

Federal Railroad Administration Office of Safety Headquarters Assigned Accident Investigation Report HQ-2008-24

> Union Pacific (UP) Mecca, CA March 5, 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.

DEPARTMENT FEDERAL RAILI	OF TRA ROAD A	ANSPORT DMINIST	TATIO RATI	ON ON	FRA FA	ACTUA	AL RA	ILR	OAD A	CC	IDENT	REPO	ORT		FRA F	ile #	<u>HQ-200</u>	08-24
1.Name of Railroad Operating Train #1									1a. Alphabetic Code					b. Railroad Accident/Incident No.				
2.Name of Railroad Operating Train #2									Alphabetic	c Coo	le		2b.	0308LA006 2b. Railroad Accident/Incident No.				
N/A 3.Name of Railroad	Operating	Train #3						39	Alphabetic	N/A	le		3h	N/A				
N/A	<i>Ja</i> .	7 Inpliabelie	N/A				N/A											
4.Name of Railroad I Union Pacific RR	4a.	4a. Alphabetic Code UP					b. Railroad Accident/Incident No. 0308LA006											
5. U.S. DOT_AAR Grade Crossing Identification Number									Date of Account 03	ciden	t/Incident Day 03	Year 2	2008 7.	. Time of A 08:	ccident	/Incic	lent AM	V PM
8. Type of Accident/I	Indicent	1. Derailı	nent		4. Side c	ollision		7.	Hwy-rail c	cross	ing 10). Explo	sion-deto	onation 12	3. Other	L		Code
(single entry in code box) 2. Head on collision 5. Raking collision								8. RR grade crossing 11. Fire/violent re					iolent ruj	ture (describe in narrative)				
9 Cars Carrying		3. Rear er	nd coll	ision	6. Broke	n Train c	ollision	9.	Obstructio	on	12. Other impac			ts				01
HAZMAT	7	10. HAZMAT Cars Damaged/Derailed					Cars Rel ZMAT	leasin	g 1		12. People Evacuated			50				20
14 Nearest City/Tow	/ /n				0	15. Mi	15. Milepost		16		State			7 County		1	Los Aliger	es
14. Nearest City/10w	'n	Mecca				(to	nearest t	<i>enth)</i> 626.1) Abbr N/A		r Co C	ie A	7. County	RIVERSIDE		SIDE		
18. Temperature (F)		19. Visib	ility	(sin	gle entry)	Code	20. V	Veather (single		e entr	entry) Coo		ode	21. Ty	21. Type of Track			Code
(specify if minus 47) 7 F	1. l 2. l	Dawn Day	3.E 4.I	Dusk Dark	4		. Clea	ear 3. Rain 5.Sle		5.Sleet 6 Snow	Sleet		1. Main 3. 2. Yard 4		. Siding . Industry		1
22. Track Name/Nu	Imber					23. FR/	A Track	. 010	Code	24.	24. Annual Track Density		sity	25. Tii	25. Time Table Dire		ection	Code
			Singl	e Maiı	n	Cla	ss (1-9, X	X) (gross tons in millions) 52					52.5		1. North 3. East			
			0				ODED		NC TD A	IN	41		52.5		2. Sou	th 4	west	5
26 Type of Equipme	ent 1	Freight tra	in	4 W	ork train 7	Vard/su	vitching		Spec Mol	WE	uin Cod	e 127.	Was Equ	ipment	Code	28	Train Nu	nber/Symbol
Consist (single et	ntry) 2.	. Passenger	train	5. Si	ngle car 8	. Light lo	co(s).	л.	Spee. Mo	W LA	uip. Cou		Attended	?	?			
	3.	. Commute	r train	6. Ct	at of cars 9	. Maint./i	nspect.ca	ır			1		1. Yes	3 2. No 1 MWCEC03				EC03
29. Speed (recorded	speed, if	available)	Code	31	. Method(s)	of Operat	ion (enter	r code(s)	that	apply)			31a. Rei	notely (Contro	olled Loco	omotive?
R - Recorded a. ATCS g. Autor								hatic b	olock	m.s n. O	ther than r	uctions nain trac	:k	0 = 100 a remotely controlled 1 = Remote control portable				
E - Esumated 46 MIPH b. Auto train control h. Curre								able/ti	rain orders	o. P	ositive trai	n contro	ol	2 = Rer	note con	trol to	ower	
30. Trailing Tons (gross tonnage, avaluting power units) d. Cab j.Track								varran	nt control	р. С	other (Spe	cify in n	arrative)	3 = Rei	note cor	ntrol		
e. Traffic k. Dire								traffi nits	c control		Cod	$\frac{e(s)}{x(x+1)}$		- transn	utter - n control	nore t trans	han one mitter	
22 Principal Car/Uni		lo Initial	and Nu	mbor	h Positi	on in Troi		Loode	ad (100		N/A		. 16 1	(1.1	1		0
(1) First involved								Loau	cu(yes/no)	- 33	enter the	numbe	r that we	re positive	in	or use	e, Alcohol	Drugs
(derailed, struck,	etc)	GAT	X1260	39	1	13		1	yes		the appr	opriate l	oox.				N/A	N/A
(2) Causing (if me	chanical	d GAT	X1260	39		13		3	yes	3	4. Was thi	s consis	t transpo	rting passe	ngers? (Y/N)		N
35. Locomotive Uni	its	a. Head		Mid 7	Train	R	ear End		36. Cars				Ι	Loaded		Em	pty	
		End	b. Ma	nual	c. Remote	d. Manu	al c. Rei	mote				~ .	a. Freigh	nt b. Pass	. c. Fre	eight	d. Pass.	e. Caboose
(1) Total in Trai	n	4		0	0	0	0	,	(1) Total	in E	quipment (Consist	53	0	1	12	0	0
(2) Total Deraile	ed	0		0	0	0	0	,	(2) Total	Dera	uled		21	0		7	0	0
37. Equipment Dama	age			38. Tra	ack, Signal, V	Way,	¢115 511		39. Prima	ary C	ause			40. Cor	ıtributin	g Cat	ise	
This Consist	\$	1,288,254.0		& Str	ucture Dama	ge	\$145,544	.00	Code			E53	BC Longth o	Code	Distri			N/A
41 Engineer/	42. Fin	emen		43. Co	onductors	44. Brakemen			45 Engineer/Operator			Lengui o	46. Conductor					
Operators 1	.2.11	0			1	0			Hrs 7 Mi			40		H	Irs	7	Mi 40	
Casualties to:	47. Railı	road Emplo	yees 4	8. Tra	un Passenger	s 49.	49 Other		50. EOT Device?				-	51. Was EOT Device Prop				Armed?
Fatal		0	0 0 49. Othe				0	1. Yes 2. No 1				1	1. Yes 2. No 1					
- uuu ~						0		52. Caboose Occupied by Crew?			?					1		
Nonfatal		0			0		0		1. Yes 2. No				N/A					
						0	PERA	TINC	G TRAIN	1#2								
53. Type of Equipme	ent 1.	Freight tra	in troim	4. Wo	ork train $\overline{7}$.	Yard/sw	itching	A.	Spec. MoV	N Eq	uip. Code	54.	Was Equi	ipment	Code	55.7	Train Nur	nber/Symbol
Consist (single er	<i>try</i>) 2. 3.	Commuter	train	5. Sir 6. Cu	t of cars 9	Maint./ii	ispect.ca	r			N/A		1. Yes	2. No	N/A	N/A		
56. Speed (recorded	speed, if	available)	Code	58	. Method(s)	of Operat	ion (ente	r code(s)	that	apply)			58a. Rei	notely (Contro	olled Loco	omotive?
R - Recorded		Í		a	ATCS		g. Autom	natic b	olock	m.S	pecial inst	uctions		0 = Not a remotely controlled				
E - Estimated	N/A	MPH	N/A	t	. Auto train	control	n. Curren	nt of ti	rattic	n. O	ther than r	nain trac	k	1 = Rei	note cor	ntrol p	oortable	

DEPARTMENT FEDERAL RAILR	OF TRA	NSPORT OMINIST	FATIO TRATI	ON ON	FRA FA	CTUAL	RAILR	OAD AC	CIDENT REI	PORT	F	RA File	e# <u>HQ-200</u>	8-24		
57. Trailing Tons (gross tonnage, excluding power units)					c. Auto train stop i. Time table/tr d. Cab j.Track warran e. Traffic k. Direct traffic				ain orders o. Positive train control control p. Other (<i>Specify in narrative</i>) control Code(s)			2 = Remote control tower 3 = Remote control transmitter - more than one				
		N/A		f.	Interlocking	1.Y	ard limits	N/A N/A N/A N/A 1			remote c	N/A				
59. Principal Car/Unit a. Initial and Nur				umber	b. Positio	on in Train	c. Load	led(yes/no)	60. If railroad en	ployee(s) tes	sted for drug/alcohol use,					
(1) First involved			N/A		N/	A	N	V/A	enter the nun	ber that wer	re positive in Alcohol			Drugs		
(derailed, struck,	etc)	,							the appropriate box.			N/A				
cause reported) N/A				N/	A		N/A	61. Was this cor	sist transpor				N/A			
62. Locomotive Units a. Head End b. M		b. Ma	Mid Train mual c. Remote		Rear d. Manual	c. Remote	63. Cars		a. Freight	b. Pass.	c. Freig	Empty ht d. Pass.	e. Caboos			
(1) Total in Train N		N/A	N/A		N/A	N/A	N/A	(1) Total in Equipment Consist		t N/A	N/A	N/A	N/A	N/A		
(2) Total Deraile	d	N/A	N	/A	N/A	N/A	N/A	(2) Total D	Derailed	N/A N/A N/A			N/A			
64. Equipment Dama This Consist	ige	NI/A		65. Tra	Track, Signal, Way,			66. Primar Code	ry Cause	NI/A	67. Cont Code	ributing	Cause	NI/A		
		Numbe	r of Cr	ew Me	w Members				N/A					N/A		
68. Engineer/	69. Fire	men		70. Co	nductors	71. Brak	emen	72. Engin	eer/Operator		73. Con	ductor				
Operators N/]	N/A			N/A	N	N/A		Hrs N/A 1	Mi N/A	N/A Hr		s N/A	Mi N/A		
Casualties to:	74. Railro	oad Emple	oyees	75. Trai	n Passenger	s 76. Othe	76. Other		Device?	N/A	78. Was	78. Was EOT Device Properly				
Fatal		N/A			N/A	N	N/A		79. Caboose Occupied by Crew?			1.103 2.100				
Nonfatal		N/A			N/A	1	N/A		1. Yes 2. No							
						OF	PERATIN	G TRAIN	1#3							
80. Type of Equipment 1. Freight train 4. Work train 7. Yard/switching A. Spec. MoW Equip. Consist (single entry) 2. Passenger train 5. Single car 8. Light loco(s). 2 Consumption in the second sec									Equip. Code 81	Was Equip Attended?	nent Co 2 No $ $ N	ode 8 V/A	2. Train Nun N/A	nber/Symbol		
83. Speed (recorded	3. Commuter train 6. Cut of cars 9. Maint./inspect.car 33. Speed (recorded speed, if available) Code 85. Method(s) of Operation (ento								nat apply)	1. 105	85a. Rem	otely Cor	ntrolled Loco	motive?		
R - Recorded a. ATCS g. Automatic							Automatic b	olock n	n.Special instruction	18 rock	0 = Not a	remotely	y controlled			
E - Estimated	N/A	MPH	N/A	b.	Auto train c	ontrol h. C	Current of the turner of the table/to the table/to table table/to	raffic	 Outer than mann to Positive train con 	trol	1 = Remo 2 = Remo	ote contro ite contro	ol portable			
84. Trailing Tons (gross ton	nage,		d.	Cab	j.Tı	ack warran	t control l	o. Other (Specify in	narrative)	3 = Remo	ote contro	ol			
excluding power units)					Traffic	k. I	Direct traffi	c control	Code(s)	NY (4 NY (4	transmit remote c	ter - mor	re than one ansmitter			
	1.		1. 1			N/A N/A N/A	N/A N/A				IN/A					
86. Principal Car/Unit a. Initial and Nu					aber b. Position in Train c. Load				87. If railroad emp	bloyee(s) test	ed for drug/alcohol use, e positive in Alcohol			Dentaci		
(1) First involved (derailed, struck,	(1) First involved (derailed, struck, etc)		N/A		N	//A		N/A	the appropria	te box.	e positive i		N/A	N/A		
(2) Causing (if mechanical N/A				N	/A	1	N/A	88. Was this cor	sist transpor	ting passen	gers? (Y	/N)	N/A			
cause reported	()		1		<u> </u>	D		1		T.		T	E			
89. Locomotive Uni	ts	a. Head End	b. Ma	Mid T mual 1	rain c. Remote	d. Manual	c. Remote	90. Cars		a. Freight	b. Pass.	c. Freig	tht d. Pass.	e. Caboose		
(1) Total in Train	ı	N/A	N	I/A	N/A	N/A	N/A	(1) Total in	equipment Consis	t N/A	N/A	N/A	N/A	N/A		
(2) Total Deraile	d	N/A	N	/A	N/A	N/A	N/A	(2) Total E	Derailed	N/A	N/A	N/A	N/A	N/A		
91. Equipment Dama	ige			92. Tra	ck, Signal, V	Vay,		93. Primar	y Cause Code		94. Cont	ributing	Cause			
This Consist		N/A		& Sti	ructure Dam	age	N/A	N/A Code N/A								
05 Engineer/	06 Eiro	Numbe	er of Ci		w Members				Length of Time on Duty							
Operators N/A	90. File	N/A		<i><i>yi</i>.c</i>	N/A	N	/A	JJ. Eligin	Hrs N/A 1	/li N/A	A Hrs N/A			Mi N/A		
Casualties to:	101. Rail	road Emp	loyees	102.7	Train	103. Oth	103. Other		104. EOT				105. Was EOT Device Properly			
Fatal		N/A			N/A	N/A		1. Y	1. Yes 2. No N/.							
Nonfatal	1	N/A		1	N/A	N	J/A	1. Yes 2. No N/A								
		Highw	ay Us	er Invo	olved			Rail Equipment Involved								
107. C. Truck 1	'railer -	Due	т	Other	Motor Val:	cla	Code	111. Equip	pment) (at men I)	6 Light	Loco(e)	(monine)	Code		
A. Auto D. Pick-Uj B. Truck E. Van	Truck C	. виs 3. School 1. Motore	J Bus J vcle M	. Otner K. Pedes A. Othe	strian	arrative)	N/A	5.11aiii (standing) 0.12giii Loco(s) (moving) 1.Train(units pulling) 4.Car(s) (moving) 7.Light(s) (standing) 5.Car(s) (moving) 2.Train(units pulling) 5.Car(s) (moving) 8.Other (moving) 7.Light(s) (standing)						N/A		
108. Vehicle Speed	1		109.		geographic	cal)	Code	112. Position of Car Unit in								
(est. MPH at impact) N/A 1.North 2.South 3.East 4.West N/A								0								

DEPARTMENT OF TRANSPORTATION FRA FACTUAL RAILROAD ACCIDENT REPORT FRA File # HQ-2008-24 FEDERAL RAILROAD ADMINISTRATION FRA FACTUAL RAILROAD ACCIDENT REPORT FRA File # HQ-2008-24												24		
110. Position Code 113. Circumstance												Code		
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 1. Rail Equipment Struck Highway User 4. Trapped N/A												N/A		
114a. Was the	e highway user	and/or ra	ail equi	pment	involved		Code	114b. Wa	s there a haza	rdous materials 1	elease		Code	
in the impact transporting hazardous materials? 1 Hickway User 2 Pail Equipment 3 Poth 4 Neither N/A 1. Highway User 2. Rail Equipment 3. Both 4. Neither											4. Neither	N/A		
1. Highway User 2. Kail Equipment 3. Both 4. Neither														
114c. State here the name and quantity of the hazardous materials released, if any. N/A														
115. Type 1.Gates 4 Wig Wags 7. Crossbucks 10. Flagged by crew 116. Signaled Crossing Code 117 Whistle Ban												Code		
Crossing 2.Cantilever FLS 5.Hwy. traffic signals 8.Stop signs 11.Other (spec. in narr.) (See instructions for codes) 1. Yes Warning 3.Standard FLS 6.Audible 9.Watchman 12.None 2. No														
Code(s)	N/A	N/A	N	I/A	N/A	N/A	N/A	N/A	N/A 3. Unknown					
118. Location of Warning Code 119. Crossing Warning Code 120. Crossing Illuminated by Street 1. Both Sides with Highway Signals Lights or Special Lights											by Street hts	Code		
2. Side of Vehicle Approach 1.										1. Ye	s			
3. Opposite Side of Vehicle Approach N/A							2. No 3. Unknown		N/A	2. No 3. Unl	known		N/A	
121.	122. Driver's	Gender	Code	123.	Driver Drov	ve Behind o	or in Front of	Code	124. Driv	er			Code	
Age	1. Male				and Struck o	r was Struc	k by Second 7	Гrain	1. Drov	e around or thru	the Gate	4. Stopped on Crossing		
0	0 2. Female 1. Yes 2. No 3. Unknown 2. Stopped and then Proceeded 5. Other (specify in N/A 3. Did not Stop narrative)									5. Other (specify in narrative)	N/A			
125. Driver Pa	ssed	Cod	le 12	6. Vie	w of Track C	bscured by	(primary ob	struction)					Code	
Highway V	ehicle			1. P	ermanent Str	ucture	3. Passi	ng Train 5.	Vegetation	7. Other	(specify in r	narrative)		
1. Yes 2. No	3. Unknown	IN/	A	2. S	tanding Railı	oad Equipr	nent 4. Topo	graphy 6.	Highway Vehi	cle 8. Not obst	ructed	** ** * *	N/A Codo	
Casualties to: Killed Injured I							ver d 2.Injured 3.	Uninjured		e 128. Was	Driver in th Yes	ne Vehicle? 2. No	N/A	
129. Highway-Rail Crossing Users 0 0						130. Hig (est.	130. Highway Vehicle Property Damage 0 131. Total N (est. dollar damage) 0 (include					mber of Highway-Rail Crossing Us driver) 0		
132. Locomotive Auxiliary Lights? Code 133. Locomotive Auxiliary Lights Operational?												Code		
1. Yes 2. No							N/A 1. Yes 2. No				N/A			
134. Locomot	ive Headlight I	lluminat	ed?				Code	135. Locor	notive Audible	e Warning Sound	led?		Code	
1. Y	es	2.	No				N/A	1.	Yes	2. No			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 3, 2008 at approximately 8:15 p.m. PST eastbound Union Pacific Railroad (UP) freight train MWCEC-03 operating at a recorded speed of 46 mph derailed 28 cars on single Main Track at milepost 626.1 on the UP Yuma Subdivision near Mecca, California. The train consisted of four leading locomotives with 53 loads and 12 empties, consisting of 7,375 trailing tons and was 4,111 feet in length. The train was crewed by a locomotive engineer and conductor. Among the derailed cars were tank cars containing phosphoric acid and hydrochloric acid which spilled approximately 8,000 gallons and 35,000 gallons respectively, and a tank car containing corn syrup/molasses, a non-hazardous material rail car. As a precaution approximately 50 people were evacuated from their homes and an eight mile stretch of highway was closed. The evacuation notice was lifted after five days. There were no injuries reported to the train crew members.

The maximum authorized timetable speed for freight trains is 65 mph for eastward trains, designated as FRA Class 5 Track, and is identified in the UP Los Angeles Timetable # 3 effective June 18, 2006. Movements on this section of the railroad are under Centralized Traffic Control (CTC) by a dispatcher located in San Bernardino, California.

FRA Post-Accident Toxicological Test Results indicated that the two crew members were tested with negative results.

Equipment damages were reported by the UP as \$1,288,254; and track and signal damages were listed at \$145,544.

The weather at the time of the accident was clear, dark, with a temperature of 47° F.

The cause of the derailment was a burned off journal, FRA Code E53C.

138. NARRATIVE

CIRCUMSTANCES PRIOR TO THE ACCIDENT

On March 3, 2008 a train crew consisting of a locomotive engineer and conductor reported for duty at their home terminal in Colton, California at 12:35 p.m. PST after receiving the required statutory off duty rest period. They were assigned to operate eastbound freight train MWCEC 03 from Colton, California en route to El Centro, California.

The train consisted of four locomotives, 53 loads, 12 empties with 7,375 trailing tons, and was 4,111 feet in length. They departed Colton Yard at 2:53 p.m. and stated the trip was uneventful between Colton and Thermal. The engineer was seated at the controls on the north side of the locomotive and the conductor was seated on the south side of the locomotive.

Approaching the derailment site in an eastward direction on single Main Track, the track is tangent with a descending grade of 0.02% at the point of derailment (POD) at mile post 626.1. The maximum authorized speed for trains operating in the area of the derailment is 65 mph for eastward trains, as identified in UP's Los Angeles Timetable # 3.

THE ACCIDENT

The engineer was operating UP Train MWCEC-03 as it approached the west end of Mecca. They were on an approach signal indication traveling at 30 mph. The crew stated they saw a clear signal aspect at the west end of Mecca and a clear signal indication at the east end. A westbound train had cleared into the siding at Mecca. At that point, the engineer set the throttle to run 7 and increased the speed of the train to 43 mph as it approached the east end of Mecca. Speed changes were recorded on the event recorder located on the lead locomotive.

According to the crew, they did not feel anything unusual prior the derailment. Shortly after clearing the east end of Mecca the crew called the train dispatcher and reported the train was in emergency. Upon stopping, the conductor walked back to inspect the train. He noticed that two tank cars were on their side, one of which was leaking a red substance. He also saw some small fires starting on the ties and immediately vacated the area and contacted the train dispatcher. The train dispatcher notified UP managers and local fire and police. A review of the train consist revealed that 28 cars had derailed, indicated as lines 57-30. The UP lists it's consist in reverse order from back to front.

The point of derailment (POD) was in close proximity to Highway 111 and is the main route to the city of Mecca. Kinder Morgan, the local energy company, has a pipeline of fuel beneath and in the vicinity of the UP main track. The fuel line was shut off as a precaution. Tank cars JSRX 10243 and JRSX 11230 spilled approximately 8,020 gallons of phosphoric acid and tank cars SHPX 206823 and SHPX 206832 spilled approximately 35,200 gallons of hydrochloric acid. The spill from the derailed tank cars produced a vapor cloud and local authorities determined it to be unsafe due to the high winds in the area. Approximately 50 local residents were evacuated as a precaution and an eight mile stretch of highway was closed. The evacuation order remained in effect for five days.

The area was taken under the combined command of the Cal Fire/Riverside County Fire Department, California Highway Patrol, Riverside County Sheriff, Union Pacific, and Kinder-Morgan.

POST-ACCIDENT INVESTIGATION

A post-accident investigation was conducted by UP managers, California Public Utilities Commission (CPUC) inspectors, and FRA Track, Motive Power & Equipment, and Signal & Train Control inspectors to determine the cause of the derailment.

The investigation focused on freight car, GATX 126039, suspected as being the first car to derail. GATX 126039 is listed on line 57 of the UP consist; however, as is UP's practice, cars are listed in reverse order from back to front, indicating the subject car was the ninth car behind the four leading locomotives. The investigators observed the remnants of a roller bearing journal in the immediate vicinity of the car. The FRA investigation disclosed that the right side number 1 (R1) roller bearing on freight car, GATX 126039 overheated and burned off the R1 roller bearing journal. Maintenance history for the subject car reveals that the number 1 wheel set was applied to the car when it was built in 1982. A detailed inspection of the burned off journal and the remaining roller bearing components was conducted. Inspection of the journal and roller bearing components disclosed that the right and left number 1 (RL-1) roller bearings were originally equipped with end cap seal rings. Stamped data on the R1 roller bearing locking plate indicates that the seal rings were removed by GATX in February 1998.

Analysis of the remaining R1 bearing components suggests that the bearing lost its retention and spun a cone, which ultimately caused the journal to overheat and burn off. Wheel set numbers 2, 3 and 4 were inspected and found to be within Association of American Railroads (AAR) specifications.

The investigation disclosed that the general construction of the single Main Track west of the POD consisted of 136-pound, continuously welded rail (CWR). The rail was seated in 8.5 inch by 16 inch double shoulder tie plates that lay between the bottom surface of the rail and the top surface of the timber crossties. The rail was fastened through the tie plates to standard timber crossties with conventional six inch cut track spikes. The spiking pattern used by the UP consisted of one rail holding spike on the gage side of the rail, two rail holding spikes on the field side of the rail and one anchor spike on the field side of the rail, i.e., four spikes per plate. The crossties measured 9 inches by 7 inches, spaced 19.5 inches on center, and consisted of twenty-four crossties per rail length. The crossties were boxed anchored every other tie at the POD. The track was supported by semi-angular granite ballast 1.5 inches to 3 inches in size that filled the cribs and outside shoulder of the track.

The rail in the area of the POD was last inspected for internal defects using ultrasonic rail testing methods at the frequency required by 49 CFR Part 213, Section 237, on February 13, 2008, by the UP's DC 405 with no defects identified.

FRA inspected and reviewed the UP's track inspection records dating back to February 25, 2008. No deficiencies were noted on the reports. UP's track inspector inspected the Main Track at the POD earlier the same day of the derailment and noted two defects in the vicinity of the POD at the east switch of Mecca, mile post 626.14. The defects noted on the inspection report were not a contributing factor to the derailment. 49 CFR Part 213, Section 233, requires track inspection records be prepared and signed on each day that an inspection is made for frequency. Those track inspection records are required to reflect actual field conditions and any deviations documented in the FRA Track Safety Standards. The UP was in full compliance with this

requirement.

An FRA track inspection made on January 15, 2008 by a CPUC track inspector noted four defects in the vicinity of the POD at the east Mecca switch. The defects noted were not contributing factors to the derailment.

A review of the signal system and hot box detector report was conducted. The signal summary of the data log confirmed the crew's observation of the signal at the west end of Mecca. The Hot Box Detector (HBD) readings at SP 570, SP 583, and SP 609 were within the absolute reading of 190 degrees and differential readings of 117 degrees. The last hot box detector noted a differential reading of 67 degrees and was well under the differential allowed at 117 degrees difference and an absolute reading of 94 degrees was under the absolute reading of 190 degrees allowed. The distance between the last hot box detector and the POD was approximately 17.6 miles.

FRA also reviewed the locomotive event recorder, which affirmed the crew's statements concerning the events surrounding the derailment. The review excluded train handling as a factor contributing to the derailment.

Six of the 28 derailed cars contained hazardous materials. Two placarded cars, indicated as lines 30 and 38, were damaged but did not release lading. Tank cars JRSX 11230 and JRSX 10243, indicated as lines 38 and 54, respectively, contained phosphoric acid solution 8, UN 1805, PG III and were placarded CORROSIVE. JRSX 11230, a specification AAR 211A100W1 tank car, released 20 gallons of lading from the bottom outlet valve. JRSX 10243, a specification AAR 211A100W1 tank car, released 8,000 gallons of lading from a 10-inch hole in the side of the car. Tank cars SHPX 206823 and SHPX 206832, indicated as lines 48 and 49, respectively, contained hydrochloric acid solution 8, UN 1789, PG II, and were placarded CORROSIVE. SHPX 206823, a specification DOT 111A100W5 tank car, released 15,200 gallons of lading from a sheared off vapor valve. Tank car SHPX 206832, a specification DOT 111A100W5 tank car, released 20,000 gallons of lading from a sheared off vapor valve. Tank car SHPX 206832, a specification DOT 111A100W5 tank car, released 20,000 gallons of lading from a 5 foot hole in the side of the car. An inspection of the train placement, placards, emergency numbers, and shipping papers was conducted on March 4, 2008 by an FRA hazardous materials inspector and no defects were noted. FRA post-accident toxicological test results indicated that the two crew members tested had negative results.

ANALYSIS AND CONCLUSION

The review of the track structure and reports revealed that the UP was in compliance with the minimum track safety standards. A review of the signal data logger confirmed the crew's observation of the signals and the hot box detector readings functioned as intended. A review of the hazardous materials records and car placement noted no defects. Train handling was also excluded as contributing to the derailment.

The mechanical reports and post-accident investigation concluded that the burned journal was the cause of the derailment. The last hot box detector readings indicating heat measurements were well within the tolerances would indicate a fast burn on the journal. The car traveled an approximate distance of 17.6 miles from the last reading to the POD.

CONCLUSION

The data revealed from the event recorder rules out train handling as a contributing cause and the hot box detector readings did not reveal any equipment conditions that would have contributed to the derailment at the times of the readings. All other data indicates the journal failed on car GATX 126039 between the time of the last hot box detector approximately 17.6 miles prior to the point of derailment.

PROBABLE CAUSE AND CONTRIBUTING FACTORS

FRA concluded that the probable cause of the derailment was a burned off journal, FRA Code E53C.