson St 243 # Point of Cillision -22

109. SYNOPSIS OF THE ACCIDENT

At 4:56 a.m. (CST) on Saturday, October 15, 2005, westward Union Pacific Intermodal Train ZYCLD13 struck the rear of standing freight train MPBHG 15 in the city of Texarkana, Arkansas. The striking train struck the standing train at a recorded speed of 17 mph. Striking Intermodal train ZYCLD13 consisted of two locomotives, 57 loads, 0 empties, 5598 feet, 3961 tons.

Struck general manifest train MPBHG15 consisted of two locomotives, 13 loads, 40 empties, 2790 tons, 3470 feet.

This accident occurred on the Pine Bluff Subdivision at mile 417.8. The method of operation at the point of collision is non-signaled Yard Limits. Timetable and geographic direction was west.

The cause of the accident was failure of the crew on the striking train to comply with the requirements of "Restricted Speed" as defined by the General Code of Operating Rules.

The accident occurred during darkness just beyond the exit of a short, non-sight restrictive, 1 degree "S" curve. There was unrestricted sight line for more than 1000 feet

The weather was reported to be 59 degrees, clear, with calm winds.

As a result of the accident 1 loaded and 12 empty railcars of the struck train required either re-railing or clearing including loaded tank car TIMX 33429 containing propylene (UN 1075 - Flammable Gas). Loaded tank car TIMX 33429 was breached with the product flowing into an adjacent waterway and ditch. The product followed the waterway and then a ditch for approximately 2,000 feet to an ignition source and explosively ignited destroying two houses and causing the death of a 61-year-old woman that resided in one of the homes. The ignited gas flashed back to the damaged car igniting the escaping product and a grove of trees on either side of the railroad. Four timber track bridges spanning the waterway were destroyed by fire. Nine other placarded cars were either derailed or damaged by fire with no release of material.

A string of 23 Maintenance Of Way railcars loaded with tie gang equipment was on an adjacent track. Nine of the 23 MOW cars were burned or otherwise significantly damaged including the destruction of several of the on board machines. Damage to these rail cars was reported as \$31,398 with an additional \$2,265,234 damage to the MOW machinery onboard the rail cars.

There were no cars or locomotives derailed on the striking train.

Initially there were no reports of injury to railroad employees but the engineer on the struck train later reported a back injury caused by slack run when his train was struck. This employee remains off work.

Approximately 1012 residents were evacuated as a precautionary measure and remained out of their homes for approximately 8 hours.

Total damages to railroad equipment and infrastructure is estimated to be about \$8.9 million which includes the MOW equipment.

Estimated damages to other private property is estimated to be about \$200,000 including the destruction of the two residences and a number of vehicles.

110. NARRATIVE

The following information was obtained from an investigation that was conducted by the Federal Railroad Administration.

Circumstances Prior to the Accident:

ZYCLD 13:

The crew of striking train ZYCLD 13 included a locomotive engineer and a conductor. They first went on duty at 10:00 p.m., CST October 14, 2005, at the UP Pine Bluff Yard in Pine Bluff, AR. This was the home terminal for both crew members and both crew members received more than the statutory off duty period, prior to reporting for duty.

Their assigned intermodal freight train consisted of two locomotives and 57 loaded intermodal platforms. It was 5737 feet long and weighed 3961 tons. This crew was assigned to operate the train from Pine Bluff, AR to Big Sandy, TX. The operation was timetable direction west on the Pine Bluff Subdivision. The train was fully assembled when the crew took control of the train at Pine Bluff and there were no pick ups or set outs made between the on duty point and the point of collision. The locomotive consist was equipped with dynamic brakes on the lead unit only. The required testing of the air brakes and rear end telemetry device had been properly completed at Pine Bluff. AR at 11:05 p.m., October 14, 2005, as indicated by documentation on the locomotives. The daily inspection of the locomotives had been completed at 12:10 a.m., October 14, 2005, shown by documentation on the locomotives.

As the train approached the point of collision, the engineer was sitting at the control desk of the lead locomotive, UP 4310. The conductor was at his desk on the other side of the cab. The locomotive was being operated front end forward. The train had entered yard limits on an "Approach" signal indication requiring restricted speed. There had been no communication between this crew and any other railroad employee immediately before entering yard limits.

MPBHG 15:

The crew of struck train MPBHG 15 included a locomotive engineer and a conductor. They first went on duty at 9:30 p.m., CST October 14, 2005, at the UP Pine Bluff Yard in Pine Bluff, AR. This was the home terminal for both crew members and both crew members received more than the statutory off duty period, prior to reporting for duty

On departure from Pine Bluff their assigned manifest freight train consisted of two locomotives, 18 Loads, 49 Empties, 4155 feet, and 3653 tons. This crew was assigned to operate the train from Pine Bluff, AR to Big Sandy, TX. The operation was timetable direction west on the Pine Bluff Subdivision. The train was fully assembled and properly tested when the crew took control of the train at Pine Bluff. The crew had completed a set out of 5 loads and 9 empties at Texarkana just prior to the collision. At the time of collision the train consisted of two locomotives, 13 loads, 40 empties, 2790 tons, and 3470 feet. The locomotive consist was equipped with dynamic brakes on both units of the locomotive consist. The required testing of the air brakes and rear end telemetry device had been properly completed at Pine Bluff, AR at 9:02 p.m., October 14, 2005, as indicated by documentation on the locomotives. The daily inspection of the locomotives had been completed at 10:10 p.m., October 14, 2005, as shown by documentation on the locomotives. There was no indication of any type of problem with the End of Train Device (EOT). The EOT shows in position on the last Automatic Electronic Identification readout.

At the time of the accident the engineer was at the control stand of the lead unit CSXT 9024. The conductor was on the ground adjacent to rear end of the rear locomotive. The crew had just coupled back onto their train after setting out cars when impact occurred.

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Both crew members of the struck train said they had seen a headlight coming down the hill but believed it was movement on one of the adjacent tracks. These adjacent tracks can be accessed through the "Back Lead" that connects to the main track at Gertrude Control Point CB 416.

Topography:

In this area of the railroad, beginning at Gertrude, Control Point CB 416 located at mile 416.35, a train movement from east to west would negotiate, in succession, a tangent of approximately 3900 feet, followed by a 3-degree 20 minute curve to the left of approximately 1,900 feet. This is followed by a tangent of approximately 1,100 feet leading to a 1-degree zero minute S-curve approximately 350 feet in total length. The point of collision (POC) was just beyond this curve

Approaching the accident from east to west, beginning at Gertrude, CP CB 416, Mile Post 416.35, to the point of collision at 417.8, the average grade is descending at -0.74 percent.

Method of Operation:

As indicated by timetable, the method of operation for westward movement into Texarkana Yard on the Pine Bluff Subdivision changes from CTC at Gertrude Control Point CB 416 to Yard Limits ABS. Yard Limits/ABS continues until end of ABS at mile 417.4 where Non-Signaled Yard Limits extends to and beyond the point of collision. The entry to Yard Limits is indicated by a Yard Limit sign within the Gertrude CB 416 control point. For westward movement there is one intermediate signal at 417.1 on a short mast located between the Yard Limit sign at 416.4 and the "END OF ABS" sign located at 417.4. The station section of the timetable shows ABS continuing to 419.1 but is described in the ABS section as ending at 417.4. A general order was issued correcting the misprint in the station section. The point of collision was at 417.8. During the initial interview with the offending engineer he said he believed ABS extended to the interlocking at 419.1 but changed his mind after interjection by a carrier officer.

Weather.

The weather was reported as clear and 59 degrees. It was dark with a near full moon low in the west. The engineer and conductor reported a "haze or light fog" in the area. A police video recorded near the location and time of the incident shows no obstruction to vision due to weather.

The Accident:

Striking Train GYCLD 13:

The geographic direction of the striking train was west. The engineer had balanced the grade against throttle position five and 7 lbs of brake pipe reduction to maintain a near constant speed of 17 mph up to the point of collision. The last train control input was throttle T4 to T5 at 4365 feet prior to the point of collision. The last horn registered 1834 feet before the point of collision and corresponds with the location of the last public grade crossing. This grade crossing is equipped with red flashing automatic warning lights and red lighted arms. Both the engineer and conductor could not recall seeing the End of Train Device (EOT) on the struck train. The color of the flashing light on the EOT of the struck train was red. The engineer stated that he saw the rear end of the struck train about 1 car length from impact. The engineer stated that he should a warning to the conductor and put the train in emergency. Event recorder data indicates the train continued to move for 243 feet beyond the point of collision. Event recorder data registers an Engineer Induced Emergency application of the brakes 5 seconds after impact and 152 feet from stop. No part of the striking train derailed. There was minimal damage to the lead locomotive of the striking train.

An accident re-enactment was performed by the NTSB under similar ambient light conditions. A series of tests were performed covering various scenarios regarding the position of headlight and ditchlight switches and with the EOT of the struck train flashing and removed. A re-enactment with locomotive headlights and ditchlights displayed on bright shows a properly mounted and flashing EOT becoming visible to the engineer at 3,272 feet from rear car on the struck train as the lead locomotive exits the last sight obstructive curve. The EOT becomes visible to the conductor at 3228 feet under these same conditions

With the ditchlights extinguished, the headlight on dim, and the EOT device of the struck train removed; the rear car becomes visible to both the Engineer and Conductor at 613 feet.

The red flashing lights of two public grade crossings add to visual stimulus in the same color spectrum as the EOT until the locomotive passes the last public crossing 1834 feet prior to the point of collision.

Struck Train MPBHG 15:

The crew of the struck train had just coupled the locomotives back onto the standing train and began to slack ahead to test the joint when a slack run in occurred as a result of the impact.

As compression forces built up in the struck train an empty covered hopper car, 18 from the rear end, popped out and was thrown up and on top of MOW cars and equipment standing on the adjacent track to the south. The 19th car from the rear was a loaded tank car containing propylene. As the east end of the 18th car became airborne it elevated the west end of the 17th car, an empty covered hopper, above and out of alignment with the draw bar of the 19th car. This allowed the 17th car to be "launched" directly into the head of the tank car with the striking train now contributing the necessary energy for the knuckle to puncture the reinforced steel head of the "A" end and penetrate through the shell into the cargo compartment. Both of these cars then derailed to the north side of the track with car number 16 from the rear of the train, an empty covered hopper, following and coming to rest on top of the punctured tank car. The three rear end cars of the struck train then derailed, remaining coupled to both the striking locomotive and the other cars on the struck train.

During the initial investigation, concern was expressed to carrier officials that the rear end telemetry device (EOT) of the struck train could not be located. It was later determined that a car department employee had found the EOT laying on the ground close to the point of collision without any apparent damage and had removed it from the scene for reuse on another train.

The FRA Inspector In Charge of the FRA investigation briefly considered that a vandal may have removed the unlocked rear end device just prior to the collision. However; it was found that the EOT mounts to the side of the coupler and there was no direct impact between the EOT and the striking locomotive. Markings of abrasion could also be seen at the mounting point of the coupler that was identified by Union Pacific carrier officers as the coupler removed from the struck car. This consideration was later mentioned to Union Pacific Special Police at the scene with the suggestion that EOT devices be secured with a seal, lock, or other device. No further action was initiated by FRA in this matter.

Although event recorder channels exist for recording the operating parameters of EOT devices, those channels did not show recorded data.

Hazardous Materials Release:

Loaded tank car TIMX 33429 was the 19th car from the rear of the struck train. This car contained Propylene- Hazard Class 2.1 - Identification Number UN 1075.

Form DOT F5800.1 indicates that this car had a maximum capacity of 33676 gallons and that the shipment volume was 30315 gallons. The "Packaging Identification Markings" on the tank car was DOT 105J400W. The material of construction was carbon steel.

The derailed position of the tank car was to the north side of the geographic east to west right of way. The earth based elevation of the track and right of way was well above the position of the derailed tank. The elevation of the tank was at a slightly higher elevation than the other immediate surrounding area including the area to the south of the right of way

After the tank was breached, the pressurized liquid began escaping to the atmosphere where it phased to a greatly expanded volume of heavier than air gas. This 6

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extremely flammable gaseous material began flowing along the ground on the north side of the right of way, filling and flowing along the lowest contours until reaching a small waterway. Once reaching the waterway it followed the path of the waterway, flowing generally southwest, and under a four track spanning rail bridge. Just south of the rail bridge there is a drainage ditch inflow point intersecting the small waterway. After flowing under the right of way and reaching this drainage ditch inflow point, some of the material began flowing along this drainage ditch in a generally eastward direction, crossing under a small residential road into a residential area. The material reached one occupied and one unoccupied residence before the material explosively ignited and flashed back to the source via the waterways. Both of the residences were completely destroyed. A police video captured the sound and shadows of the initial explosive ignition, secondary explosions, and flash fire. The secondary explosions resulted as the flash fire reached accumulations of product in low lying areas. Ignition occurred at 5:08 a.m. - about 12 minutes after impact.

One 61 year old female was killed in the explosion and resulting fire at the occupied residence. The State of Arkansas Certificate of Death reports the "Immediate Cause" of death as "Blunt Force Injuries with Thermal Burns."

Four parallel wood deck rail bridges were destroyed by fire.

A string of 23 Maintenance Of Way railcars loaded with tie gang equipment was on an adjacent track. Nine of the 23 MOW cars were burned or otherwise significantly damaged including the destruction of several of the onboard machines. Damage to these rail cars was reported as \$31,398, with an additional \$2,265,234 damage to the MOW machinery on board the rail cars.

In addition to the destruction of the private residences, three private vehicles parked at the occupied residence, and one vehicle parked on a roadway adjacent to the right of way were destroyed by fire. A semi truck and trailer parked in a nearby parking lot was also damaged.

An evacuation that affected about 1012 people was ordered by Texarkana, AR Fire Marshal Stephen Johnson.

At 05:20 initial evacuations were initiated near the scene.

At 05:30 the decision was made to evacuate within a 1-mile radius of the derailment site.

At about 2:00 p.m. the evacuation order was rescinded.

Analysis and Conclusions:

Analysis:

All members of both train crews tested negative for drugs and alcohol.

There were no non-complying conditions found on the locomotives of either train or the EOT of the struck train.

The carrier failed to report the train "collision" to the National Response Center (NRC) as required under 49 CFR 225.9 (a.)(2)(iv). The carrier reported the incident to NRC as a material release giving the wrong type of material. The NRC report shows a release of Vinyl Acetate being reported by the UP Railroad on 10/15/2005 in Miller County, AR. There were no other reports found for this incident in the NRC data base for the search date of 10/15/2005.

TIMX 33429 was sent to Trinity Rail Services for construction and material evaluation. Given the length of time the tank was exposed to high temperature fire it was determined that further evaluation would be inconclusive as to pre-accident construction and material integrity.

Conclusions:

The FRA determined that the contributing cause was human factor due to the "Failure to comply with restricted speed or its equivalent not in connection with a block or interlocking signal."